

The Revitalization of the Sioux Ranger District Compound



Bruce Crockett – U.S. Forest Service,
Northern Region Engineering

Chris Martison – A&E Architects,
Missoula and Billings Montana



The Sioux Ranger District:

- Camp Crook, SD (pop. 60+/-), the location of the Sioux Ranger District, is a very small, rural community located on the western edge of South Dakota in Harding County.
- The Forest Service has been a part of this community for over 100 years, dating back to the days of the Sioux National Forest.
- Harding County is 2,500 square miles and has an estimated population of 1,145.
- The 163,000-acre Sioux Ranger District is part of the Custer National Forest, headquartered in Billings, MT. and lies within the Northern Region of the Forest Service.
- The Forest Service manages five land units in South Dakota and three in eastern Montana (in Carter County) as part of the District.

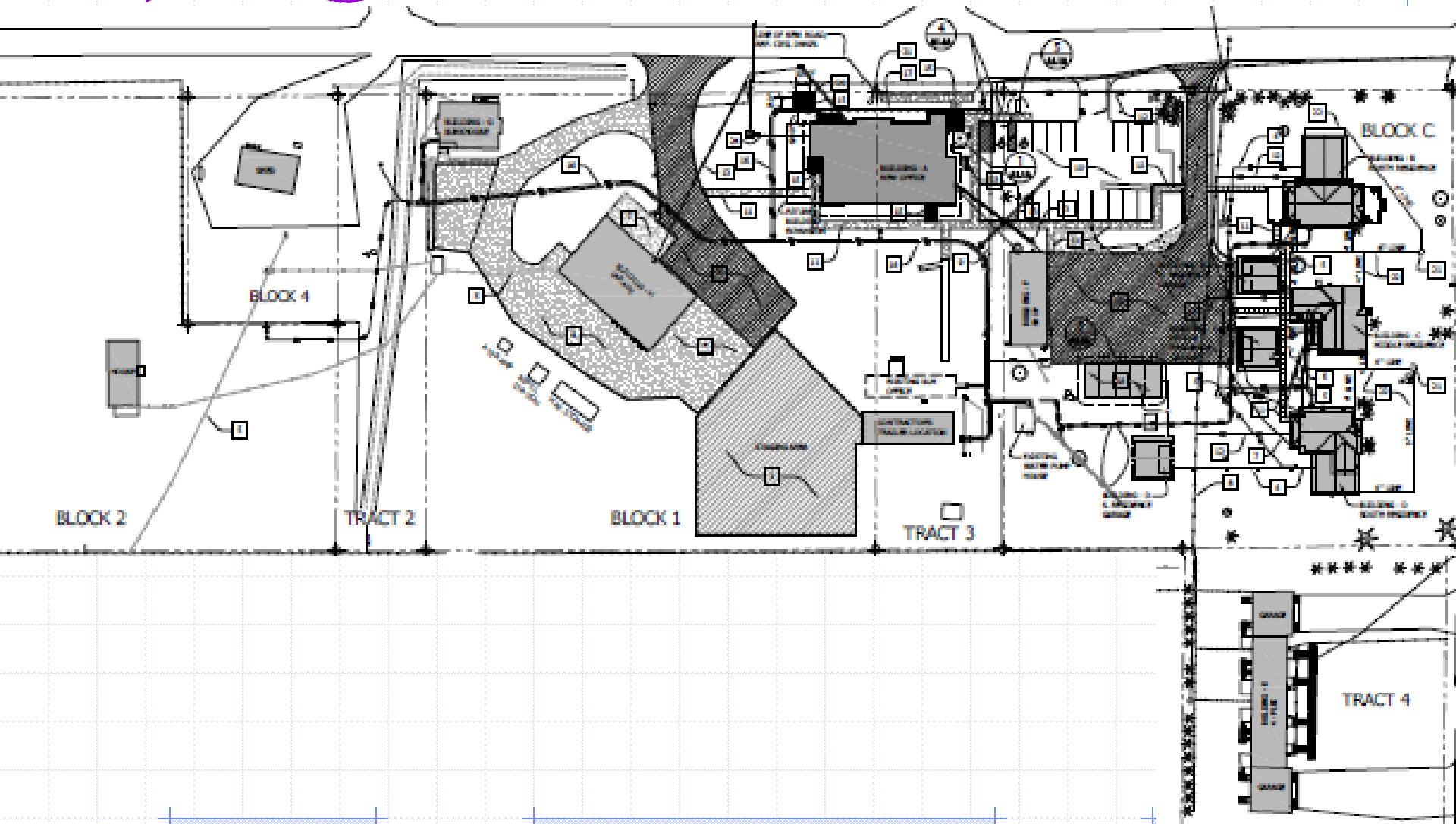
The Project:

- The current office was built in 1934 and despite additions and renovations, showed signs of deterioration and did not meet current health and safety standards or energy requirements.
- Additionally most of the other facilities had a lot of deferred maintenance and due to grading issues around the site and a high water table, basements in two of the residences and the office would have standing water on an occasional basis.
- Since there were already shelf ready designs for some of the work and the timing was right it made sense to submit this as an ARRA project and combine with Capital investment dollars to try to upgrade all of the facilities and infrastructure at the site.

The Project (cont):

- With continued forecasts of dwindling operation and maintenance dollars, the following decisions were made.
 - Require energy retrofits and upgrades to as many of the facilities as possible.
 - Provide a new energy efficient office, that included daylighting, superinsulation, efficient HVAC systems.
 - Provide a comfortable office with minimal private offices and small footprint, but functional layout.
 - Re-grade the entire site as necessary to get proper drainage and reduce or minimize future flooding and water issues.
 - Remove basements for residences and office. Add appropriate ground level space to make up for the lost space.
 - Update and install new utilities throughout the compound and install generator backup to residences and office, due to unreliable power in the area.
 - Meet the requirements for the Forest Service Built Environment Image Guide for designs in the Great Plains Province

The Site:

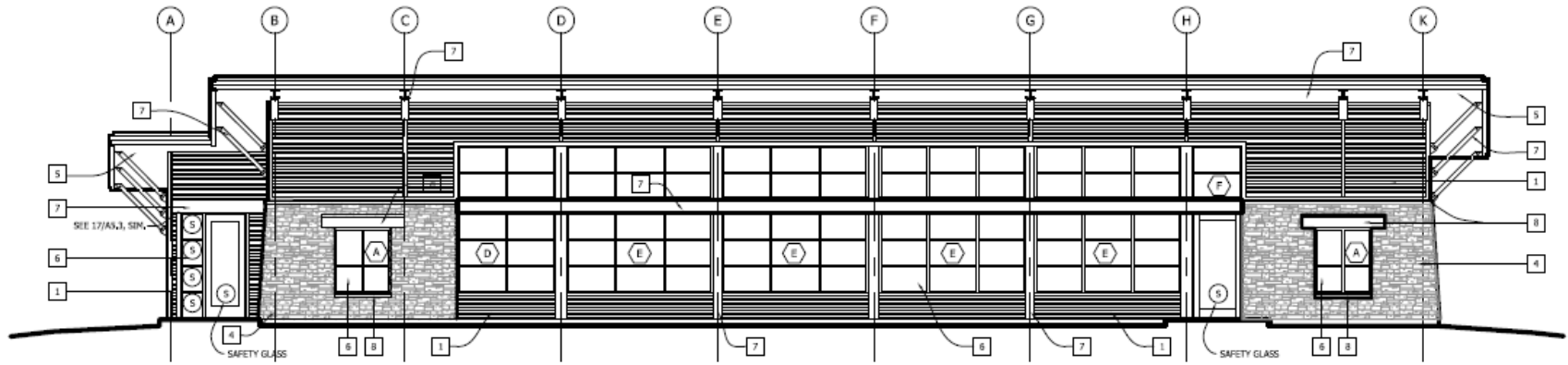


Timeline:

- Summer 2009 – submitted for ARRA project
- September 2009 – Started task order with A&E through an existing IDIQ and started fast track to complete contract documents and incorporate other completed design work in to package.
- September 2009 – December 2010 numerous scoping trips to the District and completion of all contract documents.
- January 2010 solicit project
- April 2010 award construction project to Ainsworth Benning Construction Co from Spearfish South Dakota. for \$2,532,780.
- May 2010 – Construction begins

Challenges:

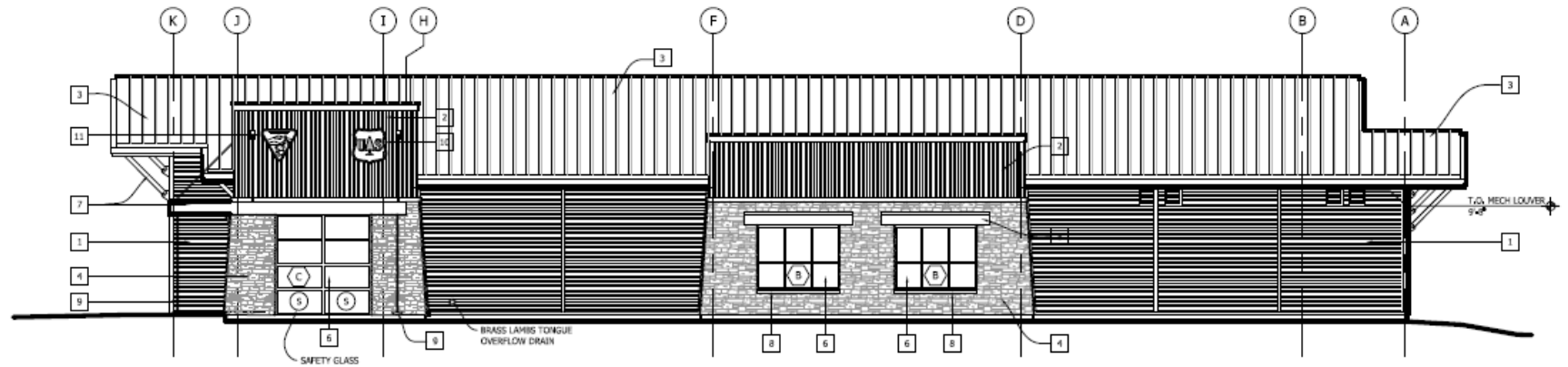
- Tight design time
- Clay soils throughout the site
- Weather conditions – During construction had the most rainfall recorded in years
- Remoteness of site and housing opportunities for workers
- Sight Drainage
- Coordination to move out of old office and into new office during construction.
- Multitude of different tasks to be accomplished
- Steel supplier wanting to change plans and then not delivering product on time.



SOUTH ELEVATION

A4.1A

3/16"=1'

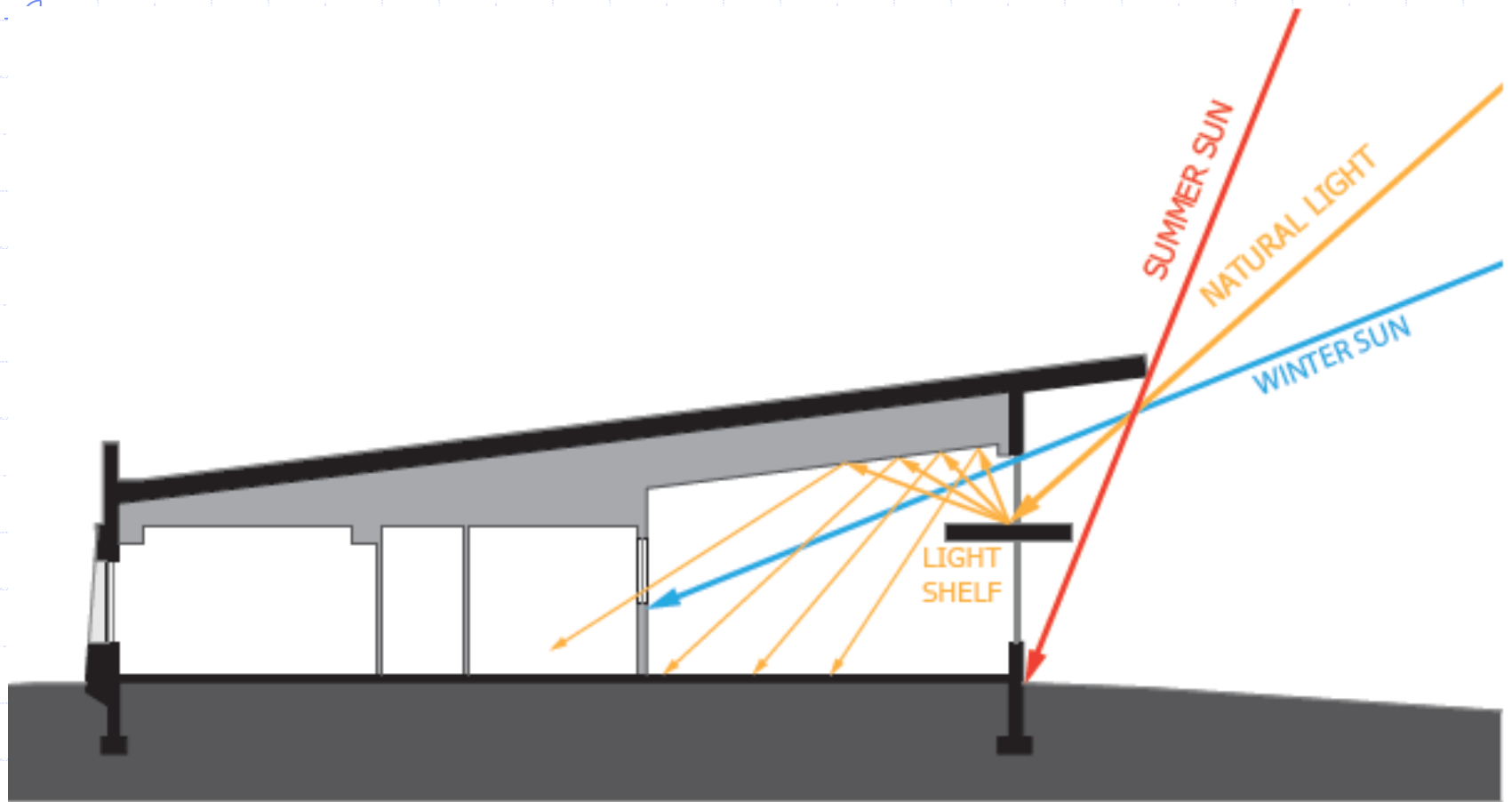


NORTH ELEVATION

A4.1A

3/16"=1'

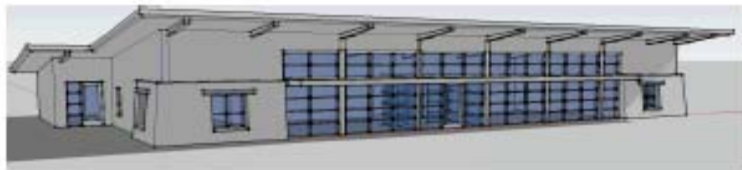
Solar Studies



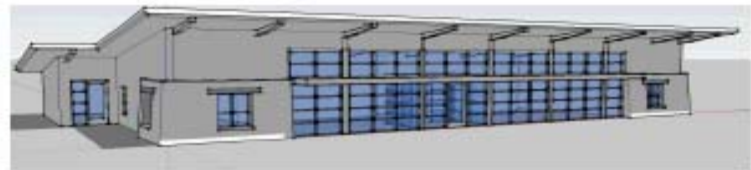
Solar Studies - Sun Shading and Diffusion

Solar Shading at Various times of the year

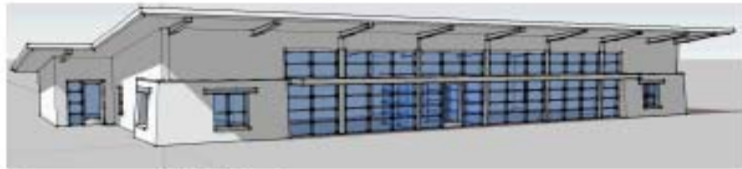
Sun Angles - Shading, Diffusion and Reflection



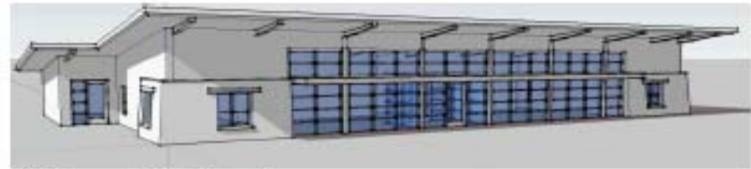
Summer - Morning



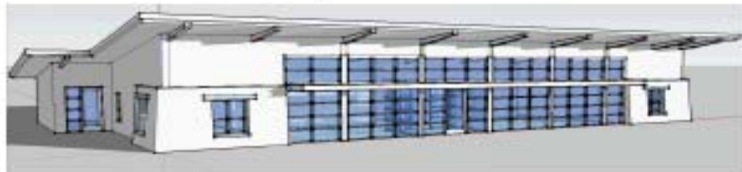
Winter - Morning



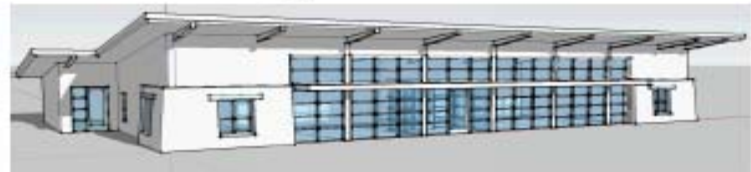
Summer - Mid-Morning



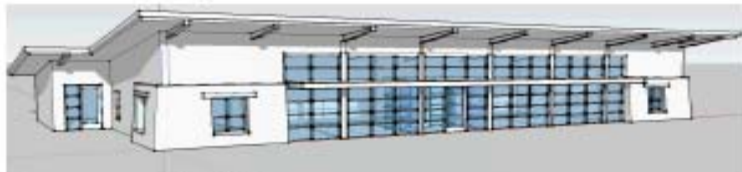
Winter - Mid-Morning



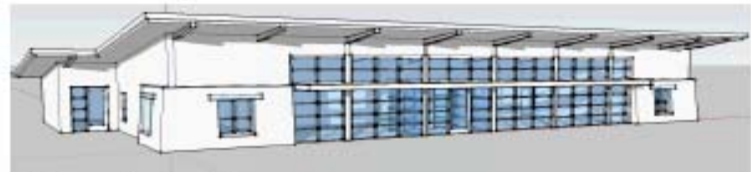
Summer - Early Afternoon



Winter - Early Afternoon



Summer - Late Afternoon



Winter - Late Afternoon

Building Section

WALL ASSEMBLY

MAINTENANCE FREE METAL SIDING
 2" EXTERIOR RIGID INSULATION, R-13
 1/2" SHEATHING
 6" FIBERGLASS BATT INSULATION, R-19
 5/8" GYPSUM BOARD

EFFECTIVE R-VALUE OF WALL
 ASSEMBLY, R-34.04

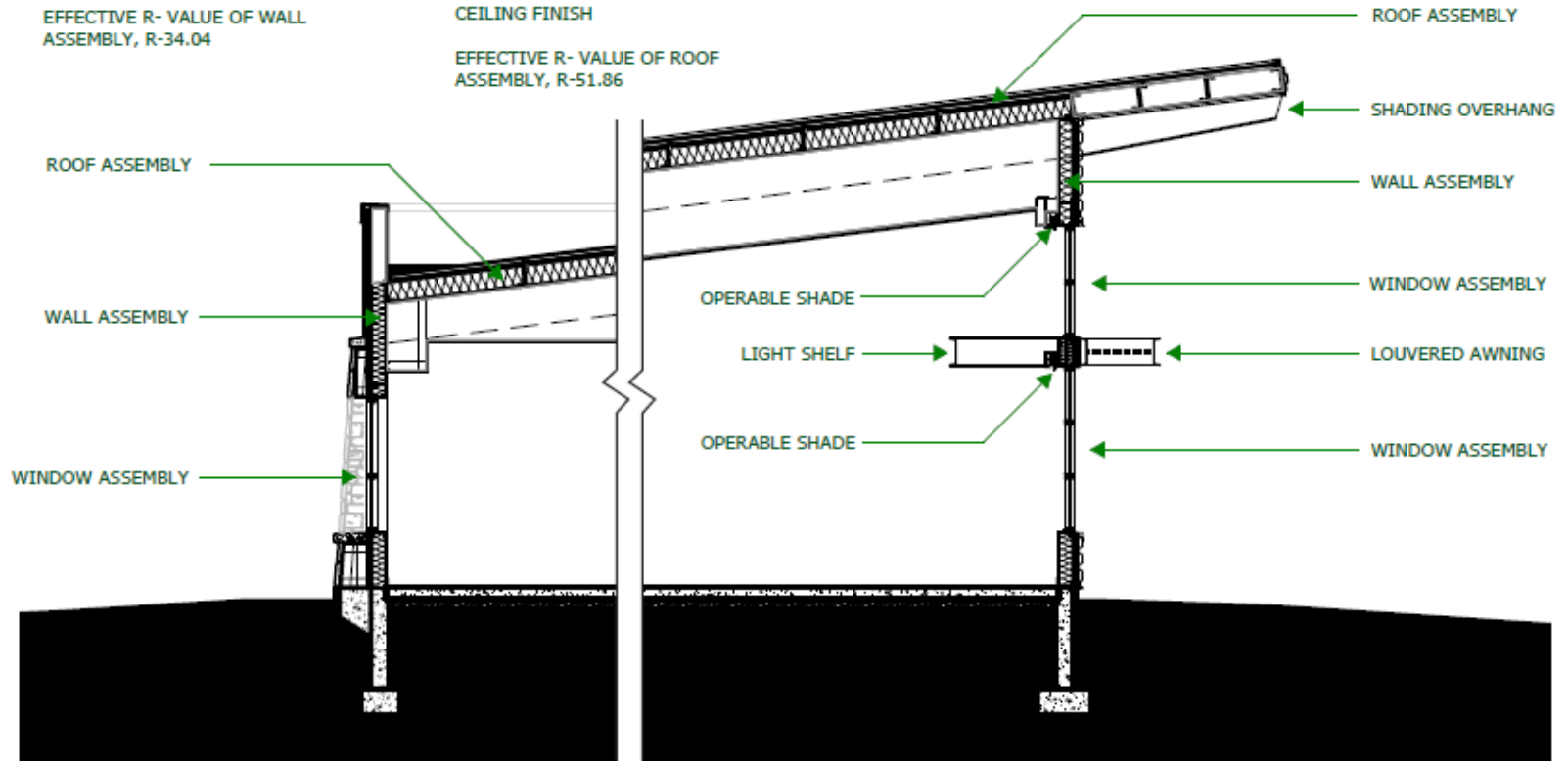
ROOF ASSEMBLY

METAL ROOFING
 1/2" COVER BOARD
 STEEL DECK
 Z PURLINS
 PRO-VALUE SYSTEM INSULATION, R-50
 VAPOR BARRIER
 CEILING FINISH

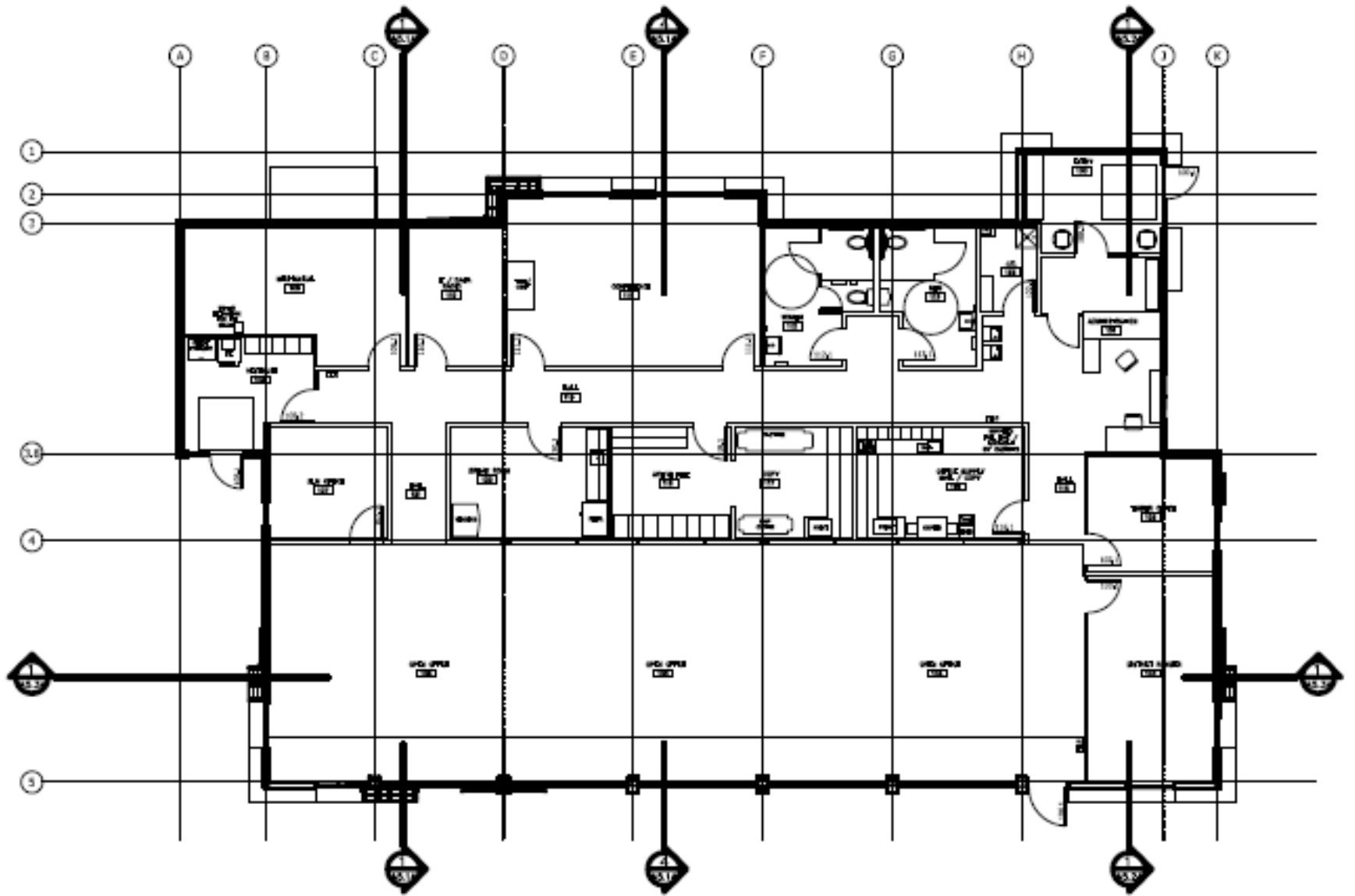
EFFECTIVE R-VALUE OF ROOF
 ASSEMBLY, R-51.86

EXTERIOR WINDOW ASSEMBLY

1" INSULATING GLASS
 - 1/4" SOLARCOOL GRAY REFLECTIVE GLASS
 - 1/2" AIR SPACE
 - 1/4" CLEAR GLASS
 THERMALLY BROKEN ALUMINUM FRAMES



Building Envelope - Performance Materials



Groundbreaking – May 2010



Water Issues ~ Who ordered this ~ we did not have swimming pools in the contract.



Water Issues

New Record Streamflow for Little Missouri River at Camp Crook

- Streamflow of the Little Missouri River at Camp Crook, S.D., set a new record high when the water level peaked on Tuesday, May 24, according to real-time U.S. Geological Survey streamgauge data.
- The new streamflow record of approximately 20,200 cubic feet per second (cfs) was recorded by the USGS streamgauge at Little Missouri River at Camp Crook, breaking the previous April 17, 2009 record of 12,400 cfs at this location. The water level peaked at 19.42 feet on Tuesday, about seven feet above the National
- Weather Service designated flood stage of 12 feet.



Day after the rains. Am I still in SD or did I get transported to Africa?



Office Foundation





Office

Previous Office



New



Office

Interior open office

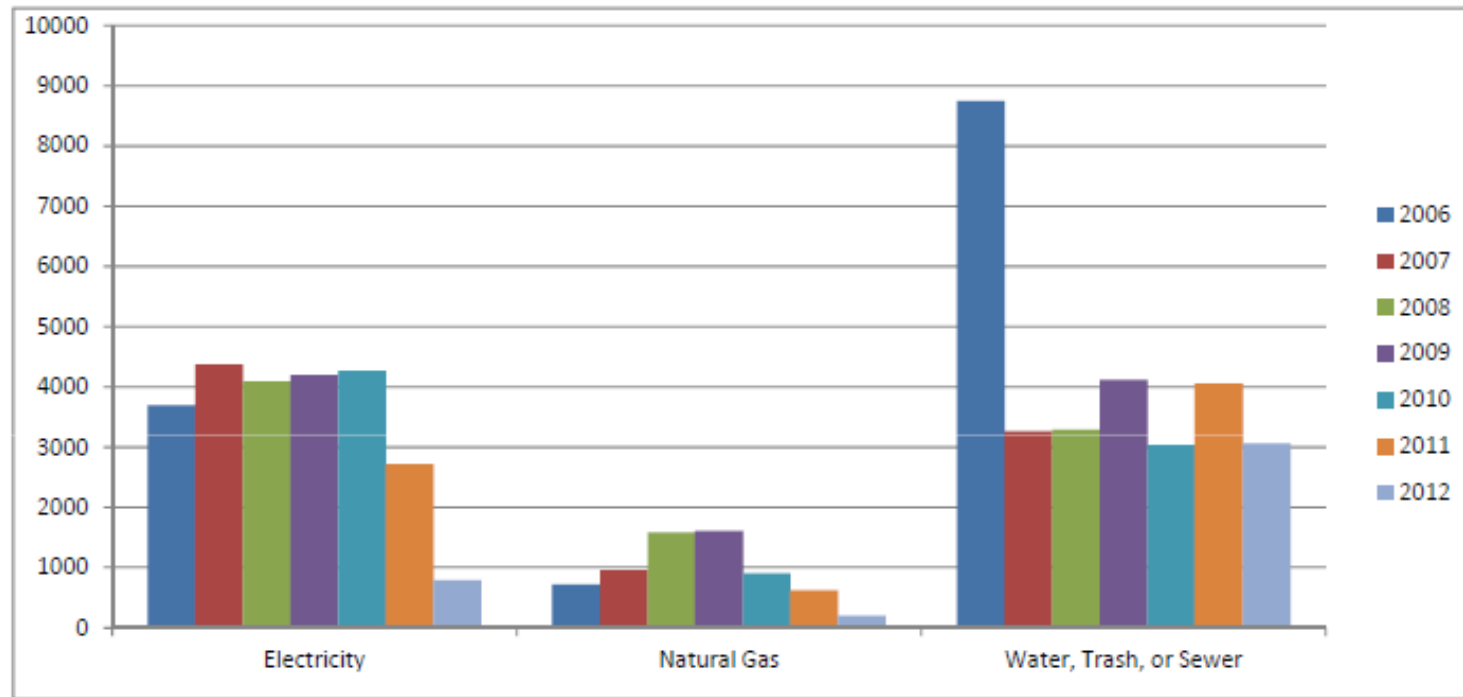


Front Entrance



Office Utility Cost Reductions

	2006	2007	2008	2009	2010	2011	2012
Electricity	\$3,692	\$4,370	\$4,083	\$4,197	\$4,265	\$2,719	\$788
Natural Gas	\$717	\$955	\$1,579	\$1,609	\$902	\$627	\$197
Water, Trash, or Sewer	\$8,746	\$3,264	\$3,283	\$4,117	\$3,030	\$4,055	\$3,063
Total	\$13,155	\$8,590	\$8,945	\$9,924	\$8,198	\$7,401	\$4,048



Reduction in Utility Usage

Other work Completed

- Eliminate basements in two of the residences and build addition to main floor to make up space.
- Remodel one residence to be fully accessible for persons with disabilities.
- Remodel the 4-plex install new energy efficient windows, new siding, additional insulation and better sewage ejection systems.
- Remodel bunkhouse and bathrooms
- Remodel the shop, warehouse and barn buildings
- Upgrade the water, sanitary and storm water systems and electrical systems

North Residence

Prior to Construction



North Residence

Before



After



North Residence

During Construction



North Residence

After Construction



Middle Residence

Prior To Construction



Middle Residence

After Construction

Meets all ADA/ABA requirements



South Residence

Prior to Construction



South Residence

During Construction



South Residence

After Construction



Foundation Work



4-Plex

Prior to Construction



Foundation Work



4-Plex



4-Plex

After Construction



Shop

Prior to Construction



Shop

After Construction



Barn

Prior to Construction



After



Barn

After



After



Bunkhouse

Before



After



Garage/Warehouse

After

Before



Other Facilities

Carport



Pumphouse



Other Facilities

South Garage



Middle Garage



Other Facilities

North Garage



Retrofit of Hazmat bldg



Other Facilities

North Garage



Retrofit of Hazmat bldg



Final Project Summary

BRIEF FINANCIAL SUMMARY OF THE CONTRACT

Final Construction Cost	\$2,906,505 – over \$300,000 of change orders were FS requested add-ons to the contract.
Original Construction Award	\$2,532,780
Total estimated Deferred Maintenance Reduction	\$2,000,000 + estimated
Total annual estimated O&M Reduction	\$25,000 + estimated

Questions/Comments?

Thank You