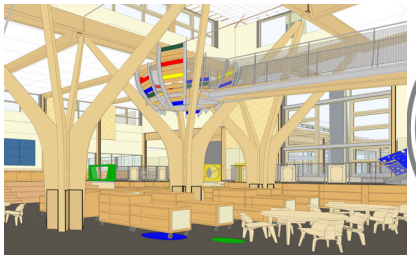
Trillium Creek Primary School



A building manual describing indoor and outdoor spaces and places that shape learning opportunities for students, teachers, staff and the community.

Stormwater and Plantings

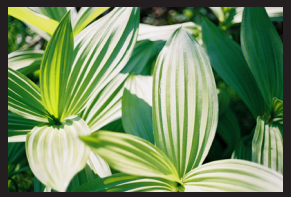
Bio-swales: Bio-swales (or rain water swales) collect rain and water that runs off of the roof and pavement, an impervious surface, and cleans it by filtering it through water quality plants before it returns to the creek and watershed.

Rainwater harvesting and reclamation: A 500,000 gallon cistern will collect rainwater that falls on the roof, clean and integrate it back into day use tanks for flushing toilets within the building.

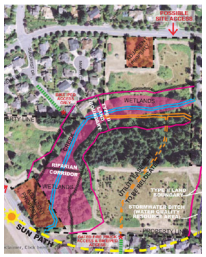
Native plants: Plants that are native and adapted to the climate and environment surrounding Trillium Creek require less irrigation, and therefore water, and are easier to maintain.

Forested Wetlands

Trillium Creek Primary School sits on the same site as a forested wetland and Douglas fir tree grove. As a prominent riparian corridor for wildlife in the region, this creek has been the focus of on-going restoration efforts supported by the City of West Linn. To date, native plants within this Douglas Fir grove and surrounding wetland have long been choked out by the dominant presence of invasive blackberry and ivy plants. A complete and collaborative design process has resulted in plans for a transformed landscape that not only highlights the unique features of this site, but enhances these diverse habitats. Commitment to this design and intetentional planning around student learning related to the wetland and forest demonstrates the School District's environmental stewardship in the enhancement and restoration of these environmental features.



Transportation to School



Bike racks to support alternative transportation: Built within an established community, Trillium Creek was designed as a neighborhood school. Bike and walking paths connect to the community and encourage students to use alternative transportation to busing and automobiles if possible when arriving to school.

Limited impervious surfaces and preferred parking: The site includes the minimum number of parking spaces required by city regulations, reducing the amount of impervious surfaces created by paving. Preferred parking spaces given to carpool and low-emitting vehicles encourages alternative transportation on-site as well.

Construction Practices

Site and habitat protection: During construction, erosion control methods were installed to protect the topsoil on-site and reduce dust in the air, helping to protect the surrounding natural ecosystems.

Construction waste management: During construction, 75% of waste was sorted, collected, recycled and/or diverted from the landfill.

Indoor air quality: During construction, materials were protected from exposure to the elements and used practices to reduce the potential for air contaminants. Prior to occupancy, the building will be "flushed" using large quantities of outdoor air to further ensure acceptable air quality.

Site Landscape and Student Learning

Trillium Creek presents a unique opportunity for the school community to engage in authentic, place-based education. Situated adjacent to the headwaters of Trillium Creek, a tributary of the Willamette River, the school landscape includes a forested wetland, riparian corridor and existing Douglas fir forest. Environmental education curriculum focused on wetland ecosystems and restoration projects will connect students and teachers to this unique natural environment and place of learning.

In addition to the natural environments, the plants installed throughout the site will be native and climate-adaptive, which require little to no irrigation and are easier to maintain. Specific water quality plants will be installed adjacent to the building as part of the school's on-site stormwater management. These plants, their characteristic and functions, will also provide learning opportunities for students studying the built environment, impacts of impervious surfaces, plant communities and environmental stewardship.

Building Design

Throughout the design process, architects, teachers, administrators, staff and community members worked together to consider the building's interior spaces. The resounding message from students interviewed as part of this design process was a need for spaces that they could make their own. "I want to be the captain of my own learning," one student stated, a notion that continuously inspired the design team and informed decisions about these spaces and their design.

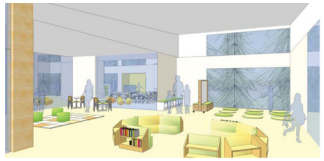
Floor Plan

Trillium Creek Primary School was built to accomodate 500 primary school students. The building includes four porches to the north of the building, two per floor, and one pre-kindergarten and kindergarten porch to the southeast of the building. Second floor porches to the north of the building are central to four classrooms, with access to an outdoor learning and green roof space.These roof gardens will be accessible to students and teachers to connect classroom learning to garden-based education curriculum and also to provide outdoor classroom meeting spaces for the school community. Second floor porches connect to ground floor through a set of staircases, as well as a slide that connects to the library. The set of north porches on the first floor support five classrooms. Interior glazing supports visual connections throughout building spaces to promote collaboration and teaming.

Building Features

The Story of the School

The Story of the School includes information about the site's historical land use, design and construction process of both interior and exterior elements, and includes connections to student learning opportunities. Teachers, students and the community can use this story to better understand the building and landcape design, as well as opportunities for restoration and community partnerships.



Recycling and Recycled Materials

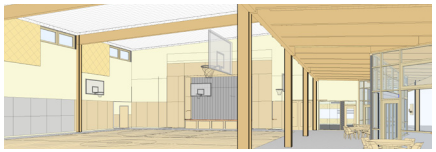
Comprehensive recycling signage and systems in the school will ensure occupants have designated locations to recycle paper, cardboard, glass and metal to support the District's commitment to waste management. Additionally, over 10% of the building materials were sourced locally with high recycled content values to reduce the footprint of the building construction.

Building Materials

To decrease indoor air pollution, materials, such as paints, coatings and adhesives, with low chemical fumes were selected and installed. Natural colors on the building exterior were intended to blend the building into the landscape, while the bright colors of the oriels, selected by students during the design charrettes, reinforce the design team's commitment to creating spaces for kids.

Roof and the Heat Island Effect

The light color of the roof minimizes the heat island effect, a condition that occurs when dark, non-reflective surfaces trap surface temperatures in urban areas. This feature contributes to a LEED credit intended to support the use of materials with these low Solar Reflective Index (SRI) values.



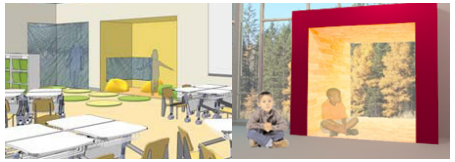
Building Orientation and Glazing

The building's orientation increases the potential for daylighting strategies and captures solar heat during the winter months, while reducing excess heat gain in the summer. Sensors within light fixtures throughout the building automatically dim the interior lights to maximize natural light and reduce energy consumption.

Passive Ventilation

The efficient heating, ventilation and cooling (HVAC) equipment installed on the roof and interior spaces exceeds energy performance baseline requirements. These systems are integrated with the sensors and motorized windows and shades to ensure that heating and cooling efficiencies are maintained while utilizing outdoor air.

Building Features



Classroom Sensors, Motorized Windows and Shades

Motorized windows in the library and wellness commons automatically open when the external air temperature is warm enough and thermal comfort can be maintained by using outdoor air, shutting down the HVAC system. Green lights in classrooms turn on to indictate this as well, allowing students to manually open the windows if desired. Red lights will indicate that windows should be closed to maintain system efficiencies.

Heating, Ventilation and Cooling Systems

The efficient heating, ventilation and cooling (HVAC) equipment installed on the roof and interior spaces exceeds energy performance baseline requirements as part of the school's quest for LEED certification. These systems are integrated with the sensors and motorized windows and shades to ensure that heating and cooling efficiencies are maintained while utilizing outdoor air.

Metering and the Building Automated System

As part of the building automated system, electrical and water consumption will be metered on various levels throughout the building. These installed meters serve as a foundation for the notion of a "building dashboard" that can be implemented as students and teachers continue to craft that vision. A dashboard can allow teachers and students to better understand how their actions influence the life of the building and live in the world.

Porch LED Poles

LED poles are installed in the porches. Lights are connected to meters that monitor water and electrical use, as well as energy produced from the PV array and small wind turbine. Students and teachers can use these lights as a teaching tool around energy and water conservation and to explore themes about how we live in and impact the building. These LED poles are an initial compent of a future design for a building dashboard.

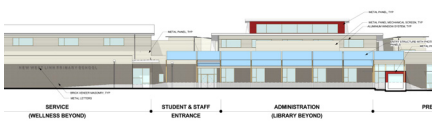


Photo Voltaic (PV) Array and Wind Turbine

A small PV array is installed on top of the covered walk in the bus entrance to the south of the building. A small, vertical wind turbine is also installed within the landscape. These forms of renewable energy production provide opportunities to engage students, teachers and the community in conversations about approaches to energy conservation and topics of sustainability. Energy production can be tracked on the LED poles in porches.

Rainwater Catchment Cistern Float

Rainwater catchment is integrated into the building's stormwater management system. A large underground cistern stores water diverted from the roofs and down through visible runnels and trenches. A day tank in the building then cycles this gray water to flush toilets inside the building. Students can track the quanities of water stored during rain events through the cistern float that is accessible from the courtyard.

LEED Certification

Upon completion, Trillium Creek Primary School will apply to become LEED® certified. The LEED green building certification program is the nationally accepted benchmark for the design, construction, and operation of green buildings. LEED for Schools™ rating system used for certifying K-12 educational facilities. Certification is based on achieving design and construction prerequisites and credits from six credit categories. An important component of the LEED for Schools™ rating system is the connection back to student learning. Projects that achieve LEED for Schools™ certification, regardless of the level, have the opportunity to engage students in meaningful studies of their surrounding built and natural environment. By understanding the design intent, overall impact, and function of the building, students can enhance their understanding of green building practices in conjunction with existing curriculum.

Sustainable sites (SS)

This category has requirements around site selection and transportation. Site selection and planning is important in reducing impact to wildlife corridors, watersheds and wetlands, and other existing site vegetation and natural features. The sustainable sites category also has credits for alternative transportation, stormwater management and reducing soil erosion potential during construction and occupancy.

Water efficiency (WE)

The water efficiency category considers both outdoor and indoor water consumption and conservation. These credits focus on reducing the amount of potable water used for irrigation in landscaping by encouraging native and drought tolerant plantings. Innovative designs, such as harvesting rainwater for non-potable uses, are also encouraged. LEED certified buildings must use 20% less water than the baseline through efficient fixtures and other design features.

Energy & atmosphere (EA)

This category considers the building envelope (windows, doors, insulation, etc.), as well as HVAC systems, appliances and equipment and other connections that the building occupants have to the indoor and outdoor environment. Strategies to balance natural ventilation and daylight with interior systems are identified in a range of credits within this category.

Indoor Environmental Quality (IEQ)

This category includes prerequisites and credits related to indoor air quality strategies, both during construction and occupancy, thermal comfort of occupants and the installation and use of low-emitting materials, such as paints, coatings, carpets and wood/ composite products. This category ensures the building provides a healthy learning and work environment for all of its occupants.

Materials & resources (MR)

Credits and prerequisites in this category relate to the content of materials and strategies to protect resources related to the built environment. Credits for materials with high percentages of recycled content and that are harvested and manufactured within 500 miles of the site reward projects that prioritize these sustainable purchasing practices. Points for diverting high percentages of construction waste can also be achieved in this category.

Innovation in design (ID)

Projects can earn a maximum of six credits for this category. These credits can be earned through "exemplary performance" of an existing LEED credit, or by integrating innovative features that are not otherwise included in the rating system. Working with a LEED Accredited Professional and using the school as a teaching tool can also earn two credits.

Key Words

Daylighting-When sunlight provides all of the light needed in a given space, eliminating the use of electric lights.

Ecosystem-A community created by the interaction of plants and animals within a physical environment.

Forested Wetland-A wetland, as characterized by soil features, hydrologic features and hydrophilic vegetation. A forested wetland has certain trees and shrubs and has water levels that vary by season.

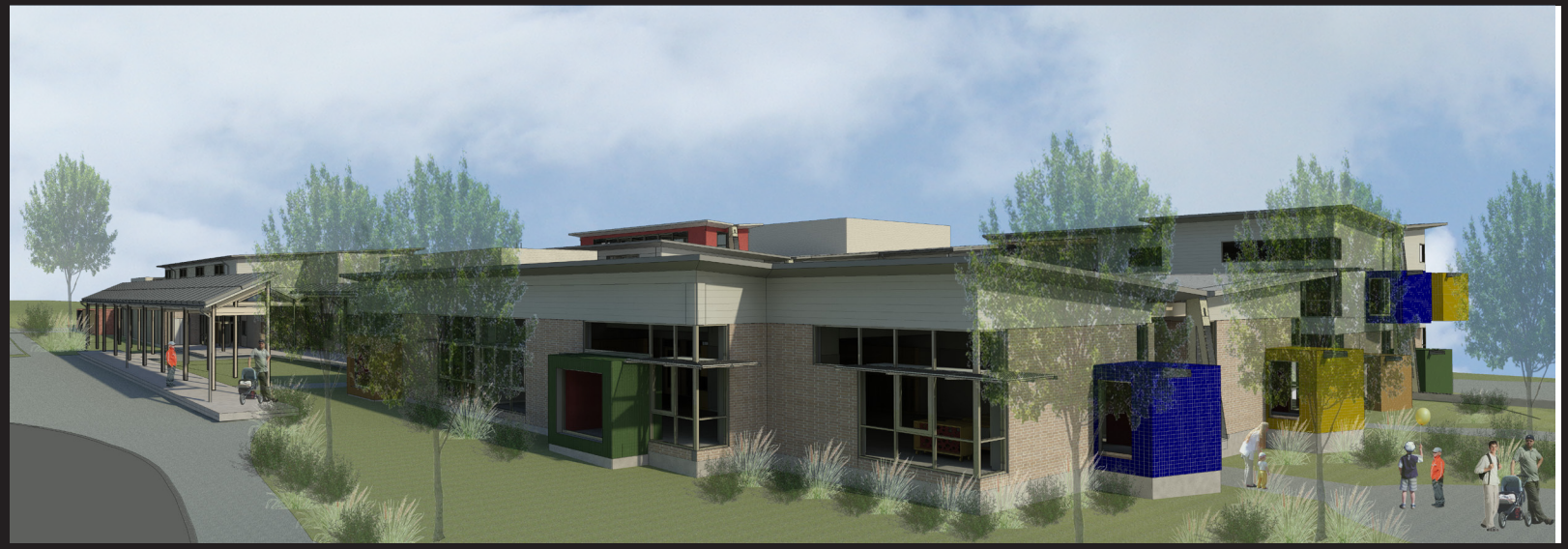
Heat Island Effect-When an urban area is significantly warmer than surrounding rural areas as result of the prevalence of building materials that retain solar heat during the day as opposed to reflect it.

HVAC-The heating, ventilation and cooling system that controls the building thermal comfort.

Native Plants-Plants that are indigenous to a given area in geological time--defined in green building practices as those plants that require less irrigation and are more drought tolerant.

Sustainability-"Meeting present needs without compromising the ability of future generations to meet their needs" (World Commission on Environment and Development, 1987).

Watershed-An area of land where all water that is under it or drains off of it goes to same place. The Willamette River watershed includes all of the small creeks and rivers that flow into the Willamette River.



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