

BSVII – Digital Delivery

September, 2023

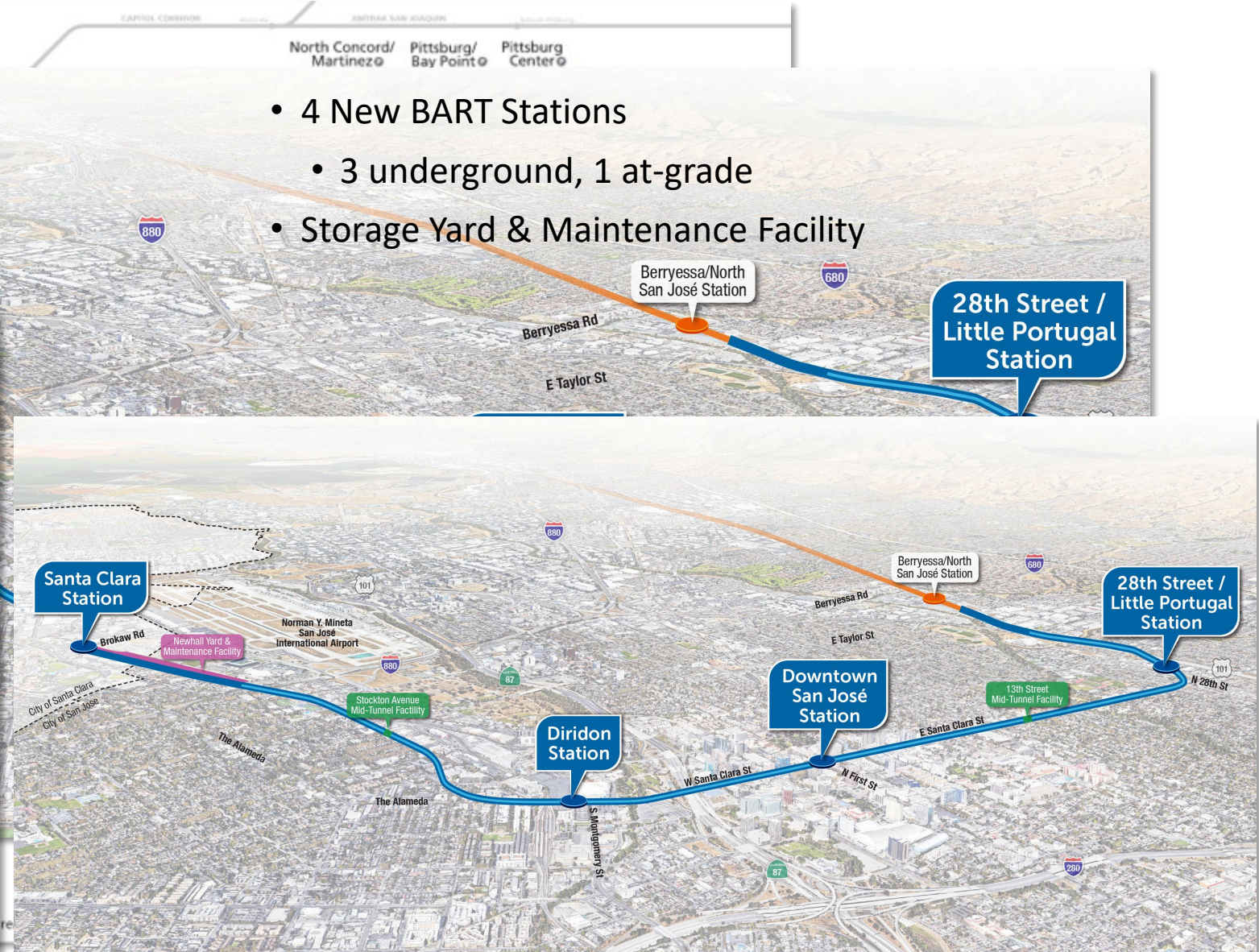
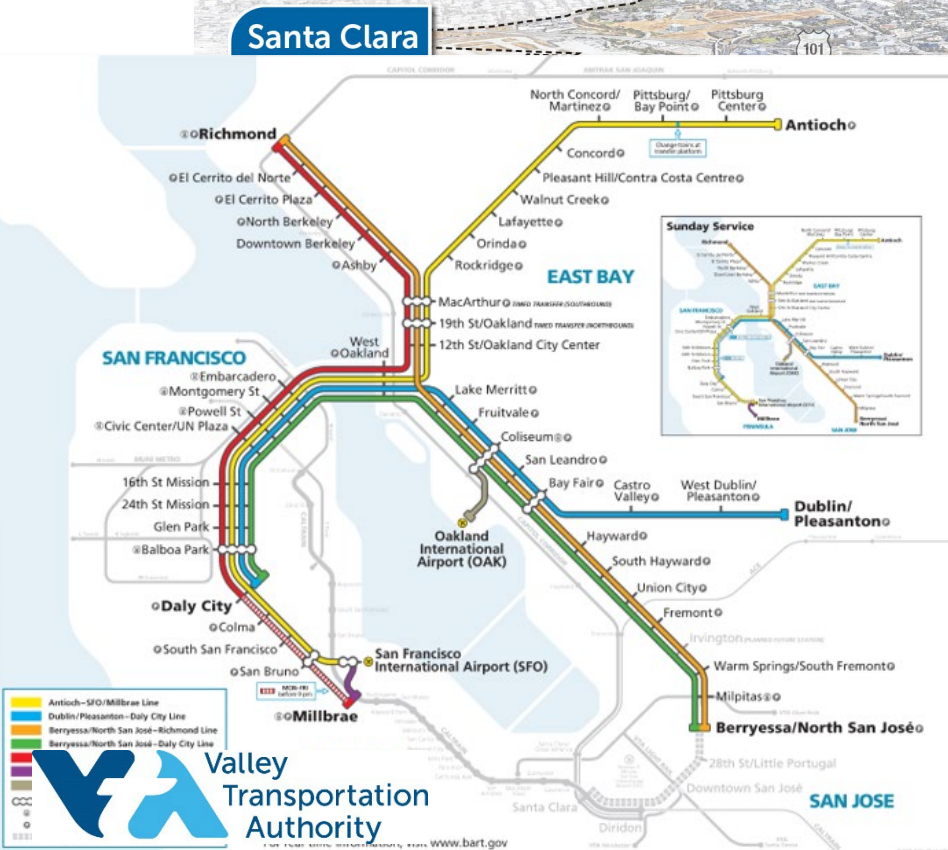
**BART Silicon Valley Phase II
Extension Project**



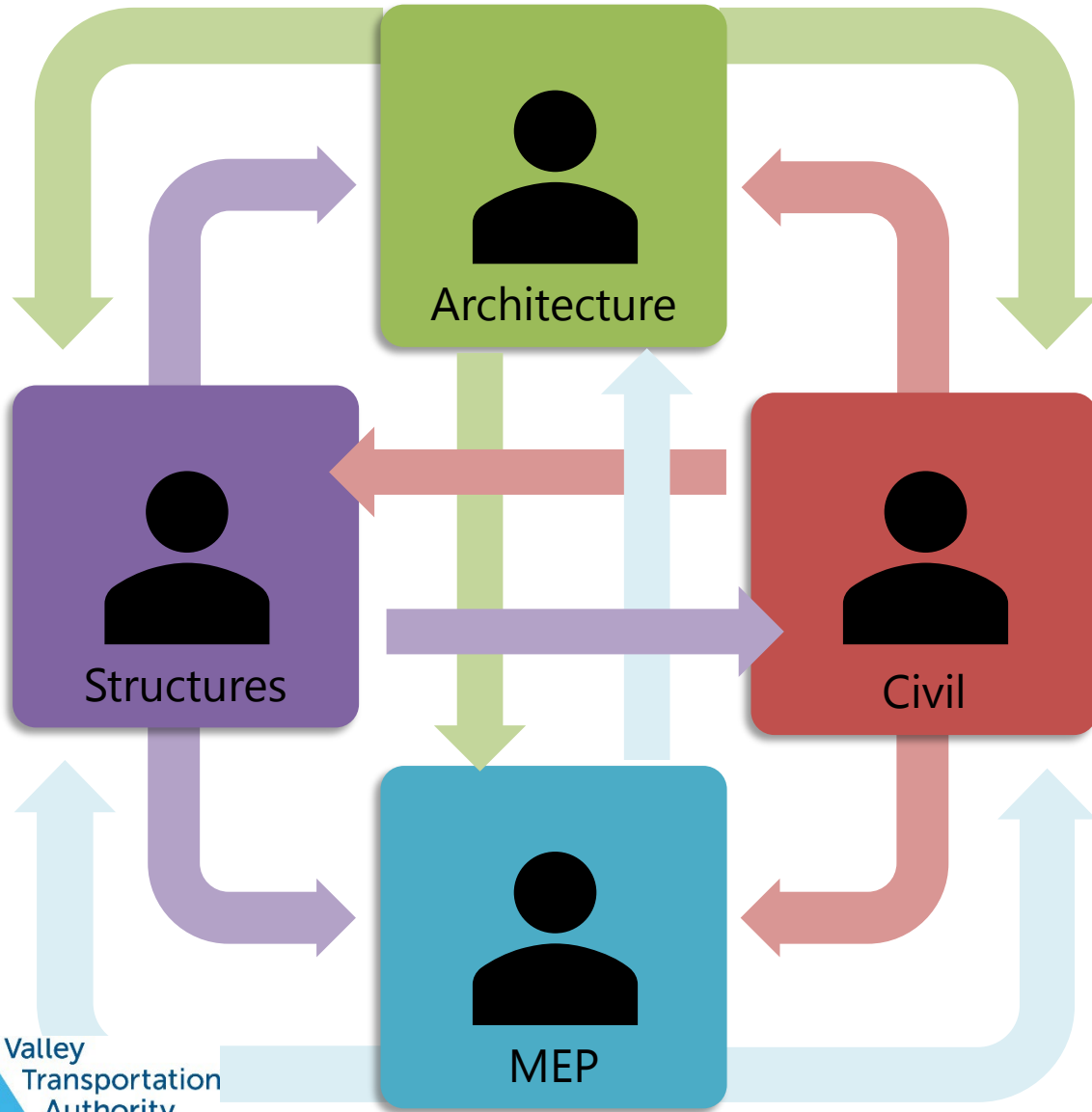
VTA's BART to Silicon Valley Phase II

- 6-Mile Extension of BART Service
 - 5-mile single-bore tunnel,
 - 1-mile at-grade

- 4 New BART Stations
 - 3 underground, 1 at-grade
- Storage Yard & Maintenance Facility



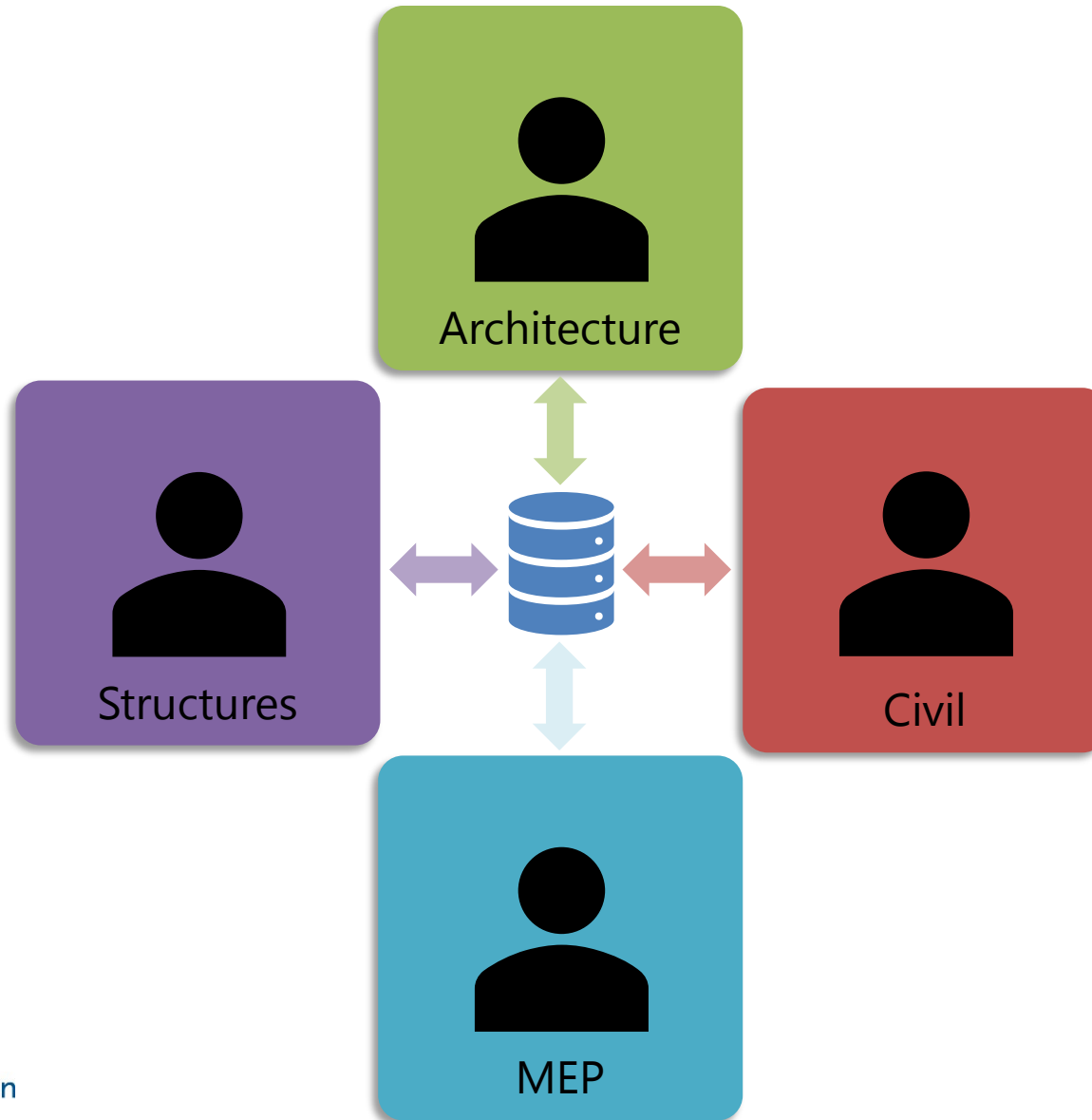
Traditional Delivery



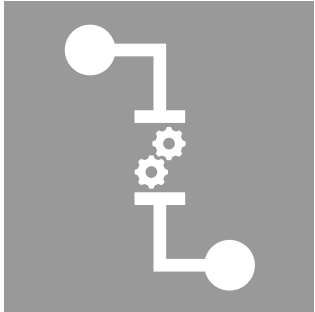
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Digital Delivery



- Facilitates collaboration.
- Creates a single source of truth.
- Earlier clash identification.



Digital Delivery

Not a deliverable, it is a system of platforms, processes and tools used to generate, validate, transfer and interrogate data and feeding back opportunities for improvement.



People

Project Team delivering the work in a digital delivery environment.

Platforms

Software platforms used to generate and store data.

Process

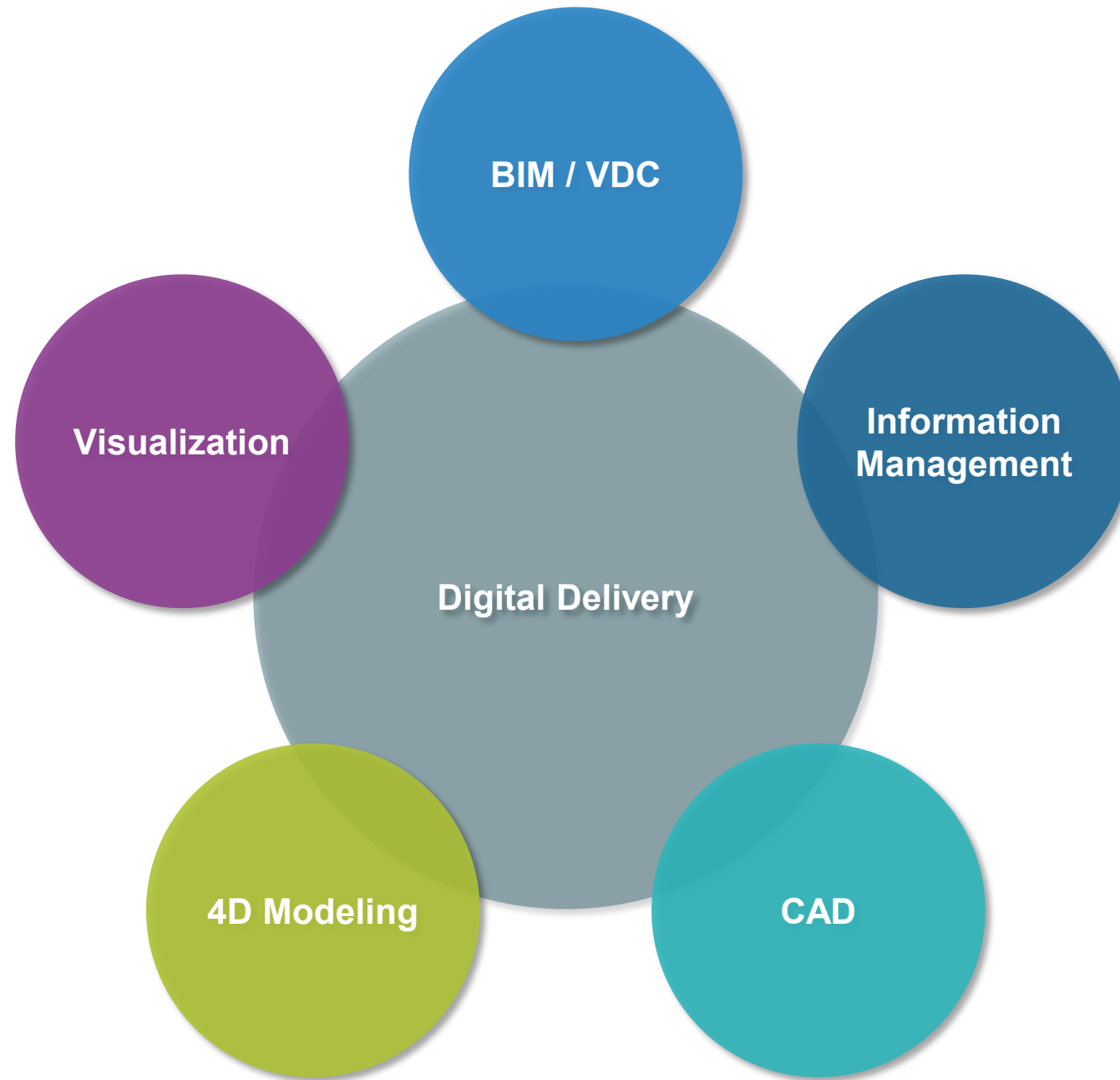
Processes which govern information generation, assurance and transfer.

Tools

Tools used to interrogate data and realize additional benefits.

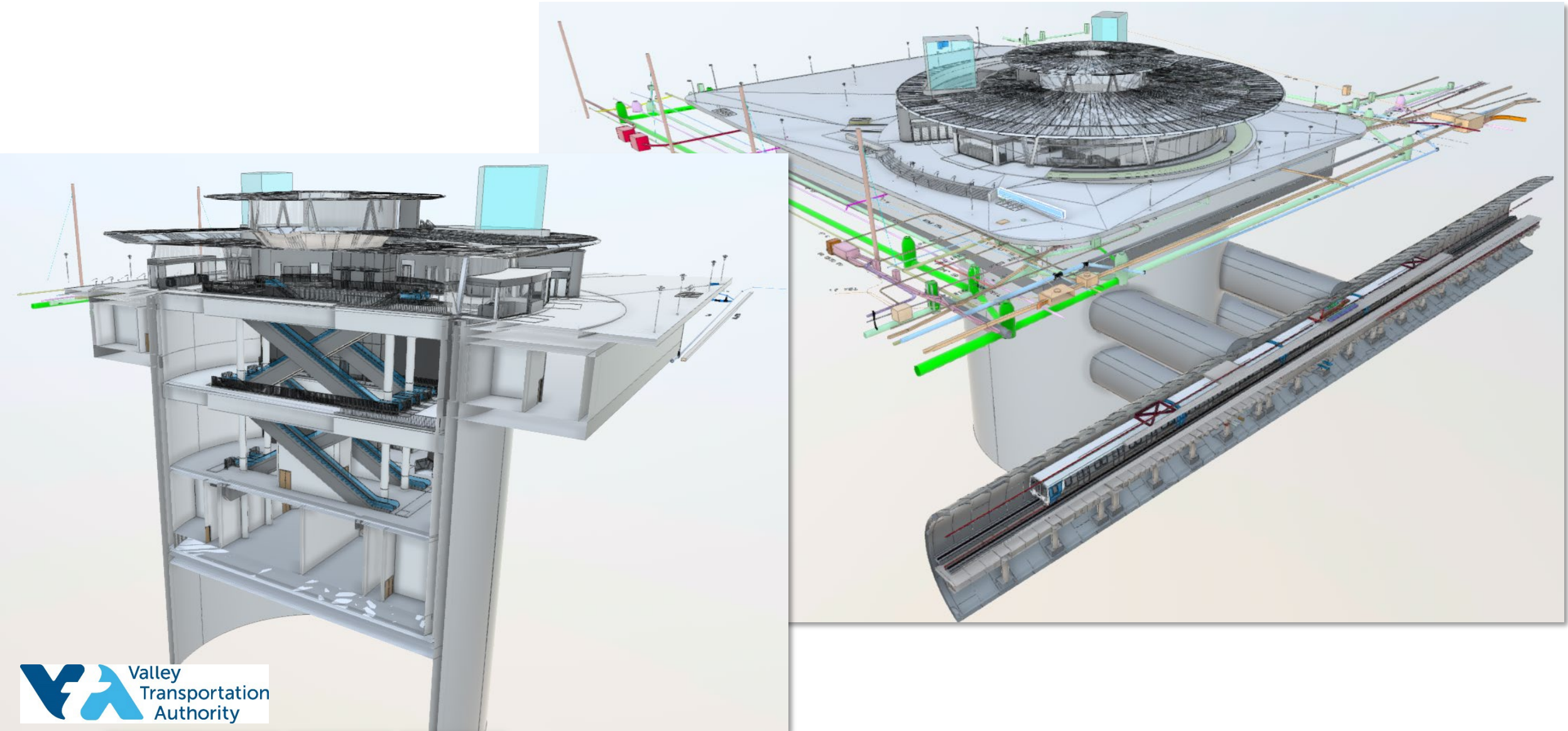
Feedback

Drawing conclusions from data to identify opportunities for improvement.

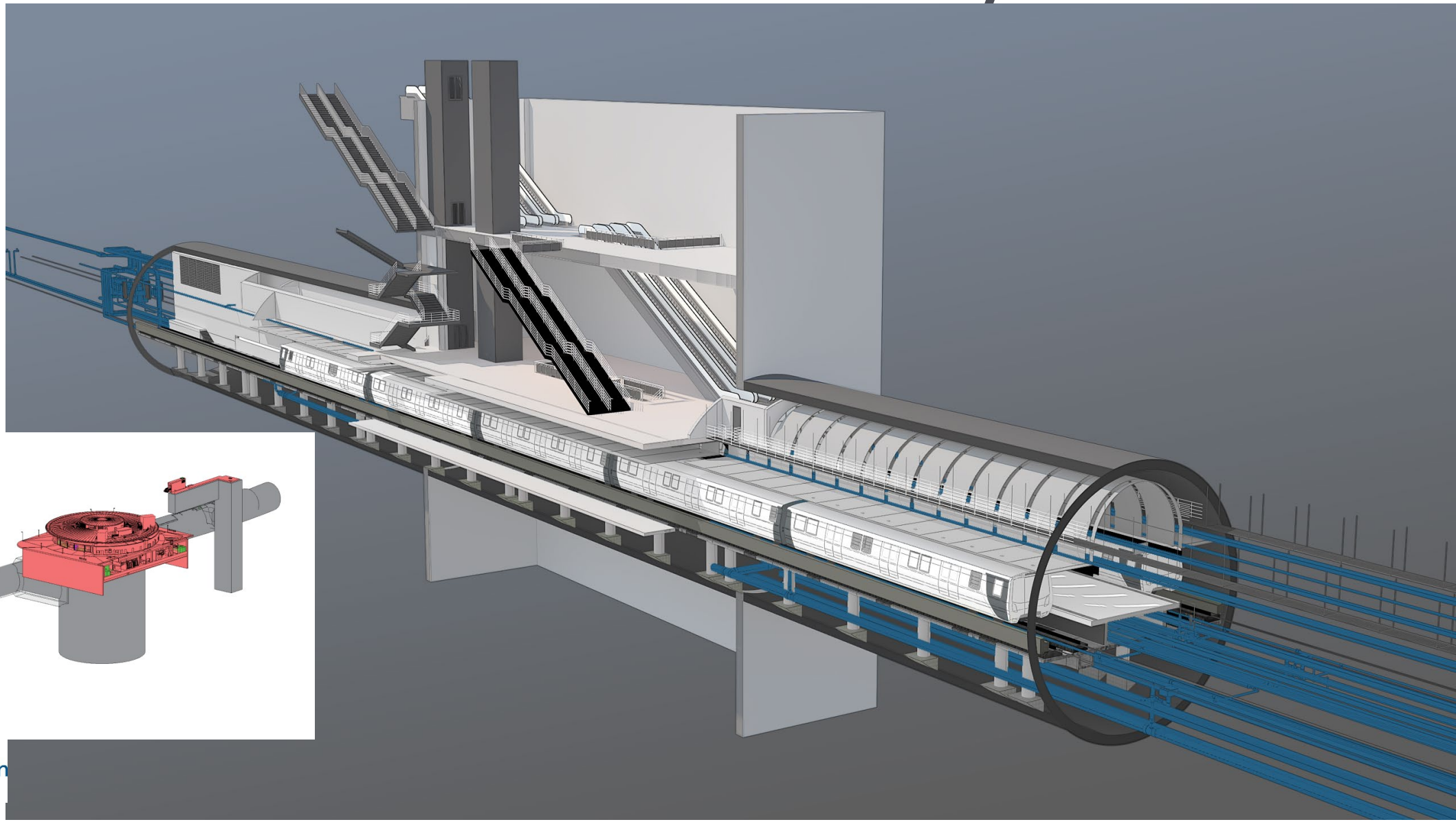


BIM / VDC

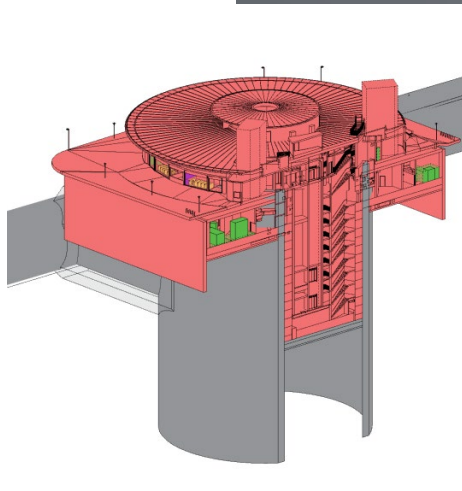
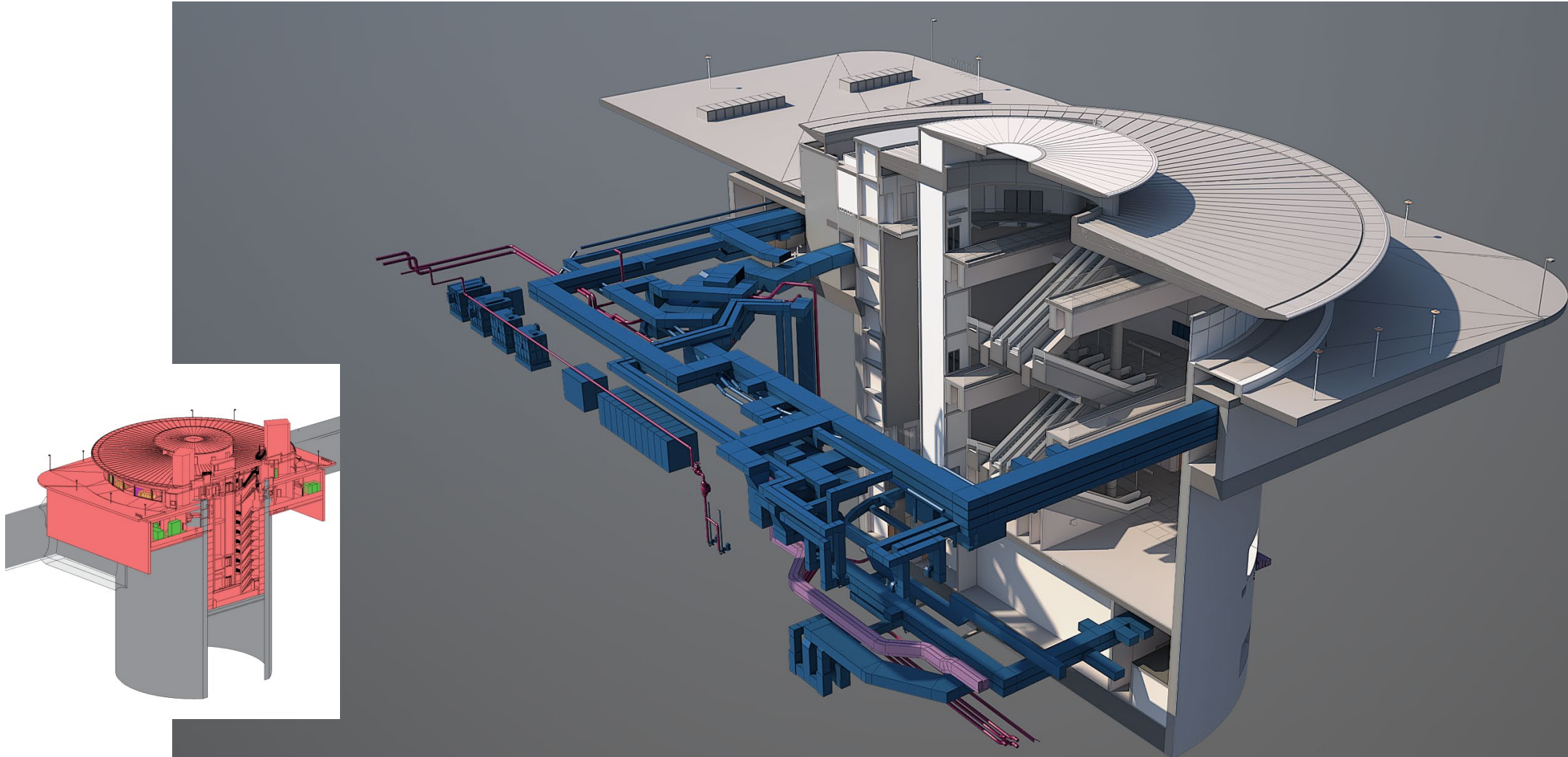
Model-based Delivery



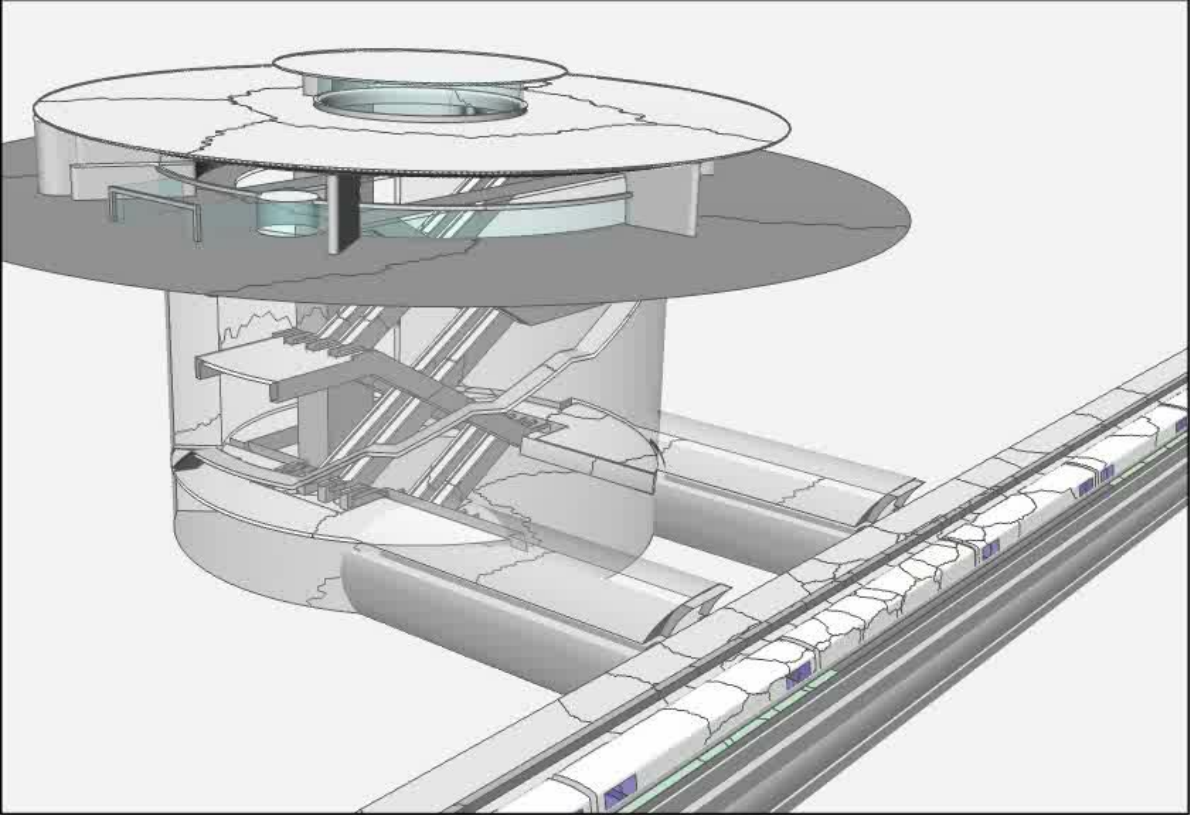
Model-based Delivery



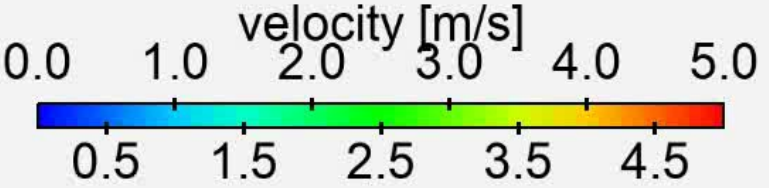
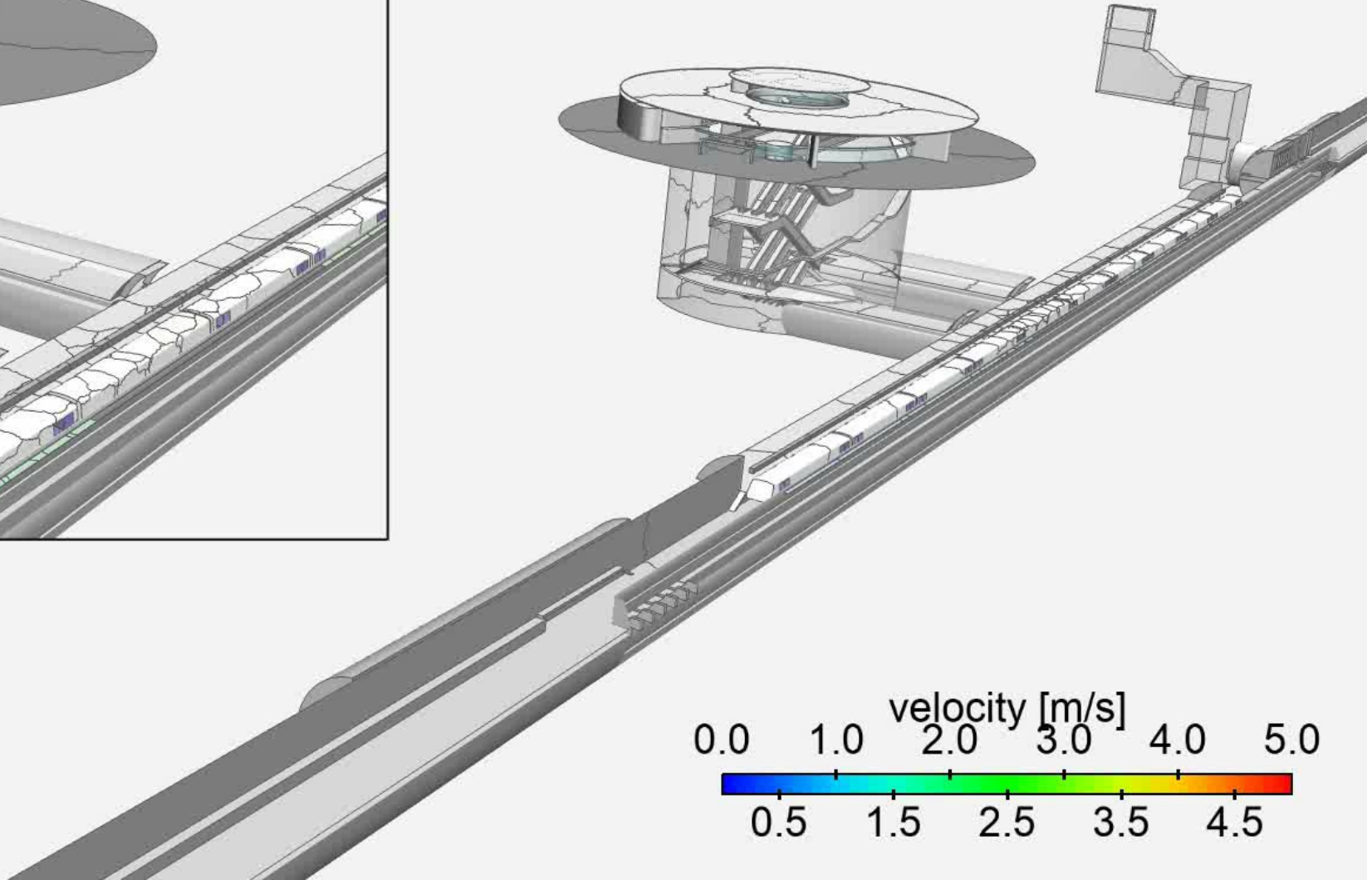
Model-based Delivery



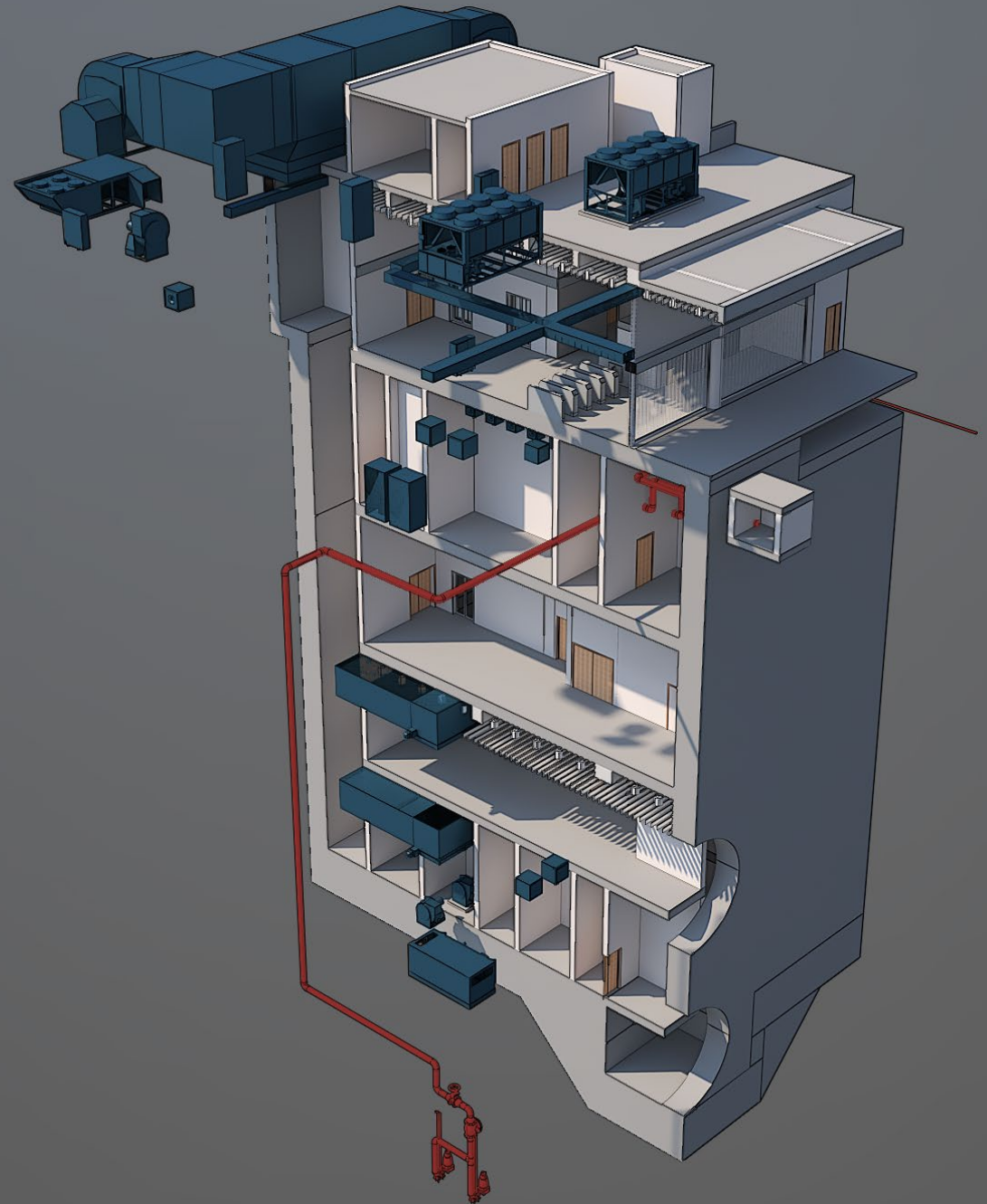
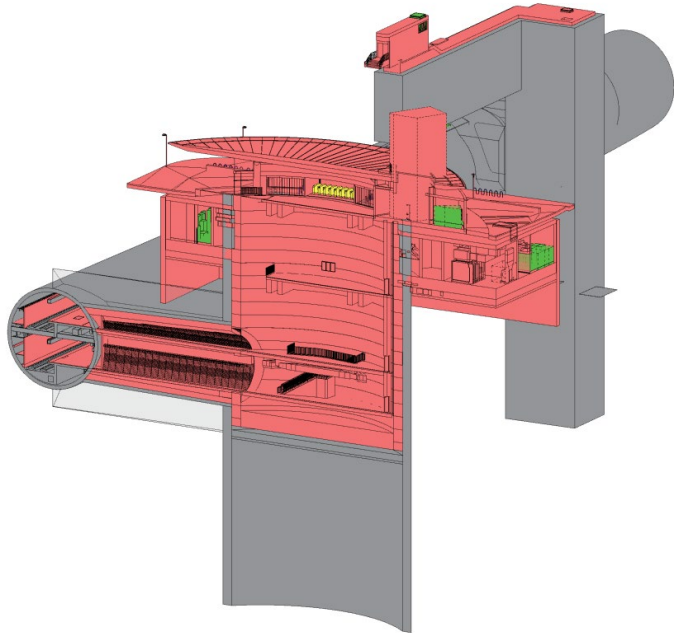
CFD models



Time = 900.50



Model-based Delivery



Leapfrog geotechnical model



Visualization





Visual Impact Simulations



Visual Impact Simulations



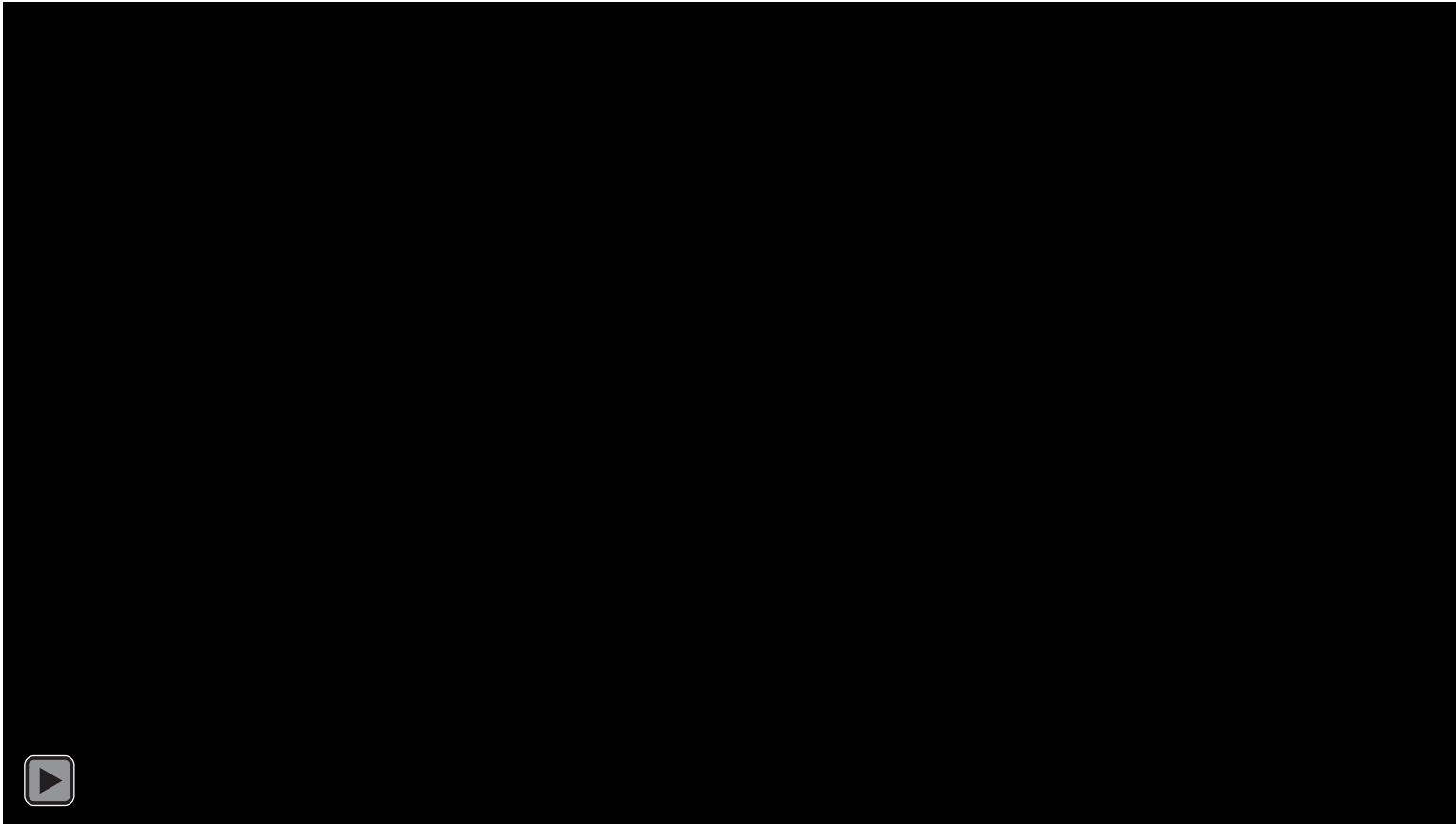
Visual Impact Simulations



Visualization / VR

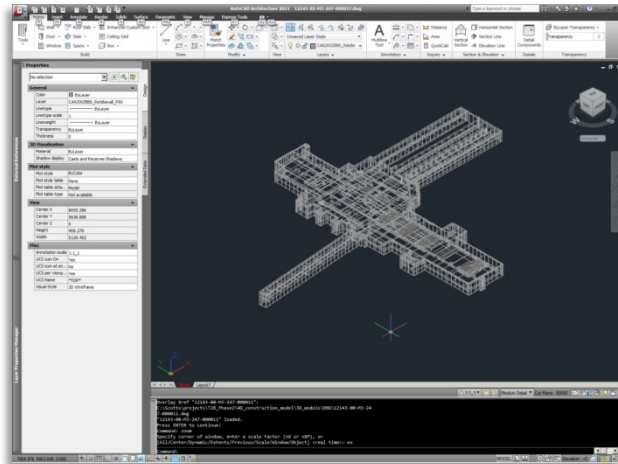


Maintenance Yard VR video

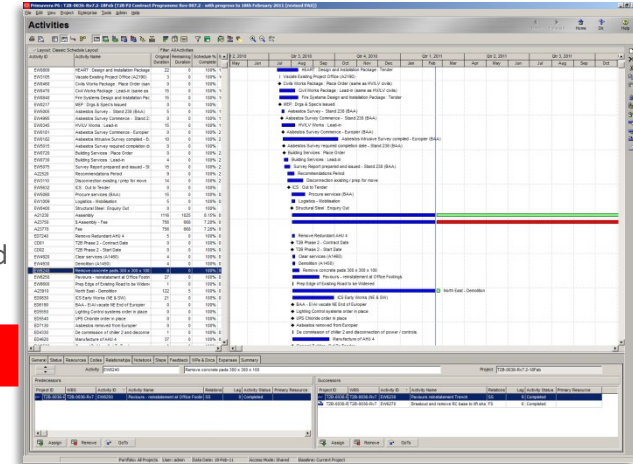


4D modeling

4D Modeling



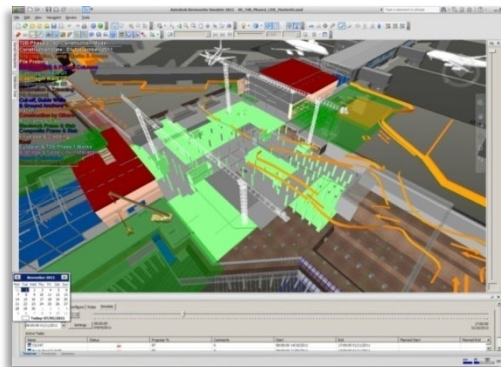
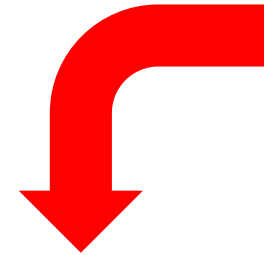
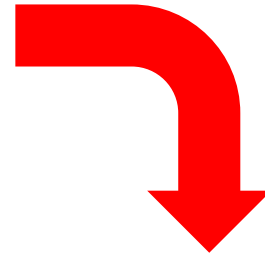
Multiple 3D Data Models



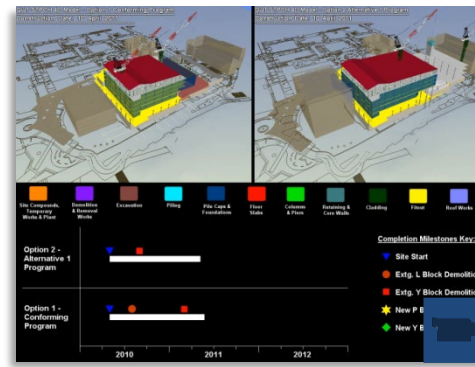
Construction Schedule(s)

Reference Link

Dynamic Synchronised Link



Construction Sequencing



Side-by-side Comparisons



Public Outreach

Information Management

Common Data Environments

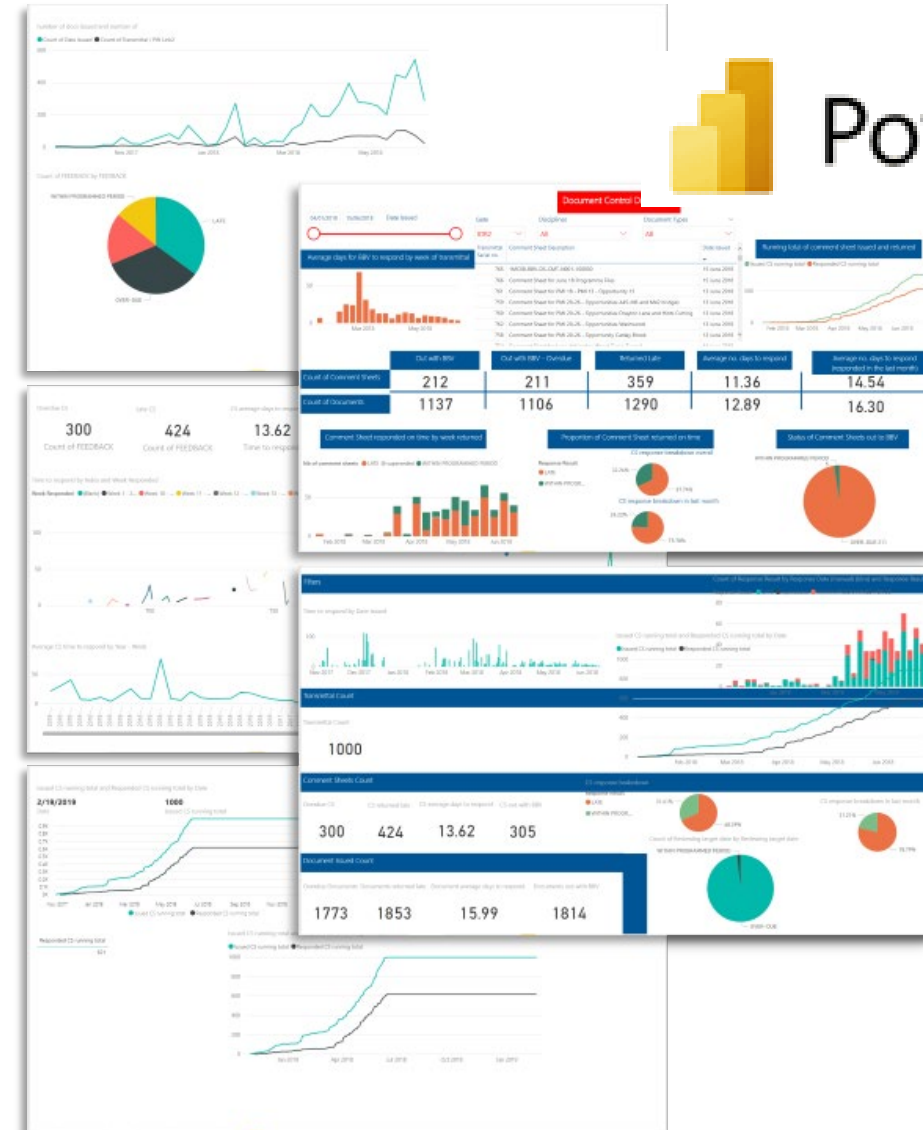
 **AUTODESK**
Construction Cloud

 **SharePoint**

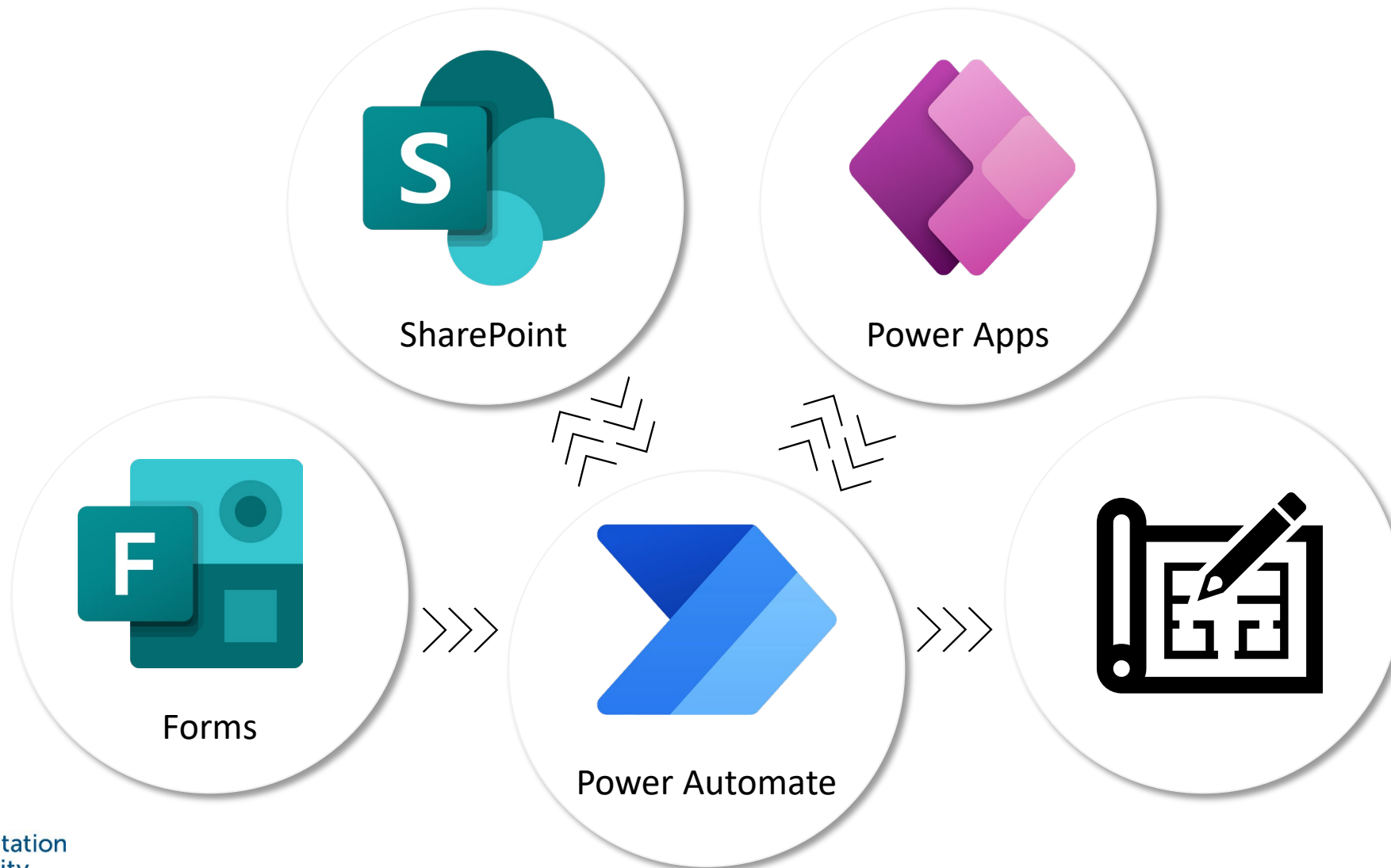
- Store and manage project information
- **Single source of truth** – avoid duplicative information
- Efficient workflows to capture QA checks while facilitating **collaboration**

Analytics dashboards

- Produced **Power BI dashboards** to gain **insight** into project
- ‘Live’** reporting of project information



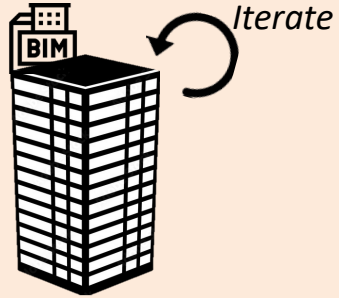
Workflows



Asset Management (Digital Twin)

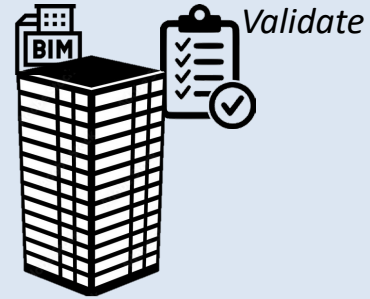
BIM Model Lifecycle

Design



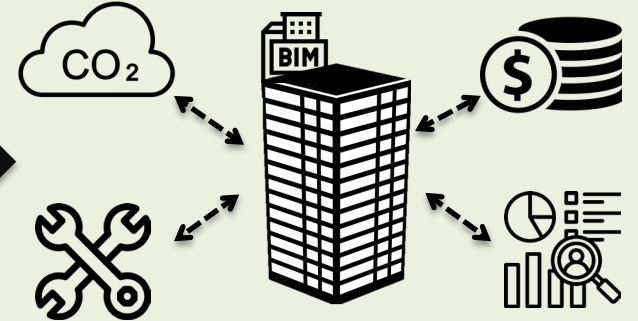
Design intent model

Construction

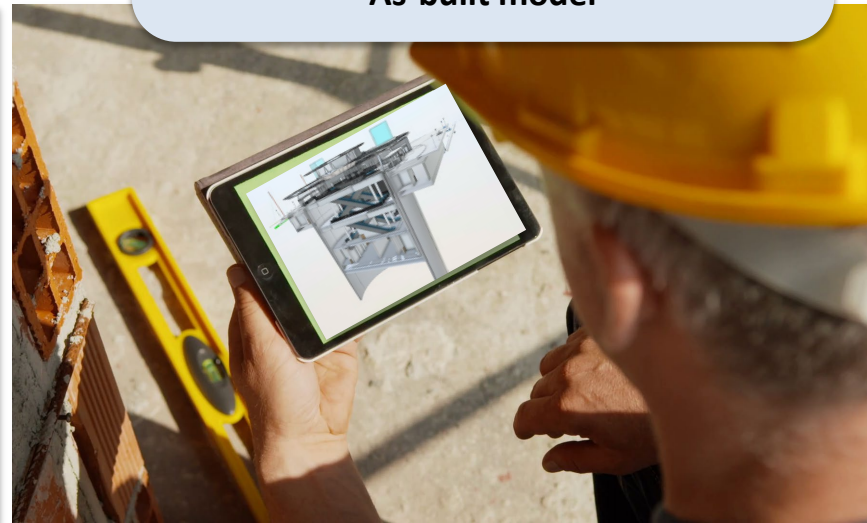


As-built model

Operation



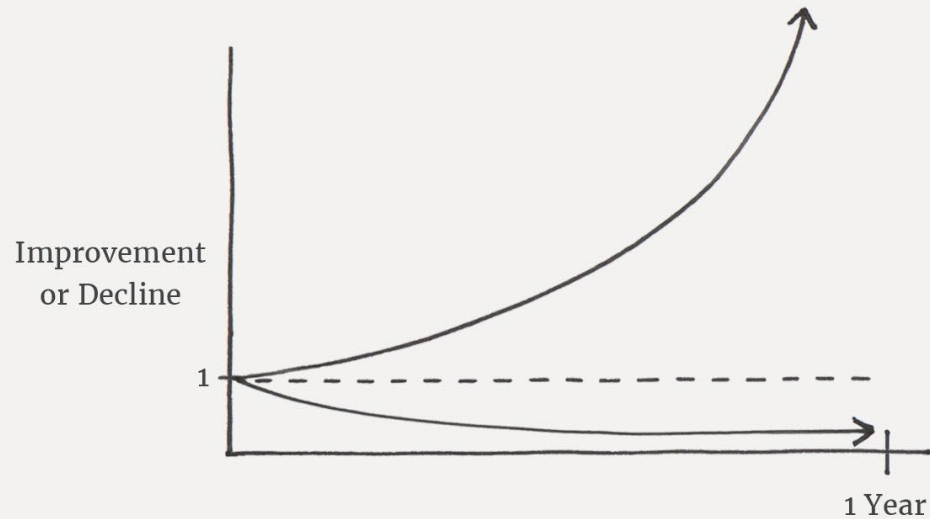
Asset management model



1% every day
↓
37.78 times
better in a year

The Power of Tiny Gains

1% better every day $1.01^{365} = 37.78$
1% worse every day $0.99^{365} = 0.03$



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QUESTIONS?

Thank you