Crystal Clear

Standards and guidance for digitising regional collections held in museums, galleries, keeping places and cultural centres

Museums & Galleries of NSW

With thanks

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NOTE ON IMAGES

All images that appear in this document are courtesy of M&G NSW Collections and Stories project 2018

Images
Left: Detail of velvet jacket owned by Shamroze Khan, one of Broken Hill's past cameleers c. 1910s, Sulphide Street Railway and Historical Museum.
Right: Photographing a tennis dress made from embroidered huckaback tea towels with the colour chart, Eugowra Historical Museum and Bushranger Centre.

Cover Images
Top: Medicine bottles from the family medical box (or chest) of Carcoar's first Mayor and former convict, Barnard Stimpson, c 1850s, Carcoar Hospital Museum.
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ABOUT THIS GUIDE

*Undertaking and addressing the challenges
of object digitisation in the regional context*

The aim of this document is to guide the digitisation of collections cared for by regional museums, galleries, cultural centres and keeping places – together referred to as cultural organisations. It has a regional focus given the particular digitisation scenarios and challenges known to the regional context. Not least are the physical environments of small and adapted spaces, or the open shelters, in which many cultural organisations (especially the volunteer-run) are located, or that house a wide-variety of collections. In turn, these collection spaces present digitisation challenges, given the diverse environments in which digital images will be made.

Undertaking digitisation is time consuming and resource intensive, but it is also hugely rewarding. Digital images of objects have multiple applications from cataloguing collections to user-end purposes, such as profiling objects or whole collections on a website. Digitisation can improve not only public access to collections, but also the preservation of objects, as access to a digitised image reduces the need to handle items repeatedly. Due to the effort it takes, in the museum and gallery sector the agreed best approach to digitisation is **'do it once, do it well'**.

Compiling this document followed the on-ground work completed in 2018 by Museums and Galleries of NSW to develop the *Collections and Stories* prototype website. Despite being most useful, when using the digitisation guidelines that are currently available in a number of regional areas it was identified that this information was too general in scope. Further, the information about digitisation specifications is dispersed across multiple publications and platforms, and authored by different cultural organisations. The field-work undertaken was able to conclude

that a significant gap in the above-mentioned guidelines is the likely array of digitisation situations faced in the regional context, as well as information on how to adapt a typical digitisation toolkit to manage these. This document pulls together all these information threads into a single user-friendly document – covering all aspects of digitisation including preparation, capturing or making digital images, and managing and using digital files in the regional context.

Similar to other sector guidelines, this document adopts current-day standard specifications for digitisation. Adhering to these standards will maximise the user-end benefits that can be realised from undertaking digitisation in the first instance. Digitisation embraces making still digital images of 2D and 3D objects, as well as making audio or moving-image digital files of records made in older analogue formats. It also includes managing born-digital files and can include making 3D digital image files of objects. In the regional context, digitisation will most commonly involve creating still digital images of 2D and 3D objects, converting records held in older analogue formats into digital playback formats, and managing born digital records to ensure these are accessible into the future as digital technology continues to change. Each of these contexts are addressed in some detail this guideline.

It is recognised that converting records from older analogue formats into digital files is less likely to be performed in-situ than the photography and scanning of 2D and 3D objects. It is also recognised that 3D imaging is less likely to occur in-situ – given the specialised equipment needed. These methods of digitisation are often carried out off-site and by specialist service providers – nonetheless this guide has included a discussion of these to assist in understanding the availability of these digitisation services and how these digitisation outputs can be used by regional cultural organisations.

Images
Left: Torpedo bottle, Orange Regional Museum.
Right: Oil portraits of Elizabeth and Michael Carroll, who settled at Orange in 1835, Orange Regional Museum.

PREPARING TO DIGITISE

The digitisation toolkit

Cameras and scanners are the principal tools used to digitize 2D and 3D objects. The following toolkit will enable minimum digitisation standards and efficiencies, as well as taking into account typical digitisation scenarios found in the regional context.

1. Camera and camera accessories

a. A **Digital Single Lens Reflex (DSLR) camera t**o enable photographing a wide range of collection items in a variety of environments – including indoors and outdoors. A camera with a rotating rear viewing screen provides distinct advantages, especially in situations where there is bright sunlight, and when the tripod is positioned higher or lower than your eyes.

The camera should be able to shoot **RAW** files. These are files that capture the true nature of the object, without any 'interpretation' by the camera.

b. A **general-purpose zoom lens** and a **macro lens.** A general-purpose zoom lens will allow you to photograph large items in their entirety, and zoom-in to capture the details of particular parts of any object.

A macro lens will provide the best results for small items and with tiny details. It will allow you to be close to the object to capture its entirety and intricacies or highlights. Extension tubes are a suitable alternative to a stand-alone macro lens, as they convert almost every lens into macro, and reasonably cheaply.

c. A **polarising filter** is essential if photographing items with reflective surfaces, e.g. paintings, or works behind glass.

d. Two **32GB memory cards**.

e. A **card reader**, or a transfer cable to connect the camera to a computer, to download image files.

f. A **tripod**, to ensure no camera shake, and to keep the framing of the object (in relation to filling the frame and remaining in focus) consistent from one shot to the next. Ideally, the tripod will be full size and have a spirit level on the mounting head so you can be sure the images you take are straight. It should be strong and stable, with easily adjustable legs. Tripods come in a few different sizes – one that can reach up to 150 – 170 cm is the most versatile.

Example of a camera clamp in use. Image courtesy of Andrew Long, Coffs Harbour City Council

An alternative, or supplementary, to a tripod is a **camera-clamp**. In some instances it can be more flexible than a tripod.

g. A **remote control** to avoid camera shake while depressing the shutter button. Note however, that some new cameras use an up-loadable app that allows using a mobile phone as a remote (e.g. Sony alpha 7R2)

h. A **colour chart and scale** to enable your photo editing software to 'see' and display accurate colours on your computer screen.

2. Scanner and scanning software:
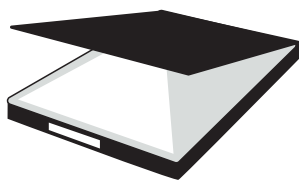
a. A **flatbed scanner** is the go-to device for scanning single page two dimensional objects like written documents and photographs.

b. An **A3** scanner is the most versatile choice, if budget permits, as older foolscap and other over-sized documents will not fit easily on an A4 scanner.

c. A **good quality scanner** with a **transparent materials adapter** will scan photographic negatives and transparencies (i.e. photographic slides). A **quality lightbox** can also be used for digitising transparent (film) material by using a camera (sometimes getting better results than a cheap scanner).

d. A scanner will come with the software it requires to import the files to a computer.

e. High-speed scanners with automatic document feeders *should not* be used. Fragile paper, or other historic documents, should never go through a document feeder.

3. Computer, computer accessories and image viewing and editing software:

a. An everyday-**computer** (desktop or laptop) with good colour rendition will be required to manage the digital files made by photographing or scanning objects.[1] (A laptop is more versatile in situations where images are taken in changin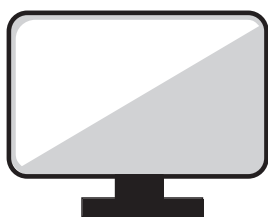g or multiple locations). When purchasing a new computer choose one with fast processing power, that will handle photo editing software and large (approx. 100MB) image files.

b. At least **two hard drives** with at least one terabyte of storage on each (for master and back up copying of digital image files).

c. Photo editing software, such as Adobe Lightroom, (not a free app) will be required to manage TIFF files, as they are large and complicated. This software will automatically convert the RAW files from the camera into the TIFF files that you will save for your preservation master.

TIFF files are complex files – they contain A LOT of data, and a simple app (such as those often packaged together with scanner software) will not have the processing power to manipulate these large files. Dedicated software will make the conversion, processing and saving of these files easier.

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1 Especially note, that many laptops do not have good colour definition (especially cheaper ones). So in the instance of relying on a laptop for digitisation seek expert advice on the current options available that render colour faithfully.

4. Photographic 'studio' set-up:

In a regional context the set-up of a photographic studio to digitise objects with a camera can be temporary or permanent, depending on the space available and the ongoing need to digitise. Regardless of the temporary or permanent nature of a photographic studio set-up the following equipment or accessory items are typically needed and used.
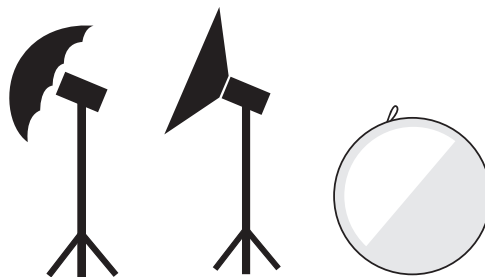
a. A **studio quality light kit with reflectors** (i.e. light boxes), to provide diffused light and lessen strong shadows – three lights is optimal for 3D objects to provide light from the left, right and above, or in front, to illuminate recessed areas.

A light kit with photographic quality **bulbs at around 5400K (daylight) and a Colour Rendering Index (CRI) of 90 – 100** is desirable. The CRI measures the ability of the light source to accurately render colour. Daylight has a CRI of 100, so a photographic quality light bulb that is close to CRI100 will give the most accurate colour compared to the item being photographed.

Light sources specifically manufactured for photographic purposes will have a high luminance – for example a 125 watt compact fluorescent bulb will produce more than 6000 lumens. (Compact fluorescent bulbs produce 50 – 70 lumens per watt, so a 125 watt bulb can give you between 6250 lumens and 8750 lumens).

b. Polaroid gel filters for lights help to reduce reflections when photographing reflective artworks or objects e.g. those behind glass.

c. A **wide paper roll** – each of white and black or slate grey – to create the backdrop, held in place by a backdrop stand. Some items will stand out better against a white background and some better against a black one, for example – white cotton under garments will stand out better against a dark background while black shoes will stand out better against a light background. In the majority of cases the white backdrop will be more commonly used.

A paper roll backdrop is recommended over a fabric drop sheet given: its portability, its rigidity, and that a 'clean' backdrop can be readily created by tearing off a used or soiled section of the roll. Moving objects off and onto a photographic backdrop can mark it and a fabric drop sheet will easily become marked or dirty and does not have the adaptability that the paper roll provides, to readily rectify this problem.

In addition: a **good quality eraser** is very useful for removing scuffs and dirty marks from the paper backdrop; **scissors** for cutting/trimming the paper backdrop, when needed; and sheets of A3 paper are useful to create a 'walkway' on the paper backdrop to prevent leaving footprints on it when setting up large objects for shooting.

d. Additional sheets of white cardboard to bounce light and reduce deep shadows – for example when lighting an object like a trophy or decorative art piece, a small amount of bounced light shining up from beneath the object can illuminate engraving, relief work or painted details.

e. Item / object labels – made using either a small whiteboard or a piece of laminated paper and a whiteboard marker – on which to write accession numbers of objects being photographed and to include in an establishing / cataloguing shot. The number can then be wiped off with a whiteboard eraser ready for the next object's number.
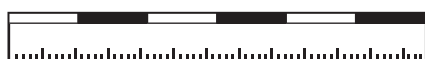
f. A scale measure to place in the establishing / catalogue shot to indicate the size of the object.

g. A large light tent for reflective objects – these are white fabric spring form boxes with a front curtain that reduce reflections falling on shiny items. A large tent also means any small object can be photographed in the tent and this is useful given the tent's ability to disperse light.

h. A table – either existing or a folding portable one. In the case of a portable table, a plastic one from the hardware shop is fine as the table is covered by the backdrop.

i. Small **map or snake weights** for holding paper objects in place.

j. A **bean bag pillow/s** to support fragile items (such as bound books). Varied size pillows to support different sized objects are useful.

k. An **easel**, when needing to support rigid items like frames, mirrors and tin signs. The easel would ideally be floor standing, with thin padding applied to the horizontal support and the top clamp. A backdrop does not need to be used, as photographs of regular shaped items (square or rectangle) are typically cropped down to exclude the background.

If many works are to be photographed on an easel, e.g. a collection of paintings, it will be worth investing in a quality product that is sturdy and easy to adjust with various height and angle settings, and preferably on wheels.

l. Nitrile gloves for handling objects and to prevent putting fingerprints on freshly cleaned items. Cotton gloves get dirty quickly, and can affect your ability to feel and support an item properly.

m. A **padded mannequin** to support / display pieces of costume – a female or non-gendered mannequin is useful as the shape can be padded out to a more masculine form, whereas a male form cannot be trimmed down to fit a female shape.

n. Acid-free tissue paper to temporarily pad out the mannequin and improve the packaging of items going back into storage.

o. Pencils – for making notes or for writing on new identification tags being applied to objects. The use of a pen around collection objects is not recommended in case they end up with ink marks on them. 2B or 3B pencils are more useful than HB or 2H.

p. Bulldog clips are handy for anchoring your backdrop and stop it sliding forwards off the tabletop.

q. Object catalogue sheets and a clipboard – for accessioning new items into a collection and if the collection management system (CMS) is not practicably accessible in the digitisation location.

r. For large items, equipment such as a **ladder, or ladders**, may be required. In the example of photographing a large silk banner at Broken Hill in 2018 two people on two ladders were needed to hold-up the object to photograph it in its entirety.

s. A **sturdy work table** to hold all the bits and pieces required close to hand, and keep items off the floor. A layer of bubble or foam wrap, Tyvec or calico on the table helps to make things safe.

t. Blackout fabric and gaffer tape is needed in situations where 'light spill' is likely (typically this occurs in small museums). Blocking out unwanted light from doors and windows greatly assists in taking good images.
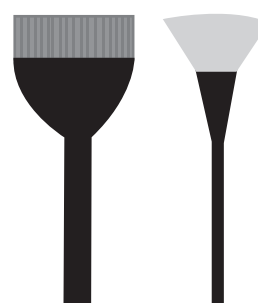
u. Soft conservation brushes to lightly dust items and/or remove cobwebs etc. when safe to do so (see conservation cleaning below).

v. Padded blocks or high-density-foam blocks on which to prop artworks when it is necessary to place them on the floor leaning against a wall, before, during, or after, digitisation.

w. A power board and electrical extension cords for situations where there are few power points.

5. Handling and moving objects for digitisation:

Focussed attention and care should be given when handling and moving items for digitisation. The following actions are recommended.

a. Make sure your pathway from the store to the studio is clear of trip hazards.

b. Use a trolley or other manual handling equipment if the item is heavy or awkward.

c. Work with a helper – a minimum of two people is considered most efficient and effective to prepare for and undertake digitisation.

d. Handle objects like eggs – they may look robust, but chances are they are old and have weak spots.

e. Transport the object in its storage box if it has one (as long as it is sturdy), if the object is not stored in a box transfer it to one when moving it.

f. Avoid lifting objects by their handles – these areas will have accumulated stress and weakness over time.

g. Support fragile 2D items on a rigid board when moving or transporting them.

h. Have freshly washed hands or use nitrile gloves if preferred (some items require the use of gloves, like photographic negatives and polished silver). Cotton gloves are not recommended.

i. Don't sneeze or bleed on objects.

j. Don't leave objects exposed to the studio lights for an extended period of time – the light levels will be very high, and will contribute to the deterioration of the object.

k. After digitisation, repackage the object and return it to storage as promptly as possible.

6. Conservation cleaning:

Prior to digitisation all objects need to be prepared, and in the case of 3D objects this requires cleaning them. A clean object makes for a much better photograph and enables its details to stand out. Ideally, given the digitisation process is undertaken once, and the file created is used into the future, the effort of cleaning objects makes good sense.

But before cleaning an object it is necessary to consider if the dirt is important to the object's history, and whether it should be retained, as it can reveal important information about the object's use and past. Do not attempt to surface clean any materials that are very fragile, have powdery surfaces or loose parts.

Dust and dirt are abrasive so the best method of removal without scratching the surface is brush vacuuming. This is ideally done with a HEPA filter vacuum cleaner to make sure the fine particles collected are not released back into the environment. A vacuum with variable control suction is also preferred as low suction is

required to safely clean objects. However, if this is not possible a hose can be attached to the end of the nozzle to lower the suction or opening the vent in the hose handle slightly will also reduce the suction.[2]

It is best to cover the vacuum nozzle with polyester netting as this prevents any original material that might detach from being sucked into the vacuum cleaner, it also protects the objects surface if it accidently gets suctioned. The polyester netting can be secured over the nozzle with a rubber band or tape. The vacuum nozzle is to be kept raised above the object's surface at a 45 degree angle.

A soft brush (such as a hake brush from an art store or another soft bristle brush) is used to dislodge the dust and direct it towards the vacuum's suction. Never let the vacuum nozzle come into direct contact with the object. Alternatively, microfiber cloths can be used to dust smooth objects like ceramics, metals or glass. Cleaning solutions should not be used. Where object cleaning is more complicated it is advisable to seek professional advice before starting a cleaning project prior to digitisation.

Further, it is strongly advised that cleaning is undertaken prior to taking photos of objects, rather than concurrently. Object cleaning requires a clear space, good light and various tools, not to mention can be a painstaking and slow process. The pressure to undertake the clean in limited space and reduced light whilst the photography of other objects is undertaken is high and can result in damage. Preparing and mounting garments on mannequins prior to the photography session rather than during (if possible) to avoid rushing is also advisable.

7. Digitisation workflows:

As noted above, working in a team of a minimum of two people enables important efficiencies during digitisation. A digitisation partner can assist: preparation, cleaning, transporting and or setting up equipment, handling objects during the photo shoot (including large or complex objects, which in instances require more than two people), recording objects for cataloguing during digitisation, problem solving issues that arise during digitisation, and returning objects to their display or store after digitisation.

In a regional context the spaces available in which to undertake digitisation can vary significantly. Both the biggest and smallest regional museums and galleries can be constrained by space and / or manage collections in adapted spaces, which complicates the digitisation process. In these instances, and where in-situ digitisation needs to occur, additional thought and planning will enable adapting the typical digitisation toolkit so that the best possible image can be taken (refer to the tables below from page 11 outlining the management of likely digitisation scenarios and object categories).

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2   https://mgnsw.org.au/wp-content/uploads/2018/11/how_to_brush_vacuum_ an_object_information-sheet.pdf

STANDARD SPECIFICATIONS FOR PHOTOGRAPHIC AND SCANNING METHODS

One of the most important aspects of the 'do it once, do it well' principle is making the effort to produce quality or high resolution master files of object collections. To assist in realising this goal, collecting institutions around the world have adopted specification standards for digitisation. To maximise the benefits derived from the effort of digitisation, regardless of where these originate from, or are housed, significant object collections should be digitised in accordance with these standards.

1. Sector-standard camera specifications:

a. Any DSLR camera will have automatic and manual settings. Ideally, use the manual setting so you can choose the ISO and aperture (f-stop) settings.

b. ISO is the equivalent of film grain. In a DSLR camera the ISO adjusts the amount of 'noise' you get in your image. A lower ISO setting will give you less noise and a cleaner image. ISO 100 is a common default setting, for a clean image in an environment with good light. Noise is an issue in an image when the image is enlarged. In the enlarged image small imperfections become obvious and distracting.

c. Manually adjusting aperture (f-stop) settings allows you to alter the depth of field of your image. A large f-stop number gives you a smaller aperture size and deeper depth of field. A deeper depth of field means more of the item being photographed will be in focus. F8 or f11 will be the most common choices.

d. Another setting to adjust is the image quality. This will be in Menu – Image Quality settings. Set the image type to RAW.

e. Select the colour depth of 24 bits per pixel.

f. Choose either the general use lens or the macro lens depending on the size of the object. Small items with intricate details are best photographed with the macro lens, while larger items will need the camera positioned further away and will therefore need the general purpose lens.

2. Sector-standard scanner specifications:

Across the world, large organisations choose to digitise 2D objects (e.g. documents and photos) on a scanner. The process is faster moving from one object to the next, the lighting is always consistent, the items are held flat, and the scanning resolution is easily adjusted when moving from a small to a large item.

You will see, in the table below, that different size originals require different resolutions (pixel counts). This is to ensure 'all possible uses' of the image are covered. This means that if you scan a 35mm negative and want to enlarge it to poster size you will have enough 'information' in your electronic file to do this. An A4 item doesn't need to be enlarged as much to get it to poster size, so the electronic file can have a smaller pixel count.

The table is arranged based on the size of the original item you are scanning, and what the ideal pixel count is for items of that size. (Note: ppi stands for 'pixels per inch' and refers to the resolution of an electronic file on a computer screen, for example, if you have a 4"x5" negative, and the scanner set at 600 pixels per inch, the electronic file will have 2400 (4 x 600) pixels along the short side of the negative, and 3000 (5 x 600) pixels along the long side. Printouts of the files are measured in dpi which is 'dots per inch'. This is literally a count of dots of ink squirted onto the paper per inch of the image.)

Table showing sector standard scanning specifications for 2D object material:

2D object / material [3]	Digital resolution of master file	Tonal resolution of master file
Colour and black and white reflective formats, including: Coloured maps, pencil sketches with wash, sepia or Coloured photographic prints, printed music, manuscripts, photographic prints, black and white line art, black and white map	smaller than A4: 400 ppi TIFF larger than A4: 600 ppi TIFF	RGB 8 bit (24 bits per pixel)
Colour negatives and transparencies, including 35mm	2000 ppi TIFF **Note:** two digital masters are created: colour negative and colour positive; derivatives are created from the colour positive	RGB 16 bit (48 bits per pixel)
Black and white negatives 35mm	3000 ppi (TIFF master and derivatives positive)	greyscale 16 bits per pixel
Black and white negatives larger than 35mm	2000 ppi (TIFF master and derivatives positive)	greyscale 16 bits per pixel

[3] Specifications outlined in this table are based on https://www.nla.gov.au/standards/image-capture For situations that are more complex than described in this table it is recommended that you refer to the NAA's detailed specifications found at this link.

DIGITISING AUDIO-VISUAL 'OBJECTS'

The context of digitising audio-visual objects

Audio-visual (AV) collections include objects like vinyl and shellac discs, movie film, audio and video reels and cassettes and CDs and DVDs. CDs and DVDs are classed as digital AV materials, while everything else is considered analogue AV material.

To the present, the digitisation of AV materials was usually undertaken because the original format is degrading due to poor storage, age or overuse. It may have been because of technological obsolescence – i.e. the playback equipment required is breaking down, and/or becoming harder to fix or replace. The digitisation of AV objects has also been undertaken in various formats for ongoing use with contemporary equipment, such as computers, screens, mobile devices or for use on the web using popular formats such as MP3 and MP4.

As noted at the beginning of this guideline, digitising analogue records – whether audio or audio-visual – is often undertaken by a specialist service provider, and these services are not usually located regionally. The procedures followed to digitise analogue records are nonetheless outlined to assist in planning and preparing for the digitisation of analogue-based objects or collections.

Preparing to digitise audio-visual media

When working with AV objects it is important to consider that establishing the importance of, or describing, AV materials held in any collection is time consuming – someone may have to sit and watch or listen to the recording in real time to be able to understand all its components accurately. If the 'tape' is exhibiting signs of deterioration (stickiness or oxide shedding) your organisation may only have one chance to digitise it – as it may not playback more than once!

If you don't already understand the significance of the AV objects you have, where relevant and possible, you should try to prioritise it for digitisation using the descriptions on the packaging or casings of these items, rather than watching / listening to it. Using this information decide if you will digitise it, digitise it in real time, then listen / watch through the new digital version so you can pause and rewind while you make your descriptive notes for cataloging purposes.

Audio-visual digitisation scenarios

1. Digitising analogue audio media:

a. Digitising analogue audio-visual material requires four basic pieces of equipment – a play-back device, an analogue-to-digital converter, a computer and a back-up storage device. Finding operating play-back equipment is the biggest hurdle, particularly for older formats like reel to reel tape or compact video camera cassettes.

b. The condition of shellac discs needs to be assessed – if there are signs of cracking or delamination of the shellac, digitisation should be referred to a professional.

c. The condition of magnetic media will need to be assessed – if there are any signs of sticking or shedding of the oxide layer, digitisation should be referred to a professional.

d. At this stage, all digital audio file formats are proprietary, meaning they are owned by a particular company. There are no non-proprietary formats at the moment.

e. It is recommended that a master file is created or saved as a .BWF file. These are Broadcast Wave Format files and are an improved version of the Microsoft .WAV file. The improvement is that the files contain metadata that allow them to be read across different platforms. The master file should not contain any edits.

f. It is recommended that the preservation master be digitised at a sampling rate of 96 kHz and a bit depth of 24 bit. Saved as a BWF file.[4]

g. As with photography and scanning, you need to keep a preservation master file and access copies for ease and speed of use. Once the master file is created, you copy it, then 'Save As' a WAV or MP3 copy at 48kHz to create a compressed, smaller file for access.

2. Digitising analogue visual media (video tape):

a. There are a variety of obsolete video tape formats that all require different playback equipment: 2-inch, U-matic, 1-inch C format, analogue and Digital Betacam, DVCAM, VHS, S-VHS, Betamax among others. Unusual formats should be referred to a professional digitisation service.

b. Digitising analogue audio-visual material requires four basic pieces of equipment – a play-back device, an analogue-to-digital converter, a computer and a back-up storage device. (Finding operating play-back equipment is the biggest hurdle, particularly for older formats like reel to reel tape or compact video camera cassettes).

c. The condition of magnetic media will need to be assessed – if there are any signs of sticking or shedding of the oxide layer, digitisation should always be referred to a professional.

d. Once the files are converted from analogue to digital, they should be saved on a computer or back-up drive as lossless JPEG2000 file for the master files with all the different file components (picture, sound, settings info) wrapped up into an .MXF file. The master JPEG2000 file can then be copied as MP4, AVI or MOV files to be used as access copies.

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4 https://sustainableheritagenetwork.org/publisher/collaborative-digitization-program

The National Archives of Australia updated its standards for preservation digitisation of many types of physical records. In summary, their recommendations for digitisation of AV records are as follows: [5]

Record type	Master file	Access file
Analogue audio	BWF file 96kHz sampling 24-bit bit depth	MP3 file 48kHz sampling 192kbits/s constant bit rate
Analogue video	MXF file 50Mb/s variable bit rate Audio at 48kHz, 16 bit	MP4 1.5Mbs/s constant bit rate 48kHz 8 bit 125kb/s

3. Digitising digital audio media:

a. Digitising digital audio material is easier than digitising analogue AV media, as long as a computer with a disc drawer is available.

b. Most files on an audio CD will already be either MP3 or WAV. Simply save a copy of these files into your digital archive.

c. Drag and drop the file from the CD drive into the folder you want to keep it in.

d. During production, CDs are recorded at 16 bit digital resolution and 44.1 kHz sampling.[6] Copy files should maintain this level of quality.

4. Digitising digital video media:

a. Digitising digital video material is easier than digitising analogue AV media, as long as a computer with a disc drawer is available;

b. Video files on a CD are usually MPEG1 or MPEG2 files and should be able to be copied straight onto your computer;

c. Video files on DVDs are usually MPEG 3 files and should be able to be copied straight to your computer;

d. Drag and drop the video file from the DVD drive into the folder you want to keep it in;

e. Copy the files with the same digital resolution as the original file.

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[5] http://naa.gov.au/about-us/organisation/accountability/operations-and-preservation/preservation-digitisation-standards.aspx#section3

[6] https://www.iasa-web.org/tc04/audio-preservation

STILL IMAGE DIGITISATION CHECK-LIST

☐ **Camera and accessories**

- ○ DSLR camera
- ○ zoom lens and macro lens
- ○ polarising filter
- ○ 32GB memory cards
- ○ card reader
- ○ tripod
- ○ remote control
- ○ colour chart and scale

☐ **Scanner and scanning software**

- ○ flatbed scanner
- ○ lightbox

☐ **Computer, computer accessories and image viewing and editing software**

- ○ computer
- ○ two hard drives
- ○ photo editing software

☐ **Photographic 'studio' set-up**

- ○ light kit with reflectors
- ○ bulbs
- ○ polaroid gel filters
- ○ wide paper roll
- ○ eraser
- ○ scissors
- ○ white cardboard
- ○ item/object labels
- ○ scale measure
- ○ large light tent
- ○ table
- ○ map or snake weights
- ○ bean bag pillow/s
- ○ easel
- ○ nitrile gloves
- ○ padded mannequin
- ○ acid-free tissue paper
- ○ pencils
- ○ bulldog clips
- ○ catalogue sheets
- ○ clipboard
- ○ ladder/s
- ○ sturdy work table
- ○ blackout fabric
- ○ gaffer tape
- ○ conservation brushes
- ○ padded blocks
- ○ power board
- ○ extension cords

☐ **Handling and moving objects workflow**

☐ **Conservation cleaning workflow**

☐ **Digitisation workflow**

Museums & Galleries of NSW

DIGITISING REGIONAL MUSEUM COLLECTIONS

The context of a 'typical' regional museum collection

Regional museum collections contain a staggering variety of objects – from single page documents to whole or series of diaries; jewelry and other small personal items; textiles and clothing that can be extremely fragile, such as silk undergarments to handmade lace collars, to delicate household goods such as crockery, doilies and quilts; historic photograph prints or glass lantern slides, artworks and the works of crafts or trades-people, from trinkets to furniture; to an immense variety of tools and farm or mining machinery. Regional museum collections also often include historic ethnographic objects; as well as records made and kept in audio and visual format. There are many other examples that could be added to this list.

While the list of objects found in regional collections is long, to prepare this guide the types of objects typically found in regional collections have been grouped according to eight categories (listed). In turn these categories represent 'typical' digitisation scenarios found in regional museums; guidance is given with respect to undertaking digitisation for each of these.

In this document the collections of cultural centres and keeping places are considered to be most in keeping with the collections cared for by museums – though it is acknowledged that in some instances collections may be more like gallery collections. Accordingly the category shown below – secret and sacred items – is considered in both contexts, though the guidance given is much the same in both instances.

The table shown below details: the eight object categories or typical digitisation scenarios; where relevant, 2D and 3D examples of objects found in this category are listed; guidance on how to manage the digitisation of each object category and the likely environment in which its digitisation will take place.

The categories addressed include:

1. Small / simple movable (can be moved and handled by one person)

2. Large movable (needs a minimum of two people to move and handle)

3. Requires assembly (object is made up of multiple parts)

4. Hard to move / fragile (requires extra care as could fall apart or break when moved or handled)

5. Unmovable / digitise in context (object is fixed or simply cannot be practicably moved to digitise)[7]

6. Has safety concerns (moving the item poses safety risks due to the material it is made from)

7. Sacred / secret items (cultural significance determines how and by whom the item should be seen or handled)

8. Born digital (was created and is maintained in a digital format)

Images
Left: Digitising an early twentieth century wedding cake topper, Golden Memories Museum, Millthorpe. Right: Measuring a late nineteenth century top hat case at Orange Regional Museum, the case is cared for by the Orange and District Historical Society.

[7] See Appendix: Digitisation fundamentals for working with First Nations communities

Regional object categories and how to manage the digitisation of these:

1. Small/simple moveable

Objects can be lifted or carried by one person; do not require assembly; are easy to access (i.e. in a compactus unit, drawer, shelf) can be digitised in situ with a temporary studio set-up or readily moved to a centrally located / permanent photographic studio set-up.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
maps, letters, diaries, manuscripts, building plans, photographs, negatives, leaflets, posters	shoes, hats, small musical instruments, jewelry, toys, household goods, badges, wartime memorabilia, tools, books, commerce-based objects; objects relating to community organisations and institutions, trophies, natural history, video and cassette tapes, reel-film	Simple moveable objects are the easiest to digitise. For the majority these objects can be digitised using a temporary or permanent photographic studio set-up using the equipment outlined in Preparing to Digitise at the beginning of this document.
		2D items can be scanned using a flat-bed A3 scanner and computer (see scanner settings detailed below). It is noted that in some instances photographing 2D objects gives the viewer a stronger sense of the tangibility of the item. Considering the end use of the object image will help to decide which digitisation method is best.
		3D objects can be digitised using a light tent and or a portable photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame, a minimum of three lights and an SLR camera on a tripod.
		The smallest items in this category can be photographed using the light tent, placed on a table. The larger items can be photographed on a table or on the ground, against the paper backdrop.
		Choose the white or black backdrop depending on which will make the object stand out the best.
		Digitise audio and audio-visual objects in accordance with the details outlined in section titled: Digitising audio-visual 'objects'.

2. Large moveable

A large item that needs at least two people to move it, given its size or weight. Moving the item in place for digitisation may require the assistance of a trolley, machine-lifter, or a ladder/s to hold in place for digitisation.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
large format maps, advertising posters and banners	transport items, small farm machinery, water or feed troughs, heavy musical instrument (e.g. piano), big furniture pieces, bulky archaeological material, grandfather clock, large banners or signs, large medical or hospital related objects	Large objects should be digitised using a photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame. In some instances the backdrop may need to be enlarged – this could be done using multiple widths of paper fixed to a wall, or using a large fabric drop that has been ironed. In some instances the object may be so large as to take up the entire frame and care must be taken when shooting these objects to ensure the object is not 'cropped'.
		A minimum of three lights and an SLR camera on a tripod should be used to take the photographs.
		Choose the white or black backdrop depending on which will make the object stand out the best.

3. Requires assembly

The object is made up of multiple parts; this includes item made up of several parts or may need to be opened up and inner parts exposed to digitise.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	clothing that needs a mannequin, scientific instruments and medical kits, some musical instruments, sets of objects in containers or boxes	Small items can be set up in the light tent, while large objects can be digitised using a portable photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame, a minimum of three lights and an SLR camera on a tripod. The largest items can be photographed on the ground, but against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best. Clothing that needs to be assembled on a mannequin may need to be padded out with tissue paper to demonstrated features such as lace inserts, frills or pin-tucking and pleating. Objects that are made up of a combination of parts and their assembly illustrate the characteristics and features of the item these should be assembled in their entirety. Planning to digitise these items should factor in time taken and any tools required etc. to do this. In other instances objects may need to be opened up and pieces exposed and laid-out for photographing to illustrate its characteristics, components and pieces or workings.

4. Hard to move - fragile

The item requires extra care when moving it, as it could fall apart or be easily-damaged.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
aged or damaged / crumbling maps, letters, diaries, manuscripts, building plans, photographs, negatives, leaflets, posters	aged textiles, historic glass and china, archaeological material, marine models, botanical specimens, taxidermy, butterflies, beetles, eggs, glass plates, fragile audio-visual records	These items will require physical support throughout the whole digitisation process. Objects should be supported when moving - carried on a board, in a rigid box or crate, where applicable supported by a pillow when digitising, and always handled with gloves. Fragile objects can be digitised using a light tent and or a portable photographic set-up made up of: a backdrop of paper roll fixed to the backdrop frame and draped over a table, a minimum of three lights and an SLR camera on a tripod. The light tent can be used for small or highly reflective items. Larger items can be photographed on a table or the ground, against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best. Fragile 2D objects that may otherwise be scanned can instead be photographed if scanning these may risk damage to them.

5. Unmovable/requires digitisation in context

The object cannot be moved as it is a permanent fixture, or because representing how the object/s looks in a display format is needed for it to make sense e.g. large and permanent display items or historic rooms.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	sulkies, drays and wagons, tractors, trains, planes and automobiles, farm and industrial machinery, dinner sets, historic rooms, cornices and decorative arts in-situ	In this situation the environment becomes the studio. The backdrop and stand should be used / adapted to isolate one item from its immediate surrounds to remove external 'noise' or distractions from the main object shot/s. Where the whole room, or large sections of it, is relevant to representing the object or its display of multiple parts, or the relevant multiple objects that are part of the display, the whole 'scene' should be captured. This may require taking multiple shots of the display, as you would of some objects. The studio lights, camera and tripod will be needed, along with the white card to bounce some light into the shaded areas. The lights may need to be moved or adjusted between some shots. You will likely need to close curtains and blinds or cover the windows with card or fabric to control the light-levels and changes to it over the course of the day. In these situations it is best to audit the environment ahead of the shoot to ensure you have all the additional materials needed to manage the light.

6. Has / poses safety concerns

The item requires extra care when moving it, as it could fall apart or be easily-damaged.

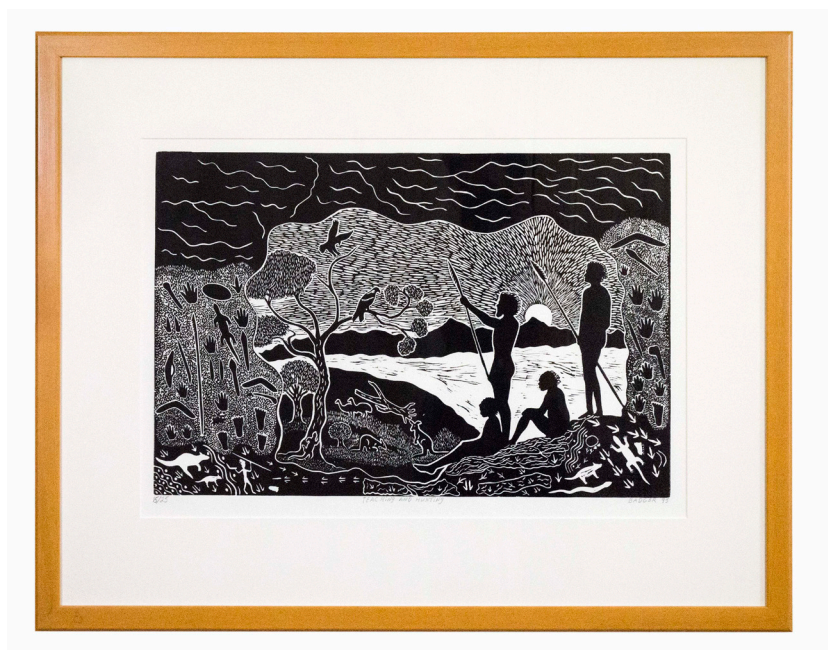| 2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	arms and ammunition, prohibited substances, items that may contain asbestos, mineral specimens that may contain toxic elements	For the smallest items in this category these are easiest to photograph using the light tent or on a table, covered by the backdrop. The larger items can be photographed on a table or on the ground, but still against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best. Anyone handling these items should be wearing gloves and other protective wear in accordance with OH&S policies.

7. Secret / sacred items

Are objects where their cultural importance or significance determines how, and by whom, these should be seen or handled. This category will largely embrace objects belonging to or originating from Australian First Nations (i.e. A&TSI) communities.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
photographs and negatives	ceremonial objects, ethnographic objects, language or song recordings, oral testimony / stories, or oral histories	All items should be digitised in accordance with the specifications and guidance outlined for all other object types in this table, but this should always be done in collaboration with the First Nations communities from which they originate or to whom they relate.

In some instances digitisation may NOT be an appropriate way to manage secret or sacred objects. First Nations communities should be given the opportunity to collaborate with museums and galleries to determine how their heritage and material culture is managed, including whether digitised objects are publically accessible and the stories told about these.

The digitisation of First Nations secret or sacred items will be of interest or value to the communities from which they originate or to whom they relate for many reasons, among these are to: access records not previously accessible; use records / objects for education and / or cultural revitalisation purposes; counter other / past interpretations of First Nations objects and collections; or to make recommendations about their future management (including wider public use). |

8. Born digital

Material created and maintained in a digital format (AGNSW definition).

Examples	Managing born-digital media
digital film / documentary, oral histories	Save files in a long term preservation (persistent) file type – i.e. one that is expected to be available and usable into the future, and schedule regular opening and use of the files. This will also allow for the files to be migrated into a newer version of the file type, if it is available.

There are some suggested persistent file types here: https://prov.vic.gov.au/sites/default/files/2016-05/PROS1503S3v1.0.pdf

Born digital media requires back-up and storage in a digital archive. In a regional context, an 'archive' may be an off-site hard drive held in a secure location, preferably with environmental control.

Storage strategies like emulation (i.e. reverse engineering a newer platform to read old formats) or transferring to open-source file formats (for example saving all .doc files as .odt files) is complex and expensive. |

DIGITISING REGIONAL GALLERY COLLECTIONS

The context of a 'typical' regional gallery collection

Regional gallery collections embrace a diverse range of art works – including paintings, works on paper, decorative and wearable arts, sculptures, photography, and contemporary art-installations that incorporate sound, moving-image and light media. Gallery collections also include historic objects – from artworks, work-books or sketchbooks to items that document the life of artists – such as letters and diaries.

The works held by regional galleries can be divided in accordance with the eight categories applied to museum collections previously listed above. Examples relating to each of these categories are mostly different, given the particular focus of regional gallery collections – principally the conservation of historic and contemporary visual art works, in all its various forms. The methods used to digitise gallery collections, like museum collections, vary according to the nature of each object or art work.

The majority of gallery collections will be digitised using photography and scanning methods. Most regional gallery collections are not housed in the variety of buildings or spaces that museum collections are. This means that for most regional galleries digitisation environments will be less varied and more conducive to establishing an in-situ photographic studio set-up, as long as space is available to do this. Contemporary art and installations will require digitisation set-ups designed on a case

by case basis. Whole room installations may require a set-up like that used to photograph a historic interior. They may also require video digitisation, to illustrate how the public interacts with the projection. Kinetic sculptures may also require video digitisation.

The table shown below details the object (or art work) categories and guidance on how to manage the digitisation of this type of object. The categories addressed include:

1. Small / simple movable (can be moved and handled by one person)

2. Large movable (needs a minimum of two people to move and handle)

3. Requires assembly (object is made up of multiple parts)

4. Hard to move / fragile (requires extra care as could fall apart or break when moved or handled)

5. Unmovable / digitise in context (object is fixed or simply cannot be practically moved to digitise)

6. Has safety concerns (moving the item poses safety risks due to the material it is made from)

7. Sacred / secret items (cultural significance determines how and by whom the item should be seen or handled)

8. Born digital (was created and is maintained in a digital format)

Image
Bager Bates, *Life on the Darling River,* 1995, Broken Hill Regional Art Gallery.

Regional object categories and how to manage the digitisation of these:

1. Small/simple moveable

Objects can: be lifted or carried by one person; do not require assembly; are easy to access, can be digitised in situ or readily moved to a centrally located digitisation set-up.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
sketchbooks, watercolor albums, photographs, negatives, leaflets, posters, glass plate negatives, artist letters, diaries, manuscripts	small costume items, jewelry, decorative arts (e.g. vases, candle sticks, folk art), miniatures and albums	Simple moveable objects are the easiest to digitise. In a majority of instances these objects can be digitised in-situ.
		2D objects can be scanned using a flat-bed A3 scanner or photographed with an overhead camera set-up. An overhead camera set-up may be: a dedicated copy stand; a tripod which has a 90 degree column tilt; or a tripod adjusted so that the camera head may be at 90 degrees to the ground (this requires the back leg of the tripod to be extended further than the other two legs to tilt the tripod forward. The rear leg will need to be weighted down). Objects should be supported on a pillow.
		3D objects can be digitised using a light tent and or portable photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame, a minimum of three lights and an SLR camera on a tripod. For framed works (paintings, sketches, photographs etc.), if the frames are newer than the work these should be de-framed before digitisation. If de-framing is too difficult or may cause damage to the item the frame can be cropped out if required.
		Where frames are original to the work, framed items should be digitised in their frames. Photograph the front and the back of framed and unframed items. Framed items with glazing can either be photographed in a light tent to reduce reflections, or removed from the frame. Alternatively, a Polaroid filter on the lights and the camera will eliminate reflections.
		For the smallest items in this category these are easiest to photograph using the light tent or on a table. The larger small items can be photographed on a table or on the ground, against the backdrop.
		Bound items like sketchbooks and photograph albums may need to be supported on book pillows and each page photographed individually.

2. Large moveable

A large item that needs at least two persons to move, it could be very sizeable or heavy. It may also require a forklift or large vehicle for transportation.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	large paintings, large decorative art pieces, fine furniture, sculpture, banners, framed posters	Large objects can be digitised using the established photographic set-up made up of: a backdrop of paper roll, a minimum of three lights and a DSLR camera on a tripod.
		Framed / stretched items should be held securely in place on the easel, with the item as close to perpendicular as possible to avoid distortion in the image.
		The largest items can be photographed on the ground supported by foam blocks, but still against the backdrop.
		Choose the white or black backdrop depending on which will make the object stand out the best.

3. Requires assembly (or is made up of an assembly of parts)

This includes items made up of several parts or needing to be opened up and inner parts exposed to digitise.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	costume that needs a mannequin, fine furniture where the doors and drawers open, clock workings, contemporary art works, the components of an installation piece.	Small items can be set up in the light tent, while large objects can be digitised using an established photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame, a minimum of three lights and a DSLR camera on a tripod. The largest items can be photographed on the ground, but still against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best. Clothing that needs to be assembled on a mannequin may need to be padded out with tissue paper to demonstrated features such as lace inserts, frills or pin tucking and pleating. Objects that are made up of a combination of parts and their assembly illustrate the characteristics and features of the item these should be assembled in their entirety. In other instances, objects may need to be opened up and pieces exposed and laid-out alongside the item to illustrate its characteristics, components / pieces or workings.

4. Hard to move - fragile

Item requires care in moving as it could fall apart, be easily damaged.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
historic or damaged works on paper, some textile art	vintage glassware, costume, botanical specimens in sketchbooks, art with friable media, silk fans, ethnographic art, dress or costume, collage with loose media, damaged items	These items will require physical support for the whole process - possibly carried on a board, supported by a pillow, handled with gloves. Fragile objects can be digitised using a light tent or a photographic set-up made up of: a backdrop of paper roll or fabric hung from a frame and draped over a table, a minimum of three lights and a DSLR camera on a tripod. The light tent can be used for small or highly reflective items. Larger items can be photographed on a table or the ground, but still against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best.

5. Unmovable/requires digitisation in context

Item cannot be moved as it is a permanent fixture or is fixed into position.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	outdoor sculpture, wall art, very large framed works that are too big to move, highly valuable works that are bolted to the wall, in-situ / permanent contemporary art installations.	In this situation, the environment becomes the studio. The backdrop and stand may be used to isolate one item from the surrounds, or not if the whole environment is relevant. The studio lights, camera and tripod will be needed, along with the white card to bounce some light into the shaded areas. You may need to close curtains or cover the windows to control the light to your liking and avoid it changing over the course of the day. Contemporary art installation can be photographed in the same manner as a historic room. Position the camera on a tripod in various positions around the perimeter of the room focusing in towards the components of the installation.

6. Has / poses safety concerns

To move or handle these objects poses workplace health and safety risks due to being made of unsafe materials, prohibited / regulated by law, or is a prohibited / dangerous substance.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
NA	arms and ammunition, prohibited substances, items that may contain asbestos, mineral specimens that may contain toxic elements	For the smallest items in this category these are easiest to photograph using the light tent or on a table, covered by the backdrop. The larger items can be photographed on a table or on the ground, but still against the backdrop. Choose the white or black backdrop depending on which will make the object stand out the best. Anyone handling these items should be wearing gloves and other protective wear in accordance with OH&S policies.

7. Secret / sacred items

Are objects where cultural significance determines how, and by whom, these should be seen or handled. This category will largely embrace objects belonging to or originating from Australian First Nations (Aboriginal and Torres Strait Islander) communities.

2D example	3D example	How to manage the digitisation of these items and the likely environments in which digitisation will take place
photographs and negatives	ceremonial objects, ethnographic objects, language or song recordings, oral testimony / stories, or oral histories	All items should be digitised in accordance with the specifications and guidance outlined for all other object types in this table, but this should always be done in collaboration with the First Nations communities from which they originate or to whom they relate. In some instances digitisation may NOT be an appropriate way to manage secret or sacred objects. First Nations communities should be given the opportunity to collaborate with museums and galleries to determine how their heritage and material culture is managed, including whether digitised objects are publically accessible and the stories told about these. The digitisation of First Nations secret or sacred items will be of interest or value to the communities from which they originate or to whom they relate for many reasons, among these are to: access records not previously accessible; use records / objects for education and /or cultural revitalisation purposes; counter other / past interpretations of First Nations objects and collections; or to make recommendations about their future management (including wider public use).

8. Born digital

Material created and maintained in a digital format (AGNSW definition).

Examples	Managing born-digital media
time based media, installations, AV components of larger installations, recordings of performance art	Save files in a long term preservation (persistent) file type – i.e. one that is expected to be available and usable into the future, and schedule regular opening and use of the files. This will also allow for the files to be migrated into a newer version of the file type, if it is available. There are some suggested persistent file types here: https://prov.vic.gov.au/sites/default/files/2016-05/PROS1503S3v1.0.pdf Born digital media requires back-up and storage in a digital archive. In a regional context, an 'archive' may be an off-site hard drive held in a secure location, preferably with environmental control. Storage strategies like emulation (i.e. reverse engineering a newer platform to read old formats) or transferring to open-source file formats (for example saving all .doc files as .odt files) is complex and expensive.

3D IMAGING

About 3D imaging

At this point in time, there are a couple of options for making 3D images of objects - photogrammetry and hand-held structured light scanning – typically used by collecting organisations.

Photogrammetry

Photogrammetry uses digital images taken from a DSLR camera and processes them through software to produce a 3D image. It is typically undertaken using the following equipment and software:

a. 3D rendering software such as Meshmaker, 3D Studio Max or Maya loaded onto a computer with lots of processing power and gigabytes of spare storage;

b. The same type camera used for 2D digitisation – a DSLR;

c. A lens with a fixed focal length (not a zoom lens) is preferable so that the magnification of the object in the view finder is not accidentally changed;

d. A tripod, to avoid camera shake;

e. A remote shutter release, or you can use the self-timer/delayed shutter release function also to avoid camera shake;

f. Studio lights to create an unchanging environment independent of the ambient light or the time of day. If you are capturing an outdoor object, you may have to work quickly to minimise the changes in the way the sunlight falls on the object. Supplement the sunlight with studio lights to try and make the light more consistent. A cloudy day which will provide more diffused light.

g. A 32GB memory card to capture many images of the same object;

h. Your studio back drop (white or black depending on what produces the best contrast);

i. Multiple external hard drives with at least one Terabyte of storage each (for master and back up copying of images); and

j. A turntable for small items.

To capture the images:

a. Use a fixed focal length lens;

b. Use automatic focus, but

c. Use the manual exposure settings;

d. Use a low ISO setting to give you less 'noise' and a cleaner image. ISO 100 is a common default setting, for a clean image in an environment with bright light;

e. F8 or higher will give you the best depth of field to capture surface formations;

f. Set the image type to RAW;

g. Set the camera to Automatic White Balance;

h. Position the tripod so that the object fills at least 70% of the frame;

i. Take many (20–200 depending on the intricacy of the object) photographs of the same object moving around the object in a circle (or rotating the object on the turntable), overlapping the images by 50% each time;

j. When capturing a room interior, move around the perimeter of the room, with your back to the wall, again, taking many photographs and overlapping each image by 50%;

k. Take photographs from different heights, and above the object. Photographing the bottom of an object should be done in a separate session, and the files integrated into the 3D rendering later;

l. Import the photographs into the software and refine the image.

Note: Another aspect of photogrammetry that is emerging is the use of mobile phones and Apps. There are several Apps (Scann3D, Qlone and Scandy Pro for example) that process images taken with your mobile phone and turn them into 3D renderings. Phones with high resolution cameras are used to take at least 20 photos in a circle around an object, and then the app processes the images in-camera. Some of the apps require the purchase of a small dongle to aid in the image capture, or they may charge to export the files. These charges apply to the free apps.

Hand-held structured light scanners

Hand-held structured light scanners look like a cross between an iron and a torch. They are about the size of an iron, with windows for light projection and a camera to receive the reflected light back into the scanner. They can be very expensive – ranging from $5,000 to $100,000, plus the software required to process the images, but they are fast, accurate and with a battery pack, can be used outdoors. They are safe to use as they do not use lasers. There are various models on the market, some will be optimised for indoor use, some will capture 'texture' (i.e. colour) better than others, and some are best for small objects. It is best to choose the scanner to match the most common scanning scenario undertaken.

To capture the images:

a. The object to be scanned is positioned in open space so the operator can move around the object capturing every angle. Real time feedback from a laptop or tablet allows the scanner to see which areas are rendering well and which need more attention.

b. Small items (up to 30cm tall) may be scanned on a system with an integrated turntable. These devices scan, record, and turn, the object until the capture is complete.

c. Completed renderings need to be saved in a file format that is usable across different platforms. Most scanners will output files that are in a proprietary format (specific to the device you are using), but it is advisable to save the files in an open format, so that they can be used for different purposes, like if they will be sent off to be 3D printed.

File types like .STL and .DAE (also known as COLLADA) can be used with any AutoCAD software. COLLADA files are better at rendering surface detail, as .STL files are a stripped back file type that take up less storage.

Above: The Broken Hill Nugget, Albert Kersten Mining and Minerals Museum (Geocentre) at Broken Hill.

SAVING AND USING DIGITAL FILES

Saving Master Files, copying and making Access Files

As stated at the beginning of this document, the 'do it once, do it well' digitisation philosophy underpins this guideline. This means that once you have created a **Preservation Master** file of an object in accordance with sector-standards you should never need to digitise it ever again – so long as you save and manage the **Preservation Master** file well.

1. Saving digital files from a camera:

a. The RAW files created on your camera will be in a format made and used by the particular camera manufacturer, e.g. Canon uses a CR2 file. Once they have been copied on to a computer (and saved to a dedicated folder) they can be converted to TIFF files, using photo editing software such as Adobe Lightroom or Photoshop. **NOTE:** the TIFF files will be bigger than the RAW files.

b. From the original RAW files, go through all the files and delete poor quality or superfluous images;

c. Save the RAW files as your **Preservation Master** files, make a full set and copy them all onto an external hard drive. These files should not be manipulated in any way (i.e. they should remain in the original state).

d. To create your **Access Master**, convert another set of TIFF files from the original RAW image files. These can be edited, cropped, art-worked etc. to create a satisfactory set of copy master images.

e. Prior to importing the images into your computer, you will need to establish a logical naming system for your files. Saving the files with their default number system from the camera will make them difficult to locate in the future.

    i. Create a new folder for each object or item and title it with the accession number and a simple descriptive term – such as the surname of the donor, the artist's name, or the type of object it is, e.g. 1995/006 Chemise;

    ii. Give each file contained within the folder the same name, followed by a numerical suffix, e.g. 1995/006 Chemise 001.tif;

    iii. Then when you create large and small derivatives of each file, include that information as well, e.g. 1995/006 Chemise 001 large.jpg;

    iv. Other metadata like date and settings used will be automatically recorded by the camera and saved with the file.

f. Some digitisation guides recommend saving up to 3 different sized JPEG files for use as everyday **Access Files** – for different purpose such as **printing large scale or posting to the web or social media.**

Given the varied contexts in which regional cultural organisations operate, or the resources available, the number of different sized files you **make and store is up to you / your organisation.**

As a general guide, **Access File** sizes often suggested are: thumbnail (of less than 1 MB); small JPEG (of approx. 2-10MB); and a large JPEG (of approx. 10-30MB).

It is also noted that some Content Management Systems (CMS) will resize everyday access files automatically, but many small organisations don't have or work with this technology. Software such as Adobe Lightroom will allow you to batch save image files and in accordance with a number of settings, including saving files according to pixels per inch (or ppi).

Several regional-based cultural organisations surveyed to prepare this guide indicated the **preference for saving two sets of access files** – a small JPEG (approx. 2-10 MB), plus a thumbnail JPEG. This preference is based on need and limiting the hard drive capacity needed for storing digital content. In some instances, larger files will be rarely used – and so it may be more efficient to resize these as needed from **Preservation Master**, rather than storing rarely needed files.

If you are using Photoshop to adjust a file size, you can choose the option 'Save for Web' to **create thumbnails**. This will save the file at around 70–100 ppi and create a file size of less than 1MB. These thumbnails are ideal for uploading to a website image gallery.

g. Whichever file size/s **you choose** to make as your everyday **Access Files**, to best suit your organisation's needs or purpose, copy these to another external hard drive, to act as the **back-up Access Files**. Store this hard drive off site, in a **safe location.**

2. Saving digital files from a scanner:

a. The process of saving scanner-created files onto a computer is the same as saving digital files from a camera. Establish a logical naming system for the files and avoid using the scanner's default numbering system as this will make them difficult to locate in the future.

    i. Create a new folder for each item and title it with the accession number and a simple descriptive term – the surname of the donor, the artists name, or the type of object it is, e.g. 1995/007 WW1 menu;

    ii. You should set this as the default folder location for the subsequent scans associated with this item;

    iii. Give each file contained within the folder the same name, followed by a numerical suffix, e.g. 1995/007 WW1 menu 001. tif;

    iv. When you create the various derivatives of these files (such as the Access Files), include that information as well, e.g. 1995/007 WW1 menu 001 large.jpg; or 1995/007 WW1 menu 001 thumbnail.jpg

    v. Other metadata like the date will be automatically recorded by the scanner and saved with the file.

b. Your **Preservation Master** files from the **scanning process** are the TIFF files created in accordance with the **table found on p. 7 of this guide.**

c. Once the TIFF files have been saved, make a full set of copies and copy them all onto an external hard drive. These files should not be manipulated in any way ever;

d. The original set of TIFF files become your **Access Master** files. These files can be edited, cropped, art-worked etc. to create a satisfactory set of copy master images;

e. Text-based originals can also be saved as PDF files for online use and distribution.

f. Suggested sizes and formats for scanned documents used every day and derived from your **Access Master** files is summarised in the table below.[7]

g. Copy these sets to another external hard drive, to act as the **back-up Access Files**. Store this hard drive off site, in a safe location.

h. You will find in the Appendix of *Crystal Clear* the specifications M&G NSW recommends for resizing digital files for use on the **Storyplace website**.

Storing Master Files of still images:

The Preservation Master files should be stored on a separate hard drive, offsite from the collection, in a location with protection from disasters like fire and flood. A duplicate set of **Master** and **Access** files should be stored off site in a third location. This may seem like overkill, but recurrent events like storms, flooding and fires can destroy all copies stored on site.

Perhaps arrange with another organisation in another town to store their backup copies for them, and they can store yours for you. Or, establish a central repository of these copies in a trusted archive that can store digital files safely.

Whatever approach you take, all the hard work invested in digitising your collection should be backed up in at least three locations, as well as 'in the cloud'.

Managing digital files for website use:

The creation of large Master files of all your images will give you maximum versatility in their ongoing use. Images may be enlarged for signage, exhibitions or publications and shrunk down for easy uploading to websites and research projects.

The **Access Master** image file (created by saving the **Preservation Master** as a TIFF file) is too large for day-to-day internet use, being be slow to upload, download and view on screen. Large file sizes will frustrate your audience who will have to endure an unnecessary to view these files. This is why smaller size **Access** copies are made. These will open quickly for administrative use and improve your organisation's online presence by respecting the needs of the end-user.

The same principle applies to sound or video content. To enable sharing or online viewing, lower resolution video files can be uploaded to YouTube while oral history audio files can be matched with a slideshow of still images and uploaded to YouTube as well.

Smaller sized **Access** files (thumbnail and small JPEG) are perfect for advertising, event promotion, sharing on social networks such as Facebook, Twitter and Instagram, or accompanying local newspaper stories. Large **Access** files (large JPEG) will serve needs such as exhibition, online use and where you want to zoom the image, or publication uses.

The **Access Master** files should meet all your subsequent needs for images without ever having to go back to the **Preservation Master**, let alone the original item.

Document format	Access 1 size / JPEG	Access 2 size / PDF
Paper documents under A3	JPEG 2500 pixels on the shortest edge, 300ppi, 8-bit colour (24 bit) & sRGB colour space	PDF 300ppi, 8-bit colour depth & sRGB colour space
Documents over A3 size (maps, plans etc)	JPEG 3000 pixels on the shortest edge, 300ppi, 8-bit colour (24 bit) & sRGB colour space	PDF 300ppi, 8-bit colour depth & sRGB colour space
Rare or significant documents, artworks, posters or large format records with a high level of detail	JPEG 3000 pixels on the shortest edge, 300ppi, 8-bit colour (24 bit) & sRGB colour space	PDF 300ppi, 8-bit colour depth & sRGB colour space
Photographic prints – colour and B&W & B&W negatives and transparencies	JPEG 2500 pixels on the shortest edge, 8-bit colour (24 bit) and sRGB colour space	JPEG 200 pixels on the shortest edge 8-bit colour (24 bit) and sRGB colour space

8 Specifications outlined in this table are based on https://www.naa.gov.au/about-us/our-organisation/accountability-and-reporting/archival-policy-and-planning/preservation-digitisation-standards, as well as have taken into consideration everyday uses such as web, publication, zooming or scaling up for printing – but using a single sized Access File other than thumbnail size. As noted above, your organisation may have different needs and consequently will make different choices regarding file sizes needed. For situations that are more complex than described in this table it is recommended that you refer to the NAA's detailed specifications found at this link.

A summary of suggested file sizes for online use:

Size	Still image	Sound file	Video file
thumbnail	less than 1 MB	NA	NA
small	2-10 MB JPEG files	MP3 or MP4 files (file size will depend on the length of the recording)	MP4 files (file size will depend on the length of the recording)
large	10-30 MB JPEG files	MP3 or MP4 files (file size will depend on the length of the recording)	MP4 files (file size will depend on the length of the recording)

SOURCES AND USEFUL LINKS

https://archivesoutside.records.nsw.gov.au/digitising-your-collection-part-4-scanning-and-handling-tips/

https://archivesoutside.records.nsw.gov.au/digitising-your-collection-part-5-metadata-and-access/

https://collectionstrust.org.uk/digital-isnt-different/digitisation/

https://collectionstrust.org.uk/resource/managing-the-digitisation-of-library-archive-and-museum-materials/

https://www.youtube.com/watch?v=oUgG7HEpvyo

https://www.sl.nsw.gov.au/public-library-services/content/digital-practice-guidelines-public-libraries

https://www.nedcc.org/assets/media/documents/dman.pdf

https://www.canada.ca/en/heritage-information-network/services/digitisation/capture-collections-small-museum.html#18

http://sustainableheritagenetwork.org/system/files/atoms/file/Audio_Best_Practices.pdf

http://www.digitisationguidelines.gov/guidelines/

http://www.digitisationguidelines.gov/audio- visual/documents/IP_Fleischhauer_AudioVisual_Reformatting_isqv22no2.pdf

https://www.youtube.com/watch?v=udwPo6vLfSU&pbjreload=10

https://www.youtube.com/watch?v=w1yamUEEADM

https://all3dp.com/3d-file-format-3d-files-3d-printer-3d-cad-vrml-stl-obj/

Appendix - Digitisation fundamentals for working with First Nations communities

If, how and why digitise:

Working with First Nations communities across regional NSW to digitise their collections and stories should be conducted in accordance with a number of principles. These include that, in the first instance:

- First Nations communities have the right to choose whether or not they wish to digitise their collections.

The right to choose whether or not to digitise is a fundamental principle endorsed by the United Nations Declaration on the Rights of Indigenous Peoples, to which Australia is a signatory. Article 31 states:

1. Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.

2. In conjunction with indigenous peoples, States shall take effective measures to recognize [sic] and protect the exercise of these rights.

Where First Nations communities wish to digitise their collections engagement must be conducted in accordance with protocols, developed collaboratively between the hub and each community, to enable each community to:

- Make informed decisions about digitisation and storytelling processes concerning their collections and cultural knowledge (i.e. understand and formally consent to a digitisation process and digitisation outcomes that are determined at a community level);

- Record or develop community derived values, meanings or narratives attached to or embodied in cultural material (i.e. actively engage with, interpret and respond to the digitisation process and the cultural knowledge and material it digitises and records);

- Determine if and how collections and stories are shared between families and communities, or the wider-community, through any online platform made public (i.e. communities are actively engaged and informed about conventional collections management protocols, as well as given the opportunity to understand and apply alternative ways to manage their cultural knowledge and material – by way licensing or labelling of content) – to ensure access to it is enabled in accordance with their cultural needs and aspirations).[9]

- All consents need to be formalised as a written consent (like a license) with contact details that can be filed and assigned to the relevant digitised records. Where images contain unidentified people permission to post these images to a website with the expressed intent that someone may identify unknown person/s should also be subject to a written consent agreement.

- In the case of posting digitised images and stories online the relevant website should include the following advisory information: that the site contains images, names or voices of people who have passed; historic language that reinforces negative stereotypes of First Nations peoples and their culture; and that some images contain unidentified First Nations people. The community may also have specific advisories e.g. these images and knowledge are shared with permission of the (Community name) for the express purpose of (e.g. study and research).

Digitisation benefits First Nation communities in particular ways:

A number of benefits can and will stem from digitisation that is undertaken using culturally safe collaboration methods with First Nations communities. This includes that:

- Digitisation 'decentralises' collections, or digitally repatriates cultural material and knowledge, to enable or enhance access by making these digitally available to communities through online means. In the regional context 'decentralising' collections through digitisation occurs in different ways to the digitisation of metropolitan collections that enables regional-based communities to access cultural knowledge / records kept by the major COs. When regional collections are digitised the reverse can result, and where Indigenous people or families live or work away from their Homelands in other regional areas or Greater Sydney.

- Digitisation enables First Nations peoples the (previously denied) opportunity to counter past interpretations of cultural material and knowledge, held by them or other regional collecting organisations, and thereby contribute First Nations voices / perspectives to the state and national narrative.

- Digitisation gives First Nations communities direct authority to manage cultural material and knowledge in accordance with their own philosophies and practices (which are distinctive and often conflict with the European-origin ideologies and practices of western collecting institutions).

- Digitisation contributes to the social justice, human rights and identity-building aspirations of First Nations peoples.

In addition to meeting cultural needs and aspirations digitisation has the potential to meet the social and economic desires of First Nations communities in NSW – such as healing, leadership and employment or business opportunities.[10]

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9   Christen, Kimberly. (2015). Tribal Archives, Traditional Knowledge, and Local Contexts: Why the "s" Matters. Journal of Western Archives, 6 (1).

10   https://www.aboriginalaffairs.nsw.gov.au/pdfs/AA-Strat-Plan-2016-19.pdf
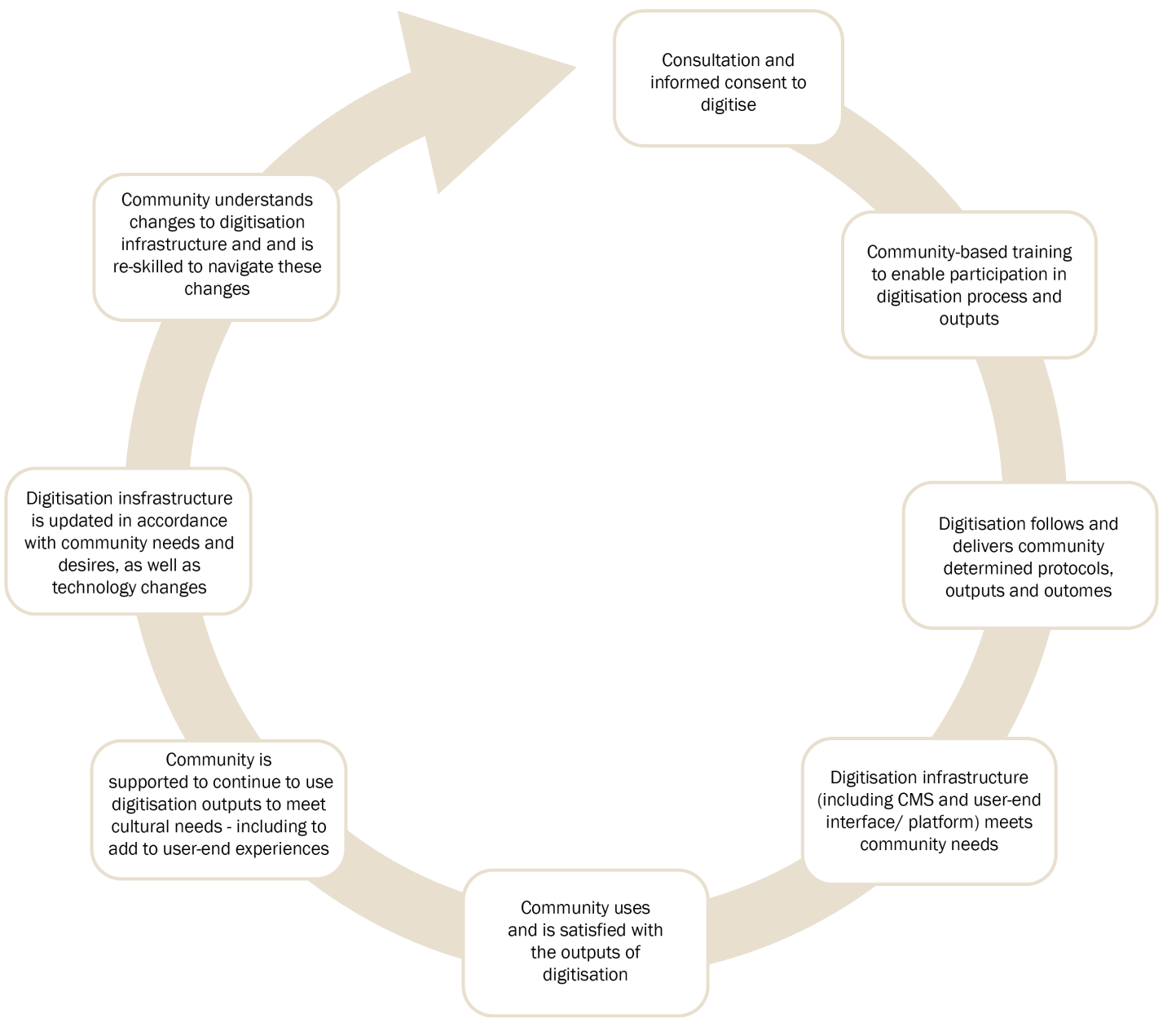
Appendix - Digitisation fundamentals for working with First Nations communities

Making digitisation sustainable for First Nations communities

Making digitisation effective for First Nations communities makes it sustainable. Digitisation processes and outputs must therefore be premised on the needs and aspirations of each First Nations community; leave a legacy of knowledge and skill development; and, where desired, lead to strategies that enable First Nation communities to continue to digitise and manage their own cultural heritage.

In the museum and gallery sector, the notion of 'do it once, do it well' is embraced to remind practitioners of the importance of digitisation meeting sector standards in order to maximise the benefits derived from the investment made in it. In the context of digitisation in First Nation communities this mantra can be extended to: 'do it well and keep on doing it' to remind practitioners and policy makers of the desired standards needed to enable the transformative change digitisation can deliver to First Nations communities.

Consultation and informed consent to digitise

Community understands changes to digitisation infrastructure and and is re-skilled to navigate these changes

Community-based training to enable participation in digitisation process and outputs

Digitisation insfrastructure is updated in accordance with community needs and desires, as well as technology changes

Digitisation follows and delivers community determined protocols, outputs and outomes

Community is supported to continue to use digitisation outputs to meet cultural needs - including to add to user-end experiences

Digitisation infrastructure (including CMS and user-end interface/ platform) meets community needs

Community uses and is satisfied with the outputs of digitisation

Above: Essential components of a sustainable First Nations community-based digitisation model. Training and capacity building enables the community to 'do it well, and keep on doing it'.

Appendix - Digitisation Example

Above: portable photographic studio set-up at Orange Regional Museum (ORM) (shooting an object from Canowindra Historical Society & Museum collection, courtesy Annie Stevens and ORM for M&G NSW 2018).

Above: Detail shots of Merle Hadley's evening dress and bolero jacket made from a WWII black- out curtain, Canowindra Historical Society and Museum.

Appendix - Digitisation Example

Above: Assembling an early twentieth century wedding dress on a mannequin for digitisation using a camera and portable studio set-up, Golden Memories Museum, Millthorpe. Images courtesy of M&G NSW Collections and Stories project 2018.

Above: The wedding dress on the mannequin and against the white paper roll backdrop.

Above: Taking an archive shot of the wedding dress with the colour chart and two detail shots of ribbon and corded trims, as well as the lace yoke.
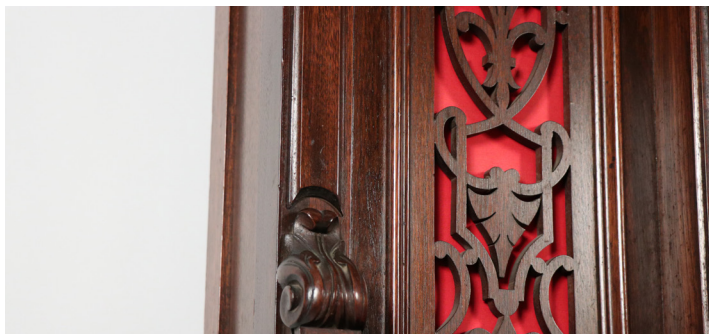
Appendix - Digitisation Example

Above: Preparing Parson William Tom's pump organ for in-situ digitisation using a portable studio set-up at the Orange and District Historical Society's collection store during the *Collections and Stories* project in 2018.

Above: An archive shot of the organ

Above: four close-up shots of the organ's detailed features

Appendix - Digitisation Example

Above: Staff from Broken Hill Regional Art Galley assist to hold the *Peace and Plenty are the Rewards of Temperance* silk banner for photographing at the Broken Hill Trades Hall. The banner is part of the Broken Hill Trades Trust collection.
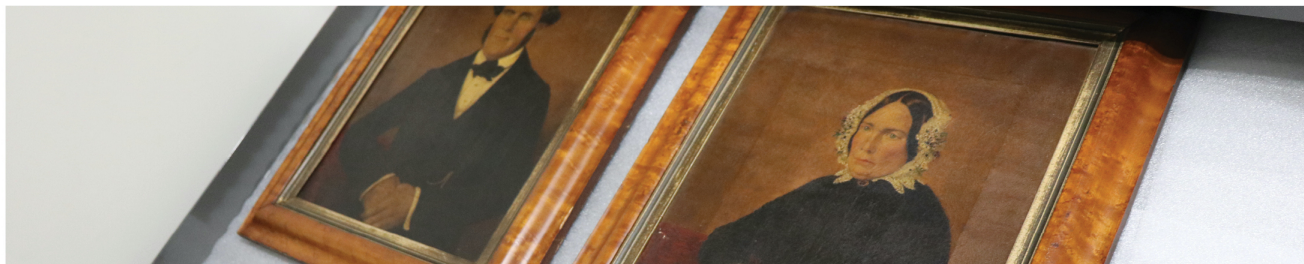

Above: Preparing to photograph the *Peace and Plenty are the Rewards of Temperance* silk banner.

Above: Close up showing detail of the corner weight, which kept the banner rigid during its use in the town's historic parades

Appendix - Storyplace

SPECIFICATIONS & GUIDELINES FOR RESIZING, SAVING & CROPPING DIGITAL FILES FOR USE ON THE STORYPLACE WEBSITE:

Storyplace is the website curated by Museums and Galleries of NSW, in partnership with regional museums, galleries and cultural centres across NSW, to highlight and promote the value of regional collections. Among *Storyplace's* key aims is to broaden access to regional collections, and the stories these represent, and to a varied audience.

Regional collections have significant cultural and research value that will benefit general and professional audiences, when made available online. Knowing about regional collections will draw visitors to regional centres, who bring important tourism dollars to these communities.

Quality digital images of objects are a key feature of the *Storyplace* website. Good quality images will spark the interest of internet users, including those with a casual interest in object stories, students and all types of other researchers, as well as regional visitors.

Above: Portraits of Elizabeth (nee Peake 1816–1855) and Michael Carroll (1811-1856) of Summerhill, Orange, unidentified artist, c. early-1850s. **Below:** Leather boxing gloves that belonged to farmer and showman Gharne Singh (1871-1935), Greens Gunyah Museum, Lockhart.

Appendix - Storyplace

STORYPLACE

RESIZING & SAVING DIGITIAL FILES FOR STORYPLACE:

So that your objects 'shine' on the *Storyplace* website the following specifications for **resizing and saving** digital files should be followed. **NOTE: All resized files** should be made from you **Access Master** files prepared using the advice on digitisation outlined in this publication, *Crystal Clear.* In other words, each time you resize your files to a different size, this is done using the Access Master files.

TYPE OF DIGITAL FILE	SPECIFICATIONS AND OTHER GUIDANCE
Files made using **a camera**	Prepare **2 different sized JPEG files** from your Master Access TIFF files – **a thumbnail** and a **small JPEG** resized to **2500 pixels on the shortest side, 300ppi, (24 bit) & sRGB colour space.**
Files made using a **scanner** - of **less than A3 size**	Prepare **2 different sized JPEG files** from your Master Access TIFF files - **a thumbnail** and a **small JPEG sized at 2500 pixels on the shortest side, 300ppi, 8-bit colour (24 bit) & sRGB colour space**
Files made using a **scanner** - **over A3 size**	Prepare **2 different sized JPEG files** from your Master Access TIFF files - **a thumbnail** and a **small JPEG sized at 3000 pixels on the shortest edge, 300ppi, 8-bit colour (24 bit) & sRGB colour space.**
Audio files (sound only)	Provide in **MP3** format
Audio-visual files (sound and moving image)	Provide in **MP4** format

Appendix - Storyplace

STORYPLACE

CROPPING 3D OR PHOTOGRAPHIC OBJECT IMAGES FOR STORYPLACE:

When cropping **3D object images** we create a visual relationship between the object and the space around it. This visual relationship is balanced by ensuring the object is positioned, or cropped, **so that sufficient 'white space' is created or left around the image**. Images cropped too 'tightly' can be visually jarring and unpleasing to the eye.

On the *Storyplace* website, and on many other collections-based websites, object images are displayed in the landscape format. Therefore, **object images should be cropped in a landscape format,** even if the object presents in the picture as being greater in height than width, such as the top hat shown below. This means that an object or group of objects should be centred in the middle of the picture, or the white space. Put another way, the space surrounding the **centred object/s** should be even on each side, and then at the top and bottom of the image. As well, ensure that you leave sufficient white space to **balance the placement or composition** of the object or objects within the picture – as shown in these examples below.

Clockwise from top left: Top Hat owned by businessman James Dalton (1834-1919) of Orange, NSW, c. 1880, Orange and District Historical Society, though the top hat is taller than it is wider, it has been cropped in a landscape format by leaving plenty of whitespace either side of the image; Acoustic guitar owned by singer Tex Morton (1916-1983), c. 1930s-1940s, City Music Collections, Tamworth Regional Council; Concertina owned by musician Harry Esperance (1859-1943) and played by him when a member of the Eugowra town band, c. 1860, Eugowra Historical Museum and Bushranger Centre; Medicines from the medicine chest of Barnard (1818-1897) and Ann (1820-1890) Stimpson of Carcoar, c. 1850s, Carcoar Hospital Museum, an example of multiple and related objects arranged to suit a landscape format image.

Appendix - Storyplace

STORYPLACE

CROPPING 3D OR PHOTOGRAPHIC OBJECT IMAGES FOR STORYPLACE:

Digital images of **'flat' artworks**, such as paintings or paper-based sketches, are **typically cropped to the edge of the picture** – be that canvas, board or paper etc. Where these are framed, and the **frame is newer than the art work**, ideally these works should be de-framed before digitising – as outlined in *Crystal Clear*. In instances where this is not possible the frame should be cropped from the digitised image. But, where **frames are original to the work** these should be digitised and **left in the image**. All 3D artworks, such as decorative art pieces, sketchbooks or sculptures etc. should be treated in the same manner as other object types.

Clockwise from top left: Portrait of Broken Hill artist Sam Byrne, by May Harding (1908-1971) c. 1960s., Broken Hill Regional Art Gallery, though this painting is in portrait format, it has been cropped as a landscape format image by leaving plenty of whitespace either side of the image; May Harding's 'Broken Hill Wildflowers', n.d., Broken Hill Regional Art Gallery, Broken Hill Regional Art Gallery; Black and white photograph taken by James Wooler of Broken Hill's 'Eight Hours Day Procession 1910', Outback Archives, Broken Hill, this image was photographed rather than scanned; Advertising fan promoting N. Kleanthi's 'Fruit Confectionary and Soft Drinks', 243 Argent Street, Broken Hill, 1930, Sulphide Street Railway Museum, Broken Hill, the image is cropped in a landscape format.

Appendix - Sample Digitisation Workflow

BROKEN HILL

REGIONAL ART GALLERY

Digitisation Project Photographic Workflow
SHOOTING

1. **Set up the Artwork**

   o   Decide whether the work is to be photographed on the easel or otherwise
   o   Plan how to move artwork from its location to the studio/easel
   o   Make sure pathway is clear.
   o   Use another person to assist with lifting the artwork if necessary and transport work on trolley if you must make more than four steps
   o   If you are photographing the work on the floor or leaning against the wall, ensure there is correct support underneath e.g. blankets, chock, foam core

2. **Condition Reporting and Cleaning**

   o   Condition Assessment may be undertaken if deemed necessary once the work is set up in the studio

   o   Cleaning: assess whether the work needs to be cleaned before photographing. Great care should be taken to not damage the work and it is better to leave a work slightly dusty than risk damaging it. If in doubt, consult a conservator. A gentle brush using a hake or other conservation grade brush into a low suction vacuum may be undertaken if considered safe.

   o   For works that are framed and glazed, the frame and glass may also be brushed to remove loose dirt and dust.

3. **Lighting**

   o   Use a tape measure to position each light the same distance away from the art work at a 45 degree angle. For small works the lights will need to be closer and vice versa.

   o   Turn the lights on, with the Flash set to its highest strength (6) and make decisions on a case by case basis on whether a lower strength setting is appropriate. The main objective is to capture even lighting with highlights that compliment the work.

   o   If the work presents a lot of texture or harsh shadows, you may need to also use a larger light source, i.e. a piece of foam core to act as a reflector to create diffused, soft light. You may even need to bounce the flash off the ceiling in some cases

Appendix - Sample Digitisation Workflow

4. **Camera**

- o Turn on the Camera and the Flash Receiver device

- o Settings: start with 100 ISO, aperture F.11, Shutter speed at 1/100th and make adjustments as needed. If art work is large and lights are set further away, giving a wider light source, the ISO can be increased and if the art work is small and lights are set closer the ISO is brought down. If work is very light, ISO may also be brought down and if very dark, adjusted up. A range of ISO L1.0 – 160 should suit most artworks in the Paper Store studio.

- o Adjust the camera physically to a landscape or portrait orientation

- o Ensure the work is straight on the easel and level with the camera. Press the "Info" button three times to get a level and adjust the camera accordingly.

- o The polarising filter must be adjusted for every work. Adjust until the reflection has "darkened" on the artwork whilst looking through the camera with the lights on. Every time the camera is moved from portrait to landscape the polarising filter must be re-set. Make sure the filter is polarising both sides of the art work equally.

- o Focus and take the shot. Check photograph on screen and re-shoot if necessary.

- o Turn off lights, camera and flash receiver device. Take out battery to re-charge if necessary. Remove SD card.

Use the colour card if the light temperature has changed. If you are shooting in a different location or if the lights have been moved due to size of the work, use the colour card to determine the correct temperature. This is a rough guide, modifications have to be made according to size of work and available light

A polarizing filter has a layer of Polaroid (synthetic plastic) sandwiched between two glass plates. In a circular polarizing filter, as the front plate is rotated, the angle of polarization and thus the amount of polarized light that passes through the filter changes. This allows precise control of the degree of polarized light that is to be removed

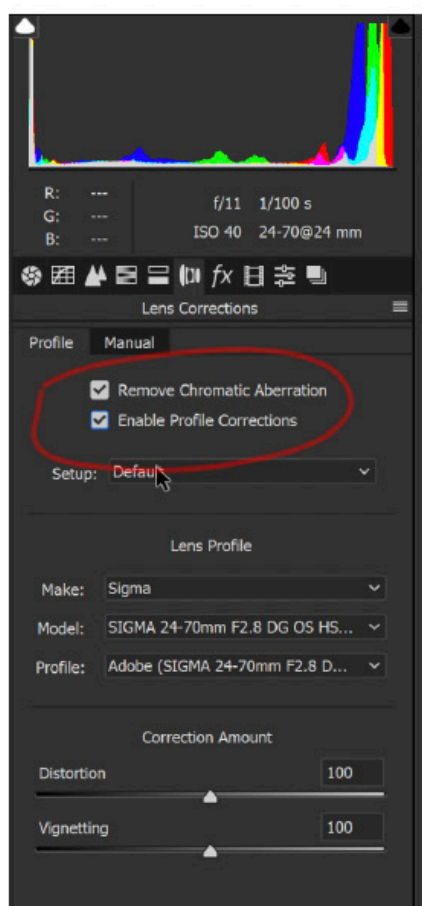# Appendix - Sample Digitisation Workflow

5. Set up image files

- Upload the photographs on the SD card to:
  \\bhfs01.bhcc.local\ArtGallery\Artworks\BHRAG Digitisation Project
  2018\Images\BROKEN HILL REGIONAL ART GALLERY COLLECTION\RAW

- Work from Bridge to rename and move files around and then open them in camera raw.

- Image files should be named as Accession No, e.g. 2011_0012 and once edits have been done, saved into the following folder.
  \\bhfs01.bhcc.local\ArtGallery\Artworks\BHRAG Digitisation Project
  2018\Images\BROKEN HILL REGIONAL ART GALLERY COLLECTION\TIFF

- Select works that you want to open and right click. Open in camera raw

6. Camera Raw corrections

- Once in camera raw make sure you select all images and apply lens correction.
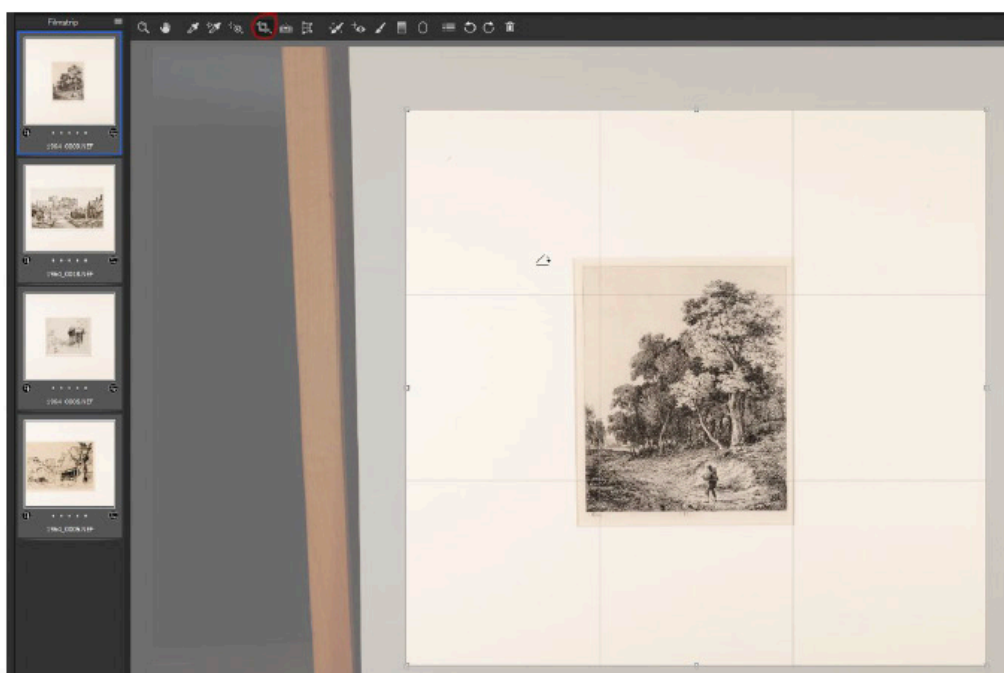
Appendix - Sample Digitisation Workflow

- o Check colour temperature and if you have to use the colour checker work from the grey scale to decide on colour temperature for the image. The temperature in the Paper Store should be about 5800.
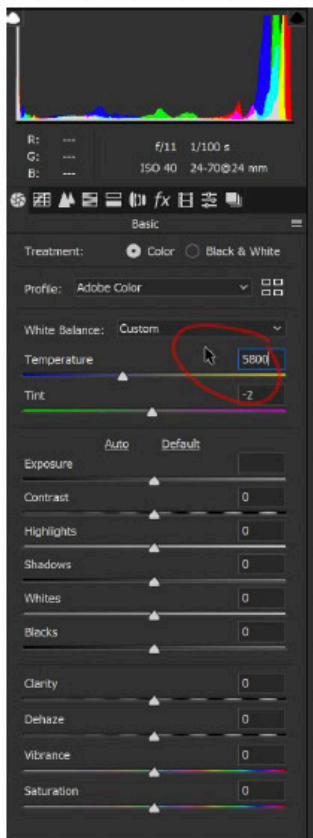
- o Do a basic crop (this will be fine-tuned in Photoshop) and if there are a lot of lines and directions in your image, the perspective crop in camera raw may straighten your image if it needs to be.

- o Check exposure, blacks, whites and highlights. Make decisions based on aesthetic and if you can use the original painting as a reference then do so. Use the gradient tool to even out any exposure at the edges of the art work, and brush tool to do local adjustments.
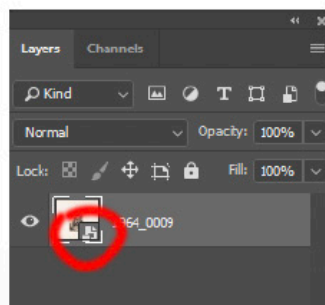

- o Select all images and open objects in photoshop.

7. Photoshop

- o Open images in photoshop. Your image will open as a smart object.

- o Rasterise your image (unless no changes are to be made in Photoshop) via Layer/Rasterise/all Layers
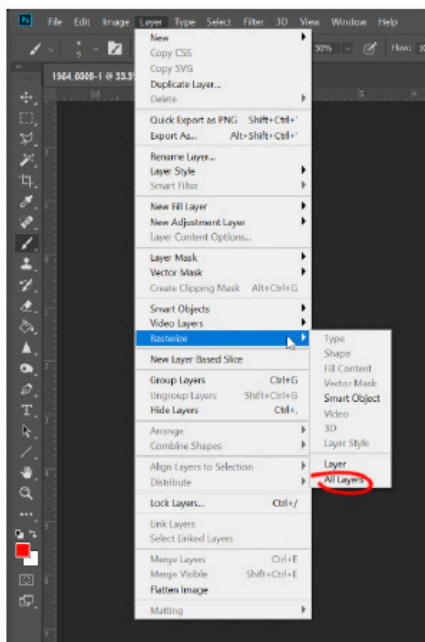
- ▪ You can move between camera raw and photoshop by clicking on the smart object image in the right hand corner of your layer.

Appendix - Sample Digitisation Workflow

- Once the image has been rasterised you will no longer be able to open that image in camera raw. and your final crop in photoshop

- Use rulers to mark out a basic outline of work. Select the perspective crop tool and click on each corner of the outlines you have made with rulers. Pull each corner of your crop to each corner of the artwork. Double clip on the artwork once you have aligned the crop.

BORDER

Ctrl + A = select all

Path = make a work path

Ctrl + Alt + C = image size. Add 3 cm in H x W
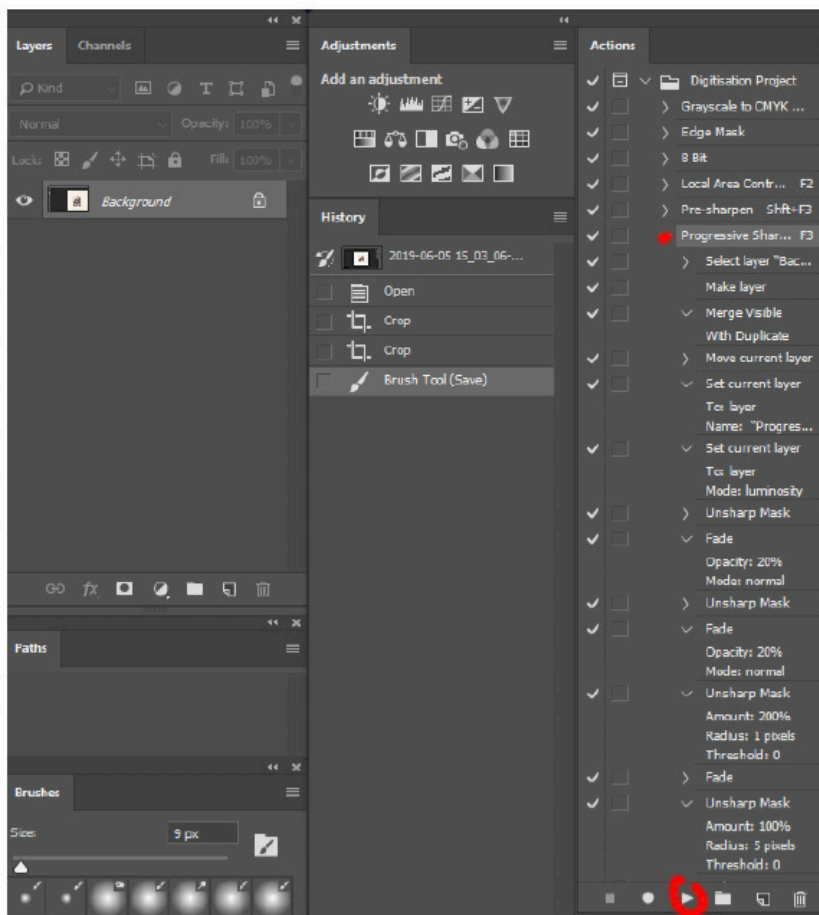
Path + Make selection

Ctrl + Shift + I = select inverse

Shift + 5 = Fill. Make sure it is white

Ctrl + D = de select

Appendix - Sample Digitisation Workflow

○ Perform Actions as required – at a minimum a Progressive Sharpen action

○ Save Image as a TIFF and a LOW RES JPEG

- go to File/Automate/Batch. A window will open with a "Play" icon. Make sure the SET drop down box is 'Digitisation Project' and the action is TIFF and the DESTINATION drop down box has NONE selected. Once all your settings are correct click ok. Then repeat the process but replace the action with LOW RES JPEG and the destination selected as SAVE AND CLOSE.

The Actions tab is on the right screen, next to adjustments. Actions are a saved series of steps that allow you to make a range of adjustments by clicking the play action icon. Actions used for photographed artworks are: locked curve, burning, dodging smoothing, colour range, perspective crop and progressive sharpen. Use keyboard shortcuts where you can to make workflow quick and efficient

Appendix - Sample Digitisation Workflow

UPLOADING TO EMU

1. Log on to the EMu catalogue database. Open the catalogue Module and search the accession number of the artwork you wish to attach a photo to.

2. Select all the text in the title bar above "Object Details" and Copy
   e.g. **[Painting] "Cockburn Range" [2018.0005], Lander, Jane**

3. Click on the Multimedia tab.

4. Click on the paperclip icon This will take you to the Multimedia Module.

5. Click on the "New Record" icon in the task bar at the top left.

6. Enter Resource information on the right hand side of the screen.
   a. Title – Paste the title bar text you copied earlier here
   b. Creator – select the name of the photographer from the list
   c. Description – enter "This photograph was taken as part of the 2019 Collection Digitisation Project" and then any other specific information pertaining to the shot, e.g. "temporary shot, for internal use only"

7. Click on small "Add Resource" icon (with green plus sign) above Resource Information. This will take you to an Explorer folder, where you can locate the Low Res JPEG file you wish to attach, usually at D:\EMu Images\LOW RES JPEG. Once located click Add. This will add the file to the record whilst generating a number of different resolutions of the same image.

8. Save the Multimedia Record.

9. Click on the large Paperclip icon to Attach the Multimedia record to the Catalogue record. This action will also close the Multimedia record

10. Save the Catalogue record once the Multimedia record has been attached..

Appendix - Sample Digitisation Workflow

This wheel changes the F stop

F stop otherwise known as aperture will range between F.11 and F.13. Use F.13 with more detailed works on paper.

On your screen this will read M

Shutter speed will stay at 100.

ISO will range between L1.0 to 160. To change ISO hold down ISO button and move wheel.

DOCUMENT HISTORY

Author / editor / reviewer	Date and summary of variations made
Cheryl Jackson (for M&G NSW)	Research and initial draft - May / June 2019; response to review comments (July 2019)
Kate Gahan (for M&G NSW)	First edit and format in M&G NSW template (June 2019); final working copy edit (September 2019)
Michael Rolfe (M&G NSW)	Comment (July 2019)
Tamara Lavrencic (M&G NSW)	Comment and edit (July 2019)
Emily Cullen (M&G NSW)	Comment and edit (July 2019)
Eileen Wright (Broken Hill Regional Art Gallery)	Review, edit and comment (August 2019)
Emily Kelleher (Paintings Conservator)	Review, edit and comment (August 2019)
Allison Campbell (Orange Regional Museum)	Review, edit and comment (August 2019)
Andrew Long (Coffs Harbour City Council)	Review, edit and comment (August 2019)
Vanessa Low (M&G NSW)	Graphic design and final review (September 2019)
Kate Gahan and Gary Crockett (M&G NSW)	Revisions to section on saving digital files & addition of Appendix: Specifications & Guidelines for Resizing, Saving & Cropping Digital Files for use on the Storyplace website (September 2021)
Victoria Cleland (M&G NSW)	Design revisions (October 2021)

Museums & Galleries of NSW