

Deconstruction, Not Demolition: A New Approach to Minimize Embodied Carbon in Construction

Location: Boulder, Colo.

Size: 250,000 sq. ft

Steel from a torn-down hospital would ordinarily have been recycled into new structural steel members without any loss of strength or durability, but one team took sustainability a step further. Instead of demolition, they opted for deconstruction, recovering 161 tons of structural steel for direct reuse in other community projects--perfect for a city mandated to divert 75% of deconstruction waste from landfills by 2025. In the end, deconstruction diverted 98% of the building's core and shell.



**Smarter.
Stronger.
Steel.**



**It's a matter of time before
structural material reuse
becomes more mainstream
and a pillar of embodied
carbon reduction strategies"**

ALEXIS FEITEL, KL&A



“Recycling brings materials back into play, but if there are ways we can preserve the built environment in its full integrity from the start, it really helps us tell the story of creating a circular economy. We’re looking at ways we can do this for other city projects.”

EMILY FREEMAN, POLICY ADVISOR FOR CIRCULAR ECONOMY, CITY OF BOULDER

The deconstruction of Boulder Community Health Hospital highlights the crucial role of steel in sustainable urban redevelopment. By repurposing steel for new projects, the City of Boulder not only exceeded its waste diversion goals but also demonstrated another long-term advantage of structural steel. Steel is the optimal building material for achieving both environmental sustainability and structural efficiency – both for today and for tomorrow.



A Uniquely Sustainable Solution

Serving the Community: The deconstruction team recovered 30 beams each day. About 25% of the recovered steel tonnage continues to serve the people of Boulder as structural framing for the new Boulder Fire Station 3.

Spreading the Wealth: The deconstruction project salvaged a total of 584 structural steel wide flange and hollow structural sections, all inventoried for a secondary market. The beams sold for \$1 each because the city wanted to encourage developers to go green.

Location, Location: The hospital was ideal for a deconstruction project, with a site nearly tailor-made for the process. The building wasn’t in a dense urban area, and there was even an unused city-owned parking lot next door for material laydown. Plus, the building was less than 40 years old and the team had access to some documents from original construction.



The salvaged
steel saved
167,300 kgCO₂eq

EQUIVALENT TO

**37 gas-powered
cars** on the road
for one year.

KL&A Engineers and Builders' Team Carbon

The Boulder Community Hospital deconstruction shows what a healthy circular economy looks like in the real world. The deconstruction process was more of a logistical challenge than a technical one because steel has standardized sizes and properties. The premium of deconstruction over demolition was less than the city expected, adding only 2.5 months to the schedule and 16% to the cost, and they could have offset the price increase by selling the steel at market value. Designing for deconstruction is one way to make a project greener—even at the end of a structure’s life.



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