

Improvement of current Quality Management System for higher product quality and customer satisfaction

by

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Executive summary

Quality can be viewed as the most important aspect in any business. Quality is mostly measured from a customer's perspective. If a company understands quality through the customer's eyes and ensures that the needs of the customer are present in the product and that the product is delivered in an effective and efficient way, the company will succeed. It is clear that quality plays an integral part in any company.

Virtual Consulting Engineers understands the importance of quality and thus wants to ensure Total Quality Management (managing the company to deliver quality to their customers).

After analysis of Virtual Consulting Engineers' Quality Management System, four problem areas were identified that needed improvement: the Document Storage System, Customer Satisfaction Surveys, Internal Audit procedure and the Non-Conformance procedure. These areas are important to the organization as it has a direct influence on the quality of the products and services they provide.

Microsoft Access was chosen to develop a database for the company where all the data regarding the customer surveys, internal audits, non-conformances and other general information is stored in a simple and fast manner. The program can also generate reports with the necessary information for Management Review Meetings.

It is believed that the database that was proposed to the company will indeed benefit them. Not only will the database allow them to be more time efficient but will also save the company money. Virtual Consulting Engineers also possesses all the resources required to implement, maintain and improve the database. The database will ensure that the user knows exactly what activities still needs to be completed, when they need to be completed, who is responsible for completion and how it must be completed.

Contents

1. Introduction and Background	1
2. Problem Statement.....	2
3. Project Aim	4
4. Project Scope	4
5. Literature Review.....	5
5.1. ISO 9001:2008	5
5.2. Customer Satisfaction Surveys	7
5.3. Corrective Action.....	10
5.4. Internal Audit	12
5.5. Process Mapping	13
6. Final Design.....	15
6.1 Problem Solving Technique	15
6.2. Document Storage System	17
6.2.1. ISOXpress	17
6.2.2. Microsoft Access	18
6.2.3. Microsoft Access vs. ISOXpress.....	18
6.3. Customer Satisfaction Surveys	20
6.3.1. Measurement of Surveys	21
6.3.2. Results of Surveys (Examples).....	24
6.4. Internal Audits	26
6.5. Non-Conformances	29
6.6 Microsoft Access Database	30
6.7. QMS Responsibilities	31
6.8. Measurement and Analysis	34
6.8.1. Time sheets	34
6.8.2. Cost Savings	38
6.8.3. Feasibility	39
7. Conclusion	40
8. References	41
9. Appendices.	43
9.1. Appendix A: Customer Satisfaction Surveys.....	43
9.2. Appendix B: Internal Quality Checklists	47
9.3. Appendix C: Procedures related to the database	52

List of Figures

Figure 1: Customer Satisfaction Procedure	20
Figure 2: Internal Quality Audit Procedure	27
Figure 3: Internal Project Audit Procedure	28
Figure 4: Non Conformance Procedure	29
Figure 5: QMD Responsibilities	32
Figure 6: Database Responsibilities	33
Figure 7: Time sheet of Quality Manger	34

List of Tables

Table 1: Microsoft Access Database vs. ISOXpress	19
Table 2: Effectiveness of solutions	39

Abbreviations

QMS	Quality Management System
VCE	Virtual Consulting Engineers
ISO	International Organisation of Standardization
QM	Quality Manager
QMD	Quality Manual Documents
SOP	Standard Operating Procedures
DCR	Document Change Requests
MRQ	Management Representative of Quality

Chapter 1

1. Introduction and Background

VCE was established in 1999 and offers a wide variety of consulting engineering services in both national and international sectors. These services include: Project and Programme Management, Civil Engineering, Structural Engineering, Mining Engineering and Water Purification and Waste Water Treatment. VCE believes in continuously improving quality management and ensures that value is added to their products. They strive to deliver innovative and optimized solutions to their customers.

Virtual Consulting Engineers has implemented a QMS according to the specifications of ISO 9001:2008. A QMS functions under the following headings, each with its own unique information to ensure that the QMS is controlled.

1. General Requirements;
2. Documentation Requirements;
3. Management Responsibility;
4. Resource Management;
5. Product Realization; and
6. Measurement, Analysis and Improvement

The project focussed on improving the Customer Satisfaction process, Internal Audit process and the Non-Conformance process as well as developing a document system. Research was conducted to ensure that the proposal that was given to the company is accurate, effective, efficient and applicable to the industry they are working in.

2. Problem Statement

VCE implemented a QMS to mainly enhance customer satisfaction but also to ensure that the needed activities/processes of the company as well as their connection to one another are managed effectively. After analysis of VCE's QMS four problem areas were identified:

1. The document storage system: At VCE the current document storage system is based on sharing folders via their local network. Due to the fact that all employees can access this network, there is a possibility that important files might accidentally be deleted or the files may be reorganised, making it difficult to access the files again. Also the server can only store a certain amount of data and as more information gets added to the server it becomes more difficult to manage. A solution is required where the document storage system must be able to store a huge amount of information, ensure that documents are secure and where the input of information is more user friendly.
2. The customer satisfaction surveys are not sent out on time as there is no type of system to track when customer satisfaction surveys need to be completed by the customer. Because the method of sending out the surveys is either through emails or web surveys, they are either not completed at all or only a few surveys are completed from what is required from the specific customer during the project life cycle. VCE are not sure how to measure the survey in terms of customer happiness and product & service excellence and thus the surveys do not add value to VCE. The current process must be improved to ensure that all required surveys are completed as soon as possible, with as little trouble as possible and to ensure that the outcome from the survey benefits the company.
3. The internal audit process: ISO 9001:2008 states that auditors shall not audit their own work. Currently, this is the case. The QM does not have the time to carry over knowledge and explain ISO 9001:2008 to any of the other employees and the other employees do not have the time to conduct audits. A solution is required to make it easier for someone, who is not familiar with QMS or the process of auditing, to conduct an audit when required to do so.
4. Non-Conformances gets lost in the system because in most cases once a Non-Conformance Record is opened it cannot be solved right away and is only looked at again with the next internal audit. VCE has stated in their QMS that Non-

Conformances must be resolved within 90 days, however, they are currently just carrying the non-conformance over to the next month every time, resulting in the fact that non-conformances are not solved within the 90 days. A solution is required that will ensure that non-conformances can be easily tracked.

3. Project Aim

The aim of this project was to improve the total quality management of the company by the improvement or design of the following elements:

1. Customer Satisfaction process;
2. Internal Audit process;
3. Non-Conformance process; and
4. A document storage system that is user friendly and easy to maintain.

To ensure that the proposed solutions to the above mentioned elements would be effective, research was conducted on specific subjects and the result of the solution was tested against the current process to ensure improvement in the system.

4. Project Scope

The project was conducted at a Civil Engineering company, Virtual Consulting Engineers, who has implemented a Quality Management System. The scope consisted of the improvement of processes within the QMS that consume a lot of time.

The scope also included assigning responsibilities to employees regarding the activities of the QMS and ensuring that the proposed solutions add value to the company, in terms of saving time and money.

To ensure that the data gathered was correct and applicable to the project the Quality Manager from VCE was continuously consulted.

Chapter 2

5. Literature Review

5.1. ISO 9001:2008

ISO 9001 is the international standard for quality management and according to the latest annual survey on ISO's official website in 2010 there were more than 1,100,000 companies across the world that complied with this standard (<http://www.iso.org/iso/iso-survey2010.pdf>) making ISO 9001 their most popular standard. This may be due to the fact that it is a generic management system standard that can be applied in a variety of industries (ISO 9001:2008). It provides companies with a framework that has clearly specified requirements (ISO 9001:2008, Point 4) that need to be reached in order to ensure that they can provide a quality service or product and ensure customer satisfaction. If the company does not comply, the standard also allows for corrective and preventative measures to achieve the desired results. The basis of the management system standard is commonly referred to as "Plan-Do-Check-Act" or PDCA (ISO 9001:2008) and can be described as follows:

Plan: establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization's policies.

Do: implement the processes.

Check: monitor and measure processes and product against policies, objectives and requirements for the product and report the results.

Act: take actions to continually improve process performance

These four steps provide companies with the processes that are necessary to ensure customer satisfaction and continual improvement of the company's quality management system.

The reason why more and more companies are starting to comply with ISO 9001 is that it seems to have a positive financial effect. A study done by D. Levine and M. Toffel (2008) showed that companies that conformed to ISO 9001 had higher growth rates in their sales, increased employment and increased average annual earnings when compared to

companies who did not conform. This is due to the fact that companies that conform to ISO 9001 improve the documentation of their operating procedures, training and corrective procedures (Levine and Toffel 2008). Thus you have staff that are better trained and procedures in place to correct any non-conformance before it becomes a problem.

The positive financial effect may further be increased by public perception as customers may start associating compliance to ISO 9001 with the quality of the product or service that they will receive from the company.

There are also a few negative feelings around the ISO system. It takes time, effort and money to implement an ISO 9001 system. Most of the time employees are against a new system, as this will change their everyday working life and they will have to start getting familiar with something new, which is frustrating and consumes a lot of time. Because people difficultly adapts to a new system, organisations feel that current operational procedures work well and are effective, they do not see the benefit of implementing a system that would just cost money. Organisations do however have customer that demands that they be ISO certified, this then means they can lose customers.

Even though implementing an ISO system results in a huge amount of initial cost, it's been proven to increase quality in the long run. With the ISO 9001: 1994 there was the feeling that this standard falls short from a Total Quality Management system and that it would be more beneficial for an organisation to implement a TQM system, but as ISO released new editions of the 9001 standard it became more of a TQM system, which makes it very beneficial for any organisation to implement.

ISO 9001 is only one of the management systems that companies tend to implement. Another well-known quality management system is ISO 9004. ISO 9001 is mostly focused on how the QMS addresses the customer's requirements. ISO 9001:2008 specifies requirements for a QMS that can be used for certification, contractual purposes or to improvement internal quality management processes. It focuses on the effectiveness of the QMS in meeting customer requirements.

ISO 9004 has a wider focus taking into account the requirements of all parties involved. The two standards can be implemented together or can be used independently. ISO 9004 gives guidance on a wide range of objectives of a QMS, it focuses on how to make a QMS more efficient and effective. ISO 9004 is recommended as a guide for organizations whose top

management wishes to move beyond the requirements of ISO 9001, in pursuit of continual improvement of performance.

Application to the project: The ISO 9001:2008 was continuously consulted to ensure that any improvement or developments proposed still conformed to the standard.

5.2. Customer Satisfaction Surveys

The aim of customer satisfaction surveys are to continually improve on the quality of products and services rendered. Every organisation requires different type of information from their customers to ensure continuous improvement and effective customer satisfaction measurement. The outcomes that an organisation required from a survey hold the key to what type of methods to use for a customer satisfaction survey. It is important for the company to decide whether the value of the feedback of the customers exceeds the costs of the feedback system.

Research design elements include factors such as: Qualitative evaluation, survey method, and type of customer survey and questionnaire design (Israel, 2002). Qualitative data refers to the customer requirements, gathered from research or from the person who owns the product to be delivered, and helps determine aspects in terms of product delivery. The type of customer satisfaction surveys most often used includes: Customer satisfaction tracking, new customer surveys and lost customer surveys. These surveys focus on pure customer satisfaction, customer relationships and identifying root causes of customer dissatisfaction respectively.

Sample design is another key aspect of customer satisfaction measure. Using sample design, one will determine who the customer is, how to contact the customer (ex. list of customers) and the sampling method.

Customer satisfaction surveys are not only there to improve product/service quality for a company, but also to build a good relationship with the customers. It is important that a survey contains the right questions, that accurately reflects the customer requirements and use the right type of ratings. When designing the survey the following questions should be asked: What is the objective of the survey, what information is needed, how the information will be used in the company and who will be surveyed. Questions must be stated correctly in order to receive data required to improve on business. The surveys must be sent to all customers, to ensure more reliable feedback that will result in higher probability to improve customer service in the organisation. Surveys should include:

- Quantitative metrics.
- Qualitative questions (allows opportunity for improvement and customer requirements).

When analysing the results of a survey it may be useful to analyse the data in such a way that it provides both the distribution of responses and the average response and also be analysed according to the type of customer.

A study done shows the difference between the different survey methods under certain variables. Survey methods include: mail, e-mail, telephone and in-person.

Comparison category:	CSM Survey Method				
	Electronic	Mail	Phone	In-Person	Hybrid
Likely response rates	Low – medium (10 – 50%)	Low – medium (10 – 50%)	High (35 – 85%)	Very High (65 -100%)	High (35 – 85%)
Effectiveness for non-core suppliers	Low – medium	Low – medium	High	High	Depends on methods
When target respondent unknown	Poor (excluded)	Poor – fair (rerouted)	Very good	Very good	Depends on methods
Value in building relationships	Fair	Fair	Good	Excellent	Depends on methods
Survey length limitations	Short, 5 – 10 comment questions limited	Short, 5 – 10 comment questions limited	Medium, 10 - 20	Long 30 - 90	Short/medium
Qualitative data quality (comments)	Fair – poor	Fair – poor	Very good	Excellent	Depends on methods
Quantitative data quality	Good	Good	Very good	Excellent	Depends on methods
Cost per survey	Lowest	Moderate	High	Highest	Blended

(Israel, 2002)

Electronic Surveys:

Electronic surveys (email) are the easiest to manage and thus the lowest in cost. This method has a lot of advantages in cycle time and cost, but only when all of the company's customers have equal access to email and internet. A disadvantage for electronic surveys is related to the quality of the feedback, as customers may answer the questions very vague (thus not giving an opportunity for an organisation to improve from results of survey), or

customer may not answer questions at all. To receive quick feedback from customers it is found that web-surveys work the easiest, because of the fact that the cycle time for this type of survey method is very small. Also to keep response rates moderate to high, these surveys must be kept short.

Mail Surveys:

To receive high response from customers when mailing them surveys requires time and effort. The process that is found to work the best includes two flights of surveys. "The first flight includes a personalised cover letter, with a short questionnaire (limit to three pages) and prepaid addressed return envelope. Customer identification numbers are placed on the questionnaire. As returns come in, keep track of which customers have replied. About four weeks following the first mailing, send the second flight of surveys only to the non-respondents. Variations that beat a single flight of mail surveys include either, send an advance letter one week before sending the survey, or send a reminder post card three to four weeks following the survey mailing. While less productive than sending two flights of surveys, these variations are easier to implement because respondent tracking is not required. The use of incentives (trinkets, lotteries for bigger prizes, or charitable donations) can also help increase response rates, especially if your customers tend to view you as a non-core supplier." (Israel, 2002)

Telephone Surveys:

In telephone surveys there is a higher probability that more survey questions will be answered and this survey method provides the opportunity to clarify any misunderstanding of the questions. It is found that with telephone surveys the highest respond rates are achieved when the survey is conducted in 10 or less minutes.

In Person Surveys:

In-person surveys are the best method to use in most cases, as it provides for high quality quantitative and qualitative data. The only disadvantage of an in-person survey is the cost. Costs can be addressed in different ways. It depends on the amount of customers: if a company only have a few customers, the costs of in-person surveys will be low but as the amount of customers increases, the costs of performing this kind of survey will become higher as well. Also one can measure the cost of the in-person survey against the value that is added in the customer relationships.

Different customer industries require different customer satisfaction surveys due to the specific needs in each industry. Each survey portrays information needed from a specific customer and specific survey objectives.

There is no one method to use when it comes to customer satisfaction surveys. It is important that cost versus value of information from customer should state the method to use. A company must ensure that they attain the required information from the survey and decide upon a method where the results can be used for improvement.

Application to the project: The research was used to determine which the best method was to send out customer satisfaction surveys to ensure that customer satisfaction surveys were completed by the customer.

5.3. Corrective Action

A corrective action process must eliminate non-conformity or other undesirable situations (ISO 9000:2000).

Corrective action is an effort to investigate quality issues and to prevent re-occurrences of anything that had a negative influence on quality. The corrective action process is also an opportunity to make changes that is of advantage to the organisation for the long term. The advantages of a non-conformance procedure will only be visible when an organisation is actually trying to improve on their business and not just to document a corrective action to say that "we did it". To achieve this it will be good to do a trend analysis of the root causes of non-conformities. It was found out of audits done that corrective actions were completed without effective verification, there were no date of completion given to the corrective action and that if there were completion dates given, it was not adhered to. (STIEMERT, N. *Corrective Action*. QC inspection services. Available from: <http://www.qcinspect.com/article/coract.htm>. [Accessed 29 April 2012])

ISO 9001:2008 states that an organisation must develop a process to eliminate the causes of non-conformities and to prevent recurrence. ISO 9001:2008 also states that a procedure must be established to define the following requirements:

- Reviewing nonconformities
- Determining the causes of nonconformities
- Evaluating the need for action to ensure that nonconformities do not recur
- Determining and implementing action needed

- Records of the results of action taken
- Reviewing of the results of action taken, and
- Reviewing the effectiveness of the corrective action taken

When non-conformities arises there should be a corrective action process in place to determine the root cause of the problem, document the appropriate corrective or preventive action, implement, record, and communicate the corrective or preventive action, and ensure the effectiveness of the corrective or preventive action.

An example of a corrective action process steps are: (developed by Master Control)

1. Document that was specified versus one that was found. Check the functional specifications and any other requirements against the actual result.
2. Determine how much time should be allowed for a corrective action process (or CAPA response).
3. Decide who will investigate the problem, find a solution and perform the corrective action procedure.
4. Research and document the cause of the problem.
5. Plan how to keep the problem from recurring.
6. Communicate the corrective action process to everyone involved, at each appropriate level.
7. Periodically check to ensure the problem is solved and that the corrective action procedure was effective.”

(Master Control., 2000. *CAPA Procedure - Corrective Action Process*. United States. Available from: <http://www.mastercontrol.com/capa-software/capa/process-procedure.html> [Accessed 26 April 2012].)

Application to the project: The research was used to determine if there was to be any improvement on the current Non-Conformance procedure (which includes the Corrective and Preventive Action) and to ensure that Non-Conformances are easily identifiable and traceable to ensure that Non-Conformances are completed within a reasonable time.

5.4. Internal Audit

Internal audits are done by the employees of an organisation in order to improve and add value to the organisation's process. ISO 9001:2008 requires that internal audits have to be done on a regular basis to ensure that the QMS conforms to the ISO requirements, requirements established by the organisation in the QMD and to determine if the QMS is effectively implemented and maintained. An internal audit provides management an independent assessment of the organisation's processes. It is a proactive approach to decrease the risks of defective products/services and improves on communication in the organisation. To decide when and how frequently a process must be audited, an organisation can ask itself what is the complexity of the processes and the maturity of the QMS system, keeping in mind that all the QMS elements need to be audited annually. Thus the benefits from an internal audit are that it results in efficiency and effectiveness of operation and ensuring compliance with legislation.

Audits are divided into three types of audits

1. First Party Audit: When an organisation uses one of their employees to perform an audit on itself;
2. Second Party Audit: When an organisation uses an employee to perform an audit on their suppliers or other organisations; and
3. Third Party Audit: When an organisation is audited by a third party independent from the company and their customers.

An organisation must ensure that the audit schedule addresses all the elements in the QMS and that the audits are done as scheduled. A checklist per element to be audited would be key in an internal audit. These checklists comprise of simple questions in order to review if the process is effective and making sure that all areas of the process are evaluated in the results.

A good approach to do an internal audit is to follow the following steps:

1. Prepare audit schedule and obtain management approval
2. Schedule the audits
3. Obtain audit requirements
4. Examine prior audit results and corrective actions
5. Prepare audit checklists and any other support questions
6. Conduct audit investigation

7. Record audit findings
8. Prepare audit report
9. Obtain corrective action
10. Follow up on corrective action

(COLLINGHAM, D., 2010. *Effective Internal Audit Planning: ISO 9000 Users Group*. International Quality Registrars Corp. Available from: <http://www.asq509.org/ht/a/GetDocumentAction/id/47405>. [Accessed 27 April 2012].)

When planning audits it would be helpful to have the following information: the specification, the relevant ISO element, audit name, date of audit (ex. in which month), person that would conduct the audit, and the category (ex. process). The results that can be obtained from the internal audit are vital. It gives information on certain procedures that needs improvement.

Application to the project: The research was used to create an applicable Internal Audit process for VCE that is simple so that any employee can conduct an audit and that the results of the audit add value to the company.

5.5. Process Mapping

Process mapping is a simple system approach to document the activities of a certain procedure and includes the time required to complete different tasks in the process in a chart form. It is a simple way to record a process and give an opportunity to improve on current processes by eliminating unnecessary activities, reducing the amount of staff required and clarifying roles within the process. Steps that are included in process mapping are: flow charting, tagging and analysis.

Process mapping describes the flow of information and documents, displays activities contained within the process, show the transformation of information into desired outputs, specify decision that has to be made in the process and can identify problem areas such as bottlenecks or capacity issues. Process mapping is an important factor to consider when system changes have to be made, because of the fact that process mapping helps one to understand the process better. An organisation must measure a process to be able to manage a process effectively and to possibly improve on a process.

Two techniques that can be used when wanting to map processes are:

1. Flow Charts: provides an overview of all the activities in the process. Ideal for capturing the initial detail of a procedure.
2. Deployment Charts (Swim Lane Charts): also provides an overview of all the activities, but include by whom the activities must be completed and the interaction between different employees.

Application to the project: Process maps were used to write down the exact activities of the processes and to show what information and documents are needed to complete the activities.

Chapter 3

6. Final Design

In this section the following subjects will be discussed: The problem solving technique used to propose a solution for the stated problem areas, document storage system, the customer satisfaction surveys, internal audit and non-conformance processes as well as the responsibilities related to the QMS and the measurement and analysis of the project.

6.1 Problem Solving Technique

The PIECES problem solving technique was used to clearly identify the problem, identify opportunities for improvement and from the data gathered provide a solution.

P: The need to improve **P**erformance

- Non-Conformances and Internal Audits consume a lot of time.
- The Document Storage System is not maintained and information is difficult to get hold of.
- Customer Satisfaction Surveys need to be distributed on time.

I: The need to improve **I**nformation (and data)

- Information must be more accessible to employees.
- Employees must be able to access data in a more effective way.

E: The need to improve **E**conomics, control costs or increase profits

- To conduct the procedures takes a lot of time that results in extra costs.

C: The need to improve **C**ontrol or security

- Every employee has access to the document storage system, which can result in important files being edited or deleted.

E: The need to improve **E**fficiency of people and processes

- The Internal Audit and Non-Conformance processes are done manually and this takes time not only to complete but also because of the fact that it has to be uploaded to the document storage system.
- The method of sending out customer satisfaction surveys is not efficient as surveys are not received back.

S: The need to improve **S**ervice to customers, suppliers, employees

- Internal Audit and Non-Conformance processes are not completed within the specified time, thus employees are overloaded.
- Customer Satisfaction Surveys are not sent out on time, resulting in the customer having to complete a huge amount of surveys at the same time.
- The document storage system is difficult to manage.

6.2. Document Storage System

A system is required where all the information regarding the QMS can be stored, accessed, maintained and analysed. This system must be:

1. Secured so that only certain employees can access parts of the information.
2. Able to store huge amount of information.
3. Easier to manage so that information can easily be extracted.

Two possible solutions were considered as a new document storage system, the ISO Xpress Software or a Microsoft Access Database.

6.2.1. ISOXpress

The ISOXpress software offers 10 modules (Document Control, Document Distribution, Corrective and Preventive Action, Internal Audit, Management Review, Training, Supplier Control, Nonconforming Product, customer complaints and Measuring Equipment) that covers all the ISO 9001 requirements, it is completely paperless and communication is enhanced through e-mailing and alerts.

Benefits of ISOXpress

- Electronic signatures.
- A document approval process.
- Data filtering.
- Export and remote connectivity.
- Documents are shown in a folder tree menu.
- Viewing permissions can be set to restrict the viewing of confidential documents.
- When the required number of approvals is given, the document is automatically saved and ready for use. Thus only approved documents are shown in the menu.
- Easy for employees to browse the documents and print what is needed, knowing they have the correct revision.
- Documents can be uploaded in a PDF format.
- Revision of documents can be controlled.
- Approvals can be sent out to the required personnel member/s.
- Record status alerts are given, giving the days it is overdue or days until the task must be completed, this ensures that all non-conformances and internal audits are done on time and trend analysis can be done.

As mentioned before the ISOXpress system is paperless which will save employees a significant amount of time managing the system and employees can then spend more time on other work related issues.

6.2.2. Microsoft Access

Microsoft Access is a well known database tool for gathering and understanding all your information and providing an easy way to enter, navigate and report your data. Microsoft Access is excellent for keeping track of information and extract information in a report format.

Benefits of Microsoft Access – General

- Quickly track and report information.
- User friendly.
- Multiple and simultaneous users.
- Customised forms and reports can be created.
- Access files can be shared to many users and files can be restricted so that only specified users have access to certain files.
- Pre-built templates are available.
- Can store large amount of data.
- Excellent tool to manage data (keep data organised and easy to search)

Benefits of Microsoft Access – In the Organisation

- Company already has Microsoft Access loaded onto some of the computers (including the Quality Manager's computer).
- No extra costs involved (including training).
- The Quality Manager has moderate knowledge about Microsoft Access.
- All data needed for management review meetings will be in one secure place.
- The database will make it easy to draw reports and records.
- Privilege will be given to the Quality Manager to edit and delete records. This is to ensure that not all the employees have access to change information on the system.

6.2.3. Microsoft Access vs. ISOXpress

The Access database and the ISOXpress software are not quite the same and will not be used for the same reasons.

The ISOXpress software is used for a whole transformation of the QMS into an electronic version, all the QMD, SOP and forms will be uploaded to this system. The Microsoft Access Database will be used only to input certain records and keep track of them.

Table 1: Microsoft Access Database vs. ISOXpress

	Microsoft Access	ISOXpress
Upload of documents	N/A	Easy and Fast
User friendliness	Excellent	Excellent
Training	Not necessary	Necessary
Track system for documents	N/A	Excellent
Track system of changes to documents and processes	Excellent	Excellent
Time Saving	Yes	Yes
Costs	No extra costs	± R17 100

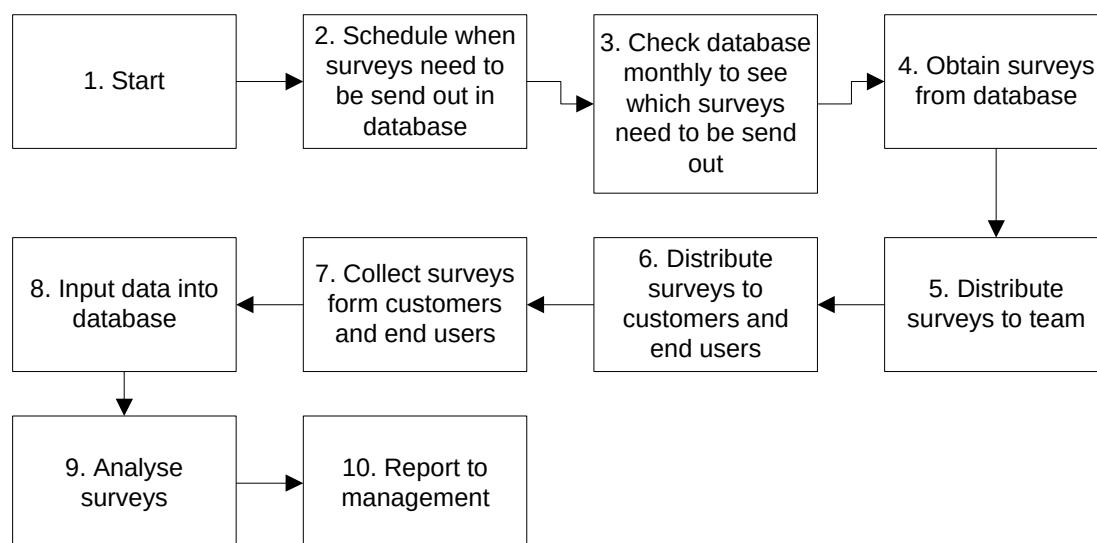
With Microsoft Access database records can be tracked, reports can be generated for specified records & outstanding tasks and analysis can be made. ISOXpress provides excellent security of all the information and documents can be accessed more conveniently.

It was proposed to VCE that both systems will work excellent, but for the long term it will be better to implement an ISOXpress system, which will add more value to the company and the sooner they can use the software the better. This solution will ensure that documents are secured, that the input of information is simpler and this software is capable of storing a lot of information. However when looking at the cost of the ISOXpress software, VCE felt that the advantages and features that it provides do not justify the capital expenditure required to implement it. It was then proposed that a simple Microsoft Access database will help to input information in a simpler more cost effective way, keeping track of the information and such a database would also be able to store all of the data required for the records. Security can also be set for the different information in the database.

6.3. Customer Satisfaction Surveys

From the research conducted, it was clear that in person surveys (hand to hand delivery of the surveys) is the best method to use. Because VCE is a civil engineering company and most of their projects that they do are construction work, the project coordinators regularly do site visits. This is then the perfect opportunity to distribute the surveys. Normally in person surveys are quite expensive, however the project directors and coordinators must go to the site anyway, thus the cost of distributing the surveys becomes less expensive. It was then proposed to VCE that surveys need to be distributed in this manner, as not only will the survey be completed, but the project coordinators can assist when the person completing the survey does not understand a particular question and distributing the surveys in this manner results in building a good relationship with the customer. Survey information will also be loaded into the database so that one could establish when the surveys need to be distributed. A procedure was developed so that employees better understand the process of distributing surveys and to ensure that all the activities are done in a constructive manner.

Figure 1: Customer Satisfaction Procedure



There are four different customer satisfaction surveys, one for design phase, construction phase and close out phase and a fourth survey for the end users. (See Appendix A) Customers are the ones that VCE completes a project for and the end users are the people using the product or service. The following solution was proposed so that VCE can better measure the survey in terms of customer happiness and product & service excellence to ensure that the surveys add more value to VCE

Every section, question and answer weighs a different amount in order to establish how good the service and customer happiness was.

Below are the measurement given to each and an example of how the surveys will be measured.

6.3.1. Measurement of Surveys

Design Phase Survey

1. Communication: 40%
 - a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings): 20%
 - b. Promptness to respond to queries or requests: 20%
 - i. Same day: 100%
 - ii. Within a week: 80%
 - iii. Within two weeks: 60%
 - iv. Within a month: 40%
 - v. > Month: 0%
2. Quality of Design: 60%
 - a. Creativity/Innovation and Appropriateness/Environmental Issues: 12%
 - b. Understanding Client & Legal Requirements: 16%
 - c. Documentation and Drawings: 16%
 - d. Adherence to specified delivery date: 16%
 - i. Excellent: 100%
 - ii. Above average: 80%
 - iii. Satisfactory / Good: 50%
 - iv. Improvement required: 30%
 - v. Very poor: 0%

Construction Phase Survey

1. Communication: 40%

- a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings): 20%
- b. Promptness to respond to queries or requests: 20%
 - i. Same day: 100%
 - ii. Within a week: 80%
 - iii. Within two weeks: 60%
 - iv. Within a month: 40%
 - v. > Month: 0%

2. Project Administration: 60%

Was the following items submitted timeously in the correct format and with the correct information?

- a. Progress Meeting Minutes: 15%
- b. Progress Payments: 15%
- c. Variation Orders: 15%
- d. Time Claims: 15%
 - i. Yes: 100%
 - ii. No: 0%

Close-out Phase Survey

1. Overall Product Service: 55%
 - a. Conformance to clients requirements: 30%
 - b. Overall quality of service provided during the project: 25%
 - i. Excellent: 100%
 - ii. Above average: 80%
 - iii. Satisfactory / Good: 50%
 - iv. Improvement required: 30%
 - v. Very poor: 0%
2. Final Documentation: 45%

Was the following items submitted timeously in the correct format and with the correct information?

- a. Final account: 15%
- b. Close-out / Follow on report: 15%
- c. Final fee account: 15%
 - i. Yes: 100%
 - ii. No: 0%

End User Survey

1. Communication: 40%
 - a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings): 15%
 - b. Promptness to respond to queries or requests: 15%
 - c. When after the Progress Meeting was the minutes received: 10%
 - i. Same day: 100%
 - ii. Within a week: 80%
 - iii. Within two weeks: 60%
 - iv. Within a month: 40%
 - v. > Month: 0%
2. Quality of Design: 60%
 - a. Creativity/Innovation and Appropriateness/Environmental Issues: 12%
 - b. Understanding Client & Legal Requirements: 16%
 - c. Documentation and Drawings: 16%
 - d. Adherence to specified delivery date: 16%
 - i. Excellent: 100%
 - ii. Above average: 80%
 - iii. Satisfactory / Good: 50%
 - iv. Improvement required: 30%
 - v. Very poor: 0%

6.3.2. Results of Surveys (Examples)

Design Phase (Appendix B: 1st Survey)

1. Communication = 40 %
 - a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings) = 20%
 - i. Same day: 100%
 - b. Promptness to respond to queries or requests = 20%
 - i. Same day: 100%
2. Quality of Design = 54.4 %
 - a. Creativity/Innovation and Appropriateness/Environmental Issues = 9.6%
 - i. Above average: 80%
 - b. Understanding Client & Legal Requirements = 16%
 - i. Excellent: 100%
 - c. Documentation and Drawings = 12.8%
 - i. Above average: 80%
 - d. Adherence to specified delivery date = 16%
 - i. Excellent: 100%

Total score of survey: 94.4 %

Construction Phase (Appendix B: 2nd Survey)

1. Communication = 32%
 - a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings) = 16%
 - i. Within a week: 80%
 - b. Promptness to respond to queries or requests = 16%
 - i. Within a week: 80%
2. Project Administration: 60%

Was the following items submitted timeously in the correct format and with the correct information?

- a. Progress Meeting Minutes = 15%
 - i. Yes: 100%
- b. Progress Payments = 15%
 - i. Yes: 100%

- c. Variation Orders = 15%
 - i. Yes: 100%
- d. Time Claims = 15%
 - i. Yes: 100%

Total score of survey: 92 %

Close-Out Phase

No survey available

End User (Appendix B: -3rd Survey)

- 1. Communication = 38%
 - a. Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings) = 15%
 - i. Same day: 100%
 - b. Promptness to respond to queries or requests = 15%
 - i. Same day: 100%
 - c. When after the Progress Meeting was the minutes received = 8%
 - i. Within a week: 80%
- 2. Quality of Design = 51.2%
 - a. Creativity/Innovation and Appropriateness/Environmental Issues = 12.8%
 - i. Above average: 80%
 - b. Understanding Client & Legal Requirements = 12.8%
 - i. Above average: 80%
 - c. Documentation and Drawings = 12.8%
 - i. Above average: 80%
 - d. Adherence to specified delivery date = 12.8%
 - i. Above average: 80%

Total score of survey: 89.2 %

6.4. Internal Audits

In this section only first party audits will be discussed. From the research conducted it was found that checklists are an easy way to ensure that a procedure conforms to the standard. But this is not the only reason checklists are beneficial, checklists eliminates the problem of other employees that cannot conduct audits because of the fact that they did not fully understand what it was and how to do it. A checklist is an easy way for these employees to see if a process conforms even if they do not understand the ISO or QMS systems. Looking at the PIECES framework, the Microsoft Access database will be excellent to use for storing records of internal audits, ensuring that information is easily accessible and to ensure that internal audits are completed on time.

The solution for the problem regarding internal audit was the following:

1. If the QM completes an internal audit, she must be assisted. Also they have a good relationship with another company, whose offices are in the same building, and they understand one another's QMS very good. It was proposed that someone from this company audit VCE's QMS, if no other employee of VCE is available.
2. Checklists were developed for the procedures of the QMS. These checklists comprise of simple questions so that the auditor can easily establish if the procedure conforms. Some of these checklists can be seen in Appendix B.
3. Improved flow charts that are more descriptive (see below) were developed so that employees better understand the process.
4. To save time information of the internal audits must be loaded into the Microsoft Access database so that one could easily see when an audit is due and what the results of the audit were.

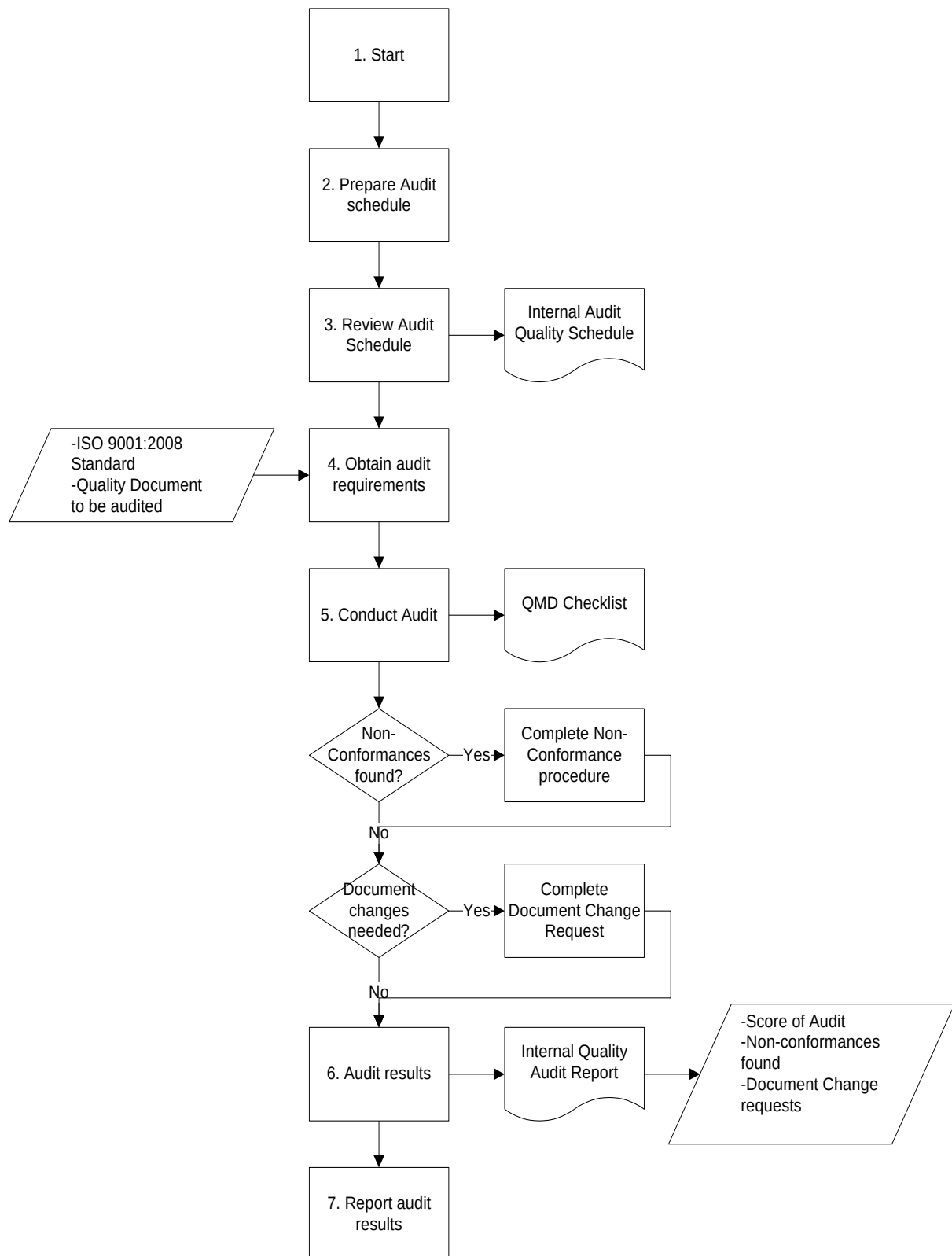
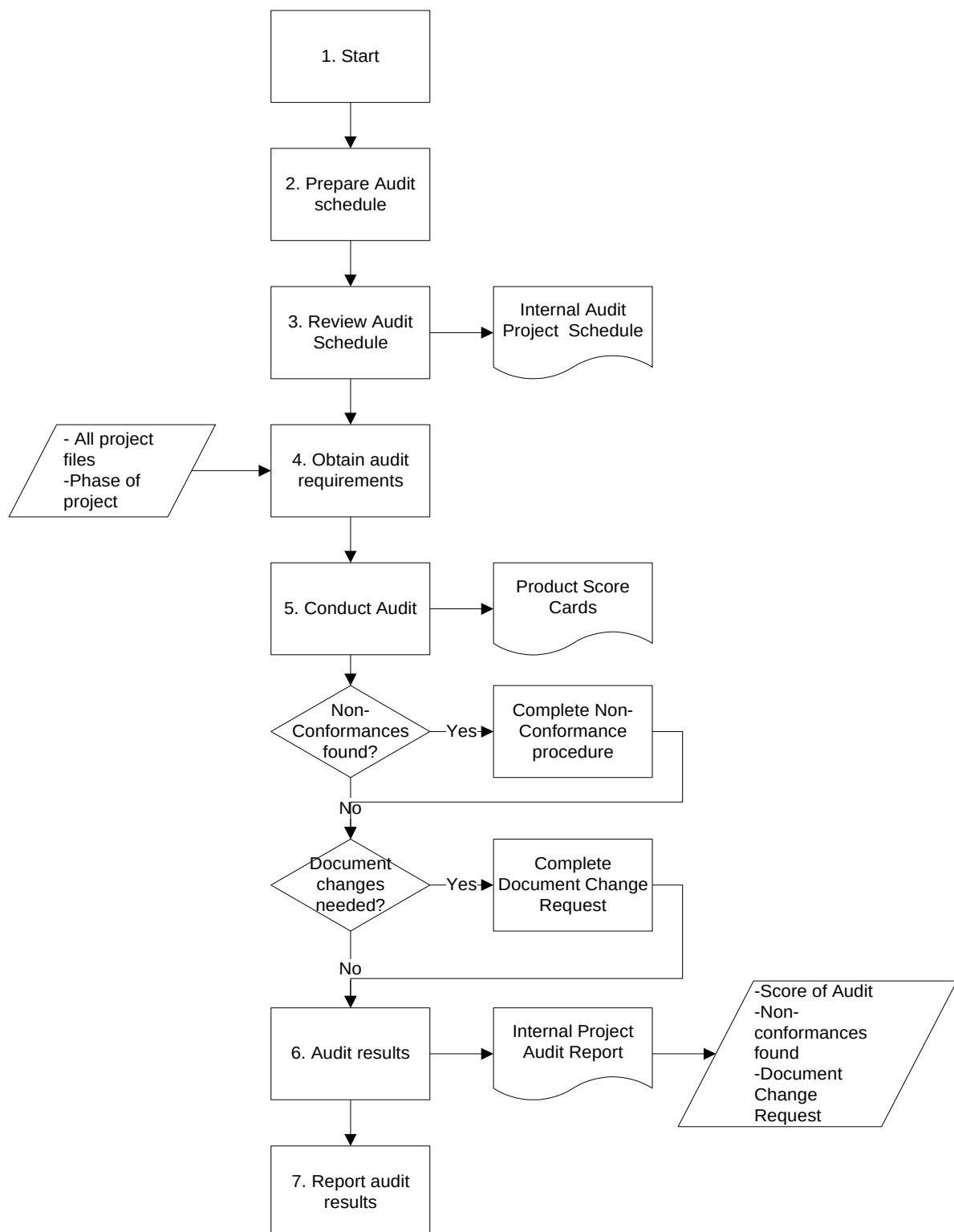
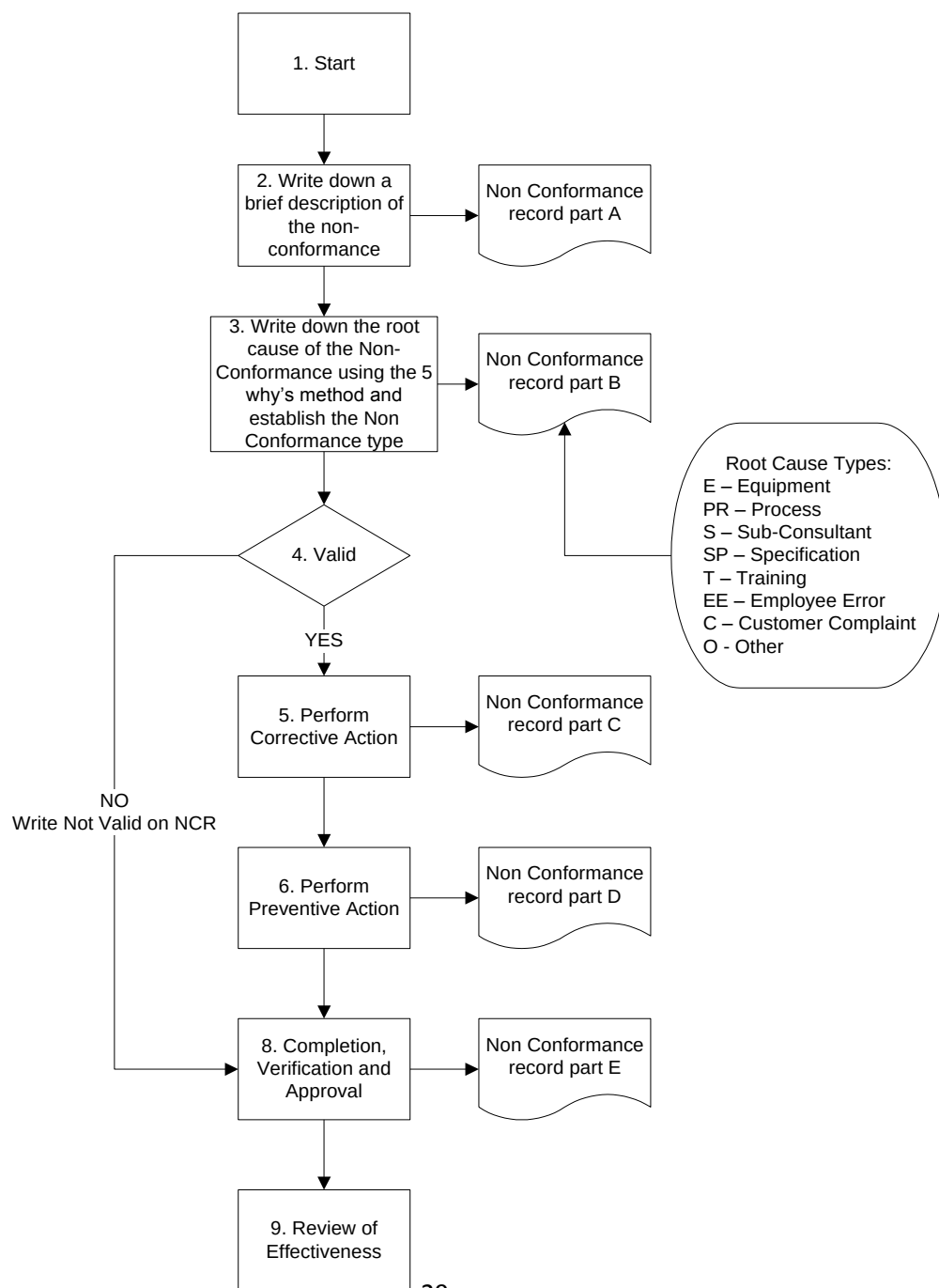
Figure 2: Internal Quality Audit Procedure

Figure 3: Internal Project Audit Procedure

6.5. Non-Conformances

To ensure that non-conformances were not forgotten and that they are completed within 90 days, it was proposed that the non-conformance records should be completed in the Microsoft Access database. It will be easy to complete it in the database and reports can be drawn to determine which non-conformances are due, overdue and how many days are left to complete the non-conformance. The non-conformance procedure was improved in order to better describe to the employees how the procedure works, so that they can complete a non-conformance record easily.

Figure 4: Non Conformance Procedure



6.6 Microsoft Access Database

The database that was developed for VCE was used for compiling reports for the management review meetings.

The following information and activities are available from the database:

1. Non-Conformances:
 - a. View, create and edit a Non-conformance
 - b. Draw reports on specific Non-Conformances
 - c. Draw reports of Non-Conformances logged between dates
 - d. Report on outstanding and overdue Non Conformances
 - e. Report on days left for the completion on a Non Conformance
2. Audits:
 - a. QMD Audits:
 - i. Compile and review the audit schedule (when audits are due)
 - ii. Complete checklists
 - iii. View results of audit (including non conformances and document change requests)
 - b. Project Audits
 - i. Compile and review the audit schedule (when audits are due)
 - ii. Complete product score cards
 - iii. View results of audit (including non conformances)
 - c. External Audits
 - i. View report of the external auditor
 - ii. Reports on any non conformances and/or document change requests that may have arisen from the external audit
3. Customer Satisfaction Surveys
 - a. Review when surveys need to be distributed
 - b. Completed surveys' information can be recorded in the database
 - c. Results of surveys.
4. Quality Manual Documents and Change Requests
 - a. View, create or edit all documents in the QMS
 - b. View, create and edit DCRs
 - c. Draw reports on specific DCRs

- d. Draw reports of DCRs logged between dates
 - e. Report on outstanding and overdue DCRs
 - f. Report on days left for the completion on a DCRs
- 5. Projects
 - a. View, create and edit projects' information
 - b. Report on all projects (including the score it received from the audit, if any)
- 6. General
 - a. View, create and edit information of employees, clients, contractors, end users and suppliers.
 - b. Draw report of the information of the employees, clients, contractors, end users and suppliers

6.7. QMS Responsibilities

A brief description of the responsibilities of the employees regarding the QMS and the database is given below. It is important that all the employees know what is expected of them so that the QMS and the database is maintained.

Figure 5: QMD Responsibilities

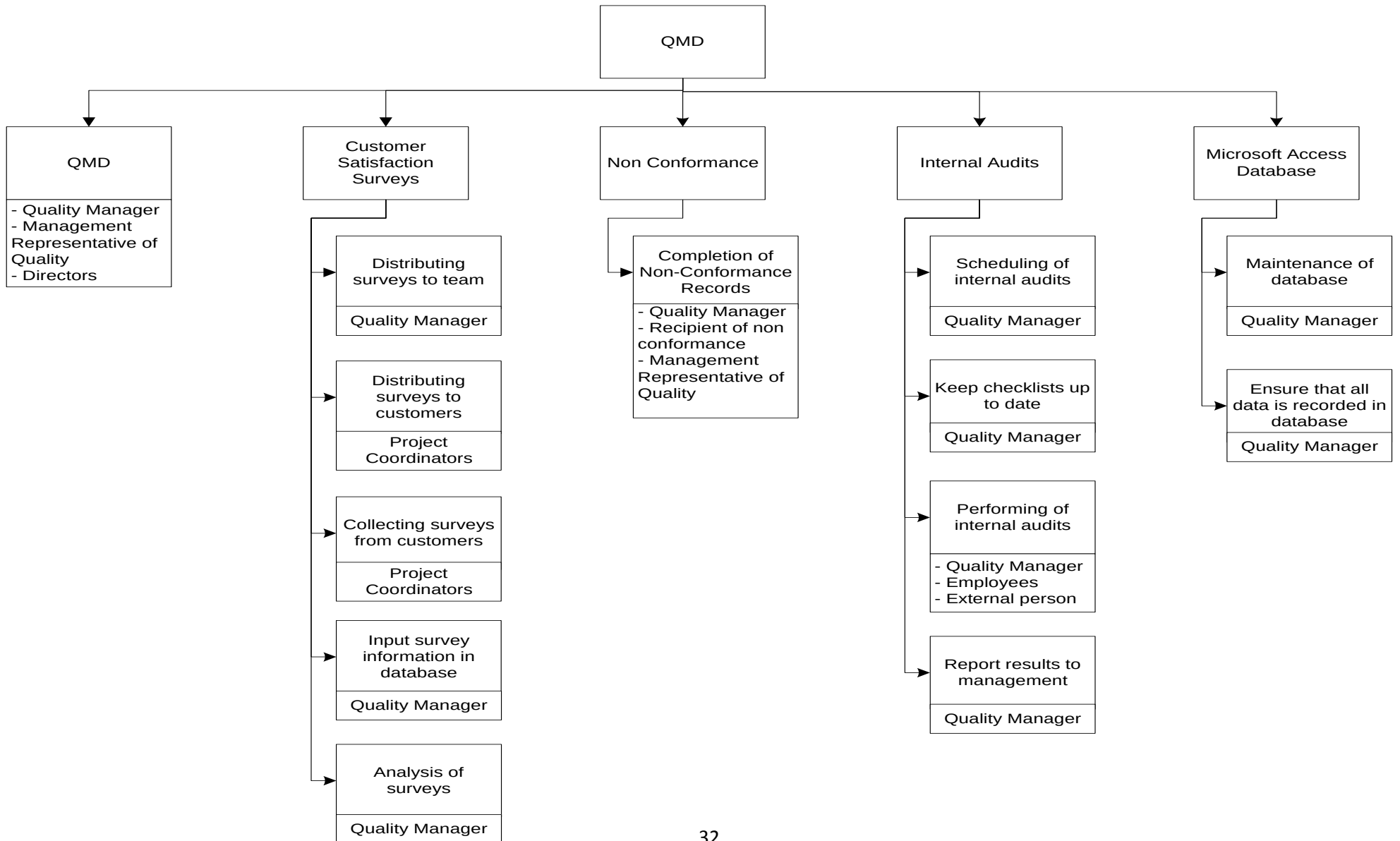
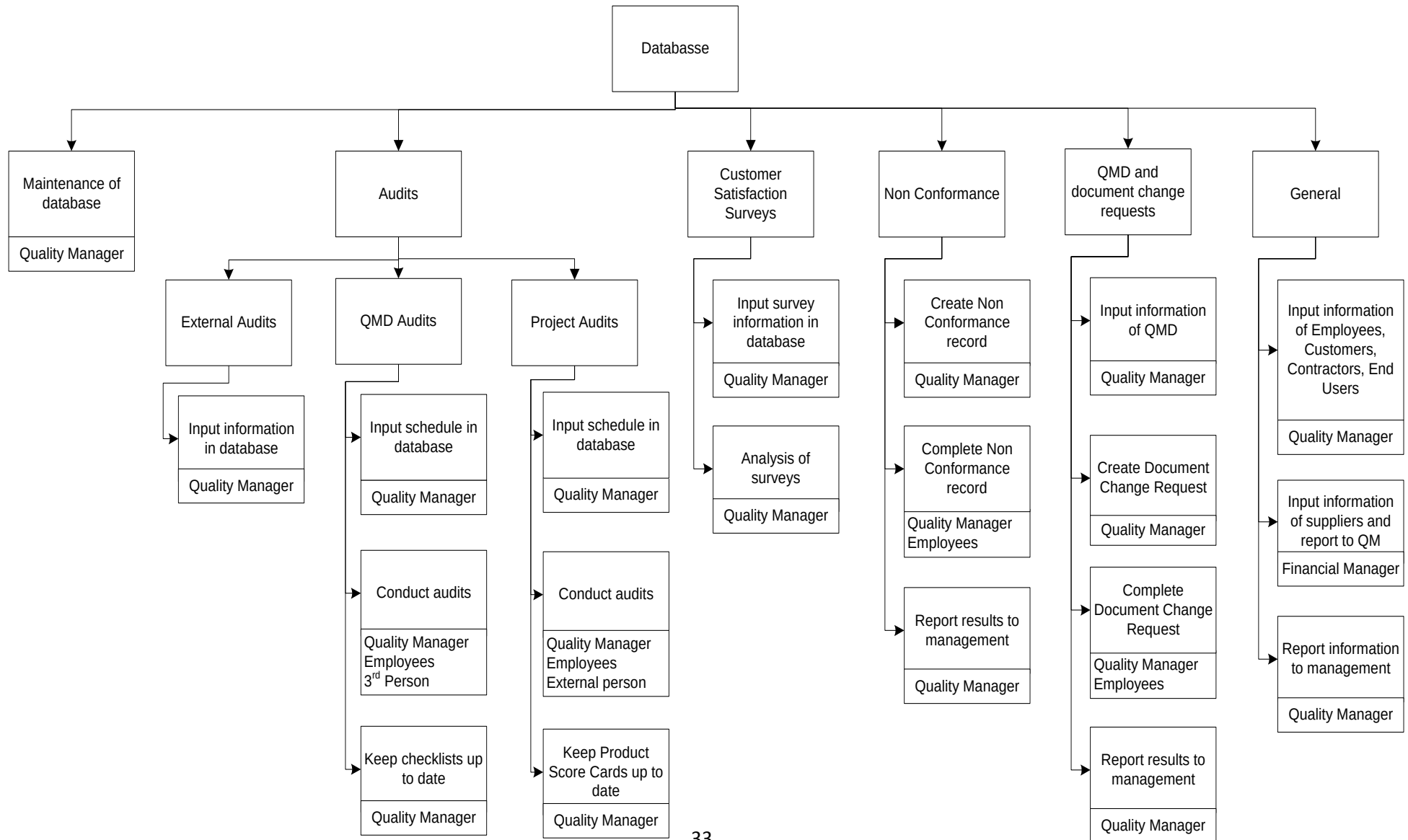


Figure 6: Database Responsibilities



6.8. Measurement and Analysis

To establish if this project was effective and beneficial to the project, it was determined if there was any time and costs saved for the company.

6.8.1. Time sheets

Time sheets were used not only to determine if there was time saved completing procedures and required activities (create non conformances, draw reports etc.) but also to analyse if there were any cost savings.

The Quality Manager is paid per hour spent on the QMS and any quality related issues. Below are the current time sheets (from 1 October 2011 to 30 September 2012) of the QM. This information was used to establish if the newly developed system was an improvement.

Figure 7: Time sheet of Quality Manger

 User Timesheets by project From: <u>Sat, 01 Oct 2011</u> To: <u>Sun, 30 Sep 2012</u>				
Barbara Botha				
Month	Project Name	Date	Duration (h)	Comments
October 2011				
	0006: ISO 9001		30	
		Mon, 10 Oct 2011	4	Scrutinised certification audit report. Compiled programme for scheduled activities, e.g. management review meetings, documentation maintenance review meetings, etc.
		Tue, 11 Oct 2011	3	Compiled list of active projects to be audited. Designed customer satisfaction survey on Survey Monkey.
		Wed, 12 Oct 2011	2	Compiled programme of activities required for ISO. Added client satisfaction survey to Survey Monkey.
		Fri, 14 Oct 2011	0.5	Discussed viability of project database with Mike.
		Mon, 17 Oct 2011	4	Finalised programme of activities required for ISO, including audit dates for projects, etc.
		Tue, 18 Oct 2011	5	Client satisfaction surveys - added two more surveys to Survey Monkey. Downloaded QMS documentation from SVN via remote access in order to perform internal audit on documentation.
		Mon, 24 Oct 2011	4	Internal audit: QSP/02-03 & SOP/02-03-01 & QSP/05-02. Compiled e-mails for MRQ on internal audit of projects & Documentation Review Meeting.
		Tue, 25 Oct 2011	3.5	Internal audit: QSP/02-03, SOP/02-03-01, QSP/05-01, QSP/05-02.
		Fri, 28 Oct 2011	4	Meeting Document Maintenance Meeting & Internal Doc Audits
November 2011				
	0006: ISO 9001		26	

		Mon, 31 Oct 2011	4	Internal audit training for Malan. Updated QSP/05-02 & SOP/05-02-01. Completed NCR 2011.09.01 & NCR 2011.10.01.
		Tue, 01 Nov 2011	4	Raised NCR 2011.10.02, 03 & 04. Explained administrative requirements of QSP/04-06 to Estelle. Performed internal audit on QSP/04-06.
		Tue, 08 Nov 2011	4	Internal audit QSP/05-03. Raised NCR 2011.10.05. Document change request for Engineer's checklist.
		Wed, 09 Nov 2011	4	Finalised Internal Audit Report. Close-out meeting with Andre & Malan. Discussed IT queries with employees.
		Tue, 15 Nov 2011	5	Kobus Coetzer induction. IT queries.
		Wed, 16 Nov 2011	4	Project Specifications: discussed templates with Estelle & Corne. SVN: cleaned up Office Docs folder. IT: feedback to Andre. QMS: document change request from Mike wrt assets.
		Tue, 22 Nov 2011	1	Compiled e-mail to Andre wrt Internal audit Nov & Doc Maint Review Nov & Dec.
		Tue, 22 Nov 2011	3	Responded to mora letter from DPW.
		Thu, 24 Nov 2011	1	Meeting with Daan, Andre & Mariska on litigation matters regarding follow-on contract.
		Fri, 25 Nov 2011	4	Responded to Managa's ridiculous requests for Final Account.
December 2011				
	0006: ISO 9001		27	
January 2012				
	0006: ISO 9001		30	
		Mon, 16 Jan 2012	4	IT SLA discussion with Philippus and Adri. Finalised November Audit report.
		Thu, 19 Jan 2012	5	Updated SPC/03-02-01, SOP/03-02-01, QSP/04-04 that are affected by the new ICT SLA.
		Fri, 20 Jan 2012	3	Updated SPC/03-02-01, SOP/03-02-01, QSP/04-04 that are affected by the new ICT SLA.
		Wed, 25 Jan 2012	4	Internal audit on projects.
		Thu, 26 Jan 2012	8	Updated Progress meeting minutes.
		Fri, 27 Jan 2012	6	Meeting: document maintenance review. Preparation & actual meeting.
		Sun, 22 Jan 2012	2	Timeline for Ehlers attorneys.
		Mon, 23 Jan 2012	1	Timeline for attorneys.
		Tue, 24 Jan 2012	4	Meeting with Ehlers Attorneys & Advocate. Forwarded relevant legislation to Ehlers attorneys wrt consultants' appointments.
February 2012				
	0006: ISO 9001		61.5	
		Mon, 30 Jan 2012	2	Minutes of Document Maintenance Review Meeting. Customer Satisfaction Surveys - discussed process with Estelle.
		Tue, 31 Jan 2012	1.5	Updated templates for Attendance Registers, Site Handover meeting minutes & Progress Meeting Minutes.
		Thu, 02 Feb 2012	1	DCR10: Progress Meeting Minutes.
		Fri, 03 Feb 2012	3	Investigated WBS software. Finalised internal audit November 2011.
		Mon, 06 Feb 2012	4.5	NCR.2011.11.01 & DCR nr 12 compiled & discussed changes to design & development process with Andre & Jac.

		Tue, 07 Feb 2012	3	Meeting with Jac & Andre on Design & Development procedure.
		Wed, 08 Feb 2012	5	Compiled new procedure QSP/04-03 Design & Development.
		Thu, 09 Feb 2012	4	NCRs 2011/11/02 to 06. Approved procedures affected by ICT SLA.
		Mon, 13 Feb 2012	3.5	Projects Database. Design database.
		Tue, 14 Feb 2012	4.5	Projects Database - Design database.
		Wed, 15 Feb 2012	4.5	Projects Database. Populate table with resources.
		Thu, 16 Feb 2012	4	Projects database - created report for Project Director / Associate resource planning.
		Fri, 17 Feb 2012	4	Projects database - created reports per employee.
		Mon, 20 Feb 2012	4.5	Internal Audit February 2012.
		Tue, 21 Feb 2012	1.5	Internal Audit.
		Wed, 22 Feb 2012	2	Job descriptions - Cleaner & signed additional job descriptions as per company organogram.
		Thu, 23 Feb 2012	4.5	Internal Audit.
		Fri, 24 Feb 2012	4.5	Internal Audit February 2012.
		Tue, 21 Feb 2012	3	Set up Progress payment.
		Wed, 22 Feb 2012	1	Set up Progress Payment.
March 2012				
	0006: ISO 9001		5.5	
		Mon, 27 Feb 2012	4.5	Internal Audit Feb 2012: Write findings in report & update project scores in database.
		Fri, 30 Mar 2012	1	Train Nadia on performing audits
		Thu, 29 Mar 2012	2	Discussed storage tanks with forgeweld. Checked filter sizes.
		Fri, 30 Mar 2012	3	Line diagram - add sampling points. Obtain info on inline closed circuit sampling. Obtain preliminary cost of tanks from forgeweld.
April 2012				
	0006: ISO 9001		18	
		Tue, 10 Apr 2012	1	Request re-issue of ISO certificate to indicate correct company name.
		Fri, 13 Apr 2012	5	Internal Audit - February. Discussed with Nadia. Compiled NCR, Document change request and incorporate changes to Purchase control procedure.
		Sun, 15 Apr 2012	4	Internal audit March 2012.
		Mon, 16 Apr 2012	3	Internal Audit March 2012 - Report for shareholder's meeting.
		Fri, 20 Apr 2012	5	Updated form for design and development for projects in construction phase. Meeting with Nadia Nagel's mentor on her thesis wrt our QMS.
		Thu, 26 Apr 2012	2	Meeting with Schalk on Professional Fee Accounts and Progress Payments.
May 2012				
	0006: ISO 9001		46.5	
		Mon, 14 May 2012	4.5	Updated records for design & development. Project audits.
		Tue, 15 May	5	Analysis of data - set up database for NCRs & DCRs &

		2012		Client Satisfaction Surveys. Updated list of NCRs & DCRs.
		Wed, 16 May 2012	8	preparation for interim external audit. compiled records for design & development.
		Thu, 17 May 2012	6	Updated projects list and database. finalise monthly audit reports.
		Fri, 18 May 2012	8	Finalised April audit. Analysis of data for management review meeting.
		Sat, 19 May 2012	3	Preparation for interim external audit
		Sun, 20 May 2012	3	Preparation for interim external audit
		Mon, 21 May 2012	8	Interim External Audit
		Fri, 25 May 2012	1	Document Maintenance Review meeting
		Fri, 25 May 2012	3	Training
June 2012				
	0006: ISO 9001		45	
		Wed, 13 Jun 2012	5	Internal Audit May 2012. Addressed NCRs & AOC raised during external audit.
		Tue, 19 Jun 2012	2	Meeting with Andre & Jac re Management Review Meeting.
		Thu, 21 Jun 2012	5	Prepared checklist for Management Review Meeting. Meeting with Nadia Nagel to identify calculation of data and graphs required for Analysis of data report.
		Fri, 22 Jun 2012	5	Prepared Analysis of data report for Management Review Meeting
		Sun, 24 Jun 2012	6	Prepared Analysis of Data Report for Management Review Meeting.
		Mon, 25 Jun 2012	6	Management Review Meeting.
		Wed, 27 Jun 2012	6	Updated Analysis of data report for Management Review Meeting to include details on NCRs w.r.t. projects and employees. Updated checklist from findings of meeting.
		Thu, 28 Jun 2012	5	Addressed NCRs from External Audit. Finalised checklist from Management Review Meeting.
		Fri, 29 Jun 2012	5	Addressed NCRs from External Audit.
		Thu, 28 Jun 2012	2	Final Account: Progress Payments for two contracts.
July 2012				
	0006: ISO 9001		32	
		Mon, 02 Jul 2012	6	Attended to non-conformances of external audit. Updated drawings procedure. Document Maintenance meeting - Progress Payments.
		Tue, 03 Jul 2012	6	Attended to NCRs from external audit.
		Thu, 12 Jul 2012	6	Drafted Service Level Agreement with Advance Call.
		Mon, 23 Jul 2012	2	ISO VCE Internal Audit.
		Tue, 24 Jul 2012	2	Advance Call Audit July. QSP/03-02 & QSP/03-03 & NCR x 1.
		Tue, 24 Jul 2012	3	VCE Internal Audit.
		Wed, 25 Jul 2012	2	Internal audit VCE.
		Thu, 26 Jul 2012	5	Document Maintenance meeting minutes. Document change for product score cards.
		Mon, 16 Jul 2012	6	Final Account

		Tue, 17 Jul 2012	6	Final Account
		Wed, 18 Jul 2012	6	Final Account
		Wed, 25 Jul 2012	3	Final Account - moved quantities between contract 1 and 2
		Fri, 27 Jul 2012	3	Final Account.
August 2012				
	0006: ISO 9001		24	
		Tue, 31 Jul 2012	2.5	Internal Audit VCE projects. Registered for CESA QMS course.
		Wed, 01 Aug 2012	2.5	Internal audit on VCE projects. Compiled due diligence checklist.
		Thu, 02 Aug 2012	5.5	Internal Audit VCE - compiled report. Resolved outstanding NCRs. Updated File Server management specification.
		Fri, 03 Aug 2012	3	Meeting with Emerald on Prism to include additional fields for analysis of tender outcomes. Internal quality audit checklist for August prepared for Advance Call.
		Tue, 07 Aug 2012	1.5	Requirements of a central database and automated QMS discussed with Nadia.
		Wed, 08 Aug 2012	2.5	Advance Call internal audit: QSP/02-03 Management Review of QMS, QSP/05-03 Monitoring of processes and Products & QSP/05-04 Analysis of Data.
		Tue, 14 Aug 2012	0.5	Investigate ISO express with Nadia
		Wed, 15 Aug 2012	1	Responsibility Assignment Matrix for projects in Close-Out phase.
		Fri, 31 Aug 2012	5	Office Meeting. Document Maintenance Meeting. Workshop for Progress Payments.
		Fri, 31 Aug 2012	1	Homework for ne Progress Payment format.
September 2012				
	0006: ISO 9001		15.5	
		Mon, 10 Sep 2012	6	Attende CESA course on ho to implement a QMS
		Tue, 11 Sep 2012	6	Attended CESA course on how to implement a QMS
		Wed, 12 Sep 2012	0.5	Compiled internal audit checklist for Adri.
		Fri, 14 Sep 2012	3	Internal Audit for Advance Call on QMD/01-01 & QSP/04-02 & NCR raised on integration of processes.
		Wed, 12 Sep 2012	2	Subversion - updated to software version 7 and reloaded all documents.

6.8.2. Cost Savings

After analysis of the proposed system, taking into consideration the training, maintenance and general quality related activities, it was established that the time the QM spent on ISO 9001:2008 decreased by 15%.

The total time spent on ISO 9001:2008 by the QM in the time period from 1 October 2011 to 30 September 2012 was 361 hours. With the 15% improvement the time spent on QMS activities would be 54.15 hours less.

The Quality Manager is paid R 292.00 per hour. Thus cost saving per year totals to an amount of R 15811.80.

6.8.3. Feasibility

The criteria decided upon to measure the effectiveness of the individual solutions given were:

- Time saved.
- User friendliness of completing the task.
- Do the employees understand the newly developed procedures (flow charts) and are the flow charts easy to follow?
- Does the database perform adequately?

Table 2: Effectiveness of solutions

		Time Saved	Easiness of completing task	Does procedure work	Does database perform adequately
Customer Satisfaction Surveys	Method of distributing	N/A	X	X	N/A
	Measurement of customer satisfaction	X	X	X	N/A
	Newly developed procedure (flow chart)	X	X	X	N/A
	Input of information in database	X	X	N/A	X
Internal Audits	Conducting and audit using checklists	X	X	X	N/A
	Improved Flow Chart	X	X	X	N/A
	Input of information in database	X	X	N/A	X
Non Conformance	Improved Flow Chart	X	X	X	N/A
	Input of information in database	X	X	N/A	X
Microsoft Access Database	Completion of tasks	X	X	N/A	X

Chapter 4

7. Conclusion

The database that was developed for VCE not only resulted in more time savings but also benefitted the company financially. The user friendliness of the database made it possible for the employees to navigate easily through the database. All the information required for the management review meetings is stored in the database and therefore analysis of the records can easily be made to present to the management of VCE.

Distributing the customer satisfaction surveys in person and using the database to determine when surveys needed to be distributed proved to be very effective. The Quality Manger could easily see by drawing reports which surveys were due to send out and all the surveys were completed adequately. The checklists that were developed for the procedures of the QMD were very effective, the employees adjusted well and the end result was that any employee can now complete an internal audit. The employees can now also refer to the new, more descriptive flow charts that can help then to better understand how to perform the procedure. The database made it easy for the QM to ensure that non conformances are not forgotten and that they are completed on time. Perhaps the best feature of the database is that VCE already possesses all the resources required to implement, maintain and improve the database.

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9. Appendices.

9.1. Appendix A: Customer Satisfaction Surveys



CLIENT SURVEY VIRTUAL CONSULTING ENGINEERS/CSR/05-01-01
PRODUCT AND SERVICE PERFORMANCE – DESIGN PHASE

Valued Client, please complete this form to enable our company to continually evaluate and improve its performance.

Project No & Description: 0204: WWTW DCS: Matatshe

Client

Organisation: N DPW Polokwane

Client Representative & Contact

details: FC Buitendach

Date: Nov 2011 Draft Tender document

ITEM	DESCRIPTION	MERIT RATING				
1. COMMUNICATION		Same Day	Within a Week	Within Two Weeks	Within a month	> Month
1.1	Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings)	X				
1.2	Promptness to respond to queries or requests	X				
2. QUALITY OF DESIGN		Very Poor	Improvement Required	Satisfactory/ Good	Above Average	Excellent
2.1	Creativity/Innovation and Appropriateness/Environmental Issues				X	
2.2	Understanding Client & Legal Requirements					X
2.3	Documentation and Drawings				X	
2.4	Adherence to specified delivery date					X

COMMENTS

Upon completion, please forward (email / fax)

Email: Reply to the email address the survey was received from

Fax: (012) 452 0583



CLIENT SURVEY VIRTUAL CONSULTING ENGINEERS/CSR/05-01-02
PRODUCT AND SERVICE PERFORMANCE – CONSTRUCTION PHASE

Valued Client, please complete this form to enable our company to continually evaluate and improve its performance.

Project No & Description: 0103: Border Control: Golela, Onverwacht. WCS ~~044334~~ 046061

Client
 Organisation: Department of Public Works

Client Representative & Contact
 details: Goodwill Lukhele.

Date: 07.02.2012

ITEM	DESCRIPTION	MERIT RATING				
1. COMMUNICATION		Same Day	Within a Week	Within Two Weeks	Within a month	> Month
1.1	Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings)		X			
1.2	Promptness to respond to queries or requests		X			
2. PROJECT ADMINISTRATION				YES	NO	N/A
2.1	Was the following items submitted timouesly in the correct format and with the correct information?					
2.1.1	Progress Meeting Minutes			X		
2.1.2	Progress Payments			X		
2.1.3	Variation Orders			X		
2.1.4	Time Claims			X		

Please provide a reason below at the "comment" field if you selected "no" above

COMMENTS

Upon completion, please forward (email / fax)

Email: Reply to the email address the survey was received from
 Fax: (012) 452 0583



CLIENT SURVEY VIRTUAL CONSULTING ENGINEERS/CSR/05-01-04
PRODUCT AND SERVICE PERFORMANCE – END USER

Valued Client, please complete this form to enable our company to continually evaluate and improve its performance.

Project No & Description: 0302: Water SAPS: Eastern Area (12). WCS 044795

Client

Organisation: Prov SCM SAPS

Client Representative & Contact details: Sup MUSAU

Date: 3/2/2012

ITEM	DESCRIPTION	MERIT RATING				
1. COMMUNICATION		Same Day	Within a Week	Within Two Weeks	Within a month	> Month
1.1	Availability of the Virtual Consulting Engineers representative (via email, telephone and meetings)	✓				
1.2	Promptness to respond to queries or requests	✓				
1.3	When after the Progress Meeting was the minutes received?		✓			
2. QUALITY OF DESIGN		Very Poor	Improvement Required	Satisfactory/ Good	Above Average	Excellent
2.1	Creativity/Innovation and Appropriateness/Environmental Issues				✓	
2.2	Understanding Client & Legal Requirements				✓	
2.3	Documentation and Drawings				✓	
2.4	Adherence to specified delivery date				✓	

COMMENTS

Upon completion, please forward (email / fax)

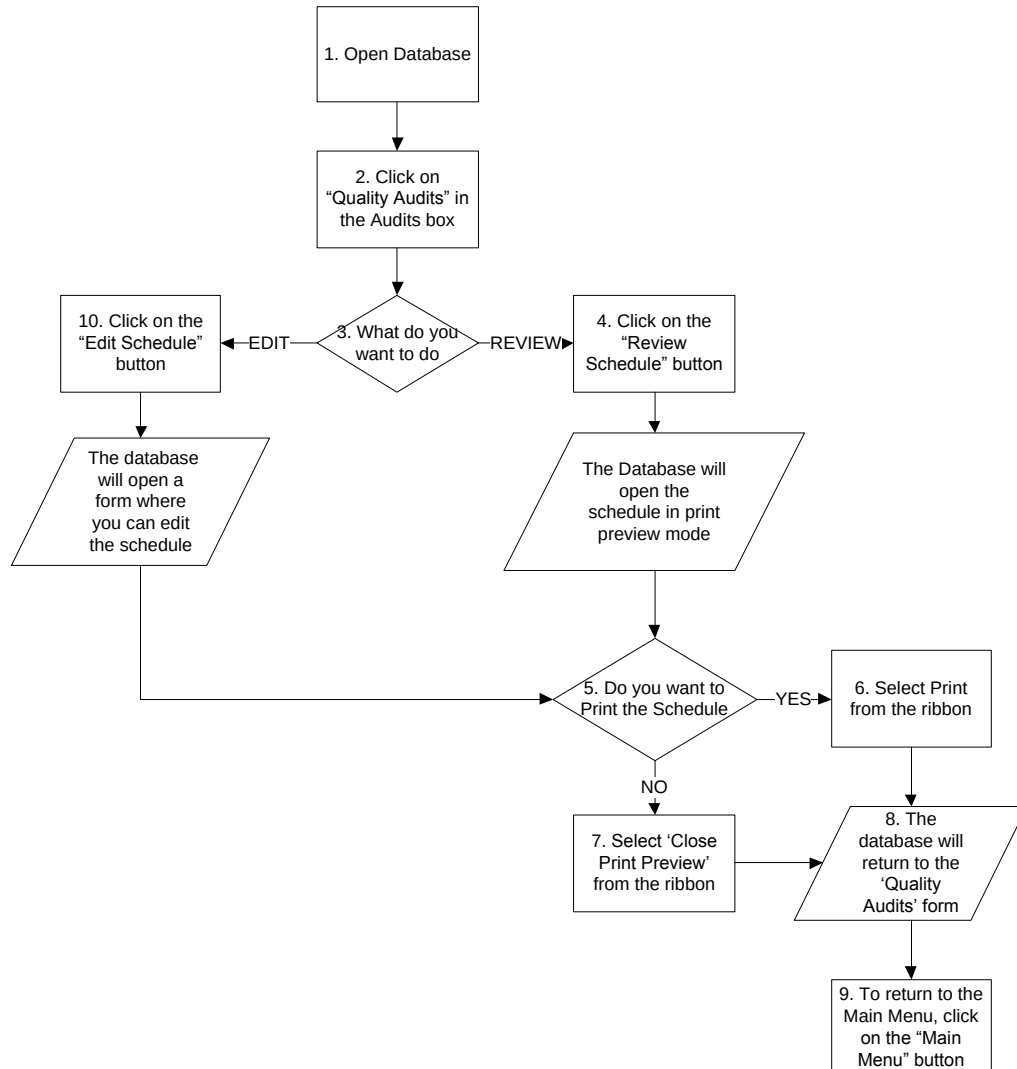
Email: Reply to the email address the survey was received from
 Fax: (012) 452 0583

9.2. Appendix B: Internal Quality Checklists

9.3. Appendix C: Procedures related to the database

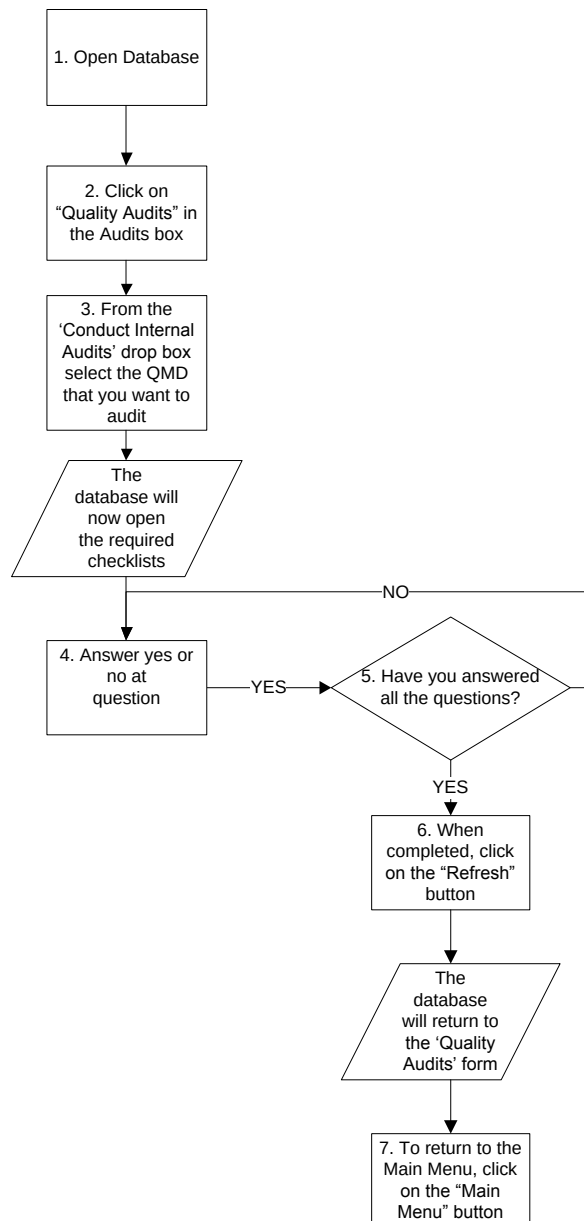


HOW TO VIEW, EDIT AND PRINT THE INTERNAL AUDIT SCHEDULE ON QUALITY PROCESSES



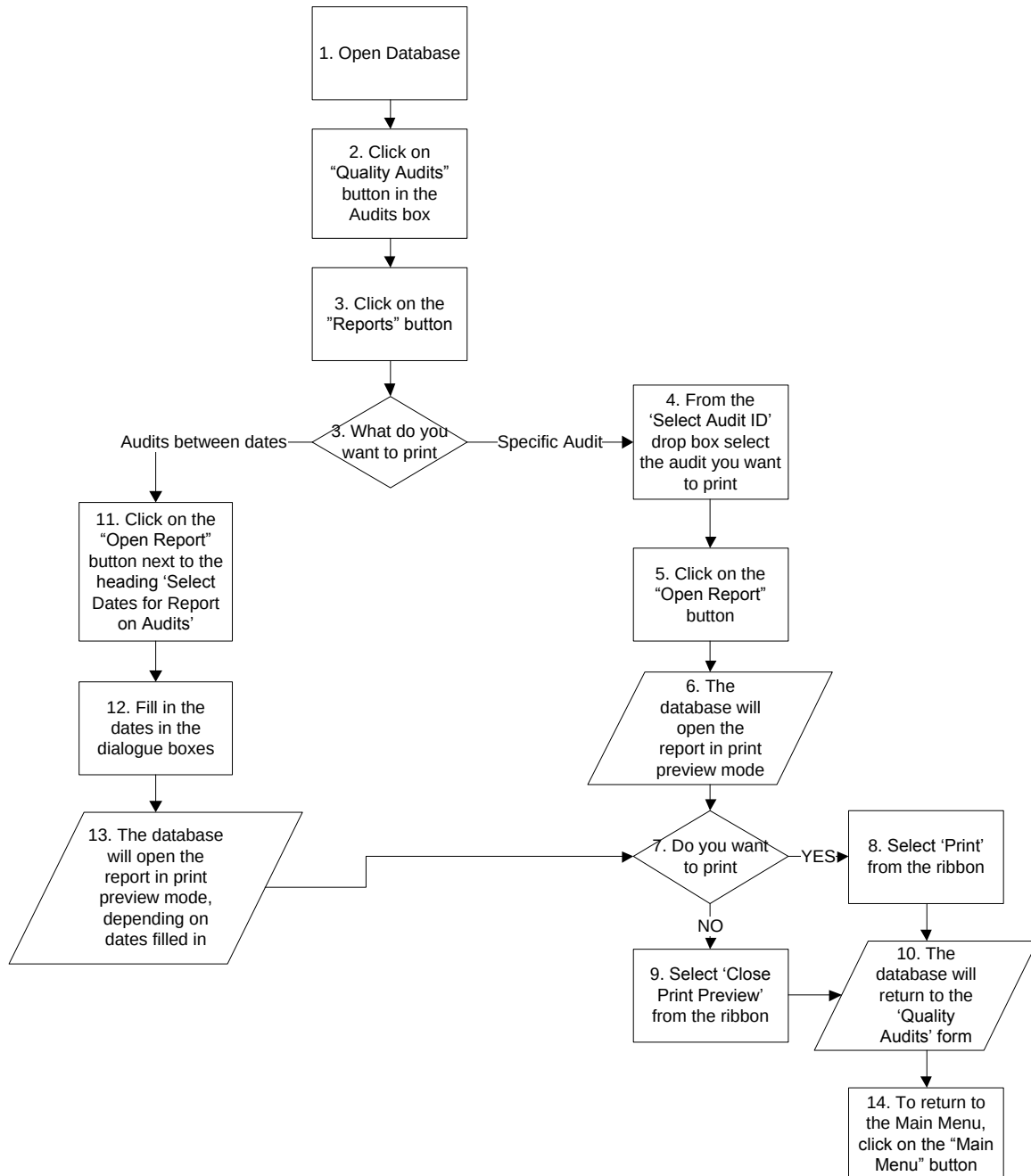


HOW TO PERFORM AN INTERNAL AUDIT ON QUALITY PROCESSES



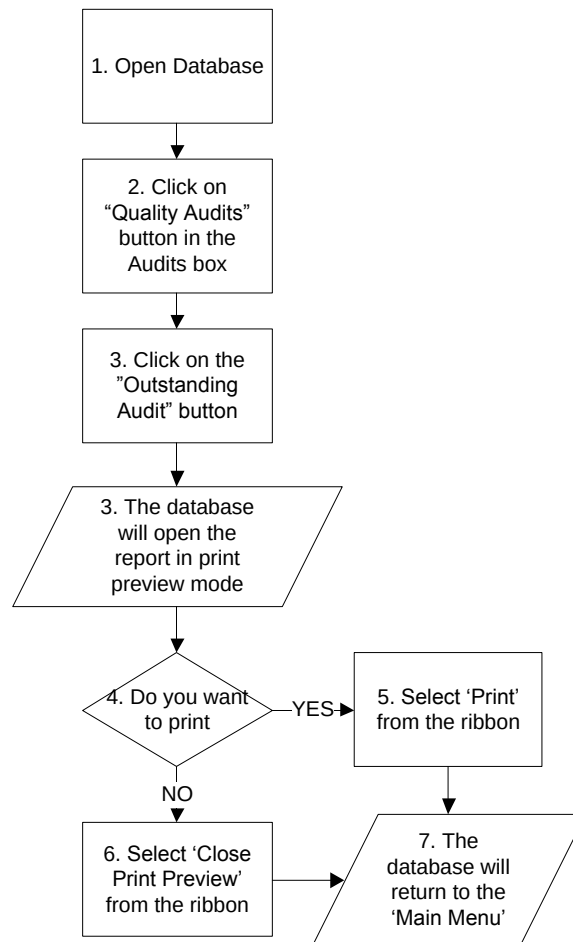


HOW TO GENERATE REPORTS FOR QUALITY AUDITS



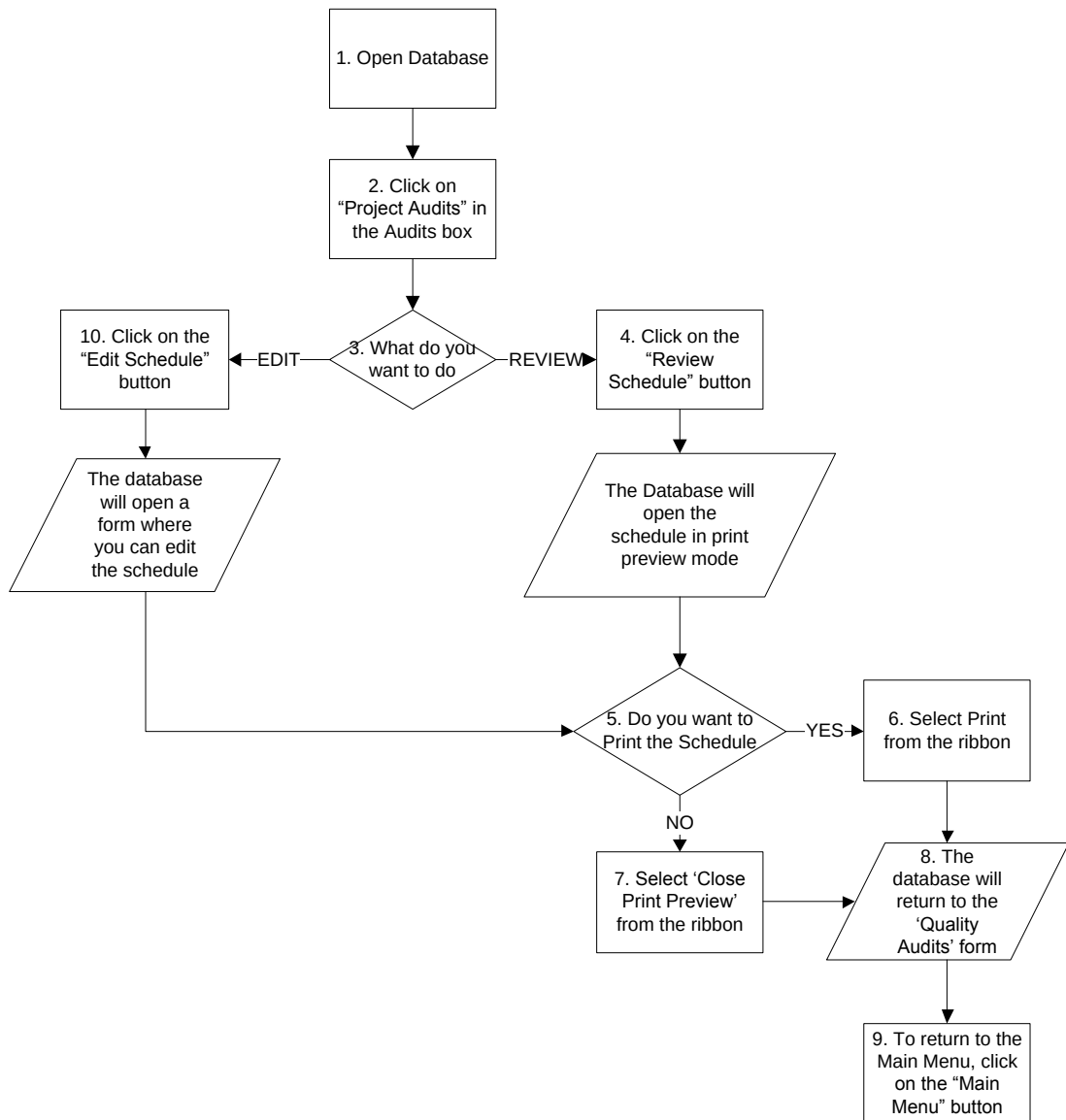


HOW TO GENERATE REPORTS FOR OUTSTANDING QUALITY AUDITS



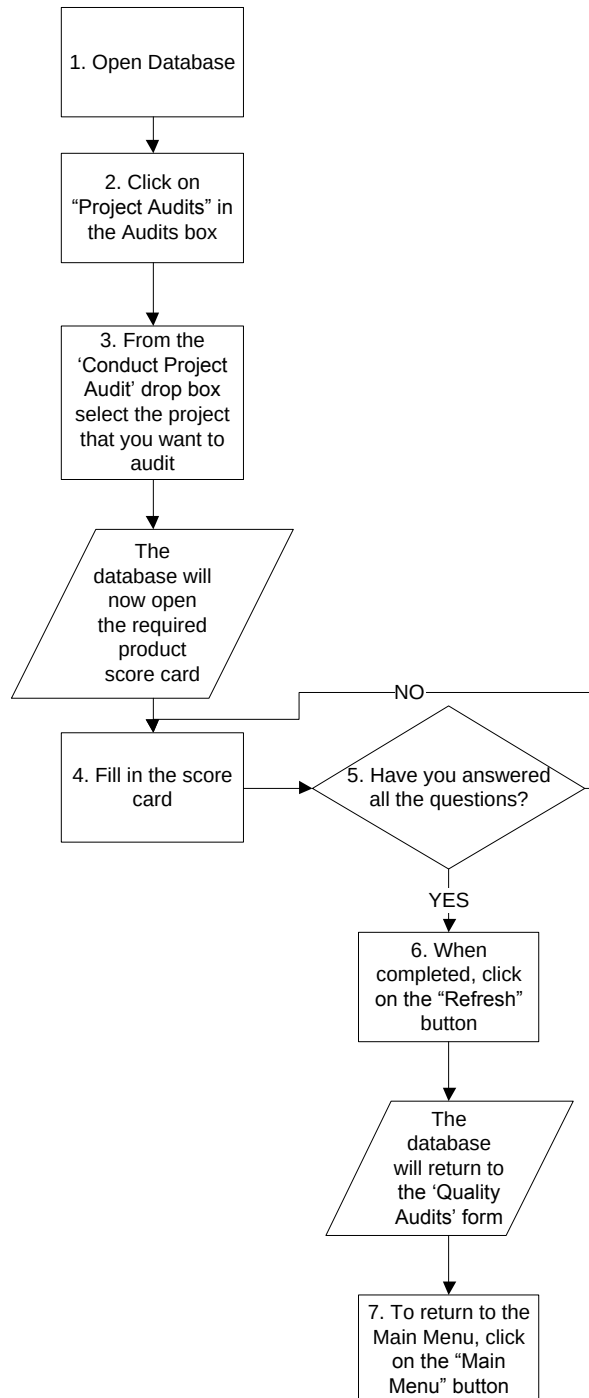


HOW TO VIEW, EDIT AND PRINT THE INTERNAL AUDIT SCHEDULE ON PROJECTS



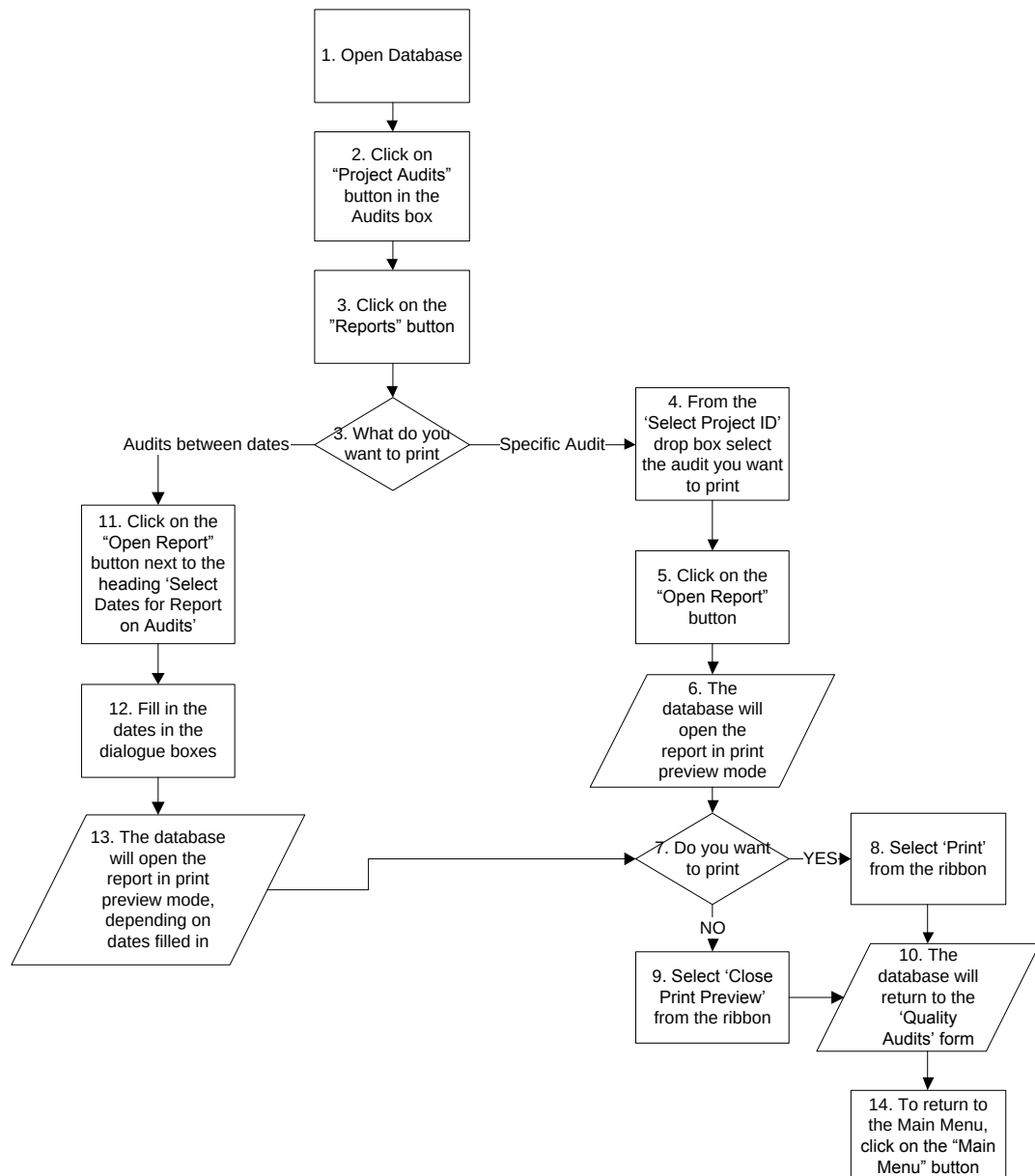


HOW TO PERFORM AN INTERNAL AUDIT ON PROJECTS



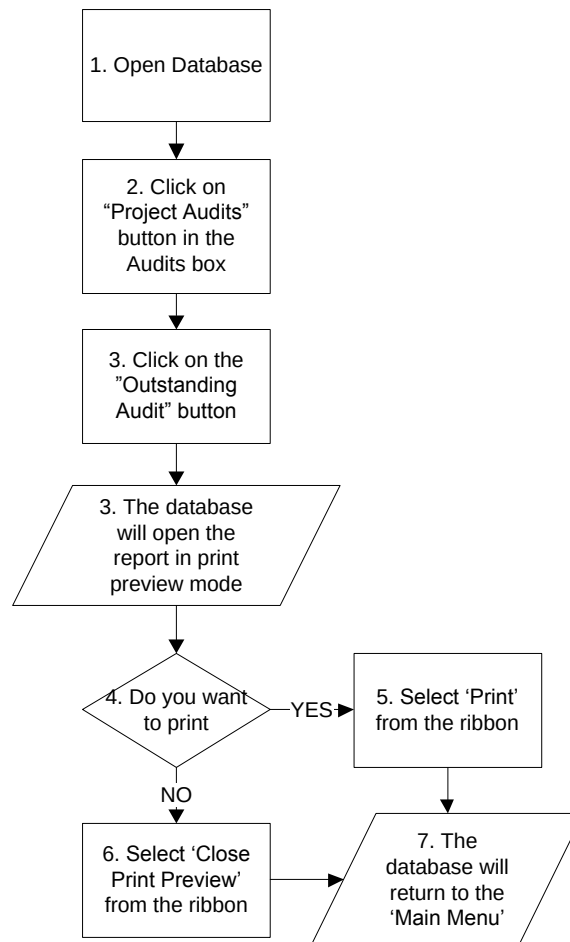


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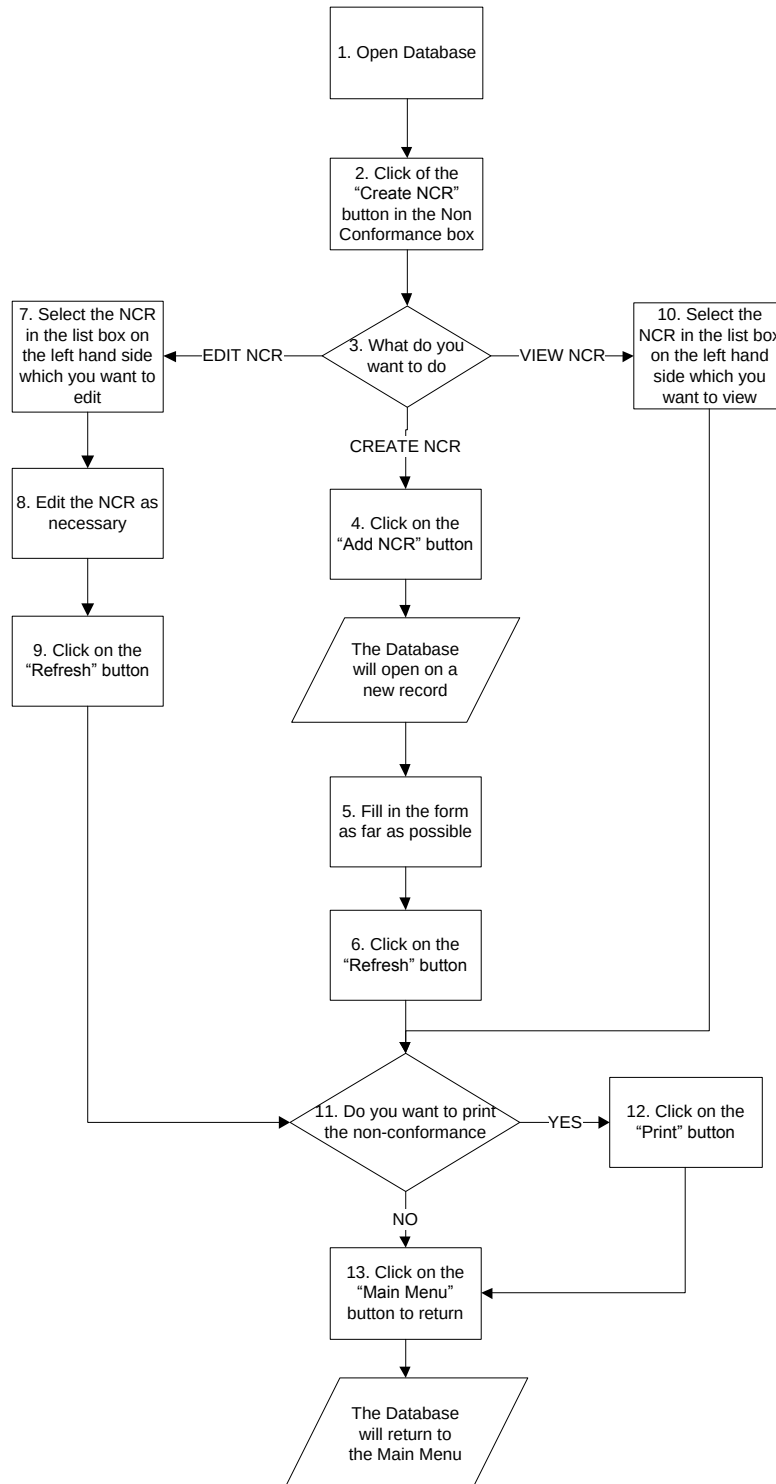


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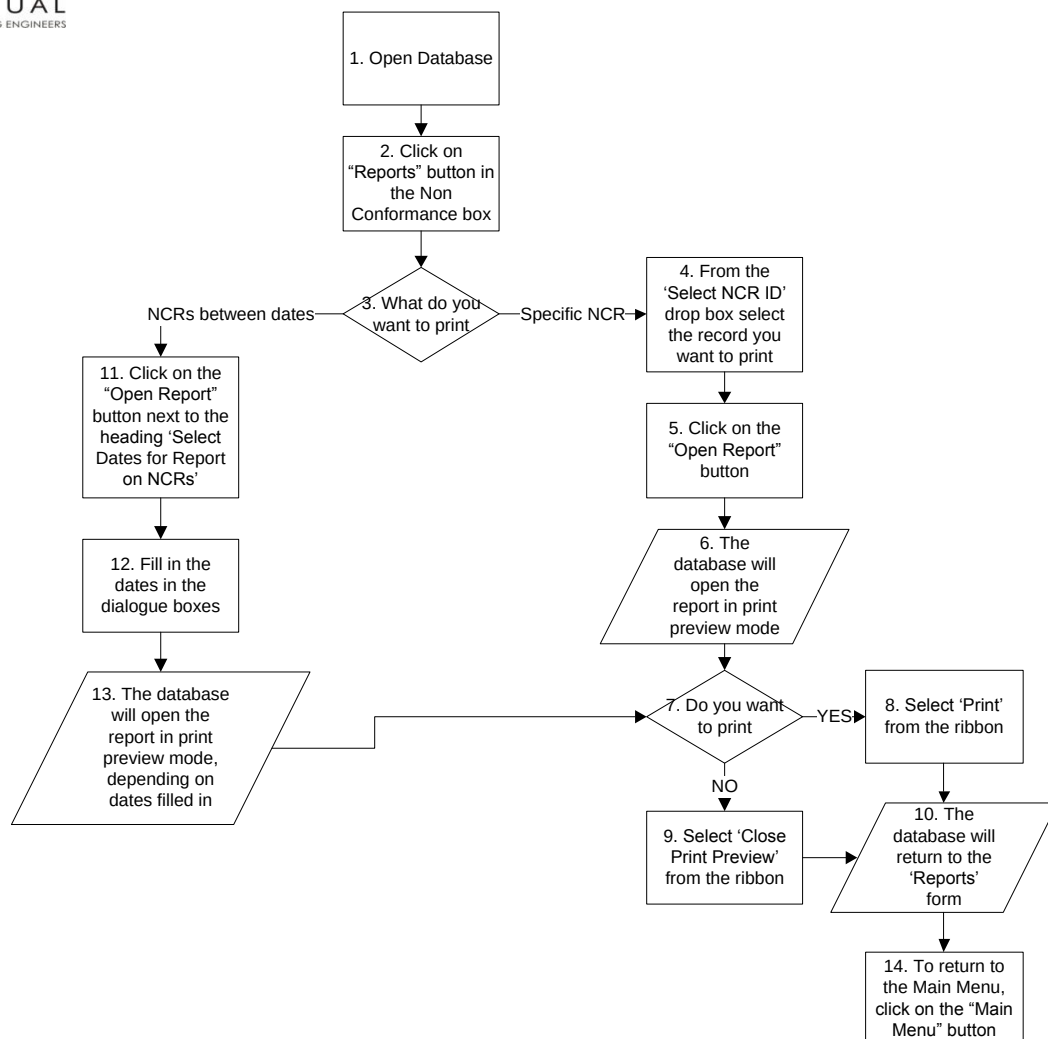


HOW TO CREATE, EDIT, VIEW AND PRINT A NON CONFORMANCE



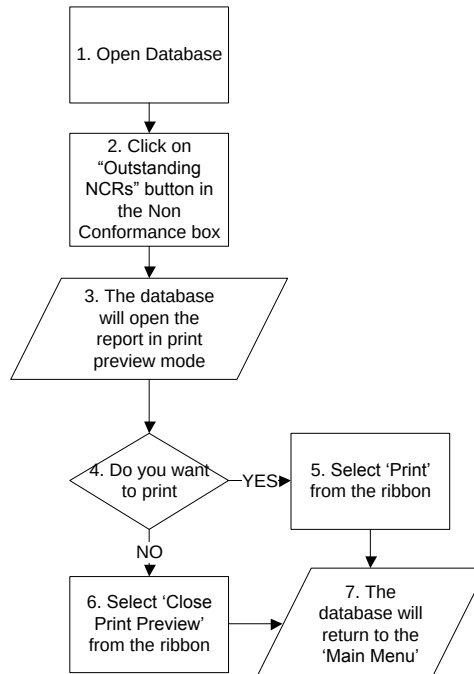


HOW TO GENERATE REPORTS FOR NON-CONFORMANCES



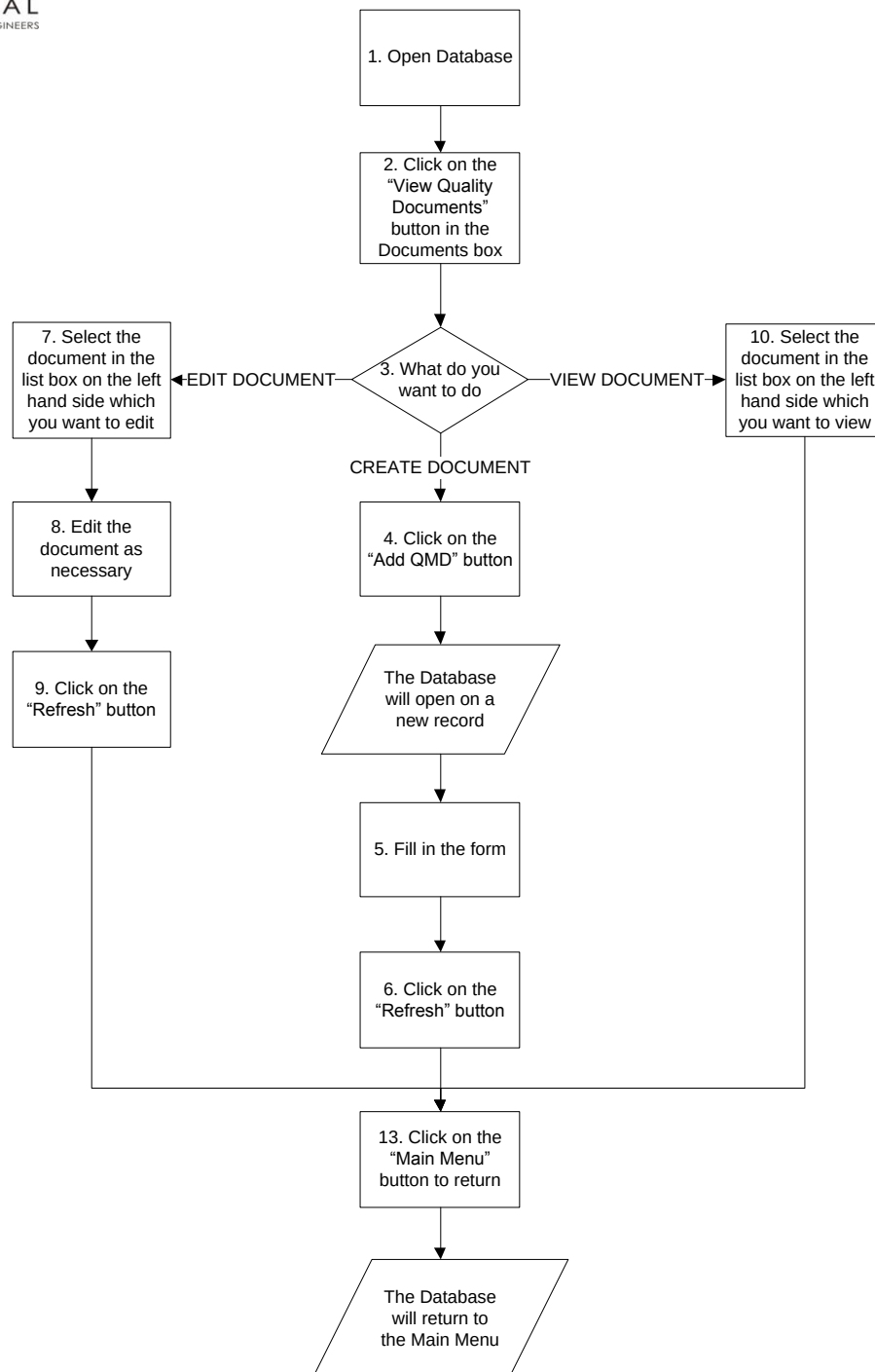


HOW TO GENERATE REPORTS FOR OUTSTANDING NCRs



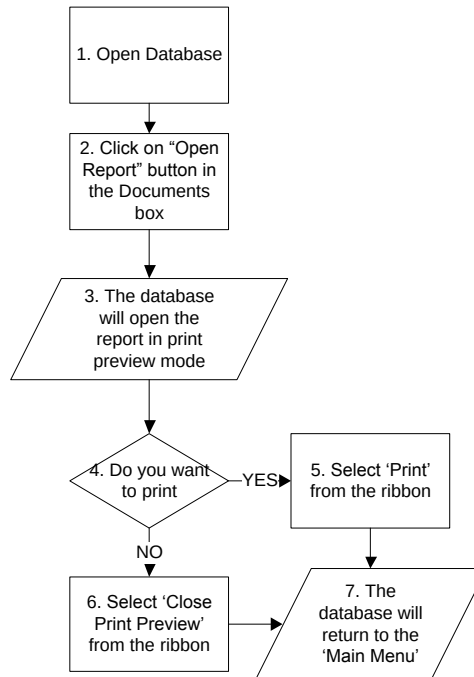


HOW TO CREATE, EDIT AND VIEW QMS DOCUMENTS



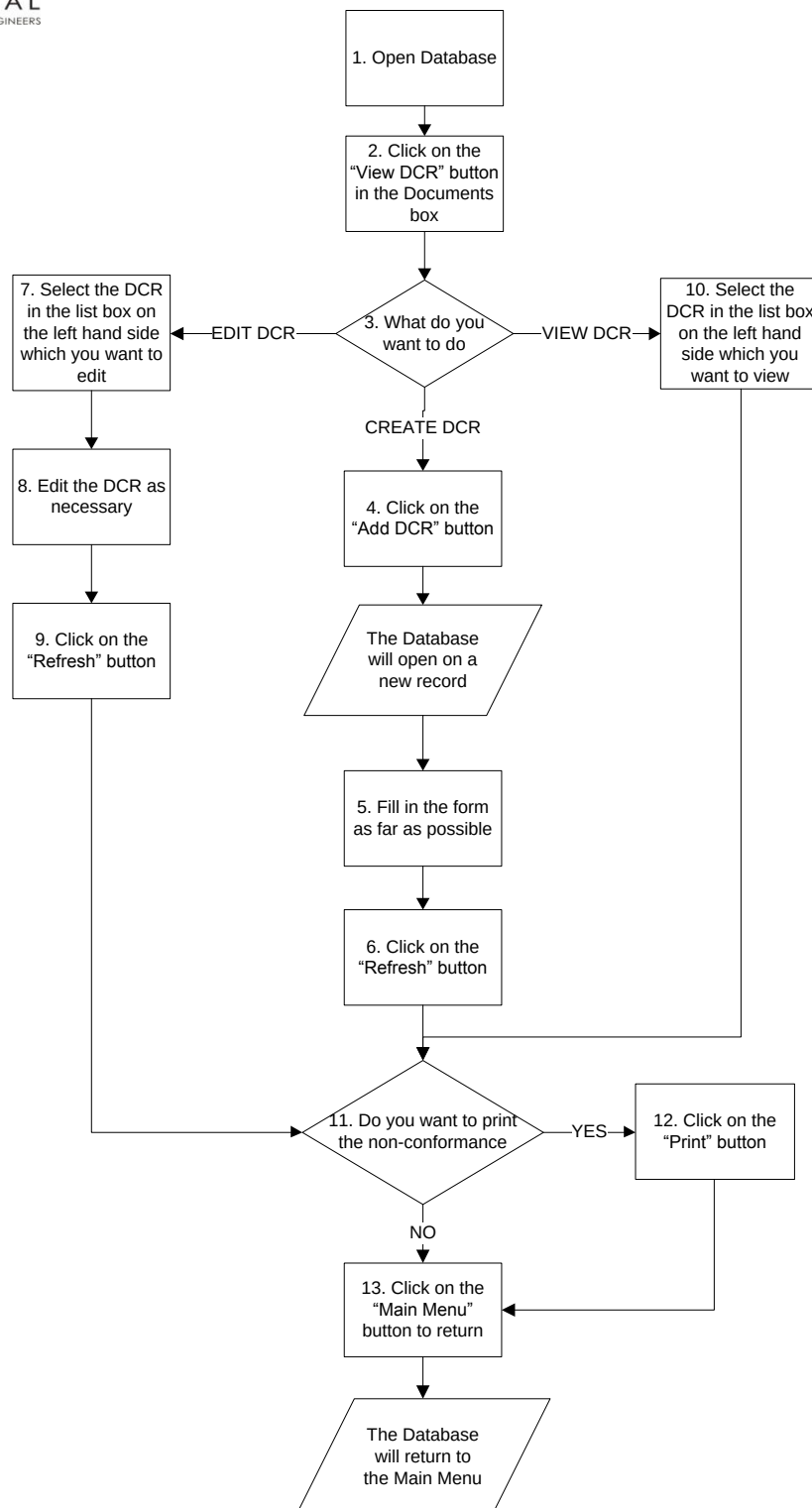


HOW TO GENERATE REPORTS FOR DOCUMENTS



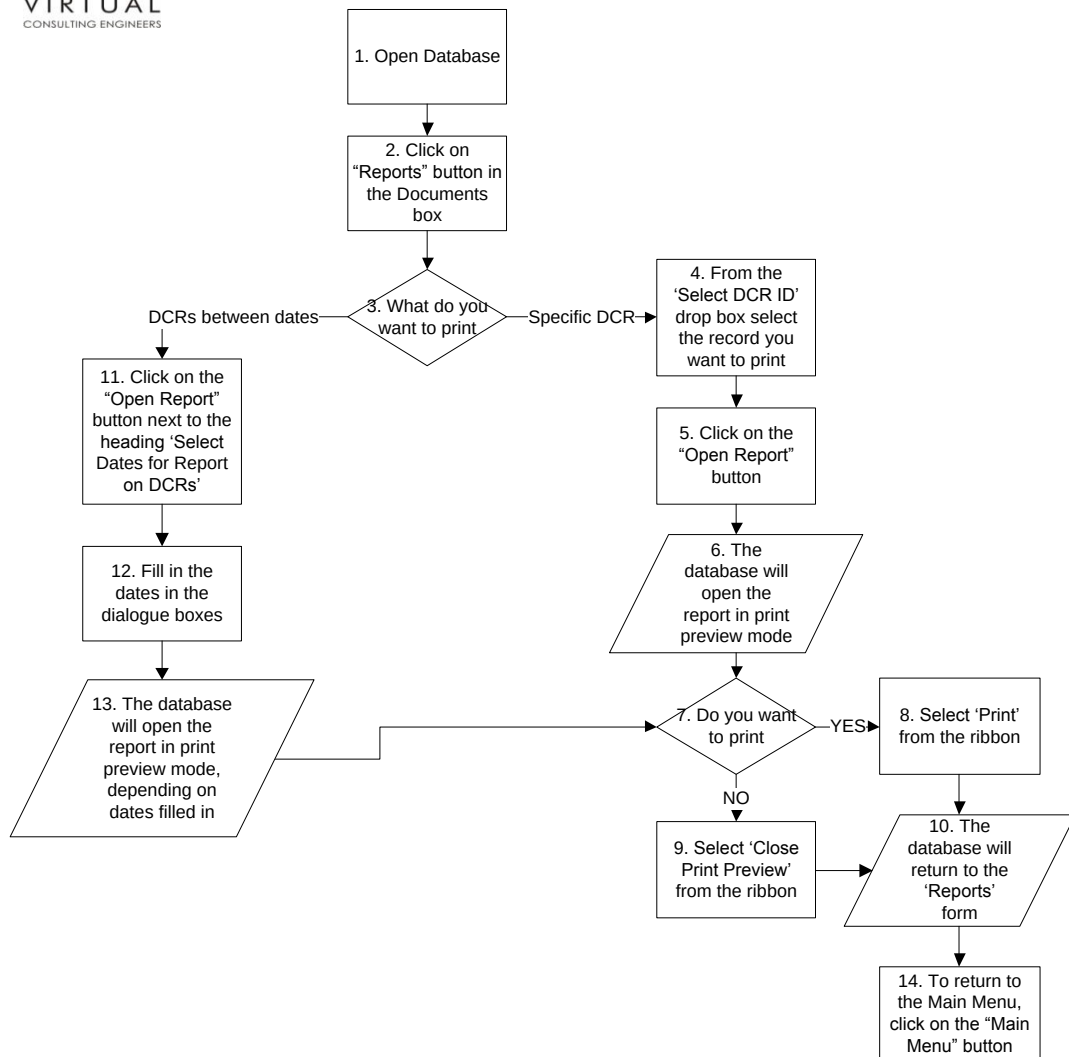


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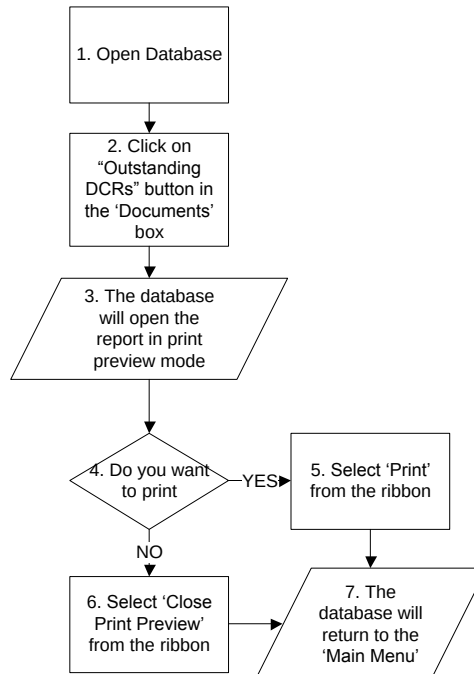


HOW TO GENERATE REPORTS FOR DOCUMENT CHANGE REQUESTS



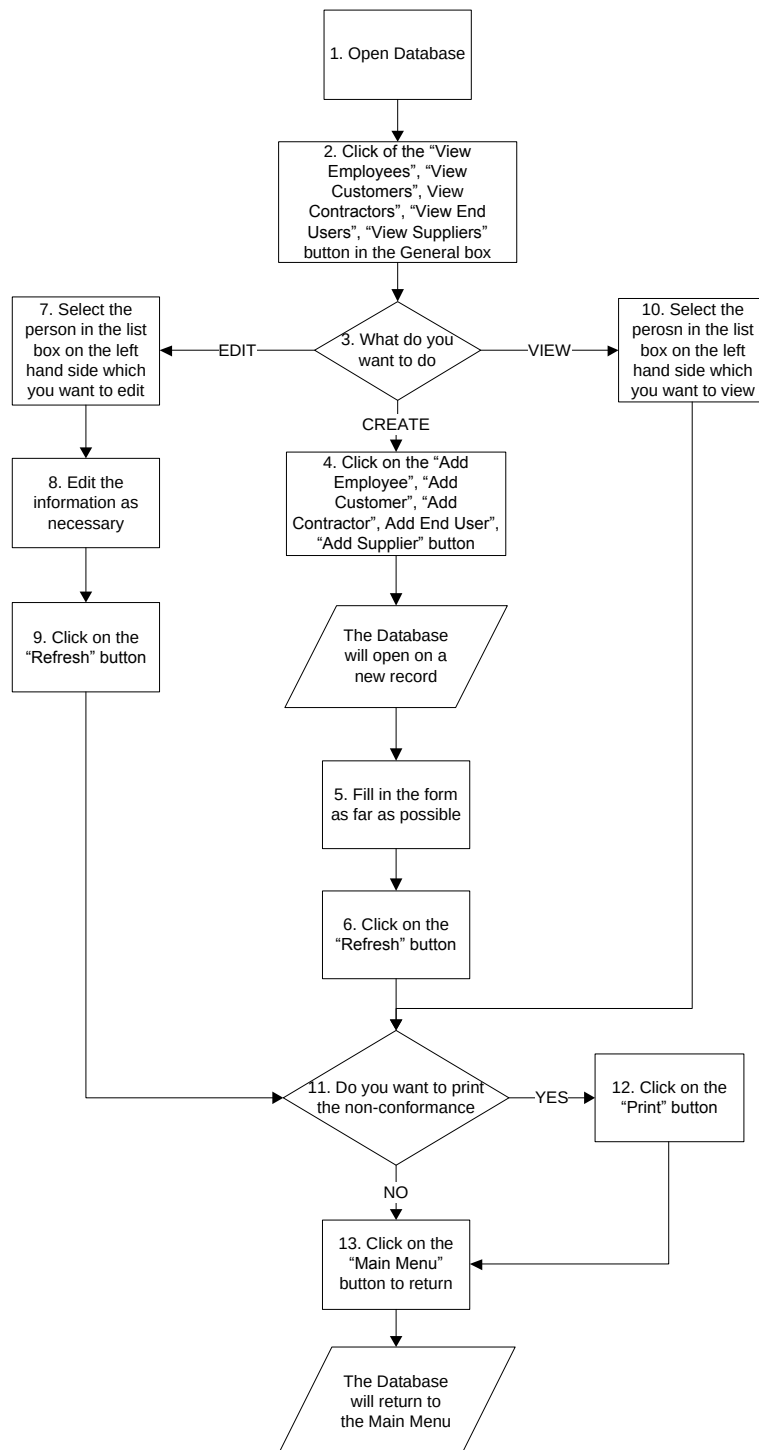


HOW TO GENERATE REPORTS FOR OUTSTANDING DCRs



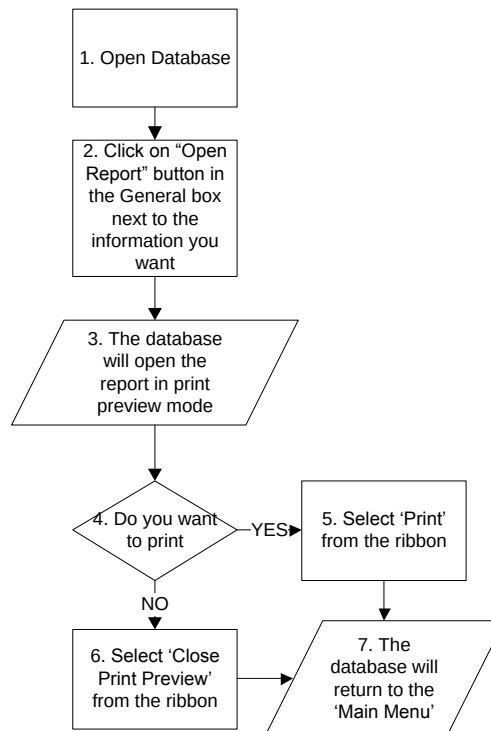


HOW TO CREATE, EDIT, VIEW AND PRINT EMPLOYEES, CUSTOMERS, CONTRACTORS, END USERS AND SUPPLIERS



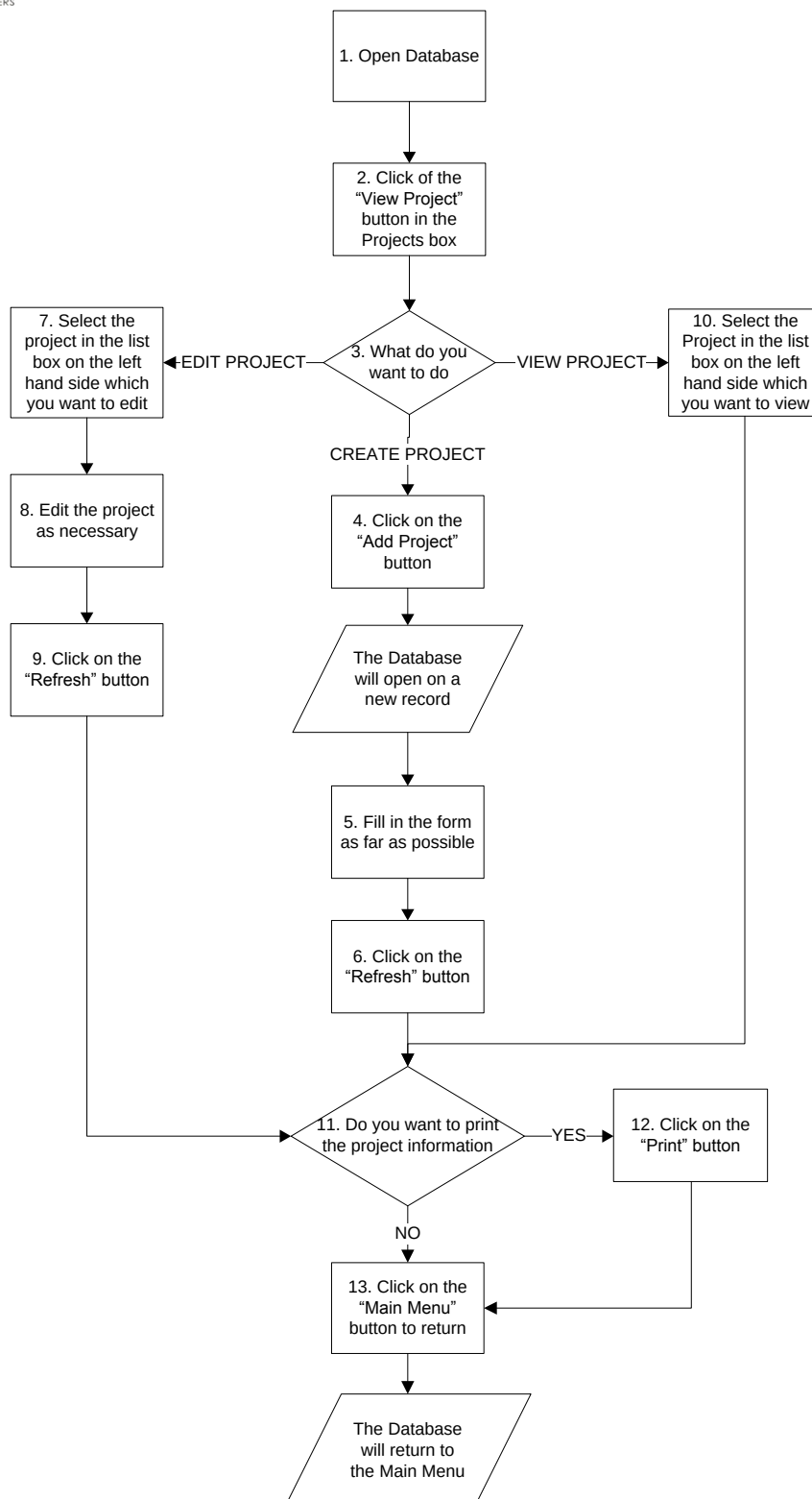


HOW TO GENERATE REPORTS FOR EMPLOYEES, CUSTOMERS, CONTRACTORS, END USERS AND SUPPLIERS



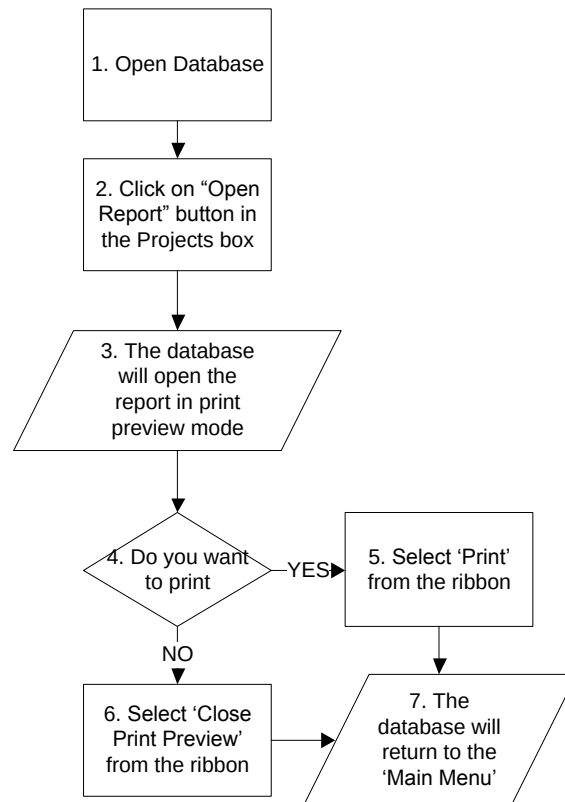


HOW TO CREATE, EDIT, VIEW AND PRINT PROJECTS



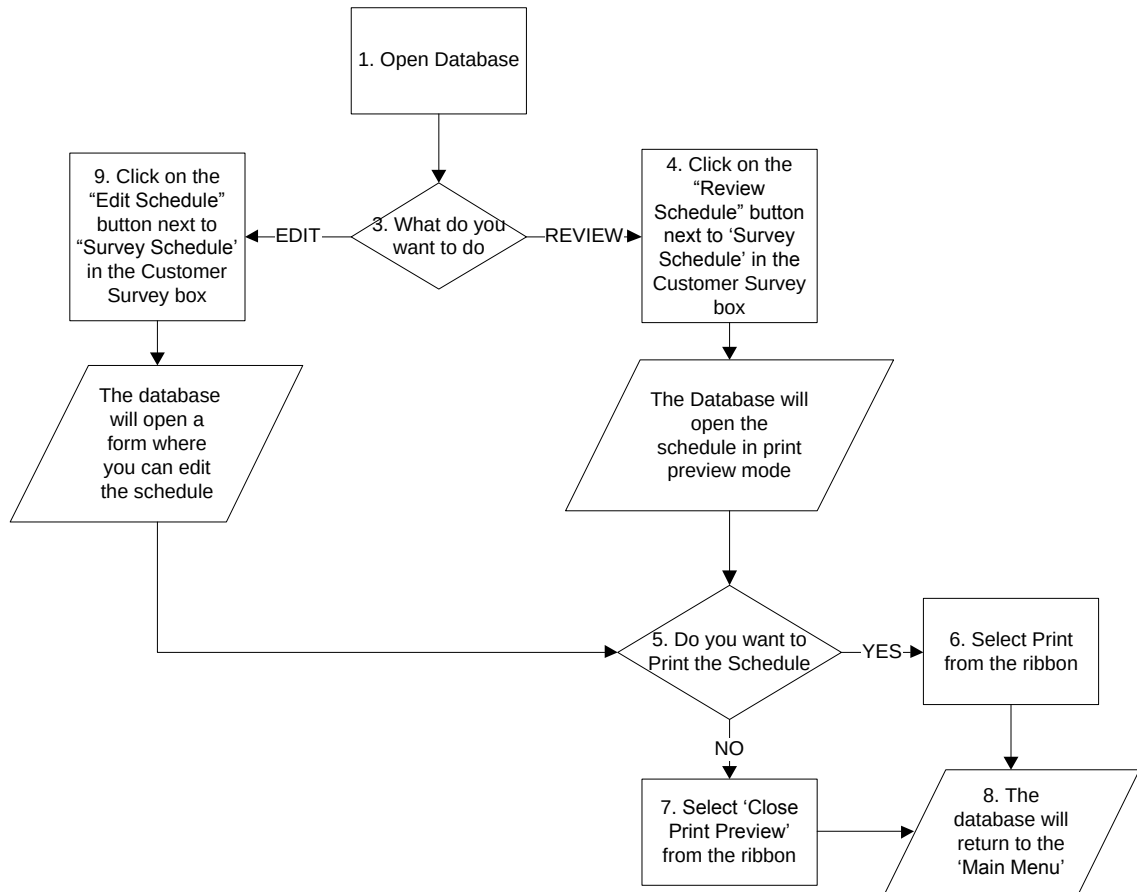


HOW TO GENERATE REPORTS FOR PROJECTS



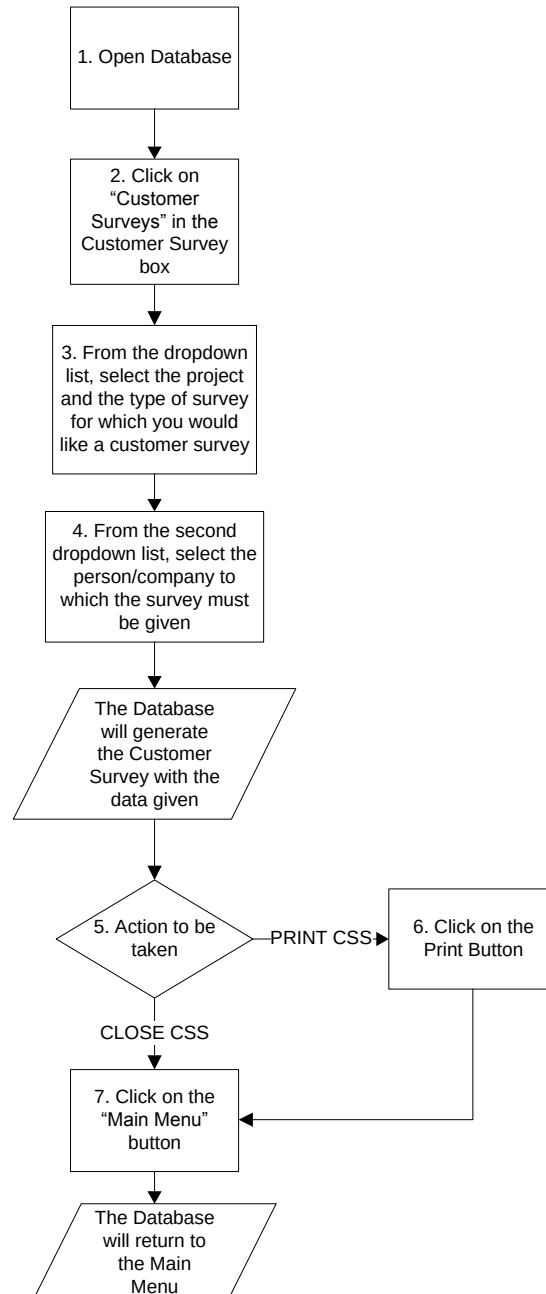


HOW TO VIEW, EDIT AND PRINT THE CUSTOMER SATISFACTION SURVEY SCHEDULE



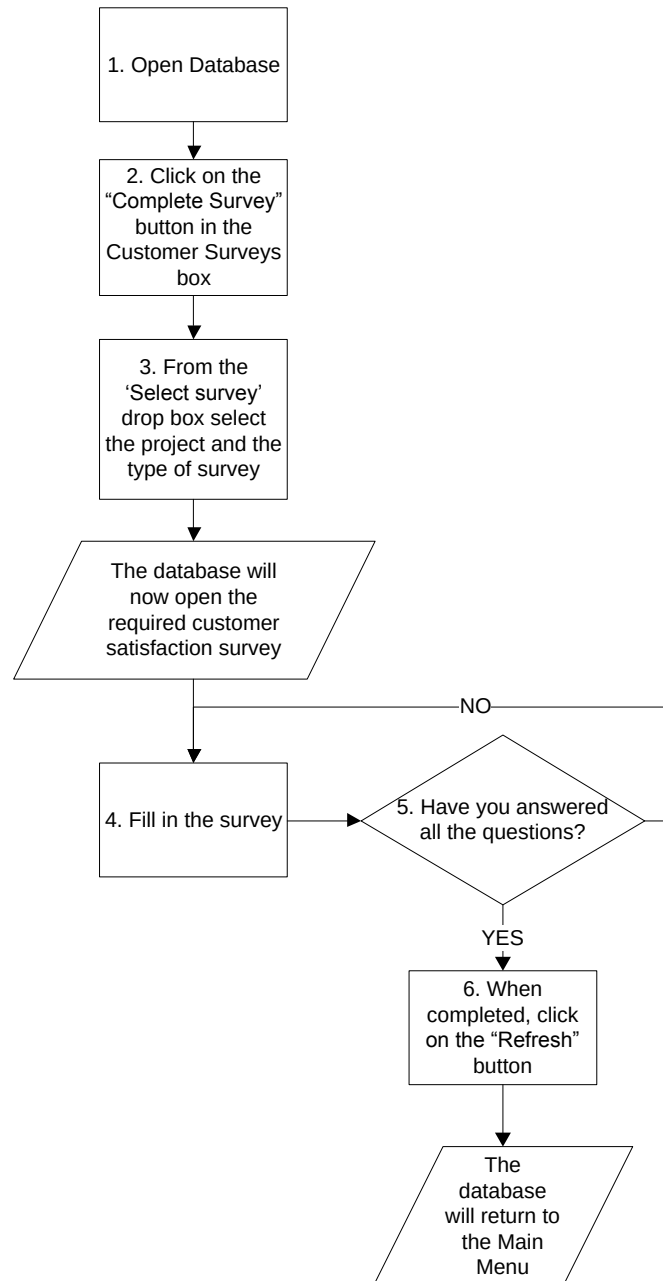


HOW TO DOWNLOAD A CUSTOMER SATISFACTION SURVEY FROM THE DATABASE





CREATE A CUSTOMER SATISFACTION SURVEY





GENERATE REPORTS OF CUSTOMER SATISFACTION SURVEYS

