Anne R. Barrett. "Born-digital Architectural Records: Defining the Archivable Record".
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Architectural records have always presented unique challenges to archivists, being much
larger, both in size and volume, and having different organizational needs than most
manuscript materials. Born-digital (Computer-Aided Design or CAD) architectural
records are particularly complex, being one of the most difficult types of electronic
records to manage. Appraisal of these records has proved challenging, because few
archives possess staff with expertise in reading architectural records or the technical
expertise to deal with CAD file formats. A larger problem persists, in that no single
record type or format has been defined as the archivable record. Is it possible to define
the archivable architectural record in a collaborative, holistic way?
Institutions that collect these materials face challenges in determining those records of
enduring value, arranging and describing those records, and providing long-term access
to them. This paper proposes a collaborative approach in defining the archivable
architectural record, using primary source interview data to explore which records are the
most meaningful to archive. Once archivable records are identified, best practices and
guidelines can be developed to ensure the longevity of those records.

Headings:

      Architecture archives

      Electronic records

      Digital preservation

      Access to information

      Information needs

"BORN-DIGITAL ARCHITECTURAL RECORDS:
DEFINING THE ARCHIVABLE RECORD"

by
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Approved by

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Introduction

Architectural records have always presented unique challenges to archivists, based on the volume of records, different formats of records, the technical nature of the records, and more. Born-digital (or computer-aided design) architectural records are even more complex, adding the complexities of electronic records (the file format of records, iterations of proprietary software used to create the records, the technical nature of the CAD models, etc.).

About architectural records, archivist Ann R. E. Armstrong explains,

> The combined problems of immense volume, unstable storage medium and obsolete software and hardware add up to some very touchy problems for the archivist to deal with. If we take our archival functions seriously, we will have to bring a high level of sophistication to research in order to develop strategies for dealing effectively with digital media. Otherwise, we will lose the records of the architecture of the late twentieth-century and beyond.[1]

Few repositories have the resources to devote to sifting through the volume of records, in order to determine those of enduring value. Archivist Tawny Ryan Nelb suggests, "...Instead of trying to decide what to keep and what to throw away, archivists should determine what the functions of architecture are, which of those should be documented for the long term, and what records document those functions."[2] Former chief curator at the Canadian Center for Architecture, Nicholas Olsberg writes, "…A diversity of

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[1] Ann R. E. Armstrong, "Architectural Archives/Archiving Architecture: The Digital ERA," *Art Documentation*, 25/2, (2006), 15.
[2] Tawny Ryan Nelb, "Architectural Records Appraisal: Discussion of Problems and Strategies for the Documenting Michigan Architecture Project," *The American Archivist*, 59/2 (Spring 1996), 228.

perspectives is essential to maintaining a universally useful record…".[3] Using both Nelb

and Olsberg's suggestions, this paper explores a collaborative approach to defining

archivable born-digital architectural papers. I will argue that archivists should join with

creators and potential users of the records early in the life cycle of those records in order

to determine those of enduring value, rather than trying to do so on their own.

Literature Review

In 1982, Nancy Carlson Schrock and Mary Cooper wrote an influential handbook for

architects and other practitioners regarding the long-term maintenance of architectural

records. Their *Records for Architectural Offices* guides architectural offices in their

maintenance and organization of records produced therein. The pamphlet was influential

enough to be expanded and reprinted in 1992. Schrock and Cooper outline different kinds

of records produced in an architectural office and provided recommendations for the

selection, care and maintenance of those records. As for CAD records, Schrock and

Cooper suggest that they should be regularly backed up. They also suggest that full-size

plots be made on archival paper or polyester as the archival record, rather than relying on

the electronic files as the permanent records.[4] The handbook serves as a foundational text

on the topic that later publications built upon and updated.

In 1996, a special issue of *The American Archivist* was devoted entirely to

architectural records. The articles were devoted to appraising, arranging, describing and

preserving architectural records. Several articles provided illustrative case studies on the

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[3] Nicholas Olsberg, "Documenting Twentieth-Century Architecture: Crisis and Opportunity," *The American Archivist*, 59/2 (Spring 1996), 131.
[4] Nancy Carlson Schrock and Mary Cooper, *Organization, Storage and Conservation of Architectural Office Archives*, 3rd Edition, (Cambridge, Massachusetts: Massachusetts Committee for the Preservation of Architectural Records, 1992).

given topics. Several of the articles in that issue are germane to appraisal. Nicholas

Olsberg, chief curator at the Canadian Center of Architecture (CCA), wrote the

introductory essay in the issue. Olsberg recounted proceedings of a conference held at the

CCA in 1994 known as the *Working Conference on Establishing Principles for the

Appraisal and Selection of Architectural Records*. The goal of the conference was to

establish standards and best practices for documenting architectural records.[5] Olsberg

discusses the proliferation of architectural records in the late twentieth-century, and

outlines seven principles to guide selection of records. These principles are: 1)

Institutions should prioritize records based on record type, building and figures; 2)

Comprehensive records of work created by architects deemed most important should be

maintained; 3) The project, from inception to completion of construction is the principle

unit for analysis and selection; 4) Architecture is wide-reaching, permeating culture

beyond its productive mode. Its reach is manifest in the built environment, but many

other ways too; 5) The record of architecture are manifestations of larger social trends; 6)

Institutions will give varying degrees of artifactual value to architectural records.

Regardless of the value given a record, institutions should acknowledge certain properties

of the records as manifestations of architectural language; and 7) Based on the sheer

volume of records, collecting institutions should work with creators and potential users to

create a collecting strategy for the records. At the end of his article, Olsberg suggests

several case studies be conducted to look into the impact of computer-aided design

(CAD) in the appraisal process, but the case studies are not specifically identified.[6]

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[5] Olsberg, 129.
[6] Olsberg, 135.

Tawny Ryan Nelb, an independent archive consultant, wrote an article devoted to the issues surrounding the appraisal of architectural records called "Architectural Records Appraisal: Discussion of Problems and Strategies for the Documenting Michigan Architecture Project."[7] Nelb outlines five problems regarding appraisal of architectural records: they are dispersed, widely duplicated, voluminous, transitory, and vulnerable.[8] Based on these problems, she suggests the need to look to other repositories and to architectural firms to develop collection development policies. She also stresses the importance of architectural firms appraising their own records, prior to the records coming to archives, keeping long-term preservation and users of the records in mind.

William J. Mitchell's article, "Architectural Archives in the Digital Era," is a particularly important essay from the issue.[9] Mitchell gets to the heart of one of the appraisal issues of born-digital records: whether or not the CAD design files are important to save. Mitchell points out that architects see printed forms of CAD drawings as ephemera, while archivists tend to see them as the truly archival record, meaning one that can be successfully maintained and preserved long-term. Mitchell outlines the difficulties specific to CAD in preserving the files: breakdowns in format, incompatibility of systems in reading those files, and the complexity and size of CAD files, to name a few.[10] Mitchell advocates for better collaboration between archivists and architects, and suggests that archivists be involved early in the creation of design documents.

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[7] Nelb, 228-239.

[8] Nelb, 228.

[9] William J. Mitchell, "Architectural Archives in the Digital Era," *The American Archivist*, 59/2 (Spring 1996), 200-204.

[10] Mitchell, 202.

Alan K. Lathrop, curator and professor at Northwestern Architectural Archives, began writing about archiving architectural records in the early nineteen-seventies.[11] While mostly a case study on the appraisal and documentation of the Northwest Architectural Archives, Lathrop asserts the importance of evaluating records on a case-by-case basis. He argues that no one policy can be applied to all architectural collections, which are produced by different firms at different times and for different projects.[12]

Richard J. Cox, an archival educator at the University of Pittsburgh, contributed the article "The Archival Documentation Strategy and Its Implications for the Appraisal of Architectural Records."[13] Cox discusses archival documentation strategy, noting that it involves looking at not individual records, but rather records within a larger context -- one that includes "the overall universe in which the records exist."[14] Archival documentation strategy also brings together record creators, archivists and users of those records to select and preserve records. Cox suggests each constituency come together to strategize the documentation of architecture as a whole and to create institutional archives.

Archival theorist Terry Cook contributed an essay to the special architecture issue entitled: "Building an Archives: Appraisal Theory for Architectural Records."[15] Cook asserts that, because of the unique challenges of architectural records (the complexity and sheer volume of records), traditional appraisal methods are not appropriately applied to

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[11] Alan K. Lathrop, "Architectural Records: A Heritage on Paper," *Historic Preservation*, 25/4 (October-December 1973), 38-42.

[12] Lathrop, 42.

[13] Cox, 144-154.

[14] Cox, 144.

[15] Terry Cook, "Building an Archives: Appraisal Theory for Architectural Archives," *The American Archivist*, 59/2 (Spring 1996), 136-143.

them. He suggests a documentary strategy, macro-appraisal approach, in which custodians determine record functions, activities and creators that need to be retained.[16] He also advocates custodians being involved earlier in the lifecycle of records, rather than waiting until after the records come into any given repository.

In 1999, the Massachusetts Committee for the Preservation of Architectural Records (Mass CoPAR) held a conference and published the proceedings in 2000, entitled *Blueprints to Bytes.*[17] Mitchell and Nelb were the keynote speakers at the conference, and they both contributed valuable essays to the field of archiving architectural records. Mitchell's "New Technologies in Architecture and Their Implications for Architectural Records" stresses the importance of applying archival functions to collections of born-digital architectural records, so they will not be lost. In the speech, Mitchell also introduced three-dimensional models to the forum. He asserted that three-dimensional modeling is gaining more and more traction within architectural firms, both as a way to generate two-dimensional drawings and to serve as databases with functionality that are not contained in a printed copy of the database. Nelb's article, "Protecting Your Investment: Will Your CAD Drawings Be There When You Want Them?" presents the problems archivists face in preserving born-digital architectural records. She also discusses with whom the responsibility of archiving records lies, whether with the architectural firm or an archival repository. Nelb, in direct contrast to her co-speaker, asserts that hard copy records are the archival records, even if CAD files are richer in data. However, it seems quite apparent that this point is still one of much

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[16] Cook, 136.

[17] William J. Mitchell and Tawny Ryan Nelb, *Blueprints to Bytes: Architectural Records in the Electronic Age*, Proceedings of a public program sponsored by the Massachusetts Committee for the Preservation of Architectural Records, (Cambridge, MA: Committee for the Preservation of Architectural Records, 2000).

discussion and contention within the field, with many archivists on either side of the argument.

In 2000, architect Tony Aeck spoke at a conference hosted by the Conservation Center for Art and Historic Artifacts in Philadelphia. In his speech, entitled "Current and Emerging Documentation and Archiving Methods in Architectural Practice," Aeck explains some advances in CAD technology and the subsequent functionality afforded thereby.[18] He advocates closer working relationships between architects and archivists, but also stresses the importance of keeping hard copies until those closer working relationships are forged.

Archivist Laura Tatum wrote a seminal survey article in 2002, "Documenting Design: A Survey of State-of-the-Art Practice for Archiving Architectural Records,"[19] in which she looks at historical and current methods for archiving architectural records. She notes that, in the past, emphasis has been placed on providing electronic access to physical materials via digitization (or file migration). However, little attention has been paid to born-digital records. However, architects have been focused on preserving born-digital content. Tatum argues it is important for archives to focus on collecting born-digital records in their original format(s).[20]

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[18] Tony Aeck, "Current and Emerging Documentation and Archiving Methods in Architectural Practice," *Architectural Records: Preserving and Managing the Documentation of Our Built Environment* (Architectural Records Conference Report, Conservation Center for Art and Historic Artifacts: Philadelphia, 2000), http://www.ccaha.org/ (accessed 18 April 2012).
[19] Laura Tatum, "Documenting Design: A Survey of State-of-the-Art Practice for Archiving Architectural Records," *Art Documentation* 21/2 (Fall 2002), 25-29.
[20] Tatum, 29.

Art Institute of Chicago's *Collecting, Archiving and Exhibiting Digital Design Data*

In 2004, the Art Institute of Chicago published the final report resulting from a multi-year grant-funded project *Collecting, Archiving and Exhibiting Digital Design Data*. The project produced "a working prototype system for the ingest, cataloguing and archiving of electronics works" and "recommendations toward developing methods for long-term preservation of digital documentation, guidance for the creation and maintenance of digital design data within architectural practices, and a pilot collection of catalogued digital architecture materials."[21] The report lists recommended file types for different design records and the proposals within the report have been adopted by other grant-funded projects both in the US and in Europe.

The purpose of the project was to investigate how practitioners and designers create and manage architectural records and further to develop best practices for archives in managing and preserving these records. AIC looked at both national and international firms. "Investigators found that no museum or archival program had successfully solved the preservation difficulties faced by information professionals in repositories of architectural records."[22]

AIC developed a model for transferring data to the archives and then providing access to those data. This model consisted of two levels of organizations for the materials. The first tier of materials consists of records that represent a given project in its final, ready-to-build stage. The second tier is made up of materials relating to the design process, including supporting materials (correspondence, etc.). It is unclear how many

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[21] Kristine Fallon Associates, Inc. *Collecting, Archiving and Exhibiting Digital Design Data* (Chicago: The Art Institute of Chicago Department of Architecture, 2004), http://web.archive.org/web/20110522133629/http://www.artic.edu/aic/depts/architecture/ddd.html, accessed 21 April, 2012.

[22] Pierce, 44.

repositories have adopted the model, but AIC also incorporated historians, technical services staff, architects and archivists into the project team.

A major conference was held in Paris in 2007 in connection with the Gau:di (Governance, Architecture and Urbanism: a Democratic Interaction) program. This vast program consists of several branch programs relating to architecture in Europe -- from representation to innovation in design to archiving digital design data. The conference proceedings were published as *Architecture and Digital Archives.*[23] The volume consists of over thirty essays all devoted to preserving born-digital architectural records, including two major projects based in the US (the Art Institute of Chicago and MIT's FACADE). David Peyceré, head of archives and curator of 20th Century Architecture Archives at the Institut francais d'architecture, was a major proponent of GAU:DI and continues to be an advocate for collaborative approaches to preserving architectural records long-term. GAU:DI and its associated conferences focused on preservation, community involvement and design. GAU:DI looked critically at previous projects (like the Art Institute of Chicago's Digitial Design Data project) and sought to extrapolate principles for application in other settings. Of GAU:DI, Kathryn Pierce writes,

> The notion of applying similar methodologies across disparate types of institutions opens up the possibility of collaboration, or at least cooperation, between professionals in archives, libraries, museums, visual resource collections and architectural firms."[24]

Thus, GAU:DI promoted collaborative strategies in moving forward with selection, appraisal and retention of born-digital architectural records.

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[23] *Architecture and Digital Archives Architecture in the Digital Age: A Question of Memory*, ed. David Peyceré and Florence Wierre (Gollion: Infolio, 2008).

[24] Kathryn Pierce, "Collaborative Efforts to Preserve Born-Digital Architectural Records: A Case Study Documenting Present-Day Practice," *Art Documentation*, 30/2, 45.

From 2007 to 2009, the Massachusetts Institute of Technology (MIT) conducted a project, funded by the Institute for Museum and Library Services (IMLS), called *Future-Proofing Architectural Computer-Aided Design* (FACADE).[25]

MIT's FACADE created a Project Information Model, or PIM, ontology that organized records related to any given project into more manageable chunks. Each file within the ontology was assigned five properties: project phase, architectural discipline (architectural, electrical, mechanical, etc.), building zone (where in the building), document type (what it was), and file format. The file format property was linked to "a record for the corresponding software that created [it]."[26]

An end result of FACADE was the development of special processing of 3-D models to generate derivative versions. These derivatives were created with increased archiving capabilities, compared with the original files. The FACADE project concluded that four copies of CAD files should be made for long-term preservation. These copies are:

- Original (the originally submitted version of the CAD model)

- Display (an easily viewable format to present to users, normally 3D PDF)

- Standard (full representation in preservable standard format, normally IFC or STEP)

- Desiccated (simple geometry in a preservable standard format, normally IGES)

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[25] MacKenzie Smith, "Future-Proofing Architectural Computer-Aided Design," www.facade.mit.edu, accessed 21 April 2012; MacKenzie Smith, "Curating Architectural 3D CAD Models," *The International Journal of Digital Curation*, ¼ (2009), 98-106; MacKenzie Smith, "Future-Proofing Architectural Computer-Aided Design: MIT's FACADE Project," in *Architecture and Digital Archives Architecture in the Digital Age: A Question of Memory*, ed. David Peyceré and Florence Wierre (Gollion: Infolio, 2008), 408-413.

[26] Smith, www.facade.mit.edu, accessed 22 April 2012.

Along with this list of derivatives, the FACADE project also produced instructions for deriving the copies of the original files. However, the list will need to be updated and changed as new software versions are released.

Several other institutions currently have projects in the works for appraising, organizing and describing born-digital architectural records. Columbia University's Avery Architectural Library acquired digital design materials for Columbia's new Manhattanville campus designed by renowned architect Renzo Piano.[27] Avery is in the preliminary stages of putting together a team to process the records. It has yet to be seen what strategies will be incorporated.

The project sought to create a model to ingest, process, store and provide access to CAD files, with special emphasis given to 3-D models. Additional outcomes of the project were suggested preservation strategies and format information for 3-D models. The project also produced prototypes for software to provide access to the digital design data and flow models for the steps any record would go through from ingest to the end user. However, since the grant funding ended, these were never tested.

In a 2011 article "Collaborative Efforts to Preserve Born-Digital Architectural Records," Kathryn Pierce surveys the relevant literature and projects to preserving electronic architectural records.[28] Pierce explains there is an understanding among archival professionals of the need to preserve these records. However, actually preserving the records has not been implemented. Additionally, Pierce points out that several

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[27] Janet Parks, *Personal Interview with author*, 17 April 2012.

[28] Kathryn Pierce, "Collaborative Efforts to Preserve Born-Digital Architectural Records: A Case Study Documenting Present-Day Practice," *Art Documentation*, 30/2 (2011), 43-48.

problems, including financial constraints and a general lack of know-how, prevent the records from being retained and preserved.[29]

Utah State University Libraries has recently established the *Design Workshop Landscape Architecture Archive*, comprised of the landscape architecture designs of a Denver-based firm, dating back to 1969.[30] The digital library initiative provides online access to TIFF files, some of which are derived from CAD originals. The project, like its predecessors, took a collaborative approach including archivists, records creators and potential users. So far it seems to be a quite successful site.

Related Studies on Appraisal

In 2003, at a Canadian Conservation Institute conference, Terry Eastwood provided a working definition for appraisal, as the process of identifying records or cultural heritage materials worthy of long-term preservation (or enduring value) and argued for a framework of policies and procedures to guide this selection function.[31] He identified four activities in appraisal that apply to both analog and digital materials: 1) compiling and analyzing information about the digital object(s), which is essential to understanding the value of records because their context within a body of records created by a particular creator gives them their meaning; 2) assessing the capacity of records to serve the continuing interests of their creator and society, and digital objects to serve as expression of cultural heritage; 3) determining the feasibility of preserving the records so that their

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[29] Pierce, 44.

[30] Utah State University Libraries, Digital Library Initiatives, "Design Workshop Landscape Architecture Archive," http://digital.lib.usu.edu/cdm/landingpage/collection/Design, accessed 23 April 2012.

[31] Terry Eastwood, "Appraising Digital Materials for Preservation as Cultural Heritage," presentation at Symposium Preservation of Electronic Records: New Knowledge and Decision Making, sponsored by the Canadian Conservation Institute to be held in Ottawa, ON, September 15-18, 2003, http://www.archivesalberta.org/vol23_3/woelk.htm, accessed 22 April 2012.

authenticity is maintained given the current and future capabilities to preserve them; and

4) based on the foregoing, making the appraisal decision and carrying out the disposition

by first setting out the terms and conditions for the transfer of records so that their

authenticity is preserved.[32] These steps can be extremely useful when applied to born-

digital architectural records. It seems especially important to consider how architectural

records serve the creators, potential researchers and serve as objects of cultural heritage.

Since these records are often created using proprietary software, the preservation

implications can no longer be ignored, and records custodians must take action to define

records that can be maintained and accessed long-term. Given the above publications and

conferences regarding the topic, a study has been undertaken to ascertain whether or not

any commonalities of practice or ideology can be united to define the archivable

architectural record.

Pierce writes,

> An open discussion within the architectural records community…would
> be beneficial to repositories in the United States and Canada that are
> seeking tools and methods to begin the process of collecting born-digital
> records…[They] could benefit from a continued discussion.[33]

In an effort to continue this discussion among all interested parties, an interview process

was undertaken.

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[32] Eastwood, http://www.archivesalberta.org/vol23_3/woelk.htm, accessed 22 April 2012.

[33] Pierce, 45.

Methodology

The current study was based on qualitative analysis of interviews of a combination of

record creators, record custodians and potential users of architectural records. Those

interviewed were selected through snowball sampling, beginning with the Computer-

Aided Design/Building Information Modeling (CAD/BIM) Task Force, newly formed

under the direction of archival consultant, Tawny Ryan Nelb. This task force is composed

of archival professionals from a range of institutions and geographical locales, with a

variety of experience and perspectives. These individuals are dealing directly with

pertinent issues and have volunteered to be on the task force, as a smaller subset of the

Architectural Records Roundtable group of the Society of American Archivists.

All interviews were conducted via electronic mail. I sent recruitment e-mail messages to

the current members of the recently assembled CAD/BIM Taskforce, with permission of

the co-chairs. The e-mail read:

> Dear Colleagues:
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> I am a current master's student at the University of North Carolina at
> Chapel Hill. I am currently at work on a study towards the completion of a
> master's degree, entitled "Born-Digital Architectural Records: Defining
> the Archiveable Record." This study will seek a collaborative approach,
> between the creators, custodians and potential users, in defining born-
> digital architectural records that can be archived and accessed long-term.
>
> I would like your assistance with my study. Interview questions will
> pertain to current institutional practices and desired future practices with
> regard to born-digital architectural records (CAD/BIM files). The
> interview will take approximately 10-15 minutes to complete.

Participation is not required and may cease at any time of your choosing. Those being interviewed will be sent questions via electronic mail, and will respond in like manner. Any question may be skipped. By participating in the interview process, you will agree to your name and/or institution being linked to your answers, and the responses may or may not be used in the final paper. Any correspondence will be overseen by my masters paper advisor, Dr. Christopher Lee, PhD

Thank you.[34]

As explained in the recruitment email, by responding to the recruitment email participants agreed to be identified in the study. However, one respondent asked to remain anonymous.

As recipients responded to the e-mail solicitation for participation in the study, I sent out an initial set of interview questions. The questions were:

1) Describe the institution with which you are currently affiliated.
2) Does this institution currently collect/accept CAD or BIM files?
3) What are the current work flows/processes associated with CAD or BIM files (if any)?
4) What aspects of a CAD drawing or BIM file are pertinent to architectural research?
5) Do you oversee a collection of architectural records? If so, what records do you think your institution could realistically provide access to long-term?
6) Do you research or need access to architectural records? If so, what kinds of records would you like to be able to access 5 years from now? 25 years from now?
7) Do you create architectural records? If so, what kinds of records would does your firm need to provide access to?

Respondents answered the questions and sent responses back via e-mail. When clarification or further information was needed, the investigator solicited the information on a case-by-case basis.[35]

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[34] Anne Barrett, Recruitment e-mail message, 25 October 2012.

[35] There were only a handful (2-3) of cases when more information was solicited from respondents. Several of these cases were simple requests for respondents to answer the interview questions, while one asked for more specific information of Mr. Peyceré regarding the findings of GAU:DI studies. Most of those interviewed simply responded to the set of questions, which brought the interview to an end.

After the last question in the interview, respondents were asked to suggest others to participate in the study. However, respondents sent recommended participants at every step of the process, even before being asked for them. Additionally, participants in the interview process sent links to publications and organizational documents to the investigator to explain institutional practices related to the interview questions.

Interview responses were gathered into a word processing document for quick reference, and certain pieces of data (name, institution, position, type of institution, and whether the institution collects CAD/BIM files) were put into a spreadsheet.

Results

Twenty-five individuals responded to the interview questions. A handful more responded

to the recruitment, but did not respond to the interview questions. Table 1 shows

participants in the study.

First Name	Last Name	Institution	Job Title
Gay	Accompanado	Elise N. Hofheimer Art Library, Old Dominion University	Supervisor
Nancy	Bartlett	Bentley Historical Library, University of Michigan	Head of University Archives
Barbara	Bezat	Northwest Architectural Archives, University of Minnesota	Assistant Archivist
Catherine	Bishir	Special Collections Research Center, North Carolina State University Libraries	Architectural Historian and Curator of Architecture Special Collections
Vincent	Brooks	Library of Virginia	Senior Local Records Archivist
Virginia	Daley	Facilities Operation, University of Kentucky	Archivist
Riccardo	Domenichini	Archivio Progetti, Università Iuav di Venezia	Director
Bryan	Green	Commonwealth Architects	Historic Architect
Nancy	Hadley	American Institute of Architects	Manager, Archives and Records
Kurt	Helfrich	British Architecture Library, Royal Institute of British Architects	Assistant Director, Drawings & Archives Collections
Quatro	Hubbard	Department of Historic Resources Archives, Commonwealth of Virginia	Archivist
Kristen	Merryman	Special Collections Research Center, North Carolina State University Libraries	Digital projects librarian
John	Nemmers	Architecture Archives, Special and Area Studies Collections, University of Florida Smathers Libraries	Archivist
Emily	Nimmo	Royal Commission on the Ancient and Historical Monuments of Scotland	Digital Archivist
Nathaniel	Parks	Ryerson & Burnham Archives, Art Institute of Chicago	Archivist
David	Peyceré	Institut français d'architecture	Archivist and Curator
Mimi	Sadler	Sadler & Whitehead Architects	Historical Architect
John	Salmon	Independent Consultant	Historian
Lynda	Schmitz Fuhrig	Smithsonian Institution Archives	Electronic Records Archivist
Bente	Solbakken	Department of Architecture, National Museum of Art, Architecture and Design, Oslo	Curator
David	Stevenson	Canadian Center for Architecture	Conservator

Skip	Tandy	Provo City Planning Department	Plans Reviewer
Jody	Thompson	Academic Archives, Georgia Tech	Archivist
Ines	Zalduendo	Special Collections, Frances Loeb Library, Harvard University	Special Collections Archivist

Table 1. Interview Participants

Individuals who responded to the solicitation for participation represent many different institutions, including: city planning departments, professional organizations, academic libraries (both public and private universities), governmental repositories (at both the state and national levels), museums, architecture and/or design firms, and independent consultants.

The individuals participating in the interview process represent different institutions with geographic diversity, cultural diversity, and diversity in approaches to the records. Based on institutional mission and objectives, differing approaches to ingesting, processing, selecting records for long-term preservation were represented in the interviews.

Of the respondents, there was an interesting mix of institutions (9 academic libraries, 7 museums, 6 government-affiliated repositories, and 3 architects and/or architect-related entities) that accept born-digital architectural records and those that do not. While seventeen of the twenty-five participating institutions accept these records, none of them actively collect – seek them out. All respondents from those seventeen indicated their institutions do not currently accept born-digital architectural records at all. Since many of the institutions do not accept these records, workflows and processes have not been defined. Archivist Deirdre Doran pointed out a problem within design firms by explaining, "There is no standardized work flow for digital records retention at the firm. It is our policy (subject to pending policy approval) to retain all records for a

minimum of ten years past completion of projects. There are no corporate guidelines on how to carry out this policy."[36]

For example, the American Institute of Architects is in the process of drafting official guidance to provide for the "coordinated and efficient use of digital data" and to begin discussions of the expected use of digital data among project teams, which could include clients, architects, engineers, contractors and more.[37] The Chicago Art Institute, is "looking to implement a bare-bones born-digital accessions initiative in the near future", though nothing has been accessioned yet.[38] The proposed initiative would "be based upon the work of Ben Goldman and others, using the Data Accessioner which was developed by Duke…But we continue to be very interested in what comes next as the capabilities of this program will be quite limited."[39] Even though his institution has a proposed workflow in place, Parks admits it will need re-evaluation once materials are ingested.

The Canadian Center for Architecture is developing workflows for accessioning these materials too. Conservator David Stevenson explains,

> Regarding the files themselves, we are using a file identification tool, which we have developed in-house, which we call the "harvester". With this tool, we can identify the file type and other particulars. From this point, we are left to consider the possibilities for ensuring access: keep the file native, migrate it to another format, or use emulation software. We consider the first and second options to be the most realistic and preferable. We preserve the file's bitstream, at least, and aim to keep "preservation files" and provide "access files" for all. The success of preservation and access files depends entirely on the details of the CAD or BIM files. Very generally speaking, the workflow is: file harvesting/ingest, preservation actions, cataloguing, and storage. However, we are still in the process of defining and refining our workflows.[40]

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[36] Interview with Deirdre Doran, Sasaki Associates, 17 October 2012.
[37] Interview with Nancy Hadley, American Institute of Architects, 4 October 2012.
[38] Interview with Nathaniel Parks, Chicago Art Institute, 8 October 2012.
[39] Parks, 8 October 2012.
[40] David Stevenson, Interview with the author, 17 October 2012.

The Art Institute of Chicago, Harvard University's Frances Loeb Library, the

Smithsonian, the Northwest Architecture Archives at the University of Minnesota, the

University of Florida Smathers Libraries, the Institut francais d'architecture, and the

Canadian Center for Architecture are all in the process of building actionable workflows

for born-digital architectural records. The processes are continually being re-assessed and

re-adjusted as more materials are transferred over or accessioned by these institutions.

About a third of the institutions interviewed collect only those files having been

migrated to formats such as .pdf, .jpg or .tiff files. Ines Zalduendo, Special Collections

Archivist in Harvard University's Frances Loeb Library points out "…We can receive

jpegs and tiffs in these collections…"[41] Academic libraries are not the only institutions

requiring migrated files. Provo City Plans Reviewer Skip Tandy explained that

architectural plans submitted to his office for review must be submitted both in paper and

in PDF format. PDF files are disseminated to different reviewers (plumbing, electrical,

etc.) and reviewed. Necessary changes are annotated on the plans using proprietary

software called Blue Beam, and the annotated plans are then saved as new PDF files.

Thus, any given project will have originally submitted PDF files and annotated PDF files

all retained in the city offices in a central digital repository.[42] Tandy, however, is quick to

explain that no adjacent city planning offices have similar processes.

In order to better select records for long-term preservation and use, it is important

to understand the records to which users will need access in the future. During the

interview process, it quickly became clear that the creators of records, the custodians of

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[41] Ines Zalduendo, "Access and Preservation of Landscape Architecture Collections – in Digital!" in
Museum Archivist: Newsletter of the Museum Archives Section, Society of American Archivists, 21/2, 4.
[42] Interview with Skip Tandy, City Plans Reviewer, 17 October 2012.

records and the some potential users of the records have well-defined roles that usually

do not overlap much. Architects focus on creating the documents, but are not generally

employed to think about organizing them or formatting them for long-term preservation.

Records custodians seem generally concerned about accessioning, selecting, arranging,

describing and preserving the records for long-term access. Potential users, of which I

only interviewed a small subset, would like access to as much information and

documentation of a building as possible.

Historian John Salmon writes,

> To help with research in architectural history and business history, and to
> uncover biographical information about architects, I do need access to
> architectural records. In that category, I regard them as business records of the
> architect or firm, including not only drawings and plans for projects but also
> letters to and from clients, bids and proposals, financial records, etc. In other
> words, to accommodate the broadest areas of research (business history,
> economic history, biography, etc., as well as architectural history), it is essential
> to preserve the full scope of records generated by the firm's activities—as for any
> type of business. I don't see the need or the range of records to be any different
> in 5 or 25 years.[43]

In the regular course of research, Salmon needs access to a range of records that

document the built environment. Through a collaborative approach, multiple perspectives

can be represented while building strategies for retaining and maintaining the records.

Several key archivists explained their experience with potential users. David

Stevenson writes,

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[43] John Salmon, Interview with author, 20 October 2012.

…Architectural historians, architecture students and working architects may, as distinct groups, each agree on different research requirements. This touches upon the idea of "significant properties", which is an immature concept, but a good one. We have not yet officially consulted with designated communities of users on those aspects of CAD files most pertinent to their needs. In general, we assume that all aspects are potentially of interest, including not only the inherent visible characteristics of the file, but also the place of the file itself in the overall workflow or process of the producer.[44]

Stevenson argues for a holistic approach to selection of records for long-term preservation and use, based on audience. David Peyceré further stresses this point,

If you only keep files for art historians, you can assume that many technical drawings will have no use. If you expect the files to be used for refurbishments or other architectural interventions on the buildings, then practically everything could be useful….[There is] no need to keep everything digitally, nor to keep everything in any form, but you must make clear for you – and for your audience – what you want to keep or not.[45]

Thus, a more holistic definition of the archivable record, with emphasis on potential users of the records, is arguably advantageous for records custodians to consider.

Taking the different functions and uses of these records into account, when asked about long-term accessibility of records, David Stevenson wrote, "…We can only take it on a case-by-case basis to assess how accessibility can be ensured."[46] Additionally, since major institutions are either not accepting born-digital architectural records or are accessioning only a handful of records each year, the records are assessed ad hoc. With scattered and piecemeal records, standardized systems and workflows are hard to implement.

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[44] Stevenson, 17 October 2012.

[45] Interview with David Peyceré, Centre d'archives d'architecture du XXe siècle, Cité de l'architecture et du patrimoine, 23 October 2012.

[46] Stevenson, 17 October 2012.

In addition to the kinds of records that are kept, the retention period for any given record is different from institution to institution. Some legal mandates apply to architectural records. For example, Tandy explained that all plans submitted to the Provo City Planning office must be retained for at least a year after construction is complete.[47] However, legal mandates are only one factor contributing guidance for records retention. Deirdre Doran writes,

> All records pertinent to the creation and fulfillment of a project would ideally be saved for at least a ten-year time period. Beyond this quasi-legal parameter for records retention, the company wants to provide long-term access to historic projects that bring prestige to the firm so these would need to be kept indefinitely.[48]

From the standpoint of a design firm, records must be retained for ten years. The interview with Doran suggests time restrictions should be considered for retention of architectural records.

Archivable Architectural Records

Appraising architectural records has always been problematic. Olsberg explains,

> Design and construction processes are some of the most complex transactions in modern society and are subject to the most varied levels of research. Any appraisal principles must take full account of these factors, which can become apparent only through consultation across disciplines.[49]

These records document complicated processes carried out with relation to any building project, and a multiplicity of record types are involved. These can include: sketches, competition drawings, working drawings, as-built drawings, photographs, correspondence, marketing materials and many more. Several drafts of the same drawing

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[47] Tandy, 17 October 2012.
[48] Doran, 17 October 2012.
[49] Olsberg, 129-130.

are often present in these collections, as slight changes and/or copies for distribution to clients were created.

So, given the multiplicity of architectural records created for any given project, and the many formats those records come in, how does a repository navigate through any given collection and make decisions about which records are of enduring value? Olsberg points out that "...Little has been written from an archival perspective on the role and function of document types in architecture."[50] Without an understanding of the functions of any given record, appraisal comes to a standstill, since it is not possible to determine the importance of records within a given project's oeuvre. Thus, he created seven principles to assist in the appraisal of architectural collections (for largely paper-based materials).

Within these principles, Olsberg suggests the unit of analysis be any given project (building project).[51] Each repository should inventory their collections, ordering the collections by project from most important to least important. Collections may also be ordered by importance of creator or importance of record type. Olsberg stresses the need to consider records from the inception of the project through its completion, and beyond (when necessary, based on records within the repository). Additionally, appraisal teams should not only consist of archivists, but should include all constituents (creators, custodians, researchers). As these teams are formed, and perform the task of appraising architectural records, Olsberg suggests they advocate for "common, complementary and comparable approaches to documentation," which could be shared with other

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[50] Olsberg, 130.
[51] Olsberg, 132.

institutions.[52] Shared knowledge and experience in evaluating these resources could provide a framework for other institutions to operate within, potentially allowing for unappraised collections to be examined.

However, Olsberg's principles only address part of the problem of retaining architectural papers. A top-down approach to selection, with a building project as the unit of analysis, provides an all or nothing approach to appraisal.

Olsberg states, "Any approach to selection must be based on an analysis that looks at the whole process of architecture and determines what gives evidence of its critical acts and moments...The universe of architecture is so large and the volume of records so vast that a diversity of perspectives is essential to maintaining a universally useful record."[53] Due to the complexity of born-digital architectural drawings and modeling, it seems as though records custodians would be well advised to bring expert creators in to consult on selection and retention.

Several other factors inhibit the appraisal, acquisition and long-term preservation of architectural records. Legal mandates and codes dictate retention of records associated with building projects, and place embargos on certain types of records relating to building projects.[54]

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[52] Olsberg, 132.

[53] Olsberg, 131.

[54] Evan Shu, Topic 10.5, "Retaining and Archiving Records," excerpted from The Architect's Handbook of Professional Practice, 14th Edition, ed. by Joseph A. Demkin, AIA, copyright 2008 by The American Institute of Architects. Reprinted with permission of John Wiley & Sons, Inc., http://www.aia.org/practicing/akr/AIAB086366, accessed 20 November 2011.

Archivable Electronic Records

Many of the issues impeding the appraisal of traditional architectural records also apply to other types of electronic records. "Collection management is still an important and necessary function for the [digital records]."[55] Even though electronic records do not occupy the same amount of physical space, there is still need to make appraisal decisions about these records.

The recommendations Olsberg made, with reference to traditional architectural records, closely resemble the idea of macro-appraisal set forth by archival theorist Terry Cook. Macro-appraisal is a top-down approach to evaluating records, and requires that archivists be familiar with the creators of the records, their mandates and functions, their decision-making processes, the way it creates records, and changes to these processes over time. Both Olsberg and Cook advocate this approach. The top-down approach and can be applied to other types of electronic records as well.[56]

The problem of file format, so prevalent with traditional records, is even more problematic when it comes to electronic records. It is estimated that digital files and storage media upon which those files are stored have a life expectancy of two to five years.[57] Each record, in effect, is a ticking clock. The records must be appraised, arranged, described and migrated to formats approved for long-term preservation before files are no longer accessible or the storage media becomes obsolete. Because of this

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[55] Fecko, 106.

[56] Terry Cook, "Building an Archives: Appraisal Theory for Architectural Archives," *The American Archivist*, 59/2 (Spring 1996), 136-143.

[57] Task Force on Preserving Digital Information, "Preserving Digital Information," http://www.rlg.org/ArchTF/tfadi.index.htm#contents, accessed 18 April 2012.

time-sensitivity, along with the other outlined factors, many repositories refuse to actively collect born-digital materials.[58]

Legal issues surrounding traditional materials are similar to those governing electronic records. However, the problems with electronic records are compounded, since electronic records can be easily distributed and copied, given certain formats (like PDF). Electronic records specialist Mary Beth Fecko argues that "Copyright and legal issues commonly affecting the ownership and use of architects' records should be summarized in a widely available published form."[59] While the regulations can be pieced together from several sources, they are not located all in one place. If they were, it would greatly benefit both architects and archivists.

Discussion

A Collaborative Definition

Several factors that still impede the archives' ability to appraise architectural records in any format. What of project files that consist of hundreds of records, in different formats? If the building or creator of the records for a building is important, the records would be retained...all of them. Is this kind of appraisal and selection really helpful? Perhaps this provides a starting point, but more specific guidance is necessary to appropriately appraise these collections of records.

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58 The Museum of Modern Art, for example, states clearly in its collection development policy that no electronic records of any kind will be accepted, even though the museum purports to be the oldest architectural repository in the country and stresses the importance of collecting artistic expressions of modern and contemporary American society. "Manuscript Collections Development Policy," Museum of Modern Art, http://www.moma.org/learn/resources/archives/archives_about, accessed 24 April 2012.
[59] Olsberg, 134.

However, appraisal can still be an attainable goal for these nebulous collections. For those items already present in repositories, processing the collections (arranging and describing them) can be coordinated with appraisal. However, as Olsberg points out, "There is little point in establishing a hierarchy in which the primary records have no hope of long-term survival, or for which the primary subjects are documented in unmanageable form."[60] Therefore, as part of the processing of these collections, the files must be migrated to manageable and maintainable formats (like PDF).

Limitations

There are several limitations of this study. The sample size for those interviewed was small, due in part to a short duration of the study. Additionally, using snowball sampling had strong points and drawbacks. Having been referred to new potential interviewees by colleagues could have increased the likelihood of a response. However, snowball sampling relied on those participating to respond and to determine who would or would not potentially be interested in participating. Since the study lasted only a short time, the ability to go back-and-forth in an iterative manner with subjects was limited. Given more time, it is likely the investigator would have further questions for those interviewed. However, that is outside the scope of this study. One person interviewed experienced a language barrier, since correspondence was conducted in English only.

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[60] Olsberg, 132

Implications and Future Research

Those institutions that do accept born-digital materials have ad hoc policies and workflows, implemented on a case-by-case or are in the process of drafting official ones. That is where the opportunities lie – in workflows and policies being created now. When considering generalized policies for retention of born-digital architectural records, all mandates on retention should be taken into account. The longest required period of retention (ten years, in this case) should be used for a repository that retains architects' records.

In order to determine the true archival record, collaborative teams should be developed, with archivists at the lead, to determine records of lasting value and to migrate the files into manageable formats. Three recent projects advocate for this very approach: AIC's *Documenting Collecting, Archiving and Exhibiting Digital Design Data,* MIT's *FACADE*, and *Gau:di.* These projects laid the foundation for future work by proposing workflows and policies for collecting and retaining born-digital architectural records. These workflows and policies need further testing to ascertain their usefulness and applicability to different situations. It is left to us, as archival professionals to define the archivable record for our institutions, to share those definitions with others, to build and implement workflows and policies surrounding those records, and to implement them. A second phase of the FACADE project began in March 2012, and it will be quite interesting to see the results.

V. Conclusion

In defining the archivable architectural record, "A diversity of perspectives is essential to maintaining a universally useful record…".[61] In defining the archivable record, several steps are important. First, the beginning focus should be on the broad documentary objectives for architecture -- a macro-appraisal of the records. Second, creators, collector-custodians and users should all be part of the appraisal process. Only in this all-inclusive model of collaboration can the appropriate diversity be synthesized to appropriately select records of enduring value. Third, the goal of the appraisal of born-electronic architectural records should be the creation and maintenance of institutional archives.[62] Such institutional archives can serve as models for future projects in appraisal and long-term maintenance of records.

In closing, archivist David Peyceré said it well, "The archivist's role, whether in architecture or in any other field, is to help digital archives take shape...More than ever, our task, as archivists, will be to dialogue with the creators [and potential users] of archivable records."[63]

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[61] Olsberg, 131.

[62] Cox, 153-154.

[63] David Peyceré, "Mapping a Brave New World, in *Architecture and Digital Archives: Architecture in the Digital Age: A Question of Memory*, (Cité de l'architecture et du patrimoine, Paris: 2008), 20-21.

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