CHEMEKETA AGRICULTURAL COMPLEX

CHEMEKETA AG. COMPLEX
https://ffadesign.com/projects/copy-chemeketa-community-college-agricultural-complex/

PROJECT BACKGROUND

The Chemeketa Agricultural Complex is part of Chemeketa Community College in Salem, Oregon. This new single-story educational building will contain lecture halls, laboratories, conference rooms, study rooms, and offices for staff all focused on agriculture and horticulture. As shown in the photo above, the lobby features an elevated roof section.

PROJECT OBJECTIVES

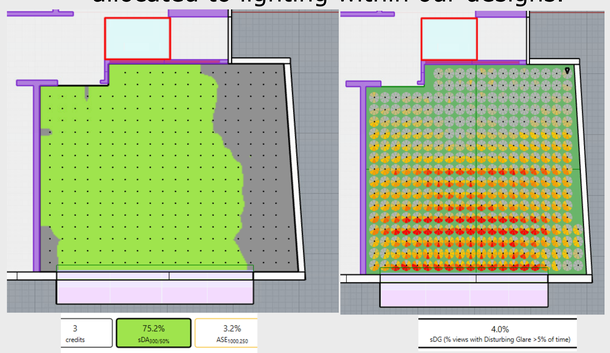
- Improve Lighting
  - Maximizing daylight penetration using large windows and skylights
  - Reducing energy waste with LEED Standard daylight targets to minimize need for electrical light
  - Provide benefits to occupant health and wellbeing through a connection to the outside
- Maintain open spaces with a steel gravity frame
- Mitigate effects of stormwater runoff and pollution with an optimized bioswale design
- Improve the Envelope
  - Increase occupant's thermal comfort

Oregon State University

LIGHTING DESIGN

DAYLIGHTING

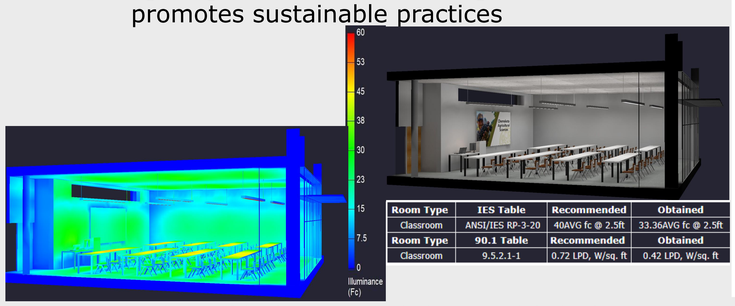
Much of the lighting design was focused on the integration of daylight into the space. This decision was reached due to an effort to design in a sustainable manner, as well as increased occupant health and wellbeing. We used LEED V4 standards as a target and were able to successfully achieve all three points allocated to lighting within our designs.



Final Results for the Soils Lab showing > 75% spatial daylight autonomy (sDA) and < 5% spatial disturbing glare (sDG) meeting 3 credits for LEED

ARTIFICIAL LIGHTING

Artificial lighting was used to supplement illumination to spaces when daylighting was sparce. The lighting design team worked in each space meticulously and created a lighting layout that suited each individual space effectively. Using highly efficient LED luminaires in conjunction with sensors, the team provided a low electrical energy lighting solution for a building that promotes sustainable practices



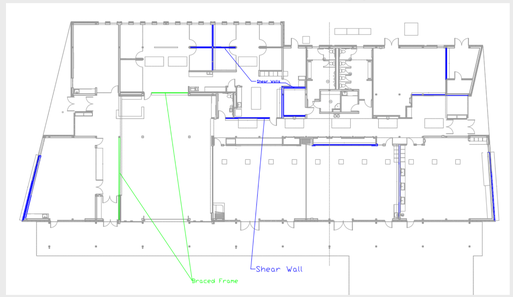
Room Type	IES Table	Recommended	Obtained
Classroom	ANSI/IES RP-3-20	40AVG fc @ 2.5ft	33.36AVG fc @ 2.5ft
Room Type	**90.1 Table**	**Recommended**	**Obtained**
Classroom	9.5.2.1-1	0.72 LPD, W/sq. ft	0.42 LPD, W/sq. ft

Final renderings of the classroom space displaying even light distribution, efficient lighting, and sufficient illumination on work surfaces

STRUCTURAL DESIGN

LATERAL DESIGN

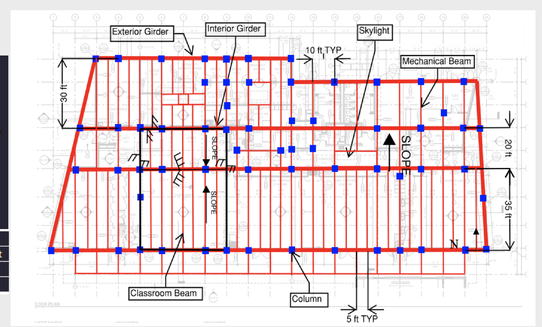
Lateral design was based on the support of the pop-up roof in the atrium and utilizing the less important walls to lighting and envelope teams. The use of Shear Walls is useful for covering large swathes of the structure that need support.



Final location of all lateral resisting shear walls

GRAVITY DESIGN

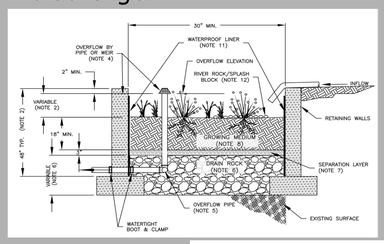
The gravity frame was designed to allow for large, open classrooms and conference rooms. The area around the pop-up roof required special consideration to account for snow drift and added wall weight.

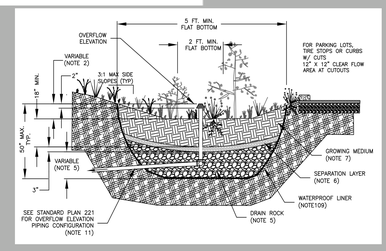


The final framing plan for the building

WATER RESOURCE DESIGN

The stormwater management alternatives were selected based on the site's topography, soil materials, and series of calculations to make sure the overflow runoff and pollutants are mitigated successfully. Use of bioswales and planter box are both effective in filtrations, treatment, and discharge.

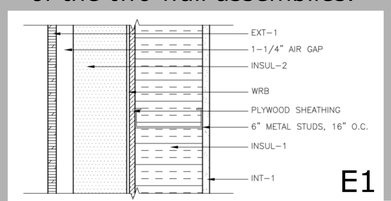




Finalized layout of an effective bioswale and planter box

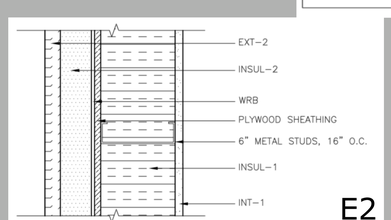
BUILDING ENVELOPE DESIGN

The envelope of the building is comprised of materials that were chosen based somewhat off price but more importantly, thermal efficiency. Thermal resistivity of each alternative material was measured and evaluated to ensure the performance of the two wall assemblies.



ARCHITECTURAL LEGEND

INSUL–1	CELLULOSE BLOWN
INSUL–2	POLYISO FOAM BOARD
WRB	WEATHER RESISTANT BARRIER
EXT–1	PLYWOOD SIDING
EXT–2	INSULATED SIDING
INT–1	MGO BOARD



Final wall assemblies including all alternative materials for increased thermal resistivity