



Novogradac Journal of Tax Credits

News, Analysis and Commentary On Affordable Housing, Community Development and Renewable Energy Tax Credits

August 2017 • Volume VIII • Issue VIII

Published by Novogradac & Company LLP

HISTORIC TAX CREDIT TOOL BOX **Curtain Wall in Historic Tax Credit Projects**

JOHN TESS, HERITAGE CONSULTING GROUP



The materials and techniques involved in modern construction allowed for rapid construction in the mid-20th century. One such technique was the advent of the curtain wall in building construction. Many of the iconic midcentury modern buildings feature curtain walls. From the Seagram Building in New York City to the one-story Farnsworth House, the curtain wall, or a thin metal and glass wall hung from the building's structure, is a defining architectural feature of midcentury architecture. As many of these midcentury buildings are now aging into the National Register's 50-year requirement for listing, new opportunities for historic tax credit (HTC) rehabilitation projects emerge. This article addresses the opportunities and challenges of rehabbing curtain walls in HTC projects, featuring the Mayflower Building in Dallas as a case study.

Curtain Walls: History and Overview

A curtain wall is defined as a thin metal-framed wall containing infill lites of glass, metal panels or stone, often arranged in a repetitive grid pattern. The metal mullion framing system attaches to the building structure, providing an exterior barrier without carrying structural loads.

Curtain walls are divided into two types: stick systems or unitized/modular. Stick systems are field-constructed, sealed and glazed, piece by piece. Unitized systems contain transportable-sized "modules" constructed and glazed or partially glazed by the manufacturer. Curtain walls may be further specified into interior or exterior glazing systems, referring to the position of the glazing within the wall. With interior glazed systems, the glass is set and or removed from the interior. Exterior glazed curtain walls are glazed from the exterior. Low-rise buildings with ready access to the building's exterior often contain exterior glazing, while high-rise buildings typically feature interior glazing.

The position of the glass is determined by the structural loads that dictate the depth of the inboard tubular mullion. The glass plane can be shifted by the introduction of deep and/or articulated exterior mullion covers. Curtain walls may also contain different types of glazing including laminated vision glass or spandrel glass. Spandrel glass may be made opaque by the use of opacifiers including film paint or ceramic frit.

continued on page 2



Image: Courtesy of Heritage Consulting Group

The mid-century modern Mayflower Building in Dallas used darker spandrel glass on the rear elevation to conceal mechanical equipment.

continued from page 1

These prefabricated exterior walls date to the 1918 Hallidie Building in San Francisco, credited as the first use of such a wall. Despite its early invention, the curtain wall did not become popular until the postwar period, when aluminum was made readily available for domestic manufacturing and remained popular in modern construction. Their lightweight construction made curtain walls ideal for both high-rise and low-rise buildings and they soon replaced load-bearing masonry walls as the predominant mode of building construction. Manufacturers created glass panels designed for curtain walls in a variety of colors. By the 1950s, the modular curtain wall design had advanced and was recognized as an ideal component for multiple building types, including office towers, commercial buildings and government buildings.

Curtain Walls: Challenges for Reuse

Curtain walls face a multitude of maintenance and conservation issues, which often need to be addressed during a building's rehabilitation. For the purposes of

HTC rehabilitations, repair or in-kind replacement of deteriorated sections of a curtain wall may be necessary. Unlike older building types, the architectural significance of modern buildings does not necessarily rest on the physical materials, but the efficiency and social impact of the design. Further, the materials used during this period do not always withstand the test of time. Therefore, the traditional approach to preservation, which prioritizes the reuse of original materials, may not be applicable. Nevertheless, the curtain wall comprises the façade of the building and is thus a building's primary character-defining feature. Therefore, the National Park Service (NPS) will assess any proposed changes to the curtain wall, including repair, with a high level of scrutiny.

The Secretary of the Interior's Standards call for retention and repair of historic materials over replacement, and replacement is permitted only in areas where repair is unfeasible. The project team must document and evaluate the conditions and make the case for repair or

continued on page 3

continued from page 2

replacement of deteriorated materials where necessary and prove that any new materials are appropriate and match the historic. The degree of deterioration on curtain walls varies. Exposure to daylight over time may degrade the curtain wall's gaskets and seals, leading to moisture issues that not only damage the curtain wall members, but can lead to interior damage and mold.

The midcentury glass within curtain walls is often single-glazed, which can cause condensation or fogging of the glazing. Earlier curtain walls, composed of steel, may corrode over time. These issues can be exacerbated by local climate. In general, moisture issues including corrosion and water infiltration are more common in colder and wet climates. Arid climates may cause warping of the curtain wall members and drying out of gaskets. Typical repairs to curtain walls include replacement of gaskets, caulk and broken glazing.

While retention and repair is favorable from the NPS's perspective, in some cases the conditions of deterioration can be so severe that replacement of elements of a curtain wall may be necessary. It is unlikely that wholesale replacement of a curtain wall would be approved. If replacement of certain elements is warranted in a HTC project, the NPS will require that the new materials visually match the historic and mock-ups will be necessary showing proposed materials adjacent to existing ones. The NPS will generally require a match in profile of steel or aluminum members of the wall as well as a closely matching glass. While contemporary aluminum products are generally similar to those used in midcentury construction techniques, replicating steel members is more difficult. Because the steel members are generally no longer manufactured in

continued on page 4*Image: Courtesy of Heritage Consulting Group***The Mayflower Building in Dallas was built in 1965 and is a typical mid-century modern office building with an aluminum-framed glass curtain wall.**

continued from page 3

historic profiles, duplicating the members in custom-manufactured aluminum may be cost-prohibitive.

Case Study: The Mayflower Building, Dallas

The Mayflower Building, built in 1965, was designed by the locally prominent Dallas architecture firm Thomas E. Stanley Architects and Engineers. Built by the Mayflower Investment Company, a subsidiary of the Fidelity Union Life Insurance Company of Dallas, the building was designed as speculative office space for financial, insurance and data processing companies that were reshaping the midcentury economy. With these tenants in mind, the building was designed with large floor plates and flexible space.

The building is a typical midcentury modern office building constructed of concrete, with an aluminum-framed glass curtain wall. As with most buildings of this era, the Mayflower does not have any applied ornamentation. Its design is simple with clean vertical and horizontal elements. The base of the building is defined by two-story tall concrete columns, with the shaft of the building cantilevered outward above base. The shaft is comprised of vertical columns clad in black terrazzo and vertical clear-finish aluminum mullions, balanced by horizontal spandrel and bands of window. The spandrels are comprised of opaque blue glazing at the structural levels, with tinted vision glass within the occupied space.

Constructed of “modern” materials, curtain walls in the midcentury period were comprised of new applications of materials that were not proven as traditional materials, such as brick, terra cotta and various types of stone. At the Mayflower, the curtain wall survived in good condition and did not suffer from any significant water infiltration or corrosion, most likely due to the dry climate in Dallas, and the advancement of curtain wall design compared to earlier postwar curtain wall systems.

After 50 years as an office building, the Mayflower was purchased by HRI Properties and rehabilitated for use as apartments with ground-floor retail and interior parking. While the building survived in good condition, HRI and its design team was challenged to make the building work for residential use. The curtain wall was functional, but it presented challenges to the building’s reuse.

The first challenge was energy-efficiency. Since the curtain walls survived in good condition, retention of the curtain wall was required. This meant repairing the windows and ensuring gaskets and window tinting film were in good condition. The film was believed to be historic and gave the windows a mirrored appearance. In many locations, the film had bubbled or had been altered. The film was an early attempt at energy-efficiency, as it helped to limit light transmission into the office spaces and thus lower the solar gain. Because the film was found to be historic, the NPS required retention with in-kind replacement. HRI located a matching film and replaced the damaged film where necessary.

An additional challenge was the location of the opaque spandrel panels. These panels were not just at the structure, but extended above and below each floor slab into the proposed apartments. These single-glazed panels were historic, so the NPS required retention. However, the single-glazed system had low energy-efficiency, which posed challenges for reuse as apartments. As a solution, where the spandrels were exposed above and below the floor slab, the panels insulated and then finished at the interior with painted gypsum board.

One final challenge occurred on the north elevation, in the building’s mechanical rooms. At these locations, the bands of vision glass were substituted with black

continued on page 5



continued from page 4

spandrel glazing to prevent visibility of the original mechanical equipment. As the mechanical equipment was being removed and apartments were proposed for these locations, the insulated vision glass would be required in the rehabilitation. During the design, the state historic preservation officer (SHPO) determined that the dark spandrel glass was an original character-defining design element and the appearance would have to be maintained. In consultation with SHPO and the NPS, through the preparation of a physical mock-up, it was determined that a dark, tinted vision glass could be used in these locations as it would preserve the exterior appearance of the original black spandrel glass, but would allow residential use of these spaces. Upon completion of the building, the north elevation retains its historic appearance with the former mechanical bays articulated by the darker vision glass.

Conclusion

Curtain walls are one of the iconic features of midcentury modern architecture and can define the character of an historic building. As such, when undertaking a HTC rehabilitation, it is imperative to recognize that the curtain wall is the primary character-

defining feature and that any proposed changes will be heavily scrutinized. The decision to repair or replace deteriorated elements of a curtain wall will largely depend on the existing condition. If the elements of the wall system survive in good condition, retention will be required. Significant conditions of deterioration may warrant replacement of certain sections or elements. When repairing or replacing sections of a curtain wall, visual and physical impacts on existing historic fabric will be carefully considered by the NPS. New materials will be required to match the historic materials and mock-ups will generally be required. As seen in the case of the Mayflower Building in Dallas, the project team must consider how an adaptive reuse plan will impact the curtain wall design. ♦

John M. Tess is president and founder of Heritage Consulting Group, a national firm that assists property owners seeking local, state and federal historic tax incentives for the rehabilitation of historic properties. Since 1982 Heritage Consulting Group has represented historic projects totaling more than \$3 billion in rehabilitation construction. He can be reached at 503-228-0272 or jmtess@heritage-consulting.com.

This article first appeared in the August 2017 issue of the Novogradac Journal of Tax Credits.

© Novogradac & Company LLP 2017 - All Rights Reserved

Notice pursuant to IRS regulations: Any U.S. federal tax advice contained in this article is not intended to be used, and cannot be used, by any taxpayer for the purpose of avoiding penalties under the Internal Revenue Code; nor is any such advice intended to be used to support the promotion or marketing of a transaction. Any advice expressed in this article is limited to the federal tax issues addressed in it. Additional issues may exist outside the limited scope of any advice provided – any such advice does not consider or provide a conclusion with respect to any additional issues. Taxpayers contemplating undertaking a transaction should seek advice based on their particular circumstances.

This editorial material is for informational purposes only and should not be construed otherwise. Advice and interpretation regarding property compliance or any other material covered in this article can only be obtained from your tax advisor. For further information visit www.novoco.com.

EDITORIAL BOARD

PUBLISHER

Michael J. Novogradac, CPA

EDITORIAL DIRECTOR

Alex Ruiz

TECHNICAL EDITORS

Mark Shelburne
James R. Kroger, CPA
Owen P. Gray, CPA

Thomas Boccia, CPA
Daniel J. Smith, CPA

COPY

SENIOR EDITOR

Brad Stanhope

ASSIGNMENT EDITOR

Teresa Garcia

SENIOR WRITER

Mark O'Meara

CONTENT MANAGEMENT SPECIALIST

Elizabeth Orfin

CONTRIBUTING WRITERS

Rob Bryant
Roy Chou
Forrest Milder
Richard Sidebottom

Thomas Stagg
John Tess
Jillian Toole

ART

CARTOGRAPHER

David R. Grubman

PRODUCTION

Alexandra Louie
James Matuszak

Jesse Barredo

CONTACT

CORRESPONDENCE AND EDITORIAL SUBMISSIONS

Alex Ruiz
alex.ruiz@novoco.com
415.356.8088

ADVERTISING INQUIRIES

Carol Hough
carol.hough@novoco.com
415.356.8040

EDITORIAL MATERIAL IN THIS PUBLICATION IS FOR INFORMATIONAL PURPOSES ONLY AND SHOULD NOT BE CONSTRUED OTHERWISE.

ADVICE AND INTERPRETATION REGARDING THE LOW-INCOME HOUSING TAX CREDIT OR ANY OTHER MATERIAL COVERED IN THIS PUBLICATION CAN ONLY BE OBTAINED FROM YOUR TAX ADVISOR.

ADVISORY BOARD

LOW-INCOME HOUSING TAX CREDITS

Bud Clarke	BOSTON FINANCIAL INVESTMENT MANAGEMENT
Jana Cohen Barbe	DENTONS
Tom Dixon	BOSTON CAPITAL
Rick Edson	HOUSING CAPITAL ADVISORS INC.
Richard Gerwitz	CITI COMMUNITY CAPITAL
Rochelle Lento	DYKEMA GOSSETT PLLC
John Lisella	U.S. BANCORP COMMUNITY DEV. CORP.
Philip Melton	BELLWETHER ENTERPRISE
Thomas Morton	PILLSBURY WINTHROP SHAW PITTMAN LLP
Mary Tingenthal	MINNESOTA HOUSING FINANCE AGENCY
Rob Wasserman	U.S. BANCORP COMMUNITY DEV. CORP.

PROPERTY COMPLIANCE

Michael Kotin	KAY KAY REALTY
Michael Snowdon	HIGHRIDGE COSTA HOUSING PARTNERS
Gianna Solari	SOLARI ENTERPRISES INC.

HOUSING AND URBAN DEVELOPMENT

Flynn Janisse	RAINBOW HOUSING
Ray Landry	DAVIS-PENN MORTGAGE CO.
Denise Muha	NATIONAL LEASED HOUSING ASSOCIATION
Monica Sussman	NIXON PEABODY LLP

NEW MARKETS TAX CREDITS

Frank Altman	COMMUNITY REINVESTMENT FUND
Merrill Hoopengardner	NATIONAL TRUST COMMUNITY INVESTMENT CORP.
Scott Lindquist	DENTONS
Matthew Philpott	U.S. BANCORP COMMUNITY DEV. CORP.
Ruth Sparrow	FUTURES UNLIMITED LAW PC
Elaine DiPietro	BLOOMING VENTURES LLC

HISTORIC TAX CREDITS

John Leith-Tetrault	NATIONAL TRUST COMM. INVESTMENT CORP.
Bill MacRostie	MACROSTIE HISTORIC ADVISORS LLC
John Tess	HERITAGE CONSULTING GROUP

RENEWABLE ENERGY TAX CREDITS

Bill Bush	STEM INC.
Benjamin Cook	NEXTPOWER CAPITAL
Jim Howard	DUDLEY VENTURES
Forrest Milder	NIXON PEABODY LLP