



**ARCHITECTURAL ASSESSMENT & CODE REVIEW  
OF IES FOR USE AT JUNE 2004 ELECTIONS  
(BUILD 0111)**

**FOR**

**THE DEPARTMENT OF THE ENVIRONMENT,  
HERITAGE AND LOCAL GOVERNMENT**



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## **1.0 ARCHITECTURAL ASSESSMENT (Build 0111)**

The issues discussed here have been identified during the current architectural assessment carried out to relevant portions of the IES source code (Build 0111) during 2003.

### **1.1 Database Security**

It has been previously established that the database utilised by the IES application provides functionality appropriate to the requirements of that application. In the original review (December 2001) it was also established that the IES database was:

- Stored in a Microsoft Access 97 database.
- Password protected, but did not utilise workgroup information files.
- Did not utilise database encryption.

In December 2002, Powervote prepared a response to a request for increased protection of the IES database and stated:

*"We are aware that additional protection could be added. In our experience it is not necessary. DOELG must review to determine if they want to encrypt the complete database".*

While adequate in its current form (assuming strong physical and networking security measures are in place), the security provided by the Microsoft Access database utilised by the IES application could be enhanced for future elections beyond June 2004 by the implementation of the following recommendations:

#### **⇒ Recommendations**

*a) Convert the database from Access 97 to Access 2002. The database technology utilised by the IES application – Opus DirectAccess – readily supports the Microsoft Access 2000 format. This format presents several additional benefits – for example, the system would be less open to corruption when dealing with large database sizes.*

*b) Utilise Workgroup Information files (.mdw) in addition to a database password. User-level security for a Microsoft Access database requires the developer to set up a separate workgroup information file (System.mdw) containing security groups and user account information. This will help prevent access to the database without an appropriate system.mdw file and consequentially make it more difficult to maliciously interfere with the system.*

*c) Implement database encryption to increase the inherent security of the IES database.*



### 1.1.1 Summary Findings

Powervote are investigating the above recommendations and are currently testing their impact on the IES application (e.g. with regard to speed). Powervote recommend deferring any modifications to the database until after the next election, given the proximity of the election and the validation process that is required by any such changes. Given that these modifications have not been required by any of Powervote's other clients, this sentiment is valid.

In addition, given the Department is putting in place robust installation and usage procedures to prevent any inappropriate physical or networked access to the computers on which the IES application is installed, we would agree that decisions regarding any changes to the IES database can be deferred until after the June 2004 elections.

### 1.2 Multi-Election Processing

Our review of the current build (0111) of the IES database provided the following notes.

#### 1.2.1 New Fields Added To Existing Tables

##### *Districts*

- Bank Nr
- Bank Name

##### *Candidates*

- Postal Code
- Profession
- Profession\_2
- Replacement\_List
- Proposer\_Nomination
- Proposer\_Name
- Proposer\_Address
- Proposer\_Address2
- Proposer\_Address\_2
- Proposer\_Postal\_Code
- Proposer\_City
- Proposer\_Register\_Number
- Fontsize\_1
- Fontsize\_2
- Fontsize\_3
- Fontsize\_4
- Name\_in\_Irish

##### *Results\_Sub\_Votings*

- Votes\_Deactivated

##### *Results\_Votings*

- Ballot\_Papers

##### *Voting*

- Title\_Ballot\_Paper
  - Amendment\_Irish
  - Amendment\_English
- Ref\_Number

##### *Results\_Petitions\_1*

- Color

##### *Results\_Count*

- Summary
- Seats Filled

##### *Results\_Forms*

- Order\_Number

##### *Sub\_Participants*

- I\_Votes\_On\_Exclusion

##### *Election*

- District\_No
- Active\_Voting
- Filter\_Kind\_V\_1
- Filter\_Kind\_V\_2
- ES3\_Language
- ES3\_KeyBeep
- ES3\_ShowInfo

##### *Sub\_Votings*

- Votes\_i1
- Votes\_i2
- Votes\_i3
- Votes\_i4
- Votes\_K
- ES3\_Language



## **1.2.2 New Tables Added**

### *Training\_Sessions*

- Number
- Code
- Description
- Date
- Time
- Duration
- Trainees
- Trainer
- Training\_Room
- Function
- URN
- Letter
- Machine
- Remark
- Occupied
- Filter
- Changed

### *Summons*

- Voting
- District
- Category
- Type
- Summons

### *Results\_Scan*

- Voting
- Sub\_Voting
- District
- Time
- Order
- Electorate
- Votes
- Count

## **1.2.3 Summary Findings**

The modifications listed above relate primarily to functionality added since the last assessment, and the modified code structure is satisfactory. Additional information was requested relating to multi-election processing and this was subsequently supplied by Powervote.



## **2.0 CODE REVIEW (Build 0111)**

Issues raised during the current code review have been addressed or clarified by Powervote to our satisfaction.



### **3.0 CODE REVIEWS & ARCHITECTURAL ASSESSMENTS - OUTSTANDING ISSUES**

#### **3.1 Issues Raised For Consideration During the Current Architectural Assessment (0111)**

<b>Architectural Assessment #4</b>	<b>Developer Comments</b>
Convert the IES database from Access 97 to Access 2002.	This issue is closed until post June 2004 (see below).
<b>Anticipated Resolution Date</b>	

<b>Architectural Assessment #5</b>	<b>Developer Comments</b>
With regard to the IES database, utilise workgroup information files.	This issue is closed until post June 2004 (see below).
<b>Anticipated Resolution Date</b>	

<b>Architectural Assessment #6</b>	<b>Developer Comments</b>
With regard to the IES database, implement database encryption.	This issue is closed until post June 2004 (see below).
<b>Anticipated Resolution Date</b>	

Powervote are investigating the above recommendations and are currently testing their impact on the IES application (e.g. with regard to speed). Powervote recommend deferring any modifications to the database until after the next election, given the proximity of the election and the validation process that is required by any such changes. Given that these modifications have not been required by any of Powervote's other clients, this sentiment is valid.

In addition, given the Department is putting in place robust installation and usage procedures to prevent any inappropriate physical or networked access to the computers on which the IES application is installed, we would agree that decisions regarding any changes to the IES database can be deferred until after the June 2004 elections.

#### **3.2 Issues Raised For Consideration During the Current Code Review (0111)**

Issues raised during the current code review have been addressed or clarified by Powervote to our satisfaction.



### 3.3 Outstanding Issues Raised During Previous Code Reviews

<b>Unit Name</b>	Calc_Count_Misc.pas
<b>Code Review #2</b>	<b>Developer Comments</b>
Interesting that code was changed from using AppendRecord to Insert/Post mechanism. Apart from being more manageable and easier to read, I wonder why the modification was made.	Modifications to system documentation to be confirmed.
<b>Anticipated Resolution Date</b>	

<b>Unit Name</b>	Mixing_Numbered_Query.pas
<b>Code Review #8</b>	<b>Developer Comments</b>
The window contains 4 dropdown listboxes from which the user can select candidates, the description of the functionality of the middle 2 is not clear	Description in the manual shall be implemented/changed to a more clarifying text.
<b>Anticipated Resolution Date</b>	
<b>Code Review #10</b>	
The message box used to inform the user that there are no matching records for the criteria supplied appears behind the criteria screen. The user cannot see the message and it may appear to him/her that the system has hung. This happens because the query screen's form style is set to fsStayOnTop	Powervote has confirmed that this has been addressed subsequent to build 0111. This will be confirmed in the next review.
<b>Anticipated Resolution Date</b>	

<b>Unit Name</b>	Petitions_1.pas
<b>Code Review #15</b>	<b>Developer Comments</b>
It was noticed during testing that new petitions created using the add/edit form from this screen are not displayed in the grid. This appears to happen because the new petition records are not being assigned the correct election and sub-election numbers.	Gabriel O'Duffy and Elizabeth Munro will be completing this testing in January 2004.
<b>Anticipated Resolution Date</b>	
<b>Code Review #16</b>	
Also during testing, it was discovered that the user could implement a petition even if no petition records exist.	Gabriel O'Duffy and Elizabeth Munro will be completing this testing in January 2004.
<b>Anticipated Resolution Date</b>	



<b>Unit Name</b>	Petitions_Edit_1.pas
<b>Code Review #17</b>	<b>Developer Comments</b>
When testing the actual application, it was noticed that the system wrote details to the Access database upon clicking the Ok./Close button, but those details did not include the election and sub-election numbers, therefore they are not displayed in the grid on the Petitions main screen.	Gabriel O'Duffy and Elizabeth Munro will be completing this testing in January 2004.
<b>Anticipated Resolution Date</b>	

<b>Unit Name</b>	Calc_Order_Election_Section_13.pas
<b>Code Review #21</b>	
The source code sets a variable to 0 and then immediately checks if the variable is greater than 0, the code after the check will never be executed. As a result of this the drawing lots function will always be called.  <i>function Look_At_Earlier_Counts</i> <i>nHCC:=0;</i> <i>if nHCC&gt;0 then begin</i> <i>tbISPart.Locate('VOTING; SUB_VOTING;</i> <i>SUB_PARTICIPANT_NO',</i>  <i>VarArrayOf([tbISVoteVOTING.Value,</i>  <i>tbISVoteSUB_VOTING.Value,nHCC]),</i> <i>[]);</i>  Is the code which will always be bypassed relevant?	Powervote have said that they have addressed this issue subsequent to build 0111. This will be confirmed in the next review.
<b>Anticipated Resolution Date</b>	

<b>Code Review #22</b>	
The if statement is not followed by any code, therefore it should be removed.  <i>function Drawing_Lots</i>  <i>if Result&gt;0 then begin</i> <i>end;</i>  Is there anything missing here?	Powervote have said that they have addressed this issue subsequent to build 0111. This will be confirmed in the next review.
<b>Anticipated Resolution Date</b>	



<b>Unit Name</b>	Print_Ballot_Papers_1.pas
<b>Code Review #23</b>	<b>Developer Comments</b>
Function DetailBeforePrint locates in a number of tables but does not establish success or failure. This could potentially lead to wrong information being displayed.	Powervote have said that they have addressed this issue subsequent to build 0111. This will be confirmed in the next review.
<b>Anticipated Resolution Date</b>	

<b>Unit Name</b>	Print_Ballot_Papers_2.pas
<b>Code Review #24</b>	<b>Developer Comments</b>
Function DetailBeforePrint locates in a number of tables but does not establish success or failure. This could potentially lead to wrong information being displayed	Powervote have said that they have addressed this issue subsequent to build 0111. This will be confirmed in the next review.
<b>Anticipated Resolution Date</b>	



### **3.4 Outstanding Issues Raised During Previous Architectural Assessments**

<b>Architectural Assessment #1</b>	<b>Developer Comments</b>
<p>The IES database is password protected but is not encrypted. This means that a user cannot gain access to the database without entering the correct password. Although this may sound secure, there are several products widely available on the Internet, which have the ability to decipher an Access database's password.</p> <p>Is there any plan to migrate the database to a later edition and or implement database encryption?</p>	<p>These issues are closed until post June 2004 (as above).</p>
<b>Anticipated Resolution Date</b>	

<b>Architectural Assessment #2</b>	<b>Developer Comments</b>
<p>No Primary Keys - None of the tables in the IES Election database have been assigned a primary key. Microsoft Access automatically creates an index on the primary key field of a table and uses it to find records and to create joins between tables. The primary key index requires an entry in each primary key field and allows no duplicates. The order of the fields in a multiple-field primary key determines the default sort order for the table. A table with no primary key can't be used in a relationship and can be slower to sort and search. While the presence of Primary Keys is not required, it is considered to be good practice.</p> <p>Is there any intention to implement primary keys as part of future database modifications?</p>	<p>These issues are closed until post June 2004 (as above).</p>
<b>Anticipated Resolution Date</b>	



<b>Architectural Assessment #3</b>	<b>Developer Comments</b>
<p>No Referential Integrity – Referential Integrity is the set of rules that you follow to preserve the defined relationships between tables when you enter or delete records. If you enforce referential integrity, Microsoft Access prevents you from adding records to a related table when there is no associated record in the primary table, changing values in the primary table that would result in orphan records in a related table, and deleting records from the primary table when there are matching related records in a related table. Again, it is not necessarily wrong to have no referential integrity, however it would not be good practice from a database design point of view.</p> <p>Given that primary keys are introduced in to the database structure, that referential integrity be implemented at the same time?</p>	<p>These issues are closed until post June 2004 (as above).</p>
<b>Anticipated Resolution Date</b>	

### **3.5 Outstanding Issues Raised by DOEHLG**

<b>Issue #2002-0096-02</b>	<b>Developer Comments</b>
<p>Hard coding of referendum title on the ballot paper form. Coding will be required so that the text is taken from the referendum set up screens.</p>	<p>Votings_Ireland_Edit_2 does indeed include this editing capability however the display on the PDF output was in the unit Participants_PDF_Ireland_2, and this unit was missing from the last review. This will be confirmed in the next review.</p>
<b>Anticipated Resolution Date</b>	



## **4.0 OUTSTANDING ISSUES (SUMMARY)**

### **4.1 Issues Raised For Consideration During the Current Architectural Review (Build 2003-0111)**

- Issue #4, #5, #6: These issues are closed until post June 2004.

### **4.2 Issues Raised During the Current Code Review (Build 2003-0111)**

Issues raised during the current code review have been addressed or clarified by Powervote to our satisfaction.

### **4.3 Outstanding Issues Raised During Previous Code Reviews**

- Issue #2, #8: Modifications to system documentation will be confirmed in the next review.
- Issue #10: Powervote have confirmed that this issue has been addressed subsequent to build 0111. This will be confirmed in the next review.
- Issue #15, #16, #17: Gabriel O'Duffy and Elizabeth Munro will be completing this testing in January 2004.
- Issue #21, #22, #23, #24: Powervote stated that these issues have been addressed subsequent to build 0111. This will be confirmed in the next review.

### **4.4 Outstanding Issues Raised During Previous Architectural Assessments**

- Issue#1, #2, #3: These issues are closed until post June 2004.

### **4.5 Outstanding Issues Raised by DOEHLG**

- Issue #2002-0096-02: Hard coding of referendum title on the ballot paper form. Coding will be required so that the text is taken from the referendum set up screens. Votings\_Ireland\_Edit\_2 does indeed include this editing capability, however the display on the PDF output was in the unit Participants\_PDF\_Ireland\_2, and this unit was not supplied at the last review. This will be confirmed in the next review.