2021 LE Solutions Award **Clyde Hill Elementary School** Bellevue School District Clyde Hill, WA

01 EXECUTIVE SUMMARY

Clyde Hill Elementary School is an exploration in spatial organization and biophilic design, providing educational flexibility and adaptability in a school that is integrated into its unique natural surroundings.

Originally built in 1952 in the "California style" with exterior circulation and low-slope roof forms, after several additions the school had become a jumble of disconnected buildings

with segregated outdoor spaces for play. Fluctuating student populations highlighted the difficulties the school was experiencing due to its disjointed buildings.

The District is systematically addressing the needs of its fleet of older schools, and Clyde Hill Elementary School (CHES) is a clear example of the potential and success of this effort. Our design team listened to the many groups voicing their needs and desires. The community and families expressed their desire for inclusion. Teachers said they wanted learning clusters with a neighborhood-like autonomy but were still connected to the whole school. Administrators wanted greater flexibility to address fluctuating enrollment. The District expected a high-performing 21st century school, and everyone agreed they wanted connections to the wonderful natural environment of this Pacific Northwest site.



The main entry of the school is a welcoming front porch inviting families to linger and cultivate relationships. Transparency, warm materials, and seat walls create places to gather and informally play.





Position building to accommodate slope and engage landscape







02 SCOPE & BUDGET



The new two-story, split level school has a capacity of 660 students, from prekindergarten through fifth grade. It consolidates previously disjointed spaces and fractured site, creating community spaces for students and families. Nestled into its wooded site and featuring a number of sustainable strategies, the school has remarkably low energy consumption and is constructed for durability and longevity.

Owner : Bellevue School District Location : Clyde Hill, WA Building Area: 90,984 SF Site Area: 10.7 acres **Student Capacity : 660** Grades Served : PreK - 5 **Project Delivery :** Design/Bid/Build

Construction Schedule : June 2018-August 2019

Occupancy Date : September 2019

Final Construction Cost : \$50.2M

Construction : Concrete & Steel. Type II-B, with partial heavy timber roof framing

Predicted EUI: 10 pEUI



- Main Entry / "Front Porch" 1
- 2 Central Courtyard
- Early Learning Entry 3
- Covered Play Area 4
- Playground 5 Playfield
- 6 Early Learning Play 7
- 8
 - Outdoor Learning 12
- Library Plaza
- Auto Drop-off 10 11

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- Bus Drop-off
- Service Access
- 13 Visitor Parking
- Staff Parking 14 15
 - **Bio-swales**
- 16 Community Trail

98th Avenue NE





The district and the design team worked handin-hand with the school's Design Advisory Team (DAT), comprised of teachers, parents, and administrative staff, to formulate and fine-tune a design that reflects this community and school's unique culture. Multiple meetings with the DAT tailored and confirmed program areas for the education specifications, identified project goals and frameworks, established guiding principles, and tested a wide range of building and site organizations before arriving at a preferred solution. Student engagement exercises were held to listen to how the students see themselves, their school, and their learning experiences.

GUIDING PRINCIPLES Student Centered Community Use Welcoming & Inspiring Safe & Secure Adaptable & Flexible Infrastructure to Support Problem-based & STEM Learning Natural Site Connections High-Performing Building Through discussions with the school and community the four most prominent challenges discovered were:

#1: Grade-level based learning clusters accommodating student population fluctuations

"Kindergarten students don't always arrive in tidy 4-classroom groupings each year." Extensive study by the design team led to a radial learning cluster organization with "swing" classrooms at pivot points, allowing classroom cluster groups to vary in size. The swing classroom, combined with generous bi-directional stairs between stacked clusters, allows learning clusters to expand horizontally or vertically to accommodate multiple classroom combinations. Natural wood screens provide filtered daylight from skylights above the stairs and allow visual continuity between shared learning spaces. The learning cluster arrangement allows fluctuation between three to five classrooms per grade depending on student enrollment.

#2: An adaptable library which can support daily curriculum, afterschool programs, & community use

An elementary library is the center of inquiry and knowledge acquisition. Connected to the school's "main street," the Clyde Hill library is located near the main entry for convenient community use and afterschool programs. Expanding the possibilities of a traditional library, the new library is physically connected to a STEM lab. The spaces are joined by a door and a large, folding glass partition which allows the spaces to flow together as programs evolve and change. In addition to the school's book collection, the library includes spaces for group and independent reading, classroom-type instruction, computer stations, and access to an outdoor reading plaza. The STEM lab is a makerspace classroom with overhead power reels, robust computing infrastructure, sinks for experimentation, and access to an outdoor testing plaza.



Early design explorations established the "swing" classroom concept through working closely with the Design Advisory Team.



(4 CR) cluster

#3: A compact school accommodating growth while meeting strict building height restrictions

Rapid student population growth necessitated a multi-story building design, however, the City of Clyde Hill's zoning code has a strict 25-foot height limit above the City's "original grade." Through extensive exploration, the design team turned the constraint into a design feature that supports the school community and ensures the building fits the residential scale of Clyde Hill. The split-level design works with the site's natural slope, minimizing excavation, and combined with the radial organization, means that the school's resources are never more than half the school or half a flight of stairs away. Additionally, locating the building's heat pumps close to the spaces served, rather than using the district's typical mechanical penthouse approach, not only helped meet the City's height requirements, but substantially lowers fan energy for heating and cooling.

#4: An arrival and departure experience establishing covered play as both a waiting area and a portal to play

The original school's outdoor covered play area was developed as a large roof over the space between separate buildings, doubling as covered circulation and play. Though this approach created a large outdoor play space, it was central to the school's campus and was not able to be used for before and after school activities. The DAT desired that the new covered play structure be located adjacent to the student drop-off loop to serve as a covered waiting area. The new building's "front porch" canopy extends along front of the school's entry, parallel to drop-off, becoming the covered outdoor play area, linking the gym and commons to play, and creating a large covered waiting area.

8 Design Advisory Team (DAT) Meetings
4 Schools Toured with DAT
9 Design Executive Meetings
1 Student Engagement Workshop

3 All Staff Updates



The design team engages students to learn about their experiences and perspectives, folding them into the new building design.



The new Clyde Hill Elementary School is a success in large part due to its existing assets: the commitment of the district, the support of the citizens to pass the 2014 educational bond, the dedication of the Design Advisory Team, and the natural environment of the site.

District Commitment: The District has seen the modernization of their facilities as an opportunity to be the best stewards of their constituents' resources through embracing an ongoing process of improving building efficiencies. They work to communicate the importance of great schools with the communities which the schools serve, promoting the value of supporting the schools, thus leading to the passing of a bond to finance education projects such as Clyde Hill Elementary School.

2014 Bond and the support of

citizens: The district's \$450 million bond was passed by 72% of voters in 2014. Money generated through the bond went toward building several schools, including Clyde Hill. Voter support for educational facilities was integral to the successful creation of the new Clyde Hill Elementary School.

Design Advisory Team: Multiple meetings with the DAT reviewed, confirmed, and tailored the education specifications, identified goals and frameworks, and tested a wide range of building and site organizations before arriving at the preferred solution. Due to the DAT's energy and dedication to the school and its students, the design team was able to create a school that belongs to and reflects this unique community. **Mature trees on site:** The character of the City of Clyde Hill is defined by the presence of mature evergreen trees. Zoning regulations are in place to protect trees and limit the scale of buildings that would diminish the presence of the trees or impede views. The CHES landscape is a laboratory for student learning, revealing the interdependence of sunlight, water, insects, birds, plants, trees, and, ultimately, salmon, which is a key species of the Pacific Northwest.

Shared community play and activity spaces: In order to promote a network of walking and bicycling paths in a community that predominantly travels by car, the CHES design includes paths that merge the site to the adjacent Clyde Hill Park and Chinook Middle School and provides numerous bike racks near the entry. The site was designed as a community connector, rather than a boundary.



An extension of the building's main entry canopy provides covered play right by the drop-off loop to support student arrival and departure and is a portal to play.



The stacked learning clusters are arrayed around a central, hexagonal hallway, helping break down the overall mass of the two-story school to fit within the mostly residential neighborhood. The brick and siding colors, textures, and rhythm were chosen to evoke the character of the surrounding trees.

04 EDUCATIONAL ENVIRONMENT



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The new Clyde Hill Elementary School is 90,984 square feet with 28 early learning, primary, and intermediate teaching stations, with spaces for special instruction including science and technology, art, music, and special education.

At the onset of this project, the goals set out for the design team included: all students have access to high-quality learning and support spaces including science, technology, math and engineering, as well as extracurricular activities, strong connections to the surrounding natural environment, and adaptable spaces capable of accommodating enrollment fluctuations and program changes. As the DAT and design team explored site opportunities, educational best practices, and development needs for the elementary school students, the program for the facility was developed, refined, and tailored specifically to Clyde Hill.

The site-specific needs were balanced with current district standards and educational specifications to create a facility that will support students and their families for generations to come.

Primary objectives include providing a safe and welcoming environment, a clearly articulated building and site organization that is easily navigable, design of outdoor and indoor areas to support extended use by the community, respect the City of Clyde Hill's "Tree City" status, and flexible instructional spaces that easily adapt to daily changes in program or longer-term evolution of curriculum. The compact, radial design of the facility, with its "swing" classrooms, folding walls, abundant windows, biophilic design, and outdoor learning areas, is a direct response to these educational goals.

Safe and Welcoming

With its extensive wall of windows providing views to the Gymnasium/Commons/Stage,

the school's main entrance is visually welcoming and provides clear wayfinding. The administrative team is located at the main entry, giving clear supervision of site access points for both auto and bus drop-off and pick-up. The building entry opens to the large multipurpose commons "living room" across a daylit corridor. The entry and community functions are highly visible and prominent upon entering the building. The spaces around the entry function as a community center to allow for extended use of the facility after school hours. The prominent use of wood creates delight and instantly relates the building and its occupants to the surrounding natural environment.



The main entry is designed to simultaneously provide safe and secure access while welcoming the community by visually connecting the approach to activities in the commons and the landscape beyond.

Adaptable Spaces

Several design features allow the school to adapt from day to day or year to year, whether it is due to fluctuating student grade-level populations or changing program requirements.

The radial organization of learning clusters originated from the idea of the central swing classroom serving multiple clusters combined with the goal of maximizing daylighting for each classroom while achieving efficiency of space utilization.

The "swing "classrooms, located at the pivot point between clusters, accommodate different classroom groupings, both horizontally and vertically, in direct response to enrollment fluctuations. Each cluster has its own stair to support vertical connection and access to outdoor learning. Within each cluster a shared learning area supports breakout groups, individual work, and sharing opportunities between multiple classrooms.

The design of the commons and gym creates an open "community asset" at the school's front door - a welcoming "living room" for students and families. The dining commons is always open to the "main street" and can be connected to the gym through an operable partition, which, when open, creates a high-school sized sports court for large student gatherings or community use. Additionally, one of the music classrooms is joined to the commons with an operable wall allowing it to double as a stage. This large group space, connected directly to outdoor play, supports movement, nourishment, socialization for students, and extended community use. It is near the library, STEM, and Art resources along the school's "main street."



ABOVE: The building's radial organization creates "swing" classrooms that can relate to and be accessed from multiple clusters. Adaptable connections allow program flexibility and the school to evolve over time.

BELOW: The "living room" commons is open to the "main street" and connects to the "front porch" and the stage. The commons and gym can be connected to become a large sports court or gathering space.







panels, clear voids, and spaced slats, recall moments one experiences in the woods.



The STEM lab is a large makerspace with large tables, sinks, outdoor access for messy projects, and technology tools, along with immediate access to research in the library. The large, movable glass partition opens to connect the space directly with the library.

Adaptable for Discovery

The Design Advisory Team asked for a library that would serve current needs and be adaptable as library use and function evolves. The design team located the library near the main entry for convenient community use and connected the library to the STEM lab with a door and large, folding glass partition, allowing the spaces to merge.

Connecting the library to the STEM lab expands the programmatic functions of the library to include a large makerspace and allows it to adapt daily and over time.

As a center for inquiry, the library and STEM lab are both wired for extensive computing resources, and the STEM lab has access to an outdoor testing plaza, overhead power reels, and sinks to support problem based learning. At the heart of the school and connected to an outdoor plaza, the library bridges between the community and academic zones. Placing the library, STEM lab, and art classroom at the center of the school emphasizes the value of knowledge, creativity, and discovery.

Clyde Hill Elementary School has been designed to provide a variety of outdoor learning opportunities, from the STEM lab testing plaza to the learning cluster courtyards and beyond.

Each area allows for a variety of learning and teaching styles. Outdoor learning opportunities abound across the site, from the raingardens to the mature evergreens that define the site boundaries.



The library has spaces for large and small groups, individual reading, and access to the STEM lab and an outdoor plaza.



The split-level design of the building integrates the building with the sloping site, meeting the City's strict building height limit, while locating each classroom only a half flight of stairs from all resources.



The radial organization of the building was developed as a series of learning clusters arrayed around a central courtyard. The clusters are composed of classrooms connected to a shared learning area, featuring a generous, bidirectional stair facilitating easy vertical connections.



A Wood screens and unique environmental graphics define learning clusters' shared areas and bring natural references inside.



B The design of the classroom clusters allows most classrooms to have windows on two sides, maximizing daylight and providing passive energy savings.



C Strong visual connections link classrooms to shared learning areas and each other. Windows are placed to balance daylight and frame views to the surrounding landscape, especially in the "swing" classroom above.

05 PHYSICAL ENVIRONMENT

Clyde Hill is small city of 3,400 residents, located between Bellevue and Seattle, Washington. Clyde Hill's proximity to the region's international technology, engineering, and financial corporations has dramatically increased the area's growth and diversity over the past several decades. In contrast to the city's demographics, over half of the school's population identify as Asian, demonstrating the growing global nature of the region and its position on the Pacific Rim as a highly desirable place to live, work, and learn.

The 10.7 acre site is one of several school and municipal sites located on the ridge of Clyde Hill in an otherwise residential neighborhood dominated by tall evergreens and dramatic views. Immediately north of Clyde Hill Elementary School is Clyde Hill City Hall and Police Station and Bellevue Fire Station #5. The District's Chinook Middle School lies directly to the south, through a stand of trees with school athletic fields, tennis courts, and a city playground between the two schools.

Key organizational factors for the site include safety and security, consolidating play areas, connecting to the natural environment, and staying within the city's building height limit.

The project design creates safe and secure circulation with separate drop-off areas for the students arriving by foot, bike, car, and bus, along with a separate building services drive. Clear pedestrian pathways and the shifting of the long vehicle queuing areas onto the site prevents backups on the city's streets and improves neighborhood safety. The previously fractured playground areas were transformed into one highly supervisable play area, which also acts a clear edge to prevent neighbors from using the site as a park during the school day. The play area connects directly to the "front porch" and school entry, creating a welcoming gathering area for parents, fostering community at the beginning and end of the school day. Walking and bicycling to and from the school are encouraged with numberous bike racks and pathways that safely connect the site to the surrounding neighborhood.



Off the "main street," the stage in the commons/gymnasium is surrounded by the rhythmic patterning of wood, windows, skylights, and acoustical panels, echoing the feeling of the wooded site, bringing nature into the school.

The school's radial spatial organization and stepped massing are direct responses to the natural and jurisdictional constraints on the site. The successful resolution of these forces, in combination with a host of programmatic and functional needs, resulted in the unique form of the new school.

Upon entry, visitors find themselves in the "main street" which links the entry to community spaces: the commons/gym, stage/ multipurpose space, and library. Moving further into the "heart of the school" the main street leads to the art/STEM/library core and beyond to the classroom learning clusters. The compact and radial organization means no classroom is more than half the length of the main street away from the heart of the school.

Extending outward from the hexagonal hallway the arrayed learning cluster organization allows for the three two-story clusters to be situated at a break in the site topography where the slope increases more dramatically, falling nearly a full story. The organization allows the cluster masses to fan out, breaking down the building scale so it dissolves into the trees and fits within the residential scale of the neighborhood. The split-level approach takes advantage of the site's natural topography, keeping the building under the city's strict 25-foot height limit and all classrooms only a half-flight of stairs from all the school's resources. The clusters extend like fingers into the landscape, allowing for better views and connections to the outdoors. The shape of the clusters allows the majority of the classrooms to have windows on two sides, creating learning environments which benefit from abundant and balanced natural light.

The Design Advisory Team asked that the new school be cohesive, especially in consideration of the former school which had multiple detached buildings. The radial organization was designed to keep any one cluster from being the "last" one in a series, which can feel isolating. Learning clusters were designed to be distinct neighborhoods within the cohesive and interconnected school while also being able to adapt to grade level fluctuations. Defined and differentiated by colors and large murals of the Pacific Northwest, each learning cluster creates a "home" for students.

Classrooms feature large glass relites linking them to shared learning areas and to each other through strong visual connections. This fosters a strong sense of community and ownership within the cluster, increasing utilization.

Ground level learning clusters have direct access to outdoor learning areas, and all sides of the building have direct connections to the outdoors, whether a learning plaza outside the library and STEM lab or outdoor play immediately accessible from the gym and commons.

District standards mandate that its new schools will have lower environmental footprints, reducing the operations and maintenance needs for generations.

The sustainable strategies integrated into Clyde Hill Elementary School include a geothermal HVAC system, efficient heat pumps, 100% outside air ventilation system with heat recovery, extensive photovoltaics, LED lighting, occupancy and daylight sensors, a high performance envelope, efficient service distribution, lowflow toilets and sinks, high quality daylighting, building zoning to support community use, emphasis on pedestrian and bicycle access, functional landscaping that manages stormwater, and visible systems and signage that allow the building to be a teaching tool for students, encouraging a deeper understanding of their relationship to their immediate surroundings and the world around them.





The building form allows for extensive daylight and connections, visual and physical, to outdoor learning areas and the surrounding natural environment.

Connections to Nature

The Clyde Hill Elementary School building organization capitalizes on the inspiring site and fosters a strong sense of place by creating many outdoor connections. The building frames a series of outdoor connections, from the main entry "porch" on the north to the library/STEM lab plaza on the south, to the outdoor learning cluster courtyards on the east, and the play area on the west. The generous entry canopy connects the commons to the exterior "front porch". The building's form extends into the covered play roof, connecting the gym and commons to outside play areas. The library and STEM lab share an outdoor plaza, and the art classroom opens onto the central courtyard. Classrooms have strong visual connections to the surrounding landscape, and the ground floor shared learning areas have exits to outdoor learning courtyards with sculpted, interactive raingardens.

Both indoors and out, the school facility integrates with its natural environment through its exterior expression, interior materials, and plentiful daylight and views.

The brick's texture and color evoke tree bark while the reveals reference the verticality of tree trunks, dissolving the building mass into the trees. Warmtoned phenolic-resin panels with wood grain blend with the landscape. Inside, wood slat ceilings, wall panels, and detailing reference nature. Forum seating risers were milled from trees logged on-site. Carpet mimics lichen-covered forest floors. Experiential graphic design elements in the learning clusters reflect the natural environment of the region shoreline, forest, alpine, and sky. Biophilic design principles, inside and out, further the occupants' connection with the surrounding natural environment and the benefits and delight it yields.



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12

10c

10d

10b

- 3

- 2 Outdoor Learning
- 3 Covered Play
- 4 Library/STEM Plaza
- 5 Courtyard
- 6 Early Learning Entry
- 7 General Classroom
- 8 Kindergarten Classroom
- 9 Early Learning
- 10 Special Use Classroom
 - 10a Art Classroom
 - 10b STEM Lab
 - 10c Stage
 - 10d Music Classroom
- 11 Library
- 12 Commons / Gym
- 13 Administration
- 14 Circulation
- 14a Shared Learning Area
- 15 Support



14a



10a

11



Shared areas connect to outdoor learning courtyards and the natural environment. Rain gardens improve ecologies and provide learning opportunities, including movable gates for experimentation.

RESULTS OF THE PROCESS & PROJECT



The new Clyde Hill Elementary School welcomed its students in the fall of 2019 and had six months of inperson classes before the world-wide pandemic suspended school operations for 13 months. Yet in its initial six months, the design of the facility was extremely well received by its community.

Key successful features include responsiveness to fluctuating enrollments, the compact facility design, and learning clusters connecting small groups of teachers and students to create a "home" for students within a large educational environment. The "swing" classroom design, allowing learning clusters to fluctuate in classroom groupings, has been effective in its first year of operation, particularly as enrollment was lower in its first year.

The flexibility designed into Clyde Hill has proven to be a real asset for safe accommodation of students indoors and outdoors. The current pandemic has created new challenges to create innovative learning settings. Better utilization of space, flexibility allowing complete re-purposing of spaces, greater utilization of outdoor learning, greater emphasis on airflow and ventilation, creative use of remote learning - these are just a few of the conversations that are now occurring.

Clyde Hill's adaptable design allowed for the building to successfully support the school's reopening in the Spring of 2021. The learning clusters' ground floor shared learning areas, with their direct connections to the outdoor learning areas, were able to adapt and be used as distributed entry points to help maintain physical distancing and minimize potential viral exposure. The shared areas were utilized as classrooms, increasing student capacity while maintaining distancing protocols. The open dining commons, imagined as the school's "living room," is a new model for the District, and the open layout facilitates ease of use and flexibility, better accommodating social distancing and increased air flow. The dedicated outside air system (DOAS), decoupled from heating and cooling, provides increased fresh air rates, improving indoor air quality without affecting the rest of the mechanical system.

The myriad of sustainable strategies integrated into the Clyde Hill Elementary School project have already demonstrated that the school is highly efficient and will make a dramatic impact on lowering the operational needs for this site into the future. The District prides itself on developing compelling, enduring, and sustainable schools that support learning and discovery, while being good stewards of resources. With a year's worth of utility data provided by the District, the design team's modeled predicted energy use index (pEUI) of 10 kBTU/ft² was validated with an actual reported EUI of 11 kBTU/ft², making Clyde Hill one of the District's most energy efficient schools.



Arriving into each learning cluster, students are engaged with both the landscape and learning spaces ahead. Unique environmental graphics give each cluster its own identity and assist with wayfinding.

07 SUSTAINABILITY & WELLNESS





Learning cluster daylight study demonstrates effective natural light in the classrooms.



Biophilic environmental graphics enhance sense of place and wayfinding throughout the school.



Brick color and texture evokes the bark patterns, relief, and verticality of the community trees.

Environmental Stewardship

The District and its community prioritize building performance and environmental stewardship. The design of the school responds with the use of highly durable interior and exterior materials and a set of robust features that reduce long-term operating costs and carbon emissions over the building's life. Featuring a net metered 99-kilowatt photovoltaic array and another 50-kilowatt photovoltaic array connected to an on-site battery back-up system, **the school has an energy use index (EUI) of 11 and is net-zero ready.**

Clyde Hill Elementary School has a learning culture based on informed stewardship of place, resources, and ecosystems. In pursuit of supporting this culture, the design team sought a solution that suggests an affinity between architecture and place, accomplished through a set of biophilic associations of space, light, and material, which, working together, recall the spatial and material experience of the forest.

The defining experience is one of natural light, material texture, and spatial connections. The shifting orientation of the plan invites light from all directions, permeating the interior much as light permeates the forest canopy. The combination of wood screens and variable plan geometry define, connect, and dissolve space, recalling the layered space of the forest landscape. Views through and beyond connect interior and exterior environments, blurring physical and virtual boundaries. Material biophilia is achieved with brick and wood elements that recall the materiality of the forest. Screens become trees. Benches recall logs. Joists and mullions are branches. Brick is earth. Patterns become bark.

The presence of nature defines the character of the school and invites student awareness and engagement with the natural world. The underlying goal being one that inspires and delights the students and staff on a daily basis, making school an enjoyable and productive place to learn and work.



Wood screens filter light and views from the commons to the school's "front porch." Tiered wood seating was created from trees selectively harvested from the site.



Library and STEM lab are connected to an outdoor classroom/testing plaza and to the site beyond with a bridge over a rain garden.



Daylight, views, wood screens, murals of the natural environment, and subtle "lichen-like" carpet patterning organize the shared learning areas and connect students and staff to nature every day, strengthening their well-being and bringing them joy.

