

# Engineering Department

## 2015 Annual Report

### **PURPOSE:**

The mission of the City Engineering Department is to provide quality engineering, planning, zoning, and building services to all citizens in a professional and efficient manner. This is accomplished through the planning, organizing and directing of construction and maintenance of public works facilities; the administration of building services and inspections; and the coordination of all public works projects with other city departments and local, state and federal agencies.

### **PERSONNEL:**

The Engineering/Community Developments utilized a part time Office Clerk to assist the Office Manager during 2015, which was successful due to the assistance of all staff covering the office during the winter and spring months. The Engineering Department had two staff members resign in 2015. Philip Tiedeman, Airport Manager resigned in August to become the Airport Manager at Fleming Field in South Saint Paul, Minnesota and Ryan O'Rear from Williston, North Dakota, was hired as the Airport Manager. In addition, Brandon Long, Engineering Technician, resigned in October to become a sales associate for Aflac Insurance and Jared Thomas was hired in that position with experience in the building trades from his employment with South Dakota State University.

### **PROGRAMS AND SERVICES:** (under the management of the City Engineer)

#### Engineering

Two licensed staff engineers, the City Engineer and the Assistant City Engineer, design, administer and inspect public works projects with the assistance of support staff. The office of the City Engineer also provides the following engineering services:

- In-house design and inspection for streets, sidewalks and drainage improvement projects
- In-house design and inspection for other City departmental projects, such as parking lots, sidewalks, chip seals, overlays, bike trails and building improvements
- Consultants are hired for specialty work such as airports, drainage, and larger street and building projects. The City Engineer and Assistant City Engineer work closely with the consultants during all phases from design through project construction and contract close-out
- Engineering staff reviews subdivision designs, drainage plans, and street designs
- Engineering staff administers and coordinates City Storm Water Management Program, monitors Notice of Intents and submits annual report to SD DENR
- City maps are updated regularly
- Assist the public and other departments and agencies with questions regarding drainage, transportation issues, ordinance questions, building codes, and general engineering advice

- City Engineer is the Traffic Engineer and manages the overall traffic system for the City and maintenance of the traffic system is performed by Brookings Municipal Utility staff

**Building Services:**

The building services staff reviewed building plans and issued building permits as well as assisted the building code questions. The staff also performed inspections of both private and public buildings being constructed throughout the year. The City adopted the 2015 International Building Codes and the building services staff was instrumental in reviewing the codes and providing amendment suggestions to the Board of Appeals and City Council.

During 2015, the City experienced steady growth in the building permit activity, as follows:

- Single Family Building Permits: 88
- Townhouse Building Permits: 7
- Duplex Permits: 0
- Apartment Building Permits: 8 permits with 62 total units
- Total value of residential permits: \$23,015,536
- Total value of non-residential permits: \$35,169,950
- Total permit valuation for 2015: \$ 58,185,486

The City of Brookings roofing and siding permits were steady with 54 total permits issued in 2015 bringing in \$1,350 of revenue, which was slightly lower than 2014 which had 64 roofing and siding permits with \$1,600.00 of revenue. During 2015, the engineering department issued 88 single family building permits as compared to the previous year of 79 single family permits. The 2014 total valuation of residential building permits was \$23,015,536, which was less than the 2014 valuation of residential permits at \$20,015,536. The total 2015 valuation of commercial building permits was \$35,169,950, which was higher than the 2014 commercial valuation of \$27,963,772. The total value of permits issued for 2015 was \$58,185,486, which was approximately 20% higher than the 2014 total of \$48,377,985. The following chart shows the totals for the last three years:

**Building Permit History**

Year	Single Family	Townhouse No.Bldgs.	Duplex No.Bldgs.	Apartments No.Bldgs.	Residential Value	Nonresidential Value	Total Value
2013	70	3	0	10	\$23,005,817	\$35,614,187	\$58,620,004
2014	79	5	2	3	\$20,414,213	\$27,963,772	\$48,377,985
2015	88	7	0	8	\$23,015,536	\$35,169,950	\$58,185,486

The building permit valuations include construction of several large projects in 2015 including the BankStar building, addition at 3-M, a new hotel and the addition to Brookings Avera Hospital. The City is experiencing multi-use developments such as the 13<sup>th</sup> Avenue and 6<sup>th</sup> Street center which has both retail uses and housing withing walking distance to SDSU. Building activity has remained strong in Brookings throughout the past several years.

Construction Projects:

The engineering department experienced a very busy year in 2015 with bidding 6 construction projects for the season, in addition to finishing the 2014 construction projects. The maintenance projects for 2015 included the Concrete Maintenance Project, Chip Seal Project, Asphalt Concrete Freight on Board Project and Street Maintenance and Overlay Project. The largest project was the completion of the Main Avenue South and 26<sup>th</sup> Street South Assessment Project. This was an important street project that is serving transportation to the new elementary school and providing utility and road infrastructure for residential and commercial growth in the southern area of Brookings.

The summary of 2015 projects is as follows with the funding source shown in parentheses:

2015-01SWR Sidewalk Replacement Project (Street Dept. Budget) with Thorstad Companies, Dell Rapids, SD

This is an annual project that included replacement of property-owner sidewalks causing trip hazards, curb and gutter repair, fillets, valley gutters, curb ramps, and pavement replacement on Railroad Street. The City of Brookings is divided into 5 sections for sidewalk replacement and engineering staff inspects each sidewalk within one section every year. These inspections identify both the homeowner trip hazards as well as curb & gutter and city sidewalks that need replacement. This project included homeowner trip hazards that weren't repaired in the 2014 sidewalk area west of Medary Avenue South and south of 8<sup>th</sup> Street South, and the 2015 sidewalk area which was east of Medary Avenue South and south of 17<sup>th</sup> Avenue South. This project also included a concrete sidewalk in Valley View park to provide an accessible walkway between Rapid Valley Street and the new Valley View Park playground. A grant was used for a portion of the Valley View park improvements, which was very helpful in funding the project. The following is a summary of the project costs:

Bid Cost: \$180,147.00 Actual Cost: \$181,702.36



2014-02SSI Main Avenue South & 26<sup>th</sup> Street South Street Assessment Project (75% 2<sup>nd</sup> Penny Budget, Assessment, and Drainage Fund) with Bowes Construction, Brookings, SD

This project was a street assessment project to construct Main Avenue South as an arterial street and 26<sup>th</sup> Street South as a collector street. The project was designed by the engineering team of Banner Associates and Civil Design Inc. and was completed in 2015. This was an important project that provided utilities to 288 acres of property, with 171 acres to be developed in the near future.

The 26<sup>th</sup> Street South improvements consisted of a forty-one foot wide asphalt street with curb and gutter, grading, gravel, storm sewer, gravity sanitary sewer, and water main. The new street runs from Main Avenue South to Western Avenue South. The improvements were assessed to the adjacent properties on a front foot basis and the City paid for the extra width and thickness costs.

The Main Avenue South improvements consisted of a sixty foot wide asphalt street starting at 20<sup>th</sup> Street South, tapering to forty-one feet wide, with curb and gutter, grading, gravel, storm sewer, gravity sanitary sewer, water main, lift station and force main. The water main ran from 20<sup>th</sup> Street South to 26<sup>th</sup> Street South and the gravity sanitary sewer ran along Main Avenue South to the lift station location on the south end of Prairie Hills Subdivision. A lift station was constructed on the south end of Main Avenue South and a force main was installed along 32<sup>nd</sup> Street South to Medary Avenue South. The City paid for the full cost of the street construction and the gravity sanitary sewer along Main Avenue South. The lift station, sanitary sewer force main, and water main associated with this part of the project were assessed to benefitting properties on a per acre basis based on a sanitary sewer service area. Brookings Municipal Utilities paid for the sanitary sewer and watermain pipe over eight inches in diameter as per BMU policy.

This contractor was Bowes Construction, Inc. with the following two schedules:

- Schedule A Base Bid: All construction for Main Avenue South and 26<sup>th</sup> Street South to the west edge of the school property including watermain to Western Avenue.
- Bid Alternate A1: Asphalt pavement option for surfacing for Schedule A
- Schedule B Base Bid: All construction for 26<sup>th</sup> Street South, from the west edge of the school property to Western Avenue
- Bid Alternate B1: Asphalt pavement option for surfacing for Schedule B

There were five change orders during this project for a total increase of \$301,000.60 to the contract, which was approximately an 8% increase in the total project. The change order items included removal of unsuitable soils, additional signage, 26<sup>th</sup> Street South storm sewer, boring of the sanitary sewer force main due to the high water table, temporary water service hookup, a concrete bike trail bridge on the south end of the project, additional valley gutter, tree removal and ditch excavation. The final project costs were as follows:

- Bid for Schedule A and Bid Alternate A1 (asphalt pavement): \$3,349,498.40
- Bid for Schedule B and Bid Alternate B1(asphalt pavement): \$295,880.06
- Total contract: \$3,645,378.46
- Final Cost: \$3,946,379.06



2014-04SSI Derdall Drive Drainage Improvement Project (Storm Drainage Budget) with Rounds Construction Inc., Brookings, SD

This was a small neighborhood storm sewer project to install new storm sewer and inlets in a residential neighborhood on Derald Drive for localized storm water flows. The project included replacing an old corrugated metal culvert between 1818 Derald Drive and 1824 Derald Drive, with two 15" PVC storm sewer pipes which connect between new storm sewer inlets on Derald Drive and the railroad right of way. The project also included replacement of fence, tree removal, and installing curb & gutter, sidewalk, driveway approaches, valley gutter and sod. The project was bid in 2014 and completed in 2015. The project costs were the following:

Bid Cost: \$62,600.90      Final Cost: \$59,867.40

2015-03SSI Division Avenue Drainage Improvement Project (Drainage Fund Budget & SRF loan) with Timmons Construction, Inc., Brookings, SD

This project was the second phase of construction on the west side of Western Avenue, near the Brookings Airport. The project included constructing a concrete reinforced valley gutter, head walls, irrigation, seeding and erosion control. The project was designed by Civil Design Inc. and constructed by Timmons Construction, Inc. The project costs were the following:

Bid Cost: \$177,331.25      Final Cost: \$172,440.99



2015-04STI, Main Avenue South & 26<sup>th</sup> Street South Traffic Signal Project (75% 2<sup>nd</sup> Penny Budget) with Action Electric Company, Sioux Falls, SD

This project was the construction of new traffic signals at the intersection of 26<sup>th</sup> Street South and Main Avenue South to serve the traffic in the Dakota Prairie Elementary School area. The project included LED traffic signals with mast arms, curb ramps, conduit, emergency vehicle preemption, pedestrian push buttons and countdown timers. The project was designed by HDR Engineering of Sioux Falls and was constructed by Action Electric Company. The project costs were the following:

Bid Cost: \$165,363.93                      Final Cost: \$163,293.69

2015-06STI, Chip Seal Project (Street Dept. Budget) with Topkote, Inc., Yankton, SD

This project was the chip seal project for the 2015 Project Area, which was located south of 6<sup>th</sup> Street and west of Medary Avenue. This project also included chip sealing several streets in the 2016 area, east of Medary Avenue, since some of the streets in the 2015 section were chip sealed the prior year. This is an annual maintenance project, where the contractor applies oil and city-purchased pea rock chips to the streets and the City sweeps up the excess chips for reuse or sale.

Bid Cost: \$236,896.00                      Final Cost: \$191,321.56

2015-07STI, Freight on Board Project (Street Dept. Budget) with Bowes Construction, Inc.

This project was the annual street maintenance project that provided asphalt patching material that the Street Department picked up at the plant to repair patches throughout the City. The Street Department used this material to patch numerous streets with their own equipment and crew which was a cost savings compared to hiring contractors to perform patching work. The final cost was lower than the bid cost due to a number of reasons including preparing a large number of streets for overlays in 2015, the Street Department's staff time involved in relocating to the temporary facility and the street department staff also assisted other departments with additional projects. The following is a summary of the project costs:

Bid Cost: \$86,620.00                      Final Cost: \$53,859.28

2015-08STI, Street Maintenance Project (Street Dept. Budget) with Bowes Construction, Inc.

This project was the annual street maintenance project which included asphalt milling, digouts and overlays on various streets in Brookings that are in need of repair. The following streets were included with this project:

- 34<sup>th</sup> Avenue between 6<sup>th</sup> Street and Highway 14 Bypass: Digout, milling, asphalt overlay and plastic pavement striping
- 32<sup>nd</sup> Avenue between 6<sup>th</sup> Street and the R & T driveway: Milling and asphalt overlay
- 5<sup>th</sup> Street South between Main Avenue South and Medary Avenue South: Milling and asphalt overlay
- Powderhorn Pass from Summit Pass to the south approximately 200 feet: Milling and asphalt overlay.
- Swiftel Center Parking Lot: Drain tile and asphalt overlay in the southwest corner of the south parking lot
- Bike Trail asphalt overlay on two bike trails near 22<sup>nd</sup> Avenue

- Airport: The project originally included milling and an asphalt overlay on taxilanes near the hangar area. The project was changed to include constructing a new taxilane for hangar development instead of the taxilane overlay.

This was a successful project that improved several streets on the City’s collector and arterial corridors. The following is a summary of the project costs:

Total Bid Cost: \$783,109.00

Total Final Cost: \$704,157.71



SDDOT Urban Project: P3273(09) PCN 03CT, 17<sup>th</sup> Avenue South, (SDDOT Transportation Funds), Bowes Construction, Inc.

17<sup>th</sup> Avenue South from 6<sup>th</sup> Street to 8<sup>th</sup> Street South was a project funded through the DOT with state transportation funds. The project included milling, asphalt overlay, curb & gutter, fillets, valley gutters, curb ramps, and also included upgrading the traffic signal at the intersection of 17<sup>th</sup> Avenue South and 8<sup>th</sup> Street South and widening the turn lanes on the south side of the intersection. The project was completed in 2015, with the following project costs:

Bid Cost: \$908,737.80

Final Cost: \$1,035,752.59

SDDOT Urban Project: P3313(11) PCN 03CC, Main Avenue South & 20<sup>th</sup> Street South Traffic Signal Project, (SDDOT Transportation Funds), Action Electric, Sioux Falls, SD

This project was a traffic signal project at the intersection of Main Avenue South and 20<sup>th</sup> Street South. This project was funded through the DOT with state transportation funds and included new traffic signals with emergency vehicle pre-emption, pedestrian push buttons and countdown timers. The project was completed in 2015 and aids in traffic flow due to increased development and school traffic in the area. The following is a summary of project costs:

Bid Cost: \$160,426.22

Final Cost: \$154,546.18

SDDOT Urban Project: P3313(13) PCN 03WP, Main Avenue South between 8<sup>th</sup> Street South and 20<sup>th</sup> Street South Overlay Project (SDDOT Transportation Funds), Bowes Construction, Inc., Brookings, SD

This project was a mill and overlay project on Main Avenue South from 8<sup>th</sup> Street South and 20<sup>th</sup> Street South. The project was funded through the DOT with state transportation funds. The project included milling, asphalt overlay, curb & gutter, fillets, valley gutters, curb ramps, and

also included upgrading the traffic signal at the intersection of Main Avenue South and 8<sup>th</sup> Street South and widening the turn lanes on the west side of the intersection. The west side of this intersection did not have a center turn lane, which caused visibility issues at the intersection. The project was completed in 2015, with the following project costs:

Bid Cost: \$965,457.35      Final Cost: \$908,430.60

SDDOT Urban Project: P0014(K4) 421, PCN 04TV, Sunrise Ridge Road between 6<sup>th</sup> Street and 25<sup>th</sup> Avenue (SDDOT Transportation Funds), Bowes Construction, Inc., Brookings, SD

This project was a new street construction by the DOT to connect to the future traffic signal at 6<sup>th</sup> Street and Sunrise Ridge Road. The project included curb & gutter, asphalt street, fillets, valley gutters, curb ramps, and striping. The project was completed in 2015, with the following project costs:

Bid Cost: \$892,443.87      Final Cost: \$883,049.78



34<sup>th</sup> Avenue Reconstruction Project (Joint project with Brookings County and the City of Brookings), (75% funds), Bowes Construction, Inc., Brookings, SD

This project was the street construction the 34<sup>th</sup> Avenue between Prince Drive and 32<sup>nd</sup> Street South. The project was designed by Banner Associates, with Brookings County as the primary lead on the project. The City of Brookings reimbursed the County for the City's share of the cost. The project included grading, asphalt pavement, storm sewer, and striping. The project was completed in 2015, with the following project costs:

Bid Cost: \$2,032,643.55      Final Cost: \$2,027,838.13      City Share: \$439,879.93

Other budgets & departments:

The City Engineer administers several budgets, with the assistance of engineering and airport staff. The annual activity for these departments is summarized as follows:

General Government Buildings:

This budget managed the capital improvements for General Government Buildings and there were minor maintenance items throughout 2015 with no large capital improvement projects.

Storm Drainage Fund:

This fund is derived from storm drainage fees that are charged on all properties in the City Limits. Brookings County is exempt from the fee since they perform the billing and collecting of

the drainage fees along with the property taxes. The drainage fee calculation is determined using the following formula:

- square footage of the parcel x the runoff weighting factor x the unit financial charge

The unit financial charge has been set at 0.00054 since 2010. The drainage fee revenue is utilized to pay a small percentage of staff wages for drainage work, maintenance of the existing storm sewer system, land purchases and storm drainage projects. The drainage projects for 2015 included the Division Avenue Drainage Improvement Project and completion of the Derald Drainage Improvement Projects listed above. The fund was also used to purchase a parcel of property near 15<sup>th</sup> Street South and 7<sup>th</sup> Avenue South for future drainage and street improvements in addition to maintenance and repair of inlets and storm sewer pipes, and to maintain the City's Storm Water Management Plan for storm water quality compliance with DENR regulations.

#### Special Assessment Fund:

This fund is a tool to construct street assessment projects and the assessment fees are deposited back in the fund by the people who are assessed. The interest rate adopted by the City Council has typically been 10% and the assessment costs include an engineering and administration fee of 6% of the project. During 2015, there were no alley assessments, and the sidewalk and street assessment projects were completed as follows:

- 2015-01SWR, Sidewalk Assessment:
  - Sidewalk replacement assessment cost for trip hazards: \$7.42 per square foot to remove and replace 4" PCC sidewalk
- 2014-02STA Main Avenue South and 26<sup>th</sup> Street South Street Assessment Project:
  - Main Avenue water main, sanitary sewer lift station and sanitary sewer force main utility assessment: \$2,850 per acre
  - 26<sup>th</sup> Street South street cost: \$115.47 per front foot
  - 26<sup>th</sup> Street South sanitary sewer cost: \$33.89 per front foot
  - 26<sup>th</sup> Street South water main cost: \$27.40 per front foot

#### Airport:

##### General Activity:

The Brookings Regional Airport is a general aviation airport with a Part 139 Class IV Certificate. The Part 139 Certificate allows the airport to receive unscheduled commercial service and provide fire response on the airfield. The airport had approximately 52 based aircraft including 3 gliders in 2015. In 2015, the largest transient aircraft was a Saab 2000 and the most active transient aircraft was the Cessna 172. Overall aircraft operations were higher in 2015 due to the completion of the airfield realignment project.

##### Functionality:

The Brookings Regional Airport is able to provide the following functions:

- Emergency Preparedness and Response – Aeromedical Flights, Law Enforcement/National Security/Border Security, Emergency Diversionary Airport,

Disaster Relief and Search & Rescue, Critical Community Services Supported by Government Agencies

- Critical Community Access – Personal & Community Connectivity and Air Taxi Operations
- Other Aviation Specific – Self-Piloted Business Flights, Corporate Flights, Flight Instruction, and Personal Flying
- Commercial, Industrial, and Economic Activity – Agriculture, Aerial Surveying and Observation
- Destination and Special – Tourism and Access to Special Events

#### Construction/Improvements/Changes:

In 2015, Taxiway A and runway connectors were finished and opened. In addition, the north end of Runway 17/35 was completed and opened. The south end of Runway 17/35 will be designed in 2016 and is scheduled to be reconstructed in 2017.

In January 2015, the Automated Weather Observation System (AWOS) was installed and operational which was in high demand by many airport users. The AWOS underwent an upgrade in November, 2015 to replace the wind sensor, computer equipment, and increase reliability long term.

In June, the Instrument Landing System (ILS) was finished and published for use on Runway 12.

A new Notice to Airman (NOTAM) system was put into place in August to expedite the NOTAM process. The Runway Opening Ribbon Cutting Ceremony also took place in August, marking the completion of the Runway Realignment Project.

Airport Manager Philip Tiedeman left the city for the manager position in South St. Paul Minnesota and was replaced by Ryan O’Rear from Williston, North Dakota in October.

A bi-annual gate card audit was conducted in November to update computer records and ensure airfield security which was a great success.

The Brookings Fire Department held a training exercise at the Brookings airport in November to familiarize with the new airport layout post-construction which had a great turnout of close to 50 individuals. All those who participated also walked through the SDSU hangar and Chris Funk educated the fire fighters on important safety features with different aircraft at the airport.

The airport received a new 2015 John Deere loader in November which replaced a 1998 loader, which was funded with 95% grant funds with a 5% City match. The loader is a great benefit to the airport, with increased reliability and increased work load and capabilities. The airport also underwent a consultant selection process to determine the engineering consultant for upcoming airport projects for the years 2016-2020. Helms and Associates was the only consultant to provide a proposal and was chosen to remain the airport’s consultant.

#### Hangar Development:

As the airport grows with the Airfield Realignment Project, we have seen increased demand for hangars for current and future tenants. One new hangar was built in 2015 to store and provide aircraft maintenance for a local tenant. Additional development areas were prepped along with the new taxiway project to allow future hangars to be constructed in 2016.

#### Taxiway Reconstruction:

In 2015, the airport constructed a new taxiway in the hangar area to accommodate additional hangars. The taxiway work was completed by Bowes Construction, Inc. in October with grading of future hangar sites completed on both sides.

#### Fixed Base Operator:

Pheasants Fury, LLC continued to provide fixed-based-operator services for the airport and the flying community. They have one full-time employee as well as several part-time employees. They provided assistance with aircraft fueling, flight line service, hangar rentals, pilot supplies, rental car arrangements, weather and flight planning, and nearly any other services an aviator could need. It is anticipated that fuel needs and other services will continue to increase now that the runway and taxiway project is complete.

#### SDSU Aviation Program:

SDSU was a big part of the activity at the airport again in 2015. The flight-training program continued to expand the skills of future commercial and corporate pilots. SDSU also provides a maintenance program that trains students to work on airplanes for their Aircraft Maintenance Management degree program. SDSU also operates their transportation department utilizing the Brookings Regional Airport, which includes flying various representatives from SDSU and the State to meetings, legislative sessions, and other events in a Beechcraft C90A plane.

#### Comprehensive/Land Use Planning:

According to the recently released South Dakota State Aviation System Plan, only one-third of system airports are included in local comprehensive or land use planning efforts. The Brookings Regional Airport has been coordinating with the local and regional communities to address land use concerns and other planning efforts near the airport, which helps promote the safety of persons in the air and on the ground by encouraging compatible land uses. Planning for future compatible development helps protect the existing and future airport infrastructure as well. Typical planning tools that the airport has developed are; Airport Emergency Plan, Security Plan, Height Zoning Guidelines, land-use compatibility planning, Irregular Operations Contingency Plan, Wildlife Hazard Management Plan, Airport Layout Plan, and other documentation and planning tools outlined in the Airport Certification Manual.

#### Aircraft Operations:

One variable in gauging airport performance and usage is to track aircraft traffic, or operations, not based at the Brookings Regional Airport. While based aircraft and operations are valuable figures to track, we can learn more about specific trends and patterns by focusing on traffic flow into and out of the airport. In addition, based aircraft counts and operational growth has

stayed consistent in relation to based aircraft, making forecasting and predicting local traffic fairly reliable, which is not the case with other types of traffic that do not normally use the airport. In 2015, the airport saw an increase in non-tenant traffic in the first 3 quarters, but dropping down significantly in the last quarter. The overall increase can be credited to the completion of construction with the decrease in Quarter 4 likely being weather related.

Non-Tenant Traffic Operations

