Appendix G
Roof Assessment

Building Envelope
Professionals Group, LLC

October 16, 2018

Mr. Joe Dettlaff, PE
Berners Schober Associates Inc.
310 Pine Street
Green Bay, WI 54301

Re: UW-Madison Camp Randall Fieldhouse Roofing Assessment

Dear Mr. Dettlaff:

Per your request, I have completed an initial assessment of the roofing systems on the UW Madison Camp Randall Field House. Based on the information obtained, I offer the following report.

Observations and Findings

1. The roof structure consists of steel structural members with tongue-and-groove wood decking.
2. Clay tile is the predominant roofing system on the field house. The tile appears to be Interlocking French roofing tile by Ludowici. Information has been requested from Ludowici to attempt to establish a date of installation. Reportedly, this roofing system was installed in the 1980s.
    a. The clay tile is laid on a vertical and horizontal batten system. The battens are secured to the roof deck; the clay tile is laid onto the battens. Where observed, no fasteners were used to secure the tile to the battens. This system allows for water to drain out of the system and promotes ventilation to dry the system between weather events.
    b. Where observed, wood battens appear to be in good condition.
    c. A few broken clay tiles were observed throughout the field of the roof. However, the clay tile appears to be in good to excellent condition based on visual assessment.
    d. No samples of the roofing underlayment were taken; however the underlayment appears to be standard heavy-weight roofing felts consistent with installation practices of the time.
    e. Clay tile roof flashings appear to be in generally good condition.
3. The low-slope membrane system at the eave / gutter edges and the east slope parapets consists of a 4-ply BUR roofing system with a granulated cap sheet installed over (approx.) 1" of rigid fiberglass insulation over varying thicknesses of cork. At both core sample locations, total roofing system thickness was approximately three (3) inches.
    a. Multiple repairs are evident though out the low-slope roofing system.
    b. The granulated cap sheet has experienced significant granule loss.
    c. Multiple roof drain repair attempts are evident. Roof drains on the west slope reportedly leak frequently.

   d. Sheet metal roof-to-wall flashings appear to be in good condition. Removal of existing flashings to determine exact composition and profile was not completed, however it is likely the sheet metal counter-flashing connects to a sheet metal reglet cut into the masonry. It is unlikely a continuous through-wall flashing is present.
   e. Multiple repair attempts have been made at the roof-to-wall sheet metal flashings.
4. While a through masonry assessment was not part of the scope of this report, masonry systems adjoining roofing systems were reviewed. The predominant masonry system (above the roof) consists of brick masonry with terra cotta ornamentation and coping. Sheet metal coping also exists at the top-of-parapet condition.
   a. Terra cotta elements are largely in good condition with some finish deterioration observed. However, all terra cotta mortar joints were observed to be failed or in some mode of failure.
   b. Brick masonry is generally in fair to poor condition and requires significant repair and restoration.
5. The sheet metal coping at the top of the parapets does not turn-down onto the terra cotta and could potentially allow moisture under the sheet metal.

Discussion

In my opinion, the predominant source of moisture intrusion and leakage is through the masonry parapets. However, the low-slope membrane system is beyond its serviceable life expectancy, is likely leaking at various locations, and should be replaced.

Recommendations

Based on these observations, I recommend the following:

1. The masonry parapet should be repaired / restored prior to or in conjunction with any roofing system replacement. New roof-to-wall reglet flashings should be supplied by the roofing / sheet metal contractor and installed by the masonry restoration contractor.
2. Low-slope roofing systems should be replaced with a robust, redundant, multi-ply roofing system. Recommended systems include a two-ply modified bitumen roofing system with a reinforced, fluid-applied poly-methyl-methacrylate (PMMA) finish with embedded granule surfacing. This system will provide required properties to resist low-term snow / ice / water flows and puncture resistance, resistance to foot-traffic, slip resistance, and superior flashing ability.
3. Given the age and composition of the various roofing materials, all felts, BUR materials, etc. should be assumed to be positive Asbestos Containing Roofing Material (ACRM) per standard DFDM roofing practice.
4. The existing clay tile roofing will need to be disturbed at its perimeters to properly integrate the new low-slope roofing systems. New edge details should be designed and implemented to allow for future roofing system repair and replacement without requiring the clay tile roofing to be disturbed. Given the clay tile is not nailed to the existing battens, minimal damage or clay tile breakage should occur.

5. New sheet metal flashing should be installed at the top of the parapet walls at the terra cotta to improve weather resistance.

Conclusion

This report is based on the data obtained at the time of assessment. BEPG reserves the right to modify this report if additional data becomes available.

BEPG appreciates the opportunity to provide this assessment and report. Please do not hesitate to contact us with any questions.

Sincerely,

Thomas M. Gernetzke, RBEC, FRCI
Principal Consultant
Building Envelope Professionals Group, LLC

Attachment: Select Photos

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Select Photos

East roof slope, north parapet

East roof slope, east parapet. Large patch was reportedly installed during the scoreboard replacement which required cutting a large access hole through the roof.

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Photo of west slope from north parapet

Photo of east slope from north parapet

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Masonry at peak of roof at north parapet. Brick masonry is in fair-to-poor condition; terra cotta mortar joints are in poor condition.

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Photo of brick from “Western Brick Co, Danville ILL U.S.A.”, typical

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Multiple reinforced mastic “dope and rag” repairs at ventilator curb flashings, north parapet

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Cracked roof tile observed at north parapet area.

Sheet metal coping and flashing joint in questionable condition.

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Close-up of photo, above. Sheet metal flashing does not appear to sufficiently overhang terra cotta elements.

Multiple BUR roofing repairs at north parapet wall.

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BUR mastic repairs beginning to fail, north parapet wall.

Terra cotta ornamentation, brick masonry in poor condition.

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Close-up of photo above.

Broken / penetrated tile observed at lower roof / east parapet area.

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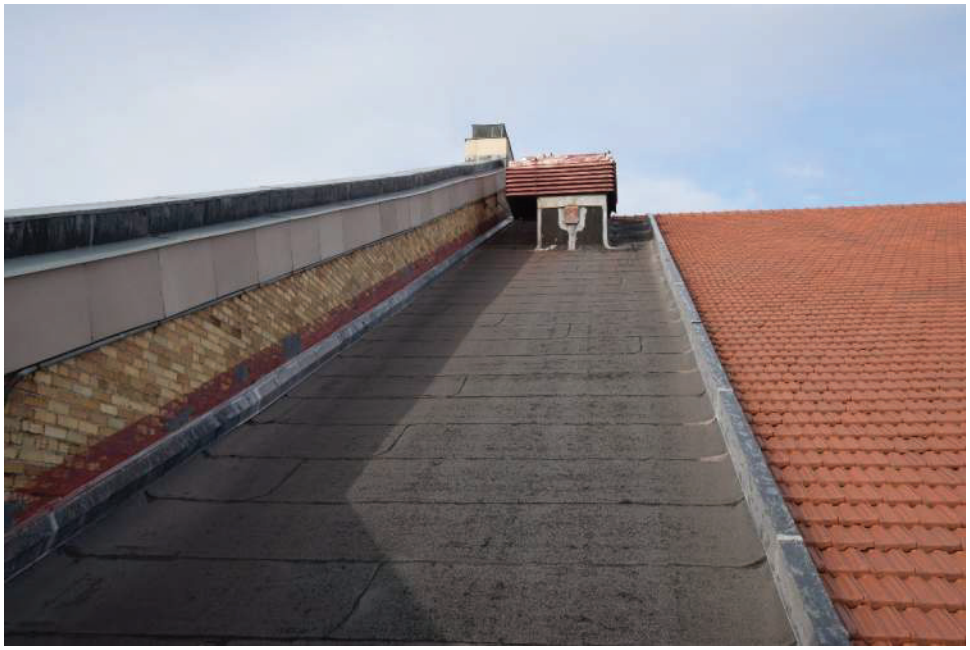
Open joint at terra cotta coping, typical.



East roof slope, south parapet

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Selective tile removal at lower edge, east slope, north parapet. Tile is laid (not nailed) on battens on (likely) multiple layers of roofing felt. Battens run horizontally and vertically (not in photo) across roof to allow maximum drainage and ventilation under tile.

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Tile is Interlocking French tile by Ludowici Tile.

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Interior photo of problematic roof drain, west slope.

West slope, north parapet

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West slope, north parapet. Masonry in poor condition; multiple repair attempts evident.

Conduit penetration through tile roofing, north parapet. Penetration flashing in questionable condition.

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West slope, west parapet

Sheet metal counter-flashing detached from receiver / drip flashing. Tile removed to expose flashing condition. Tile roofing assembly appears consistent with east slope assembly.

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West slope, south parapet wall. Mastic repair above sheet metal reglet is failing. Mastic will begin to collect water and direct it into the masonry and flashing as the mastic peels off the wall.

Original roof structure, roofing assembly observed from the west slope access scuttle. Roof saddle construction is newer vintage than other framing, sheathing present.

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Roofing core taken at west slope.

Core depth approximately 2”.

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