Thematic Survey of Modern Movement Non-Residential Architecture, 1945 – 1975, in St. Louis City

Historic Context Statement

Architectural trends, forms, materials and expression important in the St. Louis School of Modern Movement Architecture, c. 1945-1975

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I. Overview of the Modern Movement in Architecture

The Modern Movement in architecture can be described as an era of developing a new style that embraced technological advances in materials and building methods, and rejected applied ornamentation and references to the past. Architectural design focused on simplicity, spatial clarity, and daylight to create healthy living and working spaces. The Modern Movement's thesis was that "form follows function," meaning that the result of design should derive directly from its purpose, and that buildings should have a "truth to materials," meaning that the structural element and materials should be exposed, not concealed or altered. Unnecessary detail and ornamentation is replaced with an expression of functionalism.

The nonprofit organization, DoCoMoMo US, part of the International working party for the documentation and conservation of buildings, sites, and neighborhoods of the modern movement, defines the modern movement as:

> an artistic and architectural movement that embodied the unique early twentieth century notion that artistic works must look forward to the future without overt references to historical precedent. Modern design emphasized expression of functional, technical or spatial properties rather than reliance on decoration. Modern design was conscious of being modern: it purposefully expressed the principles of modern design.[1]

Modern architecture was a result of reconciling the principles underlying architectural design with technological advancements and a rapidly modernizing society.

Large numbers of European intellectuals and artists fled to the United States to escape persecution with the onset of World War II. European architects, such as those from the Bauhaus school in Germany, had embraced a new vision of artistic and architectural design meant to reflect a new way of living. As these architects were appointed the deans of architectural schools, such as Mies van der Rohe at the Illinois Institute of Technology and Walter Gropius at the Massachusetts Institute of Technology, international design theory filtered into architectural practice throughout the United States.[2] Yet the modern movement was influenced by local architects, as evidenced in the advances in residential designs led by Buckminster Fuller, George F. Keck at Keck & Keck in Chicago, John Yeon in Oregon, and William Wurster in the San Francisco Bay Area of California. [3]

Advanced technologies and the development of pre-fabricated materials, combined with Urban Renewal programs at the federal, state, and local levels, greatly impacted the social changes, design innovations, and expressive influences on the built environment in post-war United States. "Modernism was a salute to the postwar era itself, spearheaded by architectural giants such as Mies van der Rohe, Eero Saarinen, and Philip Johnson. At the height of its popularity, the sweeping curves, sheets of glass, and absence of ornament signaled change."[4] The increased use of industrially-produced materials and components led to an adoption of a "machine aesthetic" in building design.

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1 Do.Co.Mo.Mo_US. "How to Evaluate Modern Buildings and Sites," DoCoMoMo website. http://docomomo-us.org/register/how_to_evaluate

2 Leland M. Roth, *American Architecture, A History*. (Boulder, CO: Westview Press, 2001), 411.

3 Roth, 360-367.

4 Meghan Hogan, "The Future of Modern: Federal Architecture in an Era of Change," in *Common Ground* (Spring 2009), 28.

II. St Louis Location and Setting[5]

A. GEOGRAPHY

St. Louis was selected as a fur trading post due to its location near the confluence of the Mississippi and the Missouri Rivers. In 1765, French settlers began to construct a village on the site, situated on a bluff above the river, and named it after Louis IX of France. By 1900, St. Louis was ranked the nation's fourth largest city, after New York, Chicago, and Philadelphia.

Today, St Louis City Limits are bounded by the Mississippi River along the east and a curving boundary to the west creating an irregular teardrop shape, with a narrow segment of land running north along the riverfront. The city can be divided into general areas consisting of Downtown, which is a fairly small area on the riverfront, or the Central Business District; Midtown, which is just west of Downtown; and the West End, which is a larger area west of Midtown. The remainder of the City encompasses numerous neighborhoods within the South Side and the North Side of St. Louis.

Mid-century development in the city was shaped by the fact that its boundary had been established in 1876. The City did not expand with annexations and consolidations as many municipalities did during this period. The amount of land available for new development after World War II was quite limited and located in discreet areas. One of the important aspects of Urban Renewal was that it provided land for new construction. The programs that allowed for land assembly, the city's rezoning efforts, and support of several large projects allowed for redevelopment within the city.

B. WWII AND POST WAR DECLINE

Architecture was changing rapidly across the United States at the end of WWII. Though change was evident prior to the War as well, the War precipitated many of the drivers for the visual, technological, and material changes in the construction industry. During WWII, the collective feeling of patriotism and "doing one's part" for the war effort created a conducive environment for the rise of a more stripped, technologically advanced, and efficient style of architecture. Federally funded housing projects across the UNITED STATES demonstrated the new principles of "modular framing, prefabrication, and simple, functional planning, the very qualities that Modernism espoused."[6]After the War, this same trend towards economy and efficiency continued. Classical details were traded out for more utilitarian functions in design. Form and function became the primary drivers of modern design, eliminating the "extras" of classical details and architectural embellishment, and "many clients, most of the public, and some architects were talking more about bricks and mortar than about felicitous and harmonious design."[7]

In St. Louis, as in most American cities, the decade after the war was a time to address deferred renovations and repairs.[8] Although the war inflicted no physical damage on the United States mainland, most cities simply did not have the funds or the interest to invest in maintenance, much less construct new projects. There was little construction during the Great Depression, and no downtown construction during WWII, though St. Louis did benefit from wartime expansions in industry such as the McDonnell Aircraft Corporation near Lambert Airport.

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5 For an in-depth discussion of St. Louis neighborhoods, growth patterns, etc., refer to "The Gateway Years," written and developed in 2013 by the City of St. Louis Cultural Resource Office.

6 Marcus Whiffen and Frederick Koeper. *American Architecture Volume 2: 1860-1976*. (Cambridge, MA: The MIT Press, 2001, 1st ed. 1981), 345.

7 Carolyn Hewes Toft, Esley Hamilton and Mary Henderson Gass. *The Way We Came: A Century of the AIA in St. Louis*, ed. by George McCue. (St. Louis: The Patrice Press, 1991), 90.

8 Toft, et al, 88.

The City Plan Commission, led by Harland Bartholomew, engineer, analyzed the data and trends in a 1947 document entitled the *Comprehensive City Plan*. "Obsolete" or "Blighted Neighborhoods" were listed as the areas to the north, south, and immediate west of downtown, including the area just east of Forest Park that would later become Washington University and Barnes Jewish College and medical school during the 1960s.[9] St. Louis could see the energy and construction of new projects beginning to occur outside of the central core, and within the suburbs surrounding the City. To revitalize the business district and to draw people back into downtown St. Louis, officials and planners needed a strategy.

C. URBAN RENEWAL

St. Louis had been one of the first cities in the United States to make use of newly available Federal funding for public works projects under the "War Mobilization and Reconversion Act of 1944," or the George Bill. Newspaper articles from 1944 proudly trumpeted the City's lead over other major urban centers in making plans for improvement projects.[10] The Missouri Urban Redevelopment Corporation Law was passed in 1945, providing long term tax relief to developers. The land Clearance for Redevelopment Authority was created in 1945, allowing the City to buy and clear blighted areas, using federal loans, and then sell property to private developers with prescribed plans for redevelopment.[11] These programs all paved the way for St. Louis to wholeheartedly embrace Urban Renewal. The legal mechanisms created by federal urban renewal programs were extremely powerful. They vested "a city with the authority to take land from many owners and convey it as one parcel to one owner for redevelopment."[12]

St. Louis embarked on a large-scale urban renewal program after the passage of the Federal 1949 Housing Act and its later amendments in 1954 and 1960. The legislation allowed for slum clearance and the construction of low-income housing with Federal funds, while the later amendments allowed for commercial redevelopment.[13] Clearance took place on an incremental scale. Older buildings were razed by property owners for immediate use as parking lots in some areas of the central business district, as modest parking fees and tax savings incentives were enough to entice owners to demolish.[14] There was often a substantial lag in time between initial government clearance activities and the later rebuilding of a neighborhood. The DeSoto-Carr neighborhood, for instance, located just north of downtown, lost many properties and most of its population during the late 1950s and 1960s, but it was not until the mid- to late 1970s that redevelopment occurred.

D. AREAS OF CLUSTERED DEVELOPMENT

St. Louis' clearance and redevelopment programs coincided with the rise of Modern Architecture as a stylistic movement, and so various "redeveloped" areas of the City show a strong concentration of modern resources. While American cities experienced some clearance and redevelopment of their downtown cores, most cities during the postwar years expanded their growth on the periphery. St. Louis, however, was constrained within its geographical borders by natural features and a lack of

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9 Harland Bartholomew, *Comprehensive City Plan: St. Louis, Missouri.* (St. Louis: City Plan Commission, 1947), Plate No. 13.

10 "City to be One of First to Get U. S. Aid in Postwar Plan," *St. Louis Globe-Democrat*, Oct 15, 1944, and "St. Louis Placed 'Far in Lead in Postwar Plans'," *St. Louis Post Dispatch*, September 12, 1944.

11 Development Program St. Louis, *History of Renewal in St. Louis* (St. Louis, MO: St. Louis City Plan Commission, c. 1967), 6.

12 James Marchael and George McCue, *The Architecture of St. Louis* (St. Louis: City Art Museum of Saint Louis, 1971), 6.

13 Deborah J. Henry, "Race, Power, and the Building Trades Industry in Postwar St. Louis," in *Other Missouri History*, ed. By Thomas Spencer (Columbia, MO: University of Missouri Press, 2005), 88-90.

14 Eric Sandweiss, *St. Louis: The Evolution of an American Urban Landscape* (Philadelphia: Temple University Press, 2001), 233.

available property. By 1945, most of the areas within City limits were already developed. Mid-century Modern architecture in St. Louis can be found both as infill projects in established city blocks as well as "slipcover" projects over existing older buildings such as the Mercantile Library and its associated buildings (1952-1956) and the Dorsa Building (1946).[15] However, the vast majority of Mid-century resources in the City of St. Louis are located in areas that were either cleared for urban revitalization projects; "reclaimed" along new transportation corridors; or in areas, due to their distance from downtown, that were never fully developed. The following clusters or areas have discernible concentrations of Mid-century non-residential architecture.

DOWNTOWN: The cleared Civic Center Redevelopment area was developed with new office buildings, parking garages, and the major focus of redevelopment, Busch Memorial Stadium. Important Modern-era buildings such as the Pet Milk Building, Stouffer's Riverfront Inn, the Gateway Tower, and the Equitable Building were all part of this central redevelopment effort. Other Central Business District redevelopment took place in the Mill Creek Valley area, Plaza Square, the Riverfront, Laclede's Landing, and other scattered areas throughout downtown. In addition to the individual buildings, 1960s planning is evident in the street grid of downtown St. Louis. The older street pattern is defined by blocks that are 250 feet square. The 1960s-era blocks are significantly larger. Planners disrupted numerous existing streets to create superblocks within the redeveloped area, substantially changing the scale of new development in comparison to the scale of the existing older blocks.

LINDELL: Lindell Boulevard is a major commercial roadway running east-west through the City along the north boundary of Forest Park. It continues from Kingshighway on the east side of the Park to Vandeventer, which marks the west end of St. Louis University's campus.[16] As the town of Clayton, the county seat for St. Louis County, boomed with the suburban postwar expansion, Lindell Boulevard benefitted as the major artery connecting St. Louis' downtown with the suburb of Clayton. Lindell now possesses, as a result of infill, a wide range of structures with various functional uses and architectural styles, including a good representation of buildings from 1945-1975. Some of the buildings along Lindell were built for another purpose but are now occupied by St Louis University, including Fitzgerald Hall (Smith & Entzeroth, 1964) and McGannon Hall (The Austin Co., 1956).

CENTRAL WEST END/ FOREST PARK: The area just east of Forest Park encompasses a mix of medical facilities, residential areas, and other institutions. In this area, Mid-century Modern architecture resulted primarily from clearance and redevelopment in the large Mill Creek Valley project and from highway construction. Examples of mid-century buildings include the Medical Clinic for the Local 88 (Harris Armstrong, 1957; now Alzheimer's Research Center) on Forest Park Avenue and the McDonnell Medical Sciences Building (Murphy, Downey, Wofford & Richman, 1970). Projects in Forest Park such as the well-known James S. McDonnell Planetarium (HOK, 1963) were built on open park land.

COLLEGE CAMPUS GROWTH/ CENTRAL CORRIDOR: Of the large cleared area of the Mill Creek Valley project, the City of St. Louis conveyed twenty-two acres to Saint Louis University (SLU) for expansion.[17] The conveyance of property helped convince SLU to expand its campus within City limits, rather than move to the suburbs, a decision the University was grappling with during the early 1960s. As a result of expanding within the city, SLU became involved in efforts to renew and revitalize the area surrounding the campus, while enlarging its campus towards the east. SLU now anchors a substantial area of midtown St. Louis.

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15 Karen Bode Baxter, Timothy P. Maloney, and Michael Allen, National Register of Historic Places Nomination form for *Bel Air Motel*, 2009. Section 8, p. 20-22.

16 Baxter et al, *Bel Air Motel*, 7:1.

17 Development Program St. Louis, 13.

SOUTHWEST ST. LOUIS: Southwest St. Louis had several areas that were still not fully developed by the 1950s, thereby creating ideal sites for urban renewal a decade later. Specific project development included relocation of "automobile row" to Kingshighway south of Fyler, the creation of Hampton Village, one of the largest shopping centers in Southwest St. Louis and probably the oldest one in Missouri, completion of numerous buildings along Hampton Avenue south of the I-44 freeway and extending east to January Avenue, and the St Louis Police Officer's Association building (Mark Finler, 1961), an unassuming brick Union Hall on Hampton Avenue designed with panelized masonry screen walls set into a columnar framework on the front façade.

III. Modern Architectural Styles

A. EARLY MODERN STYLES (EXCLUDED)

Early Modern styles of architecture, such as Streamline Moderne, Art Deco, and Stripped Classicism are not included in the current survey. Art Deco and Art Moderne styles do break from earlier historicist and revival styles and look to technology for inspiration, but they continue to be generally load-bearing masonry structures, without the structural innovation that the International Style brought to the United States.

B. MODERN ARCHITECTURE (GENERAL)

Modern architecture was a style that embraced technological advances in materials and building methods, and rejected applied ornamentation and specific references to the past. Architectural designs focused on simplicity, spatial clarity, and maximizing interior exposure to daylight. There are a number of sub-styles within the Modern Movement which will be discussed in more detail. While it is useful to examine trends and styles within the general heading of Modern Architecture, it must be noted that not all, or even the majority, of Modern architectural resources fit neatly within one stylistic sub-group. Many buildings are simply Modern in style, without necessarily being "International Style," "Neo-Formalist," or any other specific stylistic trend under the umbrella of the Modern Movement. More commonly, a building will show influences of one or more of the predominant sub-styles discussed below.

Regional variants of the Modern Movement across the United States are rather subtle, and either show a preference for a certain material that is readily available in a certain location (as in the use of wood in the Pacific Northwest's Modern Architecture) or show a regional response to climactic factors (such as the extensive use of sunshades and jalousie windows in Florida). In St. Louis, a noticeable preference for light-colored brick as a building material is evident in its modern-era resources.

C. INTERNATIONAL STYLE

The term "International Style" originally was applied to a 1932 Museum of Modern Art exhibition of art and architecture by the curators, Henry Russell Hitchcock and Philip C. Johnson. Hitchcock and Johnson provided a definition of this emerging, mostly European style, based on three characteristics: "emphasis upon volume- space enclosed by thin planes or surfaces as opposed to the suggestion of mass and solidity; regularity as opposed to symmetry or other kinds of obvious balance; and lastly, dependence upon the intrinsic elegance of materials, technical perfection, and fine proportions, as opposed to applied ornament."[18]

Important hallmarks of the International Style include rectilinear forms; the celebration of "industrial" materials such as concrete, glass, and steel; rational grids or modularity; and smooth, "machined" finishes. Structural components of the building are typically evident on the exterior, and curtain wall construction, in which the exterior wall is supported from the structural frame, is common.

Generally, the International Style was used in the United States from as early as the 1920s to the mid- or late-1950s. Although the style was evident beyond that time period, many critics felt that the International Style became synonymous with a bland and monotonous corporate expression, especially as it was expressed into the 1970s. "Commercial architecture became an increasingly important form of public relations. International Style Modernism, originally conceived as an efficient design and construction methodology to solve social problems, was now co-opted by corporate America as a form

[18] Henry Russell Hitchcock and Philip C. Johnson, *The International Style* (New York: W. W. Norton & Company, 1966 with a new foreward and appendix by Henry-Russell Hitchcock, originally copyrighted 1932), 145-147.

of advertisement and aggrandizement."[19] Some architects began to find the style uncompromising, cold, and anonymous, and other strains of Modernism in architecture became increasingly popular.

In St. Louis, an excellent example of the International Style is the National Register of Historic Places listed S. Pfeiffer Manufacturing Company Headquarters, located at 3965 Laclede Avenue. The building, completed in 1946, is three stories in height, constructed of brick with bands of blue-tinted windows, and designed by St. Louis architect Bert Luer as office, lab, and factory spaces. Currently used as storage for automotive parts, the building has very good integrity and is considered an excellent early example of Modern architecture in St. Louis, built at a time when there were few other buildings being constructed.[20] The Pfeiffer Manufacturing Company's form exhibits the style's typical asymmetry, with a strong horizontality punctuated by a strong vertical element. The brick, buff colored at the front elevation and red colored at the sides and rear elevations, is typical of St. Louis Modern architecture. The use of brick in the design contrasts with the more typical International style use of smooth, machined, almost featureless materials such as metal and concrete or stucco.

Another example of the International Style in St. Louis is the Mark C. Steinberg Memorial Skating Rink (1957) by Frederick Dunn & Associate Architects. The building exhibits unmistakable characteristics of the International Style, such as stripped, boxy shapes and the horizontal length of its full-height glass wall.

D. NEO-FORMALISM

Neo Formalist architecture is defined by flat projecting rooflines, high-quality materials, columnar supports, smooth walls, and strict symmetry in design. The style includes abstract, simplified elements of classical architecture. The most well-known practitioners of the style, according to *American Architecture* authors Whiffen and Koeper, include Edward Durell Stone, Minoru Yamasaki, Philip Johnson, and Wallace Harrison. Harrison's Metropolitan Opera House in New York City, with its monumental colonnade, and Yamasaki's Northwestern Life Insurance Company building in Minneapolis, with its six-story screen of slender white arches, both exemplify the style.[21] The date span for the style of Neo-Formalism in the United States is considered to be generally from 1954 to the end of the 1960s.

In St. Louis, there are several notable examples of the Neo-Formalist style. One of these is the Missouri Division of Employment Security Building designed by HOK in 1959. This building has "screen-like" facades, symmetry, and a formality created by its vaulted window pattern and strong corner overhangs. The Lashly Branch of the St. Louis Public Library (now Society of Sacred Heart Archives), constructed in 1967 and designed by William B. Ittner Inc., is an excellent example of the Neo-Formalist style in St. Louis. The smooth, white verticals of the curving façade contrast with the dark inset glass to create a temple-like feeling of monumentality and solidity. This is one Modernist sub-style that did not get executed in brick in St. Louis; the abstract, white planes and forms necessary to achieve a feeling of abstract formality do not translate well to the warmth and hand-constructed quality of brick structures. One last example of this style in St. Louis is W. A. Sarmiento's AAA Building (1976). The perfect symmetry, monumentality, and white curving columns of this building illustrate the style well.

E. NEO-EXPRESSIONISM

Neo-Expressionism is outlined by Whiffen and Koeper as a revival of the German 1920s Expressionist movement typified by Mendelsohn's work. Neo-Expressionism owed a great deal to the technological advances in thin-shell concrete construction. The "streamlined shapes used with Neo-Expressionism

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19 Roth, 413.

20 Julie Ann LaMouria, National Register of Historic Places Nomination form for *S. Pfeiffer Manufacturing Company Headquarters*, 2010. Section. 8, p. 4.

21 Whiffen and Koeper, 384-388.

have analogies in automobile styling, which considers visual identity above all else."[22] Neo-Expressionism can be defined in architecture by sweeping, curved rooflines and walls with arched or vaulted spaces. Symmetrical or geometric forms are minimally used or nonexistent. Surfaces are commonly faceted, concave or convex. Eero Saarinen's Ingalls Hockey Rink at Yale University and his TWA terminal at Kennedy Airport in New York exemplify the style, which began with the Kresge Auditorium at Massachusetts Institute of Technology in 1955 and continued into the 1970s.

A popular vernacular expressionistic movement of the same time period, allied to the thin-shell concrete organic forms but much less monumental in scale and not necessarily tied to concrete as a construction material, were buildings (and signs) labeled variously in Mid-century architectural history as "Space Age," "Atomic Age," or "Futuristic" Modern styles. Many of these exaggerated forms were typically used in roadside architecture, such as diners, bowling alleys, and gas stations. Seattle's Space Needle is considered an example of Space Age design, with its three curving columns and layered round forms.[23] St. Louis did not generally have the geographical space to develop a flashy automotive strip or "roadside" architectural style, such as that called "Googie" in Los Angeles. However, St. Louis does have a strong sampling of Neo-Expressionist architecture, from the largest-scale thin-shell concrete structures down to smaller commercial buildings using exaggerated elements of structure.

St. Louis' most illustrative Neo-Expressionistic designs, aside from Saarinen's iconic arch itself, are HOK's James S. McDonnell Planetarium (1963), a thin-shell hyperboloid structure, and the Lambert International St. Louis Airport, designed by Hellmuth, Yamasaki & Leinweber (1957). What these structures have in common are their curving, almost organic, shapes. Further, they are linked by their impressive scale. Neo-expressionist structures are meant to soar overhead to create forms and spaces that rely on the might of technology, yet evoke an almost spiritual awe. Some of the Bank Building and Equipment Corporation's (BBEC) St. Louis designs show exaggerated or expressive styling; for example the International Brotherhood of Electrical Workers (IBEW) Hall on Elizabeth Avenue (1959). The IBEW Hall features noticeable structural elements typical of this sub-style, in this case the prominent fins across the front of the building, which are far larger and taller than they need to be for any structural reason.

F. BRUTALISM

Brutalist Style resources typically have a blocky appearance; rough, exposed concrete materials; broad, expansive walls, and deeply recessed windows. They are notably "heavy," expressing the massiveness of their walls and forms. The style began as early as 1950, but is probably best associated with the Yale School of Architecture circa 1960, when Paul Rudolph was the chair.

In St. Louis, the best-known and a typical example of Brutalism, at least as compared to other examples across the United States, is the National Register of Historic Places-listed Pet Plaza. "Completed in 1969 as the world headquarters for Pet, Inc., the building was designed to reflect a fresh, assertive image for a company that had expanded far beyond its original product, evaporated milk."[24] The architect chosen was Alfred L. Aydelott, from Memphis. Aydelott reacted to the site "by designing a sculpted concrete tower capped by a distinctive crowning executive and conference room level with a signature elevator tower prominently exposed on the west facade."[25] The building was a vote of confidence in downtown St. Louis, since it was constructed during a period when many companies opted to relocate to the

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22 Whiffen and Koeper, 378.

23 Matt Novak, "Googie: Architecture of the Space Age." Smithsonian blog posted June 15, 2012 accessed online at http://blogs.smithsonianmag.com/paleofuture/2012/06/googie-architecture-of-the-space-age/ on February 18, 2013.

24 Stacy Sone and Carolyn Toft, National Register of Historic Places Nomination form for *Pet Plaza*, Sec. 8, p. 6.

25 Ibid.

suburbs. The building was lauded by local architectural critic George McCue, and Dr. Osmund Overby stated that no building in Missouri's limited examples of [brutalism] comes "close to matching the authority and nuance of the Pet Building." [26] Pet Plaza was therefore designated as being exceptionally significant at the state level as an unmatched example of the Brutalist style in Missouri.

Unlike the Pet Plaza, however, the Brutalist resources in St. Louis are almost universally executed in brick rather than concrete. Examples are Harry Weese and Associates' St. Louis Community College-Forest Park (1965), the St. Louis Comprehensive Neighborhood Health Center by Jenkins-Fleming (1974), and the Washington University McDonnell Medical Science Building by Murphy, Downey, Wofford, & Richman (1970). The result, in each case, is a "softer" building than might have been rendered in concrete. The brickwork at both the St Louis Community College and the St Louis Comprehensive Neighborhood Health Center is particularly thoughtful, providing a subtle surface pattern and texture to the massiveness of the walls.

[26] Ibid.

IV. Modern Materials and Building Technology

A. PRE-FABRICATED COMPONENTS & NEW MATERIALS

Material efficiency and standardization were the key drivers behind developing pre-fabricated building components for Modern era architecture.[27] Modeled after automobile factories, mass production would maximize cost and time in building construction. Some examples of industrialized products that became widely available in the post-war years are glue-laminated timbers, pre-engineered trusses, and wall panel systems. The American belief in capitalism helped to drive the production of various new products, as people generally accepted the idea that large corporations using an assembly line model would be more efficient producers than small businesses.

Early experiments in packaging and selling pre-fabricated components took part within the single-residential building type. These included Lustron Houses (1946) sold by the Vultex Aircraft Company. But commercial buildings were using many more prefabricated components by the end of World War II. Entire buildings were available from pre-fabricated components, like the well-known steel buildings made by the Butler Manufacturing Company starting in 1940.

Technological innovations led to the introduction of new materials to the construction industry, such as fiber-reinforced plastic, glass block, vinyl tile, weathering steel, and new sealants. A demonstration structure built at Disneyland in 1957, the Monsanto House of the Future, was constructed of modular fiber reinforced plastic walls, with foam insulation.[28]

Many 1950s school buildings such as F. Ray Leimkuehler's Pruitt School (1954) used a combination of glass block and vision glass in the window openings, screening children from the distraction of a view while bringing in natural light.

B. PLANAR MASONRY

An important shift in the use of brick in mid-century architectural design was to emphasize the material as a planar element without decorative corbelling or other details. Although brick is not as prevalent as other "new" materials in Modern Era architectural resources across the United States, in St. Louis brick remained the most common building material throughout the postwar era. However, there was a general shift away from the red brick typical of older buildings. Buff, pink, or tan bricks became more common in St. Louis's Mid-century buildings, and a smattering of blue brick is also notable. "St. Louis has always been primarily a masonry town, by general preference reinforced by the building code. The easy availability of clay, which as every backyard gardener knows is just about everywhere, and of limestone, which the settlers quarried with crowbars right under their feet on the original town bluff, made brick and stone the obvious preferences.[29]

St. Louis University's Pius XII Library building, designed by Leo A. Daly and built in 1958, uses brick in its modern incarnation, as a curtainwall panel supported by the structure. The structure itself is vigorously expressed in both round concrete columns and the rectangular pilasters, entirely freestanding at the ground plane.

C. "FINISH" CONCRETE

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27 Edward R. Ford, *The Details of Modern Architecture, Vols 1 and 2* (Cambridge, MA, The MIT Press, 2003), Vol. 2, 11.

28 Anthony J. T. Walker, "Fiber Reinforced Plastic," in Twentieth-Century Building Materials, ed. by Thomas C. Jester, National Park Service (McGraw Hill, 1995), 142-146. The house was included in the April, 1956 *Popular Science* and the December 1955 *Progressive Architecture 35*.

29 Marchael and McCue, *The Architecture of St. Louis,* 8.

The Modern Movement in Architecture was responsible for elevating concrete to a finish material on buildings other than strictly utilitarian and service structures. Exterior concrete sometimes was imprinted with a textured finish from the board forms or with other visible marks of construction processes. The exterior of the Pet Plaza building is distinguished not only by its textured concrete finish, but also by the display of the steel reinforcing. "The steel reinforcing rods used in strengthening the walls were cut off on the exterior and capped with stainless steel disks."[30]

Prestressed and precast concrete elements were developed before 1900, but did not enter mainstream construction until after World War II. Major civil engineering projects such as bridges and culverts were the first to make use of pre-stressed and precast concrete, and Louis Kahn used prestressed concrete on the Richards Medical Laboratory on the University of Pennsylvania campus in 1971, one of the first documented uses of the material in architecture. In St. Louis, the C. Rallo Contracting Company was the first contractor in the region to use pre-stressed, post-tensioned beams. According to a 1965 article, the company was the first to use reinforced masonry beam construction, as well as the sliding method of moving scaffolding and metal pan forming without dismantling and then re-erecting the components.[31]

D. THIN SHELL & REINFORCED CONCRETE

The earliest innovations in thin-shell concrete construction took place in Europe, but as early as 1932, the patented "Z-D" (Zeiss-Dywidag) system of placing reinforcement in high-stress areas of concrete shell structures was introduced to the U. S.[32] Complex forms could be designed and constructed as a result of the technological engineering of placing metal reinforcement in specific areas within poured concrete. Thin-shell concrete construction allowed for large spans using relatively small amounts of material. Especially during the 1960s and 1970s in the United States, large-scale buildings such as aircraft hangars and airport terminals, sports arenas, and convention centers often turned to thin-shell techniques to provide the greatest economy, plasticity, and visual impact.

Lambert International Airport, designed in 1956 by Hellmuth, Yamasaki & Leinweber, exhibits the soaring domes and open interiors made possible by thin-shell concrete construction techniques. The unusual columns in Kramer and Harms' Fairground Park swim facility (1959) are reinforced concrete, echoing Frank Lloyd Wright's columns in the Johnson Wax Administration Building in Racine, WI (1939).

E. CURTAIN WALL CONSTRUCTION

During World War II, numerous factories sprang up across the United States to provide aluminum to support the war effort. After the war, these same factories were able to develop extrusion techniques simplifying the construction of curtain walls. Pietro Belluschi's Equitable Building in Portland, Oregon, completed in 1948, was the first building in the United States. to be constructed with an interior "skeleton," from which the exterior glass and aluminum "skin" was supported. SOM's Lever House in New York, completed in 1952, used a similar technique but the interior frame was steel rather than the reinforced concrete of the Equitable.[33] Ludwig Mies van der Rohe used layered and clad systems in building design because they "enabled him to achieve the level of precision in joinery he desired."[34] "By cladding the structure in simple seamless envelopes, [Mies] was able to hide the crude structural joints, minimize the number of joints exposed, and execute these exposed joints with the required

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30 Sone and Toft, *Pet Plaza*, 7:1.

31 "AGC Profile- C. Rallo Construction Co., Inc.," *St Louis Construction Record*, (January 1965), 7.

32 Thomas E. Boothby, M. Kevin Parfitt, and Mark Ketchum, "Milo S. Ketchum and Thin-Shell Concrete Structures in Colorado," in *AP Bulletin, The Journal of Preservation Technology* Vol. XLIII, No. 1 (2012), p. 40.

33 Roth, 413-415.

34 Ford, 287.

precision."[35] Another technological advance in air conditioning systems allowed for the construction of completely sealed buildings in which the walls no longer had to serve the function of ventilation.[36] Buildings could be constructed using metal, glass, or composite panels, such as a fusion of glass and metal, with insulation already included.[37] Spandrel glass in particular, which referred in the late 1950s only to ceramic-coated plate glass, offered new opportunities in the use of color.

The Laclede Gas Building, designed by Emery Roth & Sons and constructed in downtown St Louis in 1968, has a bronze-tinted aluminum panel and glass curtainwall. It was one of the early glass highrise buildings to be allowed by a revised 1961 City building code.[38]Prior to this legislation, the exterior wall surface of a large building had to meet minimum thickness requirements for the majority of the surface area. Effectively, this meant that materials like glass or metal panels could not be used in St Louis to cover an entire building surface before mid-1961.

F. TRUSS SYSTEMS

Pre-engineered trusses were developed and sold in both wood materials and metal. Trusses enjoyed popularity in the postwar years for several reasons. Trusses use less material than typical post-and-beam structural systems. Residential homes could limit unused attic space by lowering the pitch of the roof, reducing the amount of material needed to finish the roof. Incorporating trusses reduces the amount of labor required to construct a building thus lowering project costs. At a time when there was strong demand for new buildings of all types, and construction managers and developers were looking to keep costs low, trusses often were their first choice.

In St. Louis, the National Register-listed American Zinc, Lead & Smelting Co. Building was completed in 1967, employing the Vierendeel truss as not only a structural element, but as the major aesthetic determinant for the building. Gyo Obata, of HOK, was the principal in charge of design. "Selected by Obata to meet a number of challenges provided by the desires of his client, as well as the limitations of the building lot, the ladder-like trusses are clearly expressed in the fenestration and dominate the facade of the building. The rounded openings dictated by the bracing of the trusses are echoed on the two visible elevations of the building." [39] The stainless steel-clad American Zinc, Lead & Smelting Co. building is considered to be an example of exceptional American corporate architectural expression.[40]

G. STEEL FABRICATION

The steel industry, though already highly advanced in engineered structures such as bridges and railroads as well as high-rise buildings, continued its technological advances through the 1950s. Developments in steel construction methods during World War II enabled the construction industry to

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35 Ibid.

36 Cecil D. Elliott, *Technics and Architecture: The Development of Materials and Systems for Building* (Cambridge, MA, The MIT Press, 1992), 147.

37 Jester (ed.), *Twentieth Century Building Materials*, references an article by L. W. Ray in the June 1948 issue of *Finish* 5, p. 20 (not accessible at this time), discussing what is thought to be the first building (a White Castle restaurant) constructed with a porcelain enamel interior in St. Louis (1925). The White Castle restaurant chain branched out in 1934, starting a subsidiary company called Porcelain Steel Buildings. The company could assemble a moveable, prefabricated restaurant at any site, using porcelain enamel panels for both interior and exterior

38 Building code of the City of St. Louis : enacted pursuant to ordinance no. 50502, approved March 31, 1961, effective May 1, 1961.

39 Esley Hamilton, Doris Danna, and Steven E. Mitchell, National Register of Historic Places Nomination form for *American Zinc, Lead & Smelting Co. Building*, Section 8, p. 4.

40 Carol D. Shull and Beth L. Savage. "From the Glass House to Stonewall: National Register Recognition of the Recent Past." (Preserving the Recent Past conference, 1995).

continue its unabated appetite for steel. One of these developments was electric arc welding, replacing the riveting technique famously used throughout the heyday of 1920s skyscraper construction.[41] As one of the ideals of Modern Architecture was to express the structure of a building, steel beams and structural elements became part of the exterior of a building.

Though residential structures are not part of the survey associated with this context statement, one of St. Louis' masters of Modern Architecture, Harris Armstrong, bears a mention here. His Evans Residence in Ladue, of 1951, perfectly illustrates the expression of a framework of structure on the outside of a building. Unusually for a house, the structure is made of steel.

41 Elliott, 104.

V. Modern Building Forms and Types

A. TRAVEL-RELATED ARCHITECTURE

1. Auto-Oriented Architecture

Between World Wars I and II in the United States, society was changing rapidly. One of the profound changes was occurring in private transportation. The automobile became enormously popular and more affordable due to Henry Ford's innovative assembly line construction techniques.[42] The number of automobiles in the United States grew exponentially between 1900 and the eve of WWII in 1940. Probably more than any other single factor, automobiles changed our cities and our architecture, by making suburbs easy to reach.

New building types emerged as a result of the automobile, including the motel, the garage, the drive-in theater and drive-through bank, auto service stations, shopping strips, and later the shopping center. These types all depended on availability of land. The era of densely packed buildings oriented to the street within a city grid was replaced by a new model, where freestanding or loosely grouped clusters of buildings were connected by arterial routes.

After the war, St. Louis became a large automobile manufacturing city. Both Ford and General Motors operated assembly plants in or just outside of St. Louis. Manufacturers and dealers wanted big, gleaming showrooms, especially in locations closer to new suburbs and shopping centers. Main thoroughfares within St. Louis such as Delmar, Grand, and Jefferson attracted such dealerships, and Kingshighway was popularly called "Automobile Row" in the years after the end of the war.[43] This area continued to change and develop, becoming increasingly commercial in later years.

In addition to the business of selling cars, new building types evolved to service cars as well as to efficiently store them. Gas and service stations were constructed to be easily visible roadside resources. Parking garages made it possible to stack cars on multiple floors by using ramps that cars could drive on. Schwarz and Van Hoefen's Famous-Barr parking garage (1962) downtown on North 7th Street uses a spiral ramp, visually celebrated on the corner of the block with the edges completely free of supporting columns.

2. Air Travel Related Architecture

St. Louis capitalized on its demonstrated prowess in the aviation industry by making the decision to invest in a public airport terminal in the 1950s. Three companies based in St. Louis had together manufactured over 3000 military airplanes, and as a result, the use of Lambert Airfield, where McDonnell Aircraft was located, continued to expand.

The Lambert-St. Louis Municipal (now International) Airport Terminal, designed in 1956 by Hellmuth, Yamasaki & Leinweber, was the first building in the St. Louis area to win a national AIA honor award.[44] The terminal was built with three vaulted halls, each with 32-foot barrel-vaulted ceilings constructed of thin-shell concrete. Yamasaki's design established a model for the modern terminal- vaulted and expandable- which was later used in the John F. Kennedy Airport in New York City. A fourth dome was added to the Lambert Airport in 1964. By the affluent 1960s the airplane was the cynosure of public transit, a symbol of power, mobility, and technological might, and St. Louis was in the forefront of building a terminal that expressed this symbolism.[45]

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42 Roth, 343.

43 Ruth Keenoy, Karen Bode Baxter, Timothy Maloney, and Mandy Ford, National Register of Historic Places Multiple Property Listing form for *Historic Auto-Related Resources of St. Louis*, Section E, p.13.

44 Toft, et al, 82.

45 Roth, 439.

B. COMMERCIAL

1. Commercial Retail

With the rise of the automobile, centrally-located department stores were often replaced by strip retail commercial developments. Retailers desired parking areas so their customers could easily stop and shop and retailers wanted their establishment to be noticeable from the street. Even small buildings such as the Weinhardt Party Rentals, at 5901 Elizabeth Avenue, were constructed in a modest way, but often included a more eye-catching element, such as the large concrete "false front" which served as the background for the name of the establishment.

One emergent type in the late 1940s and early 1950s was the suburban supermarket. Kenneth Wischemeyer designed the Bettendorf's (later Schnuck's) stores in Clayton and in Olivette as well as shopping centers in the new suburban model, with large stores surrounded by plenty of parking.[46] These stores no longer were located along sidewalks, with multiple levels above the street, but now were all one level, with huge interior spaces that had flexible layouts for inventory and rolling carts for shoppers to bring their purchases to the check-out counter. Many of these original supermarkets or suburban department stores in St Louis have been significantly altered over time, or even demolished.

2. Commercial Office

During the 1950s and 1960s, office parks and corporate campuses became new models for office buildings and corporations, developed on the outskirts of cities rather than in the heart of the traditional business district. In St. Louis, the Ralston Purina corporation (now Nestle) did invest in an urban location, occupying a portion of the LaSalle Park neighborhood, though some criticize it for its "suburban" character. In 1955, Harris Armstrong designed a campus outside of St. Louis for McDonnell Engineering, much admired by his contemporaries.

C. UNION HALLS/ FRATERNAL ORGANIZATIONS

St. Louis possesses an unusually strong unionized labor force within the construction industry. As recently as 2000, 19.6 percent of all construction-industry workers nationally were unionized. During the same year, St. Louis unionized construction trades represented approximately 85% of all construction labor and almost 100% of major public sector work.[47] The growth of these construction industry unions was fueled by the postwar urban renewal and revitalization projects. Accordingly, many of the fraternal/union organizations constructed a meeting hall during this time period representing various aspects of the construction trades. The Carpenter's District Council of Greater St. Louis, on Hampton Avenue (Study, Farrar & Majers, c. 1958) is one such union hall, with Modern-era styling evident in the building's ribbon windows, exposed concrete base, and splayed portico columns.

D. FINANCIAL INSTITUTIONS

Banks expanded their operations during the postwar period from their venerable downtown locations into more residential or suburban neighborhoods. One of the biggest changes to bank architecture was the allowance for "drive-through" banking. The Bank Building and Equipment Corporation (BBEC) was started in St. Louis in 1913 as a small woodworking shop. By the end of the 1930s they had become design leaders in financial architecture, particularly in the savings & loan institutions. Financial companies increasingly wanted new style trends and materials such as glass, metal, and fine wood, and the BBEC was able to provide excellent Modern architecture, inside and out, by hiring superb designers such as W. Sarmiento and W. C. Cann. As early as 1930, the BBEC provided technical and safety enhancements to new bank structures so that the old-fashioned teller cages could be eliminated, and

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[46] Eric Mumford, "Triumph and Eclipse: Modern Architecture in St. Louis and the School of Architecture," in *Modern Architecture in St. Louis,* ed. by Louis Mumford (St. Louis: Washington University School of Architecture, 2004), 52.

[47] Henry, 113.

they pioneered drive-up facilities with teller windows that raised or lowered to the right level.[48] The BBEC grew quickly to become the national industry leader in bank design and was one of the first design/build firms in the country.[49] Sarmiento in particular created inventive and expressive financial institution designs in multiple cities across the United States.

In St. Louis, the home of the BBEC, there are several financial institutions designed by Sarmiento including the Jefferson Bank & Trust (1956) on Washington Avenue and the Chancery of the Archdiocese of St Louis (1962) on Lindell, which was not a bank but served many of the functions of a bank. The Jefferson Bank, with its angled, expressive façade and its multiple drive-through lanes and windows, perfectly illustrates the changed nature of postwar banking design.

E. POST-WAR PRIMARY SCHOOLS

The rapidly increasing population growth after World War II created a sudden demand for new schools and classrooms all over the United States. The rising birthrate coincided with a desire to compete on the world stage, especially against the perceived threat of Communism. The "little schoolhouse" model was seen as hopelessly outdated for providing children with a progressive education. The resulting redesign of the classroom environment was taken up not only by architects, but also by scientific researchers. In the mid 1940s, a Texas State Department of Health study was published which directly influenced the architectural designs of the modern classroom, including optimal light sources, colors, air movement, and seating arrangements. "Glass block above a "vision strip" of clear glass, included for social and psychological reasons rather than for luminousness, was one suggestion."[50] The Bishop DuBourg Catholic High School, designed in 1949 by Architects Murphy and Mackey and completed in 1953, illustrates these prototypical modern classroom windows.

F. MODERN CAMPUS PLANNING/ URBAN DESIGN

The primary college or university campuses in St. Louis are Washington University, St. Louis University, and St. Louis Community College. Washington University campus planning is not included here as the majority of its primary (Danforth) campus is located just west of Forest Park, outside of City limits and hence excluded from the survey area.

St Louis University is likely the oldest University west of the Mississipi, and has been in its current location since 1889. The campus basically follows the urban layout of the City streets surrounding and traversing its campus, and is a long linear shape bounded by Lindell Avenue on the north and Laclede on the south. The University's planning in the 1960s and 70s provided a distinctly Mid-century take on a campus "quad." Four new interconnected science and technology buildings, including Macelwane Hall, were designed in the early 1960s by Leo A. Daly. The buildings, not actually built until circa 1965, are oriented around an open, paved plaza. The plaza was not designed as a Beaux-Arts, axial design, but rather an irregular, spare space located behind the street-facing facades of the new buildings. The complex included a connecting underground level beneath the plaza that doubled as a fallout shelter.[51] One of the four buildings, a glassy pavilion, is solely a lobby to access the below-grade level.

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48 "New Trend is to Lavish Office and Ultra-Modern Buildings," *Globe-Democrat* 2/22/62.

49 Carol Dyson and Anthony Rubano. "Banking on the Future: Modernism and the Local Bank" In *Preserving the Recent Past 2*, ed. Deborah Slaton and William G. Foulks. (Washington, D.C.: Historic Preservation Education Foundation, Association for Preservation Technology, and National Park Service, 2000), 2-53.

50 Amy F. Ogata, "Building for Learning in Postwar American Elementary Schools," in *Journal of the Society of Architectural Historians* (Vol. 67, No. 4, December 2008), 570. The studies were performed and reported by Darell B. Harmon and published in various magazines and trade publications.

51 "Saint Louis University Magazine," April 1962, p.4.

Funded primarily through a $47 M bond issue that capitalized construction on three campuses in 1965, the St Louis Community College at Forest Park was constructed on the grounds of the former Forest Park Highlands, an amusement park and popular picnic site destroyed by fire in 1963. It was designed by Harry Weese and Associates and completed in 1968. In May of that year, Eugene Mackey of Murphy & Mackey Architects wrote a short note to the Board of the Junior College. It said, "I simply want you to know how pleased I am that a building of the quality of the Forest Park Community College has been built in St. Louis."[52] The campus exemplified the move away from traditional Beaux-Arts axial plans and towards circulation as the primary organizational principle- in this case, as defined vertical nodes (stair towers) and linear corridors. The linear layout was considered flexible, since the design could expand when needed to accommodate more "units" of the building, grouping similar functions together.

G. CIVIC/ PUBLIC BUILDINGS

The Modern Movement in architecture tended to make government buildings and private-sector buildings much more similar in appearance than in any other previous style of architecture. The symbolism and monumentality of traditional civic buildings was replaced by a more economical and flexible use of interior space. The Modern ideals of equality and democracy were translated into shared plazas and open forecourt spaces. One example of government architecture of the era is the former L. Douglas Abram Federal Building, by Murphy & Mackey with William B. Ittner, Inc (1961). The building has a raised plinth at the base above the sidewalk, with the ground floor storefront set back, creating a covered portico at the ground floor. The building reflects the modularity and no-nonsense construction materials that were intended to show a frugal use of taxpayer money. The ground floor portico is meant to be open to all citizens. The former Buder Branch Library on Hampton Avenue (Joseph Senne, 1961) has a similar raised plaza above the sidewalk. The large windows create an inviting street presence for this civic building, yet, like the Federal Building, the building is restrained and economical in its materials and details.

H. HOTELS/MOTELS

Motels catering to distance automobile travelers were another automobile-related new building form emerging in the postwar years. According to Baxter et al, the Bel-Air Motel on Lindell (1958; McCormick with Russell, Mullgardt, Schwarz & Van Hoefen) was the first of these within St Louis. By 1971, the Polk's City Directory listed sixteen motor hotels in the city, constructed between 1962 and 1970, and almost all in the Modern Movements style.[53] The Carousel Motel (1961) is another Motel, located on N. Kingshighway and one of the sole establishments catering to African-Americans during the 1960s. The Carousel has angled concrete supports at both levels supporting the roof and balcony overhangs, which provide a touch of Mid-Century Modern styling to the building. Like the other motor hotel buildings, the Carousel has individually-accessible rooms to the exterior, with exterior stair (and elevator). One could come and go quickly and easily, and the cars were within view of the rooms in the surface parking just outside the building. Many of these motor hotels, like the Bel-Air, offered "luxury" amenities such as swimming pools.

I. INDUSTRIAL BUILDINGS AND COMPLEXES

Many of the manufacturing and industrial areas of St. Louis originally developed along the Mississippi River, the River Des Peres, and the railroad tracks. By 1945, the "top 5" growth industries for S. Louis' manufacturing sector were transportation equipment (other than automobiles), chemicals, electrical

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[52] 20 May 1968 Correspondence from Eugene J. Mackey included in attachments to "Minutes of the Regular Meeting of the Board of Trustees- The Junior College District of St. Louis, May 27, 1968- 8:00 pm." Accessed online April 16, 2013 at http://www.stlcc.edu/About/Board_of_Trustees/Meeting_Minutes_Documents/1968/BOTminutes1968-05-27.pdf

[53] Baxter et al, *Bel Air Hotel*, 8:18.

machinery, machinery (other than electrical), and stone, clay, and glass products.[54] After the war, the historic port locations and rail yard freight yards became less critical to businesses as the trucking industry opened up new areas for industry. Via Bartholomew's 1947 Plan, two major new industrial areas were created in St Louis; Mill Creek Valley and Kosciusko.[55]

New fabrication facilities and light industrial buildings created in the 1950s and 1960s hew to the functional, rectilinear, and horizontal proportions of Modern architecture. Several groupings of small-scale, light industrial buildings in the Mill Creek Valley redevelopment area show strong similarities in architecture and materials. One of these is the Highland Park Drive area just south of Oakland Avenue, and the other is centered on Clark Avenue just north of I-40. As typical in St. Louis Modern architecture, the buildings are light-colored brick. The façades typically have a modular layout, with brick often applied in full-height panels between repetitive window bays, each of which might have a different brick or other material infill above or below the window. As the uses of these buildings often included a warehouse or manufacturing space with a front office, a few buildings such as 2811 Clark Avenue (1963, Hannon Construction Co.) have a visually separate "pavilion" piece as the more public part of the building, with full-height glass curtainwall and a "floating" entry porch with open steps.

J. HEALTHCARE FACILITIES

Healthcare facilities in St Louis developed during 1945 to 1975 are typically large, brick, institutional buildings. Harris Armstrong's Medical Clinic for the Local 88 (1957; now Alzheimer's Research Center) is a Modern Movements style building with a Neo-Expressionist wavy roof sunshade and stacked brick walls with irregular cut-outs. Jenkins-Fleming architects also utilized irregular openings in their Brutalist-style St Louis Comprehensive Neighborhood Health Center (1974, now Myrtle Hilliard Davis Comprehensive Health Center). These buildings generally did not have as much open glass area as many other building types, but their architecture expresses a sense of solidity and reliability.

K. RELIGIOUS INSTITUTIONS

Typically, one of the drivers in church designs is the desire for vertical space within the primary gathering area. In the Modern Movement, architects often utilized A-frame roofs, prow forms, and more plastic forms such as parabolic arches and other unique curvatures.

In St. Louis, as in many parts of the country, churches and synagogues are among the prominent and early examples of Modernist buildings constructed between the late 1930s and the mid-1960s. It has been pointed *out* that the embrace of Modern architecture with its structurally innovative forms by religious institutions is a paradox, considering that those institutions have "the greatest dedication to the eternal."[56] Yet, churches came to embrace Modern architecture for many of the same reasons that other building types and developers did. Modern architecture, in general, was more economical than traditional ecclesiastical architecture. Churches wanted to be seen as forward-thinking to attract young families to their congregations.

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54 Harry L. Purdy, "An Historical Analysis of the Economic Growth of St. Louis 1840-1945"(undated), published online by BiblioGov 12/14/2012 and accessed via http://fraser.stlouisfed.org/publication-series/?id=401, P. 123.

55 Ruth Keenoy. National Register of Historic Places Multiple Property Documentation form for *Mid-Twentieth Century Development of Industrial and Manufactured Goods Distribution Facilities and the Central Railroad and Interstate Corridor, 1940-1970*, 2013. Section E:8-11. See also Lashly, Paul W., "'Land-Locked' St. Louis," printed in *St. Louis Commerce* by the Chamber of Commerce of Metropolitan St. Louis, April 15, 1953.

56 Kathleen James-Chakraborty "Modernate Modernism : Sacred Architecture in St. Louis & Its Suburbs" in *Modern Architecture in St. Louis,* ed. by Louis Mumford (St. Louis: School of Architecture Washington University, 2004), 27.

Unlike other building types, churches are generally constructed in residential areas, and in suburbs where the typology is almost exclusively residential. Several important modern era religious resources are located outside of St. Louis City limits in suburbs such as University City, Creve Coeur, and Jennings. Churches were erected in areas in direct response to population migration. However, many churches of the Mid-Century era are located in St. Louis, such as the relatively modest New Life church (formerly Kingdom Hall) at 3833 St. Ferdinand Avenue, dating from 1965. Another church, with a strong expressive prow formed by a steep roof, is the 1961 Union Memorial United Methodist Church on Belt Avenue, designed by William E. Duncan, Charles Novak Jr., and Harry O. Osborn.

L. MULTI-FAMILY HOUSING

Residential projects are not included in the current survey, but high-rise public housing projects made a significant contribution to the St. Louis skyline during the modern era. Most of these larger buildings have been demolished and replaced with lower-scale multi-family residential units.

Because it is a mixed-use project, the Mansion House Center development (1967) is included in the current survey. The Mansion House illustrates some of the Modernist tenets in Urban Design and Planning prevalent in St. Louis and across the nation at the time. These ideas include the re-making of small-scale street grids into superblocks with towers surrounded by plazas and landscaping being the ideal layout. The Mansion House Center development created a new plaza level where residents, office workers, and users of the buildings would congregate above street level and thereby be removed from the grittiness and problems of the existing streets. Decades later, the urban-scale planning of projects from this era has been generally judged to be bleak and dehumanizing. These projects were termed “megastructures” because they became almost islands unto themselves, changing the scale of the street grid, below-grade, and above-grade landscapes However, the Mansion House buildings; three bold rectangular towers with associated low-rise structures, all connected by parking below-grade; are an iconic part of the St. Louis skyline and excellent examples of Modern architecture.

M. RECREATIONAL BUILDINGS

Recreational buildings in St Louis tend to be constructed on open public lands within a park. Building designs between 1945-1975 show conceptual similarities to provide an egalitarian civic experience with large shared plaza spaces and visually open façades. An example of public structure design is the David P. Wohl Community center (Russell, Mullgardt, Schwarz & Van Hoefen, 1960) in Sherman Park in North St Louis. The International Style building features a pool wing with double-height glass and glass block walls, and a lower volume with modular tile panels, colorful metal panels, and windows set in a continuous storefront system.

The James S. McDonnell Planetarium at the St. Louis Science Center in Forest Park (HOK, 1963) is another important and beloved recreational structure. The round base of the building is characterized by an open continuous “storefront” with a surrounding raised walkway. The form of the concrete building is a hyperboloid, derived from a series of straight lines held within a circle, similar to a handful of drinking straws set within a shorter cup. Especially for a planetarium, the form is highly innovative, and only possible with the engineering developments that allowed for its thin-shell concrete construction.

VI. St Louis Influence on Modern Era Expression

The Gateway Arch

Eero Saarinen's winning design for the Jefferson National Expansion Memorial design competition included "a steel arch rising from an urban forest."[57] According to Toft et al's account of the AIA in St. Louis in *The Way We Came: A Century of the AIA in St. Louis,* Saarinen's design was "by far the most ambitious of the five [finalists] and presented the most problems in realization."[58] Saarinen was awarded a $50,000 prize for his 1947 design, but the arch itself was not completed until 1965. Reasons for the delay included the Korean War, and the difficulty of relocating the elevated tracks that ran along Wharf Street.[59] The memorial's construction remained unfunded until the National Parks Service visitor center program, Mission 66, provided the funds in 1962 for the construction of the arch and visitor center.[60]

Prior to its construction, the competition landed St. Louis some favorable publicity as the focus of an entire issue of *Progressive Architecture*[61]. Saarinen was a sculptor and architect, but he realized quickly that he needed advanced engineering to create the 630-foot tall form (the tallest man-made monument in the United States). Engineering employed the new concept of stress analysis, and structural design was done by Hannskarl Bandel at Severud Elstad Krueger and Associates.[62] Rather than using a steel "skin" filled with concrete as initially proposed by Saarinen, Bandel introduced orthotropic design principles, which had not been utilized before, and designed an inner skin and an outer skin which supported each other.[63]

The Gateway arch "sparked a decade of growth and signaled the arrival of Modernism as an architectural style in the city," as Robert Sharoff states in his book, *American City: St. Louis Architecture: Three Centuries of Classic Design.*[64] The monumental nature of the arch design, steel materials, and abstract, slender form were an influence on and an inspiration to Modern movement architecture, both in St. Louis and across the United States. The engineering component and technical advances making the arch design possible cannot be understated. Modernism was never conceived as an overlay or "style," but instead, as a celebration of materials, technology, and human ingenuity. While the direct influence of the arch on later projects is difficult to pinpoint (especially given the 18-year lag between design and completion), news of its design reached the entire construction industry, where it inspired (and continues to inspire) many architects and engineers.

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57 Toft, et al, 75.

58 Ibid.

59 Toft, et al, 83.

60 Christine Madrid French, *The Emergence of the Mission 66 Visitors Centers*. Accessed online February 20, 2013, at http://www.mission66.com/documents/intro.html#progress

61 May, 1948 issue of *Progressive Architecture*.

62 J.E.N. Jensen, "The Construction of the Arch," on National Parks Website accessed online March 1, 2013 at http://www.nps.gov/jeff/planyourvisit/materials-and-techniques.htm and Richard Grigonis, "The Gateway Arch- Its History and Architecture," (April 9, 2011), accessed online March 1, 2013 at http://www.interestingamerica.com/2011-04-09_Gateway_Arch_Architecture_by_R_Grigonis_41.html

63 Bahr Vermeer Haecker Architects; Wiss, Janney, Elstner Associates, Inc, and Alvine and Associates, Inc, "Gateway Arch: Historic Structures Report- Vol. 1 (June 2010), p. 24, accessed online March 1, 2013 at http://www.archive.org/stream/GatewayArchHistoricStructureReportVolume1june2010/Historic-Structure-Report-for-the-Gateway-Arch_djvu.txt

64 Sharoff and Zbaren, xxi.

The form of the arch, however, was just as critical to its lasting impact on Modern design as its engineering innovations were. The arch is beautifully proportioned, ambitious, symbolic, and machined. The way these concepts came together in the arch perfectly summarize the consciousness of the times: optimistic, confident, and dedicated to the idea that science and engineering could fix any problem. Saarinen's intent as an architect went beyond what he saw as the three great principles of modern architecture: functional integrity, honest expression of structure, and the awareness of our time. What Saarinen added to his design was his commitment to conveying significant meaning as part of the inspirational purpose of architecture. [65]

Washington University in St Louis

Instrumental in the dissemination of architectural Modernism throughout St. Louis and the Midwest was the Architecture School at Washington University. Washington University's School of Architecture was started in 1901, in association with the School of Engineering. Both of these schools, as well as the Architectural Club, a prestigious design club for Architects in practice in St. Louis, were located in the same building on Washington University's primary downtown campus.[66]

The School of Architecture had extremely close ties to the local practice environment especially throughout the 1950s. [67] George Kassabaum, a partner in the international firm HOK, was on the faculty in the years 1947-1951. Many other practicing architects in St. Louis spent time teaching at Washington University, including George Ancelevicius, Roger Montgomery, and (earlier) Joseph Murphy. The architecture faculty members were actually asked to design campus buildings starting in the 1950s. This was an unusual honor and responsibility for architectural professors at that time. The Adolphus Busch III Laboratory of Biology, though often credited to Fred Hammond as the Architect of Record, was designed by "Claude Stoller, an architecture faculty member during the mid-1950s."[68] The Dean of the School of Architecture, Joseph Passoneau, designed Urbauer Hall in 1957. The best-known Modernist building on campus, Steinberg Hall, was designed in 1958 by Fumihiko Maki, only 30 years old at the time and teaching at the School of Architecture, in collaboration with the firm Russell, Mullgardt, Schwarz and Van Hoefen. "True to the spirit of its time, Steinberg Hall utilized cantilevered folded plates to express its inventive structure and, at the same time, create the vertical profile of a lighter building (composed of an elevated platform, recessed first floor, and cantilevered top floor)."[69] In the early 1960s, the full-time design studio instructors (Ancelevicius, Maki, Montgomery, Constantine Michaelides, and Bill Roberts) participated in a design competition together for a project in San Francisco.[70] Although by the late 1960s the spirit of collaboration had dissolved between the school and the local chapter of the AIA and local practitioners, the school worked to re-establish these ties and develop strong alumni relations throughout the 1970s.

The Architecture School strongly benefitted from an infusion of new ideas at the outbreak of World War II. In the fall of 1942, Washington University took in more than thirty Japanese-American students from

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65 Peter Papademitriou, "Coming of Age: Eero Saarinen and Modern American Architecture," in *Perspecta*, Vol. 21 (The MIT Press, 1984), 116-143.

66 Sally Schwenk Associates, Inc, "Survey Report: Southwest Garden Neighborhood Cultural Resource Survey," May 2010, p.51.

67 Mumford, 65.

68 Constantine E. Michaelides, *Givens Hall 1960-1993: a personal journey*. (Published by the author, 2012), 104.

69 Michaelides, 104.

70 Michaelides, 28.

the West Coast who faced internment camps in their hometowns.[71] A few of these new students enrolled in the School of Architecture, including Gyo Obata and Richard Henmi. Other Japanese citizens came to the school to teach, including Fumihiko Maki in 1956-62. The school has nurtured and benefitted from a number of international connections, including a connection with Finnish architects serving as visiting professors and student opportunities to study in Finland.[72] The first visiting professor to the School of Architecture, Alfred Roth, was appointed in 1950. Roth, of Zurich, had worked with Le Corbusier in the late 1920s on two projects and with Marcel Breuer on another in the 1930s.[73]

The School of Architecture in 1956 was under the direction of Buford Pickens, who, prior to his own departure, fired all the teachers but two tenured professors.[74]He was succeeded by Joseph Passoneau, dean from 1956 to 1967. These were important years for Modernism in St. Louis, and the school was led by a relatively young, forward-thinking faculty. While there were certainly advocates of architectural Modernism in previous faculty members such as Frederick Dunn and Joseph Murphy, the School was not a unified voice in teaching and practicing the new style until the Post-War years.

VII. Conclusion

St Louis has benefitted from its central location as a crossroads, a starting place, and a place where many different groups and cultures have come together. Because of its location, the City has absorbed design influences from the influx of various new groups and cultures. These influences were vastly increased by the international reach of the Architecture School at Washington University. Especially throughout the 1940s and 1950s, practitioners had a close relationship with faculty and students at Washington University, where Modernism was already ingrained. St Louis also created the funds and the available land for Modern projects. The City jumped into urban redevelopment immediately after WWII, clearing "blighted" areas and then using federal funds, at least partially, to rebuild. Although African-Americans in particular were often pushed into the overcrowded areas that were cleared, and were denied opportunities for jobs in the rebuilding efforts, this is an aspect of the City's past that is not glossed over. Through historic documentation, education, and preservation efforts, the lives and stories of people who experienced injustice can be told.

There is much to celebrate in St Louis' excellent collection of Mid-Century Modern architecture. At least twenty-five, and probably many more, Modern-era resources appear eligible for listing on the National Register, all under the National Register's Criterion C for architecture merit. Some properties also appear eligible under other categories such as Criterion A, for cultural significance or in association with significant historical movements or events. The City offers very good examples of International Style architecture, by local Modern architects such as Bernoudy, Mutrux, and Harris Armstrong. Its Brutalist resources, almost all of which are constructed of brick rather than concrete, are particularly compelling as "warmer" and more texturally interesting than some of the more brooding, concrete examples of the style to be found in other regions. The City's inspiring Lambert Air Terminal, an expandable multi-domed design which set a pattern for other major airport terminals, is one example of Neo-Expressionism. Other Neo-Expressionist designs were the work of the St. Louis-based Bank Building and Equipment Corporation, which was one of the first design-build firms in the country, providing innovative designs in St Louis and ultimately expanding to numerous cities around the United States.

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[71] Kavita Kumar, “Sheltered from Internment, Achieving Success: Washington U. Highlights WWII-era Students in Programs that Include Lectures and an Art Exhibit,” *St. Louis Post-Dispatch*, November 30, 2009.

[72] Peter MacKeith, “Learning from Finland,” on Washington University’s Graduate School of Architecture (Sam Fox School) website, (undated) accessed March 4, 2013 at http://samfoxschool.wustl.edu/files/Finland-Fulbright.pdf

[73] Mumford, 50.

[74] Michaelides, 38. Pickens fired long-term faculty members such as Erwin Carl Schmidt, who still taught in the classical tradition. See also Mumford, 55-56.

Neo-Formalism as the final sub-style under the umbrella of Modernism is represented well in St. Louis as well. One of the style's major and original practitioners, Minoru Yamasaki, worked for many years in St Louis.

Between the City's iconic symbol of the City and of Modernist ideals, its Mid-Century architecture, and a well-regarded and well-connected school of architecture which continues to nurture and inspire future generations of architects, St Louis deserves to be noticed for its contribution to the built environment during the Postwar era.

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