Utilising virtual design and BIM in greenfield projects

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RB Rail AS

Rail Baltica

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Agenda

- About Rail Baltica
- The Digital challenge
- Managing Digital data in Rail Baltica
- Bridging design and construction digitally
- Suggestions for future megaprojects

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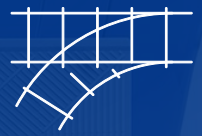
About Rail Baltica

870 km greenfield railway infrastructure

ERTMS Level 2 + FRMCS*

Maximum length of freight trains: 1050m

Design speed:
249 km/h for passenger trains ,120 km/h for freight trains



1435 mm gauge railway

Electrified 2x25kV AC

Axle load 25t

SE-C (Swedish) loading gauge

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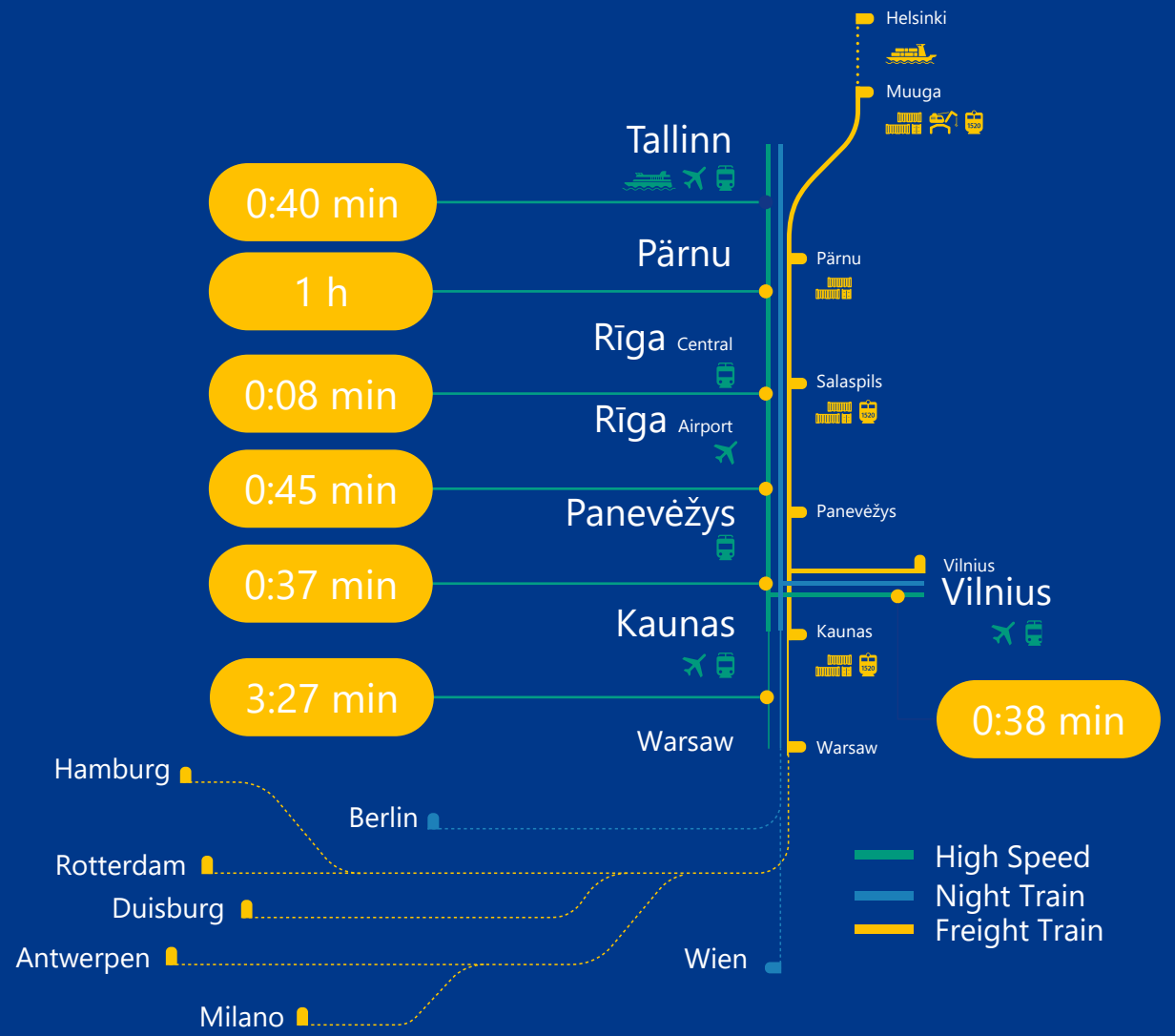
About Rail Baltica

50% less travel time compared to current journeys

5 countries involved

3 new cross-border connections

Fully electrified



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Construction progress

Estonia

- 105 km substructure and related infrastructure in construction
- Construction contracts signed for 200km

Latvia

- Riga central station and Riga airport under construction
- Contract for mainline of 230km signed, first priority construction works started

Lithuania

- Mainline embankment and structure of 46 km is under construction
- 9 km of railway installed

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The Digital challenge

Why do we need BIM?

I don’t understand YOUR BIM

It taking too long, it worked fine without BIM before

Anyway, no one is going to use this digital information

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The Digital challenge

Three countries, three languages, different laws and traditions – **but one mega-project**!

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Rail Baltica BIM roadmap

BIM Strategy
- Rules
- Design Guidelines
- Trainings

Software
- CDE
- GIS
- Asset register creation

Operations and maintenance
- Handover
- Asset management

BIM Framework
EU directive 2014/24

- BIM strategy framework
- Market engagement

Workflows and design
- Design review workflow
- Procedures
- Data collection

Construction
- BIM usage
- BIM As-built
- Progress

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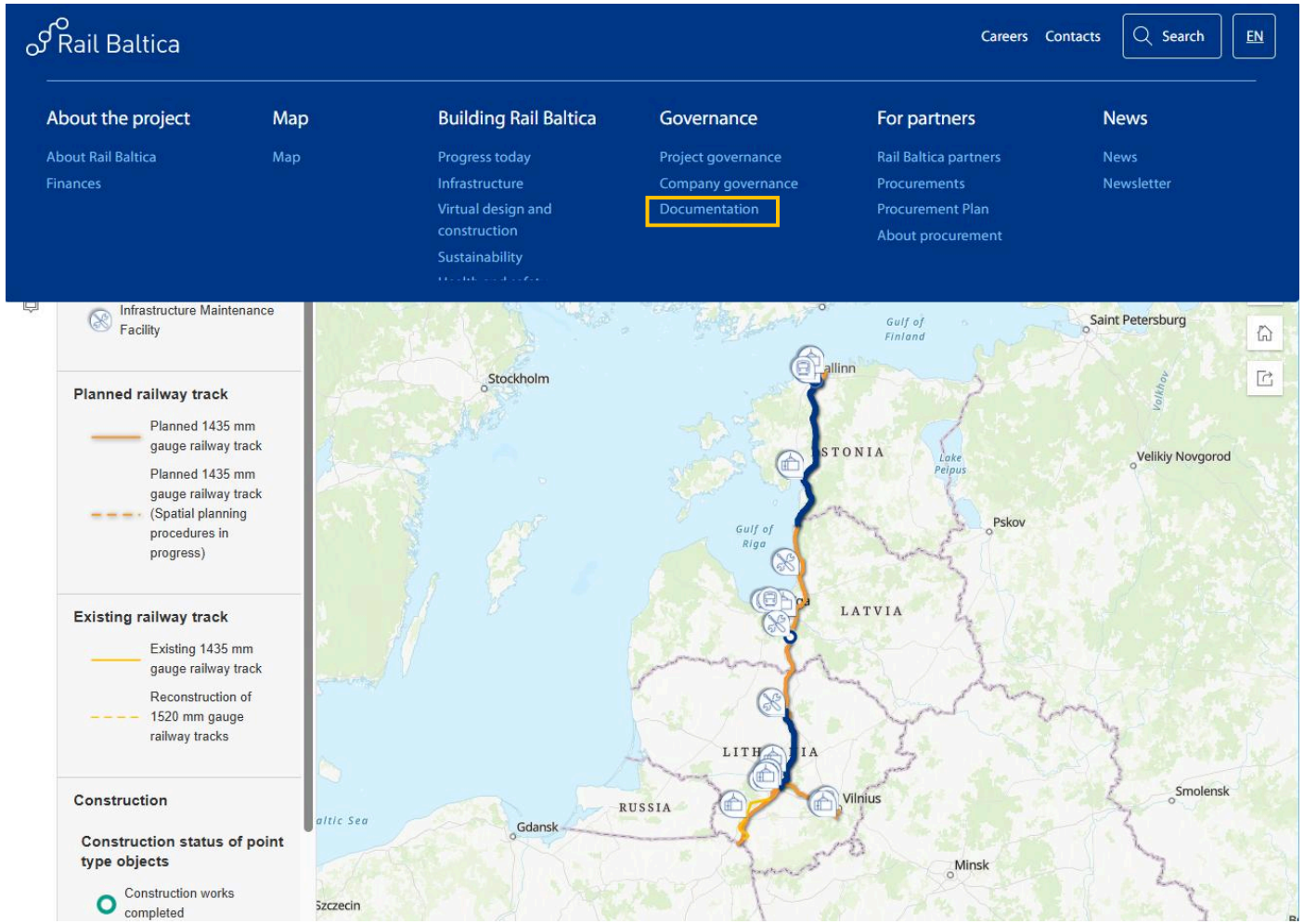
Design Guidelines and public map



https://www.railbaltica.org

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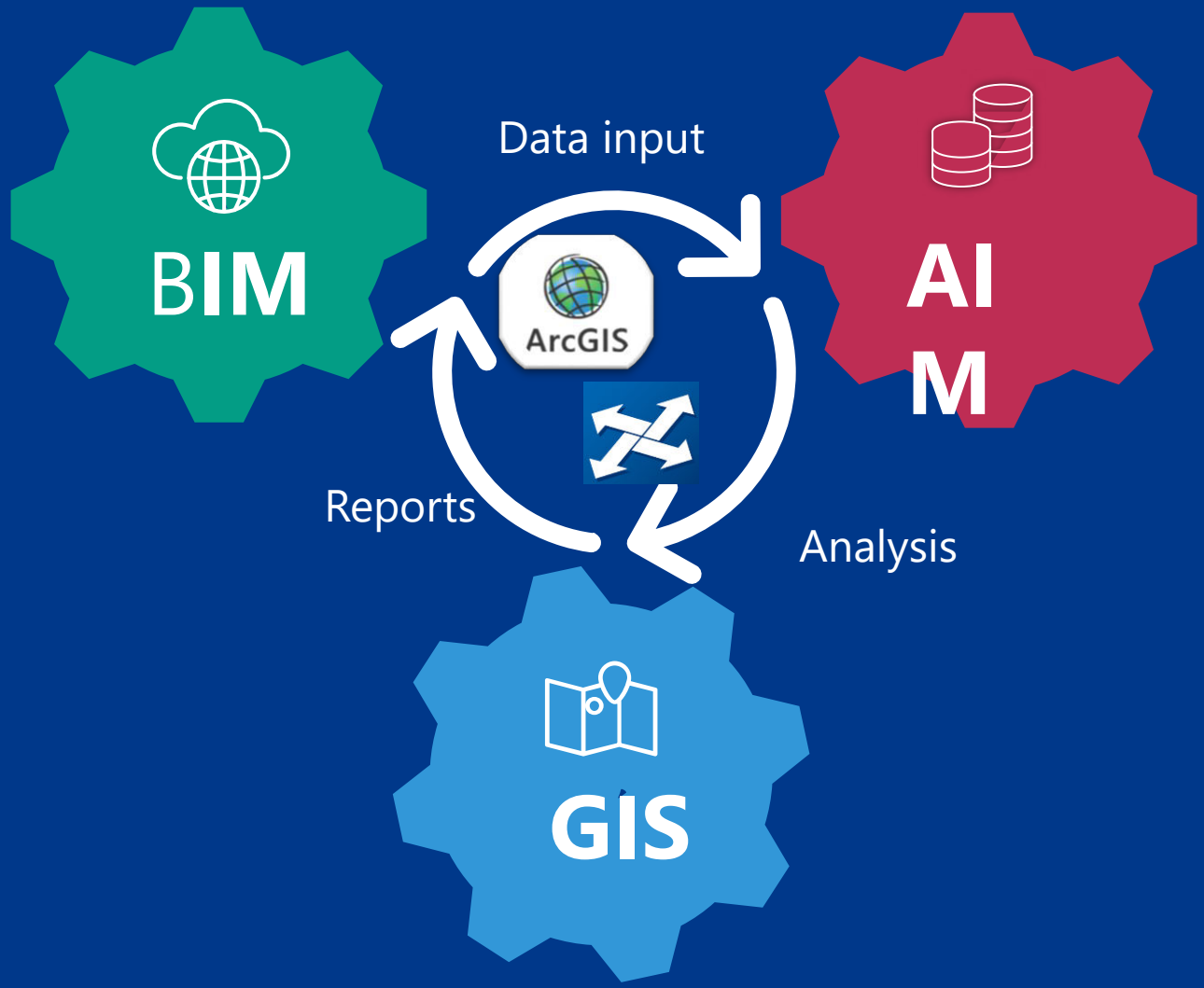
Managing Digital data in Rail Baltica



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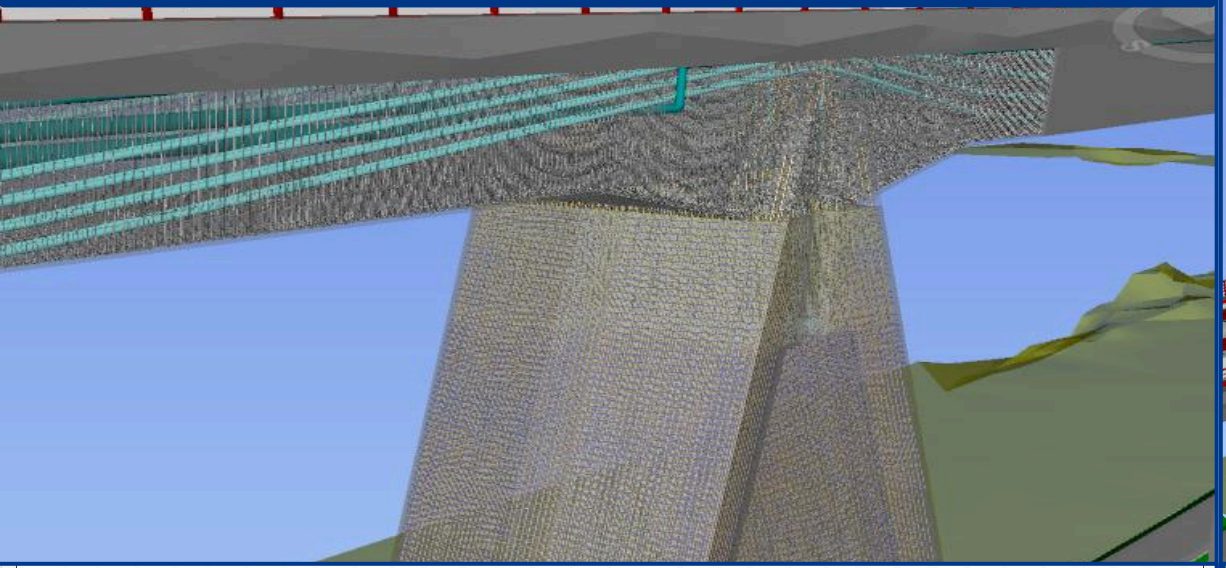
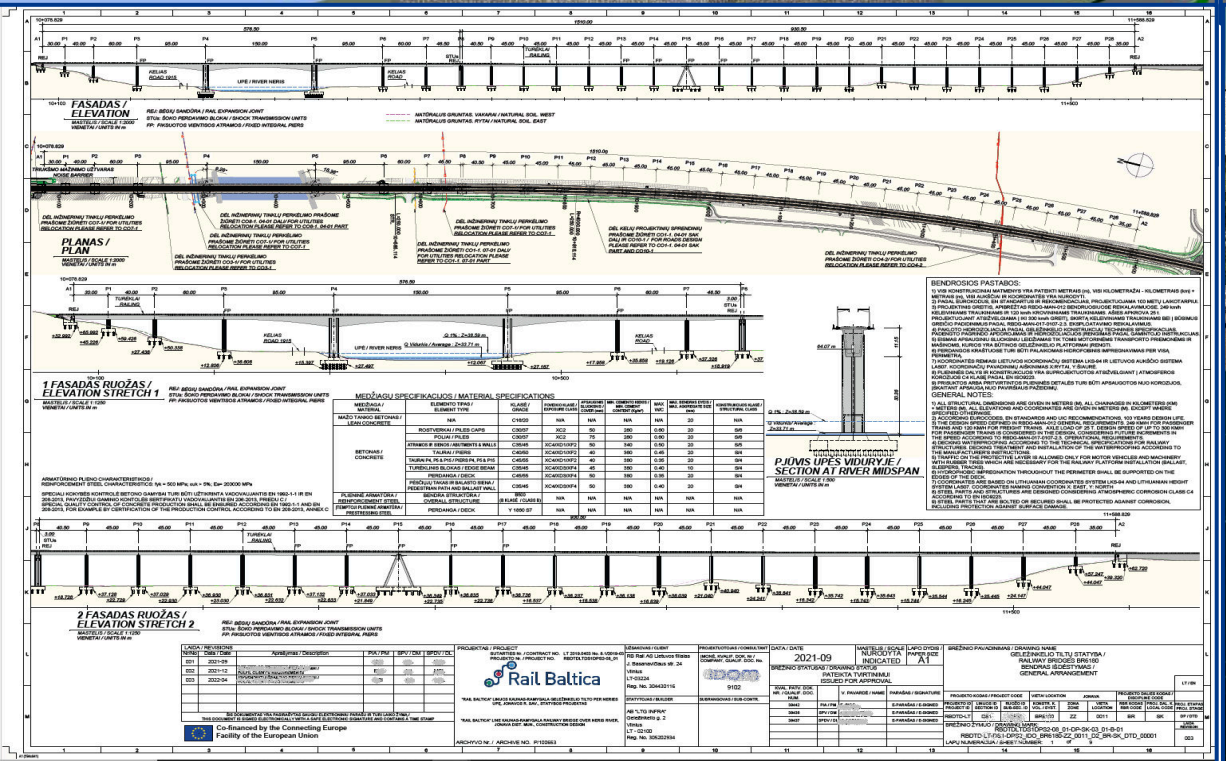
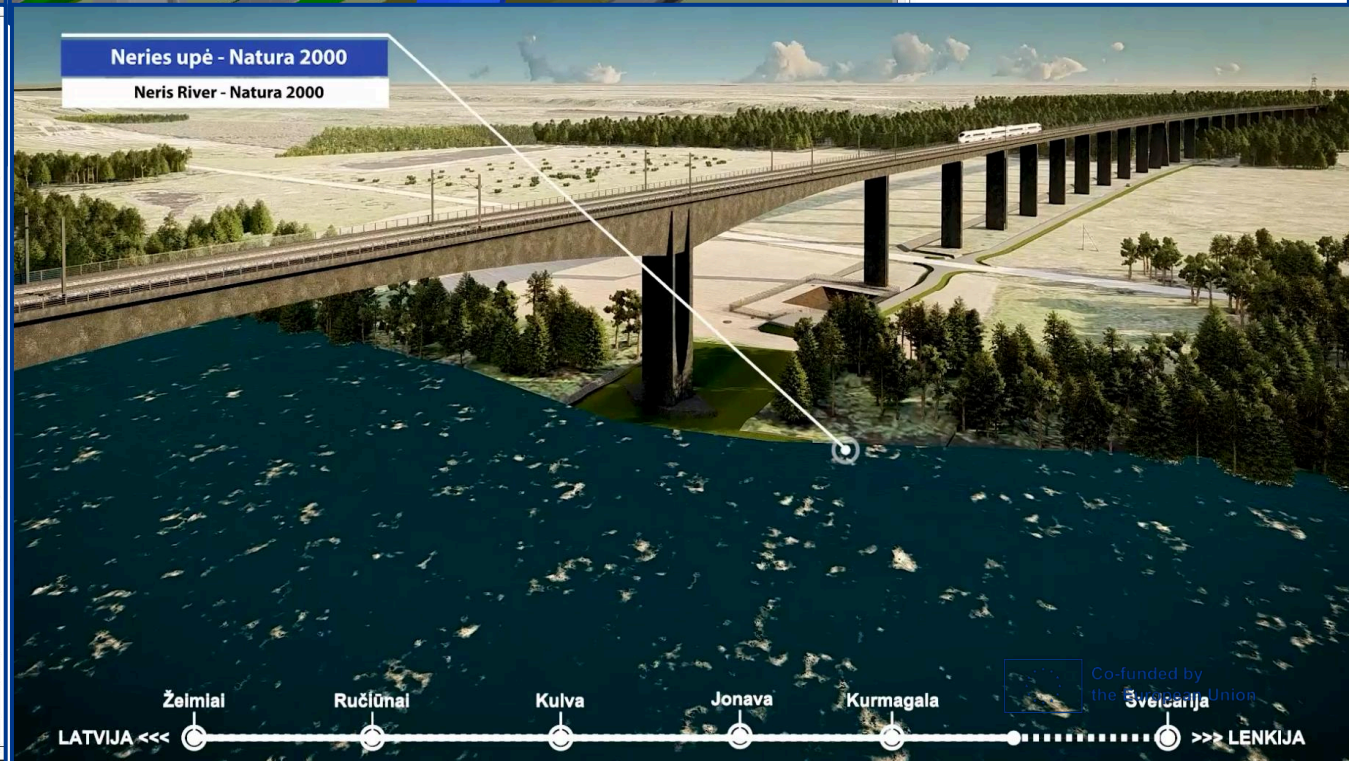
Rail Baltica design



Item	IFC	AllplanAttributes	RBR-Data	TimeLiner	Material

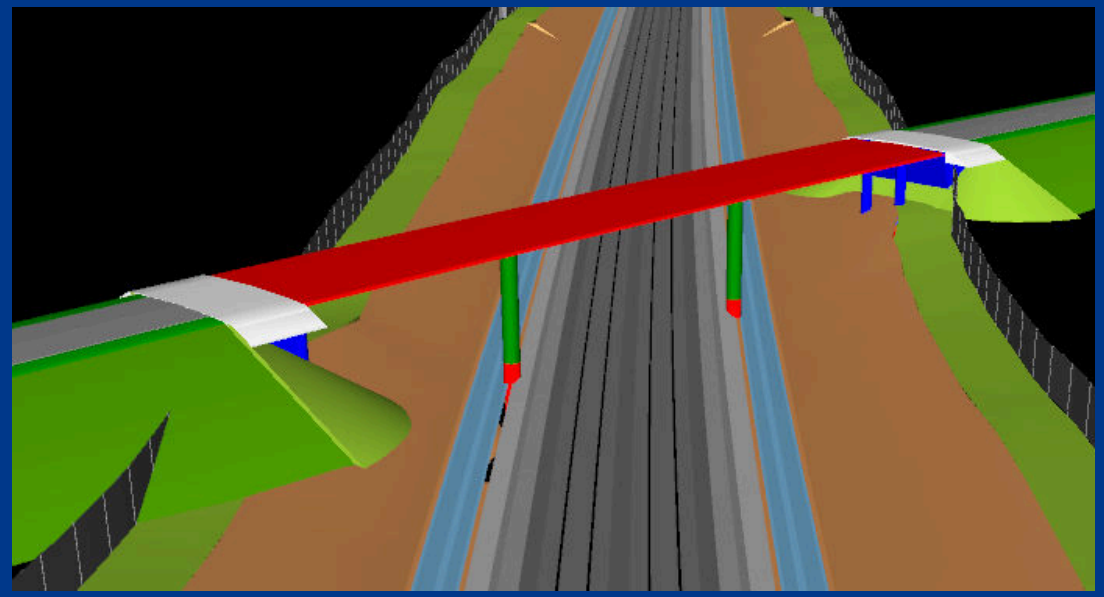
Property	Value
GLOBALID	1Ww2Jhk2DD9RuHEVPsXY7y
RBR-OCC	303
RBR-Project_ID	[illegible]
RBR-Section_ID	[illegible]
RBR-SubSection_ID	[illegible]
RBR-Originator	[illegible]
RBR-Discipline_Code	BR
RBR-VolSysZone	[illegible]
RBR-Location	0011
RBR-Functional_classification	CV-BR-RWBG-00
RBR-Object_ID	STR-PIR-022
RBR-Start_Kilometre	[illegible]
RBR-End_Kilometre	[illegible]
RBR-LoG	400
RBR-LoI	400
RBR-Design_life	100
RBR-Material_Designation	C45/55
RBR-Material_Description	Reinforced concrete
RBR-Product_Name	Bridge_Pier_C45/55_XC4/XD3/XF4
RBR-Product_Description	Reinforced concrete bridge piers
RBR-Pr_Code	Ss_20_50_20_70
RBR-Type_number	STR-000005
RBR-Units	m³
RBR-Local_Code	SK
RBR-Project_Stage	DTD
RBR-Revision	4
RBR-Type	Integral
RBR-Position	P-15
RBR-Length	28.80 m
RBR-Concrete_Volume	859.820
RBR-Steel_Mass	132154.340
RBR-Reinforcement_Ratio	155
RBR-Exposure	XC4/XD1/XF2





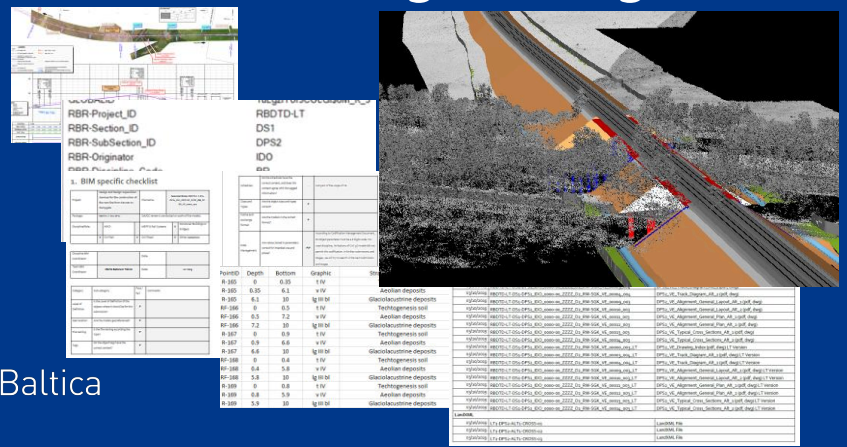
Design Deliveries and reviews

Value Engineering

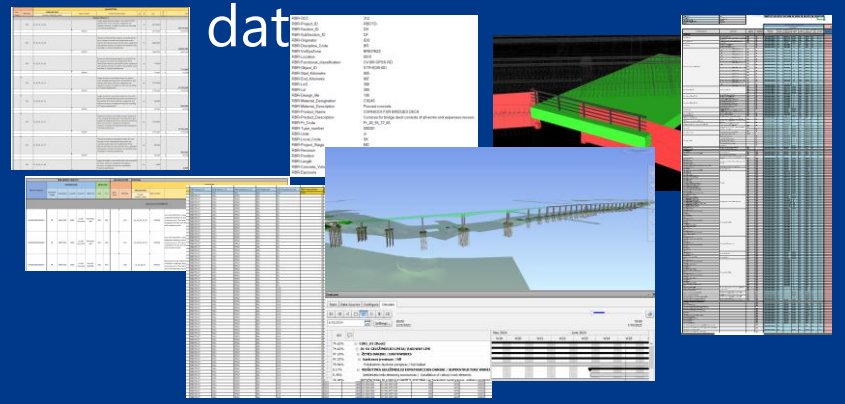


Master design

Value Engineering data



Master design dat



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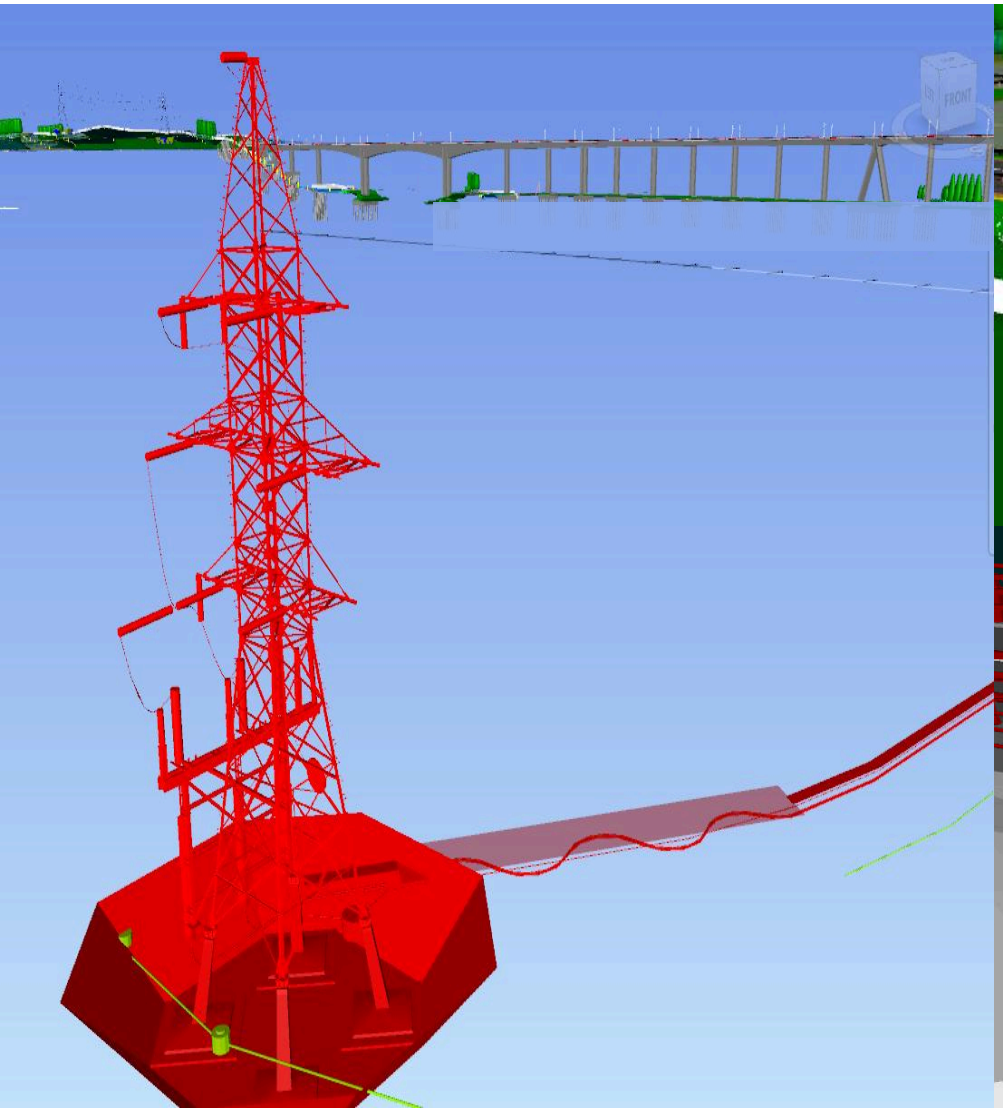
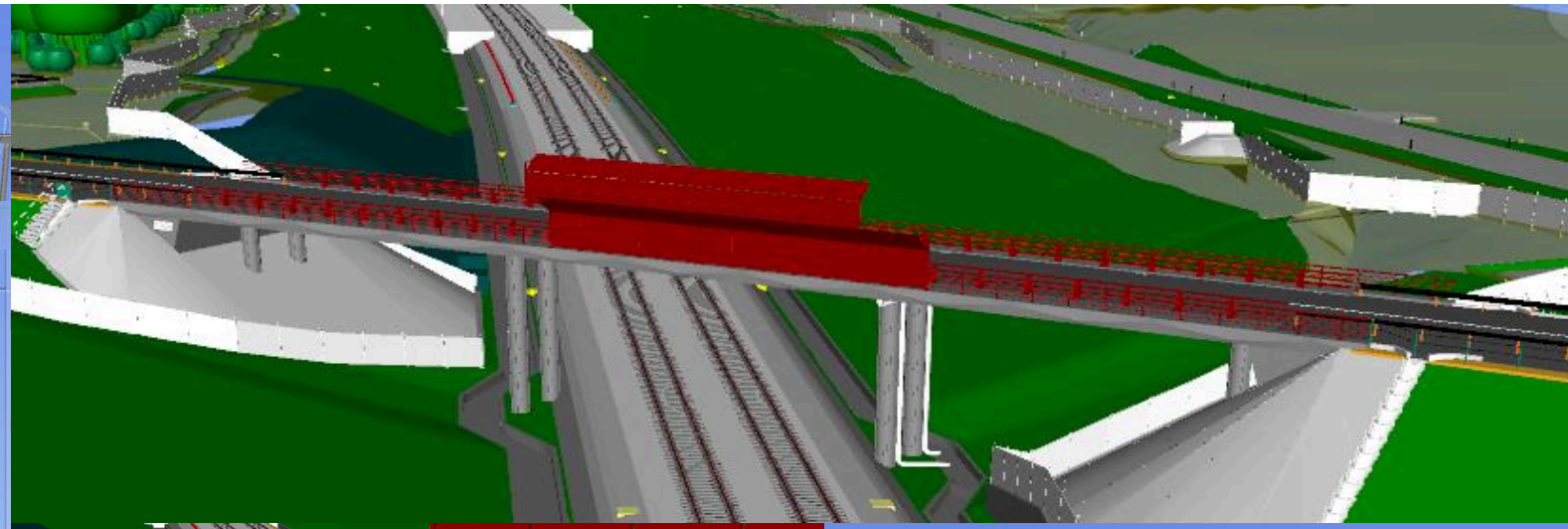
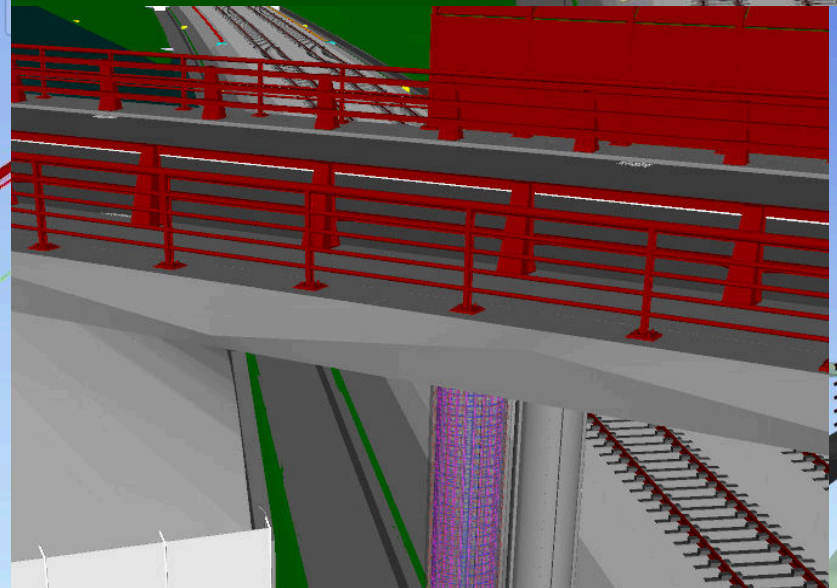
Design Deliveries and reviews

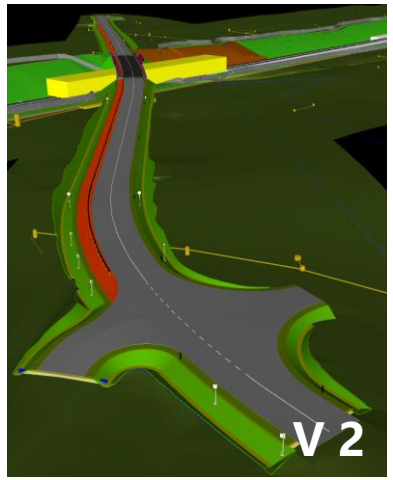
Detail Technical Design

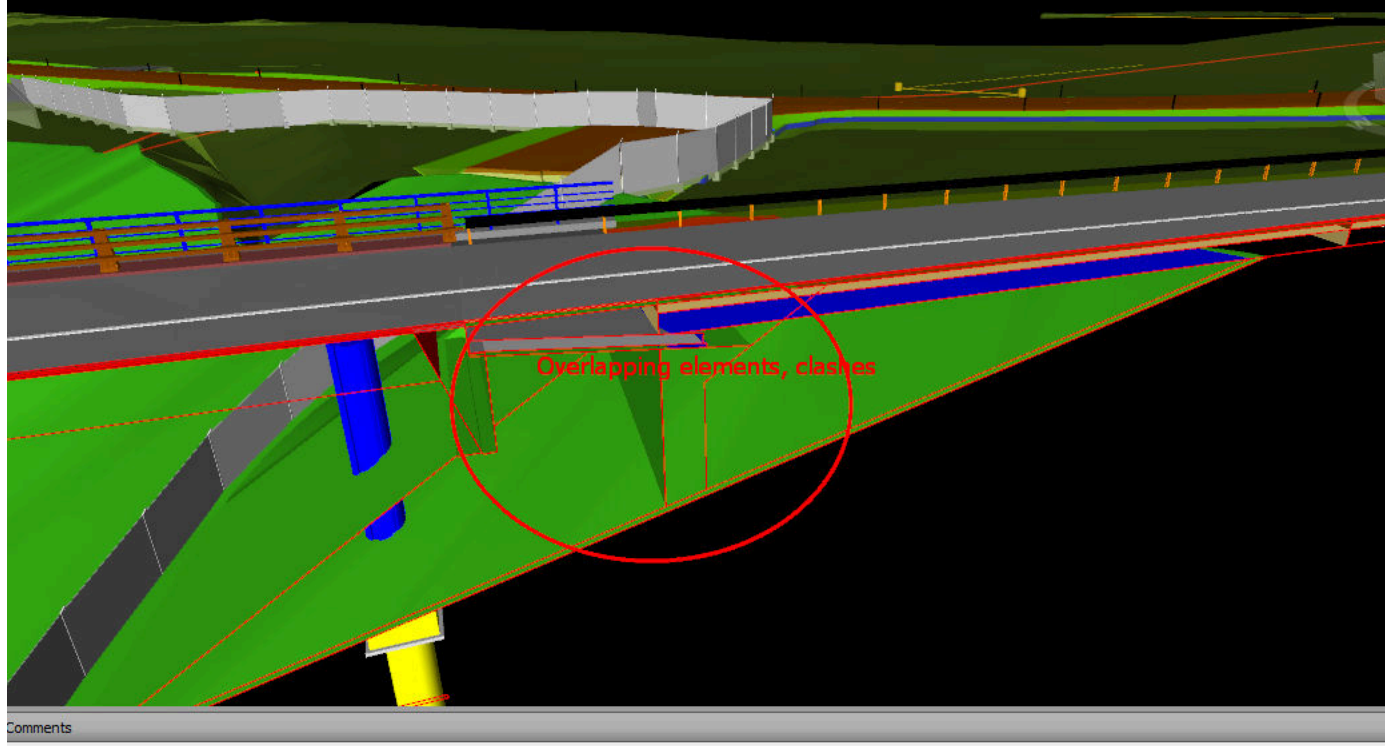


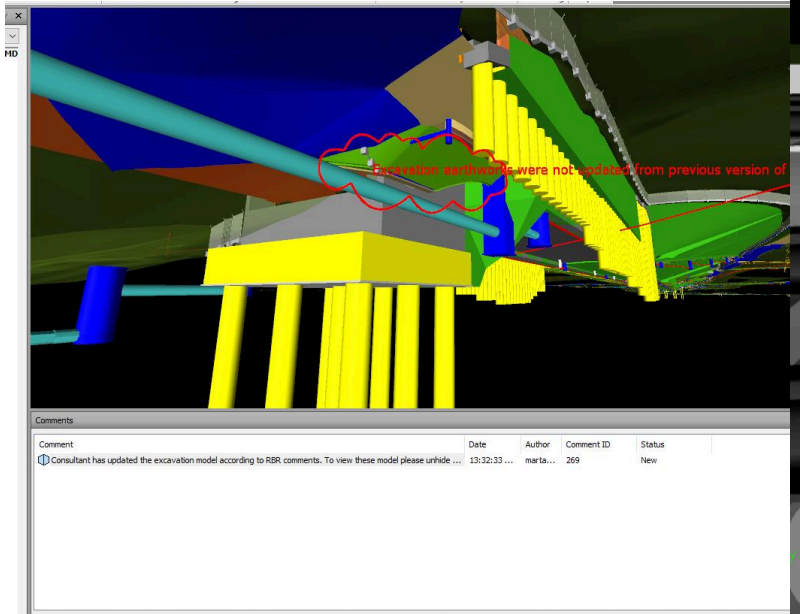


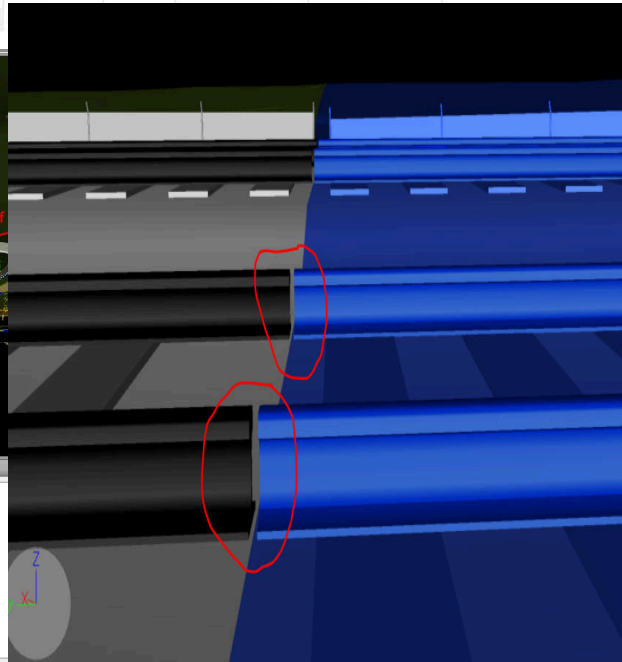


Design Deliveries and reviews









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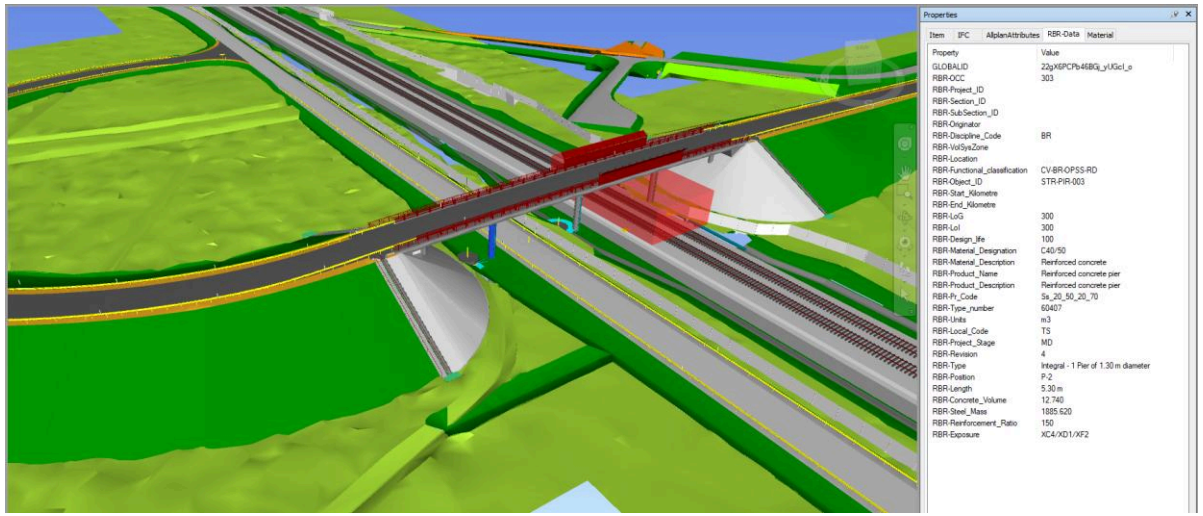
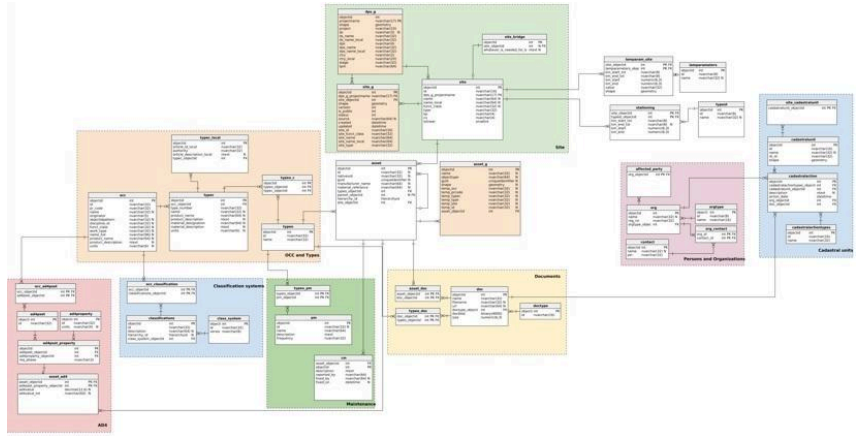
BIM to GIS = Asset Register

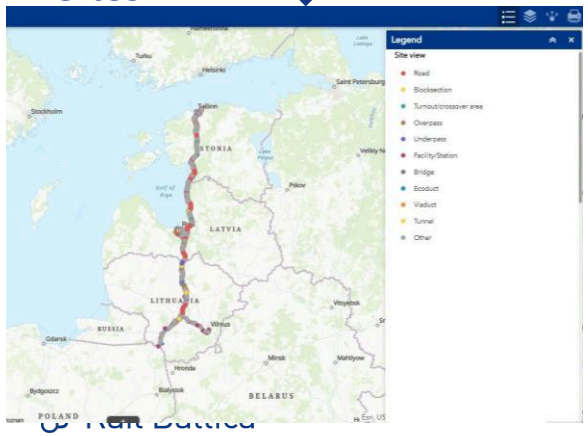


GIS Enterprise Geodatabase (SQL)

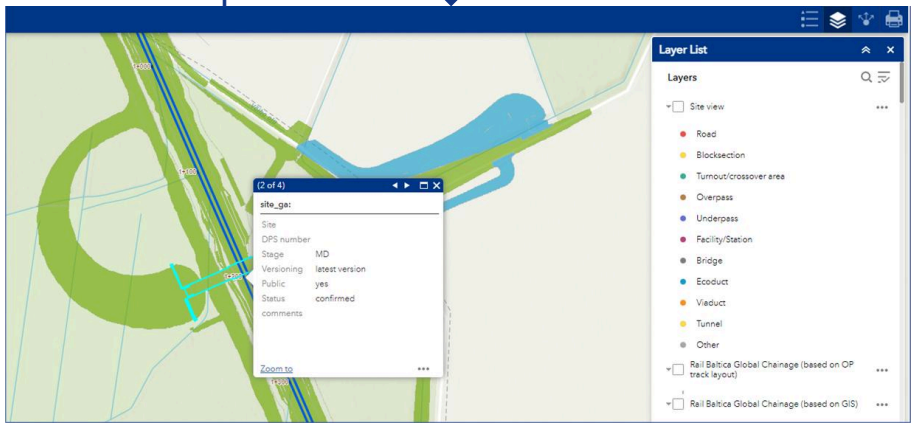


Web Interface

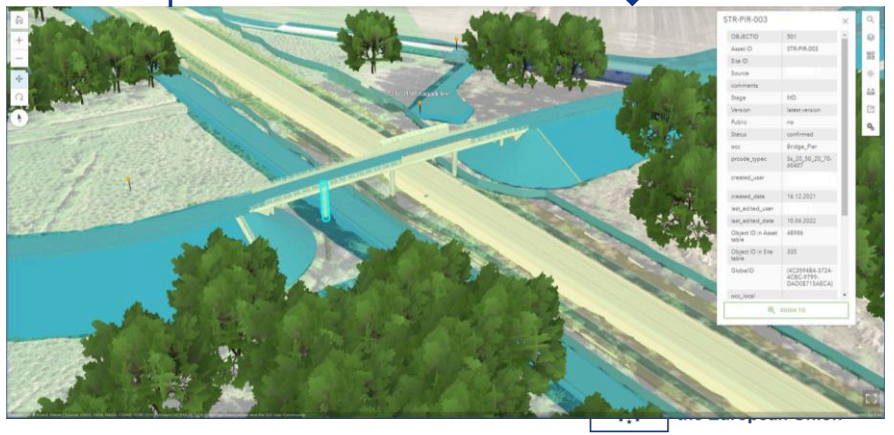
Sites



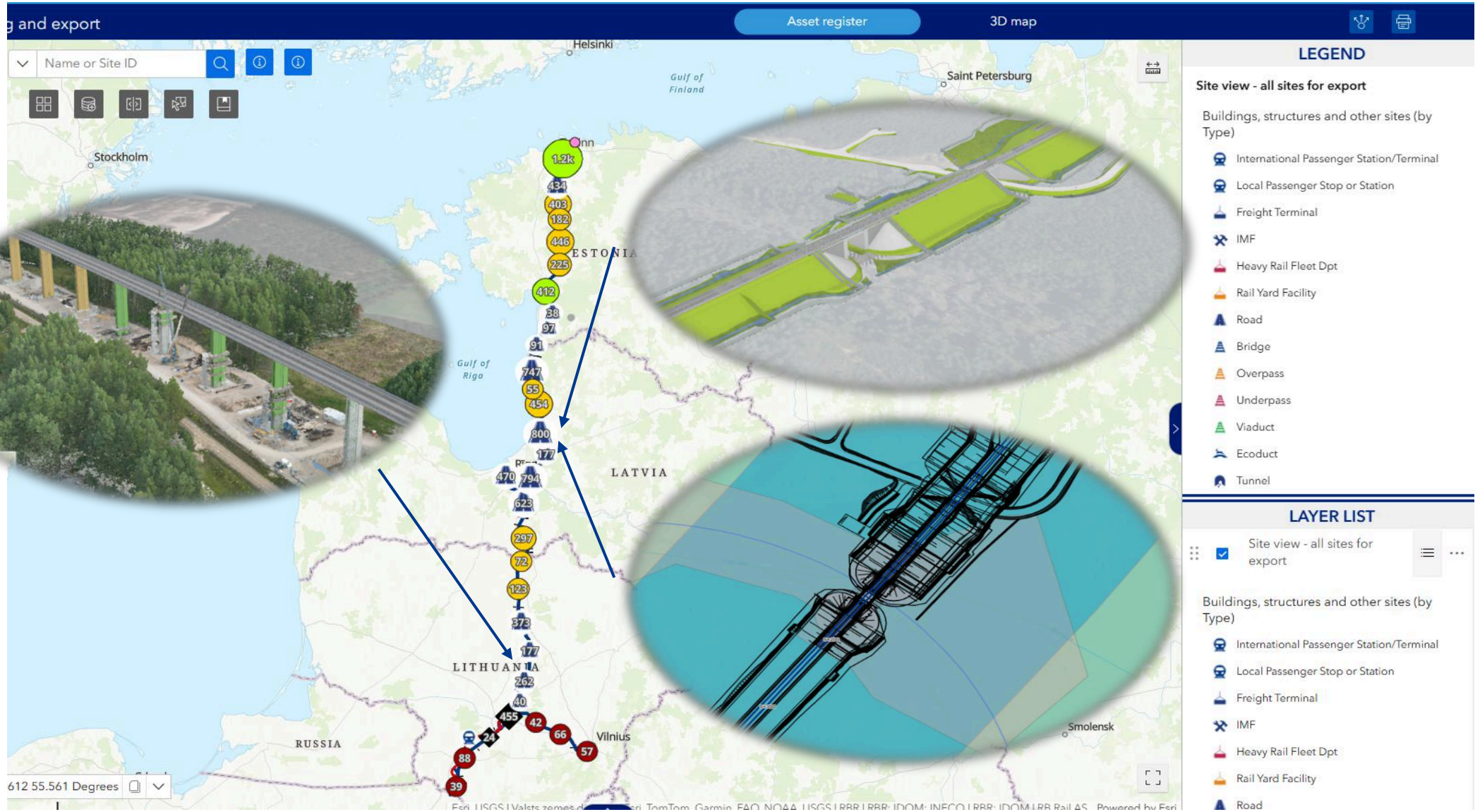
2D Footprint



3D Representation



Bridging design and construction digitally



870 km of railway infrastructure in GIS database

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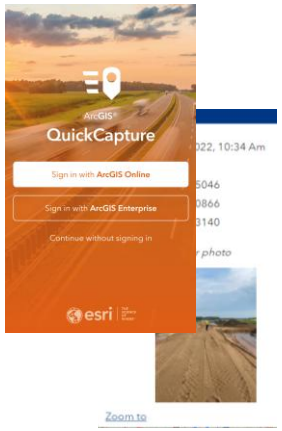
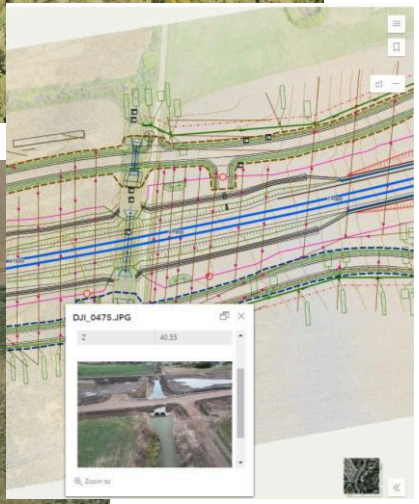
Collection and evaluation of factual data from construction sites

Field Applications. On-site Data Collection



Drones. Quick and Efficient Assessment of the Situation and Data Collection



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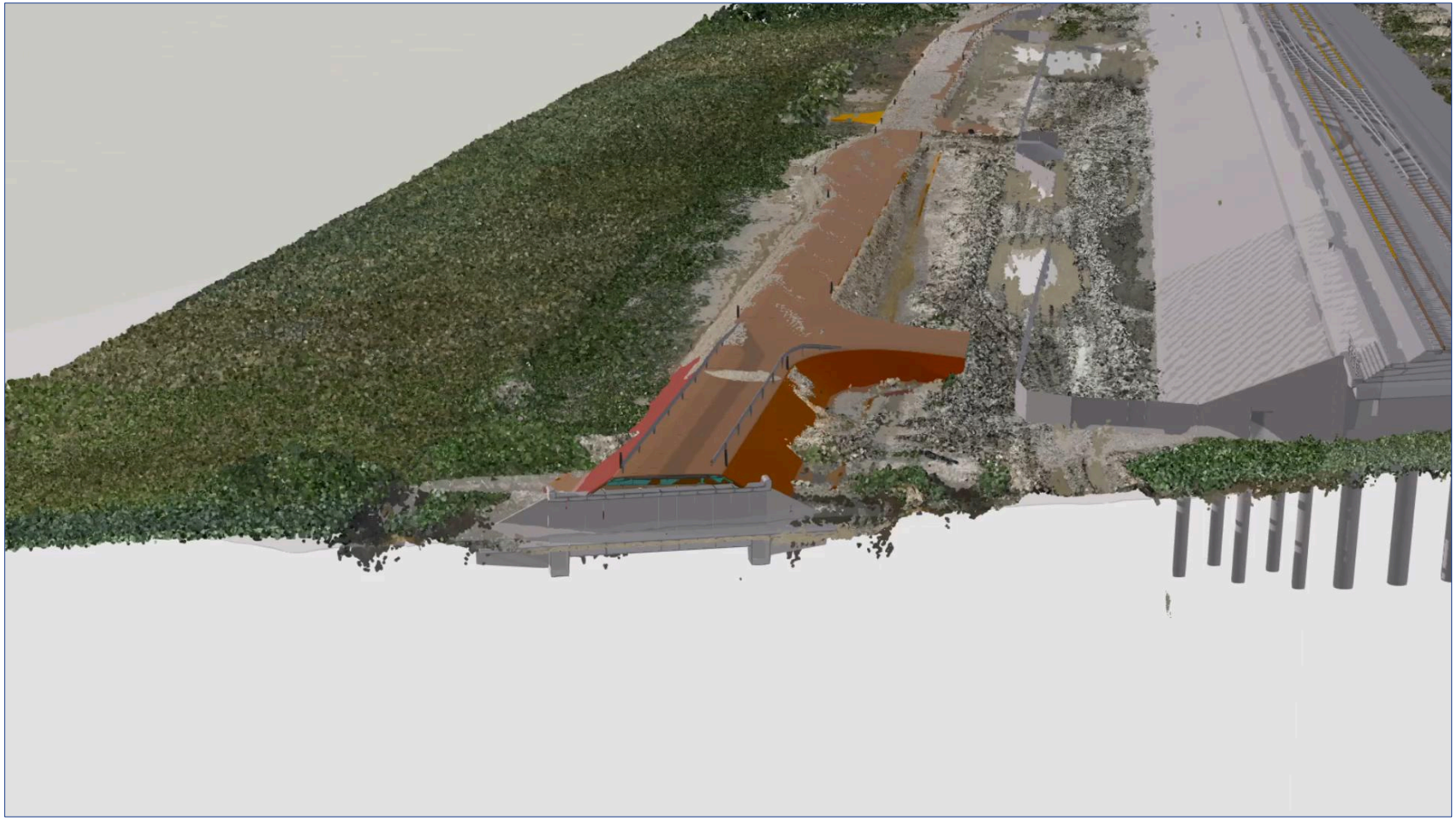
Monitoring and Reporting in GIS



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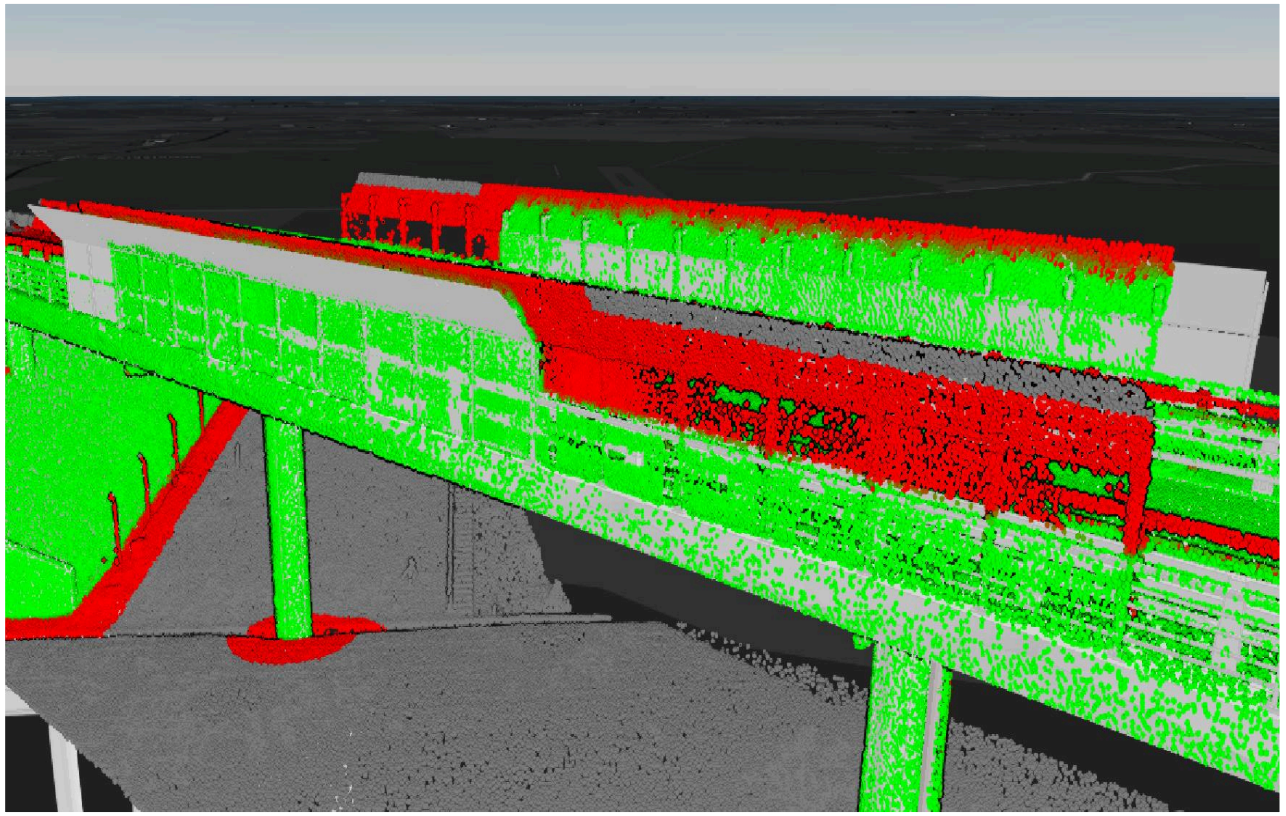
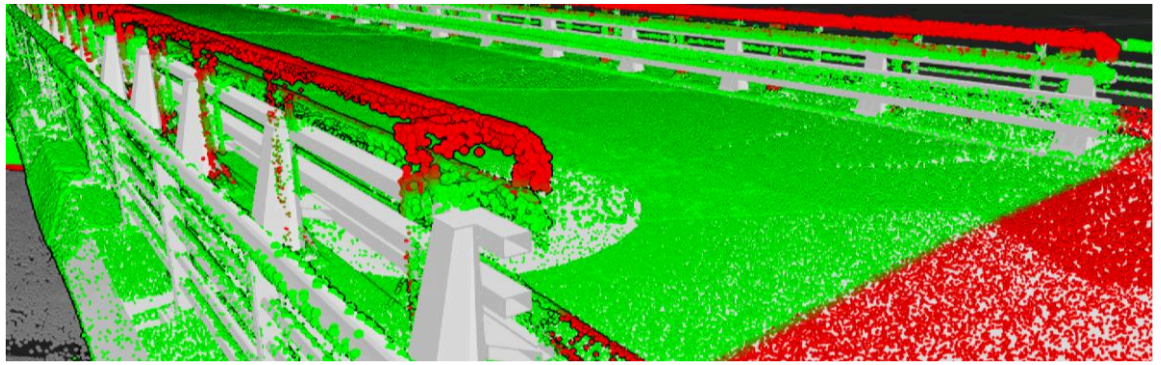
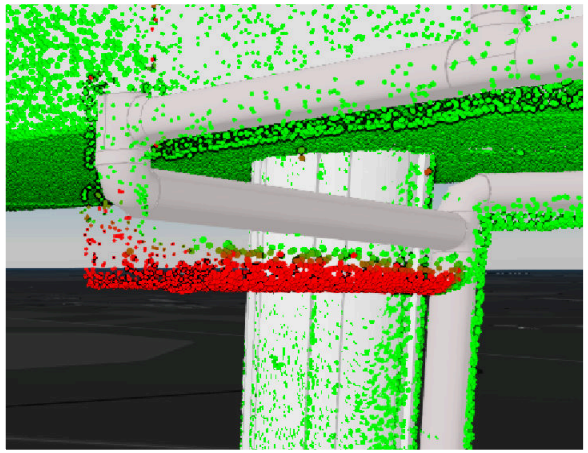
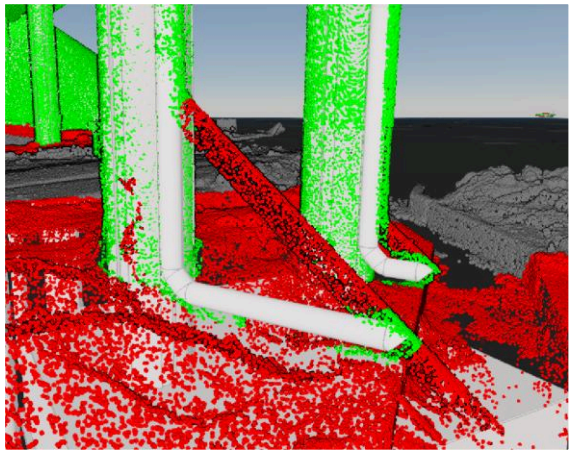
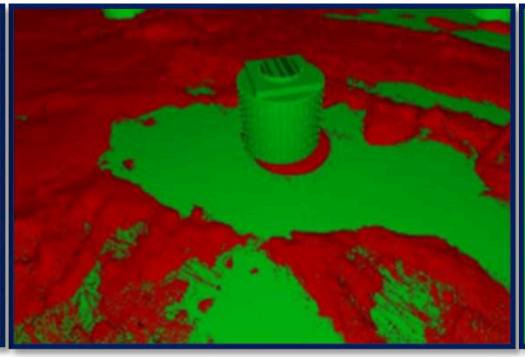
Why it is important to monitor?

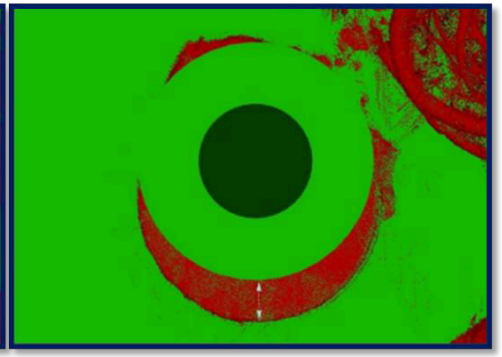












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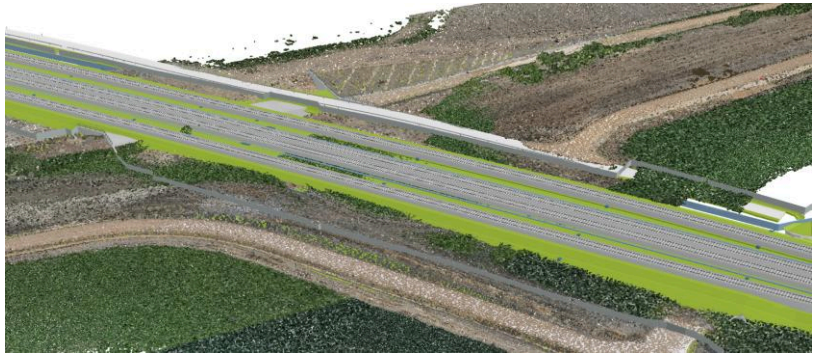
Digital possibilities

- Data analysis
- Visual supervision
- Monitoring progress from the office
- Possibilities for automated control
- Future digital twin for operation and maintenance



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Suggestions for future megaprojects

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Suggestions for future megaprojects

01	02	03	04	05
Planning	CDE	Process	Integration	Maintenanc
Client Requirements The Client, as the end user, defines what digital data will be managed and how it should be handled. Once agreed upon, these requirements are expected to remain stable to ensure consistent implementation and project alignment.	**One Environment** It is crucial that all project participants work within a single, shared environment. A strong commitment from all stakeholders is essential to ensure consistency, transparency, and effective collaboration.	**Quality** While the designer or contractor should understand how to deliver the required data, it is essential for the Client to remain actively involved in the process. Strong collaboration between all parties plays a critical role in ensuring high-quality outcomes.	**BIM – GIS – AIM** Many different systems may be used within the scope of a project. It is essential to align them within a single, coherent information flow to prevent data loss and reduce interface-related issues.	**BIM Benefit** The true value of digital data collected throughout the project phases lies in the structured, systemized information it provides, enabling more efficient and automated maintenance processes.

Thank you!

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Rail Baltic Estonia

EIROPAS DZELZCEĻA LĪNIJAS

LTG INFRA