

## **SOUTH KENSINGTON UNDERGROUND DEVELOPMENT ACTION GROUP**

## **SOUTH KENSINGTON STATION REDEVELOPMENT**

### **Station Capacity Assessment**

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## EXECUTIVE SUMMARY

This statement outlines the capacity assessment undertaken at South Kensington Station. It has been based on site observations, current design guidelines and future proposals that would affect the station.

During the morning and evening peak periods South Kensington Station is generally free flowing and indeed seems to operate better than many other stations in and around Central London at peak times.

The following capacity improvements could be provided within the existing building at relatively low cost:

- The automatic gates could be used more efficiently and additional gates could be provided.
- A new ticket area or machines could be provided.
- A new escalator could be introduced between the concourse and district / circle line platforms.

Under the Public Private Partnership concession that covers South Kensington Station, there is a commitment to spend £7 billion by 2010 and over this period there is a requirement to modernise / refurbish around 190 stations. Therefore it is evident that South Kensington Station could be modernised / refurbished in the next few years if there is a pressing need or at the very latest it would be modernised / refurbished by 2010.

In conclusion, the capacity improvements could be provided within the existing station layout at relatively low cost without the planned redevelopment of the station. These improvements could be delivered through the PPP concession.

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## FIGURE

Figure 1      -      Proposed Changes to the Automatic Gates

## 1 INTRODUCTION

- 1.1 Savell Bird & Axon have been appointed by **South Kensington Underground Development Action Group** to provide advice on the proposed improvements to the South Kensington Station in relation to the redevelopment of the land above and immediately adjacent to the station.
- 1.2 The justification for the redevelopment of the South Kensington Station site is primarily based on delivering improvements to the station. It is stated that improvements to the station could not be delivered under the existing PPP contact until at least 2009.
- 1.3 This statement concentrates on the capacity proposed improvements as they form a key justification for the redevelopment of the station site.
- 1.4 The current layout and operation of the station is reviewed together with Public Private Partnership concession that affects future operational and layout of South Kensington Station. It goes on to consider improvements to the station within the existing building and these are compared with those proposed under the station redevelopment.
- 1.5 The report aims to demonstrate that there are no existing capacity constraints, that capacity improvements could be introduced within the existing building and that the PPP Franchise will help to deliver these improvements. It will conclude by showing that the station does not require a major redevelopment scheme to improve capacity.

## **2 STATION OPERATION**

2.1 This section describes operation of South Kensington Station based on observations made in the morning and evening peak periods over three days in the month of January. It covers the ticket hall, main entrances to station, concourse, the barrier controls, staircases and escalators.

2.2 Section 4 of the report suggests possible improvements to the station.

### **Ticket Hall**

2.3 The ticket hall is located in the main concourse adjacent to the automatic gates. There are two manned ticket booths and seven automated ticket machines.

2.4 Passengers are well provided for at the station for the purchase of tickets.

### **Entrance / Exits**

2.5 The main concourse at South Kensington Station is around 3 metres below the level of the esplanade between Pelham Street and Thurloe Street. The Exhibition Road underpass can be accessed directly from the main concourse and there are two staircases leading to the esplanade, each with 16 steps and are approximately 5 metres wide.

2.6 Observations at peak times indicate that approximately 40% to 50% of the people arrive at the station from the Exhibition Road underpass. Overall there is a balance between providing a direct access to the underpass for Exhibition Road and a reasonable access to the esplanade.

### **Automatic Gates**

2.7 There are 10 automatic gates, a manual gate and a baggage gate. The gates are bi-directional and therefore can be reversed to cope with peak demands.

- 2.8 Typically, 3 operate as entry and 7 as exit gates during the morning peak, while a 5 entry and 5 exit split is used during the evening peak period.
- 2.9 Observations on the operation of the barriers in the morning and evening peak periods indicated the following:
- The evening peak was busier than the morning peak period.
  - There were no notable delays to passengers entering the barrier system during the evening peak and generally passengers moved freely.
  - The exit barriers were under utilised during the evening peak period.
- 2.10 To summarise, there were no capacity problems observed with the existing automatic gates and it would be beneficial to use more entry gates in the evening peak period. This matter is considered further in Section 4 together with other possible improvements to the automatic gate operation.

### **Access to the Platforms**

- 2.11 The station is served by the Piccadilly, District and Circle Lines. The District and Circle Lines share the same platform. The District / Circle Line platform can be reached by stairs from the main concourse while there are escalators down to the deeper Piccadilly platforms.

#### Staircase from Concourse to Circle / District Platforms

- 2.12 The staircase between the concourse and the platforms for the Circle / District Lines is approximately 5 metres wide. There are a total of 34 steps with flights of 18 and 16 steps and a short landing in between.
- 2.13 There is a pedestrian handrail down the centre of the staircase to separate passengers entering and exiting the platforms. However, observations showed that this informal arrangement was often ignored.
- 2.14 The current capacity of the staircase is estimated at between 8,500 - 10,000 two-way person movements per hour. The capacity would be higher if the

movements on the staircase were channelled into one-way movements either side of the central pedestrian rail.

2.15 The following observations were made regarding the operation of this staircase:

- The staircase was free flowing in the morning peak although there were occasional short surges in demand just after a train arrived.
- Although the staircase was busier during the evening peak no prolonged queuing was observed. There was some temporary queuing at the base of the staircase just after a train had arrived.

2.16 The queuing at the base of the staircase is partly to due to the surges in discharge from trains and the short distance between the train and the base of the staircase (this does not allow for passengers to disperse). This situation is common at most stations, particularly in and around Central London. It is difficult to provide sufficient capacity to prevent queuing and to do so, would probably lead to the over design of the station.

2.17 Therefore, apart from the short surges in demand after the arrival of trains during the peak periods, there would appear to be no capacity issues with this staircase, although the flow of passenger movements could be improved. This is considered in Section 4.

#### Escalators from Concourse to Piccadilly Line (Intermediate Level)

2.18 Access between the concourse level and the Piccadilly Line Intermediate Level is via two escalators, one up and one down. The capacity of these is estimated at approximately 12,000 two-way movements per hour.

2.19 There were no capacity related problems observed at the escalators.

#### Staircase from Circle / District Platforms to Piccadilly Intermediate Level

2.20 There are two staircases between the District / Circle Line platforms and Piccadilly Line (intermediate level). These staircases are approximately 4 metres wide and have 35 steps and the capacity of the staircases is estimated at 13,500 two-way movements per hour.

2.21 These staircases are not well used and there are no capacity problems.

Escalators from Piccadilly Intermediate Level to the platforms

2.22 There are three escalators between the Piccadilly Intermediate Level and the tunnel leading to the platforms. The centre escalator alternates between up and down to cater for tidal flow at peak times. The two-way capacity is estimated at 18,000 movements per hour.

2.23 No capacity problems were observed.

**Summary**

2.24 The busiest point in the station was observed at the staircase between the concourse and District / Circle Line platforms. However, the queuing was only limited to short periods of time at the base of the staircase. No queuing or capacity related problems were observed at any other location within the station.

2.25 Overall South Kensington Station is generally free flowing in the peak periods and indeed seems to operate better than many other stations in and around Central London.

2.26 There are opportunities to improve the flow of passenger movements at the automatic gates and at the staircase between the concourse and Circle / District Line platforms. These are considered in Section 4.

### **3 STATION IMPROVEMENTS UNDER PPP**

- 3.1 London Underground Limited has recently signed three Public Private Partnership (PPP) concession contracts with private consortiums. These consortiums will be responsible managing and improving the underground system over the life time of the contract.
- 3.2 South Kensington Station comes under the Sub-Surface Lines (SSL) network (or Infraco) that covers the Circle, District and Metropolitan Lines.
- 3.3 A consortium headed by Metronet has won the SSL concession. This consortium is also made up of Atkins (design and maintenance), Bombadier (rail transportation), Balfour Beatty (construction), Thames Water (Asset management) and Seaboard.
- 3.4 The Metronet SSL concession is for a 30-year period and was signed in April of last year. Metronet is committed to spending £23 billion over this period, of which £7 billion will be spent in the first 7 \_ years. Additionally they are required to modernise 60 stations and refurbish another 139 by 2010.
- 3.5 It is therefore evident that South Kensington Station could be modernised / refurbished in the next few years if there was a pressing need to do so under the PPP contract. At the very latest the station would be refurbished by 2010.

## 4 SCOPE FOR IMPROVEMENTS WITHIN THE EXISTING STATION LAYOUT

- 4.1 This section considers the potential improvements that could be delivered within the existing station structure.

### **Automatic Gates**

- 4.2 There are number improvements that could be made to improve the capacity at the automatic gates.
- 4.3 There were 5 entry and 5 exit gates in operation during the evening peak. Given that the exit gates were significantly underutilised, it would be prudent to allocate more as entry gates with fewer as exit gates. For example, increasing the number of entry gates to 7 would improve the entry capacity by 40%, equivalent to an additional 4200 through movements per hour.
- 4.4 This improvement would need to be subject to ensuring that there are no other potential circulation or capacity problems downstream of the gate line.
- 4.5 Additionally the manual gate could be used at peak times and this is often done at other stations where there are capacity restraints at the gate line.
- 4.6 There is also scope to move the gate line westwards (i.e. towards the esplanade access) given that the distance between the gate line and the staircase (at the esplanade) is around 21 metres. At **Figure 1** a sketch has shown one option on how this could potentially work.
- 4.7 This would have a number of benefits. It would increase the length of the gate line thereby enabling the introduction of a further two or three gates. This would increase the capacity by approximately 4,200 - 6,300 movements per hour. Additionally, it would increase the distance between the gate line and the access to staircase / escalators leading to the platforms, thus improving circulation in that area of the concourse.

### **Staircase from Concourse to Circle District Platforms**

- 4.8 The staircase between the concourse and the Circle / District platforms is around 5 metres wide. In principle two escalators could be introduced to replace the existing staircase. As well as physical capacity improvements, this would also assist in channelling the passenger flow between the concourse and the platforms.
- 4.9 The current capacity of the staircase is estimated at approximately 8,500 to 10,000 two-way movements per hour. The above proposals would increase the capacity to approximately 12,000 movements per hour, an increase of between 20% and 40%.

### **Summary**

- 4.10 These improvements could be undertaken within the existing station building.
- 4.11 Our estimate of the works would be around £200k to £300k. However this assumes that there are no significant structural alterations or service diversions, that the loadings can be accommodated and there are no other restraining issues.
- 4.12 It is considered that these improvements, together with those to the station's structure, ambience, ticket hall etc, could be delivered under the PPP given that it will deliver £7 billion improvements in the first 7\_ years.

## 5 SUMMARY OF CAPACITY IMPROVEMENTS

5.1 The Steer Davies Gleave Transport Assessment Report (TAR) highlighted capacity improvements that would be delivered with the new development above the station. This section reviews each of these capacity improvements and compares them with what could be delivered by the PPP contract without any changes to the stations structure.

5.2 The Steer Davies Gleave TAR for the Redevelopment of South Kensington Station identified the following capacity improvements:

- An increase in the number of automatic gates from 10 to 15.
- A new Ticket Hall.
- A new escalator between the concourse and Circle / District Line Platforms.

### **Automatic Gates**

5.3 The redevelopment proposal of 15 gates does not make allowance for a manual gate and a luggage gate (based on Figure 10.1 SDG TA). The inclusion of both would potentially reduce the number of automatic gates to 12 or 13.

5.4 This statement has indicated that the number of automatic barrier gates could be increased from 10 to 12 or 13 by moving the gate line westwards and that the entry capacity could be increased by having more entry barriers open in the evening peak period.

5.5 Hence the redevelopment proposal would not result in any additional capacity at the automatic gates over and above what could be achieved within the existing station concourse.

### **New Ticket Hall**

- 5.6 There is no reason, in principle, why a new ticket hall could not be provided at the esplanade level (if this is desirable) while the existing one could be used as a secondary ticket point. Also if required, the number of automatic ticket machines could be increased to minimise delays to passengers.
- 5.7 There are therefore options to improve the ticketing arrangements without the need to reconstruct the station.

### **New Escalator between the Concourse and the District Circle Lines**

- 5.8 This statement has shown that new escalators could be provided within the current station layout. Therefore, there is no net benefit to be gained by the station redevelopment.

### **Conclusion**

- 5.9 This statement has demonstrated that capacity improvements can be delivered at relatively low cost within the existing station and that the station redevelopment is not needed to deliver them.
- 5.10 These improvements could be delivered through the PPP contract together with ambience improvements, structural improvements etc. The timescale for the PPP works would be before 2010 at the latest.