

Chapter 5

Results

The results concerning the study have been based on different scenarios demonstrating the operability of the geodatabase. These scenarios have been based on the final product of the geodatabase design.

Tools	Application
“Validate Topology In Current Extent”	Applied whenever topology were created and need to be verified
“Identify”	Applied in the process of identifying different features within the model
“Select By Attributes”	Applied in the process of locating a specific feature within the model
“Select By Location”	Applied in the process of identifying selected features with reference to other features within the model
Adjusting symbology	Applied to distinguish between different feature types
Selecting features according to the attribute table	Features could be selected according to the selection within the attribute table
Shortest route model	Applied for identifying the shortest route between two or more selected points along the network

Table 5.1. Different tools and applications with regard to the model

The “Validate Topology In Current Extent” tool is applied whenever topology for a model has been created. The application of the tool would indicate whether any topological errors were made with the creation of the model. Verifying the existing topology for the model supports the integrity and accuracy of the data according to the topology rules specified. Errors would be indicated in red after which they could be adjusted and corrected to suit the

topology rules specified for the model. As mentioned in Chapter 2, topology rules could only be applied for features in ArcMap.

With regard to the “Identify” tool, utilities and any other feature within the water network model could be retrieved. This is especially helpful when managing the water network system. Whenever details of a feature within the model have to be identified the identifier tool could be used to select the feature. A window with the relevant information of that specific feature will then appear together with any other features connected to the selected feature. The creation of relationship classes enables the features to have connections with relevant corresponding features. With a single selection of a feature more than one features’ information could be retrieved. Relationships therefore also proved to enhance the operability of the features contained within the geodatabase.

The unique identifier also encouraged the ease in which features are identified. Looking at a “Unique_ID” such as ZE/E6/FL3/bend/703, a summarized indication of the feature is represented. Immediately the operator could know that the feature selected is a bended fitting, with an “Object ID” of 703, located on floor level three in building E6 within zone E. Features connected to the selected feature such as “End_Point_Fittings”, “Geysers”, “System_Valves”, “Control_Valves” and so forth would also be represented. The initial selection of the specific feature has to be done from close view in order to prevent the wrong selection of the focused feature.

The “Select By Attributes” tool could be applied whenever a specific feature within the model has to be located. For example, whenever a specific room for a feature have to be located, the “Select By Attributes” tool could be selected, and in the select by attributes window the target layer could be specified. The search could be defined by selecting one of the attribute fields that contains relevant values with regard to the query. Figure 5.1 represents the “Select By Attributes” window with the PUK_Rooms as target layer. The room that were looked for is an office occupied by an owner with an “Owner_ID” of 10058591.

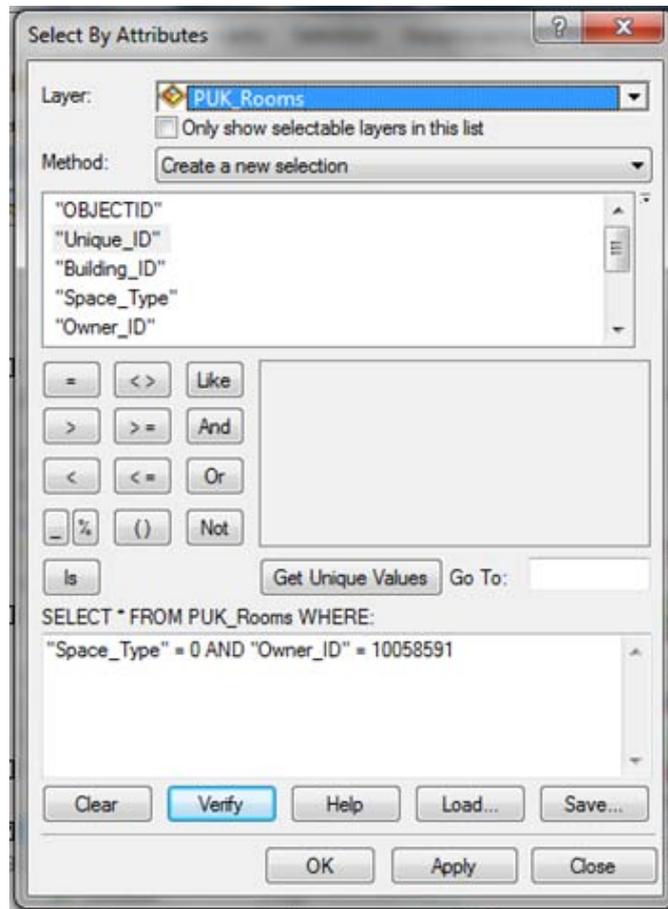


Figure 5.1. The “Select By Attributes” tool applied

The result of the selection indicated in Figure 5.1 is represented in Figure 5.2. Without having to look for the specified room on a building plan or drawing, the ArcGIS software could find the room according to the attributes.

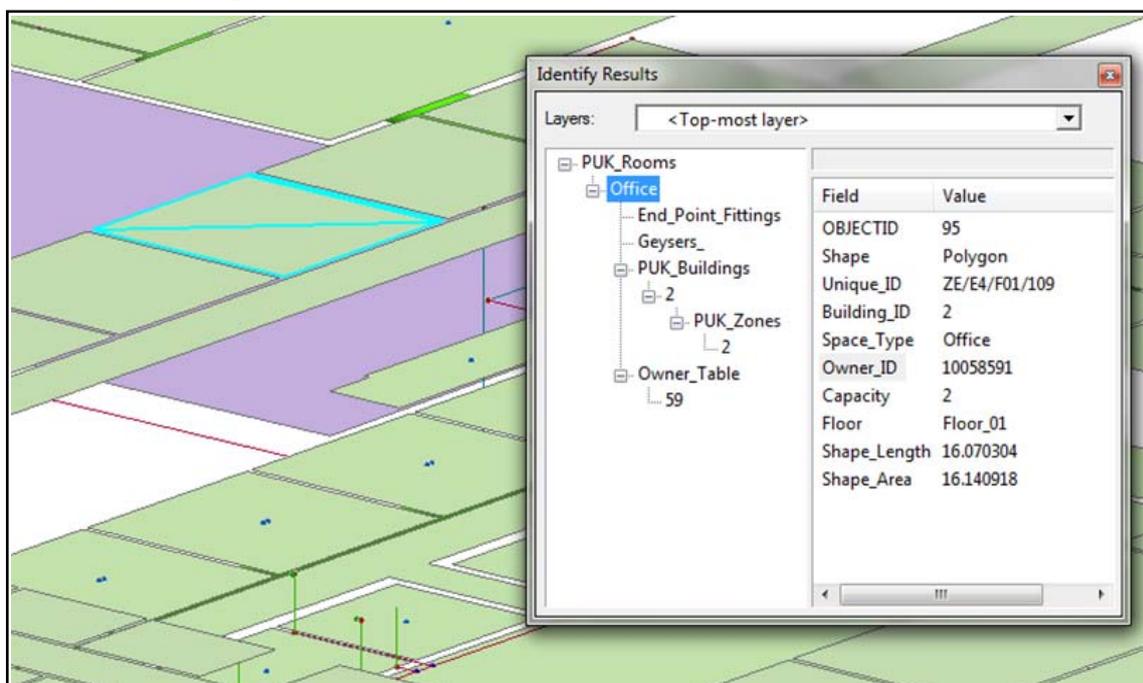


Figure 5.2. The results obtained with the “Select By Attributes” tool

The “Select By Location” tool could be applied whenever a selected feature have to be selected according to its location with reference to another feature. Whenever an operator would want to locate all the geysers within the system without having to adjust the features’ symbols, the “Select By Location” tool could be applied. Selecting the target layer in the “Select By Location” window would specify the features that need to be represented. Subsequently the source layer should be specified which represents the feature layer that would be referred to for the location of the target layer. The spatial selection method need to be chosen and the location of the features could then be identified as represented in Figure 5.3. The geysers within the system with reference to the water mains have been located and indicated in highlighted turquoise.

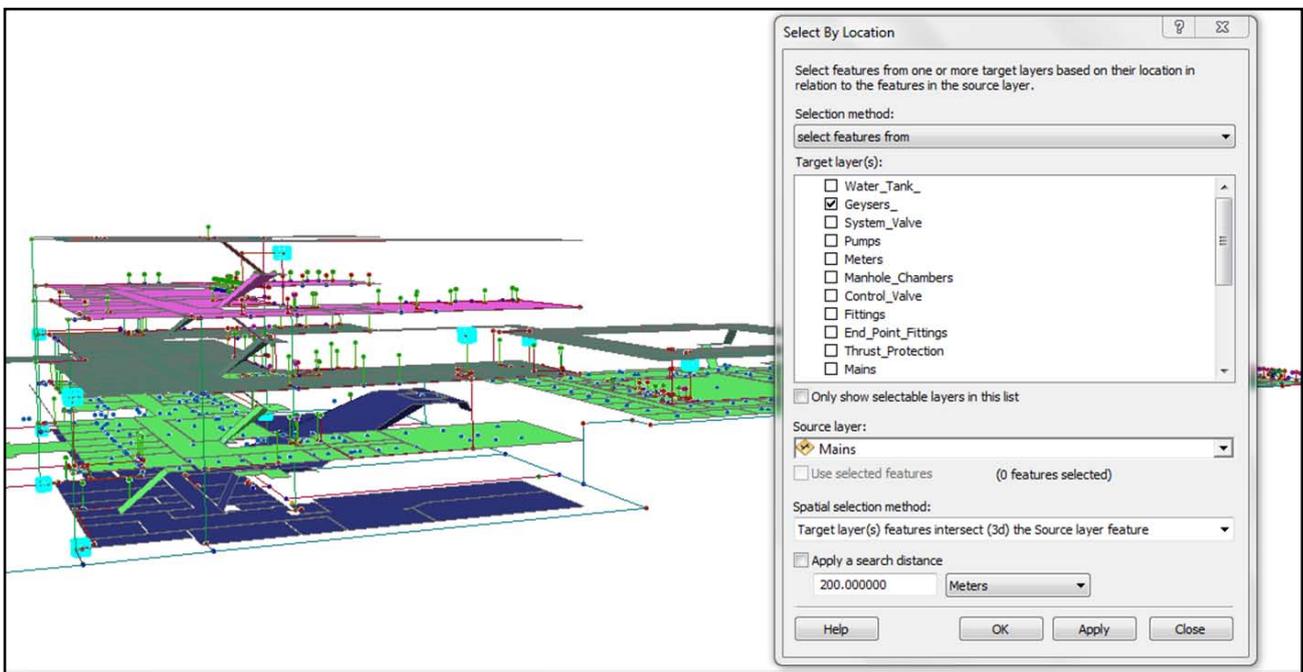


Figure 5.3. The “Select By Location” tool applied

The geysers could also be indicated with an adjustment in the properties of the geysers layer in the table of contents. The different geyser types could be indicated according to different colour schemes. This process might be a little more complex than applying the “Select By Location” tool, however it does represent the features in a more advanced way. The geysers could be represented according to their capacities or different geyser codes according to different colours. This way the different features could be distinguished from each other. This example is applicable to all the features contained within the model.

Features could also be selected according to the values represented in the attribute tables. However, scrolling down a list of more than a thousand entities might become quite a time intensive process. It is therefore found that this manual process of locating features could be applied easily but might take longer than applying the “Select By Attributes” or “Select By Location” tool.

The shortest route model has been created in order to indicate the shortest and most optimal route between two or more selected points along the water network system. The model is applied in ArcScene and is based on the network dataset. In the case of a leaking pipe section, the affected area could be identified. The closest system valves in the area could be located with the help of the “Select By Attributes” or the “Select By Location” tools. Once the different valves are located the shortest route model could be applied and the system valves together with any other feature or limitation could be selected. The model would then indicate the route between the selected points. It would therefore be visible which system valve is the closest to the affected area and which valve could be closed in order to ensure minimal obstruction to the water network.

Applying the shortest route model could save a lot of time when correctly applied. However, the application is executed manually and therefore different tools such as the “Select By Attributes” tool should be applied in conjunction to a scenario. Figure 5.4 and 5.5 represents the shortest route model executed with five stops. The stops include system valves as well as the broken pipe segment. With the route highlighted in green, the features along the route could be identified and the shortest route towards the system valves could be identified. The areas that might be affected could also be indicated as well as the persons whose offices or rooms would be affected for a certain time.

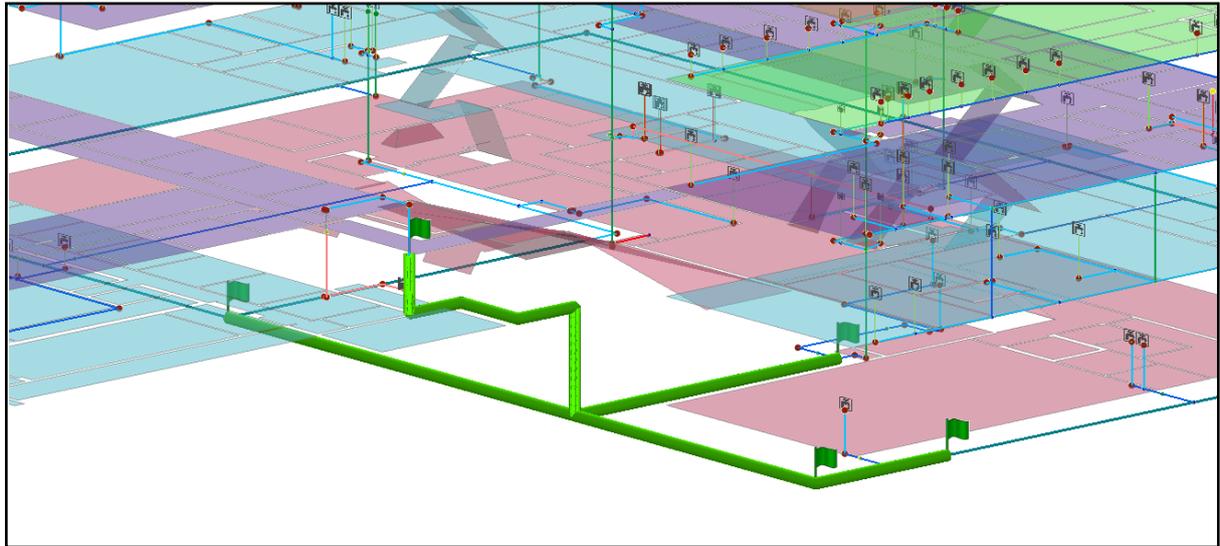


Figure 5.4. An indication of five selected points along the water network

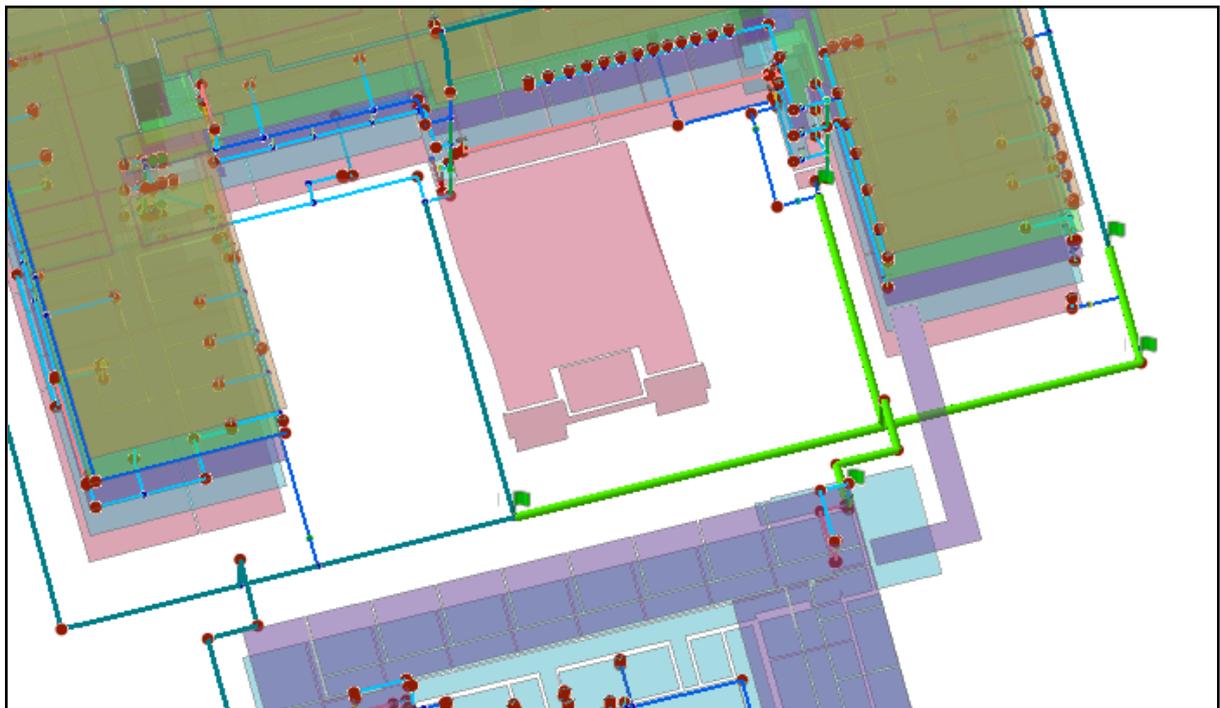


Figure 5.5. The shortest route application viewed from a different angle

Conclusion of the results

The results obtained from the different scenarios indicate the ability of GIS, as well as the data model's capabilities. Referring to Table 5.1 the applications of the model make use of different tools that could be applied to execute solutions to different problems. It is possible to use the same tool for different applications or requests.

These applications functioned seamless in the 3D environment and delivered the results that were initially proposed. A seamless geodatabase have therefore been created and the operating functions within the geodatabase proved to deliver error free results. The concept of the shortest route model has also delivered excellent results as represented in Figures 5.4 and 5.5. The features represented in 3D also provided a realistic view of the study area and the features within the geodatabase.