URS

Scott Wilson

Manual Security Queue Audit at Gatwick Airport

Final Report

September 2011

Prepared for

Civil Aviation Authority

Revision Schedule

Manual Security Queue Audit at Gatwick Airport
September 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	02/08/2011	Draft to CAA for discussion	**James Bruce** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
02	07/08/2011	Draft	**Eimear Connery** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
03	09/08/2011	Draft	**Eimear Connery** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
04	10/08/2011	Draft	**Eimear Connery** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
05	10/08/2011	Draft	**Eimear Connery** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
06	14/09/2011	Draft	**Eimear Connery** Airport Planner	**Rob Rushmer** Technical Director	**Rob Rushmer** Technical Director
07	21/09/2011	Draft	**Rob Rushmer** Technical Director	**Mike Jackson** Technical Director	**Alan Campbell** Director
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The methodology adopted and the sources of information used by URS Scott Wilson in providing its services are outlined in this Report. The work described in this Report was undertaken between July 2011 and August 2011 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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1 Introduction

1.1 Background

Following an audit focussing on the application of the service quality and rebate scheme at Gatwick Airport in 2010, URS Scott Wilson was appointed in June 2011 to undertake a manual audit of security queue time measurement in the North Terminal. The security queue measurement is undertaken as part of the rebate scheme whereby 95% of measurements are to be processed through central security in less than 5 minutes and 98% in equal to or less than 15 minutes. GAL takes measurements between 02:30 and 22:30 every day of the year.

1.2 Scope and Objectives

The key objective of the audit was to conduct a targeted, manual audit of the security queue measurement at Gatwick Airport North Terminal.

As set out in the study brief, the objectives of the study were:

- Objective 1: an assessment of the accuracy of the security times provided by Gatwick Airport Limited (GAL);
- Objective 2: an independent view on how representative the measured passenger is of the times of other passengers in the security queues; and
- Objective 3: a comparison of the measured security queue times with those reported by GAL for previous months.

The audit sampled the month of July over the working week days from Monday 4 to Friday 29 with measurements made from 10:00 to 12:00 and 13:30 to 17:30 inclusively.

URS Scott Wilson was also to report on any other points of interest, in relation to the central security queue measurement at the North Terminal, which came to our attention during the course of the audit.

1.3 Structure of Report

Section 2 sets out the method employed detailing how URS Scott Wilson manually collated independent queue time measurements.

Section 3 sets out the results and analysis.

Section 4 presents and discusses the conclusions of the study.

1.4 Acknowledgements

URS Scott Wilson would like to thank members of staff at Gatwick Airport and the Black Jack team for their assistance in facilitating our delivery of this audit to the CAA.

2 Method

2.1 Objective 1: Assessment of the Accuracy of Data Provided by GAL

URS Scott Wilson placed a member of staff at Gatwick who took measurements from Monday 4th July until Friday 29th July. Queue time measurements were taken manually using a stopwatch and observing a specific passenger through the queue. Independent queue time measurements were taken for each week day between these two dates and between the hours of 10:00 to and including 12.00 and 13.30 to and including 17.30. Queue time measurements were taken for every 15 minutes during these time periods. The first passenger passing through the 'archway' at the liquid check area security on the hour and at 15, 30 and 45 minutes past the hour were observed.

For completeness and following a review at the end of the first week of the audit, URS Scott Wilson also recorded the queue time measurement as measured by the "Black Jack" team who undertook the official measurement on behalf of GAL.

To address Objective 1 the Black Jack staff were shadowed in their measurements. The URS Scott Wilson auditor agreed with the Black Jack member of staff which passenger being observed. Although the same passenger was observed by both the URS Scott Wilson auditor and the Black Jack team member, the URS Scott Wilson auditor made their own measurement, starting and stopping their stopwatch as they independently judged the passenger had started and completed their journey through the security queue. This time was recorded along with the x-ray machine queue number in order that the unimpeded walk time appropriate to that queue could be applied.

This official passenger are presented and analysed in Section 3 and conclusions drawn in Section 4.

2.2 Objective 2: Assessment of How Representative the Officially Measured Passenger is of the Overall Security Queue

In order to assess how representative the "official" passenger is of the overall queue, between the official measurements every 15 minutes the URS Scott Wilson auditor also observed a "secondary" passenger within the remaining time period before the next official passenger. These two measurements are presented as "primary" and "secondary" in the remainder of this report. Depending upon the duration of observation time for the primary passenger, it was not always possible to record a secondary measurement, as the primary always took priority.

These data sets are presented and analysed in Section 3 and conclusions drawn in Section 4.

2.3 Objective 3: Comparison of Independent July Data with Previous Months

The CAA provided URS Scott Wilson with the queue times provided by GAL for the months of August, October to December 2010 and February 2011 to June 2011. In addition the CAA also provided URS Scott Wilson with the monthly traffic data for the North Terminal for those months. The independent observation for the month of July was compared to these previous months. The results of this comparison are presented in section 3 and conclusions are set out in section 4.

3 Results and Analysis

This section presents the results of the audit and details of the analyses undertaken to address each of the objectives of the study, the summary conclusions of which are discussed in Section 4.

3.1 Objective 1: Assessment of the Accuracy of Data Provided by GAL

This section compares the result of the analysis of the independent URS Scott Wilson observation of the primary passengers against the data provided to the CAA by GAL. As discussed in Section 2.1 URS Scott Wilson only made observations during the working week and for certain hours of the working day, therefore the same periods were selected from the GAL data to ensure that the same time periods were compared. The URS Scott Wilson and GAL observations of adjusted queue time by time slot by day are presented in Table 3.1 and Table 3.2 respectively. The queue times are as corrected for the unimpeded walk time appropriate to the actual queue used by the passenger. Figure 3.1 and Figure 3.2 show the URS Scott Wilson observations of the primary passengers over the entire month data set, falling within the queue time period indicated, firstly as the number of observations and secondly as percentages. Figure 3.3 and Figure 3.4 show the equivalent GAL data. Figure 3.5 compares the URS Scott Wilson and GAL cumulative frequencies on the same chart.

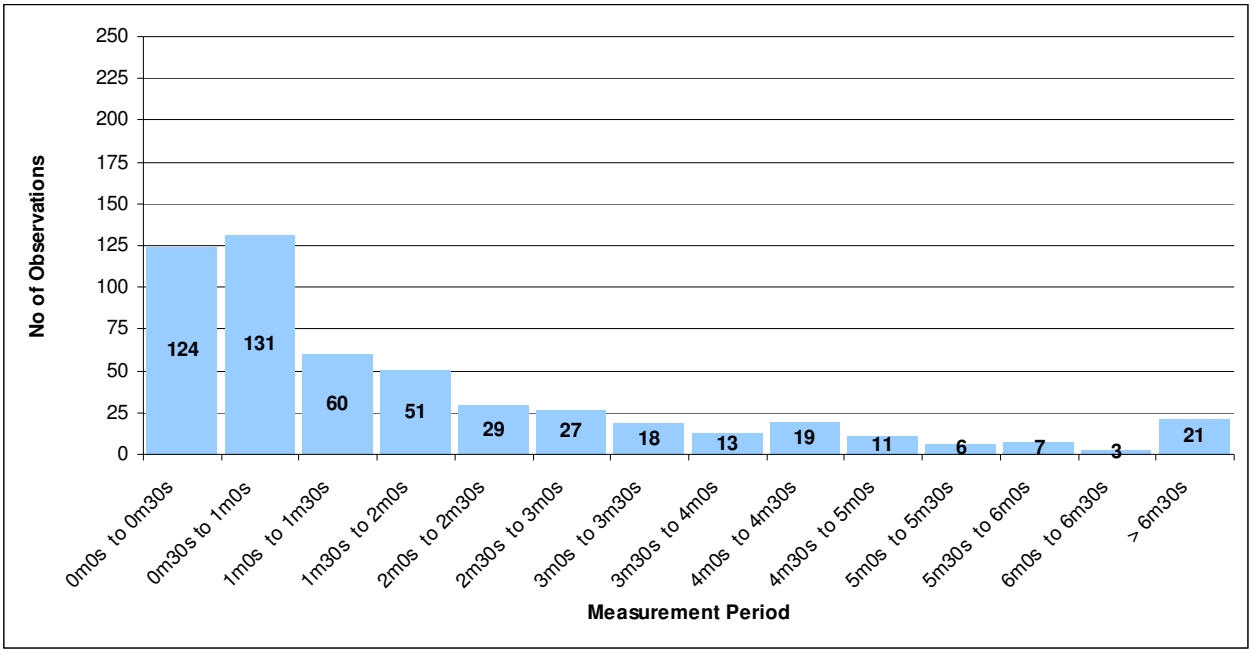

Figure 3.1: URS Scott Wilson Primary Passenger Queue Time Measurements: Number of Observations

	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30
04/07/2011	03:02	04:39	02:33	04:36	01:13	00:40	00:24	01:04	01:37						05:34	00:46	00:07	00:16	00:21	05:30	04:01	06:00	01:43	01:32	05:58	03:28	03:55	00:27	00:43	00:30	00:11
05/07/2011	04:11	00:57	00:54	01:00	01:52	00:11	00:31	00:25	01:47						02:50	01:34	04:25	00:45	00:50	02:40	00:46	01:30	00:21	01:49	00:32	00:45	03:57	03:25	00:41	00:28	00:19
06/07/2011	00:15	00:23	04:13	00:43	01:45	00:24	01:17	00:47	01:35						01:41	00:34	01:37	02:03	00:09	00:24	00:30	00:29	01:35	04:41	03:01	04:20	01:14	01:35	01:51	02:45	06:44
07/07/2011	00:41	00:17	00:21	00:14	03:07	00:47	00:26	00:12	00:40						05:10	03:41	02:45	00:45	01:17	00:28	06:28	04:30	04:54	02:30	02:12	04:48	02:35	01:58	01:18	00:35	00:04
08/07/2011	00:00	02:21	05:51	02:36	01:00	01:14	00:41	00:27	01:07						02:22	04:14	01:58	02:05	00:26	00:35	01:37	00:49	00:51	03:27	04:41	06:40	04:14	07:14	00:52	00:40	01:06
11/07/2011	04:01	05:12	06:36	06:33	03:19	00:48	02:14	00:27	03:44						02:14	02:11	00:34	01:42	01:17	06:37	02:19	06:37	06:37	05:28	06:37	04:04	03:21	03:05	00:23	06:33	06:33
12/07/2011	00:33	00:29	01:11	00:28	00:41	02:38	00:30	00:20	00:43						02:36	06:37	03:33	00:24	02:01	02:55	05:37	06:37	05:49	06:37	04:46	01:03	01:29	00:54	01:41	00:43	00:41
13/07/2011	01:25	02:14	04:00	04:52	01:04	02:38	00:21	00:54	00:08						01:30	01:09	01:37	00:33	01:25	00:36	00:06	00:30	02:41	02:05	01:06	02:36	00:49	00:17	03:46	00:40	01:07
14/07/2011	00:26	00:22	01:07	00:08	01:16	00:32	00:56	00:35	01:27						06:36	05:19	00:40	00:29	00:55	00:29	00:58	05:19	05:55	01:17	00:34	00:30	00:09	00:22	00:32	00:30	00:48
15/07/2011	00:02	00:40	00:49	00:21	00:31	00:54	01:05	00:54	01:32						00:19	04:14	00:34	00:45	00:10	00:27	00:22	00:30	00:33	00:16	01:11	00:41	00:07	01:21	01:09	00:10	00:13
18/07/2011	03:05	02:45	06:40	06:40	03:13	06:44	03:33	00:53	01:27						05:04	00:18	00:40	01:12	00:15	01:15	00:23	00:28	00:40	00:56	00:26	00:03	00:41	00:49	00:22	04:14	01:25
19/07/2011	00:59	00:38	00:44	01:43	00:08	00:59	00:46	00:18	03:22						01:18	00:40	00:24	01:38	00:58	00:10	01:10	00:15	00:30	01:52	06:51	04:19	04:09	06:40	06:35	02:33	02:30
20/07/2011	01:24	00:34	03:52	00:47	00:49	02:24	00:31	01:04	00:40						00:09	00:37	01:03	00:15	00:24	00:37	02:12	00:25	00:28	00:30	00:52	01:05	00:18	00:36	01:32	01:47	00:34
21/07/2011	00:38	00:04	00:27	00:33	00:15	00:55	00:17	00:38	00:42						00:54	00:25	01:10	00:12	01:17	00:17	00:31	02:10	01:32	01:12	00:28	01:03	01:40	00:27	00:16	01:39	00:36
22/07/2011	00:24	00:55	00:44	00:50	02:37	00:17	00:37	00:32	00:05						00:00	00:30	01:40	01:07	01:35	01:37	04:33	00:29	02:16	03:31	00:34	02:11	03:17	01:33	01:36	00:34	01:30
25/07/2011	00:11	00:26	01:50	01:31	00:55	02:02	00:35	00:14	01:21						00:28	00:07	00:22	01:16	00:44	00:32	02:24	04:28	02:10	01:27	02:11	02:03	00:00	00:09	00:11	00:48	02:59
26/07/2011	02:33	00:20	00:07	01:16	03:31	00:53	00:45	00:33	01:35						01:45	01:32	01:25	00:19	00:43	00:32	00:21	02:32	03:28	04:02	03:47	03:09	00:48	00:16	00:09	00:24	00:18
27/07/2011	00:54	01:35	04:02	02:58	00:25	00:43	00:45	00:24	00:17						00:16	00:17	03:18	01:15	00:14	01:16	02:37	02:29	01:38	02:08	00:14	00:52	04:15	06:28	03:19	01:35	01:18
28/07/2011	02:24	00:49	00:38	00:28	01:25	00:42	00:22	00:26	00:20						00:28	01:15	01:26	00:55	01:21	02:32	02:22	00:51	00:13	00:28	00:46	01:55	02:48	00:24	00:58	00:59	03:49
29/07/2011	01:37	02:03	03:34	02:51	04:22	00:41	00:41	01:09	02:22						00:34	01:32	01:07	01:39	01:45	03:16	00:40	00:35	02:00	02:57	00:26	04:32	00:14	00:12	01:18	01:33	01:22

Table 3.1 URS Scott Wilson Observed Primary Passenger Queue Times

	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30
04/07/2011	03:19	04:54	02:56	04:28	01:02	00:49	00:22	00:52	01:48						05:39	00:35	00:00	00:13	00:31	05:35	03:52	05:56	01:39	01:30	05:52	03:24	03:28	01:00	00:38	00:30	00:06
05/07/2011	03:52	00:53	00:53	00:59	01:48	00:18	00:31	00:28	01:43						02:48	02:21	04:17	00:44	00:42	02:31	00:35	01:16	00:09	02:36	00:34	00:41	03:50	03:19	00:36	00:22	00:21
06/07/2011	00:14	00:21	04:09	00:40	01:35	00:21	01:14	00:38	01:33						01:42	01:23	01:50	01:54	00:11	00:22	00:22	01:24	01:34	04:41	02:54	04:19	01:26	01:40	01:50	02:42	10:40
07/07/2011	00:37	00:08	00:00	00:09	03:08	00:45	00:19	00:10	00:32						05:20	03:28	02:39	00:42	01:12	00:19	06:27	04:26	04:50	03:20	02:07	04:43	02:28	01:54	01:21	00:32	00:08
08/07/2011	01:57	02:19	05:47	02:33	00:55	01:03	00:33	00:21	01:05						02:22	04:11	01:55	02:05	00:19	00:31	01:33	00:45	00:44	03:20	04:39	08:38	04:10	07:10	00:56	00:46	01:03
11/07/2011	03:53	05:07	07:47	10:06	03:18	00:39	02:04	00:23	03:37						02:06	02:06	00:30	01:19	01:10	08:22	02:12	13:46	09:25	05:31	08:33	03:54	02:13	02:56	00:15	08:41	06:41
12/07/2011	00:28	00:25	01:04	00:25	00:31	02:34	00:22	00:16	00:38						02:31	06:22	03:26	00:14	01:57	02:49	05:30	07:45	05:08	08:50	04:39	00:56	01:23	00:44	01:34	00:42	00:33
13/07/2011	01:22	02:10	03:53	04:48	00:58	02:31	00:17	00:47	00:06						01:29	01:03	01:36	00:34	01:17	01:24	00:02	00:24	02:36	02:03	01:02	02:33	00:47	00:13	03:39	00:34	01:01
14/07/2011	00:19	00:18	01:09	00:12	01:09	00:33	00:50	00:50	00:32						07:50	05:16	00:36	00:05	00:49	00:31	00:52	05:15	05:54	01:09	00:26	00:21	00:03	00:17	00:27	00:20	00:42
15/07/2011	00:07	00:32	00:42	00:17	00:25	00:47	01:01	00:50	01:35						00:11	04:06	00:26	00:37	00:07	00:19	00:19	00:34	00:30	00:08	01:04	00:48	00:09	01:23	01:05	00:06	00:08
18/07/2011	02:59	03:45	07:44	11:12	03:21	08:04	03:48	00:40	01:25						05:01	00:10	00:35	01:34	00:10	01:08	00:17	00:24	00:36	00:50	00:16	00:00	00:35	00:44	00:19	04:06	01:26
19/07/2011	00:52	00:43	00:38	01:46	00:11	01:02	00:44	00:11	03:21						01:14	00:40	00:19	01:36	00:53	00:10	01:11	00:10	00:37	01:42	07:01	04:12	04:06	10:50	09:35	04:05	02:22
20/07/2011	01:27	00:50	03:46	00:45	00:42	02:20	00:33	01:02	00:37						00:05	01:06	02:43	00:13	00:19	01:00	02:07	00:17	00:33	00:37	00:47	01:00	00:14	00:31	01:28	01:45	01:19
21/07/2011	00:34	00:06	00:20	00:27	00:07	00:51	00:13	00:28	00:41						00:51	00:21	01:13	00:03	01:14	00:13	00:28	02:04	01:27	01:07	00:30	00:55	01:34	00:56	00:12	01:32	00:33
22/07/2011	00:18	00:47	00:36	00:43	03:19	00:08	00:34	00:32	00:01						00:23	00:29	01:36	01:03	01:27	01:39	05:20	00:15	02:12	03:26	00:59	02:07	03:13	02:10	01:32	00:29	01:30
25/07/2011	00:04	00:19	01:45	01:26	00:45	02:04	00:26	00:06	01:17						00:29	00:09	00:15	01:09	00:36	00:25	02:20	04:20	02:06	01:28	01:36	02:04	00:01	00:06	00:04	00:43	02:55
26/07/2011	02:29	00:17	00:00	01:12	03:27	00:42	00:37	00:29	01:31						01:43	01:23	01:45	00:16	00:36	00:32	00:18	02:22	03:24	03:57	03:43	03:04	00:44	01:12	00:15	00:20	00:13
27/07/2011	00:49	01:28	03:58	02:26	00:27	00:24	00:42	00:16	00:13						00:07	00:14	03:16	01:11	00:10	01:10	02:28	02:30	01:40	02:02	00:10	00:49	04:05	07:41	03:16	01:29	01:10
28/07/2011	02:17	03:43	00:33	00:20	01:21	00:32	00:13	00:16	00:12						00:24	01:12	01:16	00:32	01:17	02:34	02:14	00:54	00:14	00:26	00:41	01:51	02:41	00:19	00:48	01:02	03:54
29/07/2011	01:32	01:55	03:26	02:46	04:16	00:40	00:29	01:05	02:17						00:29	01:25	00:58	01:38	01:35	03:08	00:38	00:31	02:06	02:49	00:28	04:25	00:10	00:09	01:15	01:30	01:23

Table 3.2 GAL Observed Primary Passenger Queue Times

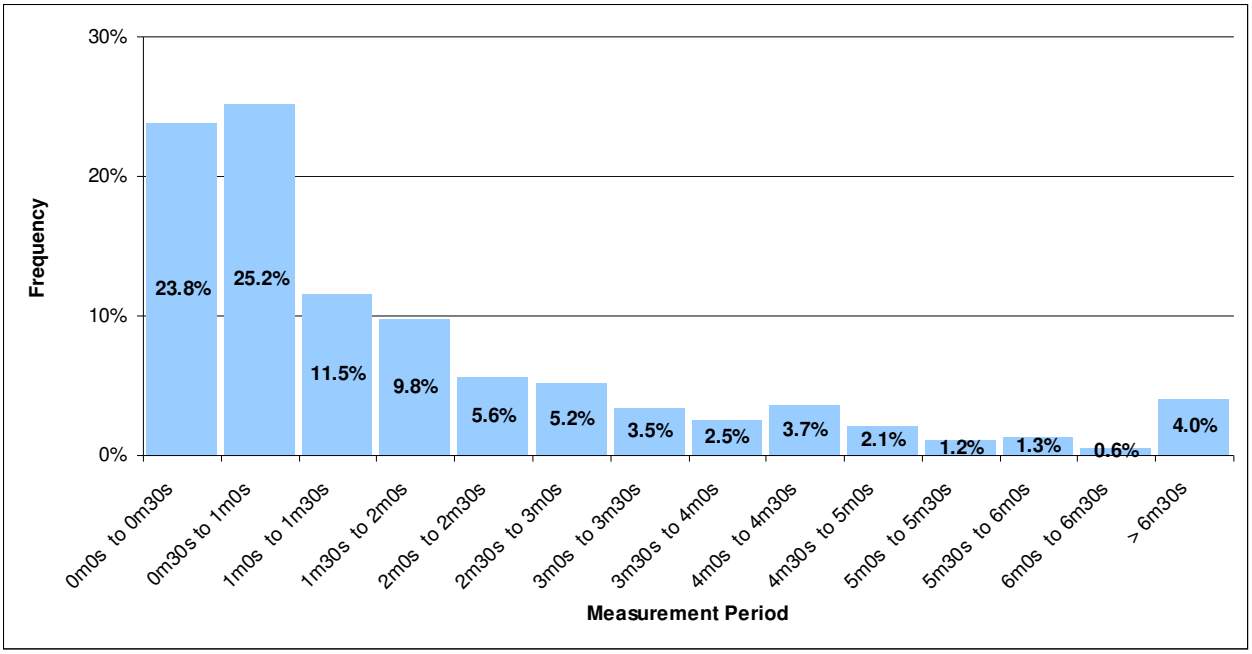

Figure 3.2: URS Scott Wilson Primary Passenger Queue Time Measurements: Frequency

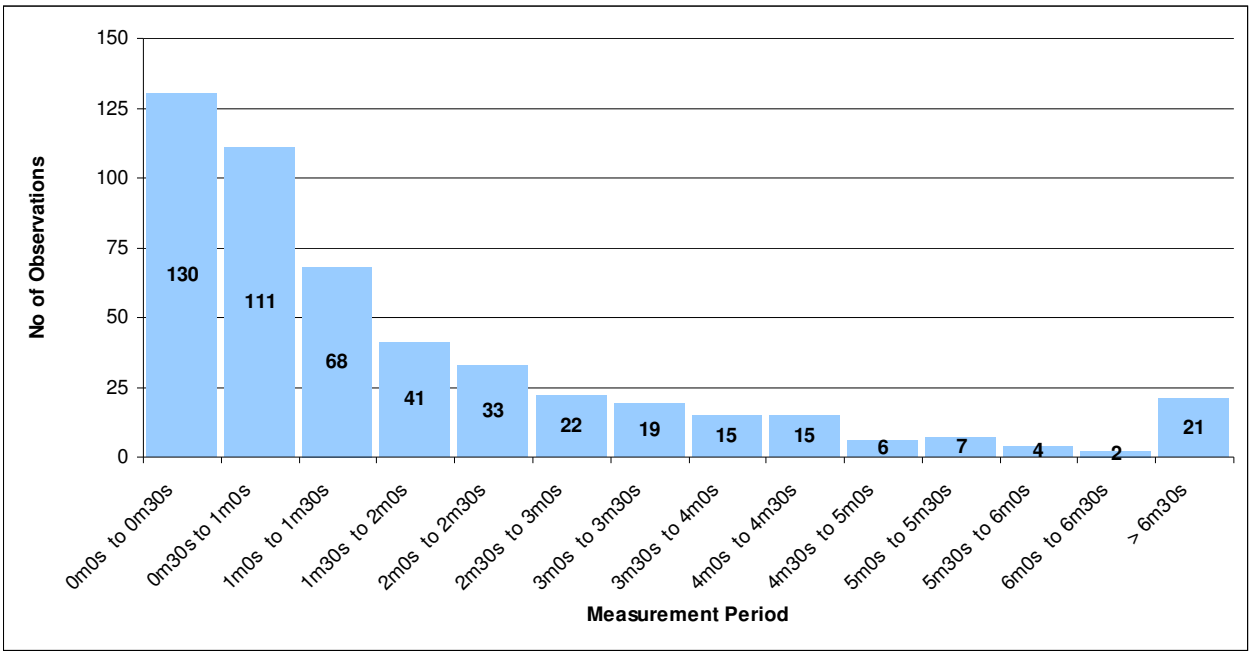

Figure 3.3: GAL Passenger Queue Time Measurements: Number of Observations

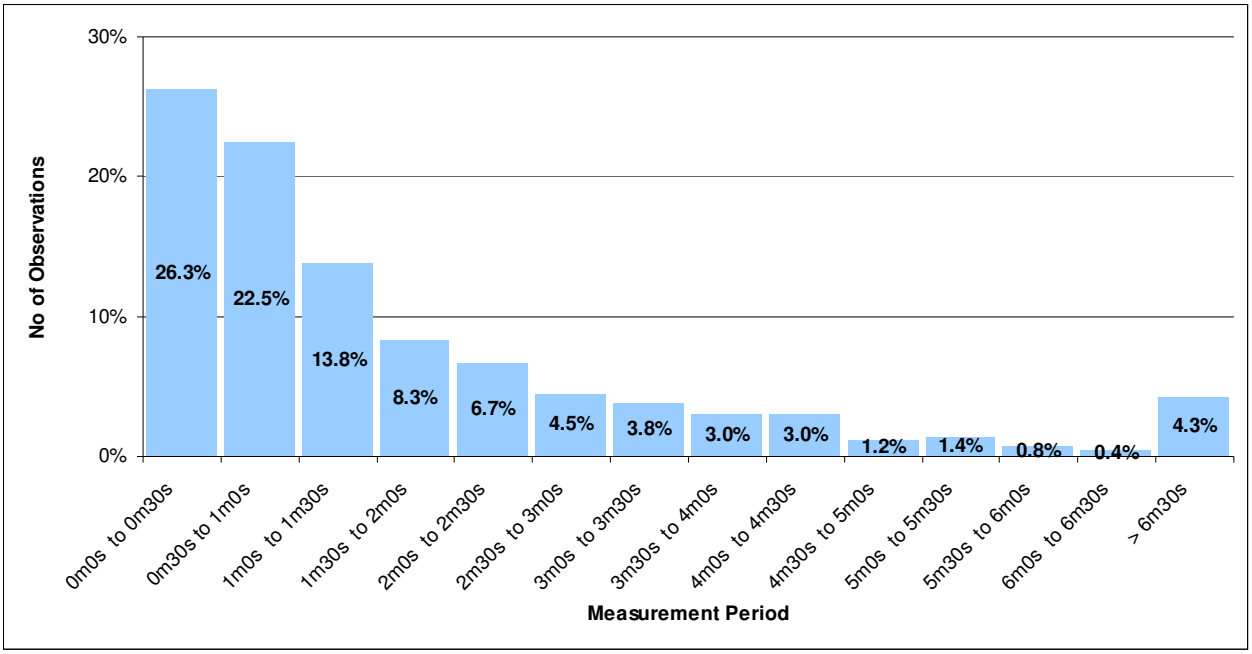

Figure 3.4: GAL Passenger Queue Time Measurements: Frequency

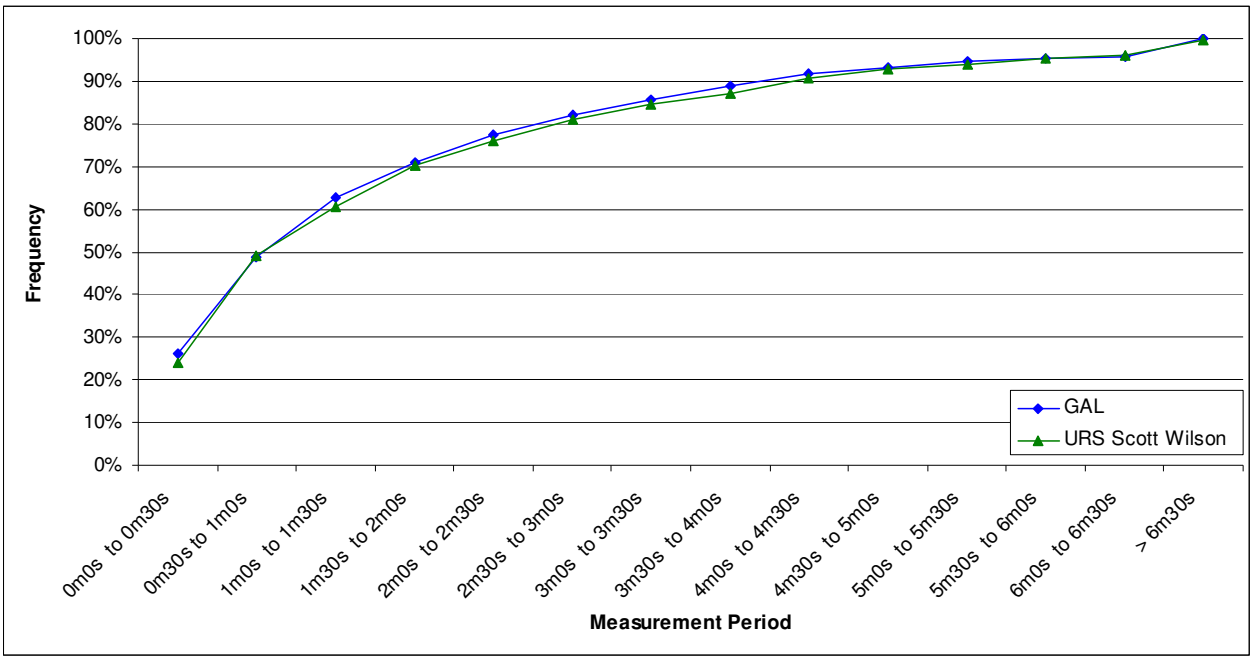

Figure 3.5: Queue Time Measurements: Cumulative Frequency GAL and URS Scott Wilson Data Comparison

Figure 3.6 presents the above data grouped into the following sets of pass/breach with respect to the target 5 minute queue time:

- Group 1 is where a breach occurs (queue time 5:00 or greater)
- Group 2 indicates a near breach (queue time between 4:30 and 5:00)
- Group 3 is all other measurements, clearly passing the criterion (queue time below 4:30)

The percentage of all observations during the month that fall into each group is presented for each 15 minute time slot during the audited day.

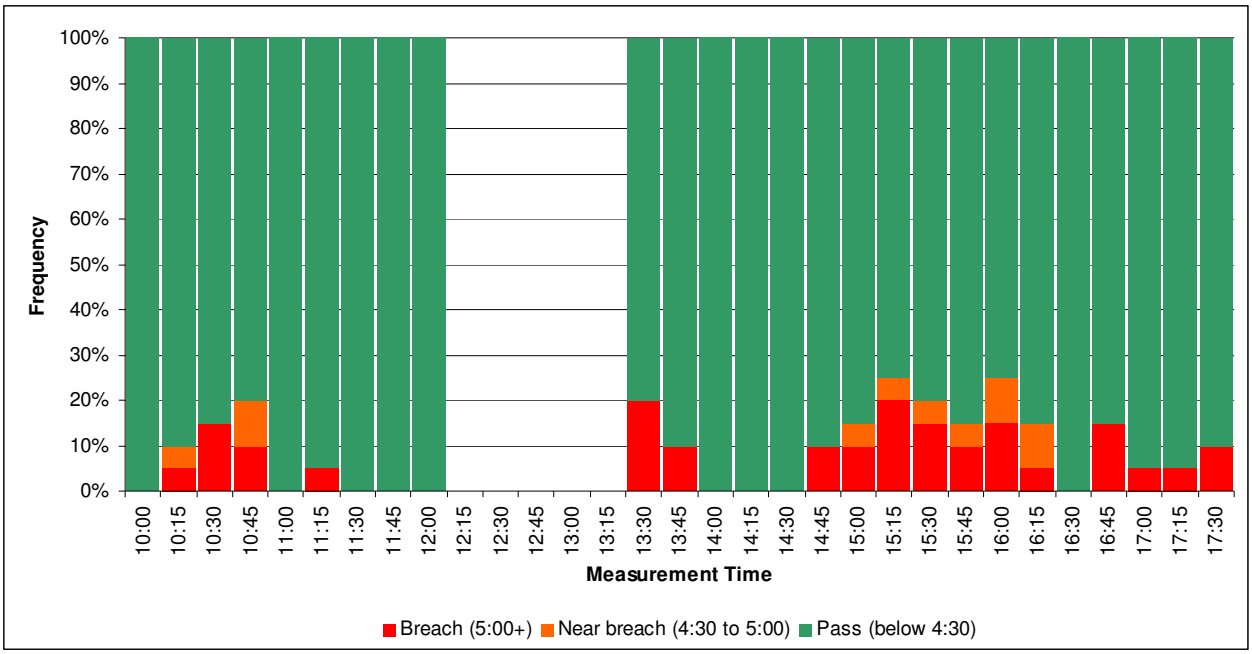

Figure 3.6: URS Scott Wilson Groups of Primary Time Measurements

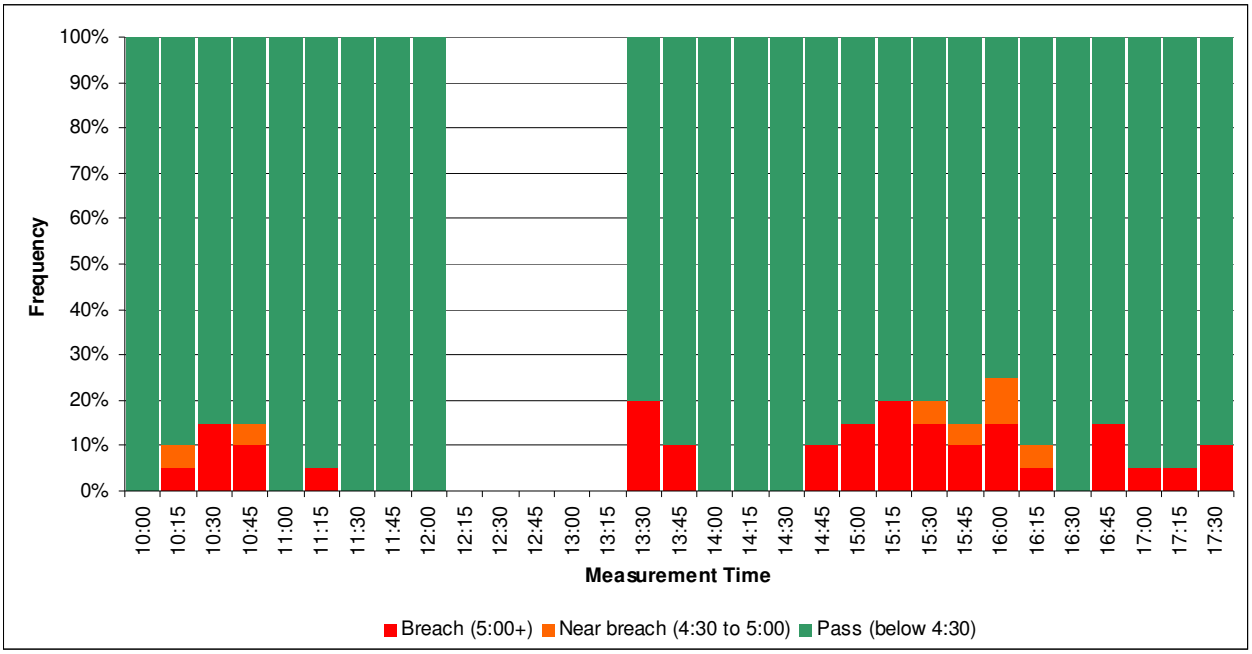

Figure 3.7: GAL Groups of Time Measurements

Figure 3.8 compares the above groups (breach, near breach, pass) over the whole month, for the days and hours of the audit only, for the URS Scott Wilson and GAL data. As these data relate only to the days and hours of the audit, they are different from the whole month data set recorded by GAL. The whole month data set would be expected to show a proportionally

higher pass rate as the audited hours did not include time periods with relatively low passenger throughput, which would increase the proportion of measurements meeting the quality criterion over the entire month.

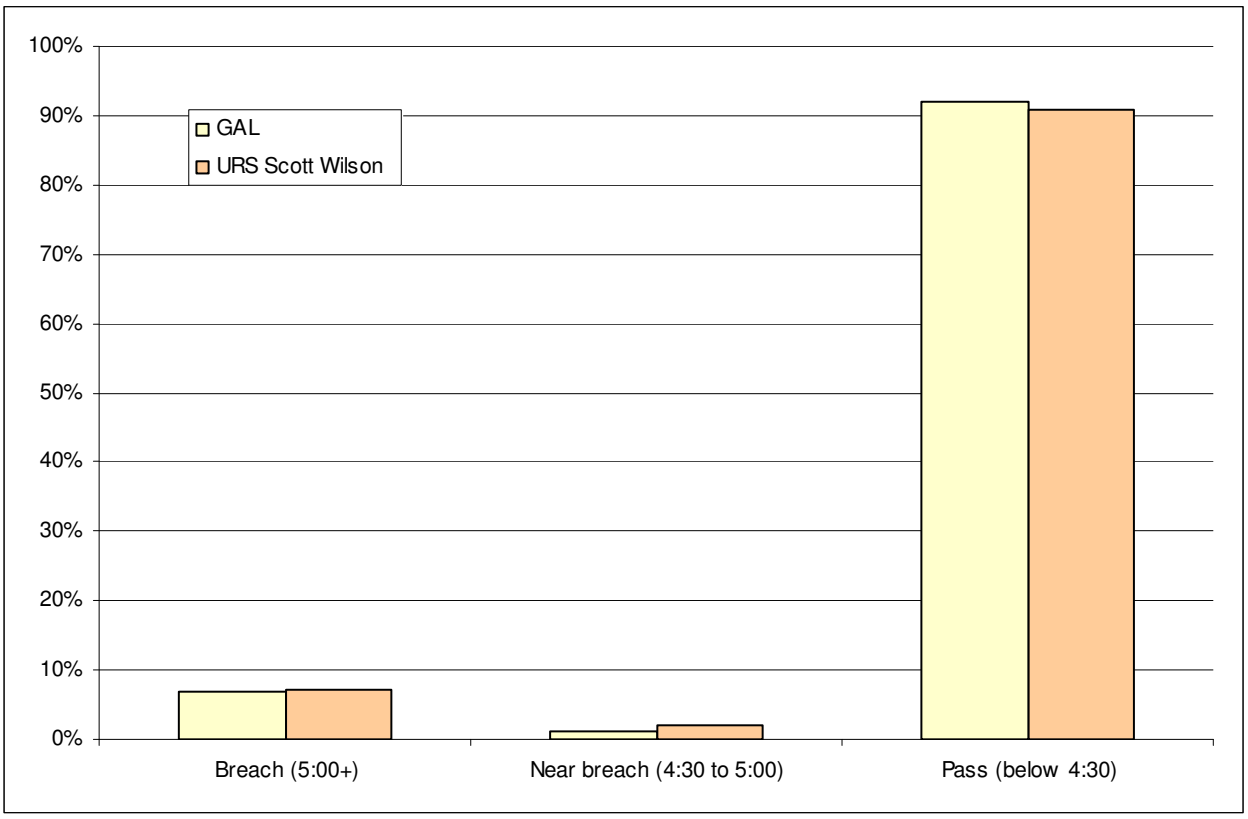

Figure 3.8: Comparison of URS Scott Wilson Primary and GAL Groups of Time Measurements

By inspection Figure 3.5 to Figure 3.8 show observations that are highly similar. This was confirmed by testing[1] for a difference between the number of observations that passed or breached the service quality criterion (as shown in Figure 3.8), which showed a less than 5% confidence of any difference.

3.2 Objective 2: Assessment of How Representative the Officially Measured Passenger is of the Overall Security Queue

To assess how representative the primary passenger was of the overall queue, it was assumed that the randomly chosen secondary passenger was representative of the queue and was compared to the more defined primary passenger. The limitations of this assumption are acknowledged, but a more extensive audit would be required to sample the entire queue to more fulsomely observe the overall queue. The primary observations are as presented in Section 3.1; the secondary observations are presented below.

Figure 3.1 above and Figure 3.9 below present the number of observations of the primary and secondary passenger respectively, over the entire month data set, falling within the queue time

[1] Throughout this report statistical testing for significance was undertaken by using a χ^2 test for equality of proportions from independent samples with URS Scott Wilson's observations as the expected values and null hypothesis being no difference between observations.

periods indicated. Figure 3.10 present the same data as percentages. Subsequently Figure 3.11 presents both primary and secondary passenger data as cumulative frequency curves.

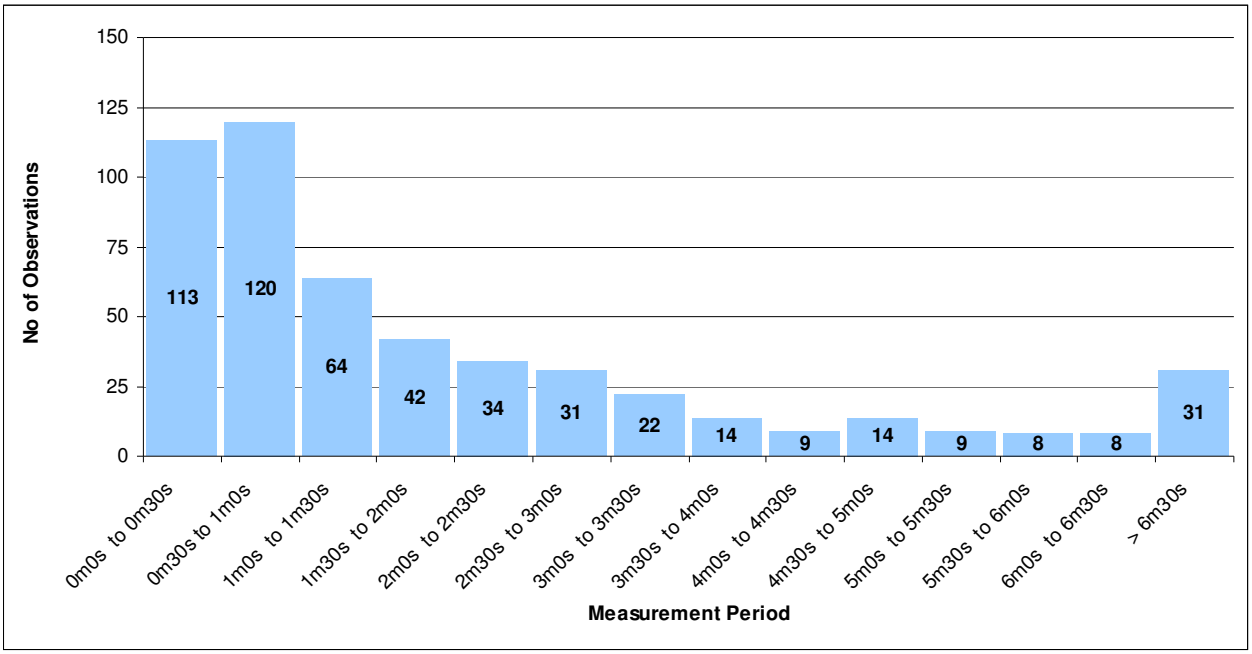

Figure 3.9: Secondary Passenger Queue Time Measurements: Number of Observations

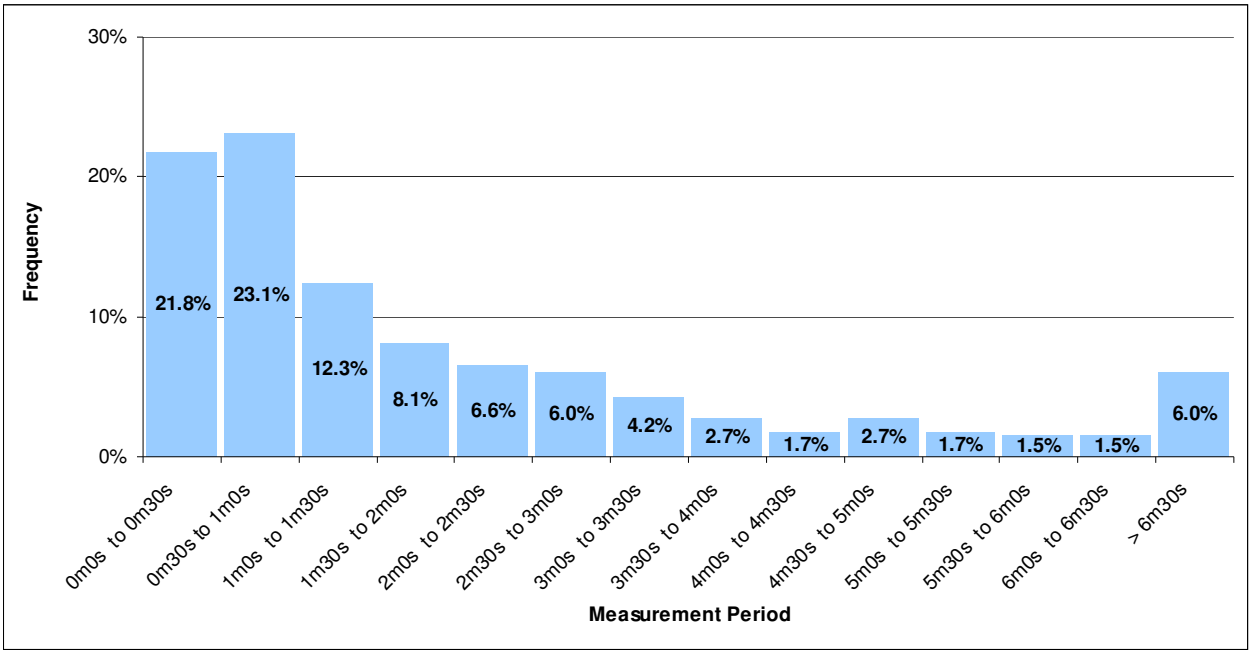

Figure 3.10: Secondary Passenger Queue Time Measurements: Frequency

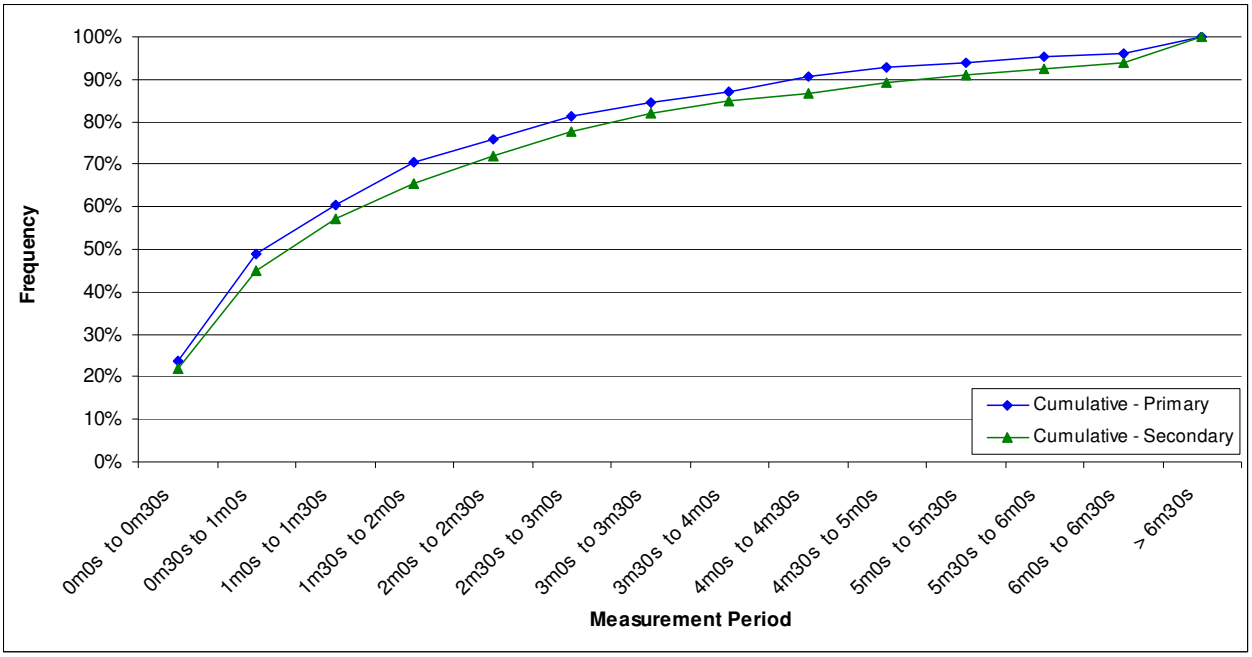

Figure 3.11: Cumulative Frequency Primary and Secondary Passenger Queue Time Measurements

Given that the primary objective was to assess whether the primary passenger was representative of the overall queue's achievement of the 5 minute quality criterion (rather than the passengers experience of queuing time itself), as previously, the data were grouped into the breach, bear-breach and pass categories as shown in Figure 3.12.

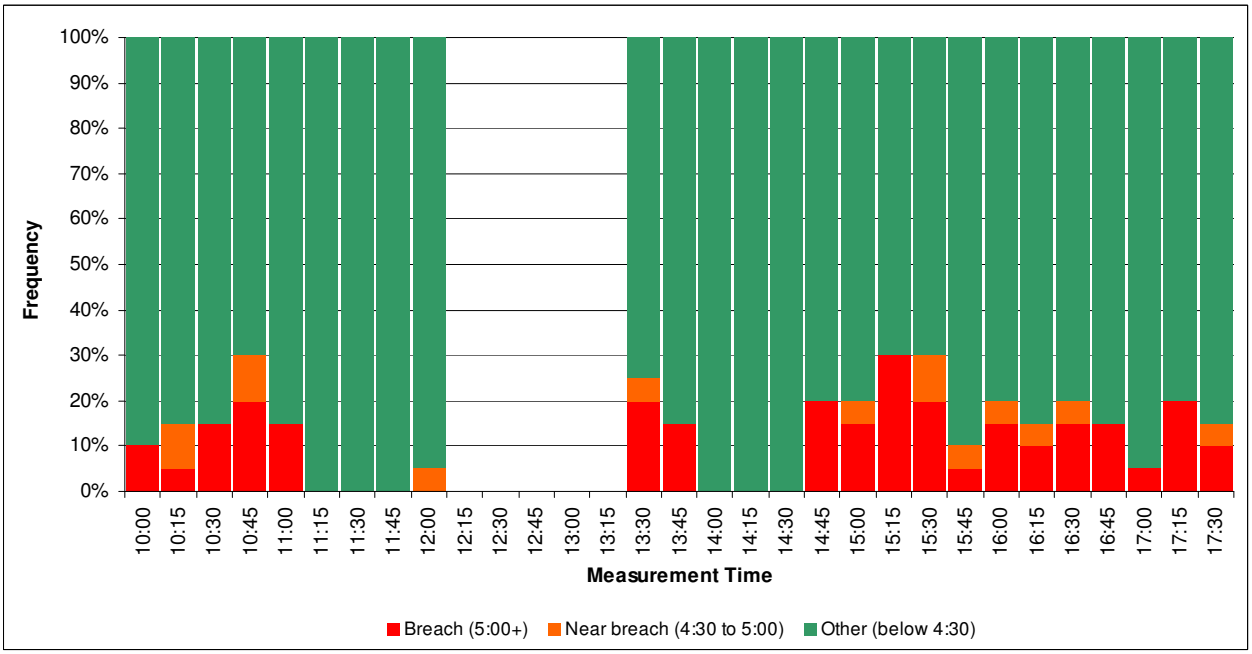

Figure 3.12: URS Scott Wilson Groups of Secondary Time Measurements

Figure 3.13 compares the above groups (breach, near breach, pass) over the month data set, for the days and hours of the audit, for the primary and secondary observations. As previously these URS Scott Wilson data relate only to the days and hours of the audit and are different from the whole month data set recorded by GAL. Should URS Scott Wilson have recorded the entire month, it is expected that they would show a proportionally higher pass rate as the audited hours did not include time periods with relatively low passenger throughput, which would increase the proportion of measurements meeting the quality criterion over the entire month.

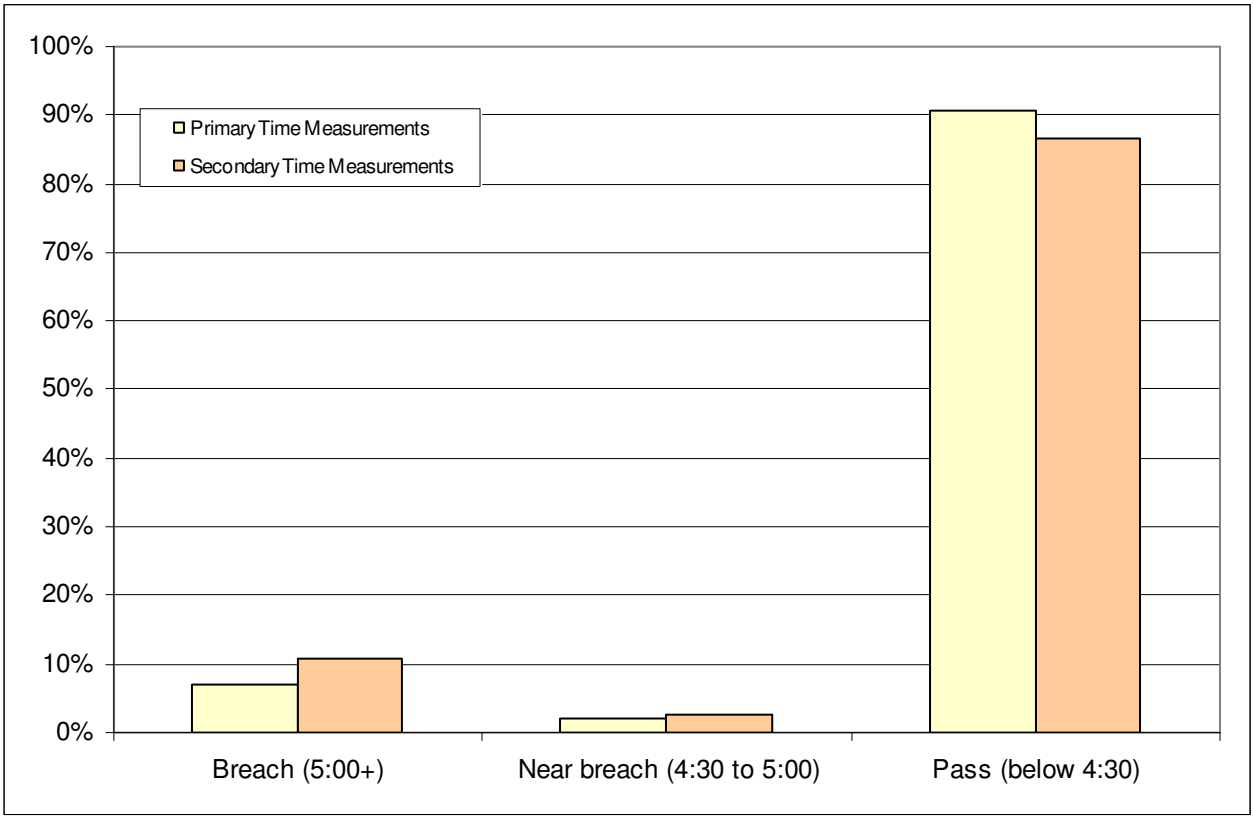

Figure 3.13: Comparison of Primary and Secondary Observations

A χ^2 test was carried out as for Objective 1. The number of passengers breaching/passing the quality criterion (Figure 3.13) was found to be significant above a 95% confidence level, although the limitation of the data set and this test are acknowledged. In particular the relatively few number of observations that breached the quality criterion between the primary and secondary passengers (37 and 56 observations respectively over the audit period) is noted. However, even within the limitation of the statistical testing, it is concluded that the primary and secondary passengers are not drawn from the same population. Therefore, whilst it is recognised that the experience of the overall queue varies throughout the day and indeed over relatively short time periods, the primary passenger does not appear to be reasonably representative of the overall security queue. Importantly, this conclusion is supported by anecdotal observations from our auditor.

GAL uses the observations from its Black Jack team to actively manage the security queue to minimise queuing time for all passengers. This is achieved by either:

- seeking to improve lane performance if a line is under performing;
- opening additional lanes if crews or lanes are available; or
- spreading passengers to lanes with fewer passengers in their queues.

These are appropriate responses to increasing queuing times. However, on a number of occasions our auditors observed intervention with the primary passenger, who was expedited through the queue (individually, or with the other passengers in that lane's queue) should it appear likely to the Black Jack team that the quality criterion may be breached.

Whilst the primary passenger was agreed between our auditor and the Black Jack team member, the secondary passenger was selected at random by our auditor and that passenger's identity was not indicated to the Black Jack team member. Consequently, as Figure 3.13 shows, a higher proportion of secondary passengers failed to meet the quality criterion. Although the identity of the secondary passenger was not communicated to the Black Jack team member, on some occasions, the identity was evidently correctly guessed and this passenger was also hastened through the security queue. On occasions these interventions benefited all passengers in the queue with the primary passenger. However on others it was the primary passenger that differentially benefited.

3.3 Objective 3: Comparison of Independent July Data with Previous Months

This section presents the result of the comparison of the URS Scott Wilson independent primary observations against the previous month's historical observations as reported by GAL to the CAA.

Figure 3.14 presents the GAL previous months' data of the percentage of North Terminal passengers meeting the 5 minute queue time criterion per month against the terminal passenger throughput. The GAL breach/pass data have been amended to only include the hours of the day for the previous months during which the URS Scott Wilson audit was undertaken in July. (This had the effect of reducing the proportion of passengers meeting the 5 minute criterion in the GAL data set as more passengers during off peak times outside the URS Scott Wilson audit times passed the quality criterion raising the overall monthly average.) The GAL and URS Scott Wilson observations for the month of July 2011 are also shown.

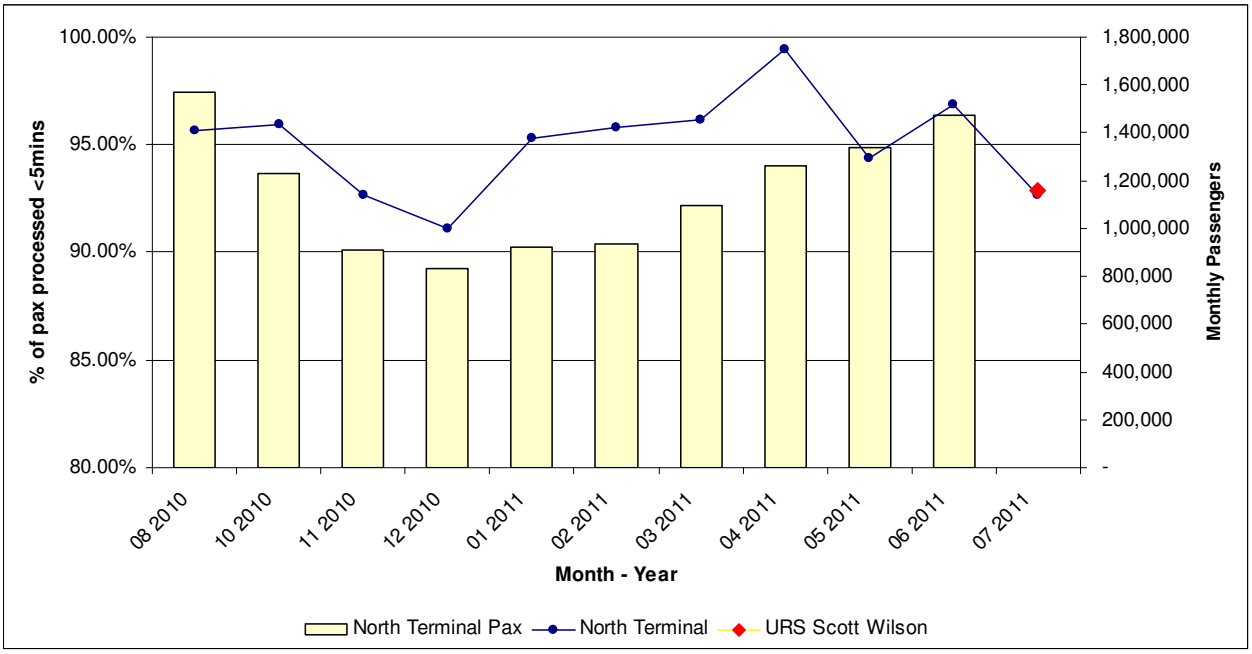

Figure 3.14: Percentage of Monthly Observations Below 5 Minutes Against Monthly North Terminal Passenger Throughput

Two analyses were undertaken. As Figure 3.14 shows, 2011 passenger throughput has seen a constant rising trend. Therefore firstly, correlation between passenger throughput and the proportion of passengers meeting the quality criterion was tested. Figure 3.15 shows scatter data from the previous months.

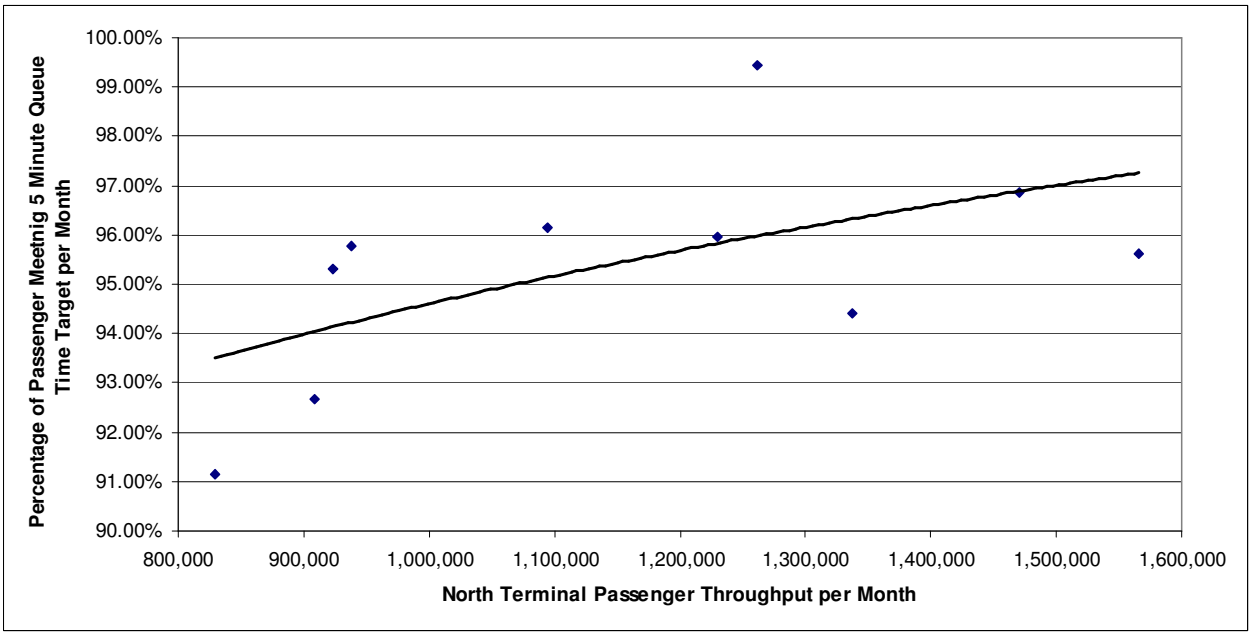

Figure 3.15: Percentage of North Terminal Monthly Observations Below 5 Minutes Against Monthly Passenger Throughput

No correlation was found. The best fit line shown has a correlation coefficient of less than 40%. Furthermore, the best fit line shows a somewhat counter-intuitive rising trend further suggesting that other factors are more significantly influencing the proportion of passengers passing the quality criterion. With processing capacity provided in discrete steps, this conclusion is not unexpected.

Secondly, the URS Scott Wilson observations from July 2011 were tested against all previous months GAL data. Figure 3.16 compares the URS Scott Wilson primary observations from July against all previous GAL data in the previous three groups of breach/pass.

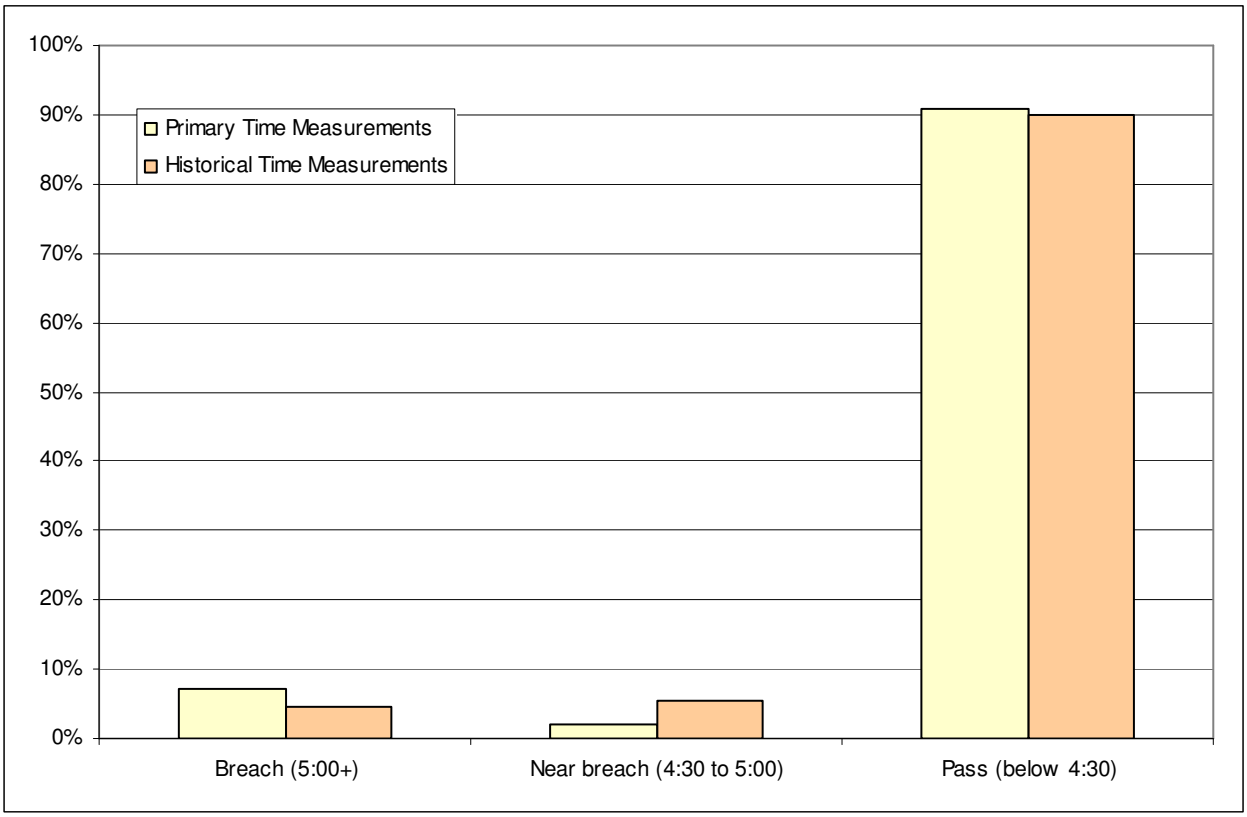

Figure 3.16: Comparison of URS Scott Wilson July Observations and Previous GAL Observations

3.3.1 Intra-Month Analysis

A further analysis of the GAL data for the audited days of July was undertaken to compare the data from the hours audited by URS Scott Wilson and the hours outside of those periods (i.e. from the start of the operating day to, and including, 09:45, between 12:15 and 13:15 inclusive and from 17:45 to 20:30 inclusive.

Figure 3.17 is a repetition of Figure 3.4 showing the GAL observations during the hours of the audit. Figure 3.18 shows the GAL observations outside those hours.

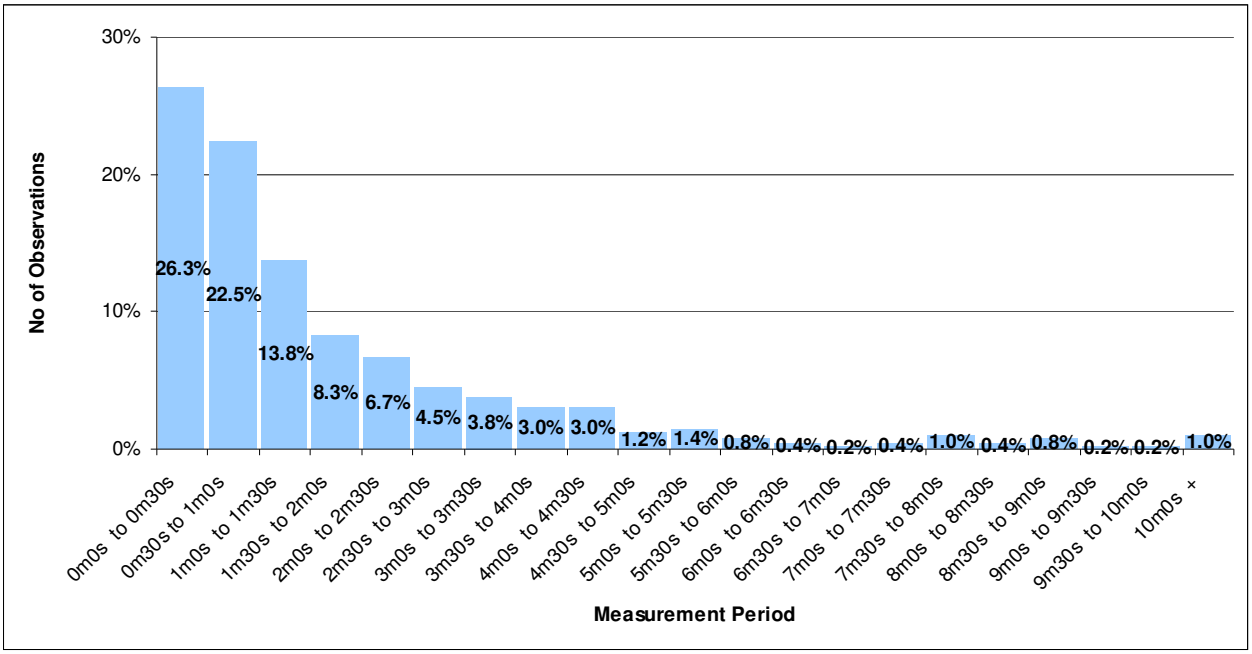

Figure 3.17: GAL Queue Time Measurements During Audit Times July 2011: Frequency

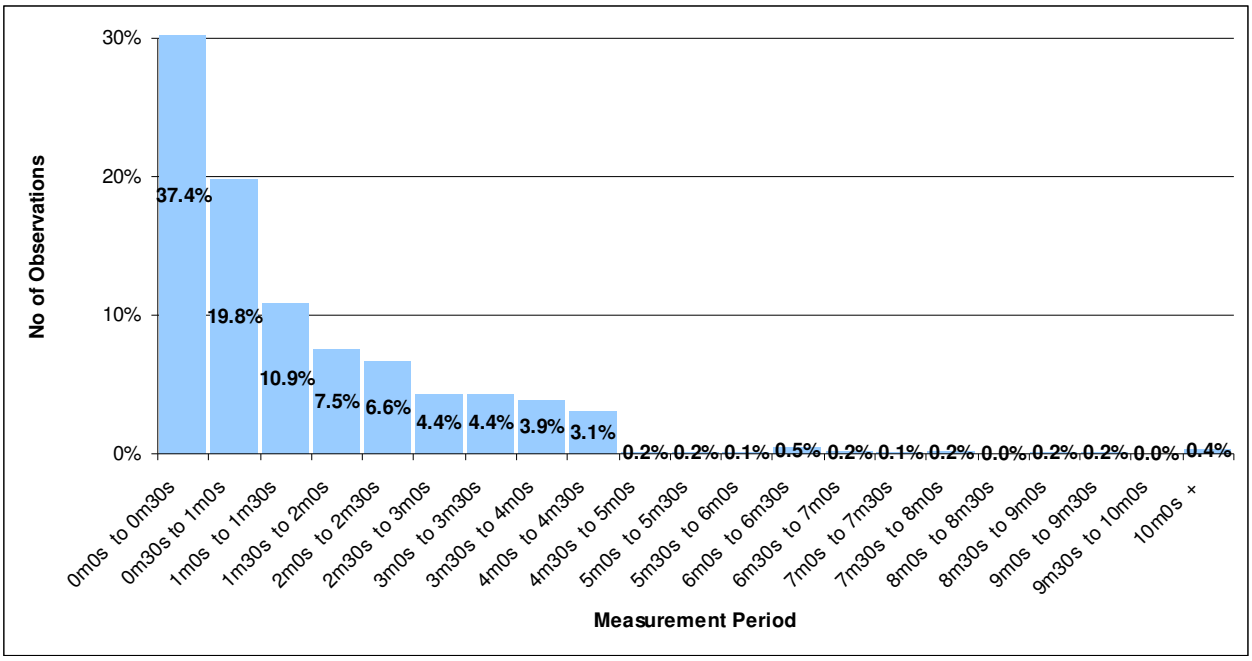

Figure 3.18: GAL Queue Time Measurements Outside Audit Times July 2011: Frequency

These charts imply a difference in behaviour of observed passengers between the times being audited and other times during the month of July 2011, with a distinct drop-off of queue times after 5 minutes observed outside the audited hours compared to during the audit periods. To assess whether this was representative of previous months, GAL data for all months shown in Figure 3.14 were assessed within and without the audited hours. The results are shown in Figure 3.19 and Figure 3.20.

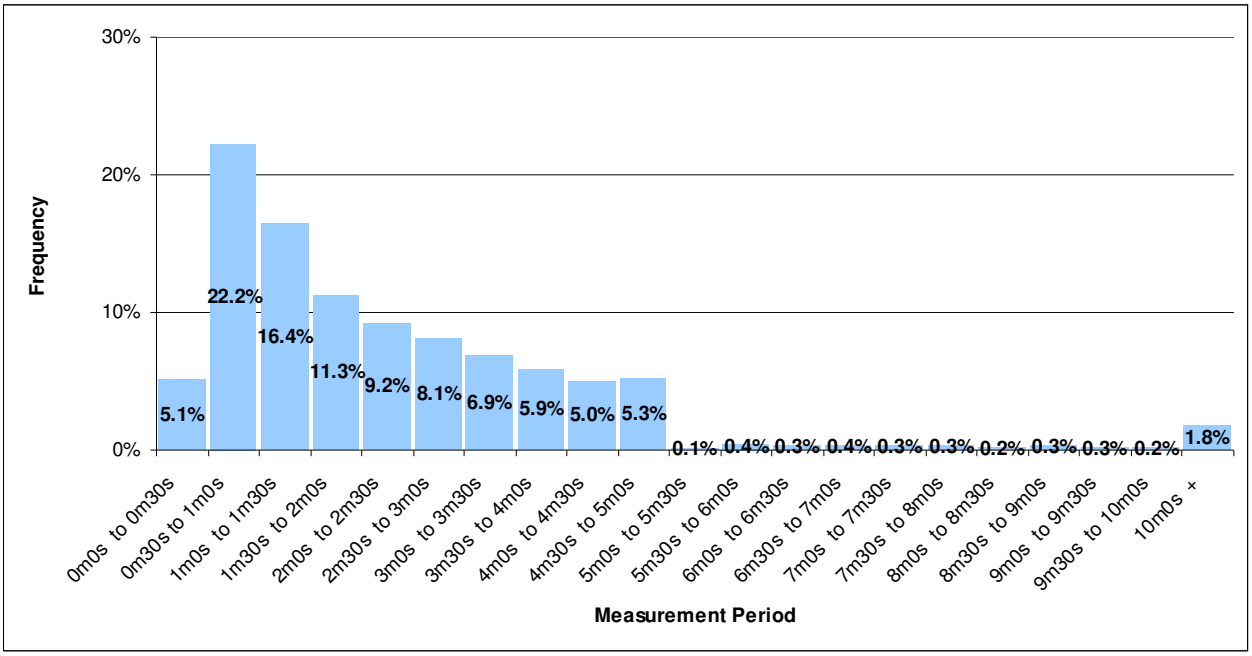

Figure 3.19: All Previous GAL Queue Time Measurements During Audit Times: Frequency

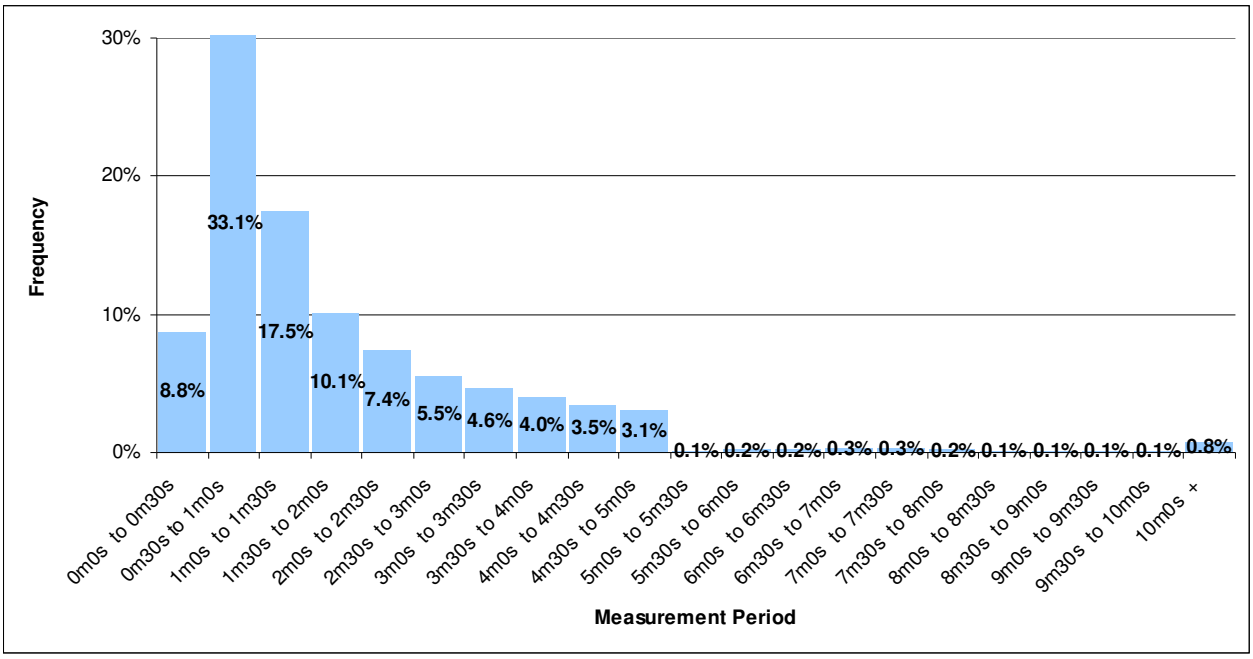

Figure 3.20: All Previous GAL Queue Time Measurements Outside Audit Times: Frequency

These charts show a consistency of previous observation with a distinct pattern of observed queuing times of or below 5 minutes. The smoother profile observed during the audit, as shown in Figure 3.17 is therefore unexplained and visibly differs from GAL data from all previous months assessed.

4 Conclusions

The following summarises the conclusions set out in Section 3:

- **Objective 1**: the URS Scott Wilson observations agree with the data provided by GAL to the CAA for the audited hours and days of month of July 2011 for the North Terminal.
- **Objective 2**: based upon the difference between the primary and secondary passenger observations, (whilst recognising the limitations of the data and the strength of this conclusion as a purely statistical test) and the anecdotal observations of our auditor, it is concluded that the primary passenger is not a reasonably representative sample of all passengers.
- **Objective 3**: although, as established by Objective 1, the URS Scott Wilson and GAL data for the month of July were similar, both observations visibly differ from all previous months' data. No correlation was observed in the previous months' data between terminal passenger throughput and the number of passengers passing the service quality criterion, and therefore the causal factor of the observed difference in the July data is to be determined. Furthermore the previously observed "squarer" distribution with almost observations in previous months being beneath 5 minutes was not replicated during the audit hours. Previously this pattern was represented in GAL's data during and outside the audited hours.