

“Building Green – Keep Green”

By: Michael Knaack / Jim Hansen



Learning Objectives

At the end of this program, participants will be able to:

- Understand details used for schools in Bethel, WA.
- Evaluate the energy benefits that wood framing provides.
- Discuss cost saving techniques used in the Bethel School District for new school construction.
- Investigate the decision making process as it relates to selection of building materials and systems.



Presentation

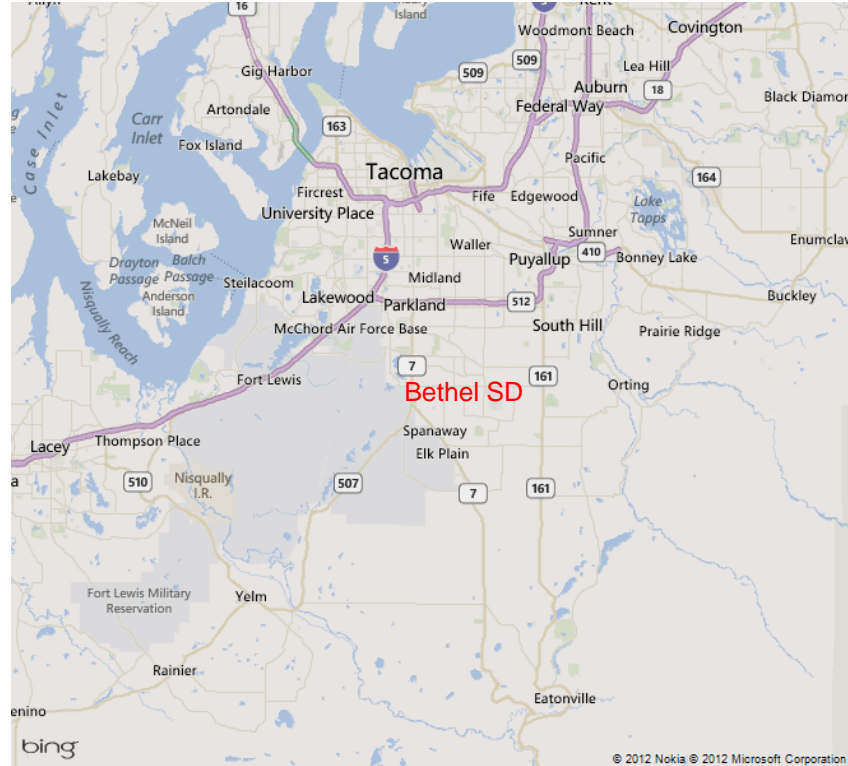
- Bethel School District
- Design Approach
 - Wood / Insulation
 - HVAC / Electrical
- Carbon Emission (Sequestration)
- History of RCM Program
- How the RCM Program Works
- RCM Program
- Lessons Learned
- Questions



Bethel School District

- 215 SQ Miles Unincorporated Pierce County
- 1/3 – In Urban Growth Area
- 18,500 Students
- 17 Elementary Schools
- 6 Middle Schools
- 3 High Schools
- 1 Alternative School
- Pierce County Skills Center

Bethel School District





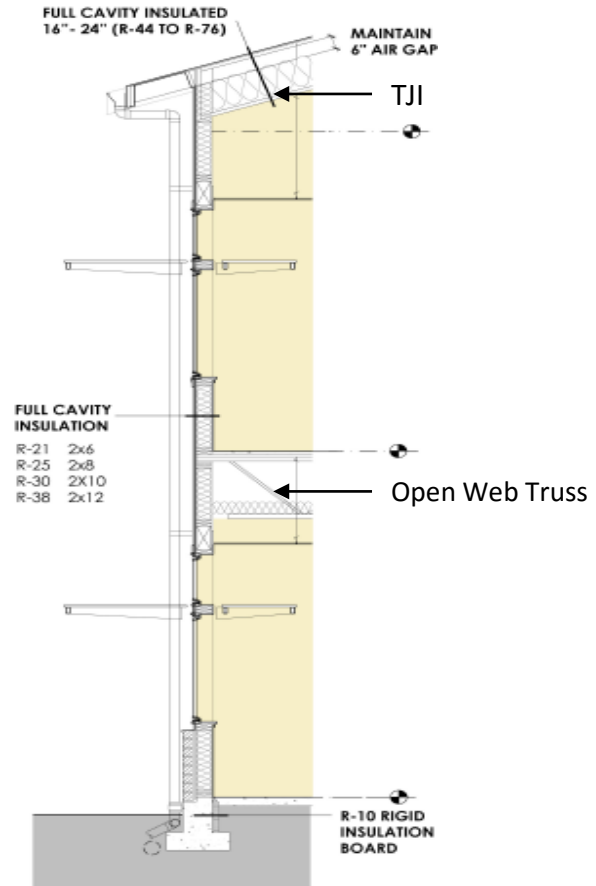
Design Approach

- **Function – Aesthetics – Economics**
- **2006 Bond Issue**
 - Educational Specifications (Administrative Team)
 - Construction Standards
 - Operational Cost
 - 30-35 Year Remodel Cycle
- **Design Team**
 - Collaborative Design with Team Members
 - Familiar with Local Codes & Design Standards
 - 4 Community Plans , 3 Power Companies, 5 Water Purveyors

Speed of Construction / Framing



Wall Section





Net Carbon Emissions

Material	Net Carbon Emissions (kg C/metric ton)	Net Carbon Emissions Including Carbon Storage Within Material (kg C/metric ton) ^{3/}
Framing lumber	50	-457
Medium density fiberboard (virgin fiber)	100	-382
Brick	80	80
Glass	150	150
Recycled steel (100% from scrap)	210	210
Concrete	240	240
Concrete block	264	264
Recycled aluminum (100% recycled content)	300	300
Steel (virgin)	660	660
Plastic	580	237
Aluminum (virgin)	4,260	4,260

^{1/} Values are based on life cycle assessment and include gathering and processing of raw materials, primary and secondary processing, and transportation.

^{2/} Source: USEPA (2006).

^{3/} A carbon content of 49% is assumed for wood.



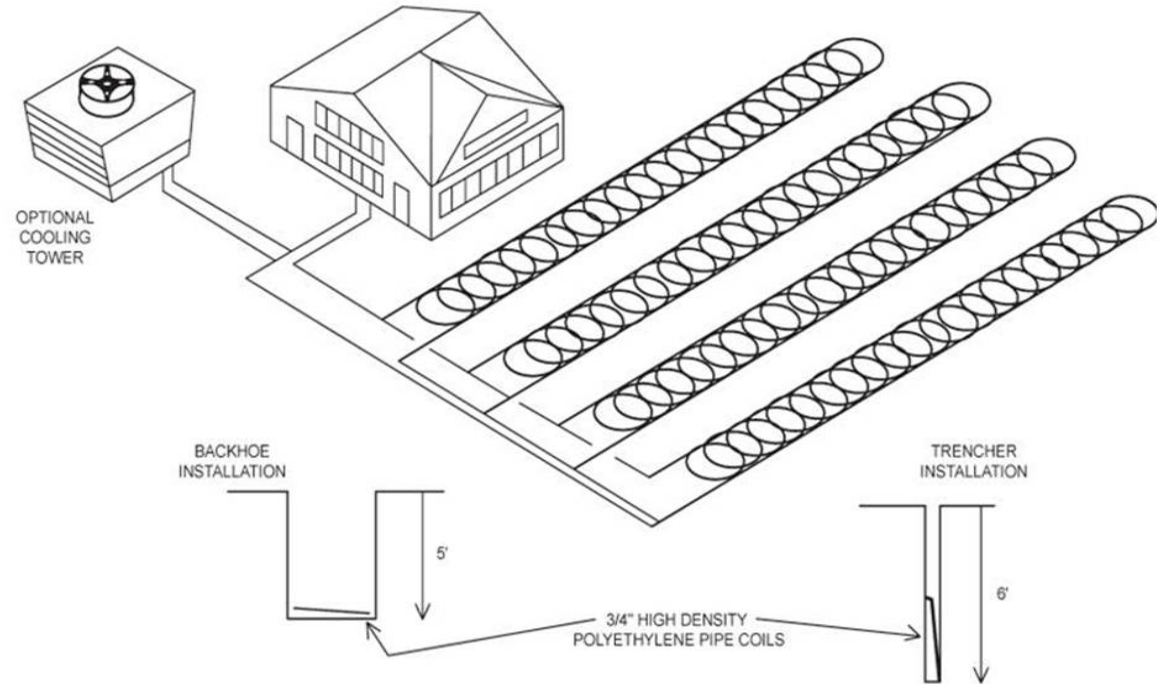
HVAC/Electrical

- Ridge Conduit (EMT) vs MC Cabling
- Lighting Fixtures
- Ground Couple vs Air Induction Systems
- Copper vs Pex Piping
- Cast Iron vs ABS
- No Sole Source
 - Controls
 - HVAC Equipment

Lighting Fixtures



Ground Couple vs Air Induction Systems



Air Induction Systems





RCM Program=M.E.A.T.

- How to Build a Program:
 - Measure
 - Educate
 - Audit
 - Talk
- HVAC is the biggest user of energy, the most difference is made there (Schedule Time = Money)
- Long term Solutions – Retrofits, Grants, Waste Mgt



RCM Program Results

- Since 2005, \$7.5 million in costs avoided
- Kilowatt reduction equal to two years of usage for all district buildings (2 million SF)
 - 2004/05 21 million KW \$1.1 Million - 26 Sites
 - 2012/13 19 million KW \$1.3 Million - 31 sites
- Nationwide Recognition
 - Overall portfolio average of 92 (out of 100)
 - 2013 ENERGY STAR LEADER
 - 2013 Leadership in Reducing Greenhouse Gases
 - 2016 Dept. of Education Green Ribbon District



Bethel Wins Green Award on Earth Day!

Today, the U.S. Secretary of Education named the Bethel School District a U.S. Department of Education Green Ribbon School District Sustainability Awardee!

Bethel was one of only 15 school districts in the country to receive the award. All were honored for their innovative efforts to reduce environmental impact and utility costs, improve health and wellness, and ensure effective sustainability education. 47 schools and 11 postsecondary institutions were also recognized.

We are excited to share this wonderful news with our staff on Earth Day!







Questions?

This concludes The American Institute of Architects
Continuing Education Systems Course.

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