Chapter 6.

Conclusions

The geodatabase created for the water network on the Potchefstroom Campus of the North West University delivered a prototype management system that is versatile and easy to apply, depending on the user's ability to operate and understand the system and requirements.

The aim of this study was to create a seamless geodatabase as a pilot project for the potable water infrastructure of the North West University of Potchefstroom. Referring to Chapter 3, the design for the geodatabase were established and executed in Chapter 4. Referring to the results obtained from Chapter 5, a seamless geodatabase that were created was presented.

The conclusion of this study would be explained with reference to the initial objectives of the study. The objectives of this study were:

- to conceptualize the design of the geodatabase for the water network on the campus;
- to create a suitable geodatabase for the study;
- to examine how CAD and GIS could be integrated;
- to examine whether or not GIS is suited to serve as a central medium for storing spatial data; and
- to indicate the advantages of the geodatabase within the context of the study and its suitability to solve the problem.

A good physical design was executed based on the theoretical knowledge obtained from planning done in the conceptual and logical design phase of the study. However, the importance of research and comparison of different database and geodatabase designs ensures a well-informed application of the proposed design. Testing and refining the proposed design with prototype geodatabases supported the initial design by eliminating or adjusting features that did not contribute to the design or need to be adjusted for effective design purposes. This way, the correct tables and feature classes were created to such an extent that unnecessary repetition and blank fields would be prevented as far as possible.

A suitable file geodatabase were created to store and manage the features within the model. The specifications of the file geodatabase delivered unsurpassed results. The file geodatabase proved to be a very effective and simplified medium to store spatial data in. As indicated throughout the study, data collection, processing and the database population process takes a considerable amount of time, but the benefits of the geodatabase are much more than data on a paper map.

Retrieving data is quick and effective and the integrity of the data added afterwards could be done very accurately with the application of attribute domains and subtypes. The study has proven that the geodatabase within ArcGIS have some advantages that a CAD system do not have. It also proved to be much more effective than the normal day-to-day knowledge-based system that the plumbers and technical staff are currently using. The most suitable process to overcome the challenges of CAD and GIS integration, were the georeferencing system. It is compulsory to have sufficient and up to date CAD data in order to create the most accurate and suitable geodatabase.

The ultimate test for the prototype geodatabase was the application by means of different scenarios. The first scenario was its operability for storing and retrieving information of the water features for buildings E4 and E6. With the creation of relationships between the related features it was possible to retrieve information in any area of the building layout or along the water network. The geodatabase have therefore proven to be an effective storage medium for the data. A research based, prototype geodatabase and data model were delivered which are illustrated in Addendum C and Addendum D.

The application of the geodatabase delivered many advantages such as integrating CAD drawings, storing undocumented and various spatial data within a central database. It provides a geodatabase that could be used for various applications within the context of the study. The geodatabase could also be used for future applications. Even though the current study focused on the design of a potable water network system, the same application could also be used for storm water and sewer networks line. Within the context of this study, the model created for the potable water network delivered a system that matched the objectives proposed in the onset of the study. The database design was done in such a way that the future applications could be included. With the expansion of the project towards systems such as storm water or sewerage water systems, the attribute fields as well as the domains used in the current geodatabase must be adjusted accordingly.

An example of the latter is the field named “Water Type” that was eventually not used in this study due to the focus that was placed on the potable water system. For the purpose of creating a complete geodatabase with the ability to be expanded, the Pumps, Meters, “Control_Valves” and the “Thrust_Protection” feature classes were created. These feature classes were hardly used during the project, but having these features in place provides a complete geodatabase with the ability to be expanded. In future applications the correct feature classes with their subtypes need to be created. The geodatabase created in this study, will provide a good platform for future application studies.

Recommendations

It is recommended that the design of the geodatabase should be adjusted with the progression of the project. This may include creating more than one geodatabase in order to test and refine the geodatabase. It is recommended that constant revision and updating of the data within the geodatabase must be an ongoing process. It would also be recommended that after each update, verification of features’ connectivity be done to ensure that features stay connected.