UCB Weber Hall R-38 Roof Insulation Variance Request Form

https://www.colorado.edu/facilities-standards/content/feedbackstandards-updateproject-variance-request-form

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Campus Standards Section #: B2020 – 8.b and 8.c.

Type of Issue: Interpretation, Technical, Additional Information

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Describe issue or variance request:

University of Colorado Boulder (UCB) and Oz Architecture have contracted Amtech to provide roof replacement design documents for the Weber Hall Apartment Building, which includes the removal and replacement of two (2) low-slope mechanical pit ballasted roofs as part of the proposed 2026 maintenance project. Both roof areas contain a large roof top unit set directly in the middle of the small, enclosed roof area(s) that is currently resting 3- inches to 4-inches above the highest point of the existing roof taper system – the thickness of the roof assembly at this location is approximately 5.5-inches. Recently documented roof cores confirmed that the existing roof assembly consists of a ballasted loose laid EPDM membrane and a ¼-inch per foot sloped expanded polystyrene (EPS) insulation all over a zero-sloped structural concrete roof deck.

As flashing heights are limited to approximately 4 to 6 inches by the mechanical units, piping, wall weep systems, and door thresholds, achieving the UCB required R-38 thermal resistance at the drains (before adding new roof taper) would increase the roof system thickness 6.5-inches. This increase in roof system height would require major modifications to the large mechanical units, piping, exterior wall systems, and door openings. This would significantly increase project costs and risk damage to adjacent construction, equipment, and surrounding areas.

Amtech's proposed design intent would be as follows:

- Remove and dispose of the existing roof system down to the concrete roof deck.
- Install a new self-adhered vapor retarder directly over the prepared concrete roof deck.
- Install a new 2-way sloped ¼-inch per foot sloped polyisocyanurate insulation with minimum ½-inch per foot sloped counter crickets, all set in a new low-rise foam adhesive.
- Install a new 5/8" DensDeck StormX cover board set in low-rise foam adhesive to achieve the Very Severe Hail rating.
    - If thermal performance is a higher priority than hail resistance, a high-density polyisocyanurate cover board may be used instead of 5/8" gypsum board, adding an R-value of 1.83 to each roof area.
- And install a new 90-mil EPDM membrane set in full coverage bonding adhesive.

Though the proposed new system would similarly reflect the slope and thickness of the existing assembly, the use of the polyisocyanurate insulation (approximately R-5.7 per inch) would increase the overall R-value compared to the existing extruded polystyrene (approximately R-3.9 per inch). While we understand UCB does not typically accept an area-weighted average R-value, given the unique conditions

and constraints for these two small roof areas, we feel it is worth noting that the estimated average R-value would be improved over the existing conditions as follows:

- North mechanical pit roof area: Proposed system estimated area-weight average R-value would be 19.41 (21.24 with an HD polyisocyanurate coverboard) compared to the existing estimated EPS area-weighted average R-value of 14.9.

- South mechanical pit roof area: Proposed system estimated area-weight average R-value would be 19.61 (21.44 with an HD polyisocyanurate coverboard) compared to the existing estimated EPS area-weighted average R-value of 14.43.

Additionally, the fully adhered roof system would remove the need for roof ballast, as ballast is to be removed per UCB Facility Standard B2020.8.b.2.

Due to budget constraints for this project, if the variance request is not approved, it is probable that the two low-slope mechanical pit roof scopes will not be completed, and the existing conditions and issues will remain until addressed in a future project.

Refer to the attached photograph log showing the limitations based on existing conditions and Design Development Roofing documents for the proposed replacement system.

Submit compiled PDF of supporting documents on comparisons, cost implications, etc.

For project related requests:
- Project Name: WEB-Maintenance-2026
- Number: UCB001328
- Project Manager: Mykala Keuter

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UCB Weber Hall
Variance Request
Photograph Log

	**Photograph No. 1.** Overview of Weber Hall roof areas. The two low-slope roof areas referenced in the variance request are circled in red. Access to the roof areas to raise or modify the existing rooftop units are limited by building height, the roof pit conditions, and surrounding building landscape.
	**Photograph No. 2.** Overview of the south ballasted EPDM roof area with the mechanical unit.
	**Photograph No. 3.** Overview of the north ballasted EPDM roof area with the mechanical unit.

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	**Photograph No. 4.** Limited clearance below RTU on north mechanical pit roof area.
	**Photograph No. 5.** Limited clearance below RTU on north mechanical pit roof area.
	**Photograph No. 6.** Limited clearance below gas piping on north mechanical pit roof area.

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	**Photograph No. 7.** Existing counter flashing height of approximately 6.5-inches on the north mechanical pit roof area. Counter flashing height is limited by the exterior wall weep system as shown below.
	**Photograph No. 8.** Weep system in wall limits the ability to raise the roof counter flashing without significant exterior wall modifications.
	**Photograph No. 9.** Sample photo of roof core taken on the north mechanical pit roof area showing a loose laid black EPDM roof membrane over tapered EPS foam insulation over the concrete roof deck.

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	**Photograph No. 10.** Sample photo of roof core taken on the south mechanical pit roof area showing a loose laid black EPDM roof membrane over tapered EPS foam insulation over the concrete roof deck.
	**Photograph No. 11.** Overview of mechanical unit height above the existing roof membrane.
	**Photograph No. 12.** Limited clearance below RTU on south mechanical pit roof area.

From: Mykala Keuter
To: Kevin Crosby; Jonathan G Akins
Subject: Fw: UCB001328-Weber - Variance request for Weber Hall roof insulation at mechanical areas + general progress update
Date: Tuesday, November 11, 2025 2:32:03 PM

Hi Kevin and Jon,

See below, from my engineers. I can ask for additional clarifications about energy savings if needed.

1. R-Value of Shingle Roof:
   The existing shingle roof assembly is estimated at R-38, based on interpolation of the limited information provided within the existing drawings, as well as the construction vintage and insulation standards in place at the time of original construction. This has not been field-verified, as our scope was anticipated to be roof repairs rather than full replacement at the time of our assessment. For reference, the 2021 IECC requires R-49 for attic spaces in Climate Zone 5B, and it's likely that additional blown-in insulation could be added if attic access is available to improve overall performance.
2. Overall R-Value / Average for Entire Building:
   The overall effective R-value, averaged between the low-slope and steep-slope roof areas, would be approximately R-37.7

For context, the IECC distinguishes between:

- Steep-slope roofs (attics or below-deck insulation): R-49 (insulation below the roof deck or in the attic).
- Low-slope roofs (above-deck insulation): R-30 continuous insulation.

Because these insulation systems perform differently (above-deck continuous vs. below-deck cavity insulation), combining or "averaging" them is not specifically recognized in the IECC. However, per your request and for general comparison or conceptual energy discussions, a weighted average based on roof area helps to represent the building's overall roof thermal performance. Worth noting is that the low slope roof area is so small in comparison to the area of the steep slope – it hardly changes the value when weighted together based on areas.

3. Energy Difference for Replacing the MAU and Roof to R-30:
   There would be some improvement in energy performance, though the benefit would be relatively modest given the small footprint of the low-slope roof area relative to the total building area.
4. Does Raising the MAU Provide a Payout?
   I believe this question refers to whether raising the MAU curb for additional insulation provides a return on investment, then yes, but likely over an long extended period. The cost of crane mobilization and curb modifications would outweigh short-term savings due to the small roof area involved. The more cost-effective approach would be to proceed with the proposed R-value variance insulation thickness and plan for a future

insulation upgrade (and curb adjustment) when the MAU is eventually replaced.

*****Please note that as of November 14, 2025, I will no longer be employed by Housing Facilities Services.*****

After this date, please send correspondence regarding all projects to Jon.Keiser@Colorado.edu and Chase.A.Johnson@Colorado.edu.

Best,

Mykala Keuter
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