

SOUTH DAKOTA BOARD OF REGENTS

Budget and Finance

AGENDA ITEM: 7 – Q

DATE: March 30-April 1, 2016

SUBJECT: South Dakota State University Utility Repairs and Upgrades – Facility Program Plan

South Dakota State University requests approval of its Facility Program Plan for utility repairs and upgrades. These water, sanitary sewer and storm sewer upgrades and repairs have an estimated cost of \$10,043,000. SDSU’s Preliminary Facility Statement was approved at the March 2012 meeting. This project was identified as part of the 2012 Ten-Year Capital Plan approved by the 2012 Legislative Session – HB1051.

In SDSU’s Preliminary Facility Statement, three primary utility systems were identified as needing repairs and upgrades: domestic water, storm water, and sanitary sewer. The domestic water and storm sewer studies have been completed. These studies included data collection, GIS model development, domestic water system analysis, and storm sewer and drainage system analysis plus development and prioritization of the recommended repair and replacement projects for each system. The final study of the sanitary sewer system will be completed in the summer of 2016.

The building committee for this project selected HR Green to conduct a campus utility study and recommend system improvements. The proposed improvements to the water distribution system are based on five criteria: 1) fire hydrant pressure; 2) system looping; 3) utility reliability; 4) campus growth; and 5) South Dakota Department of Environmental and Natural Resources (SDDENR) water main criteria. The recommended domestic water improvements will enhance domestic water distribution looping (the ability to isolate individual buildings), increase water pressures and water volume, improve water quality, remove asbestos cement piping, and enhance fire protection capability across campus.

(Continued)

RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

I move approval of SDSU’s Facility Program Plan to move forward with its utility repairs and upgrades at an estimated total cost of \$10,043,000. SDSU is requesting approval of their \$5,043,000 portion of the funds from multiple years HEFF M&R allocations, university funds, and other funds. The remaining \$5,000,000 in bond proceeds may be available to SDSU if bonds are issued in 2021 or 2022.

Based on the HR Green study, a list of prioritized domestic water utilities repair and replacement projects were identified. In addition, HR Green completed a hydrologic and hydraulic analysis of SDSU’s existing storm water conditions. This study included compiling a summary of existing conditions, completing a hydraulic model for the 2, 5, 10, and 100 year storm events and evaluating best management practices to reduce flooding and improve water quality. Prioritized lists were created for both the domestic water utilities and storm sewer system:

Domestic Water Improvements

1) Water main connection to BMU at 11 th Street and Medary*	\$ 230,000
2) Student Wellness Center – 11 th Street Loop Connection*	\$ 310,000
3) North Water Main Loop - North Head House to Stadium*	\$ 200,000
4) Water Main retention between 9 th Ave and Medary Ave	\$ 2,012,300
5) Old 11 th Street Water main Asbestos Cement Pipe Replacement	\$ 875,000
6) North Chiller Plant Section Water Main Replacement	\$ 360,000
7) Biostress Section Rotunda Lane Water Main Loop Installation	\$ 388,000
8) Mathews Hall Water Service Relocation	\$ 41,000
9) Old 9 th Street Water main Asbestos Cement Pipe Replacement	\$ 568,000
10) Art Museum Asbestos Cement Pipe Replacement **	\$ 145,000
11) East 11 th Street Asbestos Cement Water Main Replacement **	\$ 1,501,000
12) State Court Asbestos Cement Pipe Replacement **	\$ 384,000
Domestic Water Improvements Total	\$ 7,014,300

Storm Sewer Improvements

1) Animal Science Drainage Ditch*	\$ 107,000
2) Highway 14 & Medary Ave Retention Pond*	\$ 562,000
3) Drainage Ditch - Stadium Road to Retention Pond*	\$ 337,500
4) Jack Rabbit Green to Stadium Road Connection*	\$ 800,000
5) Storm Sewer – Animal Science*	\$ 148,200
6) Bioretention – Wellness Center **	\$ 152,200
7) Bioswale – Spencer Hall **	\$ 49,000
Storm Sewer Improvements Total	\$ 2,155,900

Study Costs:

1) Domestic Water and Storm Sewer Study	\$ 235,000
2) Sanitary Sewer Study	\$ 169,000
Study Costs Total	\$ 404,000

*Improvements shown with an asterisk have been completed or are currently in planning, design or construction. These projects estimated cost is \$2,950,500 and has been funded as SDSU’s matching funds towards the capital project “Utility Repairs & Upgrades Water, Sanitary Sewer, Storm Sewer”
 **Improvements shown with two asterisks will not be included in this project phase, but will be added as future M&R projects.

The sanitary sewer study will be completed summer 2016. The existing sanitary sewer mains have not been upgraded or replaced for well over 50 years and some materials still in service indicate portions of the system are being used beyond the typical life span of the materials. Maintenance issues develop related to sagging and blocked lines, corrosion due to chemical and high temperature wastes from labs, and ground water infiltration.

The following list includes items anticipated for repair or replacement in the sanitary sewer system:

- 1) A section serving Pugsley Center, Lincoln Music Hall, Crothers Engineering Hall, Solberg Hall, the Administration Building, Avera Health & Sciences Center, and the Chiller plant.
- 2) A section serving the Central Heating Plant, Yeager Hall, and DePuy Military Hall.
- 3) Sections of the system serving Pierson Hall, Young Hall, Larson Commons, Caldwell Hall, Binnewies Hall, and Brown Hall.
- 4) A section serving the Barn and Ethel Austin Martin.
- 5) A section serving Wecota Hall, Wenona Hall, Waneta Hall, Wecota Annex, and Medary Commons (AKA Enrollment Services Center)
- 6) A section serving the Alfred Dairy Science Building, Seedhouse, West Headhouse, and the Plant Science Building and Greenhouses.

The sanitary sewer system work listed above was estimated at \$2,700,000 in 2011. This work will be part of the capital project and will be programmed for design and construction following the completion of the study.

Costs for completed or planned projects of \$6,939,000 plus the Storm Sewer Study costs and anticipated repair or replacement costs of \$2,700,000 and the completed study costs of \$404,000 equal the \$10,043,000 project total. Additional prioritized projects listed with double asterisks on the page 2 total \$2,231,200, but will not be part of this funded project. These items will be funded separately from this project through future M&R project funds.

Funding for the entire Utility Repairs and Upgrades – Water, Sanitary Sewer, and Storm Sewer project was identified in the 2012 Capital Improvement Plan at an estimated cost of \$10,043,000. The project will be funded entirely from HEFF with \$5,000,000 coming from bond proceeds to be issued in 2021. The remaining \$5,043,000 will come be from multiple years of HEFF M&R allocation funds, university funds and other funds.

Additional details of this project are found in SDSU's attached Facility Program Plan. This project is under the guidance of a building committee with Regent Jewett serving as the representative.

**FACILITY PROGRAM PLAN
FOR
UTILITY REPAIRS & UPGRADES
WATER, SANITARY SEWER, STORM SEWER
SOUTH DAKOTA STATE UNIVERSITY**

SDSU requests approval of this Facility Program Plan to continue the incremental phased Planning, Design and Construction of repairs and replacements for portions of the domestic water, sanitary sewer, and storm sewer utilities. The Preliminary Facility Statement was approved at the March 2012 Board of Regents meeting and HR Green was selected by the Building Committee in July of 2012 to conduct a campus utility study and recommend system improvements.

A. Engineering Study Update (Programmatic Justification, Project Scope, Description of Phased Improvements, and Cost Estimates):

The Preliminary Facility Statement identified three scopes of study; domestic water, sanitary sewer and storm sewer. The domestic water and storm sewer studies have been completed. These studies included data collection, Geographic Information System (GIS) model development, domestic water system analysis, storm sewer and drainage system analysis, and development and prioritization of recommended repair and replacement projects for each system. The final study will be the sanitary sewer study which will be completed in the summer of 2016.

Study Summary: Domestic Water

The proposed repairs and replacements for the domestic water system were developed based on five criteria, 1) fire hydrant pressure, 2) system looping, 3) utility reliability, 4) campus growth, and 5) South Dakota Department of Environmental and Natural Resources (SDDENR) water main criteria. The recommended domestic water improvements will enhance domestic water distribution looping (the ability to isolate individual buildings), increase water pressures and water volume, improve water quality, remove asbestos cement piping, and enhance fire protection capability across campus. These improvements are prioritized based on relative need and planned future building improvements.

Domestic Water Improvements

Below is a list of repair and replacement projects identified by the study for the domestic water utilities. The projects are listed in descending order of recommended priority.

1)	Water Main Connection to BMU at 11 th Street and Medary**	\$ 230,000 ⁽¹⁾
2)	Student Wellness Center – 11 th Street Loop Connection**	\$ 310,000 ⁽²⁾
3)	North Water Main Loop – North Head House to Stadium	\$ 200,000 ⁽¹⁾
4)	Water Main Rehabilitation between 9 th Ave and Medary Ave	\$2,012,300
5)	Old 11 th Street Water Main Asbestos Cement Pipe Replacement	\$ 875,000
6)	North Chiller Plant Section Water Main Replacement	\$ 360,000
7)	Biostress Section Rotunda Lane Water Main Loop Installation	\$ 388,000
8)	Mathews Hall Water Service Relocation	\$ 41,000
9)	Old 9 th Street Water Main Asbestos Cement Pipe Replacement	\$ 568,000
10)	Art Museum Asbestos Cement Pipe Replacement	\$ 145,000
11)	East 11th Street Asbestos Cement Water Main Replacement	\$1,501,000
12)	State Court Asbestos Cement Pipe Replacement	\$ 384,000

(1) Funded from SDSU Capital Contract Fees

(2) Funded from Donations and Student Fees tied to Future Performing Arts Center and Student Wellness Center Projects

(**) The cost of these improvements will be applied as part of the University's matching funds towards capital project "UTILITY REPAIRS & UPGRADES WATER, SANITARY SEWER, STORM SEWER"

The Water Main Connection to BMU at 11th Street and Medary Avenue was determined to be the highest priority improvement. This upgrade increases domestic water reliability, increases fire hydrant pressures along the west side of campus, and eliminates the requirement of manually opening the main valve to connect campus to municipal water supply during emergencies. Currently, this connection is strictly a backup connection used only when the primary connection at 16th Avenue and 11th Street is down for maintenance or when there is an emergency that requires a connection from Medary Avenue. A Work Request for design and construction was approved by the Board of Regents at its December 2015 meeting. SDSU Facilities and Services staff have developed plans and specifications for this project and intend to go to construction following spring semester 2016.

The second and third prioritized improvements will increase fire hydrant flows, improve domestic water reliability, and increase available water pressure and quantity for the northern and central regions of campus. The northern and central regions of campus have the highest need for increased water pressure and quantity.

Water pressure tests for campus facilities west of Medary Avenue indicate fire hydrant pressures are in the low range. Prioritized improvements #4 through #7 increase fire hydrant pressures for west campus facilities, improve water quality and system reliability, and update some of the oldest water lines on campus. These improvements are recommended to be completed in the next five (5) years.

Additionally, prioritized improvements #8 and #9 should also be completed in the next five (5) years. These improvements will remove asbestos cement water lines, reduce water main breaks, reduce water loss, and improve the reliability of the system.

The remaining proposed improvements (items 10, 11, & 12) should be considered as

future capital improvements are implemented and the campus grows or building density increases.

Study Summary: Storm Sewer

HR Green completed a Hydrologic and Hydraulic analysis of SDSU's existing storm water conditions. Information on prior flooding events and storm sewer capacity issues were conveyed to the consultant by SDSU Facilities and Services staff. These issues were targeted in the modeling process and further analyzed to evaluate the storm sewer system, and recommend improvements.

The study included compiling a summary of existing conditions, completing a hydraulic model for the 2, 5, 10, and 100 year storm events, and evaluating best management practices (BMPs) to reduce flooding and improve water quality.

Storm Sewer Improvements

Below is a list of repair and replacement projects identified by the study for the storm sewer utility. These improvements were prioritized using input from SDSU Facilities and Services and modeling results from the GIS model and are listed in descending order.

1)	Animal Science Drainage Ditch**	\$ 107,000 ⁽³⁾
2)	Highway 14 & Medary Ave Retention Pond**	\$ 562,000 ⁽³⁾
3)	Drainage Ditch - Stadium Road to Retention Pond**	\$ 337,500 ⁽³⁾
4)	Jack Rabbit Green to Stadium Road Connection**	\$ 800,000 ⁽⁴⁾
5)	Bioretention – Wellness Center	\$ 152,200
6)	Storm Sewer – Animal Science	\$ 148,200
7)	Bioswale – Spencer Hall	\$ 49,000

(3) Completed through Sanford Jackrabbit Athletic Complex and the Dana J Dykhouse Stadium projects.

(4) Project Planning and Design is Being Funded by HEFF; Construction Funding is University General Funds

(**) The cost of these improvements will be applied as part of the University's matching funds towards capital project "UTILITY REPAIRS & UPGRADES WATER, SANITARY SEWER, STORM SEWER"

Improvement #1, #2, & #3 are currently being implemented through existing capital improvement projects. Improvement #4 is a high priority and will reduce flooding concerns in Jackrabbit Green south and east of Briggs Library, and along the west side of the indoor practice facility and stadium . A work request for design of improvement #4, Jack Rabbit Green to Stadium Road Connection, was approved by the BOR in December, 2015. A revision to the Work Request for full Design and Construction is presented for BOR Approval at the April 2016 meeting.

The remaining proposed improvements should be considered as SDSU's future capital improvements are implemented and the campus grows or building density increases.

Study Status: Sanitary Sewer

A study of the sanitary sewer system will be completed in the summer of 2016. The Preliminary Facility Statement noted that existing sanitary sewer mains have not been upgraded or replaced for well over 50 years and that some materials still in service (vitrified clay tile) indicate portions of the system are being used beyond the typical life span of this material. Typical maintenance issues that develop are related to sagging and blocked lines, corrosion due to chemical and high temperature wastes from labs, and ground water infiltration.

Capacity of the sewer mains is not believed to be a particular problem at this time, but capacity issues in the core of campus and the east end of campus are foreseeable with future development. SDSU is also working with the City of Brookings to eliminate remaining sump pumps and other suspect causes of infiltration and inflow that are discharging water into the sanitary sewer system.

We anticipate that the scope of necessary repairs and replacement work could include but not be limited to the following sections of the sewer system:

- 1) A section serving Pugsley Center, Lincoln Music Hall, Crothers Engineering Hall, Solberg Hall, the Administration Building, Avera Health & Sciences Center, and Chiller Plant.
- 2) A section serving the Central Heating Plant, Yeager Hall, and DePuy Military Hall
- 3) Sections of the system serving Pierson Hall, Young Hall, Larson Commons, Caldwell Hall, Binnewies Hall and Brown Hall.
- 4) A section serving the Barn and Ethel Austin Martin
- 5) A section serving Wecota Hall, Wenona Hall, Waneta Hall, Wecota Annex, and Medary Commons.
- 6) A section serving the Alfred Dairy Science Building, Seedhouse, West Headhouse, and the Plant Science Building & Greenhouses.

This work was previously estimated in 2011 at \$2,700,000. This work will be part of the capital project and will be programmed for design and construction following completion of the study.

B. Selected Recommendations from the A/E Study for Utility Infrastructure Improvements

SDSU is recommending the improvements listed below from the priorities identified in the domestic water and storm sewer studies. SDSU has also been incorporating recommendations from the studies into current capital projects. The improvements shown in parentheses below have been made or are currently in a stage of planning, design or construction. Total estimated value of work completed or in progress
\$2,950,500

Utility Infrastructure Study

[Domestic Water and Storm Sewer Study	\$ 235,000 ⁽⁵⁾
[Sanitary Sewer Study	\$ 169,000 ⁽⁶⁾

Domestic Water

[W1) Water Main Connection to BMU at 11 th Street and Medary**	\$ 230,000 ⁽¹⁾
[W2) Student Wellness Center – 11 th Street Loop Connection**	\$ 310,000 ⁽²⁾
[W3) North Water Main Loop - North Head House to Stadium	\$ 200,000 ⁽¹⁾
W4) Water Main Rehabilitation between 9 th Ave and Medary Ave	\$ 2,012,300
W5) Old 11 th Street Water Main Asbestos Cement Pipe Replacement	\$ 875,000
W6) North Chiller Plant Section Water Main Replacement	\$ 360,000
W7) Biostress Section Rotunda Lane Water Main Loop Installation	\$ 388,000
W8) Mathews Hall Water Service Relocation	\$ 41,000
W9) Old 9 th Street Water Main Asbestos Cement Pipe Replacement	\$ 568,000

Storm Sewer

[ST1) Animal Science Drainage Ditch**	\$ 107,000 ⁽³⁾
[ST2) Highway 14 & Medary Ave Retention Pond**	\$ 562,000 ⁽³⁾
[ST3) Drainage Ditch - Stadium Road to Retention Pond**	\$ 337,500 ⁽³⁾
[ST4) Jack Rabbit Green to Stadium Road Connection**	\$ 800,000 ⁽⁴⁾
ST5) Storm Sewer – Animal Science	\$ 148,200

<u>Sanitary Sewer (Study Pending Summer 2016)</u>	\$ 2,700,000
Estimated Subtotal	\$10,043,000

- (1) Funded from SDSU Capital Contract Fees (Work Request Pending BOR Approval)
- (2) Funded from Donations and Student Fees tied to Future Performing Arts Center and Student Wellness Center Projects
- (3) Funded from a Combination of University Support Funds and Donations from Sanford Jackrabbit Athletic Complex and the Dana J Dykhouse Stadium projects.
- (4) Project Planning and Design is Being Funded by HEFF (\$90,000 Work Request is Pending Approval); Construction Funding Source is Planned to be University Support Funds
- (5) Funded from FY12 and FY14 HEFF Funds
- (6) Funded from FY16 HEFF and Additional Planning Funds
- (**) The cost of these improvements will be applied as part of the University's matching funds towards capital project "UTILITY REPAIRS & UPGRADES WATER, SANITARY SEWER, STORM SEWER"

C. Identification of Proposed Funding Sources:

The overall Project, the "Utility Repairs & Upgrades - Water, Sanitary Sewer, Storm Sewer" project would be funded from Higher Education Facility Funds. The project is identified in the 2012 BOR Capital Improvement Plan. The funding authorized for these improvements is \$10,043,000. \$5,000,000 will come from HEFF Bonded funds. The bonds are likely to be issued in FY19 or FY20. \$5,043,000 in matching funds will come from multiple years of HEFF M&R funds, University funds, and other project funding. SDSU intends to complete the Project as a series of phased improvements as funding is available. The phased improvements, scope, and priorities noted above will be implemented to the extent of the available funding.

A couple of SDSU's current capital improvement projects are addressing one or more of the identified improvements listed above. These improvements are part of the engineering and design required for the completion of the capital improvements and it is therefore necessary that these improvements are included in those current projects.

D. Impact to Campus Maintenance and Repair

All planned improvements can be considered phased. The capital project, the "Utility Repairs & Upgrades - Water, Sanitary Sewer, Storm Sewer Project" was originally approved in 2012 and since then two of three studies have been completed and several identified improvements have been completed. Continued expansion of campus necessitates the remainder of these improvements be completed over the next two fiscal years.

E. Impact to Campus Operational Costs and Utility Budgets

We do not anticipate the improvements to significantly change operational costs. The water system improvements will eliminate leaks occurring in deteriorating water lines. The storm system improvements will provide improved water quality and benefit sustainable environmental design of the storm water systems. Storm system improvements will mitigate water damage similar to the recent flooding in Briggs Library.