

Report To

**Palos Heights Public Library
12501 South 71st Avenue
Palos Heights, Illinois 60463**

**Water Leakage Evaluation
Palos Heights Public Library
12501 South 71st Avenue
Palos Heights, Illinois**



By:
Christopher R. Kottra, PE, REWC, CCCA

BTC Project No. 25-128
May 30, 2025

BTC

1845 East Rand Road, Suite L-100
Arlington Heights, Illinois 60004

Building Technology Consultants, Inc.



TABLE OF CONTENTS

| | | |
|-----|--------------------------------------|---|
| 1 | Background Information..... | 1 |
| 2 | Scope of Work..... | 1 |
| 2.1 | Background Review..... | 2 |
| 2.2 | Field Investigation..... | 2 |
| 2.3 | Analysis and Report..... | 2 |
| 3 | Background Review..... | 2 |
| 4 | Findings..... | 3 |
| 4.1 | General Observations..... | 3 |
| 4.2 | Water Testing..... | 4 |
| 4.3 | Exploratory Openings..... | 5 |
| 5 | Conclusions and Recommendations..... | 6 |
| 6 | Concluding Remarks..... | 7 |

Appendix A – Field Photographs



May 30, 2025

Via E-Mail: jblazek@phlibrary.org

Mr. Jesse Blazek
Palos Heights Public Library
12501 South 71st Avenue
Palos Heights, Illinois 60463

Re: Water Leakage Evaluation
Palos Heights Public Library, Palos Heights, Illinois
BTC Project No. 25-128

Dear Mr. Blazek:

As authorized by execution of our proposal dated March 14, 2025, Building Technology Consultants, Inc. (BTC) has performed a water leakage evaluation at Palos Heights Public Library. This report outlines the findings of our evaluation.

1 BACKGROUND INFORMATION

The Palos Heights Public Library is a 2-story library facility constructed in 2004. The facade primarily consists of brick masonry cladding with metal panel cladding along the top 1/3 of the 2nd floor. There are 3 bay windows that project out along the north elevation of the building, which are clad solely with metal panels around the windows. Leaks have been reported at the bay windows on the 1st floor. As such, we were requested to perform a leak evaluation. This report outlines our findings.

2 SCOPE OF WORK

Our scope of work was as follows:



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 2 of 8

2.1 Background Review

1. Reviewed original design drawings and other available documents to become familiar with the construction of the exterior wall components.
2. Interviewed representatives from the Library to obtain information regarding prior leaks and issues, and to obtain information about remedial work attempts.

2.2 Field Investigation

1. Performed a visual review of the exterior wall construction at the bay windows from the exterior and interior to document existing conditions.
2. Performed calibrated spray nozzle testing in general accordance with AAMA 501.2.
3. With assistance from a contractor, removed some of the existing metal panel cladding components to review underlying conditions.

2.3 Analysis and Report

1. Analyzed field observations to evaluate overall condition of the exterior wall construction at the bay windows and the need for repairs.
2. Based on the findings of our analysis, developed conceptual repair alternatives.
3. Prepared this report outlining our findings, conclusions, and recommendations.

3 BACKGROUND REVIEW

Electronic copies of the following documents were provided for our review:

1. As-built drawings prepared by Engberg Anderson Design Partnership, Inc. dated July 2, 2003.
2. Window shop drawings prepared by Pella dated February 20, 2004.



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 3 of 8

The drawings provided for our review had conflicting information regarding the exterior wall construction at the bay windows. The following table summarizes the 2 variations of the wall assembly indicated in the drawings.

| Sheet A4.3 | Sheet A4.8 |
|--|---|
| Prefinished metal cladding | Brake metal trim |
| 3/4-inch thick wood sheathing | 1/2-inch treated plywood sheathing |
| 2-inch thick rigid insulation | 1 1/2-inch thick rigid insulation |
| Air barrier | 1/2-inch thick exterior gypsum wall board sheathing |
| 1/2-inch thick exterior gypsum sheathing | Through-wall flashing |
| Cold formed metal studs | Steel stud framing (shown graphically only) |

4 FINDINGS

Our field investigation was performed on May 12 and 13, 2025. Messrs. Christopher Kottra and Arturo Benussi of BTC performed our field observations. A carpentry contractor assisted us during our investigation. The following is a summary of our findings. Referenced photographs are included in Appendix A.

4.1 General Observations

1. Varying colors of sealant were observed along joints between cladding panels, which suggests that repairs have been attempted more than once (Photo 1). The sealant was exhibiting adhesive and/or cohesive failure at several locations (Photos 2 and 3). No sealant was observed at some joints including between slab edge covers and column covers, and at column cover splices (Photo 4).



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 4 of 8

2. Most of the horizontal sill covers were observed to be back-pitched (Photo 5). The sill cover above the first floor window at the west bay window was loose and one end could be pulled away from the wall by hand (Photo 6).
3. Evidence of prior leaks was observed on the interior at the middle and west bays on the 1st floor (Photos 7 through 10). We did not observe evidence of leaks at the bay windows on the 2nd floor.
4. We removed a ceiling tile at the middle bay to review conditions within the interstitial space above the ceiling (Photo 11). Evidence of prior leaks was observed on the wood framing for the spandrel panels (Photo 12).
5. The as-built drawings indicated 3 inches of batt insulation and an air barrier behind spandrel panels. Neither insulation nor an air barrier were observed behind the spandrel panels (Photos 13 and 14).

4.2 Water Testing

Using a calibrated spray nozzle or a modified spray rack, we performed a series of water tests isolating different components of the facade (Photos 15 and 16). Adjacent components were masked with plastic and tape (Photos 17 and 18). For each test, water was applied for a period of approximately 15 minutes or until leaks appeared, whichever occurred first. No differential pressure was applied during the tests.

1. Leaks occurred during several tests along the sill cover and spandrel panels at the middle bay. The window assemblies did not appear to contribute to the leaks. The sill cover test was repeated at the west bay window. Leaks were observed within 5 minutes of the start of the test (Photos 19 and 20).
2. Water was observed dripping from along the joint between the window frame and the interior trim (Photos 21 and 22).
3. The most severe leaks occurred when the sill of the 2nd floor window was tested (Photo 23). Water collected on and around the spandrel panel frames during this test (Photos 24 and 25).



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 5 of 8

4.3 Exploratory Openings

With assistance from a carpentry contractor, metal cladding panels were removed at slab edges and columns. Observations behind the removed panels included the following:

1. The wall assembly at the sill covers was generally consistent with what was indicated on Sheet A4.8 and consisted of the following:
 - a. 0.032-inch thick metal cladding panels;
 - b. 1/2-inch thick plywood sheathing; and
 - c. Self-adhered flashing membrane over apparent sheathing (the flashing membrane was not cut to review the sheathing material).
2. The plywood sheathing behind the metal panels exhibited evidence of prolonged exposure to moisture (Photo 26).
3. The rigid insulation was held in place with screws creating a penetration through the flashing membrane (Photo 27).
4. Significant debris was observed collecting along the top of the window (Photo 28). The flashing membrane loosely wrapped back toward the interior at these locations and moisture was identified within the gap between the membrane and top of the window frame (Photo 29).
5. Vertical mullion caps separate the spandrel panels. The top of the spandrel panel mullion cap was observed to be open where the sill cover was removed below the 2nd floor window (Photo 30).
6. The column covers could not be removed without disassembling more of the cladding system. A column cover was partially pulled open to review the underlying conditions (Photos 31 and 32). The vertical joint between the spandrel panels and the vertical framing at the corner was open (Photo 33). There appeared to be a flashing membrane behind the insulation (Photo 34). However, we were not able to confirm if the membrane was continuous.



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 6 of 8

5 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our field investigation, we identified several deficiencies contributing to interior leaks.

1. Failed sealant at joints between metal panel cladding components is allowing water to get behind the cladding system.
2. It does not appear that the metal panel clad walls were designed and/or constructed with an adequate internal drainage system. As such, water that gets past the metal panel cladding has direct pathways to reach the interior.

Based on the above deficiencies, we offer the following repair approaches to minimize the potential for water infiltration at the bay windows:

1. **Repair Option 1:** Remove all sealant from joints between metal panel cladding components and along window perimeters. Prepare surfaces and provide new liquid-applied sealant and/or pre-formed silicone strips.
 - a. This option has the lowest initial cost associated with it. The work can be completed in approximately 1 to 2 weeks with little disruption to library operations.
 - b. This approach does not address deficiencies such as back-pitched sill covers, or the lack of an effective internal drainage system behind the panels. As such, this approach would require more frequent maintenance. We consider this a short-term repair option.
2. **Repair Option 2:** Remove the existing metal panel cladding at the bay windows, repair the back-up construction, and provide a more robust flashing system. Reinstall the existing metal panel cladding with minor modifications to help with drainage.
 - a. This approach will have a significantly higher initial cost than Repair Option 1. The schedule for this repair option would depend on the availability of the limited number of contractors that specialize in this type of work. We estimate that this repair option would take up to 4 weeks to complete.



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 7 of 8

- b. Repairs to the back-up construction will protect those materials from damage and reduce water infiltration into the interior of the building. Removing and reinstalling the metal panel cladding may result in damage that affects the functionality and aesthetics of the facade.
3. **Repair Option 3:** Replace the metal panel cladding with a system that incorporates a redundant internal drainage system.
 - a. This approach is the most costly of the 3 options and the most invasive. The schedule for completing the work will depend on contractor and material availability. Long lead times are possible for the replacement cladding materials. However, construction duration would likely be approximately the same as Option 2.
 - b. This approach is the most comprehensive approach of the 3 by addressing the underlying deficiencies and thus minimizing the potential for future water leakage.

The lack of insulation behind the spandrel panels does not appear to be a deficiency that contributes to leaks. However, adding insulation behind the spandrel panels could improve energy efficiency throughout the building. This can be done in conjunction with the Repair Options 2 or 3 above, or as a separate project after the repairs are complete.

6 CONCLUDING REMARKS

Please note the following regarding the opinions expressed in this report:

1. They are based on project specific information available to us at the time of this writing and the scope of work performed to date. It is possible that additional documents and/or investigations will reveal more information. We will take such additional information into consideration and may supplement or modify our opinions as a result of such additional information.



Mr. Jesse Blazek
BTC Project No. 25-128
May 30, 2025
Page 8 of 8

2. They are based on our education, experience, field observations, observations by other BTC employees, photographs and samples retrieved in the field, field notes; observations, photographs, reports and analysis by others; and the content of BTC's project files and technical information library.
3. They are based on a reasonable degree of engineering certainty.
4. Any repair recommendations indicated in this report are conceptual in nature. Prior to implementing any repairs, we recommend drawings and specifications be prepared by a qualified architectural/engineering firm.

We appreciate the opportunity to be of service to you. If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Sincerely,

Building Technology Consultants, Inc.

A handwritten signature in black ink that reads "Chris R. Kottra". The signature is fluid and cursive.

Christopher R. Kottra, PE, REWC, CCCA
Principal

Attachment: Appendix A – Photographs

Copy to: Mr. Dan Eallonardo (Independent Construction Services, Inc.)



APPENDIX A
FIELD PHOTOGRAPHS



Photo 1 – Varying sealant colors



Photo 2 – Sealant exhibiting cohesive failure



Photo 3 – Sealant exhibiting cohesive and adhesive failure



Photo 4 – No sealant at column cover splice



Photo 5 – Back-pitched sill cover



Photo 6 – Loose sill cover



Photo 7 – Evidence of prior water leakage



Photo 8 – Evidence of prior water leakage



Photo 9 – Evidence of prior water leakage



Photo 10 – Evidence of prior water leakage



Photo 11 – Ceiling tile removed at middle bay



Photo 12 – Evidence of prior leaks on wood framing



Photo 13 – No insulation or air barrier behind spandrel panels



Photo 14 – No insulation or air barrier behind spandrel panels



Photo 15 – Modified spray rack water test



Photo 16 – Modified spray rack water test

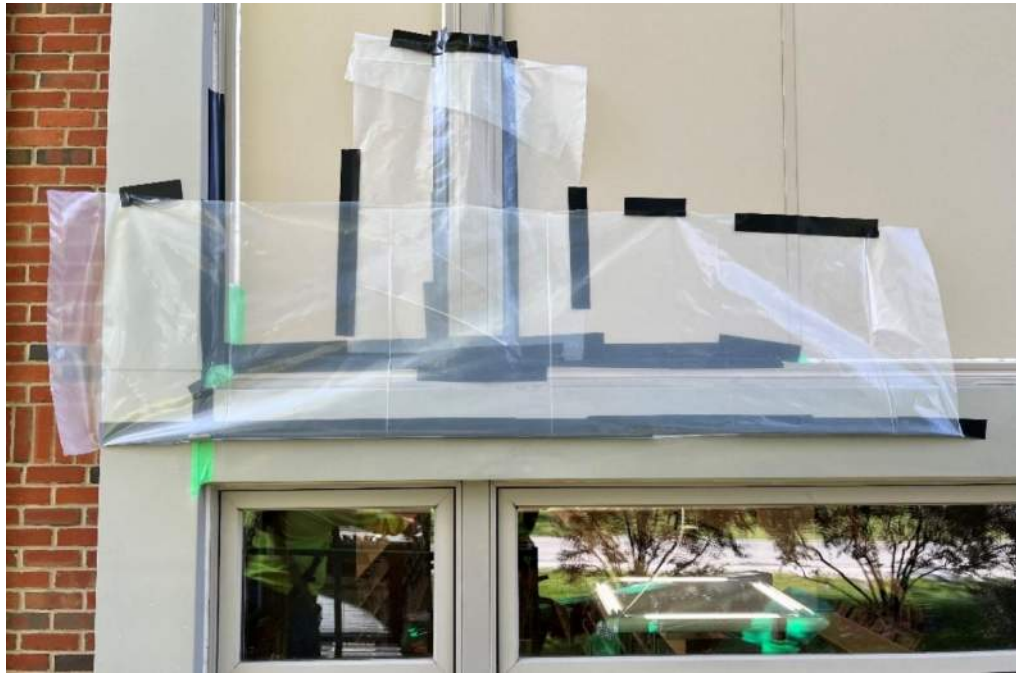


Photo 17 – Masking of various components



Photo 18 – Masking of various components



Photo 19 – Leak emanating between frame and trim



Photo 20 – Leak emanating between frame and trim



Photo 21 – Leak emanating between frame and trim



Photo 22 – Leak emanating between frame and trim



Photo 23 – Leak observed during test along 2nd floor window sill



Photo 24 – Leak observed during test along 2nd floor window sill



Photo 25 – Leak observed during test along 2nd floor window sill



Photo 26 – Plywood sheathing exhibiting evidence of prolonged exposure to moisture



Photo 27 – Screw through insulation



Photo 28 – Debris along top of window



Photo 29 – Moisture in gap between flashing membrane and spandrel panel



Photo 30 – Openings in top of mullion cap



Photo 31 – Column cap



Photo 32 – Column cap pulled back



Photo 33 – Open joint between spandrel panel and vertical framing



Photo 34 – Flashing membrane behind insulation