PROJECT Chartwell School

YEAR
2006

LOCATION
Seaside, CA, United States

USE
Education

CONSTRUCTION
New Construction

ARCHITECT
EHDD Architecture

ENGINEER
Tipping Mar + Associates

DEVELOPER
Chartwell School Owner

BUILDER
Ausonio, inc

SUPPLIER
Fort Ord Reuse Authority

SPECIALISTS
Paul T. Beck Contractors (On-site deconstruction of asphalt), John Stephens (lead-based paint removal)

GROSS AREA
21,200 sq-ft

MEAN ROOF HEIGHT
20 ft

STORIES ABOVE GRADE
1

STORIES BELOW GRADE
0

RISK CATEGORY
III

COST INFORMATION
Unavailable

LCA INFORMATION
Unavailable

Credit: UC Berkeley Center for the Built Environment

PRINCIPLE	SCALE	SYSTEMS	MATERIALS
DESIGN FOR DISASSEMBLY	**Elemental** **Subsystems** Whole-structure	Non-structural Envelope Balconies Stairs/ramps Foundations Beams Bracing **Walls** **Roof** Floors Columns	Other Earthen **Wood** **Steel** Masonry Precast concrete Insitu concrete
STRUCTURAL COMPONENT REUSE	Whole-structure **Subsystems** Elemental **+Deconstruction**	Columns Floors Roof **Walls** Bracing Beams **Foundations** Stairs/ramps Balconies Envelope Non-structural	Insitu concrete Precast concrete Masonry Steel **Wood** Earthen **Other**

SUMMARY

The Chartwell School is an independent school on the site of Fort Ord, an old Army base in Northern California. This Grade 1-12 school is a one-story building with slab on grade designed for disassembly with reused materials present throughout including salvaged wood and asphalt.

SUSTAINABILITY GOALS

The building had many high performance sustainability goals - Net Zero Electric Building, LEED Platinum Certified, and was built to be a model for green building development in the region because of its circularity goals. It was the first complete educational campus to obtain LEED-NC Platinum certification in the US. Additionally the school is said to have influenced the Lifecycle Building Challenge from the EPA. The project was also enabled by an EPA Waste Reduction Grant.

CIRCULAR ECONOMY STRATEGIES

The project team had two primary circular economy strategies: design for dissassembly (DFD) and reuse of salvaged materials. Most of the salvaged materials were wood, though asphalt was also reused and used on site.

Many design decisions were made around the idea of Design for Dissessembly, starting with the framing and layout. All interior classrooms are demised with non-bearing partition walls, so that classrooms and program spaces can be redesigned. The building's structural envelope elements are designed to take all roof loads to allow for this flexibility. The wood framing for the wall studs were also configured with standardization in mind, as standardized, modular elements are more likely to be reused in the future. Additionally, the design team spent a great deal of time thinking about the connections to allow for ease of disassembly. Exterior cladding solutions were explored to avoid nails as much as possible. The design team also created a matrix containing "levels of deconstructability". The primary roof element was selected to contain insulation with the intent of reusing the entire component at the end of project life. The steel truss connection in the school was designed with the structural engineer to be dissassembled and contains no weld connection.

The previous buildings on site were made of high quality douglas fir, and were recovered from the old fort barracks, and were cleaned be a collaborator via planing. This wood was used for interior cladding in the school. Additionally, used, high grade redwood was salvaged from large, wine aging tanks, and was used around the school, including for exterior finishes. Other clear grain douglas fir was also used for differenent interior panelling from old floors and soft finishes. Millwork onsite was also made of salvaged wood. Finally, paving asphalt from the site was used as the foundation subbase

KEY FINDINGS, RECOMMENDATIONS, AND LESSONS LEARNT

The team was highly devoted to DFD and salvage methods, and applied to an EPA grant to carry it out. There was a lot of Research and Development during the design, and the school posed as an unprecedented project in the region. Some of the success of the project can also be attributed to collaborations with deconstruction specialists. Some research and development on the project highlighted research opportunities for pavement design for dissembly, and wood connections in seismic zones.

Other key lessons included using exposed systems as teaching opportunities, and the importance of documentation so future operators can take advantage of DfD design elements.

FURTHER INFORMATION AND RESOURCES

https://www.lifecyclebuilding.org/docs/DFD.pdf

https://www7.nau.edu/itep/main/iteps/ORCA/3380_ORCA.pdf

https://www.ausonio.com/portfolio/chartwell-school/

https://ehdd.com/project/chartwell-school/

Project Source: Brad Guy

AVAILABLE QUANTITATIVE DATA

Clear grain douglas fir used as interior paneling - 800 BDFT

Asphalt used as foundation subase - 1385 CuYd

A report on the project cited 338.2 tons of embodied Co2e from 1376 tons of material

Detailing of wood studs to align with trusses reduced framing b

ABOUT THE DATABASE

This case study has been prepared by the Structural Engineering Institute Sustainability Committee Circular Economy Work Group with the goal of sharing and promoting the excellent circular economy work that project teams are working on throughout North America and the world. Often it is hard to find information on how circular economy principles are implemented in practice; these circular economy case studies aim to better share information amongst the industry.

Some case studies have been prepared directly by a project team member, while others have been prepared based on available texts and publications. In the second case, the text descriptions are a summary of information available from other sources. These sources are referenced in the *Further information and* resources section.

While reasonable efforts have been made to ensure the information is representative and accurate, we cannot guarantee there are no errors. Please contact the case study team to provide additional information, suggest updates and amendments, or with any other questions. To submit a new case study to the database, please use this submission form. Thank you!