

**South Dakota Bureau of Administration**  
**Office of the State Engineer**

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# **High-Performance Green Building Projects**

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CY2017 Annual Project Report

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# High Performance Green Buildings

## State Building Projects Designed to Higher Standard

### Background

Designing buildings to be resource-efficient can save energy, water, reduce waste and pollution, thereby reducing operating costs, improving the indoor quality for occupants, and benefit the environment.

Recognizing the opportunity to reduce costs, save resources, and make the indoor and outdoor environment better, the State of South Dakota began its green building initiative in 2008.

### Green Building in State Law

Senate Bill 188 was introduced at the request of the Office of the Governor during the 2008 Legislative Session. As amended, the bill was passed by the Legislature and signed into law.

The new laws, codified as SDCL §§ 5-14-32 through 36, established requirements that any new construction or renovation of a state building with HVAC (heating, ventilation, and air conditioning systems) that has a cost of \$500,000 or more or includes 5,000 square feet or more of space shall meet or exceed a high-performance green building standard.

The law also recognizes that meeting a high-performance green building standard may not always be feasible and allows the requirement to be waived by the Office of the State Engineer. The circumstances which allow a waiver are described in the Building Project Waivers section of this report.

The law provides the option to select from three rating systems to meet the high-performance green building requirement:

- 1) A silver standard rating under the USGBC's Leadership in Energy and Environmental Design (LEED) rating system; or
- 2) A two globe rating under the Green Building Initiative's Green Globes rating system; or
- 3) A comparable numeric rating under a certification program recognized by the American National Standards Institute.

After a review of the different rating systems, the Bureau of Administration determined the LEED rating system best meets South Dakota's needs and now pursues LEED silver rating or higher for state building projects.

Administrative rules detailing the steps necessary to certify a project as a high performance building are found in ARSD Chapter 10:09:02.

House Bill 1011 was introduced in the 2010 Legislative Session on behalf of the Bureau of Administration to update the version of LEED referenced in SDCL 5-14-32 to the current version.

## **About LEED**

LEED – Leadership in Energy and Environmental Design – is a voluntary rating system published by the non-profit organization United States Green Building Council (USGBC) that provides a framework for the design, construction and operation of green buildings.<sup>1</sup>

LEED is an internationally recognized certification system that provides third-party verification that a building uses strategies to improve performance in key categories of: site sustainability, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in design.

Credits within each category are earned for each building project, and the amount of credit points earned defines the certification level achieved. A building project must satisfy all prerequisites and earn a minimum number of points to be certified. There are four levels of certification possible: Certified, Silver, Gold, and Platinum.

LEED-certified buildings are designed to:

- 1) Lower operating costs and increase asset value;
- 2) Conserve energy and water;
- 3) Reduce waste sent to landfills; and
- 4) Be healthier and safer for occupants;

## **Annual Report**

SDCL § 5-14-37 requires this annual report to the Legislature, including a list of state building projects granted a waiver or that failed to achieve a high performance green building standard.

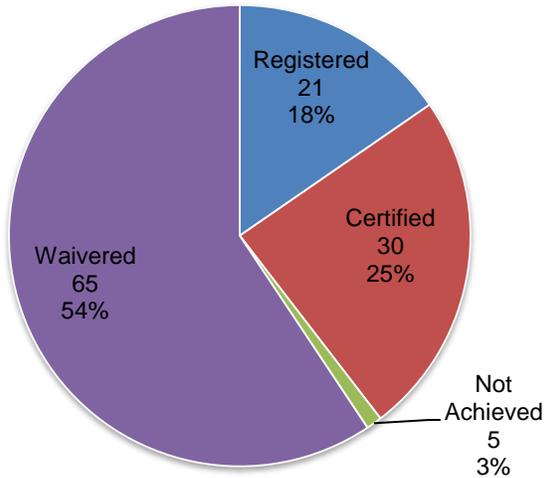
# **High Performance Green Building Projects**

## **Project Summary**

A total of 56 state building projects have been registered as LEED projects through CY2017. Forty-five of the projects are new buildings; eleven are major renovations. Thirty state high performance green building projects have been completed and officially earned LEED certification to date.

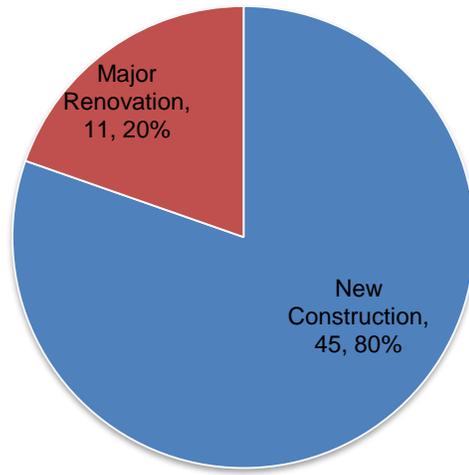
### Building Projects & LEED

July 1, 2008 - Present



### LEED Projects by Project Type

July 1, 2008 - Present



### LEED Registered Projects

State building projects registered as LEED projects through CY2017:

| Campus | Building  | New Construction | Renovation | Certification Achieved |
|--------|---|------------------|------------|------------------------|
| ACC    | MacKay State Library                              |                  | ✓          | Silver                 |
| ACC    | Dolly-Reed Plaza<br>(formerly Capitol Lake Plaza) |                  | ✓          | Gold                   |
| BHSU   | Student Union Building                            | ✓                |            | Gold                   |
| BHSU   | New Science Building                              | ✓                |            | Silver                 |
| BHSU   | New Residence Hall                                | ✓                |            |                        |
| DSU    | Habeger Science Center                            |                  | ✓          | Silver                 |
| DSU    | Beacom IT   | ✓                |            |                        |
| DSU    | Madison Cyber Labs                                | ✓                |            |                        |
| NSU    | Residence Hall                                    | ✓                |            |                        |
| NSU    | New Residence Hall 2E & 2W                        | ✓                |            |                        |
| NSU    | Science Center                                    | ✓                |            |                        |
| DVA    | Veterans Home                                     | ✓                |            |                        |
| GFP    | Outdoor Campus (Rapid City)                       | ✓                |            | Gold                   |
| GFP    | Fisheries Building (Ft. Pierre)                   | ✓                |            | Silver                 |
| GFP    | Visitor's Center (Custer State Park)              | ✓                |            | Silver                 |
| GFP    | Visitor's Center (Good Earth State Park)          | ✓                |            |                        |
| SDARNG | Joint Force Head Quarters                         | ✓                |            | Silver                 |
| SDARNG | JFHQ Addition                                     | ✓                |            | Certified              |
| SDARNG | Bldg 802  | ✓                |            | Gold                   |

|        |  |   |   |              |
|--------|--|---|---|--------------|
| SDARNG | Troop Medical Clinic                               | ✓ |   | Not Achieved |
| SDARNG | BG Earnie Edwards Readiness Center                 | ✓ |   | Silver       |
| SDARNG | Army NG Readiness Center                           | ✓ |   |              |
| SDSBI  | School for the Blind and VI                        | ✓ |   |              |
| SDDEV  | Damm & Norgello                                    |   | ✓ | Silver       |
| SDSMT  | Chemistry/Chemical Engineering                     | ✓ |   | Gold         |
| SDSMT  | Paleontology Building                              | ✓ |   | Gold         |
| SDSMT  | Connolly Palmerton Dormitory                       |   | ✓ | Gold         |
| SDSMT  | Student Recreation Center                          | ✓ |   |              |
| SDSU   | McCroy Gardens Building                            | ✓ |   | Silver       |
| SDSU   | Electrical Engineering & Computer Science Addition | ✓ |   | Silver       |
| SDSU   | Architecture, Math & Engineering Building          | ✓ |   | Silver       |
| SDSU   | Dairy Microbiology Lab                             |   | ✓ | Silver       |
| SDSU   | Jackrabbit Village Residence Halls                 | ✓ |   | Silver       |
| SDSU   | New Dining Services                                | ✓ |   | Not Achieved |
| SDSU   | Dykhouse Athletic Center                           | ✓ |   | Gold         |
| SDSU   | Agricultural Hall Lab                              |   | ✓ | Not Achieved |
| SDSU   | Jackrabbit Grove Residence Halls                   | ✓ |   | Silver       |
| SDSU   | Indoor Practice Facility (SJAC)                    | ✓ |   | Silver       |
| SDSU   | Dykhouse Football Stadium                          | ✓ |   |              |
| SDSU   | Performing Arts Addition                           | ✓ |   |              |
| SDSU   | Animal Disease Research and Diagnostic Lab         | ✓ |   |              |
| SDSU   | Wellness Center Addition                           | ✓ |   |              |
| SDSU   | American Indian Student Center                     | ✓ |   |              |
| SDSU   | Harding Hall                                       |   | ✓ |              |
| SDSU   | Precision Ag                                       | ✓ |   |              |
| SDSU   | Stanley J. Marshall Center                         | ✓ |   |              |
| USD    | School of Medicine                                 | ✓ |   | Certified    |
| USD    | Churchill Haines Science Center                    |   | ✓ | Not Achieved |
| USD    | Coyote Village Residence Hall                      | ✓ |   | Gold         |
| USD    | Wellness Center                                    | ✓ |   | Silver       |
| USD    | Akeley Science Center                              |   | ✓ | Not Achieved |
| USD    | Muenster University Center Addition                | ✓ |   |              |
| USD    | Dakota Dome Complex                                | ✓ |   |              |
| PURC   | Public University Research Center, 2               | ✓ |   | Silver       |
| PURC   | University Center, Rapid City                      | ✓ |   | Silver       |
| DOC    | Minimum Security Prison, Rapid City                |   | ✓ | Silver       |

• A key for the campus and agency abbreviations is included in the endnotes<sup>ii</sup>.

## **Certification Earned in CY2017**

Game Fish and Parks Visitor Center at Custer State Park was certified LEED Silver in CY2017

## **Projects Registered in CY2017**

Nine building projects were newly registered as LEED projects in 2017:

### **Madison Cyber Labs, DSU**

The Madison Cyber Labs is an applied research facility part of DSU's Beacom College of Computer and Cyber Sciences. It is located on the site of the former Lowry Hall. The demolition waste from Lowry will be diverted from traditional landfills and recycled to the extent possible. The new building is focused on energy savings and low emissions materials, while paying homage to the surrounding buildings in the Madison Historic District.

### **New Residence Hall 2E & 2W, NSU**

Northern State University's new residence halls are constructed using some commercial building materials as well as wood framing, making the hall feel more like a residential home. The building focuses on energy efficiency, modern lighting and control systems and environmentally friendly materials.

### **Science Center, NSU**

The Regional Science Center is a new state of the art facility that is focused on Chemistry, Biology, and Environmental Sciences. The Regional Science Center will help faculty enhance their research, be beneficial to students, serve the community by educational outreach, and address problems of local, regional, and global importance.

### **Army National Guard Readiness Center, SDARNG**

The new Army National Guard Readiness Center will be constructed on the existing AASF campus next to the Rapid City Airport Complex. The Readiness Center will house eight aviation units with 153 soldiers. The project will include backup/emergency power, geothermal heating, and is designed for a minimum of a 50 year life expectancy.

### **School for the Blind and Visually Impaired New Facility, SBVI**

The new South Dakota School for the Blind and Visually Impaired Facility is comprised of roughly 46,000 square feet. The school is dedicated to education of children who are blind or visually impaired including students who are deaf, blind or multi-impaired. The new building will be constructed with the latest technology to enhance learning in the lives of the children they serve.

### **American Indian Student Center, SDSU**

This new building will incorporate energy efficient mechanical systems and optimize building orientation and layout to better utilize natural daylight. SDSU is utilizing natural plantings as well as incorporating storm water retention. Insulation values are designed above and beyond what LEED requires. The building is being designed to incorporate photovoltaic panels if the budget allows at the start of construction.

### **Harding Hall Renovation, SDSU**

This project involves the renovation and addition of the old Harding hall building. Energy efficient chilled beams along with better insulated exterior and roof will improve the performance of the building throughout. New windows and storefront allow more daylight into the interior spaces. The project is currently on track to achieve gold.

**Precision Ag, SDSU**

The new building will include solar walls and photovoltaic panels to increase energy efficiency. Storefront and windows will also be included throughout to allow daylight throughout.

**Stanley J. Marshall Center, SDSU**

The addition to the Marshall Center will include solar walls to preheat air for heating and photovoltaic panels to reduce the peak electric load.

**Building Project Waivers**

**Waiver Summary**

SDCL § 5-14-34 allows waivers from the high performance green building standard to be granted by the Office of the State Engineer for state building projects if:

- 1) The building will have minimal human occupancy;
- 2) The increased costs of achieving a high-performance green building standard cannot be recouped from decreased operational costs within fifteen years;
- 3) A building is on the national register of historic places and achieving a high-performance green building standard would result in noncompliance with standards for historic preservation as set forth in the secretary of the interior's Standards for the Treatment of Historic Properties in effect as of January 1, 2008;
- 4) The square footage of the renovation project is less than fifty percent of the total square footage of the building being renovated. If the renovation project is being done in phases, the total square footage of all intended phases combined shall be used in making this calculation; or
- 5) The Bureau of Administration determines that extenuating circumstances exist to make impractical high-performance green building standard certification.

The conditions and procedures for granting waivers are detailed in ARSD Chapter 10:09:03.

A waiver does not mean that principles of sustainable design are ignored. State building projects are designed and constructed to be as energy and water efficient as feasible even if the project is not a LEED registered project.

**Waivers Granted to Building Projects**

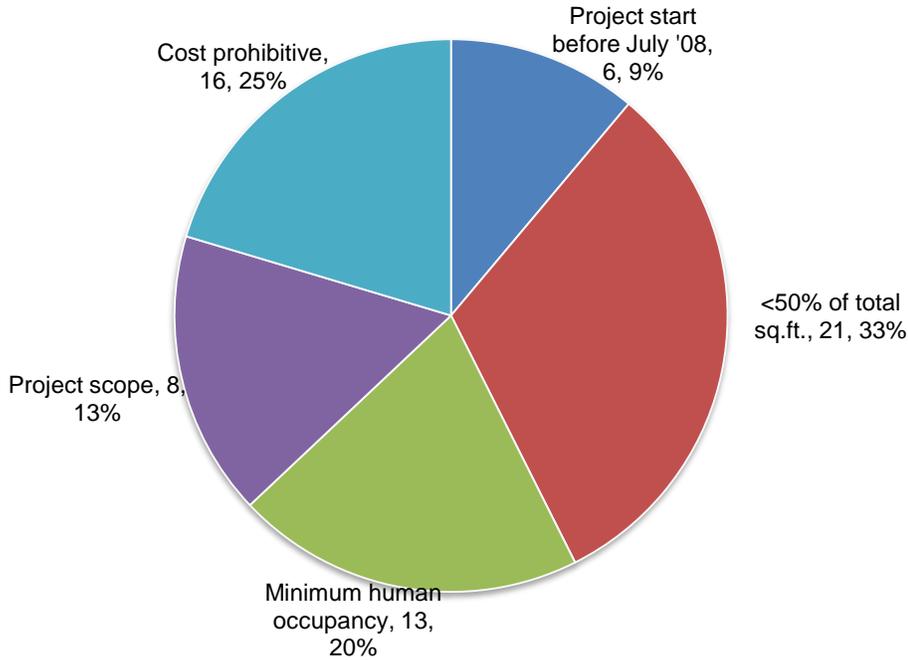
| <b>Campus</b> | <b>Building</b>                 | <b>Waiver Reason</b>                           |
|---------------|---------------------------------|--|
| BHSU          | Woodburn Hall Renovation        | Project Scope                                  |
| BHSU          | Jonas Science Renovation        | Less than 50% of Total Building Square Footage |
| DHS           | HSC Admissions Office (Yankton) | Less than 50% of Total Building Square Footage |

| <b>Campus</b> | <b>Building</b>                                 | <b>Waiver Reason</b>   |
|---------------|---|--|
| DOA           | Wildfire Office Building                        | Cost Prohibitive to Meet Prerequisites                       |
| DOA           | Clover Hall 4-H Exhibit, Huron                  | Minimum Human Occupancy                                      |
| DOT           | Pierre Regional Office                          | Less than 50% of Total Building Square Footage               |
| DOT           | Maintenance Shop, Clear Lake                    | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Martin                        | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Mobridge                      | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Highmore                      | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Kadoka                        | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Mission                       | Minimum Human Occupancy                                      |
| DOT           | Maintenance Shop, Rapid City                    | Minimum Human Occupancy                                      |
| DPS           | Highway Patrol Building, Rapid City             | Cost Prohibitive to Meet Prerequisites                       |
| DSU           | Zimmerman/Emery Residence Halls                 | Project in design development before July 1, 2008            |
| DSU           | Future Residence Hall (former Madison Hospital) | Cost Prohibitive to Meet Prerequisites                       |
| DSU           | Trojan Center Renovation                        | Cost Prohibitive to Meet Prerequisites                       |
| GFP           | State Game Lodge (CSP)                          | Project in design development before July 1, 2008            |
| GFP           | Fisheries Storage Bldg. (Ft. Pierre)            | Minimum Human Occupancy                                      |
| GFP/DOT       | Building Addition (Sioux Falls)                 | Minimum Human Occupancy                                      |
| GFP           | Legion Lake Store                               | Minimum Human Occupancy/Extenuating Circumstances (Seasonal) |
| NSU           | Kramer Hall                                     | Project in design development before July 1, 2008            |
| NSU           | MeWaldt-Jensen Science                          | Less than 50% of Total Building Square Footage               |
| NSU           | Kirkac  | Less than 50% of Total Building Square Footage               |
| NSU           | Lincoln & Graham Halls Renovations              | Project Scope  |
| NSU           | Barnett Center Addition                         | Less than 50% of Total Building Square Footage               |
| NSU           | Student Center Addition/Renovation              | Cost Prohibitive to Meet Prerequisites                       |
| NSU           | Dacotah Hall                                    | Less than 50% of Total Building Square Footage               |
| NSU           | Johnson Fine Arts                               | Cost Prohibitive to Meet Prerequisites                       |
| NSU           | Greenhouse                                      | Cost Prohibitive to Meet Prerequisites                       |
| NSU           | Spafford Hall Renovation                        | Less than 50% of Total Building Square Footage               |
| SDSMT         | Surbeck Center                                  | Project in design development before July 1, 2008            |
| SDSMT         | EE/Physics Bldg. Renovation                     | Less than 50% of Total Building Square Footage               |
| SDSMT         | Industrial Engineering Renovation               | Less than 50% of Total Building Square Footage               |
| SDSMT         | McLaury Renovation                              | Less than 50% of Total Building Square Footage               |
| SDSU          | NFA Bldg; Various Rooms                         | Less than 50% of Total Building Square Footage               |
| SDSU          | Administration                                  | Project Scope  |
| SDSU          | Northern Plains Biostress Lab                   | Less than 50% of Total Building Square Footage               |
| SDSU          | Larson Commons                                  | Less than 50% of Total Building Square Footage               |
| SDSU          | Binnewies Hall Bathroom                         | Less than 50% of Total Building Square Footage               |
| SDSU          | Seed Technology                                 | Project in design development before July 1, 2008            |
| SDSU          | Briggs Library Renovation                       | Project Scope  |

| <b>Campus</b> | <b>Building</b>                            | <b>Waiver Reason</b>                              |
|---------------|--|---|
| SDSU          | Dairy Manufacturing Addition               | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Student Union Addition                     | Less than 50% of Total Building Square Footage    |
| SDSU          | Young Hall bathroom Renovation             | Less than 50% of Total Building Square Footage    |
| SDSU          | DEH Cleanroom                              | Project Scope                                     |
| SDSU          | Enrollment Services Center Renovation      | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Frost Arena HVAC Upgrade                   | Project Scope                                     |
| SDSU          | Headhouse/Greenhouse                       | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Olson Biochemistry Renovation              | Less than 50% of Total Building Square Footage    |
| SDSU          | Wagner Simulation Lab                      | Less than 50% of Total Building Square Footage    |
| SDSU          | Cow/Calf Unit                              | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | North Chiller Plant Building               | Minimum Human Occupancy                           |
| SDSU          | Swine Unit                                 | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Brown Hall Renovation                      | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Wecota Annex Renovation                    | Cost Prohibitive to Meet Prerequisites            |
| SDSU          | Northern Plains Biostress HVAC Replacement | Project Scope                                     |
| SDSU          | Plant Science Research Facility            | Minimum Human Occupancy                           |
| USD           | Slagle Hall Renovation                     | Project in design development before July 1, 2008 |
| USD           | Delzell Renovation                         | Project Scope                                     |
| USD           | North Commons Renovation                   | Cost Prohibitive to Meet Prerequisites            |
| USD           | Patterson Hall Renovation                  | Cost Prohibitive to Meet Prerequisites            |
| PURC          | Classroom Renovation                       | Less than 50% of Total Building Square Footage    |
| SDSP          | Courtyard Addition                         | Less than 50% of Total Building Square Footage    |

- A key for the campus and agency abbreviations is included in the endnotes.

### LEED Waivers by Type



### Waivers Granted by the State Engineer in CY2017

There were no state building project granted waivers in CY2017. There are a total of 64 state building projects that have been granted waivers through CY2017.

### Projects Not Achieving LEED

To date, only five projects have not achieved LEED certification when a waiver was not granted by the State Engineer.

- 1) The SDSU Dining Hall expansion project was registered in 2009. While LEED was initially attempted, the square footage of the addition was not large enough in relation to the existing building to achieve LEED certification. Energy efficiency measures were taken to the extent practicable.
- 2) Design of the USD Churchill Haines renovation project began in 2010. While LEED was initially considered, the square footage was not large enough in relation to the existing building and the scope of the project precluded the ability to achieve LEED Silver certification.

- 3) The USD Akeley Science renovation project was registered in 2010. While LEED was initially attempted, the square footage was not large enough in relation to the existing building and the scope of the project precluded the ability to achieve LEED Silver certification.
- 4) The SDSU Agricultural Hall Laboratory renovation project was registered in 2010. While LEED was initially attempted, the square footage was not large enough in relation to the existing building and the scope of the project precluded the ability to achieve LEED Silver certification.
- 5) The SD Army National Guard Troop Medical Clinic Renovation was registered in 2010. While LEED was initially attempted, the existing exterior site conditions and location of the project were not sufficient to achieve LEED Silver Certification. Since the exterior of the facility and the surrounding landscaping was touched, it precluded the state from pursuing those points required to be able to achieve the 50 point minimum. Energy efficient measures were included to the extent possible.

## Changes Made to the Green Building State and Administrative Rules

During the 2015 legislative session, HB1029 was passed into law which does the following:

- 1) Required the implementation of the newest USGBC standard, v4.
- 2) Increased the threshold from \$500,000 / 5,000 square feet to \$1 million and 10,000 square feet for buildings that must meet the standard. This was done because 29% of all waivers were for building projects within the range differences and not projects within the range differences achieved LEED Silver certification.

In addition to this, the administrative rules ARSD 10:09 were amended to ensure state government building projects using LEED focus on energy efficiency. These:

- 1) Require a minimum energy performance that exceeds the LEED v4 prerequisite by a 5%;
- 2) Require enhanced commissioning that includes building envelope commissioning;
- 3) Require architects/engineers verify project design prior to completion of construction documents;
- 4) Prohibit the use of green power and carbon offset credits, green parking credits, and limits use of bicycle facilities credits so design focus remains on better building construction to increase energy efficiency;
- 5) Requires the Owner's Project Requirements (OPR) to state energy efficiency goal the building;
- 6) Requires the Basis of Design (BOD) document to reflect the Owner's energy goals and requirements for the building as stated in the OPR prior to design development; and
- 7) Deletes obsolete sections of administrative rules.

## More Information

Information about the State's high performance green building projects is available from:

Office of the State Engineer  
Stacy Langdeau, P.E., State Engineer  
523 E. Capitol Ave.  
Pierre, SD 57501  
P : 605-773-3466  
F : 605-773-5980

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<sup>i</sup> Information about the USGBC and the LEED rating system is available at [www.usgbc.org](http://www.usgbc.org)

<sup>ii</sup> Campus and Agency Abbreviation Key:

ACC: Bureau of Administration/Capitol Complex (Pierre)  
BHSU: Black Hills State University  
DHS: Dept. of human Services  
DOC: Dept. of Corrections  
DOT: Dept. of Transportation  
DSU: Dakota State University  
DVA: Dept. of Veterans Affairs  
GFP: Dept. of Game, Fish & Parks  
NSU: Northern State University  
PURC: Public University Research Center (Board of Regents, Sioux Falls)  
SDARNG: South Dakota Army National Guard  
SDDEV: South Dakota Developmental Center (Redfield)  
SDSMT: School of Mines & Technology  
SDSU: South Dakota State University  
USD: University of South Dakota  
SDSP: South Dakota State Penitentiary