

# GIS-BIM integration - Elbe crossing Lauenburg/Hohnstorf

In Lauenburg/Hohnstorf, a replacement for the existing Elbe crossing and 2 bypasses are planned. To integrate the GIS datasets from the EIA, PSU was commissioned to convert environmental data into IFC format on a pilot basis and to use the BIM landscape and open space model as the basis for transferring the semantic information.

Client	LBV.SH Landesbetrieb Straßenbau und Verkehr Schleswig-Holstein NLStBV Niedersächsische Landesbehörde für Straßenbau und Verkehr
Project Execution	PSU   Prof. Schaller UmweltConsult GmbH
Project Period	2024
Services	<ul style="list-style-type: none"> <li>GIS-BIM integration</li> <li>Data transformation</li> <li>Application of BIM landscape and open space model</li> </ul>
Study Area	Lauenburg (SH), Hohnstorf (NI) and Surroundings

## Data basis

The data from the EIA was provided as shapefiles:

- Protected areas
- Biotope types
- FFH-LRT
- Breeding bird territories and functional areas

In addition, terrain models (DTM) in IFC format and the project base point were used for the conversion.

## Data preparation

The current version of the BIM landscape and open space model from buildingSMART Germany (Nov. 2024) was used to create the mapping of the attributes from the shapefiles to suitable PSets in the IFC files.

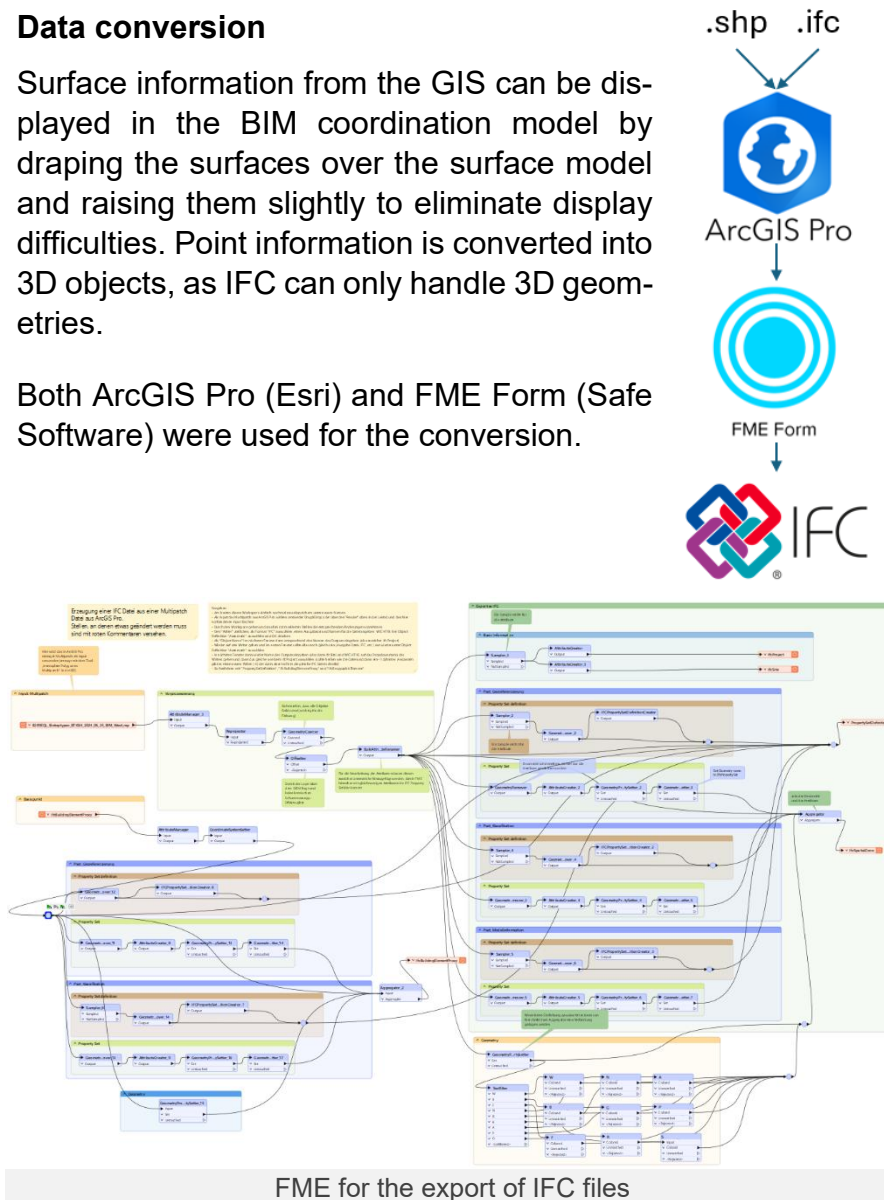


The attributes from the GIS are added to the IFC objects as custom property sets. This allows other specialist planners to find out about important environmental aspects in the project scope and, if necessary, adapt the planning accordingly (for example, to exclude sensitive areas such as protected areas).

## Data conversion

Surface information from the GIS can be displayed in the BIM coordination model by draping the surfaces over the surface model and raising them slightly to eliminate display difficulties. Point information is converted into 3D objects, as IFC can only handle 3D geometries.

Both ArcGIS Pro (Esri) and FME Form (Safe Software) were used for the conversion.

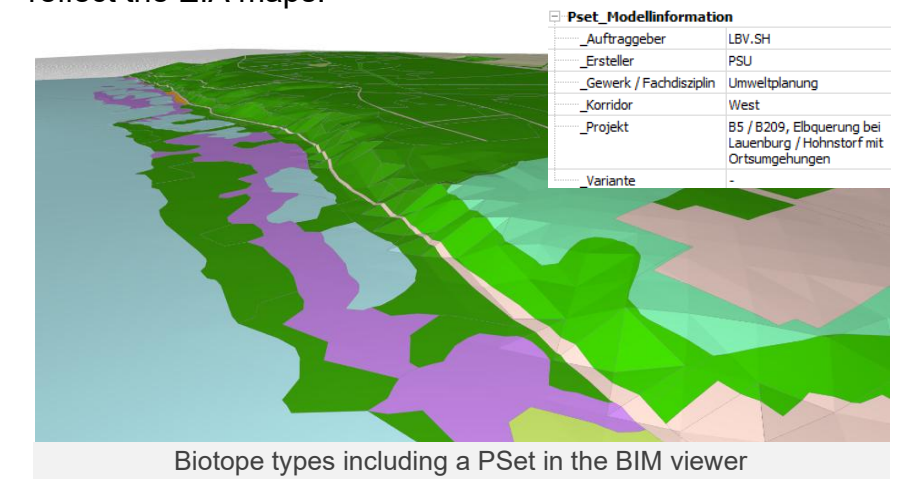


## Deliverables

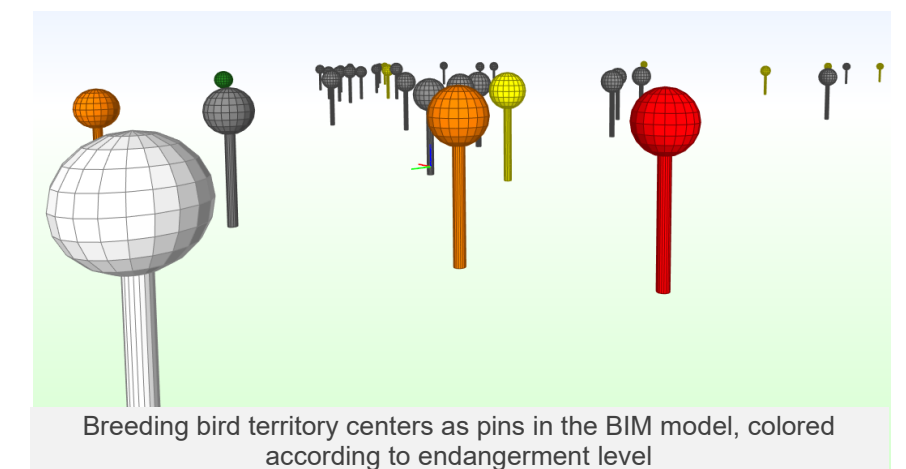
PSU's deliverables in the project were the environmental data provided as converted IFC files (based on the BIM landscape and open space model), the associated BAP for documenting the procedure and the component catalog extended by the objects, PSets and attributes of the environmental data.

The resulting IFC models can be inserted into the BIM coordination model and thus ensure that the environmental data can be displayed for other specialist planners.

The coloring of the areas corresponds to the depictions in the underlying conventional planning documents in order to best reflect the EIA maps.



Point data was converted into 3D objects (in this case "pins" to represent the centers of breeding bird territories). The coloring was done according to the Red List status of the respective species in order to be able to directly visually classify which areas should be considered.



For the documentation of the models created, the component catalog has been expanded to include the new objects and their PSets and attributes:

Scope von	Objektklassifikation (Pset_Klassifikation)	Objekt	LOG Beschreibung (LOG 100)	LOG Beispiel (LOG 100)
				gleichbleibende Attribute
KIB	Fachmodell	Mastermodell		
UMW	Fachmodell	Umwelt		
UMW	Teilmodell	SG-uebergreifend		
UMW	Gruppe	Umgebungssituation		
UMW	Klasse	Schutzgebiete Naturschutz		
UMW	Objekt	Naturschutzgebiet	nach BNatSchG, 3D Oberfläche gemappt auf Geländemodell	
UMW	Objekt	Fauna-Flora-Habitat	nach Richtlinie 92/43/EWG, 3D Oberfläche gemappt auf Geländemodell	

Excerpt from the component catalog