



Toronto Western Hospital – FP Building Envelope Assessment

Type of Document:

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Project Name:

TWH- FP Building Envelope Assessment, UHN #110023024

399 Bathurst Street, Toronto, ON

Project Number:

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Date Submitted:

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1. Executive Summary

Toronto Western Hospital is located at 399 Bathurst Street, Toronto, Ontario. Following a sprinkler head flooding incident in the Fell Pavilion Emergency Department on the ground floor, what was suspected to be pre-existing mould was discovered within the exterior wall of Acute Bays 1 and 2 during the remediation. EXP Services Inc. (EXP) was retained to conduct an assessment of the East elevation exterior wall of the Fell Pavilion to review for deterioration/ deficiencies which could result in water infiltration to the Emergency Department. The review was to be conducted only from the exterior side.

EXP's assessment included a document review, non-destructive infrared thermography, visual and tactile review, and exploratory openings. During the thermography review, EXP noted two distinct thermal anomalies which guided the selection of the exploratory opening locations to review for the cause of the anomalies. The visual review identified some minor deterioration of the masonry which would contribute to excess water entering the wall system such as damaged brick units, loose bricks with cracking mortar joints, minor mortar deterioration, and debonding sealants at the window perimeters. Additionally, the weep holes at the base of the wall were generally obstructed, limiting drainage and ventilation of the masonry wall cavity. Following the thermography and visual review, EXP conducted several exploratory openings to review the concealed conditions and determine the construction of the exterior wall drainage planes and flashings. At the base of the wall, EXP noted a hole in the water resistive barrier at the through wall flashing which would allow water penetration into the wall assembly, and details which would restrict drainage and venting of the wall cavity. At the shelf angle between floors (and one of the thermal anomaly locations), EXP noted a small void in the water resistive layer which could allow water penetration into the wall assembly. The shelf angle at this location did not extend out far enough to fully support the brick masonry. At the other thermal anomaly location in the field of the wall on the second floor, EXP observed a large hole through the insulation, water resistive barrier, and exterior sheathing layers resulting in a large air draft being felt exfiltrating the building. This hole would allow for water penetration into the wall assembly. EXP also conducted openings to review the window tie-in, a previous masonry repair area, as well as the parapet at which location EXP noted a poor tie-in of membranes between the adjacent dissimilar parapet. Lastly, EXP identified that a drawing detail of the wall section which was provided did not match what was observed on site. The drawing showed concrete block wall behind the masonry cladding, while on site Blueskin SA membrane was installed on exterior sheathing on steel studs. Additionally, EXP notes that the remediated portion of the interior wall has a polyethylene vapour retarder installed, and the exterior side of the wall has Blueskin SA membrane installed which is also a vapour retarder. The dual vapour retarders on the exterior wall assembly could lead to interstitial condensation and moisture management problems as the wall cannot dry to the interior or exterior through vapour diffusion.

Based on the field assessment, to address the observed deterioration and deficiencies, and mitigate water penetration into the wall cavity, EXP would recommend conducting a full length repair at the base of the wall to remediate the through wall flashing and address the drainage concerns. In addition, isolated repairs of the deteriorated masonry and mortar joints should be conducted, and the window perimeter sealants should be removed and replaced. The tie-in between the two dissimilar parapets at the south end should also be addressed. Prior to conducting the above noted repairs, EXP recommends further investigation to review the discrepancy between the wall section drawing and the observed conditions, as well as the double vapour retarder. EXP recommends conducting additional test openings from grade to confirm that the Blueskin SA membrane on sheathing observed is consistent throughout, verify existing interior conditions before remediation, and removal of additional layers to verify the wall construction. Once the actual exterior wall construction details are confirmed, a hygrothermal analysis should be conducted to determine if the double vapour retarder could lead to condensation issues, and to determine appropriate remediation options.

2. Introduction

EXP Services Inc. (EXP) was retained by University Health Network (UHN) to assess the condition of the East elevation exterior wall of the Fell Pavilion at Toronto Western Hospital located at 399 Bathurst Street, Toronto, Ontario to review for deterioration/ deficiencies which may result in water infiltration to the Emergency Department.

Through RFP #2727098552 and Addendum #1, issued in October and November 2022, EXP was retained to conduct the exterior wall assessment from the exterior side only to eliminate disruption to the Emergency Department operations.

To assess the condition of the exterior wall, following a review of the provided existing documentation, EXP conducted non-destructive infrared thermography of the subject exterior wall area to review for thermal anomalies (i.e., potential areas of missing insulation, air leakage, etc.) which would assist with selecting locations for exploratory openings. Following the infrared thermography, EXP conducted a close-up visual and tactile review of the subject wall area with power elevated equipment to review for deterioration which could contribute to water infiltration. Lastly, several exploratory openings were conducted in the masonry cladding, and a portion of the metal cladding/flashings at the parapet were removed to review the concealed conditions and determine the construction of the exterior wall drainage planes, through wall flashings and tie-ins.

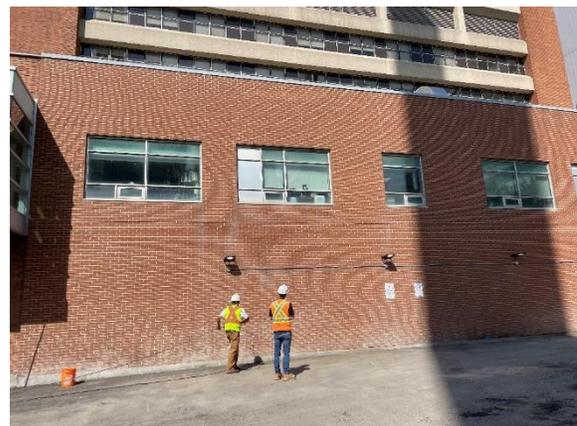
The following report outlines the reviews and testing conducted along with EXP's observations, significance of the findings, and provides recommendations to address the noted issues. This report includes a summary scope of work and opinion of probable costs to conduct the recommended repairs. Recommendations for additional investigation prior to conducting repairs are also provided based on the observed site conditions.

3. Background & Description

In 2020, a sprinkler head located in the Emergency Department within the Fell Pavilion failed, causing water damage to Acute Bays 1-4 on the ground floor. During remediation of water damaged materials, mould was discovered along the east elevation exterior wall of Acute Bays 1-2. It was believed that the mould was not from the sprinkler head water damage, but that it was a pre-existing condition, based on the assessment report. Following the flood incident, the interior assessments and remediation were conducted by SafeTech Environmental Ltd., IRC Building Sciences Group, and Diligent Construction Inc.

The intent of the work outlined in this report was to assess the exterior side of the building envelope to review for deterioration/ deficiencies which could contribute to or result in water infiltration into the Emergency Department causing the suspected pre-existing mould.

The subject wall area is two-stories, with clay brick masonry cladding, and aluminum framed punch windows on the second floor. The masonry wall has weep holes at grade level, base of the second floor and above windows, with vent holes at the top of the wall. The roof is a protected membrane roof assembly, with a tall parapet with metal cladding panels on the roof side and a prefinished sheet metal cap flashing on top.



4. Methodology

To assess the exterior masonry wall for deterioration/ deficiencies which could contribute to or lead to water infiltration, EXP conducted the following:

1. Document Review – EXP reviewed the existing documents which were provided by UHN to understand the history and previous work at this location. EXP was provided the following documents for review:
 - a. Asbestos Reassessment, Pinchin Environmental- dated May 6, 2020
 - b. Water Damage Assessment (Rev. A), Safetech Environmental- dated December 1, 2020
 - c. Site Inspection Report 2, Safetech Environmental- dated December 11, 2020
 - d. Wall Remediation Drawing D1- Wall Section, IRC- dated December 18, 2020
 - e. Water Damage- East Wall Construction- Selected Photos, Diligent Construction- no date present
2. Infrared Thermography – EXP conducted a non-destructive infrared thermographic scan of the building envelope in the vicinity of Acute Bays 1 & 2 using a Flir T400 thermographic camera. The thermography was conducted from the exterior from grade, and partially from the interior, to review for potential thermal anomalies which can indicate air leakage, thermal bridging, and potential areas of wet building materials. No induced pressure differential was applied for the thermography, other than the building's normal operating conditions. The results of the thermography were used to select locations to conduct the exploratory openings.
3. Visual Review – EXP conducted a visual and tactile review of the exterior side of the building envelope of the subject wall area using a zoom boom, with the assistance of a remediation contractor (WellDone Inc.) hired by EXP. The visual review was to note for example, out-of-plane bricks, step cracking, spalling, efflorescence and staining, and deteriorated mortar, as well as sealant joints, windows, and metal flashings. The visual review was to identify any deficiencies or deterioration that would indicate potential signs of water leakage or contribute to excess water into the exterior wall system.
4. Exploratory Openings – With the assistance of WellDone, EXP conducted several exterior openings and partial dismantling of cladding components to review the concealed conditions and determine construction of the exterior wall drainage planes, through wall flashings and tie-ins. Several masonry exploratory openings were created to review the base of the wall, shelf angle between first and second floor, window tie-in and the thermal anomalies identified during the thermographic scan. At the parapet/roof, metal cap flashing and cladding panels were partially dismantled, and pavers removed to review the construction and tie-ins from roof to wall. The exploratory openings were to identify the cause of any observed thermal anomalies, and review the construction details of the water shedding layers for appropriate moisture management. Any cuts through membrane were patched with Tremco Exoair self-adhered membrane, and all openings were reinstated following the review.

5. Observations

The location of the review and the noted observations are identified on Drawings SK-1 and SK-2 in Appendix B. The area of the review consisted of the full height of the exterior wall and a length incorporating four windows north of the exterior stairwell on the East Elevation of the Fell Pavilion. This encompasses Acute Bays 1 and 2, plus approximately 3 m (10 ft.) to the north and south.

5.1. Thermography

Environmental Test Conditions:

Test Date	Exterior Temperature (°C)	Exterior Relative Humidity (%)	Wind Speed (km/hr)	Indoor Temperature (°C)	Indoor Relative Humidity (%)	ΔT (°C)
May 18, 2023	6	47	1 (from North)	21	32	15

Thermography was conducted in the early morning (4:00 am) on May 18, 2023 prior to sunrise to eliminate the effects of solar loading which would obscure the thermal anomalies. During the scan two thermal anomalies were noted at the second floor near the north end of the review area, approximately between Acute Bays 2 and 3. The anomalies correspond to test cuts 2 and 3 on Drawing SK-2.

The following photographs display the thermal images with the noted thermal anomalies. The anomaly in Image 3 is a hot spot in the field of the wall, and based on the pattern appeared to be air leakage. The anomaly in Image 4 shows an abrupt change in the temperature profile at the shelf angle between the first and second floor. The warm side was consistent to the left, and the cool side consistent to the right. Masonry exploratory openings were conducted at these locations to review the cause.

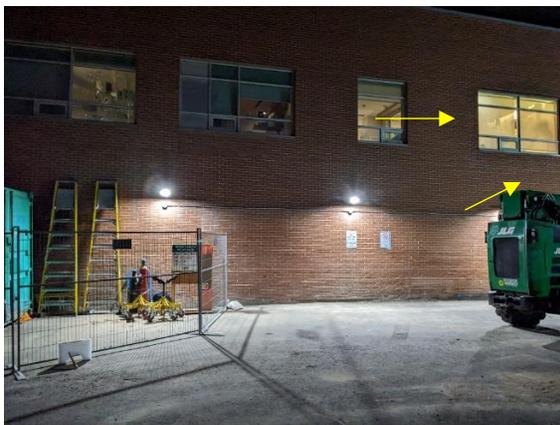


Image 1 –Location of anomalies in image 3 and 4



Image 2 – Typical thermal image



Image 3 – Thermal anomaly to left of window



Image 4 – Thermal anomaly beneath window

5.2. Visual Review

The visual review of the masonry wall, sealants and windows identified various deterioration. The following items were noted and identified on Drawing SK-2 in Appendix B.

1. Individual damaged brick units noted at three locations
2. Loose bricks/ cracking mortar joints noted at the parapet, one location
3. Minor mortar deterioration at isolated mortar joints
4. Debonding sealant at window perimeters throughout
5. Weep holes at base of wall partially obstructed with mortar
6. A previous masonry repair area beneath the second window from South, extending from shelf angle to window sill

The following images provide examples of the above noted observations.



Image 5 – Damaged brick units



Image 6 – Loose bricks / cracking mortar



Image 7 – Minor mortar deterioration



Image 8 – Debonding sealant



Image 9 – Weep holes obstructed



Image 10 – Previous repair area

5.3. Exploratory Openings

Based on the thermography and visual review, exploratory openings were conducted at representative locations and areas of thermal anomalies. Observations at each opening are noted below, and their locations are identified on Drawing SK-2 in Appendix B.

1. Exploratory Opening 1 – Base of Wall

Five courses of masonry were removed at the base of the wall, adjacent to a control joint, to review the construction details and condition of the through wall flashing. EXP noted that a self-adhered water resistive membrane (Blueskin SA) was installed as through wall flashing on the concrete foundation, with an upturn onto exterior sheathing board installed on steel studs. A lap joint in the membrane was not present within the opening to determine if they are edge sealed. Blueskin SA membrane was installed on the sheathing as the water resistive barrier (WRB), lapped shingle fashion over the through wall flashing and the masonry tie was noted to be sealed with Airbloc 21. 50 mm (2 in) thick mineral wool insulation was installed against the WRB with a 38 mm (1.5 in) air space between insulation and masonry.

EXP noted the following deficiencies at the base of the wall which could lead to and contribute to water infiltration.

- a. A hole/tear was noted in the Blueskin SA through wall flashing at the bottom corner. EXP noted that the membrane was unsupported at this location by approximately 13-19 mm (0.5 – 0.75 in).
- b. No mortar net was present at the base of the wall.
- c. A wire reinforced parging material on the vertical face of the foundation wall extended above the height of the through wall flashing, and masonry was laid in a mortar bed of equal height.
- d. As noted in the visual review, the weep holes were generally obstructed.

2. Exploratory Opening 2 – Shelf Angle

Five courses of masonry were removed at the shelf angle between first and second floor (four above and one below) at the location of the observed thermal anomaly. EXP noted that the angle to the south extended approximately 100 mm (4 in) out and projected into the masonry by approximately 13 mm (0.5 in). The angle was noted to align with masonry rather than the mortar joint, and the lower masonry unit was cut to

accommodate the angle. The angle to the north only projected out approximately 50 mm (2 in) with clearance behind the masonry. The difference in the depth of the angle was the cause for the observed thermal anomaly. In general, EXP noted the same construction details at this location as the base of the wall.

EXP noted one deficiency at this location that could lead to water infiltration. At the step in the steel angle, there was a void in the membrane and angle on the underside at the corner. This was sealed with membrane during reinstatement.

3. Exploratory Opening 3 – Field of Wall Thermal Anomaly

Four courses of masonry were removed at the thermal anomaly location in the field of the wall on the second floor adjacent to the window. Upon removal of the brick masonry only, EXP noted a hole through the insulation, Blueskin membrane (WRB) and exterior sheathing layers. Air exfiltration could be felt from this hole during the review. To the interior of the exterior sheathing layer EXP noted the backside of gypsum wall board on the interior side of the steel studs, which was intact.

4. Exploratory Opening 4 – Window Tie-in

Two masonry units were removed adjacent to the window jamb at the sill to review the window tie-in details. EXP noted at the jamb, the Blueskin membrane WRB appeared to terminate at the edge of the exterior sheathing. Spray applied foam insulation was present between the rough opening and window frame. Additionally, rigid insulation (extruded polystyrene) was present within the window frame. At the sill, EXP noted a plywood sill pan extending from the rough opening to the masonry.

5. Exploratory Opening 5 – Previous Masonry Repair Area

EXP noted that masonry has previously been replaced beneath the second window north of the stairs. The repair area extended from the shelf angle to the window sill, and from the control joint at the south of the window to approximately three bricks south of the north jamb.

Three courses of masonry were removed at the edge of the masonry repair area to review the conditions behind. EXP noted a Blueskin SA membrane patch was present at this location. Additionally, EXP noted that the shelf angle projected into the mortar joint at this location.

6. Exploratory Opening 6 – Roof Parapet

At the roof parapet the metal cap flashing and metal cladding on the interior side of the parapet were partially dismantled, including the removal of pavers at roof level. At the parapet, beneath the metal cap flashing, Blueskin SA membrane was noted to protect the wood parapet blocking. Beneath the blocking EXP noted the Blueskin WRB from the exterior wall appeared to tie into a modified bituminous roof membrane base sheet which extended from the interior side of the parapet wall over the top of the parapet. At the south end at the transition to darker coloured parapet, EXP noted a poorly installed transition of the membranes at this location.



Image 11 – Exploratory opening 1



Image 12 – Hole in membrane



Image 13 – Sheathing substrate, unsupported membrane



Image 14 – Masonry tie



Image 15 – Mortar bed and parging



Image 16 – Exploratory opening 2



Image 17 – Void at inside corner



Image 18 – Masonry cut to accommodate angle



Image 19 – Exploratory opening 3, as found



Image 20 – Hole through exterior sheathing



Image 21 – Exploratory opening 4



Image 22 – Exploratory opening 5



Image 23 – Exploratory opening 6



Image 24 – Poor membrane tie-in



Image 25 – Wall WRB tie-in to mod. bit. membrane



Image 26 – Paver removed



Image 27 – Example membrane patch applied



Image 28 – Example test opening re-instated

6. Summary of Results and Discussion

EXP's field work, as reported above, identified three deficiencies which would directly allow water ingress beyond the exterior plane of water tightness into the exterior wall cavity, as well as various deterioration or details which would contribute to the water ingress due to allowing excess water into the cladding system and limiting drainage capacity. Water which bypasses the exterior plane of water tightness and enters the wall cavity, can lead to wetting of moisture susceptible building materials at the interior, and can lead to mould growth. Additionally, EXP noted that the exterior portion of the wall construction did not match what was shown on the provided wall section detail drawing. See drawing D1 in Appendix B.

There were three locations identified with a breach in the water resistive drainage layer, which would allow water penetration into the wall assembly. At exploratory opening 1, at the base of the wall, the through wall flashing membrane was torn at the bottom corner. EXP noted the membrane was not supported at this location, which can contribute to the membrane being more easily punctured. Any water which penetrates the masonry layer above, which is expected by design, accumulates at the base of the wall, and is to be directed outward and drained from the wall system by the through wall flashing and weep holes. So holes at this location can be a significant source for water ingress. Additionally, with the weep holes being blocked and raised above the height of the membrane, the drainage of the system is restricted, further contributing to the water ingress. A lack of mortar net at the base of wall also contributes to restricted drainage and drying potential of the masonry cavity, as mortar droppings during construction build up at the base of the wall obstructing the drainage and venting paths. The full length of the base of wall should be remediated, as it can be assumed that additional holes in the membrane exist elsewhere.

At exploratory opening 2, at the shelf angle, a small void was noted in the membrane at the inside corner, allowing water to bypass the waterproofing layer, at a location where water from the wall above would be accumulating to drain out. It should be noted that this angle is not performing the function of a shelf angle, which is to support the masonry above, and compartmentalize floors and divert water out of the cladding system, as it doesn't extend adequately beneath the masonry to perform these functions. For a two-storey masonry wall this is not a requirement, but it has an impact on the drainage and venting potential of the masonry cavity. The small void was sealed during reinstatement, and at this time there is no need for additional remediation at the "shelf angle" location.

At exploratory opening 3, the thermal anomaly in the field of the wall was confirmed to be a large hole through the insulation, water resistive barrier and sheathing layers. This hole could allow water ingress into the wall cavity, as well as contribute to condensation due to the air leakage and lack of insulation. The void at this location was sealed and insulation added during reinstatement, so there is no need for additional remediation at this location.

Various other signs of deterioration were noted such as damaged brick units, deteriorating mortar, loose bricks with cracking mortar joints, as well as debonding sealant joints at the window perimeters. These items may not directly cause water ingress to the interior, but allow an excess amount of water into the wall cavity and lead to accelerated deterioration. These should be addressed at the time of repairing the base of the wall.

At the south end of the parapet, where there is a slight jog and it meets the darker coloured portion, there was a poor tie-in between membranes at the two phases of construction. As different membranes were present, it is likely they were constructed at different times. The membrane discontinuity at this location likely wouldn't allow bulk water ingress as it is protected by the metal flashing, but it may be a source of air leakage, which could contribute to condensation and energy loss. This connection should be further opened and the tie-in of the two constructions made continuous.

Lastly, EXP noted that the drawing of the wall section detail, D1, by IRC, did not match the site conditions. The drawing shows concrete block wall behind the exterior masonry cladding, however, after masonry removal, EXP noted Blueskin SA membrane was installed on exterior sheathing which was installed on steel studs (i.e., no concrete block). Additionally, EXP noted that where the interior wall has been remediated in 2020 due to the flooding, a polyethylene vapour barrier was installed on the interior side. As Blueskin SA membrane was installed on the exterior side, a vapour retarder is present on the interior and exterior of the wall section. This could potentially lead to interstitial condensation and the double vapour retarder would prevent drying in either direction, which could lead to moisture problems. It is not clear from the provided documents whether the existing interior wall had a polyethylene vapour barrier installed, or if it was added only in the remediated portion.

7. Recommendations

Based on the field assessment, to address the observed deterioration and deficiencies, and mitigate water penetration into the wall cavity, EXP would recommend conducting a full length repair at the base of the wall to remediate the through wall flashing and address the drainage concerns. In addition, isolated repairs of the deteriorated masonry and mortar joints should be conducted, and the window perimeter sealants should be removed and replaced. The tie-in between the two dissimilar parapets at the south end should also be addressed.

EXP would recommend the following to address the observed deterioration and deficiencies:

1. Base of wall through wall flashing repair (Section details provided in Drawing SK-3 in Appendix B)

- a. Along the full length of the base of wall (approximately 15 m), approximately four courses of masonry are to be removed to access the through wall flashing. Repair to be staged and masonry above to be supported during repairs. The repair area has been expanded beyond the reviewed area as it can be assumed that the same construction detail continues for the full length of that wall.
- b. Insulation to be removed and saved for reuse.
- c. The wire reinforced parging on the vertical face of the foundation wall is to be cut down to be flush with the concrete slab.
- d. Any holes in the membrane are to be sealed. Membrane to be first cleaned with solvent, Blueskin SA membrane patch applied extending a minimum of 100 mm beyond the hole, and edges sealed with BES 925 sealant.
- e. Prefinished sheet metal flashing with 100 mm vertical back leg and drip edge to be installed.
- f. Transition membrane (Blueskin SA) to be installed over the vertical back leg of metal flashing, with top edge sealed with BES 925 sealant. Existing membrane to be first cleaned with solvent.
- g. Insulation re-installed, mortar net installed along base of wall, and new cell vents to be installed in weep holes during masonry reinstatement.
- h. Reinstatement masonry along base of wall.

2. Window perimeter sealants

- a. All windows (quantity 10) to have sealant and backer rod removed and replaced. This includes all windows on that wall.
- b. Sealant to be Tremco Spectrem 2 or Dowsil 795.

3. Brick replacement, re-bricking at parapet and re-pointing

- a. Individual brick units which are damaged are to be replaced (approximately 4 in reviewed area). Replacement of 10 brick units has been allowed for in the pricing to account for any additional units on the rest of the wall.
- b. Where loose bricks were noted (1 location in reviewed area at parapet, see image 6, approximately 0.5 square meters), loose bricks to be removed and the area re-bricked. Parapet sheet metal flashing will potentially have to be removed to allow for the brick replacement.
- c. Location with deteriorated mortar joints (1 location in reviewed area, approximately 2 linear meters) to be re-pointed.

4. Parapet tie-in

- a. At the transition of the two dissimilar parapets, metal cladding and flashing to be removed.
- b. New self-adhered membrane (Blueskin SA) to be applied to transition between the two parapets to maintain continuity.

Prior to conducting the above noted repairs, EXP recommends further investigation to review the discrepancy between the wall section drawing and the observed conditions, as well as the double vapour retarder. The results from the additional investigation could have an impact on the repair recommendations. EXP recommends conducting additional exterior openings from grade to confirm that the Blueskin on sheathing observed is consistent throughout, and removal of additional layers to verify the wall construction. Additionally, an interior opening at an existing location adjacent to the remediation location would be required to verify the pre-existing conditions along the remaining wall. Once the actual exterior wall construction details are confirmed, a hygrothermal analysis should be conducted to determine if the double vapour retarder could lead to condensation issues, and to determine appropriate remediation options.

Lastly, UHN informed EXP of an ongoing project in the same vicinity as the subject wall of this report, the "SEM Center External Corridor" project. EXP recommends that this report is provided to the Design Team for that project for their consideration during design. Particularly the deficiencies in the through wall flashing, and the "shelf-angle" should be considered.

8. Class D Cost Opinion

The costs below are our opinion of the probable cost for the repair work described in this report. EXP has estimated the costs based upon the conditions present at the time of our site review and average unit prices obtained during 2023 by competitive bidding on similar projects in the Greater Toronto area as well as cost estimating guides.

Please be aware that the preparation of a cost estimate requires making assumptions as to the actual conditions encountered on site, the means and methods of construction, the costs and extent of labour, equipment and materials employed, the contractor's technique in determining prices and market conditions at the time of tender, and other factors for which EXP has no control. The actual replacement costs may vary based on the prices received at the time of competitive bidding and the actual quantities of work performed. Given that these cost estimates are Class D, we have included a twenty percent (20%) contingency allowance to address unforeseen conditions. The costs below should only be used as approximate figures for comparison of options and for order-of-magnitude budgeting purposes. The actual costs can only be established once the work is tendered and completed and final repair quantities are known. Please note that our opinion of the probable cost does not include EXP's engineering fees to prepare specifications or to provide construction review services.

Table 1 - Class D Cost Opinion Table

Description of Repair Item	Recommended Repair Work (2023 \$'s)
Base of wall through wall flashing	\$11,000.00
Window perimeter sealants	\$1,600.00
Individual brick replacement, re-bricking at parapet, re-pointing and parapet tie-in	\$5,700.00
Mobilization/de-mobilization	\$4,750.00
Sub-Total	\$23,050.00
20% Contingency Allowance	\$4,610.00
Total	\$27,660.00

Please Note:

1. Above fees do not include EXP's consulting fees.
2. Mobilization cost includes a zoom boom only. If any additional scaffolding or hoarding/fences are required it will be extra.
3. HST is not included.

9. Professional Limitations

The information presented in this report provides an assessment of the current condition at the site within the terms of reference and limitations outlined in our proposal. We have been asked to make recommendations and opinions based solely on a review and testing of a sampling of existing components. We conducted a review of the documents provided by UHN, thermal imaging, visual review, and exterior exploratory openings during our assessment.

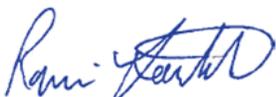
We arrived at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Refer also to our Interpretation and Use of Study and Report in Appendix B.

We trust that this report meets your immediate requirements and if you have any questions or comments concerning this report, or if you require any further assistance, please do not hesitate to contact the undersigned.

Sincerely,

EXP Services Inc.



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EXP Services Inc.

TWH-FP Building Envelope Assessment, UHN #110023024
399 Bathurst Street, Toronto, ON
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Appendix A – Interpretation and Use of Study and Report



INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorize only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorized use of the Report.

5. INTERPRETATION OF THE REPORT

- a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b. Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.
- c. To avoid misunderstandings, EXP Services Inc. (EXP) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by EXP. Further, EXP should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with EXP's recommendations. Any reduction from the level of services normally recommended will result in EXP providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When EXP submits both electronic file and hard copies of reports, drawings and other documents and deliverables (EXP's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EXP shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EXP shall be deemed to be the overall original for the Project.

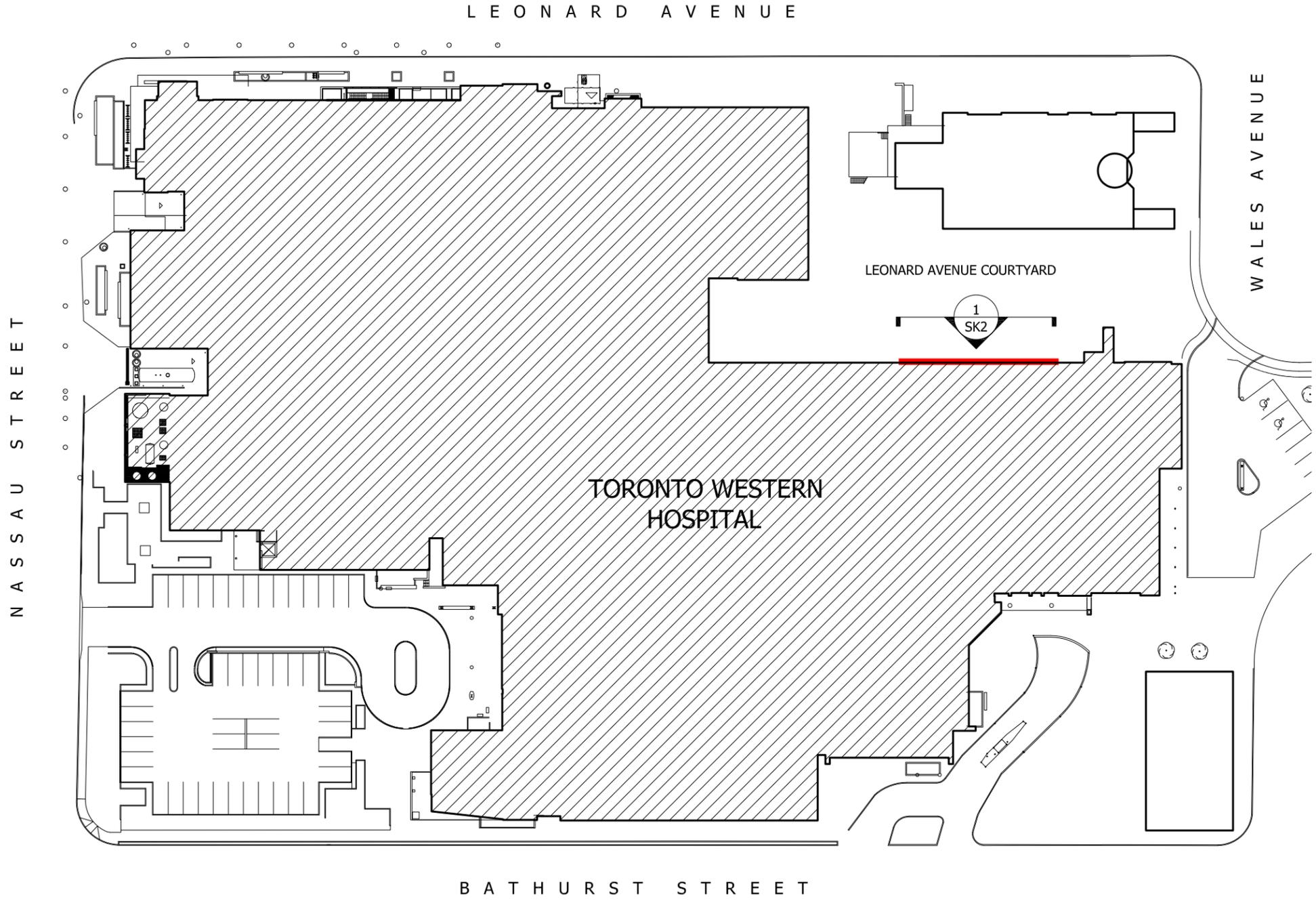
The Client agrees that both electronic file and hard copy versions of EXP's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EXP. The Client warrants that EXP's instruments of professional service will be used only and exactly as submitted by EXP.

The Client recognizes and agrees that electronic files submitted by EXP have been prepared and submitted using specific software and hardware systems. EXP makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

EXP Services Inc.

TWH- FP Building Envelope Assessment, UHN #110023024
399 Bathurst Street, Toronto, ON
BRM-21013311-B0
December 5, 2023

Appendix B – Drawings



KEY PLAN

Scale: N.T.S.

NOTE:

1. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES, SITE CONDITIONS AND ALL DIMENSIONS.
2. DO NOT SCALE DRAWINGS.
3. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

exp Services Inc.
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 1595 clark Boulevard
 Brampton, ON L6T 4V1
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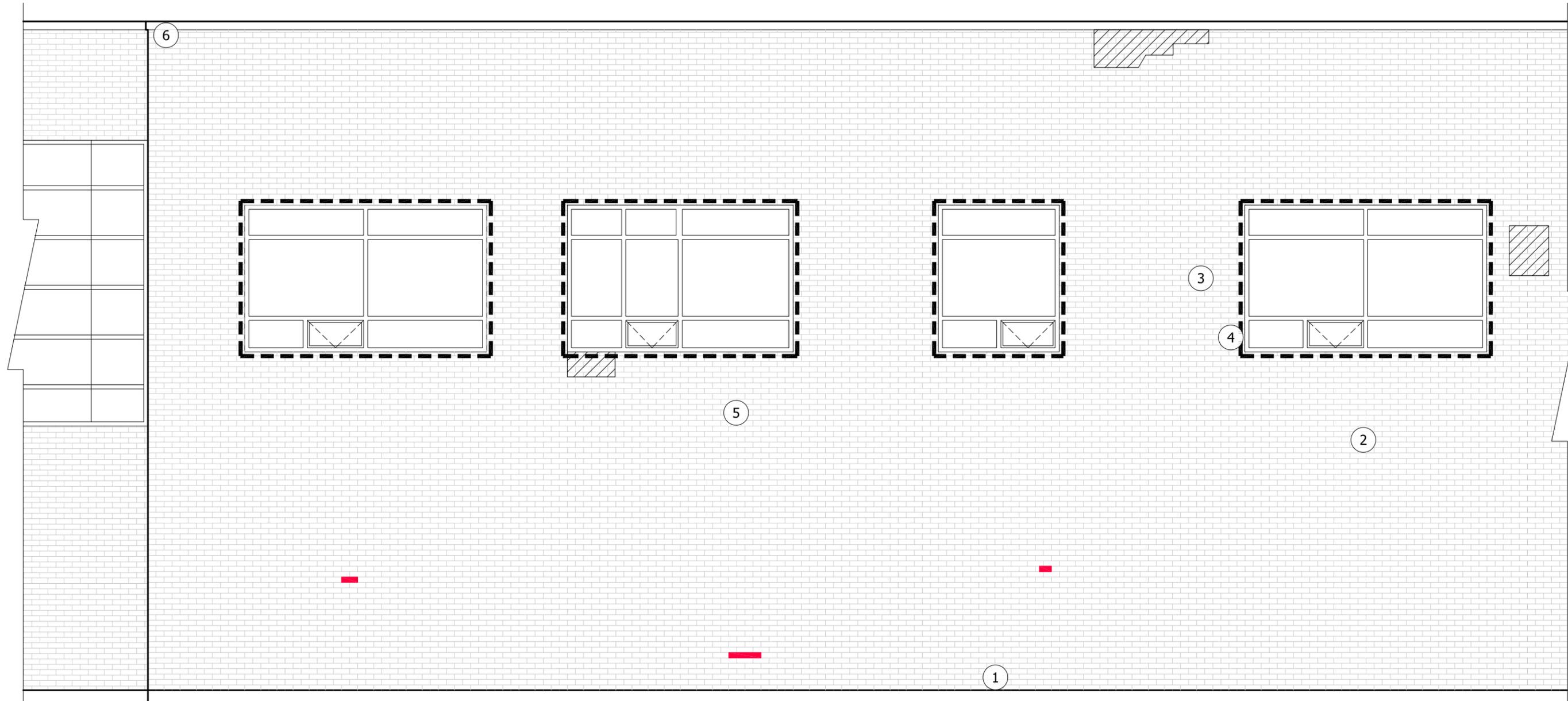
NO.	DESCRIPTION	DATE	BY	APP'D
R E V I S I O N S				

PROJECT
TORONTO WESTERN HOSPITAL
 FELL PAVILION EXTERIOR WALL ASSESSMENT
 PROJECT #110023024
 399 BATHURST ST, TORONTO, ON M5T 2S6

CLIENT
 UNIVERSITY HEALTH NETWORK (UHN)

KEY PLAN	
PROJECT NO. BRM-21013311-B0	DRAWING NO.
DESIGN XXXXX	SK1
DRAWN BY A.M.S.	
CHECKED BY R.L.	
DATE JULY 26, 2023	
SCALE NOT TO SCALE	

AMJAD SAKR December 4, 2023 E:\BRM\BRM-21013311-B0\60 EXECUTION\65 DRAWINGS\BRM-21013311-B0 - WALL ELEVATION.DWG (SK1)



1 PARTIAL ELEVATION
Scale: N.T.S.

- LEGEND:
- # EXPLORATORY OPENING
 - DAMAGED BRICK
 - DETERIORATED MORTAR, AND LOOSE BRICKS
 - DEBONDING SEALANT

NOTE:

- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES, SITE CONDITIONS AND ALL DIMENSIONS.
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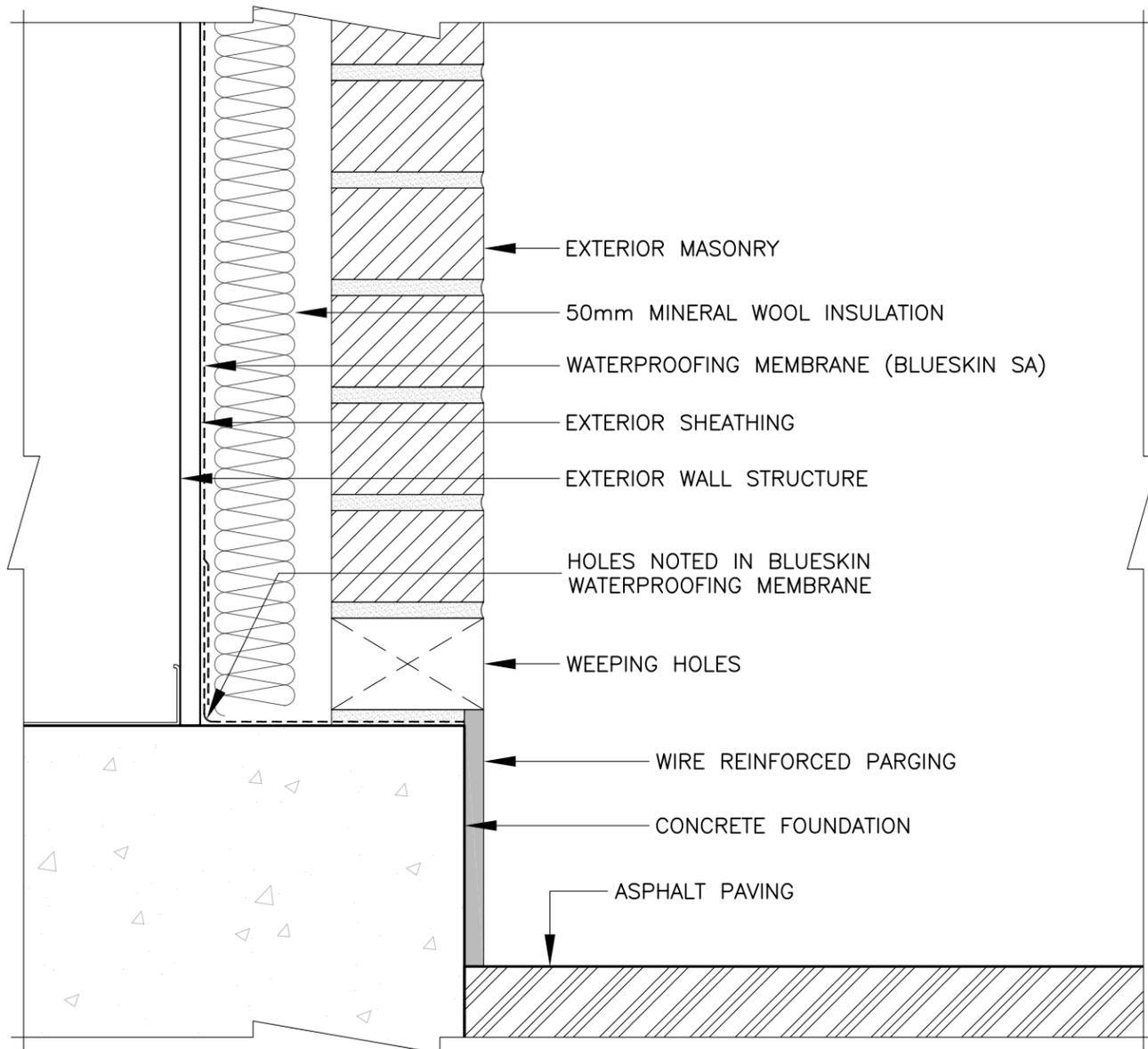
NO.	DESCRIPTION	DATE	BY	APP'D
R E V I S I O N S				

PROJECT
TORONTO WESTERN HOSPITAL
 FELL PAVILION EXTERIOR WALL ASSESSMENT
 PROJECT #110023024
 399 BATHURST ST, TORONTO, ON M5T 2S6

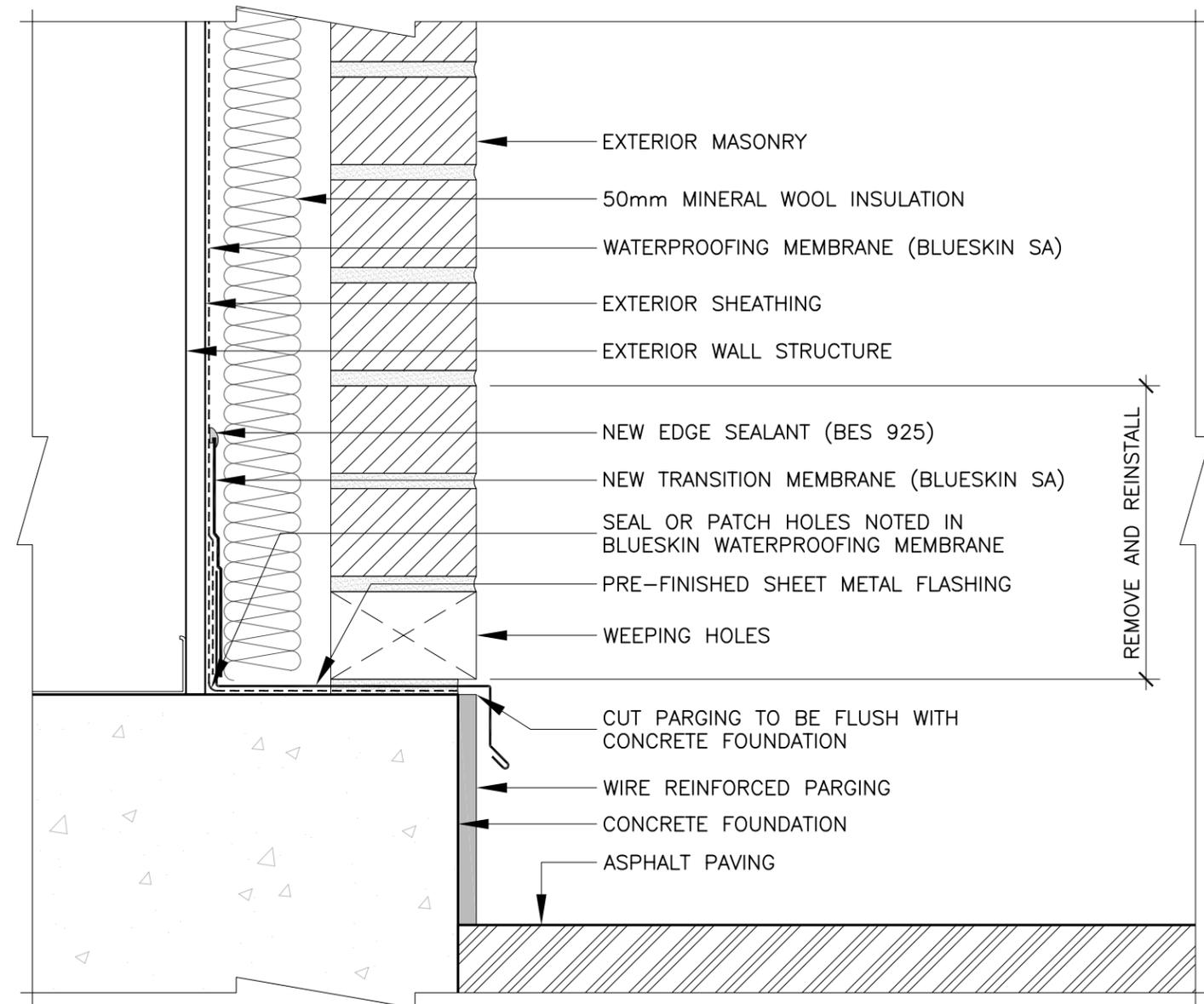
CLIENT
UNIVERSITY HEALTH NETWORK (UHN)

TITLE PARTIAL ELEVATION	
PROJECT NO. BRM-21013311-BO	DRAWING NO.
DESIGN XXXXX	SK2
DRAWN BY A.M.S.	
CHECKED BY R.L.	
DATE JULY 26, 2023	
SCALE NOT TO SCALE	

AMJAD SAKR December 4, 2023 E:\BRM\BRM-21013311-BO\60 EXECUTION\65 DRAWINGS\BRM-21013311-BO - WALL ELEVATION.DWG (SK2)



1 EXISTING THROUGH WALL FLASHING SECTION DETAIL Scale: N.T.S.



2 PROPOSED REPAIR THROUGH WALL FLASHING SECTION DETAIL Scale: N.T.S.

AMJAD SAKR December 4, 2023 E:\BRM\BRM-21013311-B0\60 EXECUTION\65 DRAWINGS\BRM-21013311-B0 - WALL ELEVATION.DWG (SK3)

NOTE:

1. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES, SITE CONDITIONS AND ALL DIMENSIONS.
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NO.	DESCRIPTION	DATE	BY	APP'D

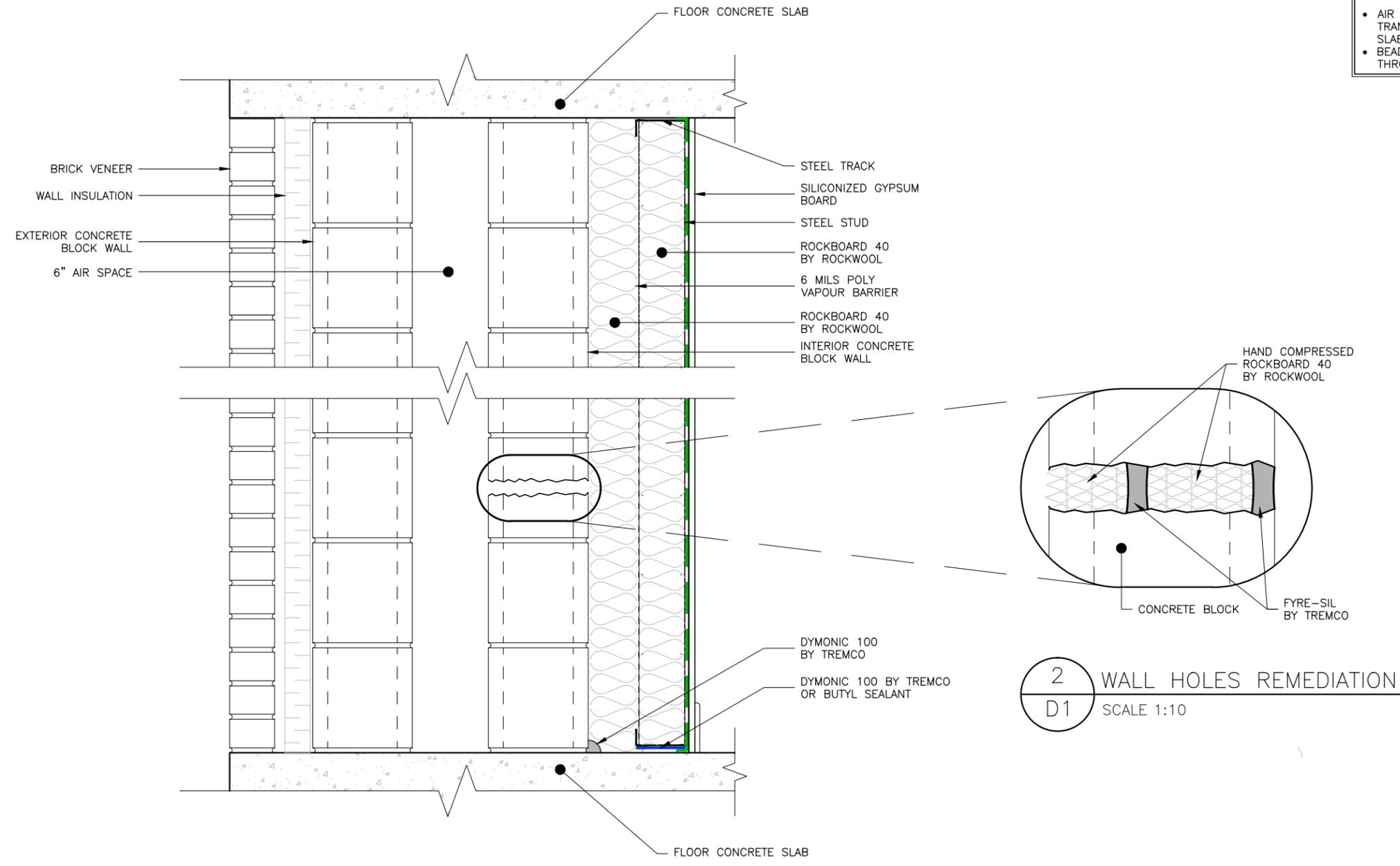
R E V I S I O N S

PROJECT
 TORONTO WESTERN HOSPITAL
 FELL PAVILION EXTERIOR WALL ASSESSMENT
 PROJECT #110023024
 399 BATHURST ST, TORONTO, ON M5T 2S6

CLIENT
 UNIVERSITY HEALTH NETWORK (UHN)

TITLE SECTION DETAILS	
PROJECT NO. BRM-21013311-B0	DRAWING NO.
DESIGN XXXXX	SK3
DRAWN BY A.M.S.	
CHECKED BY R.L.	
DATE JULY 26, 2023	
SCALE NOT TO SCALE	

- NOTES:
- AIR BARRIER TO BE INSTALLED CONTINUOUS, WITH TRANSITIONS TAPED, EXTENDED INTO THE FLOOR SLAB AND CEILING
 - BEAD OF DYMONIC 100 MUST BE CONTINUOUS THROUGHOUT THE ENTIRE WALL



1 WALL SECTION
D1 SCALE 1:10

2 WALL HOLES REMEDIATION
D1 SCALE 1:10

PEN COLOR CODE: C1-0.10 C2-0.20 C3-0.30 C4-0.40 C5-0.50 C6-0.10 C7-0.15

LEGEND:	
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 <p>IRC BUILDING SCIENCES GROUP SERVING CANADA WITH REGIONAL OFFICES FROM COAST TO COAST HEAD OFFICE 2121 ARGENTIA ROAD, SUITE #401, MISSISSAUGA, ONTARIO TOLL FREE: 1-888-607-5245 TEL: 905-607-7244 WWW.IRCGROUP.COM FAX: 905-607-7288</p>	TITLE: WALL REMEDIATION	IRC #: XXXXX	NORTH:	DRN.: H.V.	
	CLIENT: UNIVERSITY HEALTH NETWORK	W.O.#: HB20-XXXSP		CHK.: C.T.	
	PROJECT: TORONTO WESTERN GENERAL HOSPITAL 399 BATHURST STREET TORONTO, ONTARIO	SCALE: AS NOTED		DWG.#: D1	REV.#: REV 00
		DATE: 2020/12/18			