

**UTILITY SYSTEM MASTER PLAN
PHASE I FINDINGS REPORT
*EXECUTIVE SUMMARY***

Prepared for the

City of Rapid City, South Dakota

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1.0 EXECUTIVE SUMMARY

Burns & McDonnell is pleased to present the findings of Phase I of the Utility System Master Plan. In Phase I, information was gathered from every department in the City that might have some impact on the Master Plan. The overall goal of Phase I was to develop a detailed scope, budget, and set of deliverables for Phase II of the Master Plan. The following objectives were set to accomplish these goals:

1. Develop a process for administrators, staff, planners, and engineers to commit to a plan for future needs.
2. Generate accurate information to allow for timely informed policy decisions.
3. Develop documents and models that will provide a basis and justification for water and wastewater projects.
4. Ensure orderly and economical growth of water and wastewater system infrastructure.
5. Develop a proactive water and wastewater system infrastructure maintenance program.
6. Schedule improvements to meet anticipated regulatory and permitting requirements.
7. Develop a tool to clearly demonstrate projects and their needs to rate payers, council members, developers, and other stakeholders.
8. Develop a tool for proactive planning for both interim and long term utility needs.
9. Develop a tool to allow for maximization of resource allocation (i.e. funding, personnel, and facilities).
10. Develop a tool for use by the development community to assist them in water and wastewater planning.
11. Develop a tool for use by the City in meeting ever increasing water and wastewater security requirements.
12. Conduct a review and revision of City utility policies and ordinances to meet current and future utility needs.

The philosophy to accomplish these objectives that will be implemented in Phase II of the Utility Master Plan is one that not only results in the development of the findings and answers expected during a planning process but also develops a dynamic set of processes that can be used within the City to plan more often and more effectively. This process, called Always Planning, revolves around a core set of processes that must be in place to allow the City to carry out dynamic utility planning. The seven business processes that are quintessential to support an Always Planning model are as follows:

1. A hydraulic modeling process for water and wastewater utilities

2. A customer data integration plan with the hydraulic models
3. A process to collect and track the closed-circuit television (CCTV) pressure testing, and condition assessment data for the utilities
4. A process by which future growth projections and land use is integrated with hydraulic modeling
5. A process to integrate new development data into the utility mapping system
6. A process to update the utility data after repairs and maintenance
7. A process that allows development of capital improvement projects based on accurate models and sound growth projections

An overview of the City's data and processes as they pertain to the Always Planning processes is found in the following section.

Hydraulic Modeling Process

The City currently does not have any modeling processes in-house, as all modeling activities are outsourced. This process will be built during Phase II of the Utility Master Plan. In addition to the creation of the hydraulic modeling process, an examination of the data required to carry out hydraulic modeling will be conducted to address any deficiencies that may hinder the process. The City's existing sanitary sewer data is missing elevation data and the most dependable means to collect this information is through a field inventory process. The inventory data will be appended to the City's existing sanitary sewer GIS data to allow it to support hydraulic modeling. The water distribution system data is currently drawn on Mylar sheets and will need to be converted from hardcopy format to a GIS format. The GIS format for both the water and wastewater systems will serve as a good foundation for the construction of hydraulic models as well as support many other functions within the City.

Customer Data Integration Process

The existing customer billing system within the City contains all the data necessary to develop demand or usage scenarios within the hydraulic models. The data will need to be reformatted or converted from the billing system and loaded into a GIS format for usage within the Always Planning process. The conversion process that extracts data from the existing billing system and uploads it to the GIS format will be documented and delivered to the City. If the City replaces the existing customer billing system, the data conversion and process documentation can be completed for the new system.

Field Testing and Condition Data Process

The Utility Maintenance Department within the City has the equipment to carry out CCTV, jetting and root cutting for the sanitary sewer system. Additionally, hydrant tests and flow tests are done by the staff. While these processes are being completed, they are not cataloged for efficient usage within the Department or to support other initiatives. These processes will be modified during Phase II of the master plan to better integrate into the City's overall workflows and integrate the information into the City's GIS. This will be accomplished through the implementation of a maintenance management system.

Future Growth Integration Process

The City currently has ongoing future land use planning projects to define the type and location of growth throughout the City's planning area. Part of the data from these initiatives is easily usable within the GIS and will feed into the hydraulic modeling tools. Other parts of the data are not developed yet or in hardcopy format and therefore unavailable for modeling purposes. This information will need to be converted into a GIS format and supplemented to develop a cohesive set of planning data throughout the planning boundary. The future growth and land use data will be used to predict future utility needs for the City and any changes to the growth predictions can be easily integrated into the model.

New Development Data Integration Process

Currently there are two different processes in place within the City to convert water and wastewater utility data from hardcopy development drawings into City mapping. The water system is currently being drawn on hardcopy Mylar sheets. The process is very time consuming and results in a data format that is only useful as a wall map. The process will be adjusted so that a digital CAD submittal of a new development can be automatically uploaded into the City's GIS system. The new process will be much more efficient and build a usable data set within the GIS that will support the hydraulic modeling and planning initiatives of the City. The wastewater system is currently being digitized from hardcopy development drawings into the City's GIS. The data developed from this process supplements the City's GIS, but it is time consuming and could be more efficient by using a digital CAD submittal translation process similar to the water system. The CAD standards in the City will be analyzed during Phase II and a translation tool will be constructed to allow the City to import the water and wastewater utility data from standardized submittal files directly into the GIS.

Repair and Maintenance Integration Process

The Utility Maintenance Department is currently maintaining the water and wastewater system on a daily basis. Repairs or maintenance are conducted but there isn't a centralized or integrated process by which

the repairs are logged and loaded back into the mapping of the utilities for easy access by others. If the size of a section of line is increased or replaced during a maintenance effort, this information may not be updated in the City's GIS or other utility mapping formats. The maintenance management system mentioned for integration of field testing and condition assessment data will also carry out the function of updating the City's utility GIS data based on field repairs and maintenance. This system will also allow the City to transition from reactionary maintenance to schedule preventative maintenance based on data that identifies infrastructure at the greatest risk for failure.

Capital Improvement Project Development Process

The City's existing CIP development and management process is working adequately. The adjustments to this process in Phase II will focus on using the processes and tools described above to generate projects that are well thought out and have been correctly scoped. Tools such as the hydraulic model and integration with future growth predictions will allow the City to better predict future capital expenditures. Additionally, the Always Planning process and tools will allow the City to easily react to changes in development and adjust projects accordingly.

The Phase I analysis revealed that the City is currently carrying out versions of most of the fundamental Always Planning processes, but many times the processes are inefficient and don't result in the most useful data formats. Therefore, during Phase II of the Utility Master Plan, these existing processes and data sets will be adjusted and supplemented so that they align with a geodatabase model that supports the Always Planning philosophy. In some cases, the City does not have any legacy processes in place and a new process will be developed that may also include the collection or conversion of utility data. All of the efforts to implement the Always Planning philosophy will have a different priority for implementation in the second phase of the plan. Some items will be deemed absolutely necessary and others may be left aside due to budget or schedule constraints.

Phase I of the master plan revealed the following items that are of the highest priority:

1. Hydraulic Modeling
2. Water Rights Review
3. Ordinance, Rate, and Policy Review
4. Customer Data Integration
5. Infrastructure Maintenance Integration
6. Field Testing and Condition Assessment

7. Planning Data Integration
8. CIP Development
9. New Infrastructure Integration

The goal of the Phase II scope is to address all nine priorities within the budget. Some items, such as the CIP development process, are included, but the scope does not include a full implementation with new CIP software and new project estimating software. The complete scope and budget for Phase II of the Utility Master Plan can be found in Appendix F.