Integrated Sustainable Design and Constructability Team

Sustainable Construction

Building Efficiently for the next 50 years

What is Sustainable Construction and why we should do it

"Sustainable practices are an investment in the future. Through conservation, improved maintainability, recycling, reduction, reuse and other actions and innovations, we can meet today's needs without compromising the ability of future generations to meet their own." - Air Force Facilities Guide

The overall goals for Sustainability include:

- Using resources efficiently and minimizing raw material resource consumption, including energy, water, land and materials, both during the construction as well as throughout the life of the facility.
- Maximize resource reuse.
- Utilize renewable energy sources.
- Create a healthy working environment
- Build facilities of long-term value.
- Protect and/or restore the natural environment.

What is Constructability?

Constructability refers to the ease of construction attained through the optimum use of construction knowledge and expertise in planning, engineering, procurement and field operation to achieve overall project objectives.

Examples of how sustainable design and construction practices are making PenRen projects easier to build!

Fan Powered Induction Units

Cut the amount of ductwork required by almost half, by allowing the return air to be taken directly from occupied space.

Reduced the number of mechanical rooms from 118 in Wedge 1 to only 9 in Wedge 2..

Allowed for maximum use of daylight by raising the outer ceiling height by 23 inches.

Commissioning Agent

involvement throughout design

Results in ...

A more efficient Cx process
Ensures system performance
Less delays during closeout
Facilitates building turnover

Re-use of building materials.

The PAC is reusing the existing limestone veneer.

Smartwall System

Modularized and fabricated offsite

Reduces material waste and field work

Allows for ease of installation

BUILD SMART PENTAGON WEDGES 2-5 — Wedge 1 "Better the Second Time Around" — PENREN H&RP INTAKE/OUTFALL — PENNSTATE — MEF Arriving in Style. Pentagon Metro Entrance Facility http://metro.pentagon.mil — BUILDING FOR STRENGTH

If you have more examples we want to hear from you. Please contact your ISDC team member or email us

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Sustainability Highlights from PenRen Projects

Wedge 1

- 70% of debris was recycled
- Increased energy efficiency of windows
- Removed of 25 million pounds of asbestos
- Removed of lead paint, mercury, PCBs
- Contaminated soil cleaned

Remote Delivery Facility

- Registered as LEED pilot project
- Green vegetated roof
- Indigenous vegetation and water re-use
- Building control system for energy efficiency and indoor air quality
- Elimination of unnecessary materials

Metro Entrance Facility

- At least 50% of waste was diverted from landfill
- Electric vehicle outlets installed
- Vegetation covers ½ the open space restoring life back to the site.
- High reflectance Energy Star roofing installed
- 20% savings in energy consumption
- Over 50% of the building materials were assembled within 500 miles
- Over 50% of the materials contain recycled content
- 21% of wood-based materials were FSC Certified
- Permanent CO2 monitoring system installed

Wedge 2-5

- 90% of all concrete and metal diverted from landfil
- Using high efficiency T-5 and T-8 lights
- Recycled gypsum wallboard
- Highly sustainable recycled content carpet
- Recycled content ceiling tile
- Universal space plan allows for easy space reconfiguration, reducing future construction waste

Pentagon Athletic Center

- Aggressive construction waste recycling program
- Green vegetated roof
- Vegetation covers 1/2 the open space restoring life back to the site
- Rapidly renewable materials (bamboo and cork flooring
- Bathroom partitions made from 100% post consumer recylced plastic
- 20% of fly ash was added to concrete
- Composite wheat board for millwork panels
- Ozone system for the pool
- Energy reduced through heat exchanger technology, occupancy and light sensors
- Permanent CO2 monitoring installed
- Low Emitting materials used

http://renovation.pentagon.mil/sustainabledesign.htm