

Application of 3D models in complex urban multi-stakeholder projects



Client: Evides

Country: The Netherlands

Period: 2020

Case

BIM (Building Information Modelling) is a technique widely used during the construction of larger buildings and installations. It combines 3D models, that represent the work to be executed by the different parties in a project, with the work planning which adds the fourth dimension. By doing so it is possible to track the process over time and detect possible clashes in planning and construction.

Evides (a drinking water utility serving the southwestern part of the Netherlands) has investigated whether this technique could be applied to projects concerning the evaluation and replacement of underground assets. The objective of the project was to assess the technical feasibility and to explore the opportunities for practical application.

Approach and solution

Spatial Insight started with a desk study to identify similar applications of BIM in the Netherlands. Evides' ambitions included the digital collaboration with other owners of underground assets, so we were very pleased when the city of Rotterdam, experienced stakeholder in maintaining underground assets, decided to join the project. Together a pilot area was selected that met the predefined conditions.

Building a 3D model requires detailed knowledge of the existing infrastructure. Since these are underground assets installed in the pre-digital era, we were uncertain of the precision of the data. To confirm this, we had to find a way to detect pipes without digging. Ground penetrating radar as shown in Figure 1 appeared to be the solution. We applied this technique to detect the drinking water pipes, sewers, gas pipes and cables. The above ground surroundings were measured using laser scan. These data were merged in a 3D BIM model, as shown in Figure 2.



Figure 1. The ground penetrating radar in action

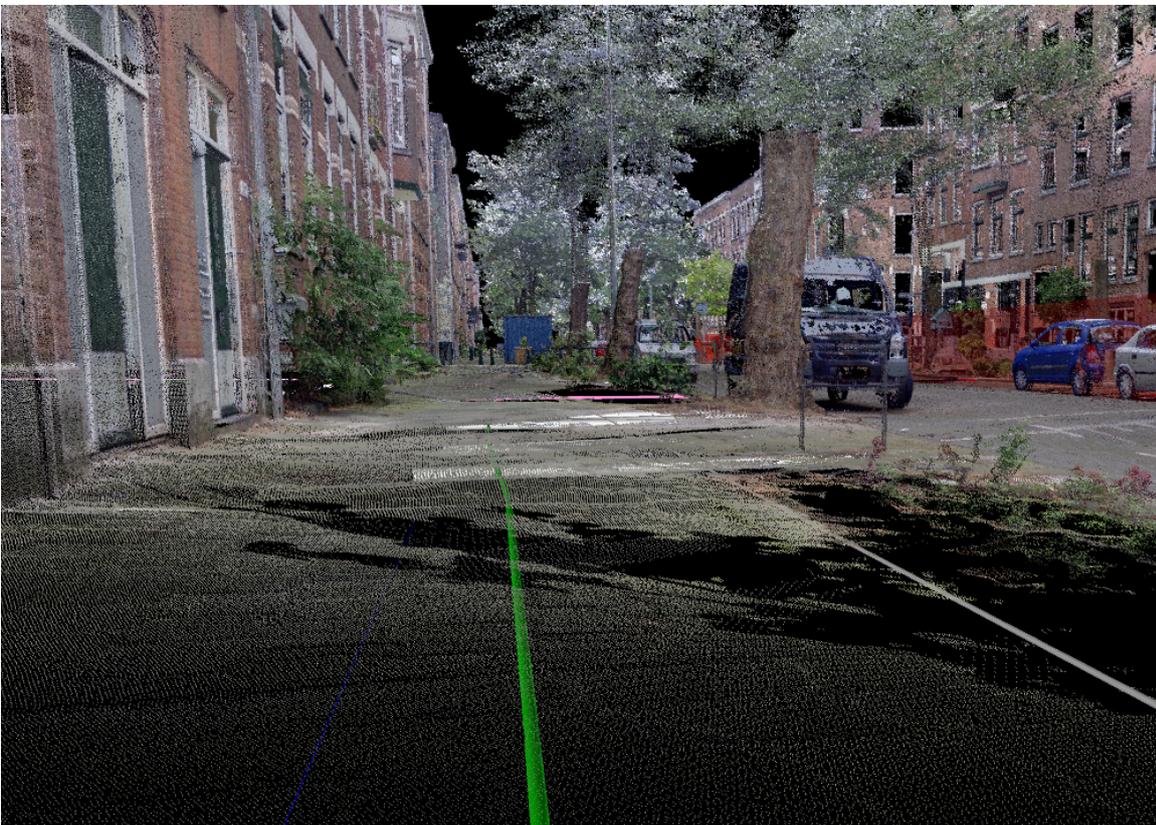


Figure 2. Screenshot of the model showing both the above and underground situation

Contribution to the organisation's strategy

Despite the significant costs, it was concluded that BIM can be a valuable tool in complex infrastructural projects. The generation of a model required substantial efforts, mainly caused by the limited availability of 3D data. For the application of each data acquisition technology, the balance between costs and added value was assessed. During the project former sewer collector pits were identified, that had not been removed after being abandoned, see Figure 3. It also demonstrated the (im)possibilities of adding city heating infrastructure and the effect on drinking water mains. The project has strengthened the belief that in bigger complex urban situations BIM 3D is beneficial in making an optimal design and limit risks and delays during execution of work.



Figure 3. The ground radar results (brown colour) identifies the present infrastructure under the street and sidewalks. Abandoned sewer pits shown as black dot in the brown areas in the upper left corner.

Customer review

Christian Kivit, consultant asset management and maintenance at Evides expressed his appreciation for the way the added value of the different 3D-data acquisition tools was assessed.

More information

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