CHI 59TH ICWMM CONFERENCE FEBRUARY 2026

Closing the Gap Between Field Reality and Your SWMM Model

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For more information, visit alcosan.org

About Us

Sam Shamsi, PE:

- From Pittsburgh, PA
- Ph.D. Civil Engineering, University of Pittsburgh, 1988
- Private to public sector in 2018
- Over 100 papers + 5 books
  - 2023 book: Search GIS Shamsi on Amazon
- Licensed Professional Engineer: PA, OH, WV
- Interests: golf, fishing, kites, cricket, GIS, modeling
- 27th paper in this conference

Rachel Sebian, PE:

- From Cleveland, OH
- B.S Civil Engineering, Ohio State University, 2013
- M.S Civil Engineering, Ohio State University, 2016
- R2O Consulting, LLC
- Licensed Professional Engineering: CO, KY
- 10 years in the Engineering Consulting Industry with a focus on H&H and collection systems
- Interests: Hiking, Painting, Dancing, Avid PCSWMM User!

Agenda

01 **Our System**
Characterization of the ALCOSAN Conveyance System

02 **Our SWMM Model**
ALCOSAN Model statistics and usage

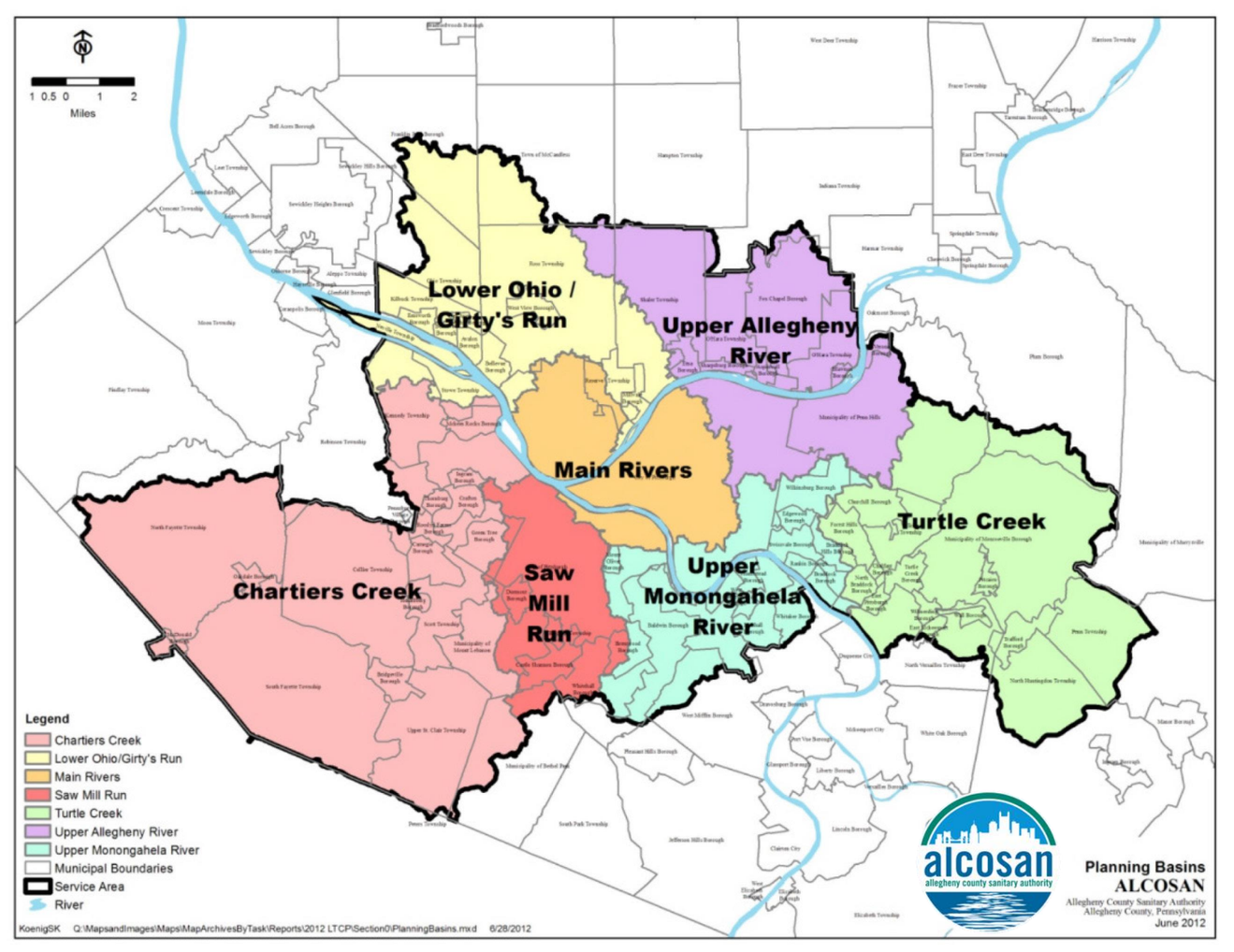
03 **Our Asset Management**
AGOL and IAM platforms and purpose

04 **SWMM Asset ID & Spatial Sync**
Bridging the gap between platforms - Our process

A Large, Evolving System Demands Aligned, Accurate Data to Support Reliable Decisions

ALCOSAN Service Area Statistics

- 83 customer municipalities
- Population of ~840,000
- 7 watersheds (planning basins)
- 305 mi^2 (790 km^2)
- 20% combined
- 90 mi (145 km) of interceptor sewer
- Regionalization of 180 mi (290 km) of large municipal sewers
- 1 treatment plant: WW capacity 250→600 MGD (11→26 m^3/s) by 2029 (2.4x)



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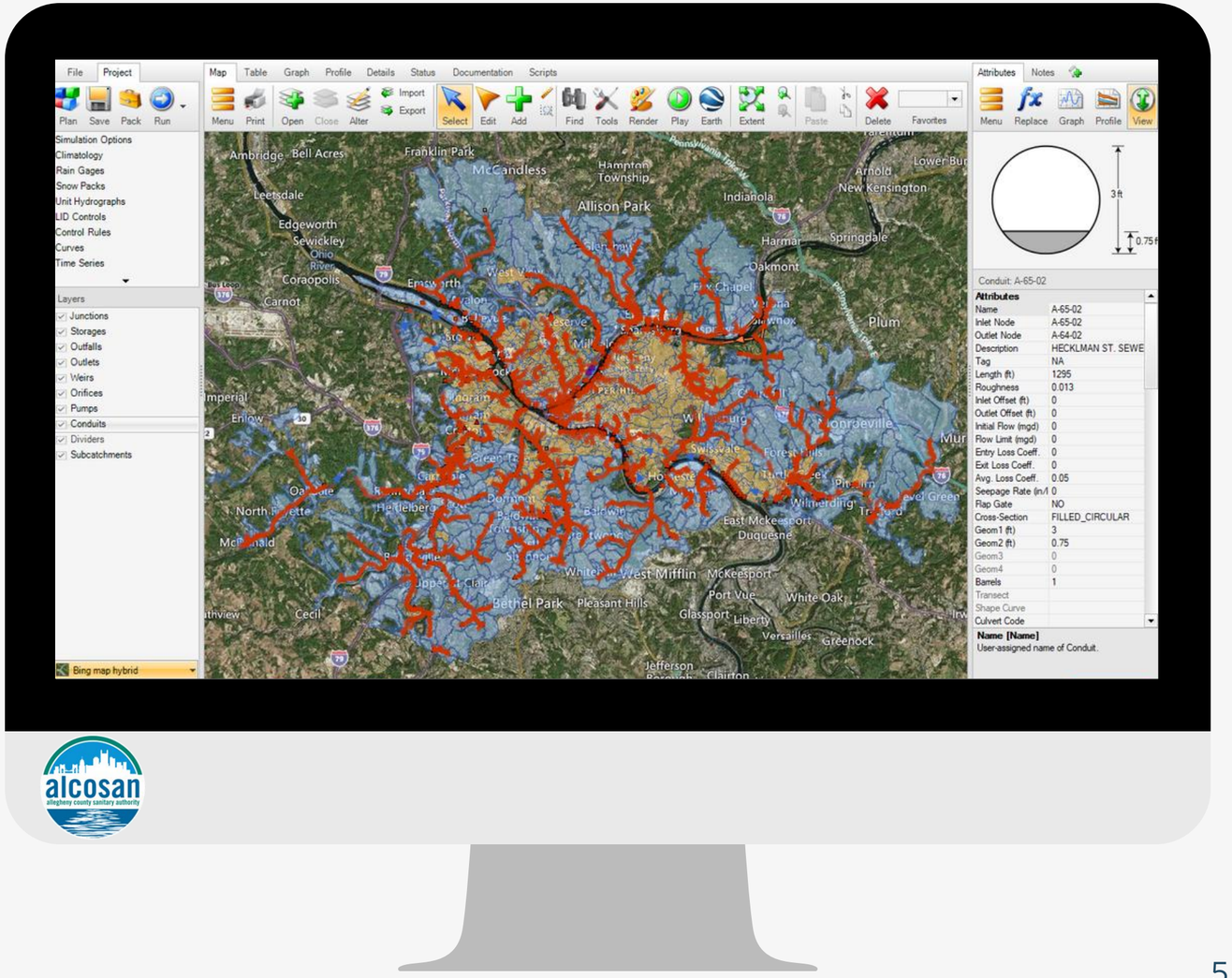
A Complex SWMM Model Depends on Strong Asset Data to Stay Reliable

SWMM Model Statistics

- One systemwide model for 7 watersheds
- 10,000+ nodes
- 9,700+ conduits
- ~ 450 Outfalls
- ~ 2,000 subcatchments
- 100+ rain gauges (virtual/radar)
- 1,500+ inflow nodes

Model Use

- Planning and design of 3 tunnel systems
- Tracking 180 miles (290 km) new regionalized sewers
- Regulatory compliance (WQ)



Planning For the Future - Building on a Solid Model Foundation

Significant ALCOSAN Modeling Milestones

- 2025 Subcatchment shapes, GIS sync, inflow deconstruction
- 2022 systemwide WQ model (RMA to EFDC)
- 2022 TY run time reduction (46% 35 to 16 hrs)
- 2021 Inflow file reduction (47% 3 to 1.4 GB)
- 2019 Clean Water Plan (Regulatory Compliance Model)
- 1991 First SWMM model (35 years ago)

Our Motivation: *Enhance the program management framework to keep supporting a growing, evolving system-wide model*

Accurate Field Data Improves Every Downstream Workflow

Field Reality

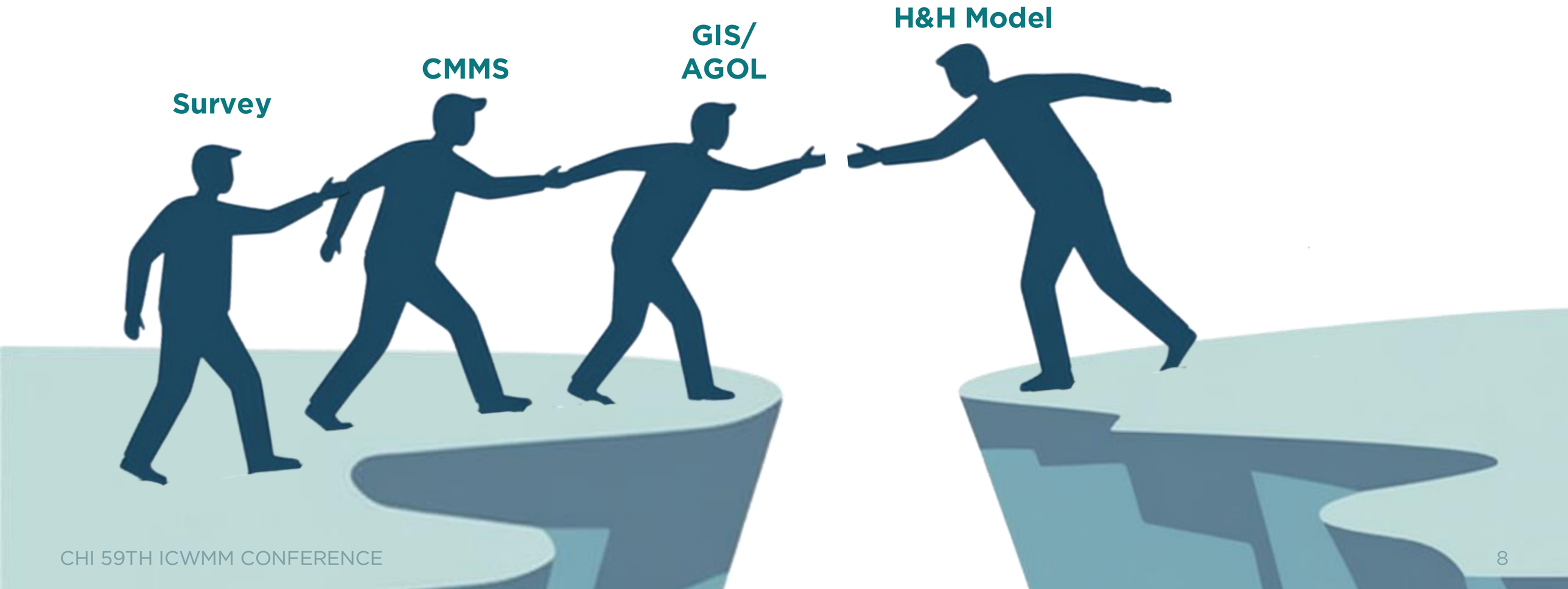
ALCOSAN Survey Technology
RTK-grade (Real-Time Kinematic) GPS data

Accurate Survey

Reliable GIS/CMMS Data

Improved Spatial Representation of the SWMM Model

*How do we **close the gap** between our data sources, GIS, asset management software, and H&H models?*

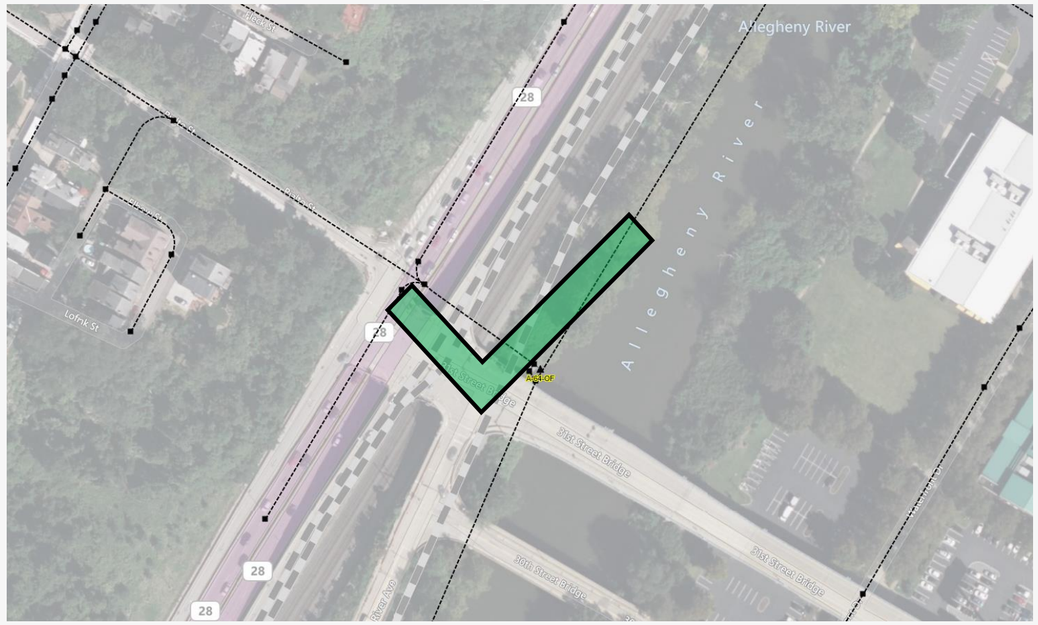


A One-Time Manual Alignment Sets The Stage For Automated Updates In The Future

CMMS/GIS Platform

- Spatial and ID misalignments limit automated sync processes

CMMS/GIS Platform



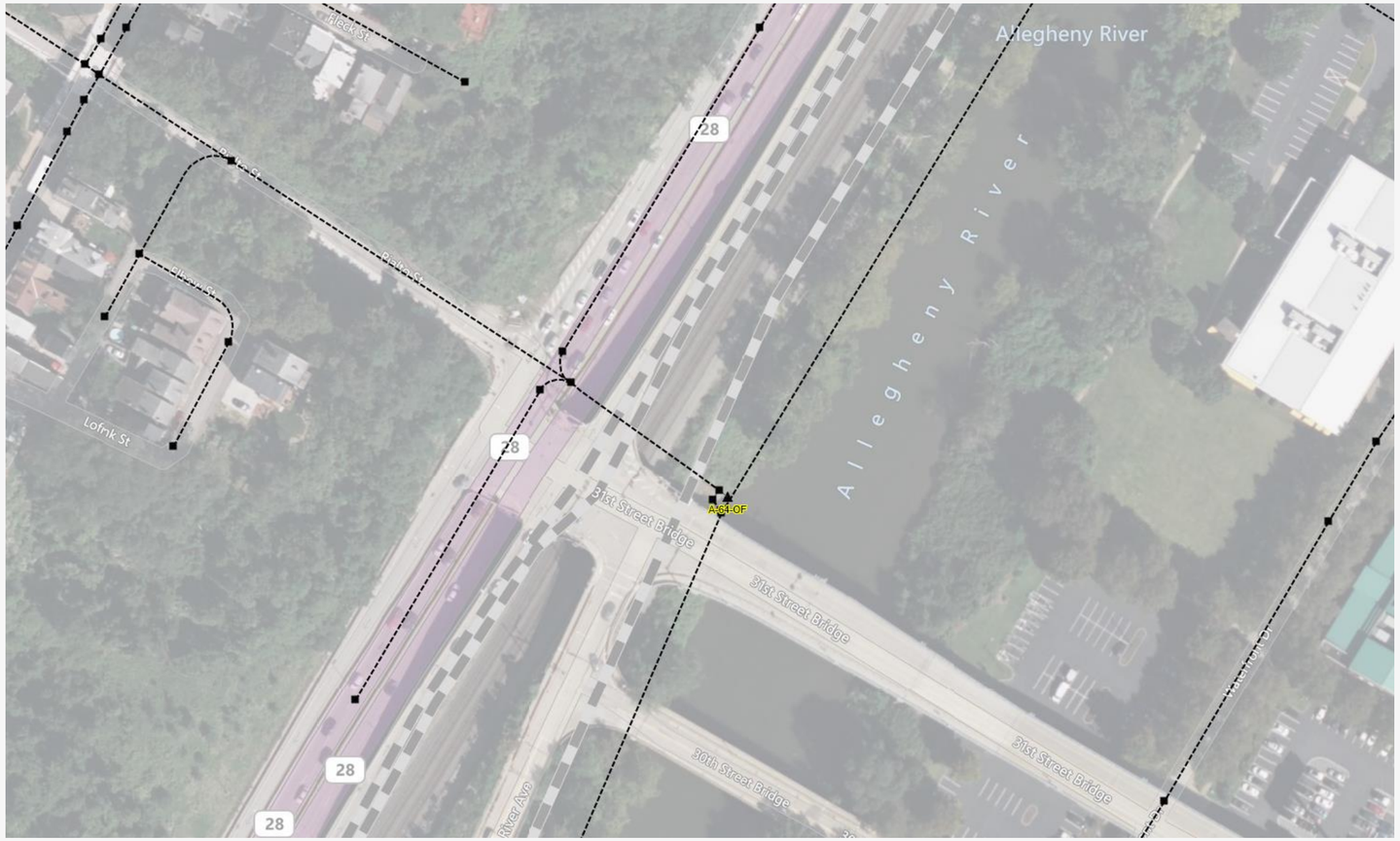
- Well aligned Spatial footprints and ID fields enables automated sync processes for future updates

2025 IAM ID and Spatial Alignment Sync

The Process:

- Align user-defined ID fields with the latest GIS Data
- Align model's spatial footprint with the GIS Data
- At this phase - no changes to model functionality, connectivity, or parameters

CMMS/GIS Platform



2025 IAM ID and Spatial Alignment Sync

IAM ID

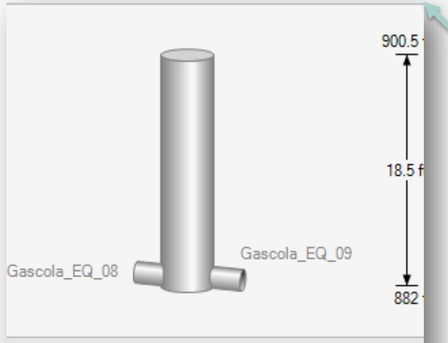
Asset Management System Data

Post Sync Notes

Sync Date

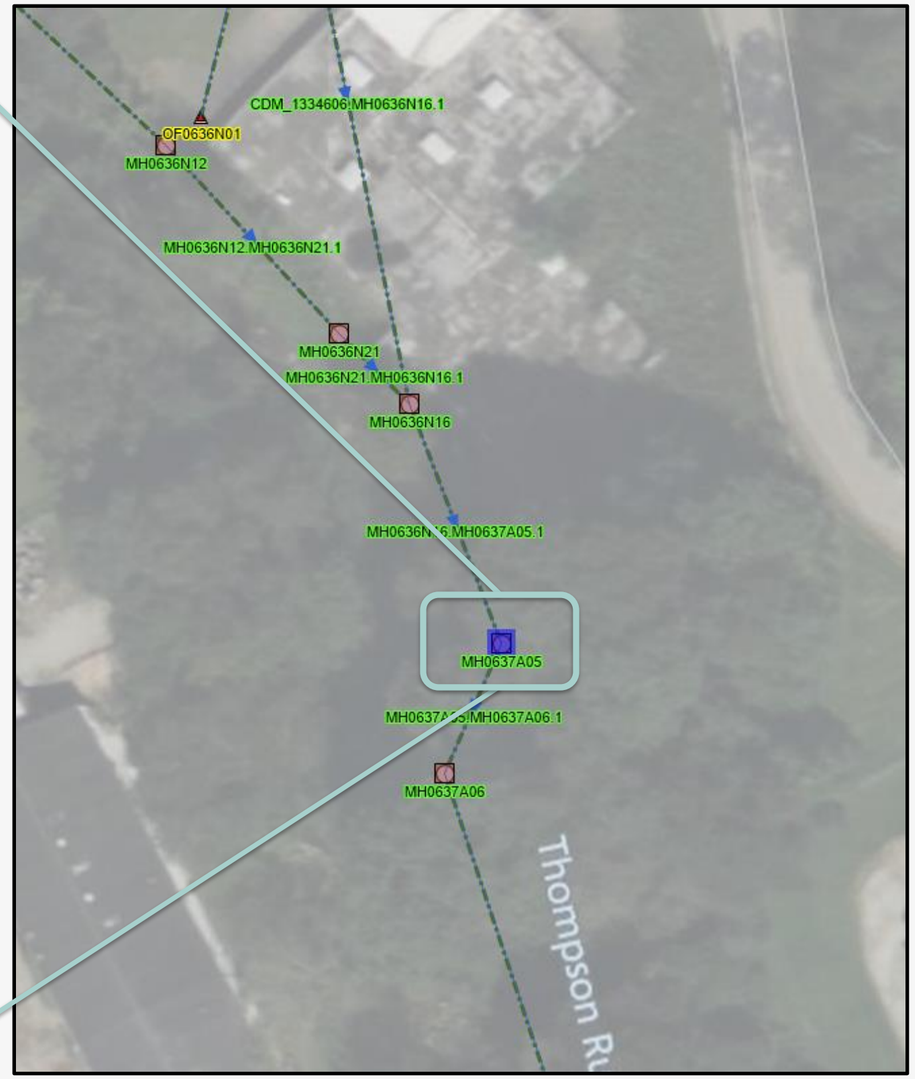
Legacy IAM ID

Junction Example



Junction: Gascola_EQ_MH119

Surcharge Depth (ft)	0
Ponded Area (ft²)	0
Inflows	
Baseline (mgd)	0
Baseline Pattern	
Time Series	
Scale Factor	1
Average Value (mgd)	0
Time Pattern 1	
Time Pattern 2	
Time Pattern 3	
Time Pattern 4	
Hydrograph	
Sewershed Area (ac)	0
Source Data	
IAM_ID	MH0637A05
IAM_RIM	897.816
IAM_DEPTH	885.816
PRE-SYNC INFO	
PRE_SY_DES	
PRE_SY_TAG	
DM_PARAM	
POST-SYNC INFO	
POS_SY_NOTE1	NA
POS_SY_TAG	
SYNC_DATE	9/25
Legacy_IAM_ID	LBs_1291484
User_Defined_Tags	
OLD_TAG	TC
BASIN	TT
PROPOSED_ASSET	EX
MOD_TYPE_DATE	EX-NA
Results	



2025 IAM ID and Spatial Alignment Sync

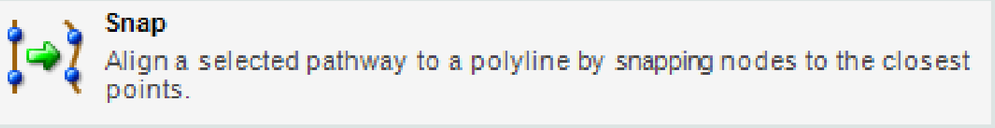
Key Data: PCSWMM Model, Export of IAM Database
Key Processes: Manual Review, GIS based adjustment via spatial join

Review Process:

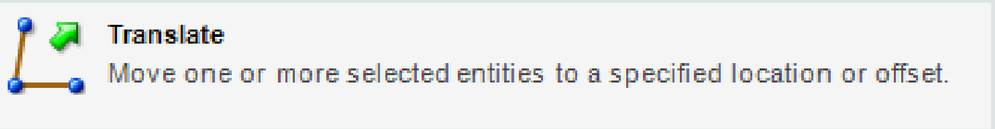
- Cross check IAM ID (IAM Dataset vs. Model IAM ID Field)
- Cross check attributes (pipe length, pipe diameter)

PCSWMM Tools Utilized:

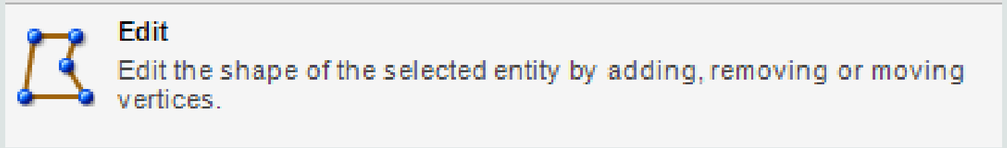
Snap:



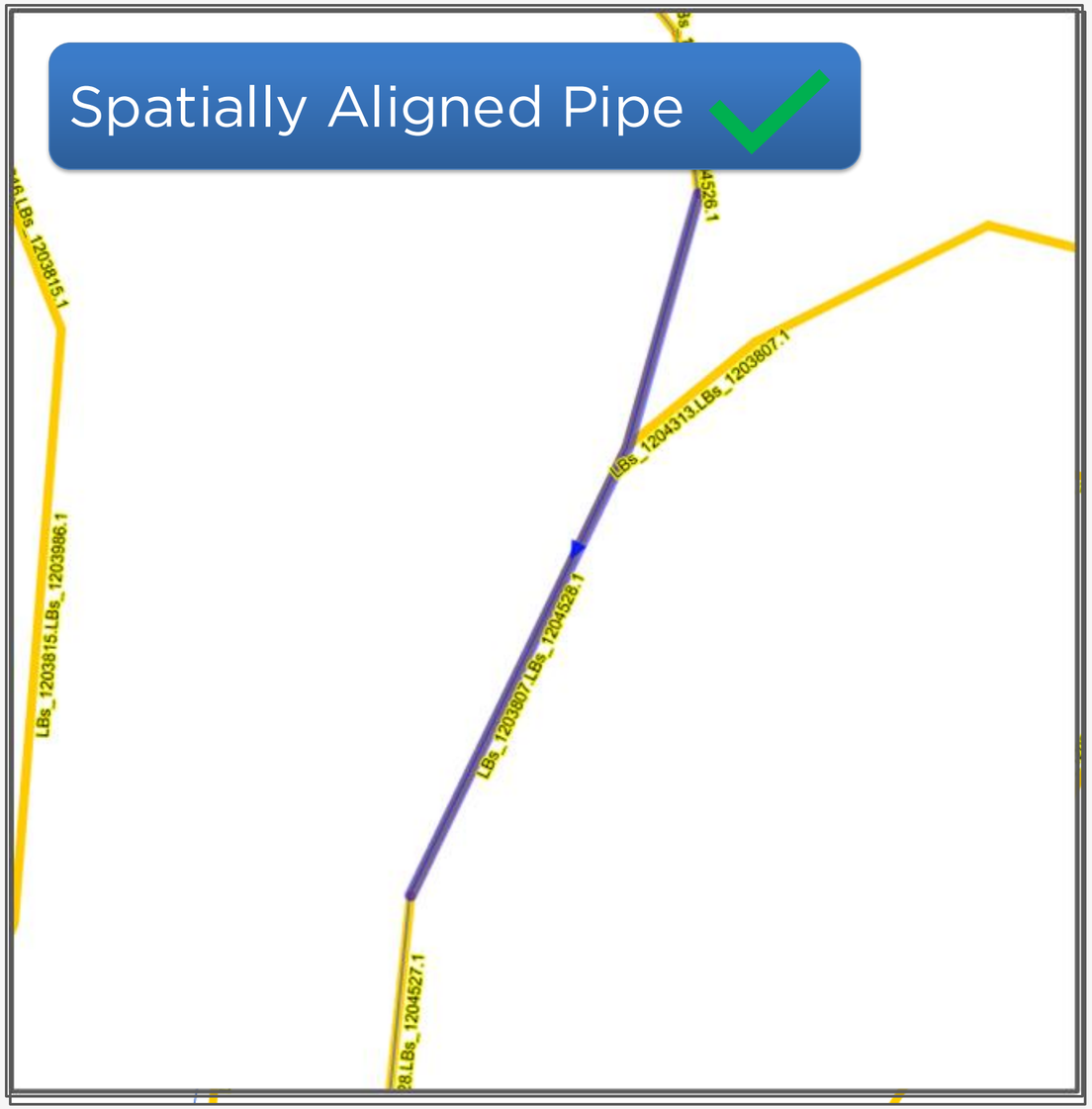
Translate:

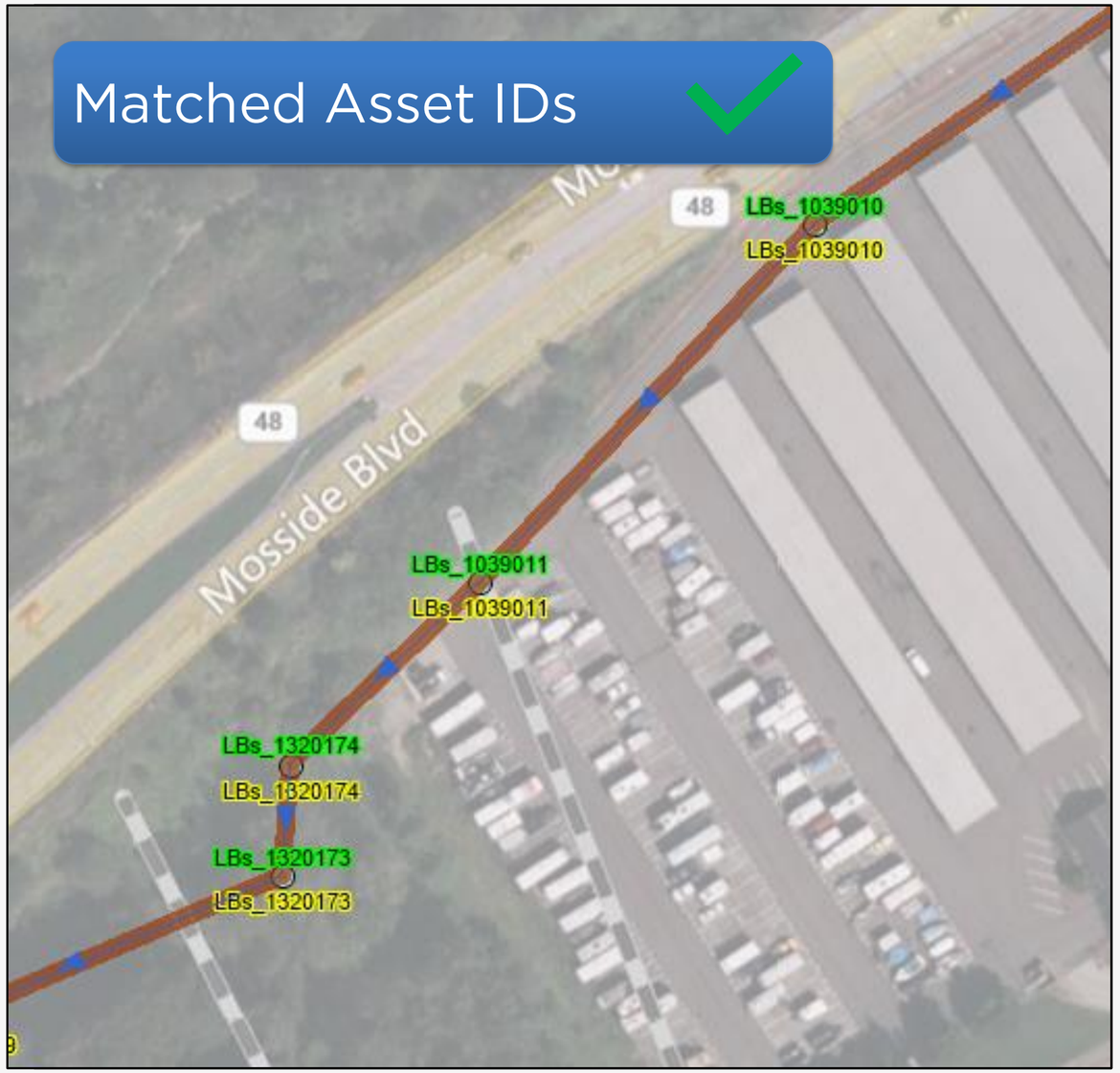


Edit → Add Vertices:

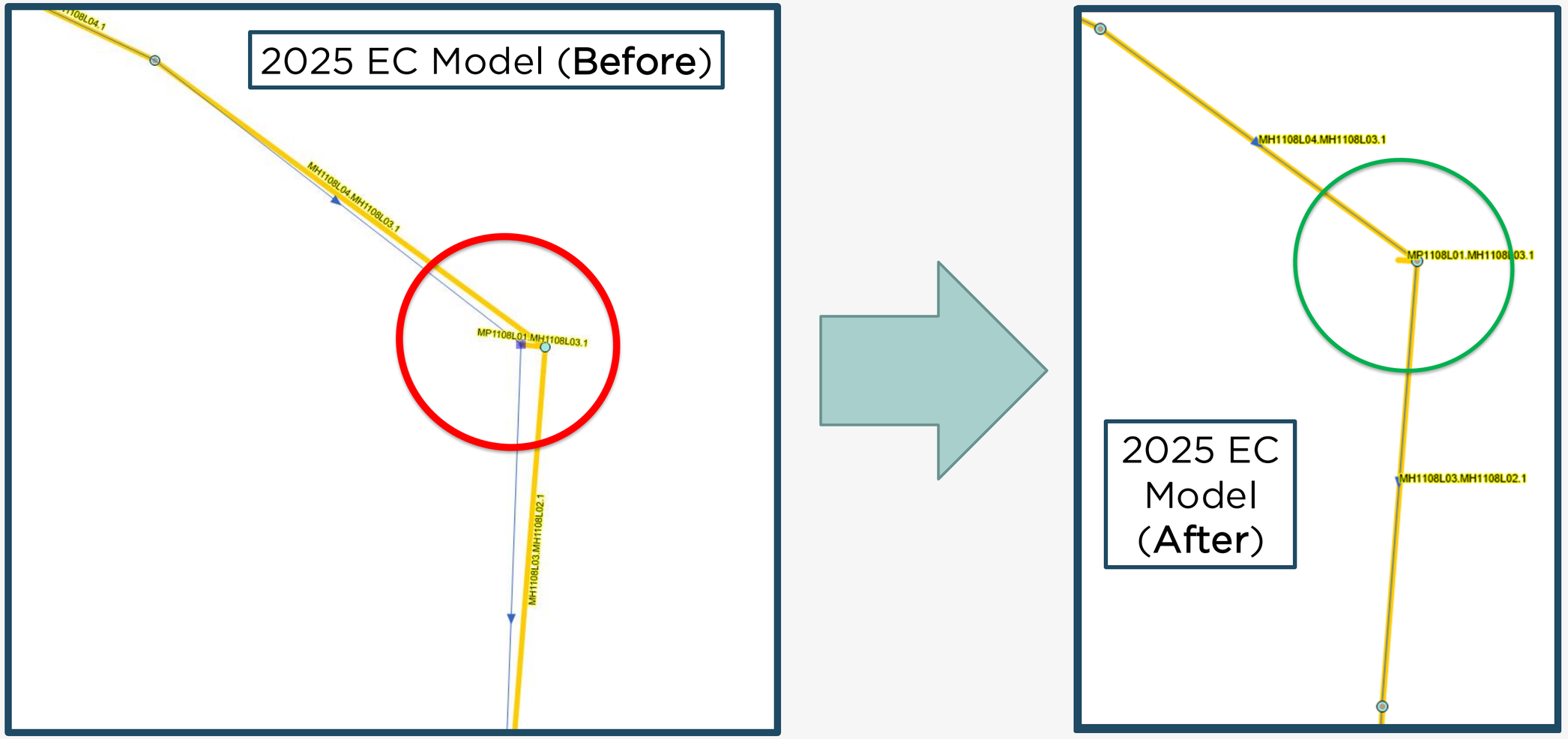


A Repeatable Process Reducing Discrepancies



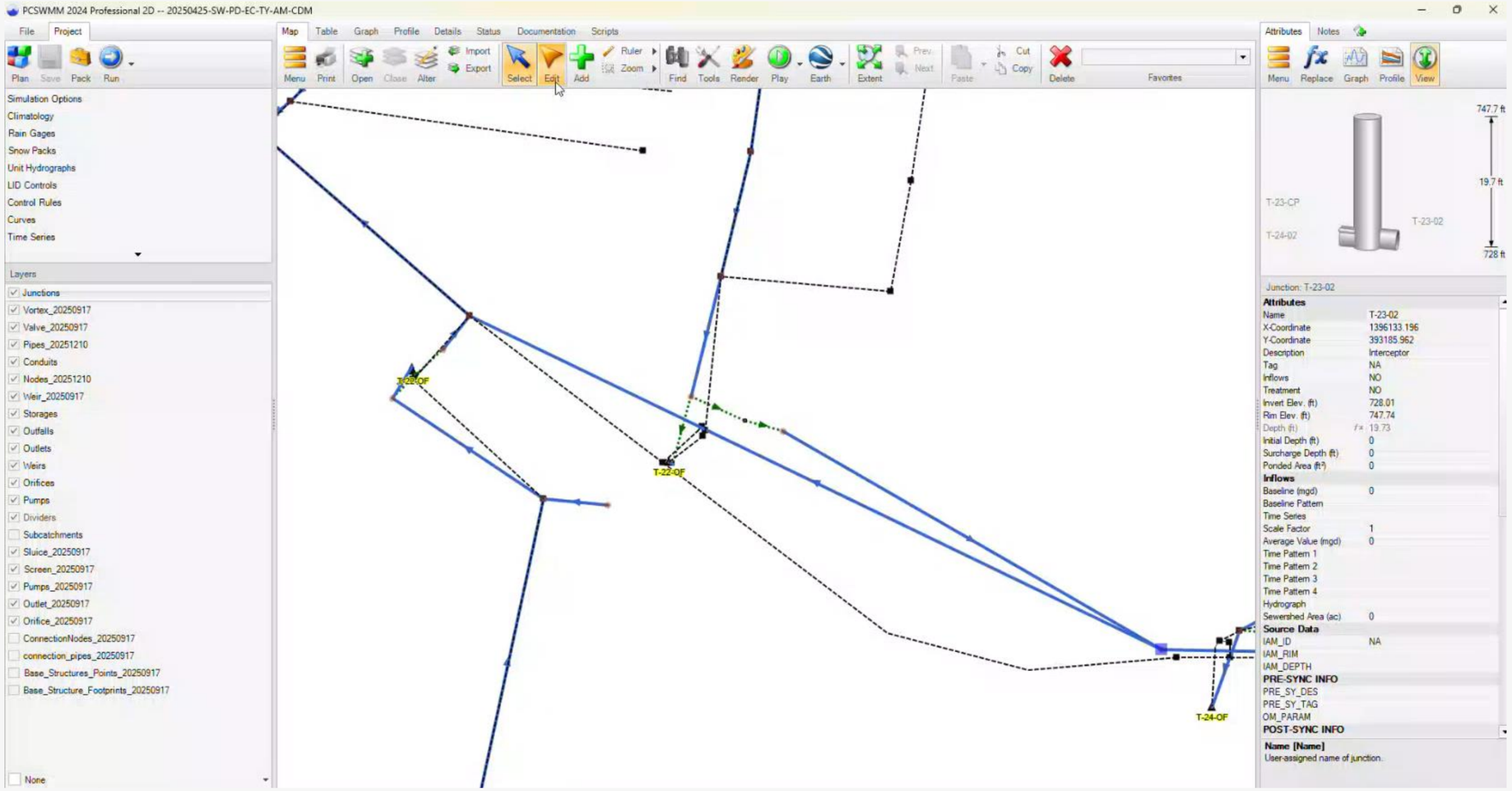


Simple Resolution Example

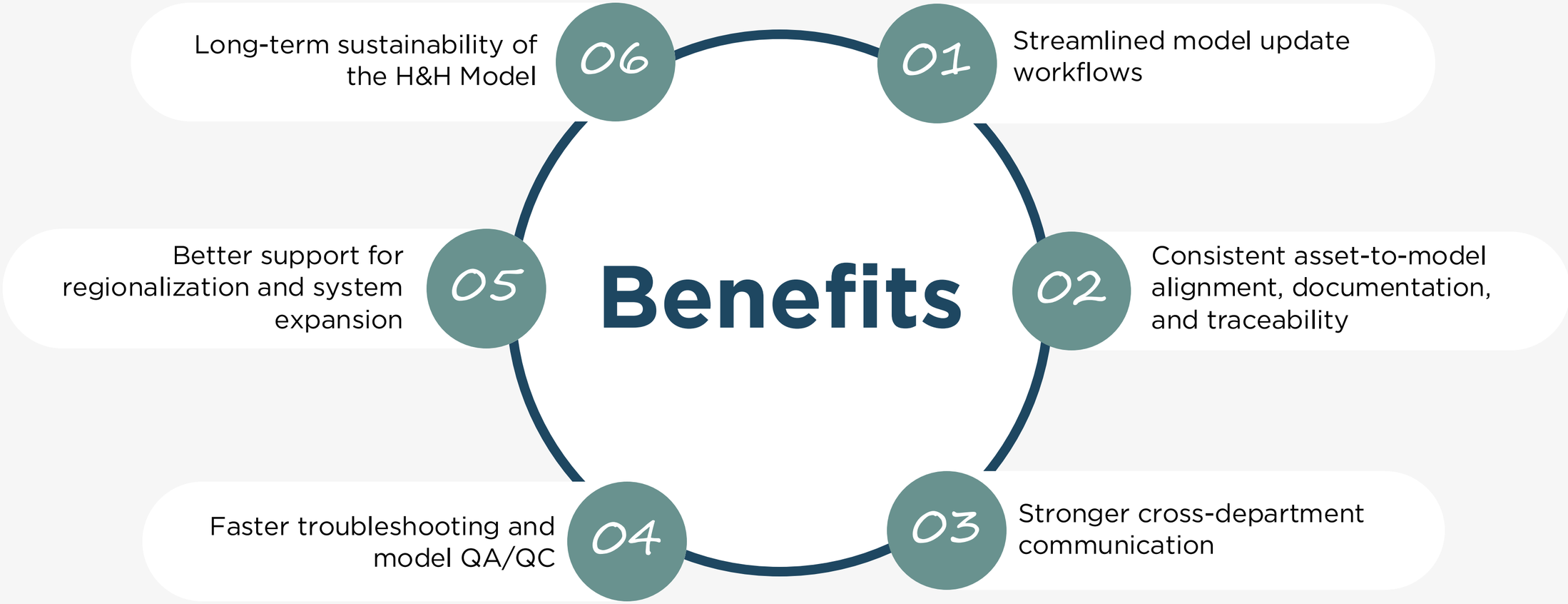


Moving junction snaps both model conduits to IAM data alignment

High Complexity Resolution Example



Closing the Data–Model Gap Builds Lasting Modeling Confidence



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Thanks

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Gracias

Merci!

धन्यवाद

DANKE

谢谢

Cannot wait to answer your questions after the session!

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