CHARLES ROSE ARCHITECTS

CRA wins 2023 American Institute of Architects' Highest Award for Sustainable Design

Charles Rose Architects' pathbreaking zero-net energy building in Greenfield, Ma., the John W. Olver Transit Center, is a winner of the AIA's highest honor for sustainable design. The 2023 COTE Top Ten Award, often called the "gold-standard" for sustainable design in the United States, recognizes design excellence and the comprehensive integration of innovation and engineering. The Olver center, a combined train depot, transit station and government office building, symbolizes CRA's mission to create sustainable architecture and landscapes that support communities and offer compelling solutions to climate change.

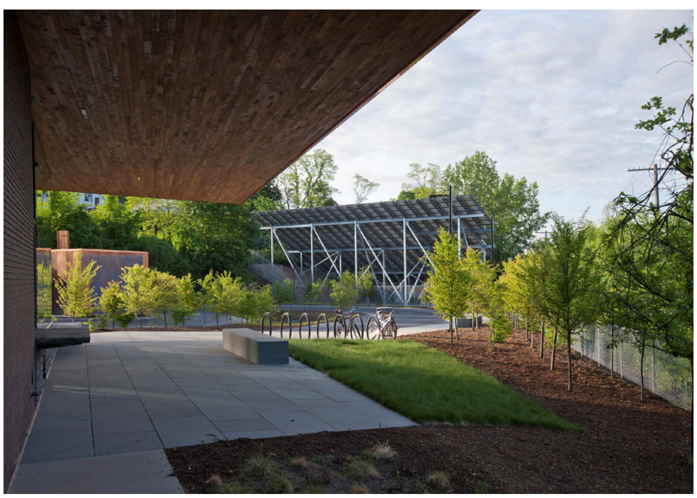
The Olver center is the first zero-net energy combined office and transit center in the United States. Named in honor of former U. S. Rep. John W. Olver (D-MA) the project was funded in part by the Federal Transportation Authority (FTA), the American Recovery and Reinvestment Act (ARRA), and the Commonwealth of Massachusetts. The 24,000-square-foot transit hub introduced high-performance architecture to Franklin County, blending principles of sustainable and ethical design. The project serves as a depot for regional and interstate bus lines, plus Amtrak's Vermonter and Valley Flyer, and an office for the Franklin Regional Council of Governments.

"A large part of our job at the Council of Government is forward thinking; how can we help our region, and our towns have a better, more comfortable future. This project is a model of what can be achieved and what we should be working towards.."

Linda Dunlavy. Executive Director

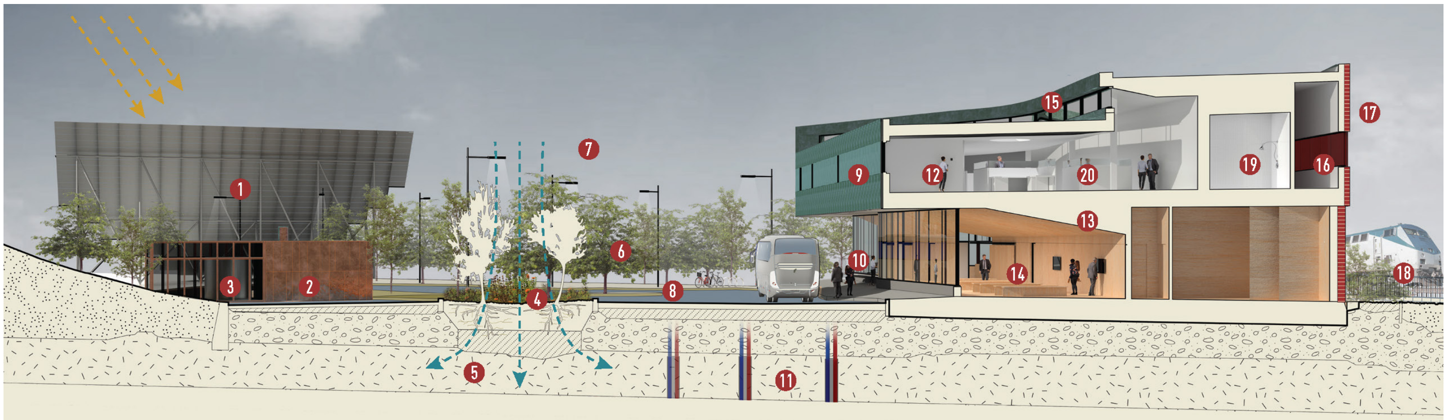
Franklin Regional County of Governments

CRA’s sustainable projects are the result of the simultaneous exploration of science, technology, and artistic expression. We collaborate with our engineers starting in the early design stage to attain the highest building performance by optimizing form in terms of orientation and massing. The aspirations of clients and communities are integrated into the design process and are critical to decision making.



From xeriscaping to sustainable technologies, this project brings a broad range of ecological and environmental values to the heart of the community--values that support indigenous species, native fauna, social equity, zero fossil-fuel emissions, on-site energy generation, high-performance facades, material selection, daylighting strategies, and designing with ecosystems in the landscape. Our design process is open and inclusive, and we seek to create a holistic approach to design.

Designing for Sustainability
at the John W. Olver Transit Center



Design Strategies

Design for Ecosystems

- Previously paved areas now planted with native species 4,6,8
- Terraces at the buildings north and south ends provide a transition space and invite users to connect with the site's landscape 8
- Dark Sky Compliant Fixtures 7
- Copper and Brick Screens over most windows promote bird safety 9,16

Design for Water

- Low flow fixtures reduce water usage over baseline 19
- Native plantings and xeriscaping eliminate need for irrigation 4,5
- 100% Storm water is managed on site through collection basins, drywells, and swales 4,5,18

Design for Economy

- High performance facades reduce energy loads and ongoing operational costs 9
- Durable materials reduce maintenance costs over time 17
- Passive design strategies allow for low-cost operation 9,10,15
- Building use as a transit center brings affordable regional and interstate level travel, via bus and AMTRAK 8,18

Design for Energy

- Thermal mass wall on west side regulates interior temperature 16,17
- Solar wall on south facade to pre-heat make up air in heating months to reduce heat loads
- Optimized sun shading on east facade to increase daylighting, reduce glare and electrical lighting 9,10
- Strategic overhangs to provide shading to glazed lower level 10
- 22 Geothermal wells ain in reducing mechanical loads
- 98kW photovoltaic array generates clean energy on site 1
- Biomass boiler fueled by wood waste from local lumber mills 3

Design for Well-Being

- Interior occupies spaces all have access to natural light 9,10,16,20
- 85% of interior spaces have a view to the outdoors/landscape 10,12,16
- Bike racks, lockers, showers, and changing rooms encourage employees to commute via bike 8,19
- Right sized HVAC system with MERV-14 filtration provides clean air 13
- All wood used in the project was FSC certified 14
- Occupants have control over the microclimates 12

Design for Resources

- Materials were selected for durability and minimal maintenance over time 9,10,14,15,17
- Strategic overhangs, screening, and shading reduce conditioning loads 10
- Recycled steel used for structural system 13
- Biomass boiler uses waste wood from local lumber mills 3
- 85% of construction waste, and 75% of operating waste is diverted from landfills through proper sorting

Design for Change

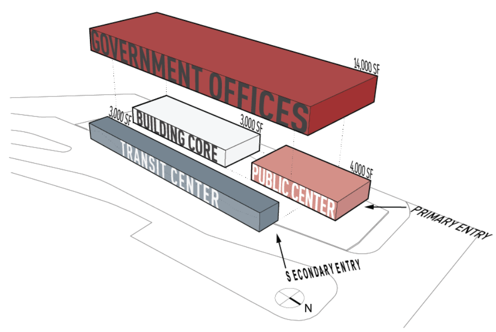
- 98kW photovoltaic array generates energy for on site electrical needs 1
- Optimized daylighting and natural ventilation along with PV array provides a period of passive survivability in emergencies 1,15
- Natural materials, selected to last, create an adaptable framework for various use scenarios 2,9,14,17
- Flexible dual program space, offices and transit could easily become studios and galleries, co-working space and a conference center, or a recreation or visitors center 14

Design for Discovery

- Continuous real time data collection of energy for heating, cooling, process loads, plug loads, water usage, and PV energy generation 12
- This information available on a touchscreen dashboard allowing for building maintenance and the public to learn about sustainability features 14
- Continued collaboration with engineers on future projects
- Post occupancy reports and analysis adjustments and improvements
- Continued communication with building occupants

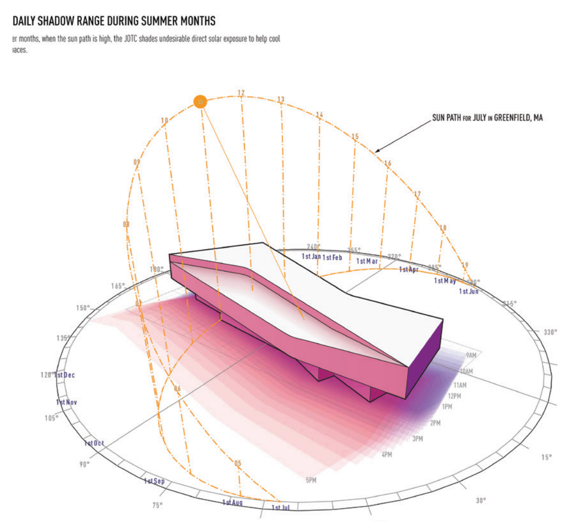
Designing for Efficiency

The building forms were sculpted in response to energy models to minimize the surface-to-volume ratio and to minimize energy consumption. Volumes were molded to shade fenestration, and window locations were determined based on heat-gain impact and the daylighting effect on lighting loads. We collaborated with our engineers to ensure each design iteration was created with real-time energy modelling—meaning that aesthetic choices were informed in response to real-time energy modelling.



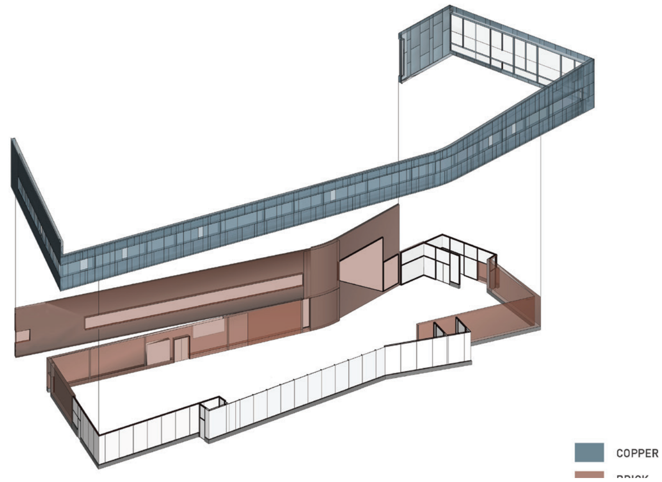
Daylighting Strategy

The larger program requirements of the second level provided an opportunity to use the second-floor volume as a solar shade to reduce glare and solar heat gain on the first-floor transit waiting area. Clerestory windows and skylights were added to increase the impact of daylight within the office floorplate on the second floor.



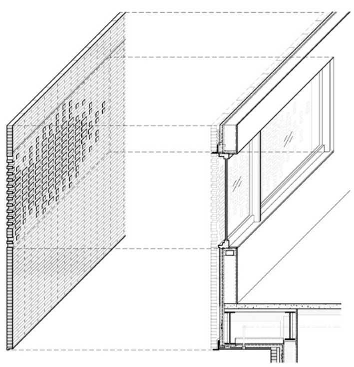
Material Selection

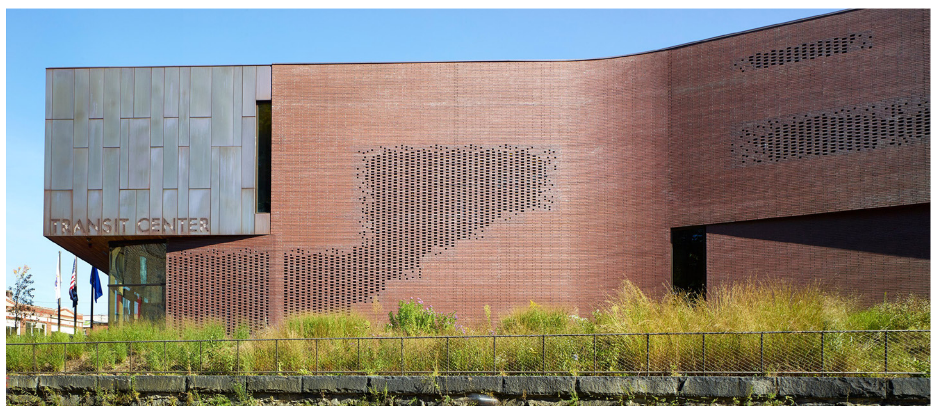
The construction materials for this project were selected to be durable, nontoxic, and as close to their natural form as possible. Brick and copper were the primary building materials as they require little to no maintenance, hold up well over time, do not emit VOCs, and are natural materials. All woods used in the project are FSC certified.



High Performance Facades

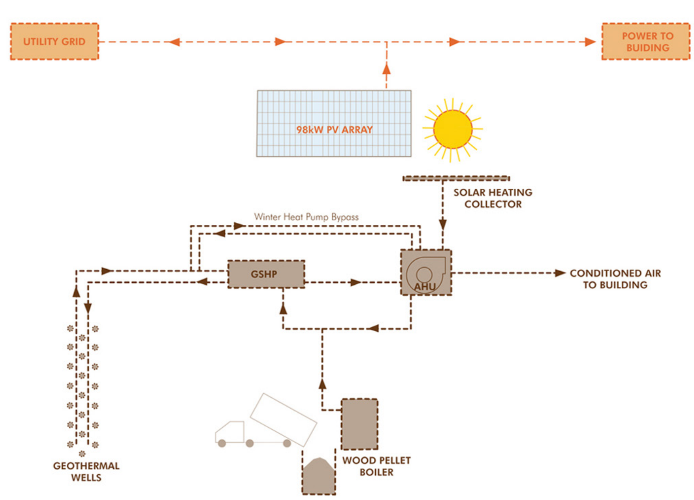
Each façade was designed in response to seasonal sun angles. The north façade is fully glazed without additional shading, due to minimal direct sunlight striking it. The east and south facades have glazing shaded by copper screens with 50% openness. On the western side, the brick cladding dissolves, and the façade becomes a screen; the resulting patterns control the amount of heat entering the interior in the summer.

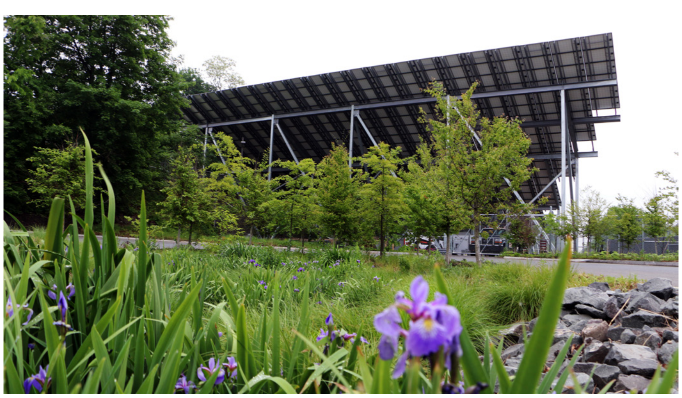




On-Site Energy Generation

The design intent was to create a net-zero energy building that eschewed fossil fuels. The site area was limited: there was only space to build a 98kW photovoltaic array to power the electrical systems of the building.





Design Team:
Architect: Charles Rose Architects
Consulting Engineer: ARUP
Landscape Architect: Groundview, LLC
Structural Engineer: Richmond So Engineers
Civil Engineer: Nitsch Engineering
Geotech: McPhail Associates
Construction Manager: Fontaine Brothers, Inc.

Learn more about the nationally recognized award winners here.
Learn more about the John W. Olver Transit Center on our website.
Architectural Photography by John Linden