

CHAPTER 7: ELECTRONIC RECORDS MANAGEMENT

7.1 General

Federal Records Act Amendments of 2014, section 10 prohibits an officer or employee of an executive agency from creating or sending a record using a non-official electronic messaging account unless such officer or employee: (1) copies an official electronic messaging account of the officer or employee in the original creation or transmission of the record, or (2) forwards a complete copy of the record to an official electronic messaging account of the officer or employee not later than 20 days after the original creation or transmission of the record. Violation of this requirement provides for disciplinary action against an agency officer or employee for an intentional violation of such prohibition.

36 CFR 1236.10. The following types of records management controls are needed to ensure that Federal records in electronic information systems can provide adequate and proper documentation of agency business for as long as the information is needed. Agencies must incorporate controls into the electronic information system or integrate them into a recordkeeping system that is external to the information system itself.

- A. Reliability:** Controls to ensure a full and accurate representation of the transactions, activities, or facts to which they attest and can be depended upon in the course of subsequent transactions or activities.
- B. Authenticity:** Controls to protect against unauthorized addition, deletion, alteration, use, and concealment.
- C. Integrity:** Controls, such as audit trails, to ensure records are complete and unaltered.
- D. Usability:** Mechanisms to ensure records can be located, retrieved, presented, and interpreted.
- E. Content:** Mechanisms to preserve the information contained within the record itself that was produced by the creator of the record;
- F. Context:** Mechanisms to implement cross-references to related records that show the organizational, functional, and operational circumstances about the record, which will vary depending upon the business, legal, and regulatory requirements of the business activity; and
- G. Structure:** Controls to ensure the maintenance of the physical and logical format of the records and the relationships between the data elements.

36 CFR 1236.12. As part of the capital planning and systems development life cycle processes, agencies must ensure:

- A. That records management controls (See § 1236.10) are planned and implemented in the system;
- B. That all records in the system will be retrievable and usable for as long as needed to

conduct agency business (i.e., for their NARA-approved retention period). Where the records will need to be retained beyond the planned life of the system, agencies must plan and budget for the migration of records and their associated metadata to new storage media or formats in order to avoid loss due to media decay or technology obsolescence. (See § 1236.14.)

C. The transfer of permanent records to NARA in accordance with part 1235 of this subchapter.

D. Provision of a standard interchange format (e.g., ASCII or XML) when needed to permit the exchange of electronic documents between offices using different software or operating systems.

§ 1236.20 What are appropriate recordkeeping systems for electronic records?

A. General. Agencies must use electronic or paper recordkeeping systems or a combination of those systems, depending on their business needs, for managing their records. Transitory email may be managed as specified in § 1236.22(c).

B. Electronic recordkeeping. Recordkeeping functionality may be built into the electronic information system or records can be transferred to an electronic recordkeeping repository, such as a DoD-5015.2 STD-certified product. The following functionalities are necessary for electronic recordkeeping:

1. Declare records. Assign unique identifiers to records.
2. Capture records. Import records from other sources, manually enter records into the system, or link records to other systems.
3. Organize records. Associate with an approved records schedule and disposition instruction.
4. Maintain records security. Prevent the unauthorized access, modification, or deletion of declared records, and ensure that appropriate audit trails are in place to track use of the records.
5. Manage access and retrieval. Establish the appropriate rights for users to access the records and facilitate the search and retrieval of records.
6. Preserve records. Ensure that all records in the system are retrievable and usable for as long as needed to conduct agency business and to meet NARA-approved dispositions. Agencies must develop procedures to enable the migration of records and their associated metadata to new storage media or formats to avoid loss due to media decay or technology obsolescence.
7. Execute disposition. Identify and effect the transfer of permanent records to NARA based on approved records schedules. Identify and delete temporary records that are eligible for disposal. Apply records hold or freeze on disposition when required.

C. Backup systems. System and file backup processes and media do not provide the appropriate recordkeeping functionalities and must not be used as the agency electronic recordkeeping system.

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OMB Circular A-130, par. 8a (1)(k) requires agencies to incorporate records management and archival functions into the design, development, and implementation of information systems.

OMB Circular A-11, section 300.3 requires that the capital planning process integrate the planning, acquisition, and management of capital assets into the budget decision making process and is intended to assist agencies in improving asset management and in complying with the results-oriented requirements.

Paperwork Reduction Act, § 3506 par. (f) requires agencies to implement and enforce applicable records management procedures, including requirements for archiving information maintained in electronic format, particularly in the planning, design, and operation of information systems.

Clinger-Cohen section 5125(b) requires the Chief Information Officer to implement policies and procedures of the Paperwork Reduction Act and promote the effective and efficient design and operation of all major information assets for which the agency is responsible, including internal audits.

Federal Information Processing Standards (FIPS) 199 provides guidance on identifying high-risk information systems and necessary controls to adequately secure information and ensure it is of high integrity and available for use. FIPS 199 should be used in conjunction with NIST 800-37 and NIST 800-53.

7.2 Appropriate Recordkeeping Systems

Over time, the historic paper-based, recordkeeping systems slowly gave way to electronic records management. NARA has now created mandates and deadlines for prospective, exclusive electronic records. This transition mandates familiarity with the following terms:

A. Recordkeeping System (RKS)

A systematic process which captures, organizes, and categorizes records to facilitate their preservation, retrieval, use, and disposition.

B. Electronic Recordkeeping System (ERKS)

An electronic system (machine readable) that captures, organizes, and categorizes records to facilitate their preservation, retrieval, use, and disposition.

C. Document Management Application (DMA)

1. A system based on computer programs in the case of the management of digital documents used to track, manage, and store documents and reduce paper.
2. Most applications are capable of keeping a record of the various versions created and modified by different users.

D. Records Management Applications (RMA)

1. Software that aids the management of records, especially electronic records.
2. These records include the use of a file plan for classifying records and
3. Records schedules for identifying records that are due for disposition.

E. Appropriate Electronic Recordkeeping System (AERKS)

1. A system which maintains all the functionality outlined in 36 CFR 1236.20 or for email in 36 CFR 1236.22.
2. Recordkeeping functionality may be built into the electronic information system or records can be transferred to an electronic recordkeeping repository.

7.3 Creation, Use, and Maintenance of Structured Electronic Data

For electronic information systems that produce, use, or store data files, disposition instructions for the data will be incorporated into the systems' design. Program offices will maintain adequate and up-to-date technical documentation for each electronic system that produces, uses, or stores data files. The minimum documentation required is as follows:

- A. Narrative description of the system, physical and technical characteristics of the records, including a records layout that describes each field (name, size, starting or relative position);
- B. A description of the form of the data (alphabetic, zoned decimal, packed decimal, or numeric);
- C. A data dictionary, or the equivalent information associated with a database management system, i.e., a description of the relationship between data elements in databases, and any other technical information to read or process the records;
- D. A copy of the user's manual/handbook to operate and use the system or database;

Electronic System Shutdown and/or Decommissioning (related to projects that follow the Enterprise Life Cycle [ELC] process). Electronic system owners must follow appropriate shutdown procedures when a system is scheduled for cancellation. The process is defined through a systematic series of actions to ensure orderly and efficient performance of essential shutdown activities.

The following records management actions must be taken when migrating, retiring, or shutting down an electronic system:

- A. If the information is to be migrated to another system you must:
 - 1. Notify the RIM staff of changes to system (i.e., name change, or changes in functionality, etc.);
 - 2. Determine if any changes need to be made to the disposition of the new system based on changes in functionality; and
 - 3. Manage the new system in accordance with an approved disposition authority.
- B. If the information is not being migrated to a new system you must:
 - 1. Notify the RIM staff that this information will no longer be collected; and
 - 2. Establish a plan to manage any legacy record data that has not yet met its approved disposition.

7.4 Creation, Use, and Maintenance of Unstructured Electronic Data

At a minimum, electronic recordkeeping systems that maintain the official copy of unstructured data, such as text documents, emails, presentations, audio video files, image files, and PDF files, electronically will provide:

- A. A method for all authorized users of the system to retrieve desired documents, such as an indexing or text search system;
- B. An appropriate level of security to ensure integrity of the documents;
- C. An appropriate audit trail or tracking system for data manipulation and version identification;
- D. A standard interchange format when necessary to permit the exchange of documents on electronic media between HUD computers using different software/operating systems and the conversion or migration of documents on electronic media from one system to another;
- E. The disposition of the documents including, when necessary, the requirements for transferring permanent records to NARA; and
- F. Authorized administrators with the ability to remotely access, copy, transfer, and prevent edited files as needed to preserve electronically stored information that is subject to a litigation hold.

7.5 Metadata

Metadata are elements of information that answer the questions “who, what, where, when, and why” regarding electronic records. Metadata elements provide administrative, descriptive, and technical information that describe the structure and content of electronic records. Metadata elements also provide contextual information that explains how electronic records were created, used, managed, and maintained prior to their transfer to NARA, and how they are related to other records. This information enables NARA to appropriately manage, preserve, and provide access to electronic records for as long as they are needed.

There are two types of metadata—taxonomy metadata and transfer metadata—as well as important differences between them.

- Taxonomy Metadata also known as terms, is used to categorize information created within an office to facilitate quick and accurate retrieval of information in the daily course of business. Taxonomy metadata describes all the content managed by an organization. It is used to categorize information created within an office to facilitate quick and accurate retrieval of information in the daily course of business.
- Transfer Metadata describes the primary attributes of a permanent electronic record, as required by NARA. It is required for successful transfer of permanent electronic records from HUD to NARA. NARA uses the documentation to identify and interpret permanent electronic records for preservation and future access by both the general public and HUD employees.

The correct applications of transfer and taxonomy metadata will minimize confusion regarding metadata creation within HUD, ultimately allowing for more efficient business processes, as it as described below.

- A. Provides more time for staff to focus on other aspects of their job.
- B. Ensures that the process will be completed in as timely and efficient manner as possible. Staff who are knowledgeable about how metadata is used for taxonomies are able to develop a system of categorization that accurately represents the information created by the organization.
- C. Allows staff to efficiently locate and access information.
- D. Results in detailed and accurate file plans. The process of designing a taxonomy is similar to the process of building out a file plan—identifying content and assigning words and phrases to describe it—allowing HUD to better organize and retrieve information.

Permanent electronic records should have transfer metadata associated with them. Provided below are required transfer metadata elements for permanent electronic records, as dictated by NARA Bulletin 2015-04.

- A. **Transfer Request Number** - the number is generated when a transfer request is created in NARA's Electronic Records Archive (ERA)
- B. **Identifier, File Name** - the complete name of the file, including its extension, if present
- C. **Identifier, Record ID** - a unique identifier assigned by either the agency or a records management system (such as SharePoint)
- D. **Title** - name given to the record; often it will closely resemble the file name
- E. **Description** - a summary of the records' content
- F. **Creator** - documents the agent primarily responsible for the creation of the record
- G. **Creation Date** - date the file met the definition of a Federal record
- H. **Rights** - used to document any rights or restrictions that may affect access to the record(s), such as national security classification, personally identifiable information (PII), or Freedom of Information Act (FOIA)

Provided below are transfer metadata elements that should be included with permanent electronic records if the elements apply to the records to be transferred.

- A. **Coverage** - used to describe the geographic and/or time period/dates the records cover
- B. **Relation** - used to describe relationships between records when a record is composed of multiple files

HUD offices must notify NARA if they use the following to manage permanent record content:

- A. Data dictionaries** - information that describes the structure of a database and the relationships between metadata elements
- B. Controlled vocabularies** - organized words that provide terminology to catalog and retrieve information
- C. Ontologies** - a standard definition for a word or concept
- D. System indexes** - used to improve data retrieval in a database

7.6 Email Records Management

Email is an integral part of doing business, enabling rapid delivery of vital programs, services, and information. Increasing dependence on and use of email results in a compelling need to protect HUD resources through constant and improved monitoring, administration, user training, and awareness.

The Office of the Chief Information Officer (OCIO) maintains an electronic mail (email) system connected to the Department's Local Area Networks, both in Headquarters and in the Field, to satisfy messaging and workflow collaboration requirements. This system allows users to conduct Government-related business by exchanging electronic communications, including attachments, to improve customer service and to reduce or replace paper exchanges.

A. Records Management

1. OCIO will establish specific automated and scheduled procedures for regularly archiving the email system of "outdated" data in accordance with Chapter 11, Records and File Management of HUD Handbook 2200.1. All email data is stored for 7 years to allow all employees to access historical emails needed to perform HUD's business.
2. An official record is any documentary material, regardless of physical form, that is made or received by HUD for the transaction of public business, and appropriate for preservation by HUD, or its legitimate successor, as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities, or because of the value of the information it contains. (44.U.S.C. 3301).

B. Email Records

1. Draft documents circulated on email systems may be records if they meet the criteria of a record as described above. However, note that not all emails are records.
2. Both originators and recipients of email messages are responsible for determining if their email is a record. A transmission has record value if it is the only place that transmits information fitting the definition of an official record stated above.

3. Once the originator and/or recipient determines that an email is a record, he/she must retain a copy of the message for reference. This copy must contain all transmission data, including sender/recipient(s) of message, date, and subject line. This copy may be an electronic copy under an approved electronic records retention schedule.

C. Email Records in Personal Accounts

1. Official agency business should first and foremost be done on official HUD information systems.
2. Use of non-HUD systems to conduct agency business may lead to the mismanagement of agency records and/or the unauthorized disclosure of agency information.
3. The Federal Records Act (FRA) prohibits the creation or sending of a Federal record using a non-HUD electronic messaging account unless the individual creating or sending the record either:
 - a. Copies their HUD email account during initial creation or transmission of the record, or
 - b. Forwards a complete copy of the record to their HUD email account within 20 days of the original creation or transmission of the record.
 - c. Ensures that any use of a non-HUD information system does not affect the preservation of Federal records for FRA purposes, or
 - d. Identifies and ensures the processing of those records if requested under the FOIA, the Privacy Act, or for other official business (e.g., litigation, congressional oversight requests).

Federal agencies are required to manage their email records in accordance with the FRA and 36 CFR chapter XII, sub-chapter B. The issuance of NARA Bulletin 2013-02 established “the Capstone Approach” as an alternative means of managing email, while the transmittal of General Records Schedule (GRS) 6.1 provides disposition authority for the approach.

D. Capstone Email Approach

1. HUD will manage email under NARA’s “Capstone Approach.”
2. This approach acknowledges that the email records of senior agency officials document high-level policy and operational decisions and includes significant and historically valuable communications of the agency.
3. OCIO captures all email data from the accounts of agency Capstone officials, including secondary accounts and/or accounts maintained by assistants.
4. Email records of designated Capstone officials and officials under the delegations

of authority will be permanently retained and transferred to NARA.

5. HUD's Capstone officials are listed in the most current and approved NARA form NA-10005 and include, but are not limited to, these individuals, each of their deputies, and each of their staff assistants:

- i. Secretary
- ii. Deputy Secretary
- iii. Assistant Secretary for Administration
- iv. Chief Financial Officer
- v. Assistant Deputy Secretary for Field Policy and Management
- vi. Assistant Secretary for Community Planning and Development
- vii. Assistant Secretary for Congressional and Intergovernmental Relations
- viii. Assistant Secretary for Fair Housing and Equal Opportunity
- ix. Assistant Secretary for Policy Development and Research
- x. Assistant Secretary for Public and Indian Housing
- xi. Assistant Secretary for Housing-Federal Housing Administration
- xii. Director, Center of Faith-Based and Neighborhood Partnerships
- xiii. President, Ginnie Mae
- xiv. Deputy Assistant Secretary for Community Planning and Development
- xv. General Deputy Assistant Secretary for Congressional and Intergovernmental Relations
- xvi. Deputy Assistant Secretary for Fair Housing and Equal Opportunity
- xvii. General Deputy Assistant Secretary for Housing
- xviii. Deputy Assistant Secretary for Public and Indian Housing
- xix. Deputy Chief Financial Officer
- xx. Executive Vice President, Ginnie Mae
- xxi. Deputy Assistant Secretary for Housing Operations
- xxii. Deputy Assistant Secretary for Public Affairs
- xxiii. Deputy Assistant Secretary for Multifamily Housing Programs
- xxiv. Deputy Assistant Secretary for Single Family Housing Programs
- xxv. Special Assistant to the Secretary
- xxvi. Special Assistant to the Deputy Secretary
- xxvii. Special Assistant to Assistant Secretary for Community Planning and Development
- xxviii. Special Assistant to Assistant Deputy Secretary for Field Policy and Management
- xxix. Special Assistant to Assistant Secretary for Congressional and Intergovernmental Relations
- xxx. Special Assistant to Assistant Secretary for Fair Housing and Equal Opportunity
- xxxi. Special Assistant to Assistant Secretary for Housing
- xxxii. Special Assistant to Assistant Secretary for Public and Indian Housing
- xxxiii. Special Assistant to Assistant Secretary for Housing-Federal Housing Administration
- xxxiv. Special Assistant to President, Ginnie Mae
- xxxv. Special Assistant to Chief Operations Officer
- xxxvi. Chief Operations Officer
- xxxvii. Chief Information Officer
- xxxviii. Chief Administrative Officer
- xxxix. Chief Human Capital Officer
- xl. Chief Procurement Officer

- xli. Chief Technology Officer
- xlii. Deputy Chief Information Officer
- xliii. Director, Office of Small and Disadvantaged Business Utilization
- xliv. Director, Strategic Planning and Management
- xlv. Director, Office of the Executive Secretariat
- xlvi. Director of Strategic Planning and Management
- xlvii. Director of Sustainability Housing and Communities
- xlviii. Director, Departmental Equal Employment Opportunity
- xlix. Director, Disaster Management and National Security
 - l. Director, Departmental Operations and Coordination
 - li. Director, Office of Block Grant Assistance
 - lii. Director, Office of Economic Resilience
 - liii. Director, Office of Executive Scheduling and Operations
 - liv. Director, Office of Healthy Homes and Lead Hazard Control
 - lv. Director, Departmental Enforcement Center
 - lvi. Regional Administrator, Region I
 - lvii. Regional Administrator, Region II
 - lviii. Regional Administrator, Region III
 - lix. Regional Administrator, Region IV
 - lx. Regional Administrator, Region V
 - lxi. Regional Administrator, Region VI
 - lxii. Regional Administrator, Region VII
 - lxiii. Regional Administrator, Region VIII
 - lxiv. Regional Administrator, Region IX
 - lxv. Regional Administrator, Region X
 - lxvi. General Counsel
 - lxvii. Inspector General
 - lxviii. Senior Advisor to the Secretary
- lxx. Deputy Chief of Staff
- lxxi. Senior Advisor to the Secretary

NARA Bulletin 2014-06 reminds Federal agencies about their records management responsibilities regarding email.

- a. Agencies must have policies in place to identify emails that are Federal records.
- b. These policies must ensure that emails identified as Federal records are filed in agency recordkeeping systems.

7.7 Electronic Communication and Instant Messaging

The statutory definition of records (44 U.S.C. 3301) includes all machine-readable materials made or received by an agency of the United States Government under Federal law or in connection with the transaction of public business. Agencies that allow Instant Messaging (IM) traffic on their networks must recognize that such content may be a Federal record under that definition and must manage the records accordingly.

The ephemeral nature of IM heightens the need for users to be aware that they may be creating records using this application and to properly manage and preserve record content. Agency records management staff determine the record status of the IM content based on the overall records management policies and practices of their agency.

IM is an electronic messaging service that allows users to determine whether a certain party is connected to the messaging system at the same time. IM allows them to exchange text messages with connected parties in real time.

The difference between IM and email is the notion of presence. This means that users of the IM system are aware that other users have logged in and are willing to accept messages. Unlike email, IM content can only be sent to users who are logged in to the system and accepting messages. If users are not logged in, others do not have the ability to send them messages.

7.8 Cloud Computing

Cloud computing is a technology that allows users to access and use shared data and computing services via the Internet or a Virtual Private Network. It gives users access to resources without having to build infrastructure to support these resources within their own environments or networks. Policy for keeping and maintaining records/archives applies regardless of the underlying system architecture.

General interpretations of cloud computing include "renting" storage space on another organization's servers or hosting a suite of services. Other interpretations of cloud computing reference particular social media applications, cloud-based email, and other types of Web applications. However, the National Institute of Standards and Technology (NIST) has developed definitive standards, guidelines, and definitions for Federal cloud computing. NIST defines cloud computing as "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (NIST Definition of Cloud Computing, Version 15, 10-07-2009). NIST stated the definition of Cloud Computing is evolving. The user should consult the most current definition available from NIST and other resources.

NIST also identifies five essential characteristics of cloud computing:

- A. On-demand self-service** - A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.
- B. Broad network access** - Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and other devices).
- C. Resource pooling** - The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.
- D. Rapid elasticity** - Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the

consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

- E. **Measured Service** - Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

7.9 Contractor Records-Electronic Systems

Ensuring adequacy of documentation in any information system depends on the clear articulation of recordkeeping requirements. Recordkeeping requirements:

- A. Specify the creation and maintenance of specific records to document Agency operations and activities;
- B. Facilitate action by Agency officials and their successors;
- C. Permit continuity and consistency in agency;
- D. Make possible a proper scrutiny by Congress and other duly authorized agencies;
- E. Protect the rights of the Government and those affected by its actions; and
- F. Document important meetings and the formulation and implementation of basic policy and decisions.

This also applies to contractor records when dealing with electronic systems, requiring the following:

- A. Contracts identify which contractor-created records are Federal records.
- B. The program office provides contractors with the regulations and procedures governing Federal records.
- C. Contracts specify the delivery of background data that may have further value to the Agency in addition to the final product, particularly when electronic records are involved.
- D. Contracts involving development of electronic systems specify the delivery of systems documentation to the Agency along with the final product.
- E. Contracts specify the delivery of final products and background data in a format that is compatible with program records maintenance and retention guidelines, particularly when electronic records are involved.
- F. Deferred ordering and delivery of data clauses are included in contracts when it is impractical to identify in advance all electronic data that should be delivered to the Government.

7.10 Digitization of Paper Records to Electronic

To establish a standard for capturing digitized (scanned) content from paper, microfilm and/or microfiche from HUD documents and records in content repositories or other designated digital storage environments. The standard is designed to enhance the efficiency of the digitization efforts and ensure that the quality of digitized documents meets intended uses.

Authority

- 36 CFR Chapter XII, 1236
- National Archives and Records Administration (NARA)/Office of Management and Budget (OMB) Memorandum, M-19-21: Transition to Electronic Records, June 8, 2019
- Clinger-Cohen Act (also known as Information Technology Management Reform Act of 1996) (Pub. L. 104-106, Division E)
- Paperwork Reduction Act of 1980, as amended by the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35)
- Government Paperwork Elimination Act of 1998 (Pub. L. 105-277, Title XVII)
- OMB Circular No. A-130: Management of Federal Information Resources
- OMB Memorandum M 10-06: Open Government Directive, December 8, 2009
- OMB Memorandum M-13-13: Open Data Policy - Managing Information as an Asset May 9, 2013

Standard

Program Offices at Headquarters and in the Field are directed to:

- Use the digitization standard for capture of hard copy documents and records in Housing content repositories or other designated storage environments, where use does not jeopardize existing standard business practices; and
- Incorporate the digitization standard into documented standard operating procedures (SOP) to ensure consistency across Housing and establish the framework for legally defensible standard business practices for digitization. For addition digitization SOP, please refer to the Digitizing Temporary Federal Records for the Office of Housing.

Hardware ("brand neutral") Standard

1. Low volume scanner standard

The standard designates the acceptable scanner device for low volume (i.e., incidental/infrequent use for small batch jobs less than 25 pages) applicable for the scanning of standard office paper materials only:

- Desktop/stand-alone flatbed scanners
- Multi-function copier/printer machines
- All-in-one scanner/printer

- Wide-format scanners for oversized documents, up to 34 inches x 44 inches (i.e., page measurement standard ISO-AO and ANSI-E).

2. High volume scanner standard

The standard designates the acceptable scanner device for high volume (i.e., frequent use for large batch jobs 25 pages or more) applicable for the scanning of standard office paper materials only:

- 1,000 pages/hour minimum throughput
- Compatible with Enterprise Capture Standard
- Sheet size capability from 2.05 inches x 2.91 inches (i.e., page measurement standard ISO-A) up to 11 inches x 17 inches (i.e. page measurement standards ISO-A3 and ANSI-B)
- Duplex (2 side scanning) capability
- Color, gray-scale and monochrome capability.

3. Film digitizers standards (microfiche, microfilm, slides, etc.)

The standard directs users to address the following characteristics that may influence the digitization approach or affect the digital image quality:

- The type and volume of the materials to be digitized
- Text quality and clarity on the microfiche or microfilm
- The quality of the original capture of the film (lack of focus, uneven lighting, page curvature, gutter shadows, etc.)
- Variations in density between exposures
- The reduction ration of the film
- Resolution and the ability to detect detail on the film
- The condition of the film itself (scratches, etc.)

Digitizing and capturing software standard

The standard here applies only to new acquisitions or upgrades to the software already in use in Housing. They are not intended to require wholesale replacement of software used now or in the past.

4. Low volume digitizing and software applications standards

- Stand-alone (non-networked) usage:
 - Manufacturer supplied capture software
 - Manual submission of output to Enterprise Capture Software
 - Network attached usage

5. High volume digitizing and software standard

- Enterprise Capture (high volume, as defined in the high-volume scanner standard above).

Content digitized file format standard

6. Portable Document Format (PDF) file format standard

- Preferred format for documents that are primarily textual in nature
- Image over text content indexing (optical character recognition (OCR))

- Optimized for internet/Web streaming
- National Archives Records Administration (NARA) preferred specification for transfer to Archives:
 - ISO 19005-1:2005 electronic document file format for long term preservation part1: Use of PDF 1.4 (PDF/A-1): (<https://www.iso.org/standard/38920.html>).
 - Not the preferred output for non-network scanning of textual documents where the output should be passed on to Enterprise Capture software for processing (see the TIFF file format standard below)
 - Not the preferred output for non-textual materials such as graphics, maps and photographs (see the JPEG file format standard below)

7. Tagged Image File Format (TIFF) file format standard

- Preferred format for low volume, stand-alone documents scanning where the TIFF file can be passed on (manually or via automated workflow) to Enterprise Capture software for additional processing such as OCR, image enhancement, conversion to PDF, etc. NARA Bulletin 2018-01

specification for transfer to Archives:

- TIFF Revision 6.0 Final — June 3, 1992 Adobe Systems, Inc. (<https://www.adobe.io/content/dam/udp/en/open/standards/tiff/TIFF6.pig>)

8. Joint Photographic Expert Group (JPEG)

- Preferred format for non-textual documents that are primarily graphical (image) in nature, e.g., maps and photos
- Compression should not result in an image quality of 10% or less than the original image to preserve image quality while minimizing file size
- NARA Bulletin 2018-01 specification for transfer to Archives:
 - ISO/IEC 10918-5 Information technology-Digital Compression and coding of continuous tone still images: JPEG Interchange File Format: (http://www.iso.org/iso/home/store/catalogue_tc/detail.htm?csnumber=54989)
 - ISO/IEC 15444-1:2004 Information technology-JPEG 2000 image coding system: Core coding system (<https://www.iso.org/standard/37674.html>)

Content image standard

9. Image resolution standard

- Predominately textual documents
 - Good to average quality originals-Bi-tonal (2-bit), scanned at a minimum of 300 pixels per inch (ppi), up to 600 ppi.
 - Average to poor quality originals-Low inherent contrast, staining or fading, e.g., carbon copies, faxes or documents with handwritten

annotations or other markings-Bi-tonal (2-bit), scanned at a minimum of 400 ppi.

- Predominately textual documents of good to poor quality with gray scale or color illustrations, photo or text containing color important to interpretation or content 24-bit RGB (Red, Green, Blue), scanned at 300-400 ppi.
- Non-textual (or minimal text content) graphic, illustrations, photos, charts and maps-24-bit RGB, scanned at 300-400 ppi.

Contrast and brightness standard

10. Due to variances in scanner and software, each digitization installation should run test batches of documents to be digitized to determine the capture software contrast and brightness setting calibrations that are needed for optimum document viewing, utility, and production software functionality.

Output information standard

11. Content indexing standard (Optical/Intelligent Character Recognition (OCR/ICR))

- Only with human review and rekeying can 100% content indexing accuracy for scanned documents be achieved. For effective, efficient and accurate retrieval of digitized content from content management systems, content indexing must be supplemented by cataloguing (indexing) documents for metadata-based searches, as described in the cataloguing and categorization standard below.
- All textual documents should be content indexed during the digitization/captured process.
- When ever possible, content indexing should be accomplished using the Enterprise Capture software standard described above. For low volume scanner, this may require passing TIFF file output to the Enterprise Capture software, utilizing Housing data network(s), secure Web portal, or via secure email.

Cataloguing and categorization standard (metadata indexing)

Associating metadata with an imaged (scanned) file is necessary to meet the NARA Bulletin 2015-04. This necessitates the cataloguing of scanned content in order to maximize the power, effectiveness and accuracy of enterprise information search/retrieval tools.