OPEN RIGHTS GROUP

May 2008 Election Report

Findings of the Open Rights Group Election Observation Mission in London

2 July 2008

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Executive Summary

There is insufficient evidence available to allow independent observers to state reliably whether the results declared in the May 2008 elections for the Mayor of London and the London Assembly are an accurate representation of voters' intentions. Given these findings, the Open Rights Group (ORG) remains opposed to the introduction of e-counting in the United Kingdom, unless adopting ORG's recommendations for increasing the transparency around e-counting can be proved cost effective.

The Mayor of London has the largest personal mandate of any politician in the UK, and the third largest mandate of any politician in Europe. Since the Greater London Authority was established in 1999, votes in elections for Mayor of London and for the 25-member London Assembly have been counted electronically.

May 2008 offered the first opportunity for independent observers to scrutinise the London elections. ORG deployed 27 volunteer election observers, officially accredited by the Electoral Commission, to observe the e-count on 2 May 2008. For ORG, the opportunity to observe the e-counting of the London vote was particularly important; one of the key concerns ORG has expressed over the use of technology in elections has been that it obscures the workings of elections from outside scrutiny.

Management

ORG commends London Elects for delivering the May 2008 elections without significant procedural hitches. ORG also commends the spirit in which London Elects has sought to enhance transparency around the May 2008 London e-count. However, ORG has identified several areas where the workings of the e-counting systems obscured crucial elements of the election from candidates, agents and independent observers, as well as from election officials.

Transparency

This report identifies several key aspects of the election where the level of transparency is not yet adequate — to the extent that there is insufficient evidence available to independent observers to state reliably whether the results declared are an accurate representation of the intentions of London's voters.

Recording of valid votes

On the day of the count, efforts towards transparency around the recording of valid votes were nothing more than pretence. As a result, many ORG observers concluded that they were unable to observe valid votes being recorded. The hundreds of screens set up by the scanners showed almost meaningless data to observers, party candidates and agents, while officials admit that underneath the system was likely to be recording blank ballots as valid votes.

Indra Service Desks

Indra, the company with whom London Elects contracted to deliver the e-count system, had equipment directly connected to the counting servers to which observers had limited or no

access. This, in ORG's opinion, is a critical issue. ORG views this as a serious gap in the chain of accountability.

40 **Source Code Audit**

London Elects commissioned a partial source code audit from KPMG. However, due to reasons of commercial confidentiality, which appear to have been unforeseen, London Elects has been unable to publish that audit, as well as another audit undertaken by KPMG on the counting infrastructure. Tools for source code audit provide limited assurance and are no substitute for a thorough manual audit of the live count. However, if the audit commissioned from KPMG is to be understood as a transparency measure, then it is unacceptable that the results are not available in full to the general public.

Even if the KPMG audit were published, the fact that its scope precludes examination of some of the codebase involved in delivering the London elections — including the code that

50 recognises voters' marks — limits its usefulness as an aid to transparency. ORG's more fundamental concern is that even a full audit, published and made available to the public in good time before the election, would exclude candidates and agents who lack the technical skills necessary to interpret it from undertaking their traditional roles as election observers.

System Design

Several observations made during the e-count highlighted poor system design.

Inflexibility

At the ballot box verification stage, count staff were unable to record reasons why ballot boxes had been approved despite significant discrepancies between the number of ballots scanned and the number of ballots polling station staff had recorded as being in the box. In terms of a

60 retrospective audit, this flawed process and its accompanying lack of data introduces an unacceptable level of uncertainty in the declared results. In at least two constituency member elections the absolute variance between ballot paper accounts from the polling station and number of ballots recorded as scanned by the system exceeds the margin of the winning candidate.

At the second-level adjudication stage there were problems when the system did not allow the CRO to go back on an adjudication decision once it had been recorded after a party agent observed a valid vote being rejected.

Error Messages

Error messages generated by the vote database and observed frequently at the scanning stage

70 indicate poor software quality and/or lack of quality control.

Bugs and freezes

An unexplained bug, which appeared to cause the system to auto-process ballots, was briefly observed at the first-level adjudication stage. A system freeze was observed at the second-level adjudication stage.

Ballot Paper retrieval

No observer reported seeing CROs retrieve paper ballots where scanned images were insufficient to determine voter intention. ORG has received assurances from London Elects that the system was designed so that paper ballots could be retrieved where necessary. That no CRO chose to exercise this ability represents either poor training or a cavalier attitude toward
80   voter disenfranchisement.

Conclusion: what cost functional e-counting?

Many of the problems observed by the ORG team can be solved, but it is important to ask: at what cost? ORG makes several recommendations to improve the transparency of any future e-count, but ORG's headline recommendation is that London Elects undertake a full cost-benefit analysis of the electronic count, setting it against a properly-costed manual count of a similarly complex election.

There is insufficient evidence available to let independent observers reliably state whether the results declared in the May 2008 elections for the Mayor of London and the London Assembly are an accurate representation of voters' intentions. Given these findings, ORG remains
90   opposed to the introduction of e-counting in the United Kingdom, unless it can be proved cost-effective to adopt ORG's recommendations for increasing transparency around e-counting.

The May 2008 Elections in London

The Mayor of London has the largest personal mandate of any politician in the UK, and the third largest mandate of any politician in Europe. The position, along with the 25-member London Assembly, was established by the Greater London Authority Act 1999. 1 May 2008 saw the third set of elections for the Mayor of London and the London Assembly since this act received Royal Assent.

100   The Electoral Administration Act 2006, including the provision that allows for formal election observation, applied to the London Election for the first time this year. This report will focus primarily on the results of the elections observations carried out by ORG during the London elections. It is informed by the organisation's experience of observing the May 2007 local electronic voting and electronic counting pilots in England and Wales and the May 2007 electronic count in Scotland[1].

Since the establishment of the Greater London Authority, the Mayor of London has been elected using the Supplementary Vote system, which invites voters to make a supplementary (second) choice of candidate. The 25 London Assembly Members have been elected using an Additional Member System, a combination of the First-Past-The-Post system and party list voting. All three
110   elections (in 2000, 2004 and 2008) have been counted electronically, or "e-counted".

The 2008 elections saw London Elects, the independent body in charge of organising the elections, enter into a contract with a new supplier, Indra. The previous two elections were conducted with equipment supplied by DRS (Data Research Systems). London Elects issued a call for tenders in August 2006 and, having received tenders from their shortlist of three suppliers in December 2006, entered into a contract with Indra in April 2007. The following month, e-counting in local elections in Bedford and Breckland that used systems supplied by Indra experienced serious problems[2].

London Elects states that because of the different voting systems involved in the elections for London Mayor and the London Assembly a manual count of the ballots would take around three
120   days. It is unclear how that approximation has been arrived at and ORG would welcome a full cost-benefit analysis comparing the electronic and manual options for counting the London vote. London Elects has estimated the cost of the May 2008 elections at around £19 million. Of this, £12 million goes direct to the London boroughs and £7 million is allocated to central costs; the Indra contract represents £4.5 million of this £7 million. The £4.5 million figure is provisional — at ORG's meeting with London Elects on 28 May 2008 ORG was told that it was likely to increase and that final costs would not be known until around 18 months after the election.

Demonstrations

Having contracted with Indra in April 2007, London Elects had just over a year to prepare for the May 2008 elections. Observations during the pre-election period were limited to a demonstration

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[1] Open Rights Group *May 2007 Election Report* (June 2007)
[2] *ibid*

130   attended by two observers on 2 November 2007, a meeting with London Elects on 22 January 2008 and an observer briefing on 29 April 2008. ORG met again with London Elects on 28 May 2008.

On 2 November 2007, ORG was alerted by a journalist that a media demonstration of e-counting equipment to be used in the London elections was taking place in City Hall that day. ORG contacted London Elects, and were informed that London Elects was unwilling to invite ORG to this demonstration as it had been specifically designed for members of the press, but that ORG would be welcome at a demonstration taking place later the same day designed for party agents and potential candidates. Two ORG observers (both accredited to observe elections in 2007) attended this demonstration.

140   At the demonstration, attendees were told that London Elects had performed several trials of the equipment. A trial involving 6,000 ballots had taken place in June 2007, and a trial where 120,000 ballot papers were both scanned and manually counted had taken place in September 2007, as part of wider "user acceptance testing". This latter trial was said by Deputy Returning Officer (DRO) John Bennett to have demonstrated 100% accuracy. It emerged in later meetings with London Elects that the manual counts had been repeated until the number of votes counted manually matched the number recorded electronically. ORG is not satisfied that this testing justifies the statement that the electronic counting equipment is 100% accurate; what it shows is that on one occasion a count, count and count again approach eventually led to a manual tally that matched the electronic count.

150   During the demonstration, ORG observers asked questions about the possibility of manually recounting a statistically significant sample of ballots on count night. They were told that such a measure was undesirable as it would "aggravate the situation". In a later meeting with London Elects, DRO John Bennett appeared to suggest that the Greater London Authority Election Rules 2007 did not allow mixing manual and electronic counting of ballots, although he did express an interest in finding out how large a statistically significant sample would have to be.

It was at this demonstration that ORG first heard that London Elects planned to commission an audit of the source code of the software deployed in the e-counting system (see The Audits).

Generally, the demonstration was well designed and well attended, and London Elects officials were ready and able to answer questions about the system and its deployment on count night.

160   Apart from the two ORG observers, attendees asked very few questions about the system, and focussed instead on questions about the likely outcomes of second-level adjudication decisions. At best, this demonstrates a high level of trust between political parties and London Elects; at worst, this demonstrates a complete lack of understanding of the increased risks associated with introducing computers into the election process.

Before the demonstration began, ORG observers were asked by a member of the London Elects team to limit the number of detailed questions they asked about the technology because such questions would not be of interest to the other attendees. At the demonstration, ORG was told that a further demonstration would be organised specifically for independent observers like ORG. However, no such demonstration took place. At an observer briefing on 29 April 2008

170   (where again, ORG was asked by members of the London Elects team to limit technology-specific questions for the sake of other audience members) it emerged that demonstrations for observers had indeed been planned, but that these plans had been shelved because subsequent events took up more time than anticipated. As a result, many ORG observers felt less prepared than they would like to have been before entering the count centres on 2 May 2008. London Elects did prepare an E-Counting Factsheet, as well as a two-minute video about the process. However, these were aimed at a non-technical audience, and did not compensate for the lack of an observer-specific demonstration.

Meeting London Elects

On 16 January 2008, ORG met with senior members of the London Elects team including DRO
180   John Bennett.

The meeting presented an opportunity to discuss in more detail London Elects' plan for an audit of the source code. ORG learned that KPMG had been engaged to perform this audit, while Deloitte would audit the information security elements of the count. ORG learned that the KPMG audit would only apply to the source code of the application layer software deployed at the count, and not, for example, the underlying computer operating system, which London Elects said at that meeting would be Windows 2003. Although ORG accepts that auditing the source code of a proprietary, third-party system would present significant challenges to London Elects, ORG notes that there is no technical requirement to use Windows. ORG further rejects the notion that 'auditability' of the entire system was not an appropriate requirement for the tender.
190   At the time of the meeting, plans for code audit were still in draft, and ORG was given assurances that we would receive a finalised audit plan as well as system design documents and a confirmed date for code lock-down and (once completed) the audit reports themselves.

ORG left the meeting impressed with the measures London Elects intended to take with regards to the security and transparency of the electronic count, as well as the openness with which the organisation was prepared to deal with ORG. In particular, measures to ensure as far as possible that the system deployed matched the one used in test looked well thought-out. These included holding the code in escrow and transferring it to an image server and specifying a final date for code lockdown (after which no more changes to the code would be permitted).

The Audits
200   After ORG's January 2008 meeting with London Elects, ORG did not receive a finalised audit plan, nor did ORG receive system design documents. ORG was told on 6 June 2008 that the date for code lockdown had been 17 April 2008. At time of going to press, London Elects has been unable to supply ORG with copies of either the code audit produced by KPMG, or a subsequent infrastructure review also commissioned from KPMG. Information available on these audits is extremely limited and takes the form of two Executive Summary documents. With respect to the source code audit, the only substantive information on the system itself available to the public (the reports' "Summary of findings" and "Next Steps") amounted to under 200 words of text, despite the fact that the report identified "four medium and three low risk issues".

210 ORG met with London Elects again on 28 May 2008. At this meeting ORG was informed that "few" of the risks identified by KPMG had been addressed in source code changes, because they were mitigated by physical security factors. The KPMG executive summary reveals that the source code audit excludes source code relating to scanning and recognising voters' marks. ORG was told that this was because the software deployed, Softgrid, was, like the operating system, a third-party, proprietary product. Since scanning and recognising voters' marks is, in ORG's view, the central function of the e-counting system, the fact that the audit excluded this function entirely is problematic.

Tools for source code audit provide limited assurance and are no substitute for a thorough manual audit of the live count. Nevertheless, the process of a KPMG audit was highlighted by

220 London Elects as an added layer of transparency, and not simply an exercise in quality assurance. Certainly, Constituency Returning Officers used the KPMG audits to reassure party agents and candidates later, when problems arose at the declaration stage (See Declaration > At the Count Centre).

At the Observer briefing on 29 April 2008, DRO John Bennett gave public assurances that all the audit reports (the two KPMG reports, the Deloitte audit and the Cragg Ross Dawson ballot design research) would be available in full to the general public. And yet, to date, the KPMG audits remain unpublished. If the audits were intended to engender public trust in the systems employed to count votes on 2 May 2008, the fact that London Elects has had to delay, perhaps permanently, their release to the general public has if anything had the opposite effect. This

230 situation only serves to highlight the problems that may arise when the very public function of running elections is mixed with issues of commercial confidentiality and proprietary code. In the context of a public election, it is unacceptable that these issues should preclude the publication of the KPMG audits.

The audit prepared by Deloitte was undertaken as part of London Elects' annual audit programme and has been published in full. It does a good job of checking that London Elects had plans in place to ensure that it could competently manage the 2008 elections. However, in several places Deloitte stresses that it is London Elects that has the specialist election knowledge. The auditors were not in a position to judge whether the election was conducted fairly or properly, nor was this audit designed to detect fraud or corruption.

240 **Rule changes**

ORG's post-election meeting with London Elects also revealed that it had been unhappy about incorporating late rules changes into the software. These changes were ostensibly motivated by the publication, in May 2007, of the Gould Review of the Scottish elections[3], which demanded that London Elects and Indra make changes to the software so that party candidates and agents could view automatically rejected blank ballots if they wished. Incorporating these late changes was one of the reasons why the "drop-dead" date for code lockdown was pushed back (to 17 April 2008, just over a fortnight before the election).

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[3] Ron Gould *Independent review of the Scottish Parliamentary and local government elections 3 May 2007* (October 2007)

Business continuity and contingency planning

250 2008 offered a rare opportunity to see the business continuity and contingency planning of London Elects put to the test, as flooding in the local area caused power cuts to City Hall several days before the election. These unforeseen events did cause some difficulties: candidates and agents needed to pick up their passes to enter the count on the door at Count Centres rather than have the passes posted to them; London Elects missed three meetings with Indra, which caused further delay in releasing the code audits. However, relative to the operation London Elects was running, these difficulties are minor, and ORG commends London Elects for delivering the election in such challenging circumstances.

Becoming Observers

The Electoral Administration Act 2006 allows accredited election observers to operate in the United Kingdom. This brings the United Kingdom's electoral regime into line with the majority of democracies around the world. The May 2008 London elections would mark the first time this new legislation could be applied in London. For ORG, the opportunity to observe the e-counting of the London vote was particularly important. A key concern ORG has expressed over the use of technology in elections has been that it obscures the workings of elections from voters and candidates[4].

Recruitment and Registration of Observers

ORG recruited volunteer election observers from the general public. To help recruit volunteers, ORG used the website PledgeBank.com to create a pledge which asked people to "dedicate 2nd May 2008 to observing the electronic counting of votes for the London mayoral and London Assembly elections, to help protect the integrity of our elections and to independently verify any problems that occur with e-counting systems"[5]. The pledge was launched on 22 January 2008 and had attracted 31 volunteers by the time it closed on 1 March 2008.

ORG chose to create its own registration pack incorporating, with permission, content from the Electoral Commission's registration materials. This greatly aided the administration of collecting the required signatures, personal information and photographs into ORG's organisational submission which, with the addition of a few late registrations, was accepted and processed efficiently by the Electoral Commission. Accreditation badges were received by ORG observers by 10 April 2008, when ORG held the first meeting of the observation team.

To guide ORG's work, the following terms of reference for the observation mission were developed:

- to evaluate the integrity of technologies and processes used in the electronic count;

- to examine whether the electronic count might increase the risk of electoral fraud or error;

- to observe whether the electronic count risks the secrecy of the ballot; and

- to collect the views of voters, candidates and officials on the e-counting scheme.

To further assist the observers in their task, ORG wrote a handbook[6] based on international best practice guidelines such as those from the OSCE's Office for Democratic Institutions and Human Rights. The handbook also included guidance relating specifically to the technologies to be used and to UK law. Resources for observers were gathered together on a public wiki page[7],

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[4] See Open Rights Group *Electronic Voting: A challenge to democracy?* At
http://www.openrightsgroup.org/e-voting-main/e-voting-briefing-pack/
[5] http://www.pledgebank.com/electionwatch08
[6] http://www.openrightsgroup.org/wp-content/uploads/observer_handbook_2008.pdf
[7] http://www.openrightsgroup.org/orgwiki/index.php/London_Elections_in_2008

290 to allow the task to be undertaken collaboratively. Evaluation forms, modelled on forms used by the OSCE in international observation missions, were developed. Observers joined a private email discussion list to talk through plans for the count day. For election day and count day, observers were issued with location-specific quick reference sheets and briefing papers, along with a distinctive T-shirt to help voters, candidates and election workers understand who they were.

Contacting CROs

ORG's specific focus on the e-count meant it was desirable to contact Constituency Returning Officers (CROs) to introduce the organisation and our mission before count day. Each CRO had ultimate jurisdiction over his or her constituency count compound, including the power to throw out observers if their behaviour was judged to be disruptive. ORG experienced some difficulty 300 establishing the limits of CROs' competence with regards to count-centre wide activity such as granting permission for the use of photographic equipment. However, ORG's approach of openly engaging with CROs, both prior to the count and on count day itself, turned out to be fairly effective and ORG observers established generally good relations with CROs on count day.

Polling

Accredited observers were able to observe at polling stations on 1 May 2008, as well as to observe the opening of postal votes. Observers were asked to fill out Polling Place Evaluation Forms (see Appendix III), as well as to take freehand notes on what they saw during the day. The information that follows tends to focus on those elements of polling that were affected by the e-count. For a full analysis of polling station activity, see the quantitative report in Appendix I.

At polling stations, voters were observed asking for help with or more information about first and second choice votes on the Mayoral ballot. Despite — or occasionally in the absence of — instructions from polling staff, voters were observed folding ballots before placing them in the ballot boxes. One Presiding Officer did not issue instructions to voters, but instead stood close to the ballot box and asked people to unfold as they approached it, occasionally handling completed ballots himself. Another told observers that folded ballots could be unfolded at the count centre so he wasn't overly concerned about ballots entering the box folded. Observers received no reports from Presiding Officers about voters querying the new "official mark" (the barcode) or the absence of the old official stamp. Several voters did report to observers that they were unhappy about using a pencil and would have preferred using a pen. One or two observers reported overcrowding, and one observer reported a loose seal on the ballot box.

One observer received reports from various Presiding Officers and Polling Clerks that they were unhappy with the design of the ballot boxes. One Polling Clerk commented that the box did not look official enough (other comparisons included boxes for containing wine, or boxes bought at Ikea). In another polling station, the same observer reported that the chute section of the ballot box was missing. The Presiding Officer explained that he had received no instructions on how to put it together.

Family voting and other instances of invasion of voter privacy were frequently reported by observers. One observer reports being told by a Presiding Officer that family voting was "endemic for Continentals and Indians. It's part of their culture. I can't stop it, so why fight it?". ORG is shocked by this attitude.

Figure 1: An ORG observer

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ORG received one report from an observer at the close of a polling station that incorporated two polling places that noted that both Presiding Officers made fencepost errors[8] in calculating the ballot paper account. Both independently complained to the observer about having to do important calculations when tired.

350   An observer team visited an opening of postal ballots and found the setup welcoming to observers, and the process generally sound.

Although the terms of reference for the ORG mission dictated a focus on the counting of votes, rather than the casting of them, the number of ORG observers who chose to observe at polling stations indicates that observers found it useful to observe polling to inform their observations of the e-count.

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[8] A fencepost error can be understood as an an off-by-one error. It is so called because a person who is asked how many fenceposts, one foot apart, are needed to build a 10-foot fence, is likely to answer 10 rather than the correct 11.

The Count

Observers arrived at count centres around 8am on 2 May 2008. No problems were reported accessing the count centres and on the whole staff seemed ready to greet observers and prepared to work under monitored conditions.

360 ## Count Centre Setup

The count took place in three centres across London. Each count centre housed a number of constituency counts, as follows:

Alexandra Palace

- Barnet & Camden

- Brent & Harrow

- Enfield & Haringey

- North East (Hackney, Islington, Waltham Forest)

ExCel

- Greenwich & Lewisham

370 - Bexley & Bromley

- City and East (Newham, Barking & Dagenham, Tower Hamlets and City of London)

- Havering and Redbridge

Olympia

- Ealing & Hillingdon

- Croydon & Sutton

- Lambeth & Southwark

- Merton & Wandsworth

- West Central (Hammersmith & Fulham, Kensington & Chelsea, and Westminster)

- South West (Hounslow, Richmond Upon Thames and Kingston Upon Thames)

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ORG observers split into three teams. Each team had one team leader and one additional observer who remained at the count centre from the opening of the count centre until the last result was declared. The remaining observers were at the count centre in two shifts — either a

morning shift, from 8am to 2pm, or an afternoon shift, from 2pm until the final result was declared. Some observers from the morning shift stayed later than planned, or returned to the count centre in the evening to help out. ORG's Head of Mission, Becky Hogge, spent time at all three count centres during the day.

Observers were asked to fill out Count Centre Evaluation Forms (see Appendix II), as well as to take freehand notes on what they saw during the day.

390   **Count compounds**

Each count centre had a separate count compound for each constituency count taking place there. Each (usually rectangular) compound had tables set out around the periphery of the compound, with a further bank of desks set out in rows in the centre of the compound. This central bank was where the ballot boxes were kept, placed on top of and underneath the tables.

Figure 2: Aerial view of constituency count compound

The compound was roped off, and observers, party agents and candidates were not permitted to enter it. The count activity took place on the tables around the edge of the compound, in full view of all those present to watch the count. Scanning generally took place on the tables along the length of the compound, with registration and first-level adjudication taking place on tables
400   at one end of the compound, and verification and second-level adjudication taking place at tables at the other end of the compound, where there was also a large projector screen for second-level adjudication. At this other end were also two desks marked "CRO Count Progress"

and "Indra Service Delivery Manager". The setup was relatively clear and there were some good practices observed, such as taking all cables from terminals directly to a single conduit. All workstations were labelled clearly and all of the PCs, with the exception of the CRO count progress PC and Indra Service Delivery PC, had dual screens – one facing count staff and one facing observers.

Figure 3: A scanning desk, with dual screen

PCs were thin clients running Windows XP Pro and were connected via Ethernet, with smartcard readers attached. All PCs had mice. PCs at the registration desk in addition had numeric keypads, and the PC at the second-level adjudication desk had keyboards. At the scanning station, scanners were connected to PCs via USB, and were equipped with barcode readers in addition to smartcard readers. Additionally, there was a bank of plasma screens displaying information about count progress and provisional results for constituencies in each count centre.

Indra Service Desk

As well as several count compounds, each count centre housed a server compound and a bank of desks with several laptop computers with operators off to the side. These were positioned against a wall, and had no observer screens and no labelling as to their function in the count. This was the "Indra Service Desk". None of this equipment was labelled, so observers in ExCel asked if they could be shown round.

Initially, the ExCel observers were refused access to the Indra Service Desks. However, after some discussion the Indra team offered to show round two ORG observers as well as a representative from the Electoral Commission. Despite requests, observers were not granted similar access at either Olympia or Alexandra Palace.

At ExCel, the servers contained two Windows domain controllers, two machines in a cluster running the central vote-recording database using SQL Server, a large disk array and two NetApp FAS3020c boxes, which served screens to all the machines being used in the count. The rack was connected to two uninterruptable power supplies to keep the system up in the event of a power failure to the main complex.

The laptop computers at the Indra desk had the following functions, split among the various machines:

- monitoring network load, both locally and on the link between the count centre and City Hall;

- monitoring system resources, such as server load, temperature and memory use;

- monitoring load on the SQL cluster;

- monitoring the status of machines on the local network;

- administering the smartcard system used for authentication;

- monitoring the multimedia display being shown to agents/candidates on the plasma screens; and

- monitoring the adjudication queues.

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ORG observers noted that Fujitsu (which supplied the scanners) had an area at the Indra Service Desk in two of the three count centres. For most of the day, a scanner was also present at the Indra Service Desk in ExCel, and Fujitsu employees were observed working on it at least once. An observer who spoke to a Fujitsu employee at Olympia was told that the Fujitsu laptops on the Indra Service Desk were not connected to the Local Area Network, but were connected to a separate, wireless network so that Fujitsu executives could check their emails during the day.

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The fact that Indra had equipment directly connected to the counting servers to which observers had limited or no access is, in ORG's opinion, a critical issue. ORG views this as a serious gap in the chain of accountability, as it could allow Indra employees unmonitored access to the central vote database.
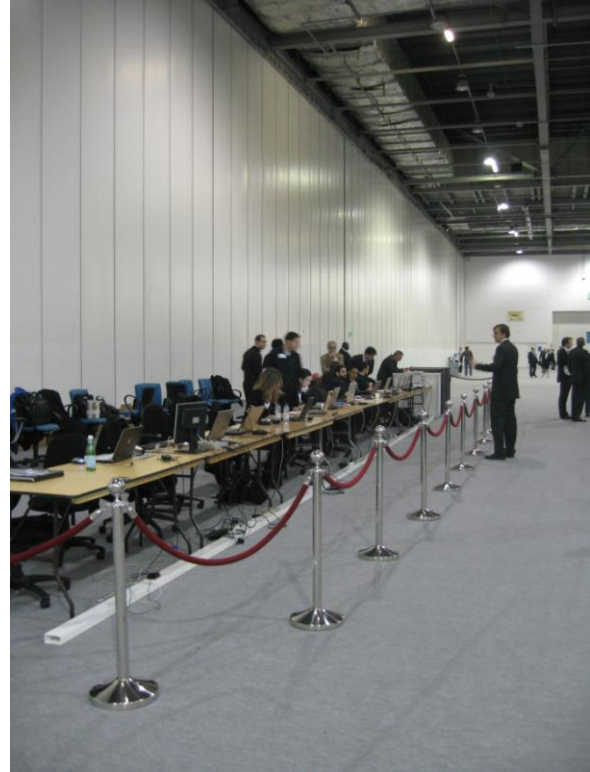
Figure 4: The Indra Service Desk at ExCel

The ballot boxes

Figure 5: Ballot box with detached seal

When observers arrived at the various constituency count compounds, they noted that several ballot boxes were observed with detached seals. Later, candidates and agents reported to ORG observers that they were unhappy with the makeup of the ballot boxes, which they thought were flimsy. One ORG observer noted that seals had been misapplied to ballot boxes so that the boxes could have been opened from the bottom leaving the seals applied to the tops intact. It is of significant concern that seals were already detached before the count began.

Zero reports

The zero reports were produced from the system and shown to all the observers present. These consisted of two reports for each election (Mayor, Constituency Assembly Member and London-wide Assembly Member). One showed that the system was empty of votes, and the other showed that no ballot boxes had been registered on the system. A further zero report showed that there were no rejected votes registered on the system.

In one constituency, no announcement was made to observers, candidates or agents to explain that zero reports were about to be produced. Another observer reported that the actual act of printing the zero reports from the system had not been seen.

It should be noted that the zero reports seen by observers, candidates and agents did not in themselves prove that the count system was empty of votes before the scan began. They can only be understood as a valid check on the system in concert with a full audit of the system together with an audit of the measures in place to ensure that the system being tested is the same as the system deployed on count day. One agent expressed the following view of the zero reports: "that's just numbers on a piece of paper".

Registration of the Ballot Boxes

The London Elects E-Counting Factsheet[9] has this to say on the subject of ballot box registration:

> Each ballot box has a number that links it to the polling station and borough that it came from. It also has a number on it, recorded by the presiding officer at the polling station. This represents the number of ballot papers issued at the station that should be inside.
>
> This information is registered on the e-counting software to be used for verification later on in the counting process.

Registration was handled by count centre staff working in pairs, and appeared to go well. Once a number had been entered onto the system for the ballot papers issued at the station it could not be changed. This caused minor problems at the end of the process in at least one constituency (Enfield and Haringey), just before the declaration of results, when it appeared that one entry for this figure had been miskeyed. This caused a significant discrepancy that in turn contributed to a discrepancy approaching the margin of the winning candidate. This situation delayed declaration and caused uneasiness among candidates and agents.

Scanning

The London Elects E-Counting Factsheet[10] has this to say on the scanning process:

> Once all the ballot boxes have been registered the count starts. The first ballot box is allocated to a free scanner for scanning to begin.
>
> The scanner performs a number of operations at the same time.

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[9] http://www.londonelects.org.uk/pdf/FS7-E-counting.pdf
[10] *ibid*

> - It checks against various security features to ensure the ballot paper is genuine.
>
> - It counts the number of ballot papers being fed through it.
>
> - It records how each vote has been cast and stores images of 'doubtful' ballot papers.
>
> If a ballot paper cannot physically go through the scanner – for example if it is torn – it is entered manually into the system by an election official.

In practice, scanning began before all ballot boxes had been registered. Observers reported a number of issues to do with the scanning of the ballots, detailed below.

520 **Scanner Jams**

At each compound, there were roughly between 10 and 16 scanners, each manned by two people — one scanner operator, employed by Indra, and one member of count staff. The count staff sorted through the ballot papers some, but not all, unfolding folded ballots and removing items such as polling cards, then divided the ballots into batches, which were then scanned by the Indra scanner operator.

Postal ballots were scanned first. These appeared to cause the scanners considerable difficulties, and soon after scanning began jams were occurring frequently. These jams were attributed both to the fact that postal ballots had been folded and to the suggestion that glue from the envelopes had rubbed off on the ballots themselves and was sticking in the scanners.
530 Observations later in the day supported the possibility that postal ballots might have caused particular problems for the scanning equipment; it was noticed that scanner jams occurred less frequently after the postal ballots had been scanned successfully. One observer, however, reported that folded ballots continued to cause problems for scanners throughout the day.

In many instances, sometimes after briefing from senior Indra staff, jams were cleared proficiently. However, a lack of training about how to deal with scanner jams was observed. The correct procedure appeared to be to rescan the entire batch. Instead,
540 scanner operators occasionally appeared to continue from where they left off. This is likely to have caused errors observed at later stages in the process. These included, for example, at the verification stage, variance between ballot paper accounts filled out at polling stations and the number of ballots reported as scanned, and, at the second-level adjudication stage, the appearance of duplicate ballots. Indra
550 senior staff told observers that Indra

Figure 6: Fujitsu employees remove a faulty scanner

scanner operators were hired in from temping agencies and had received less than one day's training prior to 2 May 2008.

Scanner Maintenance

Scanners were cleaned at scheduled intervals. Unscheduled maintenance also appeared to take place.

At Olympia, an observer reported that a scanner was replaced with another scanner, which had been insecurely stored adjacent to the Indra Service Desks. Later in the day, ostensibly after scanning was complete, the machine that had been replaced was reinstated, and the replacement scanner taken away. Another observer at Olympia received reports from Indra staff that a faulty scanner was introducing artefacts onto ballot paper images.

560

Transparency

Each scanner terminal had an operator-facing screen and an observer-facing screen. During the scanning of a batch, the observer-facing screen showed a bar chart as well as thumbnail images of each ballot as it was scanned.

The bar chart had seven bars. The legend beneath the bar chart was as follows:

Our ref	Legend displayed on screen	Colour of bar
a	Not ident	Red
b	I_C_C&S_P_R	Pink
c	I_C_C&S_G_R	Peach
d	I_C_MY_P_B	Light Green
e	I_C_MY_G_B	Dark Green
f	I_C_LM_P_A	Dark Blue
g	I_C_LM_G_A	Light Blue

Table 1: Legend of bar chart displayed to observers during scanning stage

The bars that grew the fastest were b, d and f. Observers concluded over time and after discussion that b, d and f represented Constituency Assembly Member ballots, Mayoral ballots and London-wide Assembly Member ballots respectively, and that a represented ballots which could not be identified. However, the identity of c, e and g remained unknown until much later.

570 One observer team, noticing that c, e and g were occasionally registering votes, asked a senior Indra staff member what the bars represented. They were told that all questions should be directed to the Constituency Returning Officer. When asked the same question, the Constituency Returning Officer stated that he did not know what the bars represented, and that he would have to consult Indra. Later, he came back to the observer team with the response that he was not allowed to tell the observer team what these bars represented because of an agreement between London Elects and Indra, but that a representative of London Elects would be able to tell the observer team what c, e and g represented.

In terms of transparency this sequence of events was unsatisfactory. Given that c, e and g turned out to represent ballot papers that were slightly larger than the standard ballot paper size

580 because they had been torn from the ballot book incorrectly - observers were later to find out that the legend included Spanish abbreviations for 'large' and 'small' – this sequence of events is baffling. ORG sees absolutely no reason why the legend beneath the bar chart should not have been made clear to observers from the outset.

Moving on to the thumbnail images, ORG sees a missed opportunity in terms of the transparency of this stage of the process. ORG questions the utility of the thumbnail images: they were neither large enough to be seen by the naked eye nor accompanied by any indication of how the system was translating them into recorded votes. However, ORG notes that although incorporating both these measures could improve transparency, it could only do so in concert with a full audit of the system together with an audit of the measures in place to ensure that the

590 system audited is the same as the system deployed on count day.
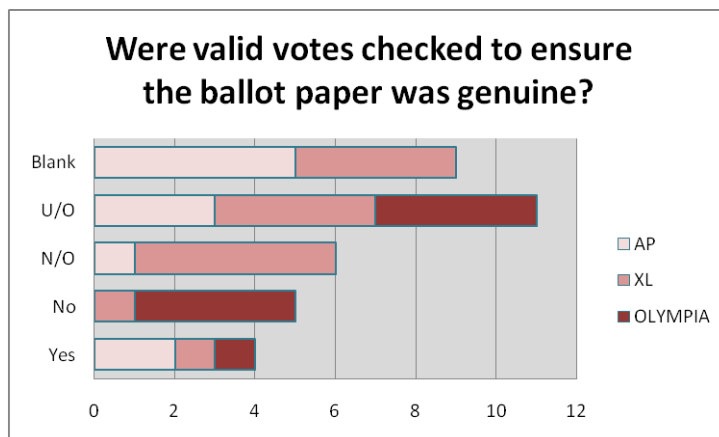
Chart 1: Quantitative analysis of observations - ballot papers

At the scanning stage observers were clearly unsure how to record what they were seeing. For example, when asked, "Were valid votes checked to ensure the ballot paper was genuine?", only four observers answered "Yes". The majority (11) of observers responded that they were "Unable to Observe" what was going on, while a further five observers concluded from their observations that valid votes were not checked to ensure the ballot paper was genuine.

The London Elects E-counting Factsheet states that the scanner "checks against various security features to ensure the ballot paper is genuine". However, the majority of ORG observers were not presented with enough evidence to conclude that this was what was happening during the scanning process.

Similarly, the London Elects E-counting Factsheet states that the scanner "records how each vote has been cast", but,when asked, "Were valid votes recorded", only six ORG observers answered "Yes", with 11 observers stating they were "Unable to Observe" this activity taking place.

Overall, hundreds of screens were set up by the scanners to show

meaningless or hard-to-interpret data to observers, party candidates and agents. This has cost implications to

Chart 2: Quantitative analysis of observations - valid votes

London's voters not only in terms of how much money was spent on these hundreds of screens, but also on party candidates, agents and observers whose time spent watching these screens was in effect wasted. But most importantly, the absence of transparency around how the system recorded valid votes is of deep concern. ORG notes that the KPMG source code audit excluded the software source code relating to scanning and recognising voters' marks. ORG further notes observations at the first-level adjudication stage that suggest that some blank ballots are likely to have been mistakenly recorded as valid votes by this software. ORG further notes that testing of the system against a manual count took place in September 2007, some seven to eight months before the system was deployed, during which time several changes to the software can be assumed to have taken place. All these observations lead us to conclude that ORG does not have enough evidence to state whether the results declared are an accurate representation of the intentions of the voters of London in these elections.

Error messages

Error messages were frequently observed during the scanning process. Typically, error messages can give insight into the internal running of a software program. Observers saw two error messages in particular which merit some analysis, provided below.

Error 1 – "Deadlock Error"

A "deadlock" error is caused by some variant on the following scenario: two or more processes want exclusive access to some resources, say A and B. In order to get exclusive access, each process acquires an "exclusive lock" on the resource. Once one process holds the lock, no other process can acquire it, and will normally "block" (that is, stop at the point of lock acquisition) it until the lock becomes available.
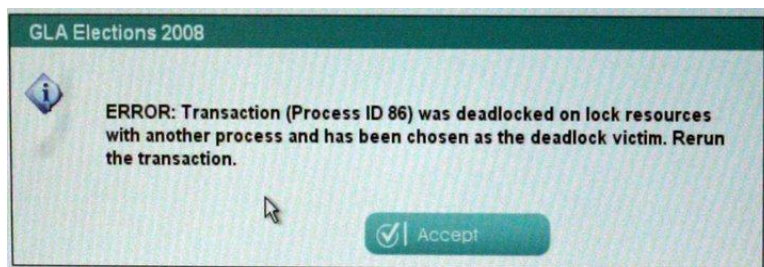
Figure 7: Deadlock error

650 If process 1 acquires a lock on A, then process 2 acquires a lock on B, then process 1 attempts to acquire a lock on B (and is therefore blocked) and finally process 2 attempts to acquire a lock on A then a "deadlock" arises: process 1 is blocked waiting for process 2 to release the lock on B, but process 2 is blocked waiting for process 1 to release the lock on A.

Obviously, this situation will never resolve itself, so the usual resolution is to pick a process to kill (that is, forcibly terminate), thus releasing its lock and allowing the other process to continue.

In a database context, this will normally cause the killed process to "roll back" its transaction — which means to undo any uncommitted changes it has made to the database. It is up to the system's designer to ensure that the process is restarted in such a way that it restarts the transaction that was rolled back. Without further insight into the software design, ORG cannot
660 determine whether this was done correctly.

However, it is generally considered better to make deadlocks impossible by the simple expedient of ensuring that all locks are acquired in the same order by all processes. ORG's analysis suggests that the Indra system was not designed in this way, indicating poor software quality and/or quality control.

Error 2 – Foreign Key Constraint conflict
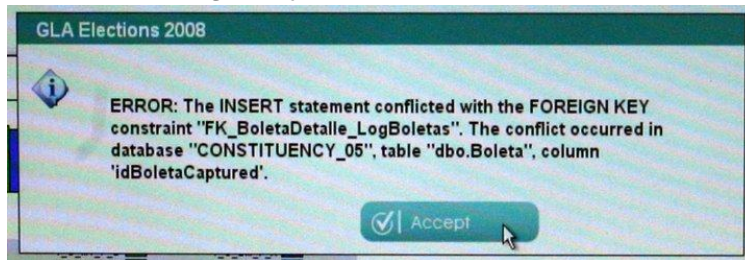
Figure 8: Foreign key constraint error

In a relational database, data is held in "tables", each of which consists of rows and columns. The columns are chosen in advance and the rows hold the actual data. It is best practice to "normalise" the data, that is, ensure that each piece of data is only held once. In general, this technique leads to a need for multiple tables which are linked together by "keys" (generally referencing a special column containing a unique ID, which is often just a number chosen sequentially for each new row). For example, an address book might have one table containing the names and IDs of contacts and another containing phone numbers and IDs, thus linking multiple phone numbers to a single contact.

680 When data is broken up in this way it is important to ensure "referential integrity" — that is, to ensure that each ID used in a subsidiary table is actually present in the master table. Referential integrity is generally maintained through "foreign key constraints" (the "foreign key" is the column in another table, the constraint is the requirement that the value exists in some row of that table). A foreign key constraint violation means that an attempt was made to add a row to a table that contained an ID not present in the master table. Rows that violate foreign key constraints are not added, since that would violate referential integrity.

Well-designed software should never cause a foreign key constraint violation. They are generally only added in order to ensure the correctness of the program in testing. Thus, the

presence of a violation in the Indra software is a symptom of poor software design and/or quality control.

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As a result of the violations, data may have been lost. However, ORG cannot tell for sure without actually looking at the code.

The above errors were seen quite frequently at first, but then died away. Later, scanner operators were observed hitting "Accept" every time they saw these errors. ORG does not, therefore, know how often they occurred — and ORG suspects that Indra does not know either.

ORG is surprised that these error messages were displayed to scanner operators, and ORG would be keen to know whether scanner operators received training on how to deal with such errors before 2 May 2008. Without further insight into the design and deployment of the system, ORG is unable to comment further on these errors.

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Error messages arising from duplicate ballots were also observed at second-level adjudication stage.

Further Observations

Open USB ports and unsecured power supply cords were observed on scanners at the outward-facing edge of the compound. However, given the presence of Indra operators and count centre staff, as well as other observers, these presented an opportunity only to disrupt proceedings, not to influence them covertly. One scanner was observed to assign 124 consecutive ballots to the "not identified" category, which seems implausible. ORG offers the interpretation that a fragment of torn ballot caused up to 124 valid ballots to be misread. Compared to the second-stage adjudication process, the scanning process was poorly

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observed by candidates and agents.

Ballot box verification

After the ballot boxes had been scanned, the system checked the number of ballots scanned against the figure recorded at polling stations on the Ballot Paper Account (BPA) and entered into the system at the registration stage. The London Elects e-counting factsheet[11] has this to say on the verification stage:

> When all the ballot papers from the ballot box have been scanned, the total number of papers scanned is verified by comparing it with the number recorded by the presiding officer on the ballot box. If there is a difference in the numbers election staff will investigate and may re-scan a batch of ballot papers.

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> Once the numbers are confirmed, the votes from that ballot box are counted and recorded on to the system. The system deals with all papers where a valid vote is clear or there is absolutely no mark on a ballot paper.

> Doubtful ballot papers are forwarded for adjudication.

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[11] http://www.londonelects.org.uk/pdf/FS7-E-counting.pdf

Procedures for dealing with ballot boxes where the number of ballots scanned did not match the number reported in the BPA varied across constituencies and across the day. A majority of observers reported that elections staff, guided by the CRO, were letting ballot boxes through within a margin of error of ± (plus or minus) 3 ballots. In one constituency, this margin was increased to ± 10 later in the day. In another constituency, the permissible margin of error was ± 6 ballots. One observer reports that the system was flagging ballot boxes for re-scanning which had no discrepancies between the two figures.

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Ballot boxes with larger discrepancies were sent back for re-scanning. Perhaps due to errors at the scanning stage, a significant number of ballot boxes came through with discrepancies between the two figures in the region of hundreds, and occasionally thousands, of ballots. Different constituencies adopted different strategies to deal with this. In one constituency, if, on a rescan, exactly the same discrepancy was reported, elections staff would telephone the Borough centre where the rest of the polling materials were stored and ask them to investigate. In another constituency, if the same discrepancy was reported twice, election officials would assume a mistake had been made at the polling place and let the box pass. In yet another constituency, the box would be re-scanned until the discrepancy fell within the tolerance level.

740 Although observers expended considerable effort to keep on top of what was happening at the verification stage, observing the process was difficult. The verification station had outward-facing screens for observers, but information on these screens was limited to information about ballot boxes currently being considered by elections staff, which meant that tracking problem ballot boxes was hard unless the observer was there to monitor decisions being made in real time. Observers wishing to ask questions of elections staff manning the verification station were often asked to put those questions to the CRO, and CROs were often busy manning the CRO adjudication station and otherwise overseeing activity in the count compound.

Many of these problems appeared to arise from the system design, with which verification staff were observed to have their own difficulties. The system often[12] did not allow staff to set aside

750 problem ballot boxes, meaning queues developed behind boxes which were awaiting the results of investigation from Borough polling staff, or decisions from the CRO. Further, the system did not allow records of decisions made at verification stage to be made. In one constituency, the verification team attempted to maintain paper records of decisions made. The absence of records of decision-making around the verification stage has significant implications for audit of the count, since count staff can neither change BPA figures once entered into the system, nor leave an explanation of why BPA figures do not match the number of ballots scanned.

It is clear that there are several valid reasons why BPA figures might not match the number of ballots registered by the scanners. BPA figures are derived from the number of ballots issued by a polling place: electors may well walk out of the polling place with unused ballots, or, in a

760 polling place where more than one ballot box is present, place their ballots in the wrong box. In addition, in at least one instance, miskeying at registration stage caused discrepancies to emerge. The verification process was poorly designed to cope with this level of human error —

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[12] Sometimes staff were able to skip problem boxes until later, sometimes they couldn't. At Ealing and Hillingdon, nobody managed to work out why.

and this before factoring in problems observed at the scanning stage. ORG's observations lead ORG to conclude that the verification stage, as a check on the accuracy of the scanners, was deeply flawed.

According to figures provided by London Elects after the election, out of a total of 4,355 ballot boxes, 674 ballot boxes needed to be re-scanned at least once (the most number of times a ballot box was rescanned was 5). In total, 1,463 rescans were performed during the count.

770   Compared to the second stage adjudication process, the verification process was little observed by candidates and agents.

Calculating variance across ballot boxes and boroughs
After the election, London Elects provided ORG with variance figures for all the ballot boxes used in the London elections. London Elects have chosen to calculate variance as the net sum of the variances of each ballot box in each constituency. However, given that a missing ballot in one box is not necessarily accounted for by an extra ballot in another box, and that both a missing and an extra ballot should be of equal concern when judging the integrity of an election, it could be equally valid to count absolute variance. By way of an example, figures for City of London are reproduced below.

Ballot Box	Papers	BPA	Difference	Absolute variance
C001	1,227	1,227	0	0
C002	1,776	1,773	3	3
C003	1,781	1,777	4	4
C004	969	979	-10	10
C005	837	837	0	0
C501	917	917	0	0
C502	474	474	0	0
C503	643	643	0	0

Ballot Box	Papers	BPA	Difference	Absolute variance
C504	900	900	0	0
C505	326	326	0	0
C506	650	649	1	1
TOTAL			-2	18

Table 2: Ballot box variation figures for City of London

For City of London, adding together all the differences gives a net figure of -2 ballots difference across the borough, but calculating the absolute variance gives a figure of 18 ballots difference across the borough. Neither the "Difference" approach, nor the "Absolute Variance" approach is an adequate mechanism for capturing how the total ballot papers scanned by the equipment varied from the total ballot papers issued at the polling stations. The "difference" approach assumes that lost ballots from one box will *always* end up in another box, while the "absolute variance" approach assumes this will *never* happen. In reality, ballots ending up in the wrong box will account for only some of the variance observed. However, it is worth noting that in the Constituency election in at least two constituencies, the "absolute variance" figure is greater than the winning margin.

	Constituency Member Margin	Absolute Variance
Brent and Harrow	1649	5251
Enfield and Haringey	1402	2130

Table 3: Absolute variance versus winning margin

How do these differences of approach compare at the level of the entire election? The "difference" approach generates a figure of 301 extra ballots scanned than were supposedly issued at the polling stations. Given that it is unlikely that ballots from one borough would end up in the ballot box of another (although this was observed at least twice on count day), it might be sensible to take an "absolute variance" approach to calculating the London-wide figure from each of the borough's "difference" figures, an operation which generates a figure of 10,125

ballots unaccounted for across London. Taking the absolute variance approach at both borough and London-wide level generates a figure of 41,213 ballots unaccounted for.

Approach	Total Variance (ballots issued vs. ballots scanned)
Net Difference	+301
Net Difference + Absolute Variance	10,125
Absolute Variance	41,213

Table 4: Election-wide approaches to ballot variation

These figures illustrate the level of uncertainty in the declared results that a flawed ballot box verification process can introduce.

First level adjudication

800   The London Elects e-counting factsheet[13] has this to say on the first level adjudication stage:

> At first level adjudication, all the doubtful ballot papers are looked at by elections officials. If the voter's intent is clear, the officials manually enter the votes and accept the ballot paper. If the voter's intent is unclear, the election officials pass the ballot paper to the Constituency Returning Officer (CRO) for second level adjudication.
>
> No votes can be rejected at first level adjudication.
>
> The images of the ballot papers can be viewed on screens identical to those the election officials use, so that election observers can see the decisions being made."

Figure 9: First-level adjudication desks

Each constituency compound had several first level adjudication desks, each one normally, though not always, manned by two members of count staff. Throughout the day, long periods of inactivity were observed on the first level adjudication desks.

Inconsistency was observed across first level adjudication decisions, with some doubtful ballots being accepted where other similarly doubtful ballots had been sent to second level adjudication. Observers did not receive guidance on the procedure for adjudication decisions until

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[13] http://www.londonelects.org.uk/pdf/FS7-E-counting.pdf

after the elections. Guidance shown to ORG by London Elects instructs CROs to make examples of valid and invalid ballots available to candidates and agents during the count, but observers rarely saw this taking place.

Adjudicators were observed racing one another to get through batches of ballots sent to first stage adjudication, an understandable if unpredictable effect of the long periods of inactivity adjudicators were subjected to. This made observation of the first stage adjudication process challenging.

One observer reported that at one stage, a first-level adjudication screen showed ballots disappearing from the screen without action from the member of count staff manning that station. The observer reports that:

> "We didn't know where they (the ballots) were going. Perhaps they were being sent for secondary adjudication, perhaps they were just being accepted, perhaps they would even come around again"

Indra were called over to investigate but could not immediately give an explanation of why this may have happened, and promised to investigate further.

Several ballots observed at first stage adjudication demonstrated that the scanners were picking up all marks made on the paper ballots. So, where a ballot had a clear cross in one box, and a speck of something else, be it ink or dust, in another box, a ballot was marked doubtful by the system and sent to adjudication. Here, subjected to the human eye, the vote cast by the speck of ink could be unchecked, and the valid vote recorded. This indicates that the scanners had been calibrated to accept faint marks as votes, giving rise to the question of how the system dealt with ballots that are obviously blank to the human eye, but which have a speck of ink or dust on them in one box only.

It is possible, indeed based on ORG's observations it is probable, that such ballots were recorded as valid votes for the candidate against whose name the speck of ink or dust appeared. ORG put this to London Elects in ORG's post-election meeting and they accepted that this was a highly likely scenario, commenting:

> "Clearly on that point you understand getting the balance right on sensitivity so you don't miss an intended mark but also you don't count too many specks of dust as valid votes is one of the core problems."

Short of recounting all the ballots by hand, there is no way of knowing whether this had a significant effect on the result of the elections.

Second-level adjudication

The London Elects e-counting factsheet[14] has this to say on the second-level adjudication stage:

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[14] http://www.londonelects.org.uk/pdf/FS7-E-counting.pdf

> The CRO adjudicates all the ballot papers that have been referred to him or her at
> second level adjudication.
>
> The CRO can reject votes if they are not valid – for example if a voter has voted for too
> many people or they have spoiled their ballot paper. This is done in consultation with
> agents from the political parties.

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Each constituency compound had one second level adjudication desk, with a large projector screen behind it so that observers, candidates and agents could see decisions being made. In more than one constituency, another second level adjudication station was opened on one of the first level adjudication desks. This was often poorly advertised by elections staff, such that these second desks had fewer observers monitoring decisions being made. Neither these secondary stations, nor the primary second level adjudication station, were continuously

860 manned by the CRO.

Inconsistency was observed across second-level adjudication decisions, and observers did not receive guidance on the procedure for second-level adjudication decisions until after the elections. Guidance shown to ORG by London Elects instructs CROs to make examples of valid and invalid ballots available to candidates and agents during the count, but observer rarely saw this taking place.

Figure 10: Barriers to interaction? Second-level adjudication at ExCel

Candidates and agents complained to observers that the consultation process was "adversarial" and "mechanistic". It did appear that the adjudication interaction had not been thought through. ORG noted that it was difficult (psychologically and physically/verbally) for observers to intervene where they are corralled behind a cordon while the count centre staff are hidden behind computer monitors and have their hands hovering over the keys on a keyboard. What is the interaction convention for this scenario? What is the "script" for these particular scenarios? Candidates and agents appeared unsure, and this draws ORG to conclude that objections to adjudication decisions occurred less frequently as a result.

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Several technical issues were observed. CROs and others manning this stage of the process were unable to return to and overturn adjudication decisions. ORG received a report from a party agent that he had seen a valid vote for another party rejected at second-level adjudication stage. The agent reported that adjudication decisions were happening so fast that he could not challenge the adjudicators until after they had clicked "Accept". The adjudicators, having been challenged on this decision, attempted to go back and change the decision, but found that they were unable to. Indra were called over to try and fix things, but they were unable to bring the ballot back into the adjudication queue to have the adjudication decision changed. The agent was told by the CRO that the vote would be recorded as being lost due to administrative error.

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One observer noted that adjudication screens occasionally froze, and that on one occasion where an adjudication screen froze and a CRO had clicked on the "accept" button more than once, that click was retained and transmitted once the screen unfroze, which could have had the effect of accepting the following ballot (although in this case, it did not, as the system recognised the ballot was in an unsubmittable form).

Observers reported that ballots occasionally appeared at second-level adjudication with the wrong checkboxes alongside them, that is, that an image of a Mayoral ballot appeared next to check boxes associated with votes for a London Assembly member, and vice versa. These ballots were rejected, and the voters disenfranchised. Observers also reported two instances where a ballot for the wrong constituency appeared at second-level adjudication stage — again, these ballots were rejected and their voters were disenfranchised.

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Further observations

Smartcards
Access to the system was via single-factor authentication using role-based smartcards. According to the Count Centre guidelines issued by London Elects, CROs held ultimate authority over smartcards, and the Smart Card log represented part of the count documentation to be retained by the CRO as evidence that the count was properly conducted.

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One observer reported that 17 second-level adjudication smartcards were handed out at Merton and Wandsworth. ORG would be keen to understand why so many second level adjudication smartcards were issued in this instance. Another observer reported that a whole folder of smartcards was left unattended at a desk (although Count staff were "nearby").

Entering ballots manually

Ballots which could not be fed through the scanners were entered manually into the system. This procedure was dealt with differently in different constituencies. On one occasion there was some doubt about the intention of the voter and the CRO was called over to the table to adjudicate from the paper ballot. In another case ballots were observed being manually entered - and in one case rejected - without a CRO present. Votes that were manually entered were not
910   projected onto big screens with the result that observers could not see decisions being made.

One agent commented to ORG observers: "There are half a dozen votes being entered from this box and there's nobody here to see. He could have entered anything he liked. If that's going on at tables up and down here, then anything could be happening. With a manual count, you are nearer the table, and you can see that ballots are properly counted as they are put into candidate trays. It's very clear."

Retrieving paper ballots

On no occasion in any constituency did any observer see original ballots being retrieved where there was doubt about the voter intention or the validity of the ballot. At Olympia, one observer received a report from a party agent that he had been told that a doubtful ballot could not be
920   retrieved because "it had been scanned ten minutes ago". Again at Olympia, a partially obscured ballot which could not be accepted as a valid vote was rejected, rather than retrieved in paper form. As noted above, observers also reported two instances where a ballot for the wrong constituency appeared at second-level adjudication stage. These ballots were rejected and their voters were disenfranchised, rather than being retrieved and transferred to the correct constituency. From observations ORG concludes that ROs were possibly unwilling and, more likely, unable to retrieve paper ballots. This is wholly inadequate.

Ballot design

London Elects commissioned qualitative research company Cragg Ross Dawson to evaluate four Mayoral and two constituency ballot paper designs. Cragg Ross Dawson were also behind
930   the "focus-grouping" of the controversial ballots used in the Scottish elections in 2007[15]. The Cragg Ross Dawson research for London Elects reported opinions and some data on success rates. However, it is worth noting that opinion data is often misleading where issues of ease of use are concerned. For example, participants may report liking a design that suffers from poor usability for superficial or unconnected reasons (e.g. visual appeal, or environmental concerns).

While several designs were considered in the research process, there appeared to be no expert interaction design input to the process, and the Cragg Ross Dawson work added little to the pre-existing knowledge on the mayoral ballot design. Interaction design (and its subset forms design) is a specialist field with a large body of academic and professional literature. If public money is to be used to contract third parties to provide research on ballot design, it would seem
940   appropriate to consider contracting agencies with relevant interaction design experience, such as specialist forms design, interaction design, or usability agencies, rather than market research firms without specialist design expertise.

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[15] Cragg Ross Dawson *Ballot Paper Designs for Scottish Parliament Elections 2007* (August 2006)

Experience of candidates and party agents

Many candidates and agents ORG spoke to were happy with the way the election was being run. But a significant number of candidates and agents who spoke to ORG observers had doubts about the technology. The lack of transparency was an issue for some candidates and agents ("Once you hand over control, anything can happen", "The counting is done by the software. You can make an edit to the software to make the result you want."), with one commenting that "There's an unease about it. We feel quite detached from it. There's very little understanding of what is going on. 95% of the votes that go through you can't see". Candidates and agents were also worried about the ballot boxes with detached seals.

Some candidates and party agents felt alienated from the electronic system: "There's no feeling of ownership of the system here. It's Indra."; "It's all smoke and mirrors. We have this display, but I still don't know what that means". Others felt that they were not getting enough of a "feel" of the progress of the count: "With all the boxes in the middle there, you don't know where they are from, you can no longer assess the volumes of boxes."

Figure 11: Candidates and agents at ExCel

Most of all, candidates and party agents focussed on the time taken to count the vote, and questioned what the new technology brought to the table. Two of the winning candidates at ExCel made mention of these issues in their acceptance speeches:

"We have to ask ourselves whether this new technology is the correct way to do it, as it seems to take three times as long.". —John Biggs, Labour (Winning candidate for Constituency Member election, City & East)

"It does make you wonder whether this technology is appropriate, when we spent 12 hours on a count and we still don't know the result. Members of Parliament would never put up with it themselves. So why do Members of Parliament inflict this on us?" — James Cleverly, Conservative, (Winning candidate for Constituency Member election, Bexley and Bromley

Declaration

The London Elects E-Counting Factsheet has this to say on Declaration:

> Once all the votes have been counted and adjudicated, the results are calculated. The result for the Constituency Assembly Member is announced by the CRO at the count centre.

> The number of votes cast for the Mayoral candidates and London-wide Assembly seats is stored and it is sent securely to City Hall where the results are calculated. The Greater London Returning Officer will declare the results for the Mayor of London and the London-wide Assembly Members in the Chamber at City Hall.
>
> The whole process should take around 12 hours.

980 **At the Count Centre**

Several observers reported "ghost ballots" that were stuck in the system but could not be located, which caused delays to the declaration and transmission of results. Further delays were caused in at least one constituency, where discrepancies at the verification stage appeared to approach the margin of the winning candidate, causing unease among candidates and party agents. The CRO attempted to calm the situation, stating that "This has been verified by KPMG, so it will add up". One candidate asked "So we have to take it on trust…?", to which the CRO replied "Well, it's double-scanning and…<shrug>".

Overall, the e-count took approximately 3½ hours longer than expected. Although at the time Greater London's DRO John Bennett ascribed this to higher turnout, ORG believes that
990   problems with scanning postal votes, combined with a high number of re-scans at the verification stage, also made a significant contribution to the delay.

At City Hall

ORG observers from the morning shift arrived early at City Hall for the declaration of results, and were joined later by observers from the ExCel count centre after the counts had finished there. In total, seven ORG observers attended City Hall.

All agents, candidates and observers were allowed in the Central Calculation Room to listen to the results from each constituency being read out by DRO John Bennett. However, in practice there was limited space so many chose to remain outside.

The first results were read out just before 9pm. These were from Brent & Harrow, and were
1000   followed by North East and City & East. Following the first batch of results, one observer remained in the Central Calculation Room and talked to John Bennett about the setup of the room. He was very approachable and happy to talk through who everyone was and what they were doing.

On the left side of the room were Indra staff with a live link to all the count centres, scanners and adjudication data. The observer was told that all data was streamed live and securely from the count centres as it happened. Mr Bennett had his own computer with all the live information on "just about everything that was happening". There were also four or five fax machines for emergency backup. Three further London Elects PCs were looking at particular aspects of the data. Two Greater London Authority media officers were posting results on the Internet as soon
1010   as they were ready after being announced.

After the election, one observer noticed a discrepancy between different sets of published vote data on the London Elects website. After enquiring with London Elects, ORG was told that data

from two ballot boxes had transmitted incompletely, but that this had not affected the overall result.

Observers were told that the final mayoral result would be calculated by a computer. The raw data would also be fed to three London Elects employees. Each of these had set up a separate database and set of spreadsheets to calculate the result. The result would be declared when all three of them and the main computer agree on the numbers.

1020 Just before the second batch of results was called, agents and candidates were called back in. However, observers, including one from the Electoral Commission, were asked to stay outside. After the Electoral Commission intervened the observers were let back in. At 11.36pm, all present were summoned to the Chamber to hear the final result.

Conclusions and Recommendations

ORG recognises that elections are challenging projects that must deliver confidentiality, accuracy, integrity and transparency. In delivering the May 2008 elections without significant procedural hitch, London Elects has demonstrated a level of project management that far outstrips the project management that ORG saw lacking in the delivery of the English e-voting and e-counting pilots and the Scottish e-count in May 2007.

1030   ORG also commends the spirit in which London Elects has sought to enhance transparency around the May 2008 London e-count. However, as has been noted in various sections of this report, the level of transparency is not yet adequate. There is insufficient evidence available to allow independent observers to reliably state whether the results declared are an accurate representation of the intentions of London's voters.

If the audits commissioned from KPMG are to be understood as a transparency measure, then it is unacceptable that they are not available in full to the general public. In light of the database errors observed and documented here, question marks remain over the quality of the software deployed in the e-count. Perhaps the KPMG source code audit would answer those questions — but until it is published this remains unknown.

1040   Even if the KPMG audit were published, the fact that its scope precludes examination of the much of the codebase involved in delivering the London elections — including the code that recognises voters marks and the operating system upon which the code runs — serves to limit its usefulness as an aid to transparency. A more fundamental concern is that even a full audit, published and made available to the public in good time before the election, would still exclude candidates and agents without the skills necessary to interpret it from undertaking their traditional role as election observers.

ORG rejects the assertion that the user acceptance testing of September 2007, where 120,000 ballot papers were both scanned and manually counted, is a sufficient measure of the accuracy of the system some seven to eight months later, not least because ORG would expect significant changes to have been made to the software and hardware during this time. On count

1050   day, efforts towards transparency around the recording of valid votes were nothing more than a pretence: hundreds of screens were set up by the scanners to show almost meaningless data to observers, party candidates and agents, while officials admit that underneath the system was likely to be recording blank ballots as valid votes.

Poor system design around ballot box verification is also a concern. This stage in the count process has the potential to act as a check on scanner accuracy. But because officials were unable to record likely causes of ballot box variance, this check has been obscured. In its place is a dataset that is open to question, with potentially as many as 41,000 ballots unaccounted for and the only justification being human error at any one or more of at least three stages in the election administration process.

1060   Poor system design is also evident from the deadlocks observed at the scanning stage, from the bug observed at the first-level adjudication stage and the freeze observed at second-stage

adjudication, to the observation that the system did not allow CROs to go back on adjudication decisions once they had been entered into the system.

The fact that Indra had equipment directly connected to the counting servers to which observers had limited or no access is, in ORG's opinion, a critical issue. ORG views this as a serious gap in the chain of accountability.

Finally, ORG expresses strong concern that no observer reported CROs retrieving ballot papers where the scanned images were insufficient to determine voter intention. ORG has received assurances from London Elects that the system was designed so that paper ballots could be
1070   retrieved where necessary. That no CRO chose to exercise this ability represents either poor training or a cavalier attitude toward voter disenfranchisement.

Many of these problems can be solved, but it is important to ask: at what cost? ORG makes several recommendations for improved transparency of any future e-count overleaf, but ORG's headline recommendation is that London Elects undertake a full cost-benefit analysis of the electronic count compared to a properly-costed manual count of a similarly complex election. Although the problems posed by e-counting are not as completely insurmountable as the challenges presented by e-voting, it remains ORG's position that e-counting presents considerable risks to the integrity of our democracy, and that these risks outweigh any benefits the systems might potentially offer.

1080   **ORG concludes that there is insufficient evidence available to independent observers to state reliably whether the results declared are an accurate representation of the intentions of voters in the May 2008 London elections. Given these findings, ORG remains opposed to the introduction of e-counting in the United Kingdom, unless it is proved cost-effective to adopt ORG's recommendations for increasing transparency around e-counting.**

Recommendations
ORG's position is that e-counting obscures the workings of elections from voters and candidates. Mitigating this risk in order to sufficiently enhance the transparency of e-counts could well be more expensive than sticking with manual methods. ORG has received comments
1090   that suggest that e-counting is inevitable and that opposing these technologies is a Luddite view. ORG disagrees, and considers it telling that a significant proportion of those concerned about voting and counting technologies are computer scientists and professionals, who are normally the most enthusiastic adopters of new technology.

The political climate is still in the shadows of the chaotic May 2007 e-count in Scotland, and the electoral timetable is likely to preclude the deployment of computers in elections for the next two years. For the moment, therefore, ORG recognises that elections administrators may be turning away from experimenting with e-counting technologies in statutory elections. However, ORG suspects that in two years' time these deterrents may have faded and legislators may feel eager to experiment with e-counting again. ORG therefore makes the following recommendations for
1100   improved practice in e-counting below, and refers any legislators tempted to reopen the

Pandora's box of e-voting to the conclusions and recommendations of ORG's May 2007 elections report.

- **Recommendation 1:** A full cost-benefit analysis of electronic counting at the London elections in May 2008 should be performed by London Elects. The analysis should be set against a properly-costed manual count of similar scope. London Elects should also cost the following recommended enhancements to the electronic count, including:

  - A statistically significant live manual audit on count day, or some other effective means, accessible to the layperson, of monitoring votes that are counted as valid

  - A comprehensive, independent audit of all source code deployed on e-counting systems, made publicly available before the elections

  - Improved record-keeping facilities at the ballot box verification stage

  - Improved transparency around the contractor's service management desk

  - System-designed assurance that the voter's paper ballot remains the ballot of record so that, for example, paper ballots can easily be retrieved by CROs wishing to ascertain the intention of a voter where this is not clear from the scanned image of a ballot.

- **Recommendation 2:** Time should be given for formal consultation — at national and local levels — prior to the approval of e-counting being used in an election.

- **Recommendation 3:** Administrators should remain committed to long lead-in times for procurement and implementation of election technology. Based on the experience of London Elects, ORG revises this figure upwards from one year (as recommended in ORG's May 2007 report) to 18 months as a suitable application and implementation timetable.

1110

1120

Appendix I: Polling Place Evaluations

Did the Presiding Officer (PO) show to all present that the ballot box(es) was empty?

Yes	0
No	1
Not Observed	27
Unable to Observe	2
Blank	1

Did the Presiding Officer close and seal the ballot box(es) before opening the polling station?

Yes	1
No	0
Not Observed	27
Unable to Observe	2
Blank	1

Did the polling station open at exactly 0700?

Yes	0
No	1
Not Observed	27
Unable to Observe	2
Blank	1

Were voters asked to state their name and address or present a polling card?

Always	28
Sometimes	3
Never	0
Not Observed	0
Unable to Observe	0
Blank	0

Did polling officials mark the register of electors?

Always	31
Sometimes	0
Never	0
Not Observed	0
Unable to Observe	0
Blank	0

Did polling officials call out the number and name of the voter?

Always	19
Sometimes	5
Never	5
Not Observed	1
Unable to Observe	0
Blank	1

Did polling officials write the voter's number on the corresponding numbers list?

Always	29
Sometimes	0
Never	0
Not Observed	1
Unable to Observe	0
Blank	1

Were any ballot papers torn while being detached from the books by polling officials?

Yes	6
No	25
Not Observed	0
Unable to Observe	0
Blank	0

Did polling officials check to see that ballot papers included the unique identifying mark?

Always	10
Sometimes	7
Never	6
Not Observed	4
Unable to Observe	0
Blank	4

Did polling officials clearly ask the voter not to fold the ballot paper when voting?

Always	13
Sometimes	15
Never	2
Not Observed	0
Unable to Observe	0
Blank	1

Were voters able to mark their ballots in privacy?

Yes	31
No	0
Not Observed	0
Unable to Observe	0
Blank	0

Was the voter asked to show the official mark on the back of the ballot before placing it in the box?

Always	1
Sometimes	2
Never	27
Not Observed	1
Unable to Observe	0
Blank	0

Was the voter encouraged to post the ballot paper in the box face down and flat?

Always	12
Sometimes	16
Never	2
Not Observed	0
Unable to Observe	0
Blank	1

Did the polling station close at exactly 2200?

Yes	8
No	0
Not Observed	15
Unable to Observe	1
Blank	7

Did the PO close the aperture of the ballot box and secure it using the seal provided?

Yes	8
No	0
Not Observed	15
Unable to Observe	1
Blank	7

Did the PO fill in the Ballot Paper account?

Yes	6
No	0
Not Observed	15
Unable to Observe	1
Blank	9

Appendix II: Count Centre Evaluations

Was the counting equipment "zeroed" before the procedure began?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	6	2	3	11
No	0	0	0	0
Not Observed	3	10	4	17
Unable to Observe	1	0	1	2
Blank	2	0	1	3

Was each ballot box shown to be securely sealed before it was opened?

	AP	ExCeL	OLYMPIA	TOTAL
Always	1	0	0	1
Sometimes	4	3	2	9
Never	0	0	0	0
Not Observed	4	9	4	17
Unable to Observe	1	0	0	1
Blank	2	0	3	5

Was each ballot box successfully registered on the e-counting system?

	AP	ExCeL	OLYMPIA	TOTAL
Always	1	4	3	8
Sometimes	1	0	0	1
Never	0	0	0	0
Not Observed	5	8	4	17
Unable to Observe	1	0	0	1
Blank	4	0	2	6

Had every ballot box been registered before the count started?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	0	3	0	3
No	0	4	0	4
Not Observed	5	9	4	18
Unable to Observe	1	0	0	1
Blank	4	0	2	6

Were valid votes checked to ensure the ballot paper was genuine?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	2	1	1	4
No	0	1	4	5
Not Observed	1	5	0	6
Unable to Observe	3	4	4	11
Blank	5	4	0	9

Were valid votes recorded?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	3	1	2	6
No	0	0	0	0
Not Observed	1	5	0	6
Unable to Observe	1	5	5	11
Blank	6	4	2	12

Were any ballot papers unable to be fed through the system?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	4	4	5	13
No	1	5	2	8
Not Observed	0	2	1	3
Unable to Observe	1	0	0	1
Blank	6	4	1	11

If yes, were they entered manually into the system by an election official?

	AP	ExCeL	OLYMPIA	TOTAL
Always	2	1	3	6
Sometimes	0	0	1	1
Never	0	0	0	0
Not Observed	1	4	1	6
Unable to Observe	1	0	1	2
Blank	7	10	3	20

Were any ballot boxes unable to be verified?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	7	7	5	19
No	0	2	1	3
Not Observed	1	3	1	5
Unable to Observe	0	0	0	0
Blank	4	3	2	9

Were any of these ballot boxes re-scanned?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	7	8	6	21
No	0	0	0	0
Not Observed	0	2	1	3
Unable to Observe	0	0	0	0
Blank	5	5	2	12

Was first stage adjudication handled by election officials?

	AP	ExCeL	OLYMPIA	TOTAL
Always	8	10	8	26
Sometimes	1	0	0	1
Never	0	0	0	0
Not Observed	0	0	0	0
Unable to Observe	0	0	0	0
Blank	3	5	1	9

Were doubtful ballots projected onto screens so that observers could see decisions being made?

	AP	ExCeL	OLYMPIA	TOTAL
Always	8	11	8	27
Sometimes	0	0	0	0
Never	0	1	0	1
Not Observed	0	0	0	0
Unable to Observe	0	0	0	0
Blank	4	3	1	8

When a voter's intention was not clear, were ballots sent for second stage adjudication?

	AP	ExCeL	OLYMPIA	TOTAL
Always	6	8	6	20
Sometimes	3	4	1	8
Never	0	0	0	0
Not Observed	0	0	0	0
Unable to Observe	0	0	0	0
Blank	3	3	2	8

Was second stage adjudication handled by the CRO?

	AP	ExCeL	OLYMPIA	TOTAL
Always	3	3	3	9
Sometimes	9	6	5	20
Never	0	1	0	1
Not Observed	0	1	0	1
Unable to Observe	0	0	1	1
Blank	0	4	0	4

Were doubtful ballots projected onto screens so that observers could see decisions being made?

	AP	ExCeL	OLYMPIA	TOTAL
Always	12	10	4	26
Sometimes	0	0	5	5
Never	0	0	0	0
Not Observed	0	1	0	1
Unable to Observe	0	0	0	0
Blank	0	4	0	4

Did you observe any significant procedural errors or omissions?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	1	2	4	7
No	3	5	1	9
Not Observed	1	1	0	2
Unable to Observe	0	0	0	0
Blank	7	7	3	17

Did party agents request to see automatically rejected blank ballots?

	AP	ExCeL	OLYMPIA	TOTAL
Yes	1	0	0	1
No	1	1	5	7
Not Observed	1	2	0	3
Unable to Observe	3	1	0	4
Blank	6	12	4	22

Please indicate an opinion as to officials' understanding of the count process

	AP	ExCeL	OLYMPIA	TOTAL
Very bad	0	0	0	0
Bad	1	1	1	3
Good	5	2	4	11
Very good	0	5	1	6
Blank	6	8	2	16

Please indicate an opinion as to observers' understanding of the count process

	AP	ExCeL	OLYMPIA	TOTAL
Very bad	0	0	0	0
Bad	2	1	4	7
Good	4	7	1	12
Very good	0	0	0	0
Blank	6	8	3	17

Please indicate an opinion as to officials' handling of complaints

	AP	ExCeL	OLYMPIA	TOTAL
Very bad	0	0	0	0
Bad	3	0	3	6
Good	1	3	2	6
Very good	1	1	0	2
Blank	7	10	3	20

Please indicate an opinion as to transparency of the count

	AP	ExCeL	OLYMPIA	TOTAL
Very bad	2	1	2	5
Bad	0	3	4	7
Good	2	5	0	7
Very good	1	0	0	1
Blank	7	6	3	16

Appendix III: Sample evaluation form

Excerpts are provided below of evaluation forms developed by ORG for the May 2008 London elections observation mission. The forms are modelled on those used by the OSCE in international observation missions.

Polling station evaluation form

The full version of this form is available at http://www.openrightsgroup.org/wp-content/uploads/polling_place_report_form.pdf

May 2008 Observer Mission Polling Station Evaluation Form		**OPEN RIGHTS GROUP**	
Constituency		Name	
		Name of partner	
Polling Place		Time arrived	Time left

Points to remember

- When you arrive, introduce yourself to the presiding officer and show your accreditation card
- Talk to voters — but NOT when voting.

Instructions

Please circle the most appropriate answer to each of the questions on this report sheet. There is space for further comment and observation after the questions. If you cannot answer a question because you have not observed this part of the process, please circle N/O ("Not Observed"). If you cannot answer a question because you cannot observe this part of the process, please circle U/O ("Unable to Observe").

Polling place opening

1	Did the Presiding Officer (PO) show to all present that the ballot box(es) was empty?	Yes	No	N/O	U/O
2	Did the Presiding Officer close and seal the ballot box(es) before opening the polling station?	Yes	No	N/O	U/O
3	Did the polling station open at exactly 0700?	Yes	No	N/O	U/O

Checking the voter

4	Were voters asked to state their name and address or present a polling card?	Always	Sometimes	Never	N/O	U/O
5	Did polling officials mark the register of electors?	Always	Sometimes	Never	N/O	U/O
6	Did polling officials call out the number and name of the voter?	Always	Sometimes	Never	N/O	U/O
7	Did polling officials write the voter's number on the corresponding numbers list?	Always	Sometimes	Never	N/O	U/O

Issuing the ballot paper

8	Were any ballot papers torn while being detached from the books by polling officials?	Yes	No	N/O	U/O	
9	Did polling officials check to see that ballot papers included the unique identifying mark?	Always	Sometimes	Never	N/O	U/O
10	Did polling officials clearly ask the voter not to fold the ballot paper when voting?	Always	Sometimes	Never	N/O	U/O

Count centre evaluation form

The full version of this form is available at http://www.openrightsgroup.org/wp-content/uploads/count_centre_report_form.pdf

May 2008 Observer Mission Count Centre Evaluation Form p.1		**OPEN RIGHTS GROUP**		
Count Centre		Name		
		Name of partner		
Constituency		Time arrived		Time left

Please circle the most appropriate answer to each of the questions. If you cannot answer a question because you have not observed this part of the process, please circle N/O ("Not Observed"). If you cannot answer a question because you cannot observe this part of the process, please circle U/O ("Unable to Observe"). If you using the "Further Comments" section to comment in the context of any of the questions above, please put the number of the question in the right hand column. In the further comments section, record exact times observations were made wherever possible.

Pre-count

1	Was the counting equipment "zeroed" before the procedure began?	Yes		No	N/O	U/O
2	Was each ballot box shown to be securely sealed before it was opened?	Always	Sometimes	Never	N/O	U/O
3	Was each ballot box successfully registered on the e-counting system?	Always	Sometimes	Never	N/O	U/O
4	Had every ballot box been registered before the count started?	Yes		No	N/O	U/O
5	What time did the count start?					

Further Comments

Question Number	Time	Notes
Please continue on a blank sheet if necessary		

Appendix IV: Submissions and further references

Cragg Ross Dawson, *LONDON ELECTS Research on 2008 ballot paper design* (July 2006)

KPMG, *Greater London Returning Officer, Technical Review of Source Code used for electronic counting: Executive Summary* (28th March 2008)

KPMG, *Greater London Returning Officer, e-Counting Infrastructure Review: Executive Summary* (30th April 2008)

London Elects, *Constituency Returning Officer's Guide to E-counting* (18 April 2008)

London Elects, *Dealing with Doubtful Ballot Papers: Guidance for Constituency Returning Officers (CROs) on adjudication of doubtful ballot papers for the Greater London Authority Election on 1 May 2008* (April 2008)

Deloitte, *Final Internal Audit Report, E-Counting System* (April 2008)

Greater London Authority, *Count Centre Admissions Policy Elections May 2008* (April 2008)

Open Rights Group, *Election Observer Handbook, May 2008 Elections* (available at http://www.openrightsgroup.org/wp-content/uploads/observer_handbook_2008.pdf)

London Elects *Factsheet 7: E-counting in the London Elections* (available at http://www.londonelects.org.uk/pdf/FS7-E-counting.pdf)

Open Rights Group, *Electronic Voting – a challenge to democracy?* (January 2007) available at http://www.openrightsgroup.org/e-voting-main/e-voting-briefing-pack/

Open Rights Group, *May 2007 Election Report: Findings of the Open Rights Group Election Observation Mission in Scotland and England* (June 2007)

London Elects publish detailed breakdowns of the elections results, as well as information on rejected ballots, here:

http://results.londonelects.org.uk/Results/DownloadResults.aspx

We are grateful to London Elects for supplying the following information:

- Ballot Box verification report

- Ballot box rescans report

Appendix V: ORG observers

This report is the direct result of the hard work and dedication of the following people:

Ian Brown
Chris Burnett
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Felix Cohen
James Cox
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Susanne Lamido
Ben Laurie
Daryl Lloyd
Stefan Magdalinski
Gervase Markham
Harry Metcalfe
Jonathan Peterson
Loretta Platts
Alex Robinson
Lucy Sherriff
Adrian Thurston
Alex Tingle
Glyn Wintle

About the Open Rights Group

Politicians and the media don't always understand new technologies, but comment and legislate anyway. The result can be ill-informed journalism and dangerous laws. ORG is a grassroots technology organisation that exists to protect civil liberties wherever they are threatened by the poor implementation and regulation of digital technology. We call these rights our "digital rights".

In 2005, a community of 1,000 digital rights enthusiasts came together to create ORG. Since then, ORG has spoken out on copyright term extension, DRM and the introduction of electronic voting in the UK. We have informed the debate on data protection, freedom of information, data retention and the surveillance state. These are issues that affect all of us. Together, our community, which includes some of the UK's most renowned technology experts, works hard to raise awareness about them. If these are issues that you care about, please consider joining the ORG community and visit http://www.openrightsgroup.org/support-org.

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Acknowledgements

The Open Rights Group is grateful to all its supporters and volunteers who make its work possible. ORG particularly wishes to thank our volunteer election observers for the hard work and long hours they have contributed in observing elections.