Public Works and Services

Guidelines for Scanning Projects

Records Management Section
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Introduction

Purpose

The purpose of this document is to provide guidance to departments on digitally imaging paper or microfilm records. Use of these guidelines will bring imaging projects into compliance with national and international standards. Individual projects may need to implement more stringent requirements than those defined within these guidelines.

What is Scanning?

Scanning is a process by which a document (primarily paper, although any medium can be used) is converted from a human-readable format to a computer-readable digital image file. These images can be stored on variety of media in various forms.

Advantages of Scanning

- Ability to use very high-density storage media.

- Shorter retrieval time than hard copy when the images are well indexed.

- Multiple users and access levels are possible.

- Ease of information dissemination.

- Ease of use of imaged copies of records in vital records and disaster recovery plans.

- Legal uses. Organizations that need to retrieve information efficiently during discovery and litigation may find that using imaged records can assist in the effort.

- Ease of making copies of the imaged records.

- Digital images don't lose quality from generation to generation. Well made copies and derivatives can be as good as the original images.

Disadvantages of Scanning

- Digital images are not human-readable without computer equipment.

- Significant equipment costs, including hardware and software.

- Potential for hardware and software obsolescence. Generally, systems change every 18 months to 5 years, software changes every 2-3 years, and the life expectancy of storage media is relatively short.

- Different types of scanners must be used to scan text, oversize items, photographic prints, slides, and other formats.

- Digital quality control, image capture, and indexing are complex and time-consuming processes requiring training and constant vigilance.

- Retention and dispositions must be addressed.

How this Document is Organized

This document has two parts. The first part briefly discusses project planning in the context of planning a scanning project. The second part goes into the details of what must be done to successfully scan documents. The sections that make up the second part of the document discuss document preparation, the scanning of the documents, quality control, and retention and disposition of records. Throughout the document, we identify decisions that must be made while you develop your project plan. We recommend that you read this entire document before beginning to write your project plan.

Definitions

- **Batch** – a collection of one or more documents that will be scanned together as a unit and saved as a single file.

- **Document** – one or more sheets of paper or frames of microfilm that contains information.

- **File** – an entity of data available to computer system users (including the system itself and its application programs) that is capable of being manipulated as a single unit (for example, moved from one file directory to another).

- **Group** – a defined set of documents that will be scanned. A single group of documents may contain many batches. For example, a group may consist of all of the documents scanned during a single day, all of the documents that belong to a certain class, or all of the documents that share a certain characteristic. Groups are defined for the purposes of project planning and quality control.

- **Image** – the electronic digital representation produced as a result of the scanning of an original document, or a representation of that data on a computer screen or on a hardcopy printout. A single image represents one page of a document

- **Scanner** – a device that electronically captures data from a document in a raster pattern, and that creates a digital file of the image of that document.

- **Scanning** – The process of electronically capturing an image of a document and storing it as a digital file.

Supporting Information

- ANSI/AIIM MS44-R1993, Recommended Practice for Quality Control of Image Scanners

- ANSI/AIIM MS52-1991, Recommended Practice for the Requirements and Characteristics of Documents Intended for Optical Scanning

- ANSI/AIIM TR34-1996, Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems

- ANSI/ARMA 16-2007, The Digital Records Conversion Process: Program Planning, Requirements, Procedures

- CAN/CGSB-72.34, Electronic Records as Documentary Evidence

- ISO/TR 15801, Electronic Imaging – Information Stored Electronically – Recommendations for Trustworthiness and Reliability

Project Planning

It is very important to have a plan before you begin any project. Without a plan, a project tends to either expand in scope to the point where it becomes a never-ending job or it fizzles out and dies because the motivation to complete it has disappeared. Allowing projects to expand uncontrollably or to die incomplete is a waste of time and money.

Importance of Planning

Project planning is particularly important when it comes to document conversion projects. Scanning original paper documents or microfilm with the intention of replacing the original with the scanned images raises a number of issues. A good project plan will address these issues.

First, there are the legal issues that surround document conversion. Images of original documents are generally accepted in place of paper records in legal proceedings. However, they may be rejected as evidence if the electronic records system that stores the records does not have integrity or if the image cannot be proven to be reliable. Assessments of the integrity of the system and the reliability of the image are based on the procedures used to create, store, and maintain the images.

Next, there are issues of storage and security. Images must be stored on the appropriate medium. How you choose to store the images depends on the access, retention, and security requirements that you have for the images.

- Images that are used frequently need to be easily accessible. Save images on shared network drives for greatest ease of access. However, before deciding to store images on a shared network drive, it is important to remember that GNWT departments pay for the storage space that they use on the GNWT network. Image files are large and may take up an unacceptable portion of a department's network space. It may be more appropriate to store image files on CDs or DVDs rather than on the network.

- Images that need to be retained for long periods of time need to be stored on media that does not degrade quickly and be in a file format that is unlikely to become obsolete in the short term. See Appendix A for more information on the longevity of digital media. Data conversion and migration projects may be necessary at some point in the future, for one of several reasons:

  o The medium used to store the images may begin to degrade causing a loss of data.

o The storage medium may become obsolete and hardware for reading it will not be available in the future.

o The file format used to store the image may become obsolete and software will not be available to read it.

- Images that cannot be made widely available due to security concerns should be stored in locations where access restrictions can be implemented.

- If images are going to be imported into an information system for access and retrieval purposes, documentation must be kept showing how the system has been maintained over time.

- Backup copies of the images need to be made and maintained in addition to the master set of images. There are two reasons for having backups: one is to provide a backup in case the master image is damaged or destroyed, and the other is to provide a comparison if it is necessary to show that the master image has not been altered.

Writing the Project Plan

A project plan usually contains the following components:

- **Mission Statement or Purpose Statement** – a short explanation of the purpose of the project.

- **Goals and Objectives** – Goals are general statements about what the project should achieve. Objectives describe the steps needed to reach a goal. Objectives also identify the criteria that will be used to show that a goal has been reached.

- **Scope** – The scope sets the limits for the project. It describes what will be included in the project and, if necessary, what will be excluded from the project.

- **Assumptions, Constraints, and Risks** – Describe any assumptions that have been used to make decisions about the project. Describe any constraints, or limits, that could affect the project. Describe any risks associated with the project.

- **Deliverables** – A list of the products that the project will produce.

- **Tasks** – A detailed list of the tasks that need to be done in order to finish the project. These tasks should be listed in the order in which they are done. The tasks can also be shown as a Work Breakdown Structure.

- **Timeline** – A set of dates or deadlines for starting and finishing each task. Timelines can be shown as a simple list of dates that is set against teach task or it can be set up in something as complicated as a GANTT or PERT chart.

- **Resources** – A list of the people, equipment, supplies, and funds needed to complete the project.

A sample project plan may be seen in Appendix B.

Responsibility and Authority

Careful consideration needs to be given to providing proper authority and responsibility to the scanning project. The project itself must be authorized by senior management. Senior management may then delegate authority and responsibility to the employees who supervise the project, carry out the scanning, perform data entry, perform quality control, and provide information security. Any changes to the scanning project need to be authorized. Once the scanning project is completed, someone must be assigned responsibility for managing and maintaining the image files over the life span of the records.

It is important to note that different people must be given responsibility for scanning images and performing quality control on those images. The person who is responsible for quality control must also have the authority to reject groups of records and order them to be rescanned. If original source records are going to be destroyed after the scanning project is completed, the person responsible for quality control must have the authority to validate that the images were properly scanned. The project supervisor must have the authority to certify that the project was carried out in accordance with the project plan.

Document Preparation

Document preparation is the first stage of a scanning project and is probably the longest stage in the project. Proper preparation of documents ensures that all records are scanned and that scanning is done as quickly as possible. The following section discusses the steps that must be taken to prepare original source documents for scanning. It does not address prepping microfilm as there is very little preparation required for microfilm and microfiche.

When to Prepare Documents

It is best to prepare all documents in batches before they are going to be scanned. While it is possible to prepare each document at the same time that scanning occurs, this slows down the scanning process considerably. It is also not feasible if records are being scanned in an off-site location or if the scanning is being contracted out.

You should also keep in mind that the people doing the scanning may not be familiar with the material. The more well organized it is before it is given to the scanner, the better the resulting scans will be.

How to Prepare Documents

- List each document or file as you prepare it. As you box the prepared documents in anticipation of sending them to the scanner, make a list of the documents or files that have been placed in the box. Number each box and record the box numbers on the file/document lists. Keep a copy of the list for tracking purposes.

- Remove all clips, brads, staples, and other fasteners from folders and from multi-page documents. Use an appropriate tool to prevent tearing or otherwise damaging the documents.

- Carefully unfold and flatten documents to eliminate creases and wrinkles.

- Check every document in every folder or other file unit to make certain that all documents are available or accounted for and that they are in their proper sequence.

- Check the numerical sequence and the order of all pages in multi page documents and note all omissions; note missing parts of pages, stains, tears, or obliterations that affect the text of any document; and note all other irregularities that affect the archival character and legibility of the material.

- Tape torn documents using non-yellowing, matte finish tape. For single sided documents, place the tape on the back side of the document so that it does not obscure the document.

- Remove sticky notes and flags, unless they contain important information. If sticky notes and flags must be retained because they contain important information, tape them to the document or onto a separate sheet of paper so that they do not obscure the main document.

- Tape small documents onto 8 ½ x 11" sheets of white paper. Tape the top and the bottom of the small document, keeping them at least 1.5 cm away from the edge of the larger piece of paper. This may not be necessary if you are scanning a large quantity of uniform sized small documents, such as a form.

- Photocopy torn, brittle, faint, or thin papers. Use the reduction feature on a photocopier to reduce oversized documents.

- Identify illegible documents and remove them for separate processing.

- Identify documents to be enhanced by using special scanning techniques. If special processing techniques are required, these should be clearly explained in instructions to the scanner.

- Verify that all papers are facing the same direction and are right side up so that they are easy to feed.

- Transcribe hard to read handwritten documents and place the transcription behind the handwritten document. The transcription should indicate that it transcribes the preceding document.

- Sort documents into batches based on common criteria, such as the file number, retention, and disposition. Wherever possible, keep all pages the same size. Place a batch header at the beginning of each batch.

- Insert dividers or separator pages in between documents or batches of documents to indicate where each scanned file should start and stop.

Photocopying

Where the source documents are photocopied prior to scanning, the procedures used should be documented. Photocopying of documents prior to the scanning process should be done if:

- The documents may be damaged by scanning, such as already damaged or delicate papers.

- The documents have substantial contrast or density variations over the area of the original and photocopying may improve the quality of the image.

- The documents contain paper or ink colours that do not produce legible scanned images.

- The documents are too large to be scanned as a single full-sized image.

Photocopies should be examined to ensure that there is no significant loss of information before they are scanned. Additional quality control procedures should be adopted to ensure that there is no significant loss of detail in the scanned images of photocopied original documents. In the case were photo-reductions are made, checks should be made to ensure that there is no significant loss of detail in the scanned images compared to the original caused. If multiple images are captured, these should be overlapped to ensure that there is no significant loss of information at the edges between adjoining images.

If a photocopy is scanned, it should be clear to a user of the image that they are looking at a photocopy. It should also be clear whether the photocopy was made from the source document during document preparation or whether the source document was itself a photocopy. This may be done during document preparation by stamping or marking the document as a photocopy or an original photocopy or by electronically marking the image as having been captured from a photocopy.

Document Batching

It was noted above that documents should be batched together for scanning. This should be done in order to make it easier to manage the documents and to make it easier to sample the records during quality control. Documents should be batched by similar classification, retention and disposition dates. Choose a batch size that is not too large to be easily managed but not so small that performing quality control on the batches would be inefficient.

Batches should have a unique identifier for retrieval purposes. This identifier is also used as the file title for the saved images. The identifier should be kept consistent from batch to batch. Some possible identifiers include a range of numbers for the material being covered or the date that the image was captured. We suggest the following format: Batch name – date of scanning – batch number. This format would appear as "Batch Name – YYYYMMDD - nn"[1] or "Disposition Files – 20100205 - 05."

A batch header sheet should precede the documents in each batch. The batch headers have several purposes. One use is to identify each batch, usually by indicating the department that owns the

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[1] YYYYMMDD = year month day

documents and by giving the batch a name or other identifier. Another use for the batch header sheet is to tell the person operating the scanner where each batch of documents starts and ends. Usually, you would save all of the pages in a batch into a single file, although it is possible to split a batch into several files. Finally, the batch header sheet is used to document the procedures that should be followed for scanning each batch. The batch header sheet may include a checklist of tasks that must be completed when preparing and scanning the batch. The person who performs each task is required to verify the task was completed without errors.

Potential Problems

Some documents do not scan well and may require special care while doing document preparation. Here is a list of things to look out for:

- **Non-standard paper sizes** – Scanning is most efficient if all of the documents in a batch are the same size because they can be put through an automatic document feeder. If different sized pages are mixed in a batch, each page will have to be scanned individually on a flatbed scanner.

- **Non-standard text orientation** – Standard text is oriented so that the text runs parallel to the short sides of the piece of paper. If text is oriented so that it runs parallel to the long sides of the paper it may be necessary to rotate the images after they have been scanned. It may be more difficult to run OCR (optical character recognition) software on these documents.

- **Coloured paper** – When scanning in black and white, coloured papers may appear as black to the scanner. Scanner settings may need to be adjusted so that the scanner can distinguish the text from the background colour. Run a test scan of coloured documents before scanning a batch. Paper with watermarks and high gloss paper may also be problematic. The scanner can sometimes see watermarks and the watermarks may obscure the resulting image. High gloss paper may reflect too much light back to the scanner and obscure thin lines.

- **Ink colour** – Some scanners have difficulty recognizing certain ink colours when scanning in black and white. Dark coloured inks are easier for a scanner to read than light coloured inks.

- **Colour combinations** – Some colour combinations may not be readable by the scanner when scanning in black and white.

- **Smoothness, texture, and finish** – Three problems can be caused by rough paper. The first is that the texture of the paper causes the image to appear broken. The second is that the texture of the paper may be picked up by the scanner and reproduced in the image. The third is that rough papers may cause the document feeder mechanism to jam.

- **Show-through** – Show-through occurs when printing on one side of a page bleeds through onto the other side of a page. The scanner may pick up both images, obscuring the text. It may be necessary to adjust scanner settings to reduce its sensitivity.

- **Thickness of paper** – Extremely heavy or light paper may not feed properly through an automatic document feeder. These types of papers should either be photocopied and a scan made of the photocopy or they should be scanned by placing each page individually on a flatbed scanner.

- **Image contrast** – High contrast pictures scan more easily than images that have a low level of contrast. It may be necessary to adjust scanner settings in order to scan a picture. However, some detail may still be lost by the scanner.

- **Dot matrix** – Older documents printed on a dot matrix printer may not scan properly because the text has a broken appearance. Some OCR software may not recognized images of dot matrix documents.

- **Character size, style, and weight** – Text smaller than 8 point font may not be legible in a scanned image. Serif fonts and highly stylized fonts may not scan legibly. Text with very thin lines may not scan legibly.

- **Negative images** – If the document contains light text on a dark background the scanner may have difficulty reproducing the image as scanners are optimized for dark text on a light background.

- **Margins** – Information that is close to the edge of a page (within 6 mm or ¼ inch) may be lost because some scanners do not read to the edge of the page or because the page is not aligned on the scanner.

- **Bar codes** – Bar codes may not be reproduced at a fidelity that allows them to be read by a barcode scanner. This is not significant if the purpose of the barcode is to provide the scanner with a document number for indexing or document separation purposes.

- **Photographs and images** – Colour, halftone, and continuous tone photographs and images may not reproduce well, particularly in black and white scanning.

- **Backgrounds** – Text printed on a background image, crosshatching, or shading may not reproduce well as the scanner may have difficulty distinguishing the text from the background.

Scanning the Documents

After the documents have been prepared they can be taken to the scanner. Scanning the documents is not as simple as just running the documents through the scanner. There are a number of decisions that have to be made before and during scanning. Some of these decisions should be made during the project planning phase.

Pre-Scanning Decisions

A number of decisions must be made before you begin scanning documents. First, you need to decide on the file format that you will use for saving the images. There are a number of options to choose from

including PDF, TIFF (.tif), and JPEG (.jpg). PDF (portable document format) and TIFF (tagged image file format) are both formats that can be used for multi-page documents. The PDF format has been released as an open standard and has become an international standard published by the International Organization for Standardization (ISO). There is also a "flavour" of PDF called PDF/A, which allows for the visual appearance of images to be retained over time, regardless of the tools and systems used to create, store, and render (reproduce) the images. TIFF is also available in the public domain. JPEG (Joint Photographic Experts Group) is an open source file format used for digital photographic images. It is also an ISO standard. Open source file formats are preferred because they are stable. Open source file formats are also publicly available so that it will be possible to write programs to read them even after hardware and software changes.

The next thing that you need to decide is where to store the scanned images. As was mentioned previously, images that are used frequently should be easily accessible. While it may seem logical to save the images on a shared network drive, image files are large and may take up too much space. Other options for storing and saving image files include storing them on DVDs or CDs and keeping them in the hands of a custodian. A listing should be created when the documents are scanned to indicate which images are on which disk. This list could be saved on the shared network so that users of the images can see what is available and know who to contact to obtain an image.

As mentioned previously in the discussion of batching, scanned images require names or titles, or a unique identifier. Decisions on how to title the files should be made before any scanning is done. We suggest the following format: Batch name – date of scanning – batch number. This format would appear as "Batch Name – YYYYMMDD - nn"[2] or "Disposition Files – 20090909 - 05."

Scanned images may also be imported into an information system that stores and manages the images. If images are going to be imported into an information system, someone will have to perform data entry to index each image while a second person spot-checks the entries to make sure that they have been filled out correctly. At minimum, the information system should capture the following data:

- Date created

- Format

- Unique identifier for the image

- Official title of the image

- Creator – this is usually the organization that originated the document rather than a person

Indexing is very important because the indexing information is used to search for and retrieve the scanned images. When indexing information is lost, the stored information may also be lost. Indexing may be done manually, or it may be performed automatically using computer software. Automatic

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[2] YYYYMMDDhhmm = year month day

indexing requires the use of OCR technology. It is best used to create a keyword index. Manual indexing is more time consuming because someone has to review each image and index it. Manual indexing allows for the assignment of classification numbers and subjects to the images. If possible, a combination of manual and automatic indexing is ideal.

Checking the Scanner

In order to ensure that good quality images are made, the scanner must be checked before and periodically during the scanning project. By regularly monitoring the performance of the scanner you can identify reoccurring problems and a possible need for repair before the equipment breaks down and causes delays to your project.

Before the scanning project begins, assemble a set of test documents to run through the scanner. The test set should be representative of the documents that are going to be scanned. For microfilm or microfiche, this may be a set of images off of a roll or fiche chosen at random. For paper documents, the test set should include documents that have the same characteristics as the documents that are going to be scanned. For paper documents, the test set should also include a test chart.[3] Test charts are also available for microfilm.

Scan the test set and save the scan as your quality reference. Print the scanned images and save the printouts for comparison purposes. Test scans should be run at pre-determined intervals during the project. At minimum, a test scan should be run before and after the settings on the scanner are changed. Ideally, a test scan should be run before and after each batch. We recommend running a test at the beginning and end of every shift. The reason for testing at the beginning of a shift is to make sure that the images about to be scanned are of sufficiently high quality and to make any adjustments to the settings that are necessary. The reason for scanning at the end of a shift is to make sure that the scanner is continuing to work as it was set up.

To run a test scan, set up the scanner with the settings that will be used to scan the next batch of documents. Scan the test documents using these settings. Scan the documents using the same procedures that you would use for the next batch of documents. Save the scanned images in a temporary folder. Examine the test scans on screen and compare them to the quality reference. Then print the test scans and compare the printouts to the quality reference set of printouts. If the printouts are not satisfactory, print the quality reference images again and compare the new printouts to the test scans. This will rule out problems with the printer. If there are no problems with the printer, then the scanner should be checked for problems or the settings for the scanner adjusted to improve image quality.

Test Scan Log

Each test run must be entered on a log. If a test scan indicates that there are equipment problems, then the test scan printouts should be saved with the log. Write the date and time of the test and the settings

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[3] The Records Management Section has test charts for use with the Multimedia/Vital Records Storage Room scanner.

used for the scan on the back of the printout. Save this test for the scanner repair technician. See Appendix C for an example of a Test Scan Log.

Scanning

Scan documents according to the instructions provided for using the scanning equipment. Make sure that each page is scanned. This may be done by logging each document or batch before it goes into the scanner and then comparing page counts with the resulting scanned images. It may be useful to mark each page after it has been scanned so that the scanned pages do not get mixed up with pages that are still to be scanned.

Before placing documents in the scanner, check for single-sided versus double-sided documents. If there is a mix of single and double-sided documents, set the scanner for duplex scanning. Images of blank pages may be removed later. If you are using a flatbed scanner and placing each document by hand, check both sides of a page before moving onto the next page.

When you have finished scanning a batch of documents, return them to their original box in the same order in which they were originally packed. It is important to maintain the original order of the documents in case they have to be rescanned at a later date. Mark on the box that it has been scanned and the date of scanning.

Post-Scanning Operations

After a batch has been scanned, the person operating the scanner should quickly check the scanned images. The person should check for two things:

1. That all pages were scanned.

2. That all pages have the correct orientation.

3. That all pages are legible.

To verify that all of the pages were scanned, check the count of the number of pages in the scanned batch. Then compare it to the number of pages in the original set of documents. The two numbers should match.

Images that are oriented the wrong way may be rotated using the scanning software or another program.

Two things may be done to address legibility issues with any images. The first thing that may be done is to make adjustments to the image using the scanner software or another program. The most common adjustments that may be made are deskew (straighten), despeckle (remove black spots on the image), black boarder removal, and adjustments to brightness and contrast. These adjustments must be used with care as there is a risk of altering the original image. In particular, the despeckle function in the imaging software may mistake a punctuation mark for noise on the image, and remove a decimal point. This could change the value of numbers. For example, $10.95 could become $1095. Carefully compare

the scanned document to the original after making any adjustments to make sure that the meaning of the document has not been changed.

The second thing that can be done to address legibility issues is to rescan the page that is illegible. To do this, make adjustments to the scanner to bring the image into focus. Then place the page in the scanner. Scan the page and save it as a new file. Using the scanner software or another program, insert the new page into the document in place of the illegible document.

Post Scanning Log

Modifications to scanned images after they have been scanned should be entered in a log. The reason for this is that making modifications to electronic documents may affect the admissibility of the records in the event of an audit or a legal action. The log provides evidence that images were modified only at the time of scanning and that the modifications were done in order to improve legibility and not to modify the contents of the document. An example of a Post Scanning Log is found in Appendix D.

Quality Control

Quality control is vital to the success of any scanning project. If quality checks are not performed on the scanned documents the result may be images that are unusable. Quality control is also needed to ensure that any indexes and metadata collected about the images is correct.

Quality control should be done either while a scanning project is underway or immediately after scanning is completed. It must be done while the original source documents are still available so that they may be rescanned if necessary.

Performing Quality Control

Ideally, quality control will be performed at periodic intervals while the documents are being scanned. To test for quality, take a random sample of the documents and check to see if they are satisfactory. Sampling procedures will be discussed below. Then, review each image in the quality sample either on screen or on a printed version. If the images are mostly going to be viewed by the users on screen, then check the quality on screen. If the images are mostly going to be printed before they are used, then check the quality using a printout.

 The following chart indicates what you should look for while performing quality control.[4] Class A indicates that there is a major concern, while Class B indicates that there is a minor concern.

Electronic Image Attributes	Class A	Class B
Size of image relative to the original (measured horizontally and vertically)	X	

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[4] Chart taken from ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems.*

Electronic Image Attributes	Class A	Class B
Adequate contrast		
• For text there should be a high contrast ratio between the text and the background		X
• For grey scale images the contrast should represent the original image		X
Adequate brightness (more of a monitor problem)		X
Colour dropout (dropout of specific colours from a test target)		X
Poor thresholding (dropped low contrast features, dark background obscuring foreground)		X
Image skew on page		X
Incorrect image orientation on page		X
Speckle or noise in the background of the image		X
Character dropout (a missing character)	X	
Legibility of small characters or features (poor focus)	X	
Separation of black from white features (bar chart may be required)	X	
Scan line drop out (missing scan lines, single or multiple, across the image, either white or black)	X	
Repeated scan lines on successive images	X	
Repeated pixel on successive images (consistent noise or spot on each image at the same location)		X
Borders not cropped		X
Missing portion of edge of image	X	

Before checking a quality sample, prepare a score sheet for each attribute that you are checking. Score each attribute as either yes or no. Yes means that it does have a particular problem while no means that it does not. If an image has any one of the attributes then it fails the quality control test. For each quality sample, keep track of how many documents fail the Class A tests and how many fail the Class B tests. A sample score sheet can be seen in Appendix E.

Selecting Sample Size
For almost all scanning projects the number of images scanned is too large to check each image individually. Consequently, quality control is performed on a random sample of the total number of images. Because you will not be checking every image, there will be a number of images that have errors on them even after quality control has been performed. The goal is to keep the number of poor images

to a reasonably small number, while recognizing that the closer that you get to zero errors, the larger the sample size that you must check. This introduces two risks to the project. One is the risk that you will reject a group of records that could have been accepted. The second is that you will accept a group of records that should have been rejected. If this risk is unacceptable due to the critical nature of the documents, then a 100 percent inspection (inspection of every image) is required and an adequate amount of time and personnel must be assigned to the task.

Before selecting the sample size, you must first determine what percentage of images in the sample set can have either Class A or Class B errors. Generally, you would only accept a very small percentage of images that have Class A errors and a slightly larger percentage that have Class B errors. For example, you could decide that for Class A records you will accept an error rate of 0.1 percent and for Class B records you will accept an error rate of 1.0 percent.

Once you have determined what percentage of error is acceptable, you have to determine the sample size.[5] To do this, first determine the size of the total number of documents from which the sample is to be taken. For example, Public Works and Services has a scanning project. They have determined that they can scan approximately 583 images per hour. Assuming that scanning will take place for six hours per day, they will be able to scan approximately 3,498 images per day, or approximately 17,490 images per week. If they are performing quality control daily – meaning that they are checking the previous day's output of images – then their sample will be taken from a group of approximately 3,498 images all taken the previous day. If they are performing quality control on a weekly basis, then their sample will be taken from a group of approximately 17,490 images taken over the previous five days.

Look at the following chart and find the code letter that corresponds with the size of the group of images that you will be checking.

Group size	Code Letter
2 to 8	A
9 to 15	B
16 to 25	C
26 to 50	D
51 to 90	E
91 to 150	F

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[5] The following instructions are based on the instructions provided in section 12 of ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems*, which are based on ISO 2859-1 (1996 edition), *Sampling procedures for inspection by attributes -- Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*. They use Inspection Level II.

151 to 280	G
281 to 500	H
501 to 1,200	J
1,201 to 3,200	K
3,201 to 10,000	L
10,001 to 35,000	M
35,001 to 150,000	N
150,001 to 500,000	P
500,001 and over	Q

In our example, if PWS performs quality control daily, they will pick the letter L. If they perform quality control weekly, then they will pick the letter M.

Next, look up the sampling plans for your letter on the chart on the next page.

Sampling Plans for a Normal Inspection – Use when sampling at end of project

For complete chart, see ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems.* Pick your sample plan and acceptable error percentage then follow the arrows to the acceptance number.

AC = Number of acceptable errors in sample.   **Re =** If you reach this number of errors in the sample you must reject the entire group of records.

Sample size code letter	Sample size	Acceptable Quality Levels (Normal inspections)															
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10 %
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↓
B	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓
C	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2
D	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3
E	13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4
F	20	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6
G	32	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8
H	50	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11
J	80	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15
K	125	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22
L	200	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑
M	315	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑
N	500	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑	↑
P	800	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑	↑	↑
Q	1250	0 1	↑	↓	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑	↑	↑	↑
R	2000	↑	↑	1 2	2 3	3 4	5 6	7 8	10 11	14 15	21 22	↑	↑	↑	↑	↑	↑

In our example, if PWS is performing quality control every day, they will look up the letter L on the Sampling Plan. This gives them a sample size of 200 images. Next, if they read across the chart and follow the arrows, they will find that to have a 0.1 percent error rate on Class A errors, they will have to find zero or no Class A errors. If there is one Class A error, they will have to reject all of the images scanned that day. For Class B errors, they will find that to have a 1.0 percent error rate they would accept up to five errors in the sample but they would reject all of the images scanned that day if they found six or more errors.

In our second example, if PWS is performing quality control once a week, they will look up the letter M. This gives them a sample size of 315 images. If they read across the chart and follow the arrows, they will find that to have a 0.1 percent error rate on Class A errors, they would have to find no more than one Class A errors. If there are two or more Class A errors, they will have to reject all of the images scanned that day. For Class B errors, they will find that to have a 1.0 percent error rate on Class B errors they would accept up to seven errors in the sample but they would reject all of the images scanned that week if they found eight or more errors.

Sample Size Code Letter	Sample Size	Acceptable Quality Levels (Normal Inspections)					
		0.10	0.15	0.25	0.40	0.65	1.0
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
K	125	0 1	↑	↓	1 2	2 3	3 4
L	200	↑	↓	1 2	2 3	3 4	5 6
M	315	↓	1 2	2 3	3 4	5 6	7 8
N	500	1 2	2 3	3 4	5 6	7 8	10 11

Sample size for daily quality control

Class A acceptance levels - daily quality control

Class B acceptance levels - daily quality control

Sample size for weekly quality control

Class A acceptance levels - weekly quality control

Class B acceptance levels - weekly quality control

The above example allows for a very low error rate and may be appropriate to highly sensitive documents. For the majority of records a higher error rate may be acceptable, such as 1 percent for Class A errors and 4 percent for Class B errors.

Adjusting the Sampling Plan
Follow a normal inspection plan, such as the one outlined above, when you first begin performing quality control. Over time, however, you may find it necessary to adjust the sampling plan. Initiate a

tightened sampling plan if you find that you are rejecting a large number of groups of records. Initiate a reduced sampling plan if you are rejecting few groups of records. In order to maintain quality, only switch from a normal to a tightened or reduced sampling plan according to a set of rules. The rules are described in the table below.

Switching Procedures	Rules
From normal to tightened	When normal inspection is being carried out, tightened inspections shall be put into place when two out of five, or fewer, consecutive groups of images have been rejected on original inspection (ignoring resubmitted images). For example, if the first group is rejected, the second, third, and fourth are accepted, and the fifth group is rejected, then you should switch to a tightened inspection plan.
From tightened to normal	When tightened inspection is being carried out, normal inspection shall be reverted to when five consecutive groups of images have been considered acceptable on original inspection
From normal to reduced	Reduced inspection is an optional procedure that all parties should approve prior to its use. If approved, when normal inspection is being carried out, reduced inspection may be put into operation provided that all of the following conditions are satisfied: • When the acceptance number is 0 or 1, the preceding 15 groups of images have been submitted to normal inspection and all have been accepted on original inspection; or • When the acceptance number is 2 or more, the preceding 10 groups of images have been submitted to normal inspection and all would have been accepted on original inspection if the acceptable quality level had been one step higher.
From reduced to normal	When reduced inspection is being carried out, normal inspection shall be reverted to if a group of records is rejected on original inspection.

The following tables describe the sampling plans for tightened and reduced inspections.

Sampling Plans for a Tightened Inspection

For complete chart, see ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems.* Pick your sample plan and acceptable error percentage then follow the arrows to the acceptance number.

AC = Number of acceptable errors in sample.   **Re =** If you reach this number of errors in the sample you must reject the entire group of records.

Sample size code letter	Sample size	Acceptable Quality Levels (Normal inspections)															
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10 %
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
B	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↓
C	15	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓
D	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2
E	13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3
F	20	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4
G	32	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6
H	50	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9
J	80	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13
K	125	↓	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19
L	200	↓	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑
M	315	↓	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑
N	500	↓	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑
P	800	↓	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑
Q	1250	↓	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑
R	2000	0 1	↑	↓	1 2	2 3	3 4	5 6	8 9	12 13	18 19	↑	↑	↑	↑	↑	↑
S	3150			1 2													

Sampling Plans for a Reduced Inspection

For complete chart, see ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems.* Pick your sample plan and acceptable error percentage then follow the arrows to the acceptance number.

AC = Number of acceptable errors in sample.   **Re =** If you reach this number of errors in the sample you must reject the entire group of records.

Sample size code letter	Sample size	Acceptable Quality Levels (Normal inspections)															
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10 %
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↓
B	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓
C	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓
D	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2
E	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3
F	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4
G	13	↓	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5
H	20	↓	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7
J	32	↓	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9
K	50	↓	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11
L	80	↓	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑
M	125	↓	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑	↑
N	200	↓	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑	↑	↑
P	315	↓	0 1	↑	↓	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑	↑	↑	↑
Q	500	0 1	↑	↑	↓	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑	↑	↑	↑	↑
R	800	↑	↑	↑	1 2	2 3	3 4	4 5	6 7	8 9	10 11	↑	↑	↑	↑	↑	↑

Rejecting Scanned Images

If the sample that you are reviewing fails the quality control inspection, it must be returned to the person doing the scanning and the original documents must be re-scanned. Make sure that you explain to the person doing the scanning why the original images failed so that he or she can correct the problems when the documents are rescanned.

Save the rescanned images separately from the original set of scanned images. Give unique identifiers or file names to the rescanned images to distinguish them from the rejected images. For example, if a batch was originally named "Disposition Files – 20090909 – 05," the rescanned batch could be called "Disposition Files – 20090909 – 05r". The R at the end of the file name indicates that this image was rescanned.

The rescanned images must be submitted to a quality control review when they are received from the person doing the scanning. This review does not count towards a decision to adjust the sampling plans.

A group of documents may have to be rescanned several times before it passes the quality control test.

Documentation

Information about the quality control process should be captured in several places. The project plan or a separate quality control plan should identify who is doing the scanning and who is doing the quality control evaluations. The person who scans the records cannot perform quality control on them. The plan should also indicate if the sampling plans can be adjusted and who approves the changes. The plans should indicate if a single quality control sample will be taken of all of the images after everything has been scanned or if quality control will occur while scanning is ongoing. The plans should also document the percentage of Class A and Class B errors that are allowable.

As noted above, a score sheet should be kept for each sample of records. This score sheet is used to document any errors identified in the sample. It is used to determine if a group of documents needs to be rescanned and to justify that decision.

A log should be kept to document each sampling exercise and note any changes to sampling plans. An example of a Quality Control Log is in Appendix F.

Letters or memos should be used to authorize changes from a normal to a reduced sampling plan.

A letter or certificate should be issued upon completion of all quality control activities confirming that the scanned images comply with the quality control plan. The purpose of this certificate is to validate the scanned images.

Retention and Disposition

There are many reasons why a department may wish to scan their documents and keep them in an electronic format. They may be using the scanned images as a backup to their vital paper records, while maintaining the paper records as a master record. They may be using the scanned images as a

preservation technique or as a way to provide easier access to records with the intention of retaining the scanned images and disposing of the originals. Regardless of the purpose of the scanned images, they are records and both they and their original source records must be scheduled according to an approved records disposition authority.

Reason for Scanning	Retention and Disposition Considerations
Scanned images are a backup to vital paper or microfilm records. Original source records are kept as master records along with the scanned images.	The paper original records are the master records and should be classified and scheduled in ARCS or ORCS. The scanned images are backup copies and should be disposed of according to the appropriate copy file retention in ARCS or ORCS when they are no longer required as a backup to the original.
Scanned images are replacing original source records for access or preservation purposes. Original source records will not be kept.	The retention schedules in ARCS and ORCS must authorize the conversion of records to a new medium and the destruction of the original record. This may require an amendment to the Records Disposition Authorities. Original source records are scheduled for destruction.

Procedures for Disposing of Original Source Records and Scanned Images

As noted above, original records and scanned images may only be disposed of in accordance with an approved records disposition authority, such as ARCS or ORCS. Disposition must comply with the Archives Act, the Records Scheduling Policy, and with Public Works and Services' disposition procedures.

Disposal of Records where Scanned Images are kept as a Backup

If the original source records are kept as a master record and the scanned images are maintained as a backup, the following procedures apply:

1. For original master records

    a. When the original master records have reached the end of their life cycle, the department prepares box inventory forms listing the records to be disposed of.

    b. The Director or Regional Superintendent authorizes the disposition and the Records Coordinator forwards the disposition package to the Records Analysts at Public Works and Services.

    c. The records are disposed of according to normal disposition procedures.

2. For backup scanned images

a. When the scanned images reach the end of their life cycle, the department prepares a listing of the images that are to be disposed of. The listing should connect the scanned images to the appropriate ARCS/ORCS classification number and retention schedule.

b. The Director or Regional Superintendent authorizes the disposition. The authorization letter should indicate that the scanned images were backup copies maintained for vital records protection purposes and that the original records are being scheduled and disposed of as master records according to ARCS or ORCS.

c. The Records Coordinator reviews the disposition package and forwards it to the Records Analysts at Public Works and Services.

d. The Records Analyst agrees to the disposal of the records.

   i. If the images are stored on a network shared drive the Records Analyst provides authorization to the department to delete the records. The Records Coordinator notifies the Records Analyst when the images have been deleted.

   ii. If the images are stored on a removable storage medium, such as a CD or DVD, the Records Coordinator and Records Analyst will arrange to have the images transferred to the records centre for disposal by shredding.

Disposal of Records where the Scanned Images are replacing the Original

If the scanned images are replacing the original source records as the master record, the following procedures apply. In order to dispose of original source records and replace them with scanned images, the retention and disposition schedule in the ORCS must state that departments can replace original records with scanned images.

1. For original source records

   a. The department prepares box inventory forms listing the records to be disposed of.

   b. The Director or Regional Superintendent authorizes the disposition. The authorization letter should indicate that the records are original source records that have been converted to a new medium and that the new scanned images are going to be kept in place of the originals. A copy of the scanning project plan and the certificate validating the scanned images should be attached to the letter and the box inventory forms.

   c. The Records Coordinator forwards the disposition package to the Records Analysts at Public Works and Services.

   d. The Records Analyst reviews the disposition package. If it appears that the disposition package complies with the ARCS/ORCS retention schedules, the Records Analyst agrees to the disposition.

e. The Records Coordinator and Records Analyst arrange to have the records transferred to the records centre for destruction.

2. For scanned images

   a. When the scanned images reach the end of their life cycle, the department prepares a listing of the images that are to be disposed of. The listing should connect the scanned images to the appropriate ARCS/ORCS classification number and retention schedule.

   b. The Director or Regional Superintendent authorizes the disposition. The authorization letter should indicate that the scanned images are original records and are being scheduled and disposed of as master records according to ARCS or ORCS.

   c. The Records Coordinator reviews the disposition package and forwards it to the Records Analysts at Public Works and Services.

   d. The Records Analyst agrees to the disposal of the records.

      i. If the images are stored on a network shared drive the Records Analyst provides authorization to the department to delete the records. The Records Coordinator notifies the Records Analyst when the images have been deleted.

      ii. If the images are stored on a removable storage medium, such as a CD or DVD, the Records Coordinator and Records Analyst will arrange to have the images transferred to the records centre for disposal by shredding.

Exceptions to Destroying Original Source Records

There are some situations where it is not advisable to destroy original source records, even though the intent is to replace them with a verified scanned image. Original source records should not be destroyed if:

- A legible image cannot be made.

- Where fraud has been identified or litigation is ongoing and affects the records.

- Where an Access to Information and Protection of Privacy request has been made for the records.

- Where original signatures are significant or have high value, such as with a contract or agreement. In this case, a legal opinion on whether or not the records can be destroyed should be obtained before the records are submitted for disposal.

Appendix A – Life expectancy of recording media[6]

Recording media used to store digital information has a limited life span in comparison to paper. There are two threats to digital media: 1) that the recording medium will degrade before the information on it loses its usefulness; and 2) that the recording technology will become obsolete before the information on it loses its usefulness. The length of time that it takes for digital recording media to degrade varies depending on a number of factors. For maximum data protection, digital media that stores long term records should be replaced (i.e. the data copied to a new medium) roughly every 10 years.

Media Type	Description	Longevity	Required Storage Conditions
Flexible Magnetic Disks (Floppy Disks)	A flexible magnetic disk housed in a rigid or semi-rigid casing. Several formats were available. Now obsolete	Up to 5 years	• Do not open casing or touch disk • Labels should only be applied in the label area of the disk • Write-protect switch should be set immediately after writing • For short term storage store between 10 and 51.5°C and at 20-80% humidity • For long term storage store between 18 and 22°C and at 35-45% humidity
Magnetic Tape	One of several formats that comprises a magnetic recording layer on a flexible, usually polyethylene, tape. Usually found in reels (one spool) or cassettes (two spools)	High capacity formats such as Digital Linear Tape (DTL) and linear Tape Open (LTO) are considered the most stable and long-lasting, and have a life span of 30 years.	• Do not open cassettes • Do not touch tape surface • Labels should only be placed on the label area of the container • Cassettes should be retensioned annually • Write-protect switch on cassettes

[6] Information based on The National Archives (United Kingdom), *Digital Preservation Guidance Note 3: Care, Handling, and Storage of Removable Media.*

			• should be set immediately after writing • For short term storage store between 16 and 32°C and at 20-80% humidity • For long term storage store between 18 and 22°C and at 35-45% humidity (LTO format is 16 and 32°C and at 20-80% humidity)
Optical Disks	One of several formats of rigid disks that are comprised of a reflective layer and a recording layer that is read using a laser. The most common types are Read-only compact disk (CD or CD-ROM), Recordable CD (CD-R), Rewritable CD (CD-RW), Read only Digital Versatile Disk (DVD or DVD-ROM), Recordable DVD (DVD-R and DVD+R), Rewritable DVD (DVD-RAM, DVD-RW, DVD+RW), and High Definition DVD or Blu-Ray.	CD-Rs that use a gold reflective layer and phthalocyanine-based dyes have the greatest lifespan. Manufacturers claim life spans of up to 100 years using accelerated aging tests. CD-RW formats are not recommended for long term storage. DVDs are similar to CDs and the same recommendations apply. Manufacturers claim life spans of up to 200 years	• Do not touch recording area • Adhesive labels should never be used • Disks may be marked on upper surface with water soluble permanent ink • For short term storage store between 5 and 45°C and at 20-80% humidity • For short term storage store between 10 and 50°C and at 10-80% humidity • For long term storage store between 18 and 22°C and at 35-45% humidity
Solid State Media (Flash)	A non-volatile, solid state memory commonly used in laptops, digital cameras, and USB memory sticks.	Degrades and becomes unstable with repeated use. Manufacturers claim life spans of up to 10 years.	• Gold contacts on media should not be touched • Labels should only be placed on the label area of the casing • For short term storage store between 10 and 50°C and at 20-80% humidity

			For long term storage store between 18 and 22°C and at 35-45% humidity

Appendix B – Sample Project Plan

Purpose Statement
The purpose of this project is to image the Records Management Unit's Disposition Files and import them into a document management system. These records have a very long retention period and conversion to another medium is recommended for ease of retrieval and preservation purposes.

Goals and Objectives
The goal is to fully digitize the information that the Records Management Unit has regarding the disposition of boxes so that they are fully indexed and may be easily searched for and retrieved.

The project has the following objectives:

- To prepare digital images of disposition files.

- To import the digital images into a document management system.

Scope
The project will include all disposition files created prior to January 2006, the transfer forms in the old disposition binders, and transfer forms from the old transfer binders where the transfers were partially disposed of. Disposition files created after January 2006 have been fully captured in the document management system.

Assumptions, Constraints, and Risks
This plan assumes that scanning will be performed in Public Works and Services' Multimedia/Vital Records Storage Room. It also assumes that the relevant ORCS can be amended to allow conversion of the records to a digital format and the disposal of the original records. Finally, it assumes that a casual employee can be hired to perform the scanning and index them in the document management system. It also assumes that a full time employees can be made available to prepare the documents and perform quality control.

The project may be constrained by the availability of the Multimedia/Vital Records Storage Room. It may also be constrained by how quickly an ORCS amendment may be made and approved. It may also be constrained by the availability of staff for the project.
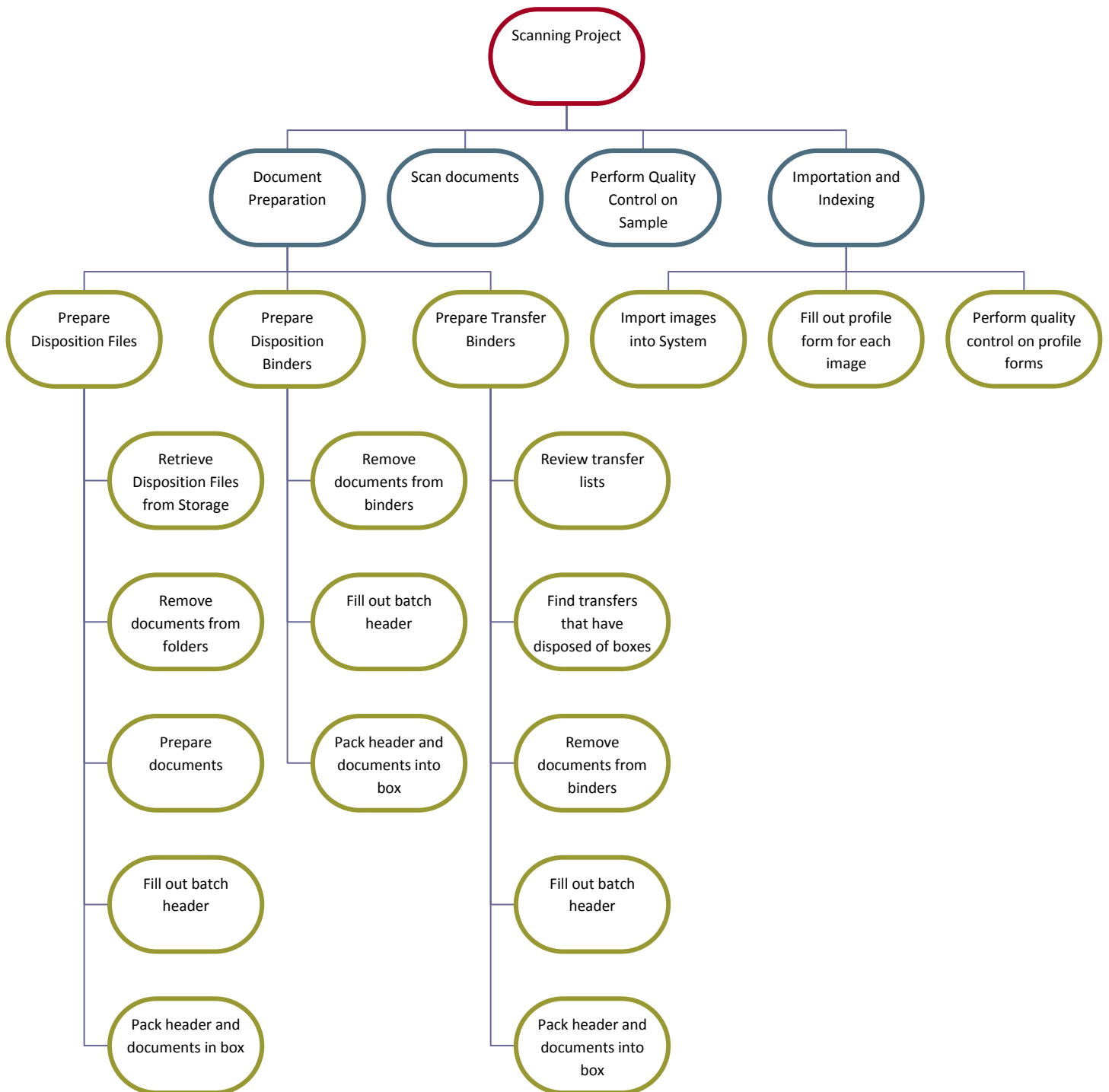
The risk of not performing the project is that the original paper records will continue to degrade and over time will become too brittle to handle. There is a small risk that the resulting images will not be of high enough quality to be useable.

Deliverables
- Prepared documents for scanning.

- Scanned images.

- Indexed images imported into a document management system.

Tasks

Timeline

Timelines are based on an estimate of the total number of documents to be prepared and time and motion studies to determine how long it takes to prepare a box of records for scanning. A 15 percent contingency has been built into the schedule.

Task	Sept 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011
Document Preparation	▬▬▬					
Scanning		▬▬▬▬▬▬▬▬				
Quality Control		▬▬▬▬▬▬▬▬				
Importation and Indexing					▬▬▬	

Resources

- One Records Management employee to prepare documents.

- One Casual employee to scan documents and index them in the document management system.

- One Records Management employee to perform quality control

- Workstation for casual

- Multimedia/Vital Records Storage Room

- Office supplies

- 75 new records boxes

Appendix C – Sample Test Scan Log

Date	Time	Initials	Settings	Results	Comments
2010/02/05	16:00	TBH	7 50 90	Ok	Disposition files
2010/02/06	09:10	JR	12 50 95	Too Dark	Disposition files
2010/02/06	09:30	JR	8 49 92	OK	Transfer sheets
2010/02/06	11:55	JR	8 49 92	OK	Transfer sheets

Appendix D – Sample Post Scanning Log

Date	Time	Initials	Batch Name/File Name	Problem With Image	Resolution
2010/02/05	14:15	TBH	Disposition Files – 2010/02/05 – 25	Pages 3, 4, 5, and 6 illegible	Rescanned pages and inserted into document
2010/02/05	14:15	TBH	Disposition Files – 2010/02/05 – 25	Several pages in portrait instead of landscape orientation	Rotated pages to landscape orientation
2010/02/05	15:40	TBH	Disposition Files – 2010/02/05 – 28	Page 15 too dark	Adjusted image brightness
2010/02/05	15:52	TBH	Disposition Files – 2010/02/05 – 29	Page 2 too faint	Adjusted image contrast

Appendix E – Sample Quality Control Score Sheet

Quality Control Score Sheet

Date: 2010/02/06   **Initials:** JR

Quality control performed on: Images filmed on 2010/02/05 by TBH

Image Number	Class A – Major Problems							Class B – Minor Problems								
	Size of Image	Character dropout	Illegible small characters	Poor black/white separation	Scan line drop out	Repeated scan lines	Missing portion of edge of image	Inadequate Contrast	Inadequate Brightness	Colour dropout	Poor Thresholding	Image Skew	Incorrect orientation	Speckle or noise on image	Repeated Pixels	Borders not cropped
1		X						X				X				
9												X				
10												X	X			
17									X							X

Appendix F – Sample Quality Control Log

Date	Initials	Image Group	Comments
2010/02/05	JR	Group 1 - Images scanned on 2010/02/04	OK
2010/02/08	JR	Group 2 - Images scanned on 2010/02/05	Failed. Sent for rescanning.
2010/02/09	JR	Group 3 - Images scanned on 2010/02/08	OK
2010/02/10	JR	Group 4 - Images scanned on 2010/02/09	OK
2010/02/11	JR	Group 5 - Images scanned on 2010/02/10	Failed. Sent for rescanning
2010/02/11	JR		Switch to tightened sampling plan because 2 out of 4 sequential samples failed.
2010/02/12	JR	Group 6 - Images scanned on 2010/02/11	OK
2010/02/13	JR	Group 2 Rescan - Rescans of images scanned on 2010/02/05 – images rescanned on 2010/02/12	OK