

## Yard (Setback) Relief for Exterior Insulation – Background

Continuous insulation is a proven energy efficiency measure that can lead to significant energy savings. Exterior insulation greatly reduces heat transfer across the wall, often referred to as ‘thermal bridging,’ thus reducing the total energy demand of a building across all seasons. This same principle can be applied to the roof of the structure as well; for a building to realize full potential energy savings, it is generally recommended that the exterior wall, roof, and even basement slab be continuously insulated so as to reduce thermal bridging across the entire exterior envelope of the structure. Energy Star estimates that approximately 20% reductions in energy used for heating and cooling needs could be realized if these basic retrofit measures are performed on existing structures.<sup>1</sup> As more than 60% of Cambridge’s building energy consumption is attributed to heating and cooling, these potential savings could make significant reductions in carbon emissions from buildings in Cambridge.

Apart from environmental benefits, exterior insulation for buildings is also the preferred insulation method for feasibility purposes as retrofitting can take place without displacing occupants. Furthermore, adding insulation to exterior walls of buildings can help mitigate excess noise, improve moisture-related issues within walls, and reduce the amount of mechanical equipment needed.<sup>2</sup>

The City’s ambitious net zero emissions goals support the efforts of building owners to undergo extensive energy retrofits for existing buildings. When it was adopted in 2010, the goal of Section 22.43.2 of the Zoning Ordinance was to remove policy barriers discouraging the addition of continuous insulation to existing residential buildings. The section provides relief from dimensional yard (also known as setback) requirements to add insulation to existing buildings, provided that it does not encroach more than 4” in comparison to the existing wall, and that the resulting wall is not closer than 7’-2” to the nearest property line. The more recent Net Zero Action Plan recommended reassessing the potential for insulation projects of this type under current zoning. Review by CDD staff has shown that the current zoning relief would not be applicable to many existing residential buildings in Cambridge.

The results of CDD’s review indicate that both the 4” limit to additional wall thickness and the 7’-2” minimum setback requirement are restrictive. While it is technically feasible to add insulation within the current 4” limit, analyses of case studies for high-performance buildings suggest that a minimum of 6” to 8” is required to allow for buildings to reach target energy standards. Furthermore, as building code requirements continue to incorporate energy efficiency measures, the current 4” limit has become increasingly prohibitive over time. A review of GIS data also indicates that only a small percentage of existing residential buildings within Cambridge would meet the 7’-2” minimum setback requirement.

The objective of this zoning provision is to allow for building owners to add continuous insulation to the exterior of the structural wall; however, based on CDD’s review of case studies and GIS data the language of Section 22.43.2 restricts building owners from capitalizing on the allowable increases to insulation exterior to the exterior structural walls of buildings.

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<sup>1</sup> Energy Star: [https://www.energystar.gov/index.cfm?c=home\\_sealing.hm\\_improvement\\_methodology](https://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_methodology)

<sup>2</sup> GBA (2015): <http://www.greenbuildingadvisor.com/blogs/dept/guest-blogs/case-continuous-insulation>

A zoning change is suggested below, based on the Net Zero Action Plan recommendations and CDD's subsequent review. These changes, if adopted, would amend the provision and would move it to Article 5.000 of the Zoning Ordinance, so that it is listed along with other exceptions to yard (setback) requirements.

***Proposed Zoning Change***

Delete Current Text from Article 22.000:

**22.43.2** *Yard Exceptions for Added Exterior Insulation.* Existing conforming or pre-existing non-conforming buildings or buildings that received a building permit prior to August 2, 2010 that cannot add insulation exterior to the exterior structural wall of the building without intruding into a required setback may encroach or further encroach into the required yard setback through the addition of insulation external to the exterior structural wall of the building, provided that the additional insulation does not increase the thickness of the exterior wall by more than four (4) inches and that the resulting outermost plane of each exterior wall is no closer than seven feet, two inches (7'-2") to the nearest property line.

Proposed: Move text to the "Yards" section of Article 5.000, and amend to read as follows:

5.24.2 Projecting eaves, chimneys, bay windows, balconies, open fire escapes and like projections which do not project more than three and one half (3 1/2) feet and which are part of a building not more than thirty-five (35) feet in height, and unenclosed steps, unroofed porches and the like which do not project more than ten (10) feet beyond the line of the foundation wall and which are not over four (4) feet above the average level of the adjoining ground, may extend beyond the minimum yard regulations otherwise provided for the district in which the structure is built.

5.24.2.1 Existing conforming or pre-existing non-conforming buildings in existence prior to August 2, 2010, may encroach or further encroach into a required yard solely in order to install exterior insulation to an existing exterior wall, provided that such existing exterior wall is not moved or demolished except to remove and replace its exterior wall covering and that the requirements of either Paragraph (a) or Paragraph (b) below are met:

- (a) The yard is not decreased by more than eight (8) inches from the pre-existing condition, the wall itself does not intrude more than eight (8) inches further into the existing yard, and the outer plane of the exterior wall after the installation of exterior insulation and exterior wall covering is not closer than three (3) feet to the nearest property line; or
- (b) the Board of Zoning Appeal (BZA) has granted a special permit to exceed the limitations of Paragraph (a) above upon finding that, given the unique physical constraints of the building or the site, such relief is necessary to install exterior insulation that will substantively improve the thermal performance of the exterior wall envelope, that potential impacts to the safety or privacy of abutting uses will be mitigated, and that the general criteria set forth in Section 10.43 of this Zoning Ordinance are met.