OPTIMIZING LEARNING ENVIRONMENTS FOR THE LITTLEST LEARNERS: ELEMENTARY SCHOOL DESIGN IN 360°

Association for Learning Environments
Pacific Northwest Regional Conference

June 21, 2019
PRESENTERS

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Principal
BLRB Architects

Dr. Linda Florence
Former Superintendent
Reynolds School District

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Principal
PAE Engineers

Association for Learning Environments
Pacific Northwest Regional Conference

June 21, 2019
1. Overview
2. About the District
3. Parity & Equity
4. Whole Child Development
5. Integrated Sustainability
6. 360° Review
7. Q & A
OVERVIEW
ABOUT THE DISTRICT

- East Multnomah County
  Portland, Oregon

- Serves 1,200 Students

- Covers Five Municipalities:
  - Portland
  - Gresham
  - Fairview
  - Wood Village
  - Troutdale
ABOUT THE DISTRICT

- East Multnomah County
  Portland, Oregon
- Serves 1,200 Students
- Five Municipalities:
  - Portland
  - Gresham
  - Fairview
  - Wood Village
  - Troutdale
WILKES ELEMENTARY

- Original Pioneer School House
- Modern Day Pioneers
- Multi-Cultural Identity
FAIRVIEW ELEMENTARY

- Established Suburban Community
- Surrounded by Metro-Portland Growth
- Historic Red Brick School

ABOUT THE DISTRICT
TROUTDALE ELEMENTARY

- Gateway to Historic Hwy 30 & Columbia Gorge
- Historic Downtown
- Walkable Community School
### Be a learner-centered environment

- A variety of spaces, both interior and exterior, will be provided to support multiple intelligences and encourage multiple learning modalities.
- The schools will incorporate Small Learning Communities to enhance learning, connectedness, and collaboration.
- Ample, robust, and flexible technology options will be available to support learning.
- The learning environment is to include space for hands-on project-based learning.
- Utilize evidence-based design when selecting interior colors and materials so as to positively impact student behavior, productivity, and achievement.

### Be flexible and adaptable

- Various learning spaces will promote multiple uses to enable high utilization of all spaces.
- Include a variety of spaces such as learning studios, learning commons, and small group rooms in each Small Learning Community to provide diverse and agile places of learning.
- Buildings shall be designed to accommodate change over time; consider building structure, infrastructure, and technology.
- Furniture and equipment will be selected to support flexibility and multi-use.
- Consider providing flexible space that can support and encourage community partnerships.
- Provide adequate covered outdoor space to allow for year-round outdoor play.
- Efficient use of space.

### Promote meaningful collaboration

- Small personalized learning communities will be provided that promote collaborative activities.
- Provide staff team/planning spaces in each Small Learning Community to promote teacher communication and teaming.
- Provide spaces such as learning commons and small group rooms to support student collaboration and interaction.
- Accommodate staff professional development needs.
- Consider the concept of "the open office" to encourage better communication and collaboration in the school admin area.
- Consider providing common space for parent and community volunteers.
- Provide a "Community Living Room" to welcome and foster communication.

### Be a community resource

- The school will be well lit, visible, inviting, and accessible for community use.
- Zone the facilities in such a way as to promote and support community use.
- Consider the school facility as a potential community FEMA shelter in an emergency.
- Accommodate and allow for community use of playfields, gymnasiums, and other school facilities as deemed appropriate.
- Unity of school community will be supported and promoted through the inclusion of Small Learning Communities, shared spaces, and multi-use of spaces.

### Be a safe environment

- The schools will be designed to support security and personal safety.
- The school's main entrance will be adjacent and visible to the administration and incorporate a "secured vestibule" for controlled entry during the school day.
- Access points to the school will be limited, easily supervised, and controlled.
- The schools will be zoned for before- and after-school community use.
- Design the Small Learning Communities as "safe havens" in case of emergency lockdowns.
- Provide separate and discreet vehicular drop-off zones for parents and buses.
- Provide adequate exterior site lighting throughout pedestrian and vehicular zones.
- Provide emergency access and exiting throughout the schools.

### Be a model school for stewardship & sustainability

- The school facilities will incorporate natural light and daylight harvesting features.
- The school building and site will be a teaching tool for environmental stewardship.
- Select bldg. materials/systems that are sustainable, durable, and cost-effective. Select mechanical systems that are both energy efficient and simple/easy to operate and maintain.
- Use renewable energies (i.e. solar, wind) where appropriate and cost effective.
- Provide a healthy indoor school environment; including quality indoor air, quality acoustics, and supporting physical activity.
- Encourage environmentally responsible behavior through the inclusion of recycle stations, energy performance reporting stations and outdoor learning labs.
- Effectively use public funds to deliver a resource and energy-efficient school.
- Foster student health and wellness by encouraging physical activity, active lifestyle, and healthy eating.

### Honor community context

- Design each of the three elementary schools (Wilkes, Fairview, and Troutdale) to reflect and honor the unique community/neighborhood in which it resides while adding to the strength and stability of the neighborhood.
- Ensure that the design of each school is equitable in quality, program, and features.
- Design each school to celebrate and showcase the school’s heritage and history.
- Utilize a design aesthetic that is not trendy and will pass the test of time. Consider the use of masonry as a preferred exterior building material.
PARITY & EQUITY
**PROGRAMMING**

- Initial Programming – Create Individual Schools
- Enrollment
- Unique Program Elements

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<th>WILKES ES</th>
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<th>TROUTDALE ES</th>
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PARITY & EQUITY
### PROGRAMMING

**FAIRVIEW ELEMENTARY**

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**SPECIALIZED EDUCATION**

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**SPECIALS**

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**Parity & Equity**

- District-Wide Opportunities
- Program Parity & Equity
- Efficiency & Economy
## PROGRAMMING

### TROUTDALE ELEMENTARY

**PROGRAMMING**

- District-Wide Opportunities
- Program Parity & Equity
- Efficiency & Economy

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**SPECIALIZED EDUCATION**

- Special Classrooms
  - SPED Classroom | 2 | 900 | 900 |
  - SPED Resource | 1 | 900 | 900 |
  - TITLE 1       | 2 | 400 | 800 |
  - ELD Oral/Conf/Meeting | 2 | 320 | 640 |
| **Sub-Total**    | 5 | 2,920 |

**SPECIALTIES**

- PROJECT STUDIO (Sci/Art) | 1 |
  - PROJECT STUDIO | 1 | 1,100 | 1,100 |
  - Materials/Supply Storage | 1 | 100 | 100 |
  - Project Storage | 1 | 100 | 100 |
- MUSIC | 1 |
  - Music/Stage | 1 | 1,100 | 1,100 |
  - Music/Stage Storage | 1 | 200 | 200 |
  - FLEX CLASSROOMS (Computer Labs) | 2 |
  - Flex Project Classroom | 2 | 1,100 | 2,200 |

**Sub-Total** | 4 | 4,800 |
## PROGRAMMING

**WILKES ELEMENTARY**

### District-Wide Opportunities

### Program Parity & Equity

### Efficiency & Economy

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**WILKES ELEMENTARY**

10-Mar-16

**SPACE ALLOCATION SUMMARY**

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<td>average capacity</td>
<td>546</td>
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<td>STUDENTS</td>
<td>73,832 SF</td>
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PLANNING & CONSTRUCTION

- Equity v. Prototype
- Concurrent Construction
- Occupied Sites
- Same Products & Systems
- Same Construction Conditions
- Same but Tailored – Orientation, Access, Parking
WHOLE CHILD DEVELOPMENT
SAFE ENVIRONMENT

• Monitoring Access & Entry
• Grade Level Learners Organized Around Common Areas
• Belonging to a Smaller Community
TEACHING & LEARNING

- “Fat L” Learning Studio
  - Plenary
  - Small Group
  - Independent Learners
TEACHING & LEARNING

- Large Group
- Essential Service Within the Community
- Grade-Specific Spaces
  - Grades K-1
  - Grades 2-3
  - Grades 4-5
PHYSICAL NEEDS

• Free & Reduced Meals Program

• Family Support Services
PHYSICAL NEEDS

- Outdoor & Indoor Play Areas
- Before & After School Programs
• Wall Mural – History & Heritage of Each School
COMMUNITY

- Oversized & Flexible Commons/Gymnasium
- Maker Space – Hands On Learning + Community Use
- School-Based Facilities for Families
INTEGRATED SUSTAINABILITY
DISTRICT GOALS

• Resource & Energy Efficient
• Daylight Harvesting
DISTRICT GOALS

- Cost-Effective Maintenance
- Teaching Environmental Stewardship
- Path to Net Zero
- PV Ready
PROCESS TO NET ZERO

- Guiding Principals
- Multiple HVAC Options
- High Performance Building Envelope
- Natural Ventilation
- Active Supplemental Systems for Heating & Cooling
Energy Use Goal Setting

In the chart, the following categories are compared:

- Architecture 2030 Baseline
- Code Baseline
- Better
- Best
- Architecture 2030 Target

Energy use is broken down into categories:

- Domestic Hot Water (DOMEST HOT WTR)
- Ventilation Fans (VENT FANS)
- Pumps and Auxiliary (PUMPS & AUX)
- Space Cooling (SPACE COOLING)
- Space Heating (SPACE HEATING)
- Plug Loads (PLUG LOADS)
- Lights (LIGHTS)

The chart shows a comparison of energy use across different standards and targets.
CLIMATE ANALYSIS

PORTLAND

Active Heating Zone
4719 hours, 54%

Passive Cooling Zone
3141 hrs, 36%

Active Cooling Zone
900 hours, 10%
CLIMATE ANALYSIS

PORTLAND

Active Heating Zone
1205 hrs, 14%

Passive Cooling Zone
7276 hrs, 83%

Active Cooling Zone
279 hrs, 3%

INTEGRATED SUSTAINABILITY

BIN DATA PASSIVE
ENERGY USE BREAKDOWN

INTEGRATED SUSTAINABILITY
HEATING ENERGY BREAKDOWN

- Wall Heating Energy [PERCENTAGE]
- Window Heating Energy [PERCENTAGE]
- Roof Heating Energy [PERCENTAGE]
- Exposed Floor Energy [PERCENTAGE]
- Infiltration [PERCENTAGE]
- Ventilation Heating Energy [PERCENTAGE]
Passive Approach

Roof = R-50  
Wall = R-40  
Window = U-0.25, 40% wwr  
Infiltration = 0.18 cfm/sf

1000 sf floor, 900 sf wall  
20 people  
1 w/sf Plugs and Lights
PASSIVE HEATING

WALL DETAILS

INTEGRATED SUSTAINABILITY
PASSIVE HEATING

WALL DETAILS

INTEGRATED SUSTAINABILITY
BALANCE POINT TEMPERATURE

Heat Load in Passive Buildings

Window 49%
Wall [PERCENTAGE]
Roof 17%

Balance Point Temperature

Heat (Btu/h)

Outside Air Temp (F)

- Total Heat Gain (Btu/h)
- Total Load (Btu/h)
Occupied Hours with Temperature > 74°F

- Baseline
- Natural Ventilation
- 3' Overhang
- Decreased SHGC
- Concrete Floor
- Concrete DOAS night flush
- DOAS Cooling 55F
- DOAS Cooling Concrete Flr Night Flush
- Decreased SHGC Concrete Flr Night Flush
- Decreased SHGC Concrete Flr Night Flush DOAS Cooling
- 3' Overhang, DOAS Cooling

Legend:
- NW Classroom L2
- SW Classroom L2
### August – Option 12

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NATURAL VENTILATION STACK

INTEGRATED SUSTAINABILITY
SYSTEM CONTROLS

Thermostat + LED Sensor + Ceiling Heat Pump

INTEGRATED SUSTAINABILITY
REYNOLDS IN 360°

ENSURING PARITY & EQUITY

RSD Board & Administration are committed to serving all students equally by providing comparable:

- Schools, not just replacements
- Equipment & finishes
- Size & amenities
- Flexible funding to build parity
WHOLE CHILD DEVELOPMENT

RSD Board & Administration are committed to helping the whole child succeed:

- Mind, body & a sense of belonging
- Safety & security
- Age-specific environments
- Integration of contemporary learning environments
- Student & family services beyond the classroom
- Supporting the community through families
REYNOLDS IN 360°

INTEGRATED SUSTAINABLE DESIGN

RSD Board & Administration are committed to a sustainable future:

- Durability & maintainability are priorities
- Energy conservation is a priority
- High performance building design
- Integrated student learning in controlling the learning environment via system controls
QUESTIONS?