

# Revit for P&IDs

A New Perspective on Design Synchronization for Water Projects | CES320823



Brian Melton | Technology Evangelist



**BLACK & VEATCH**





**BLACK & VEATCH**

**Global Engineering & Construction Company  
Founded in 1915**

**BLACK & VEATCH**

**POWER | WATER | OIL & GAS | TELECOM | FEDERAL**



# AGENDA

## WHY

FOCUS ON WHAT WAS  
IMPORTANT

## WHAT

WHAT DID WE PRODUCE  
AND WHAT WAS THE VALUE

## HOW

HOW DID WE USE REVIT,  
DYNAMO, FORGE &  
MICROSOFT

## NOW

LESSONS LEARNED AND  
NOW WHAT

# Expectations



## This is NOT:

- ...a commercially available thing
  - ...a pitch to convince you to change anything
- 



## This IS:

- ...a demonstration of possibilities
- ...a challenge to the status-quo
- ...an experiment
- ...hopefully an inspiring fresh perspective



# Learning Objectives



- Opportunity for Revit to successfully create intelligent schematic documents
- New opportunities for using Dynamo to support schematic documents
- How Forge & Azure help improve data access for team members

# BIM in the Water Market

[Download a Copy](#)



SmartMarket Report

**DODGE** DATA & ANALYTICS



## The Business Value of BIM for Water Projects

Premier Partners:



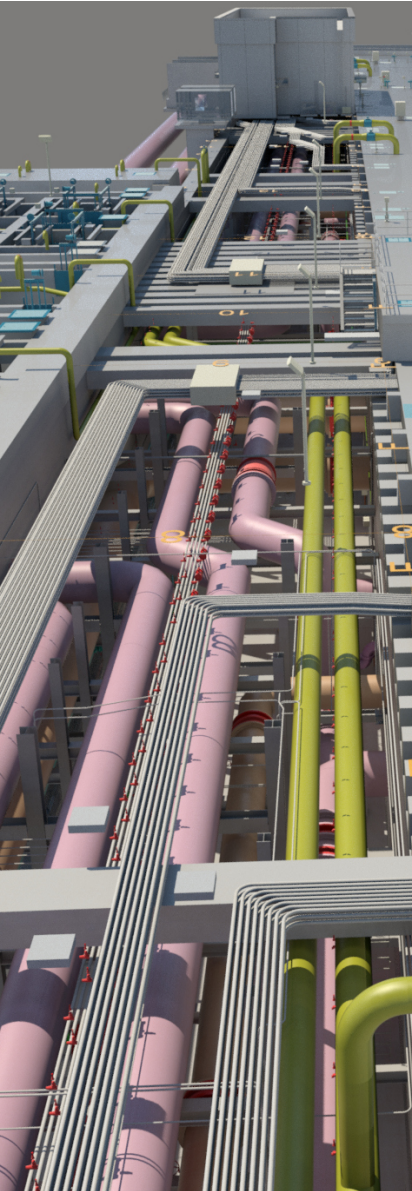
Supporting Partner:



Research Partners:





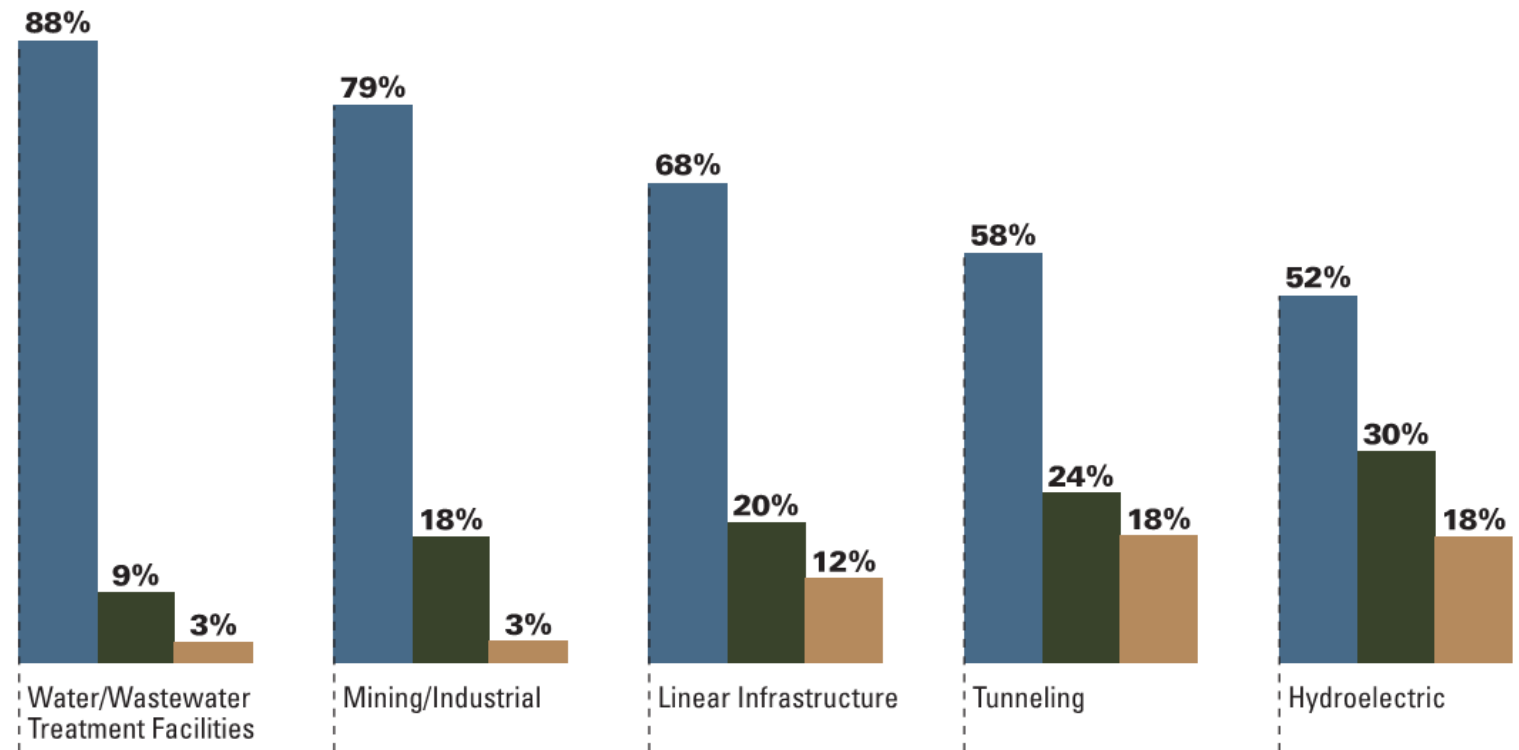


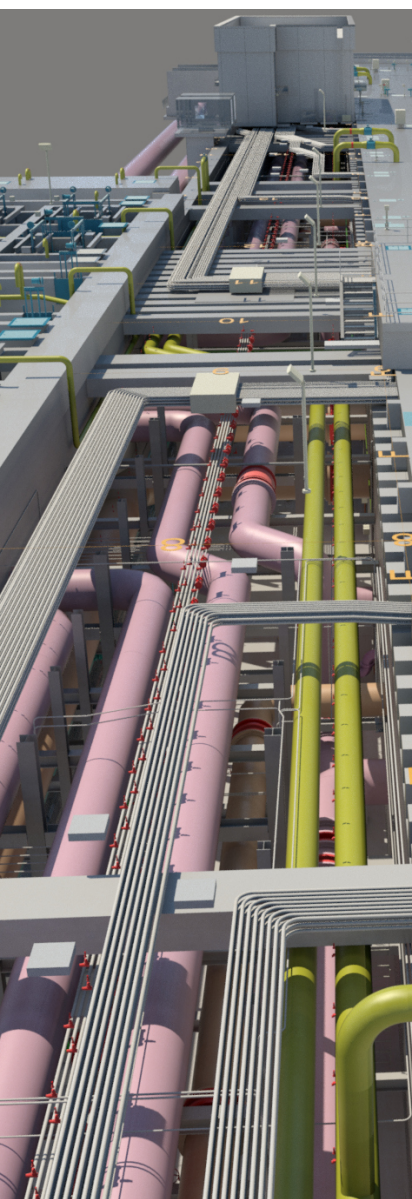
# Industry Benchmark

## Use of BIM by Project Type (Current and Expected Future Use)

Dodge Data & Analytics, 2018

■ Currently Use BIM ■ Do Not Use BIM but Plan to Begin Within Two Years ■ Do Not Use BIM and Do Not Plan to Within the Next Two Years





# Industry Benchmark

## Owners

- The highest percentage of owners (58%) expect to invest in developing BIM standards for project teams.

## Top Project Benefits of BIM Use (According to All Respondents)

Dodge Data & Analytics, 2018



## Top Investments Related to BIM (According to Engineers and Contractors)

Dodge Data & Analytics, 2018





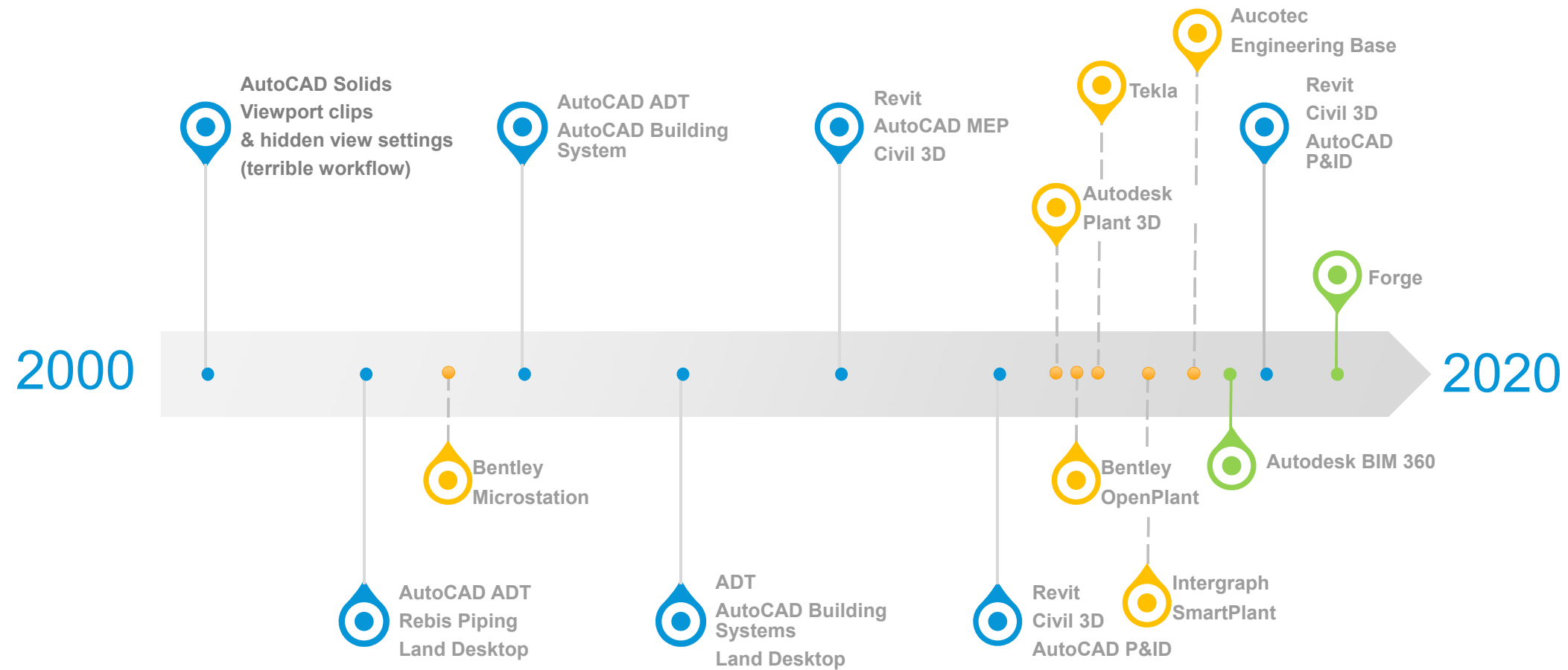
# WHY

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Refocus on what was important

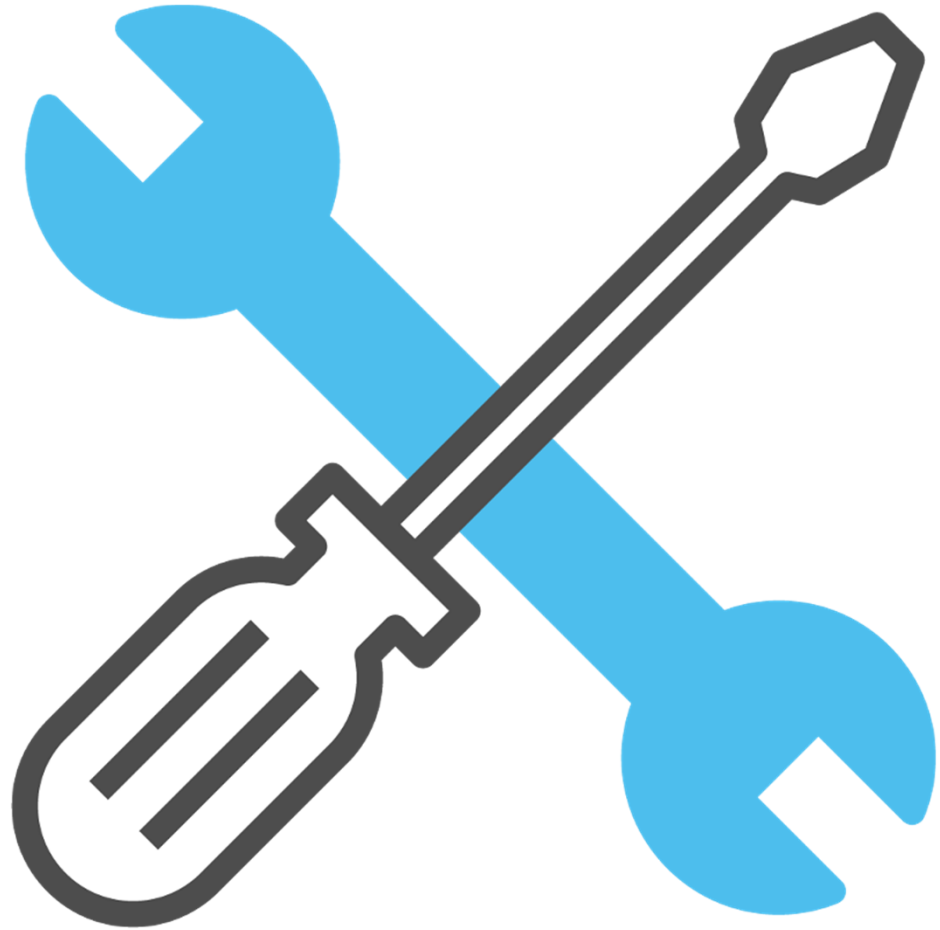


# Brief History

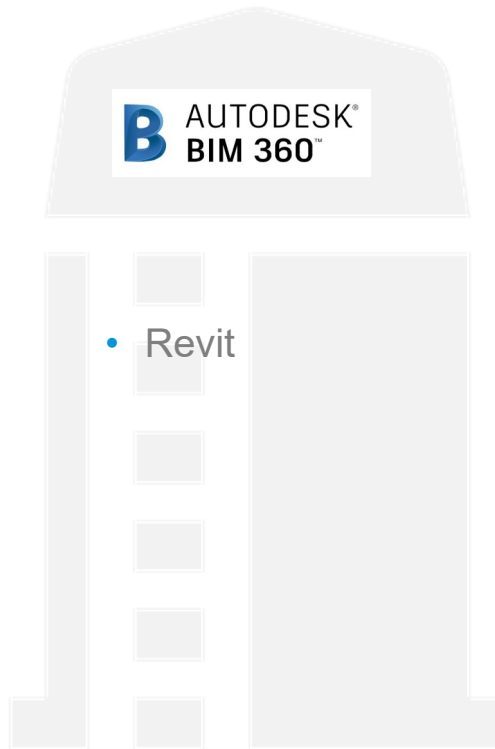
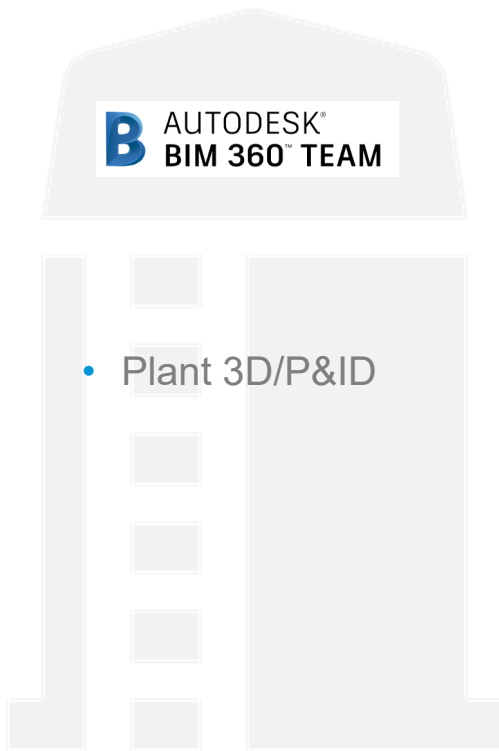


## BIM for Water @ BV

- Revit
- Civil 3D
- Plant 3D
- Infraworks
- ReCAP
- Autodesk BIM 360
- ProjectWise



# Torn Between Worlds







## A view through our lens

- Autodesk most commonly used in US water market, growing usage in APAC & UK
- Revit for 3D spatial modeling (including 3D process modeling)
- Autodesk Plant 3D for schematic P&IDs only
- Microsoft Excel is main interface for the equipment data
- Civil 3D used for site & buried utilities
- Growing usage of BIM 360

YOUR PERSPECTIVE MAY DIFFER



## Define the problem?

- Connectivity across project artifacts
- Difficult to get to the data
- Excel creates opportunity for errors & omissions
- Data explosion – humans can't check it all

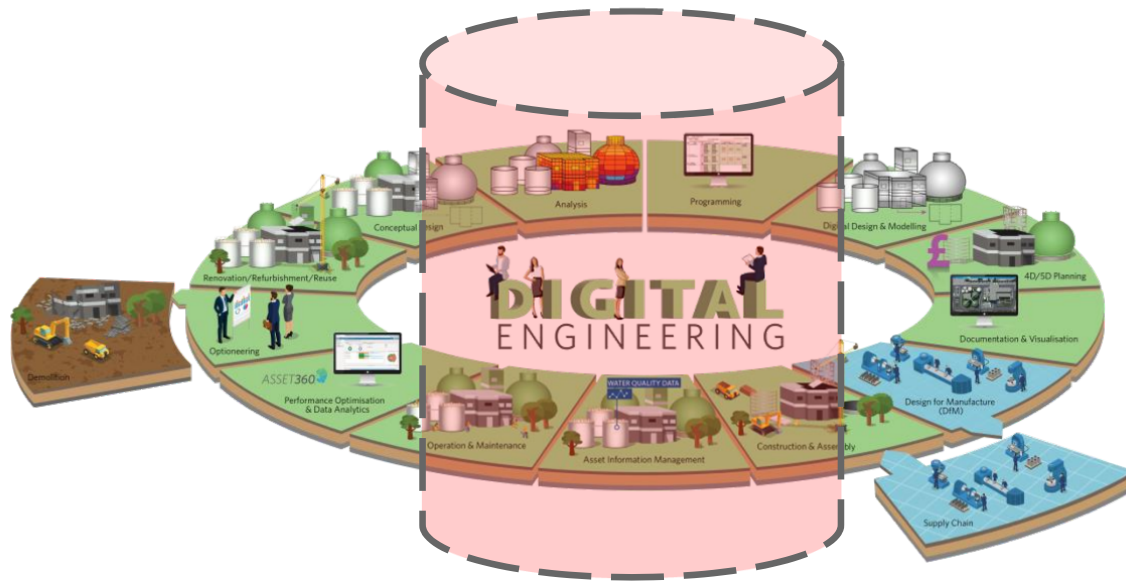
# WHAT

There's an app for that (now)



# What We Wanted

Where's the data?



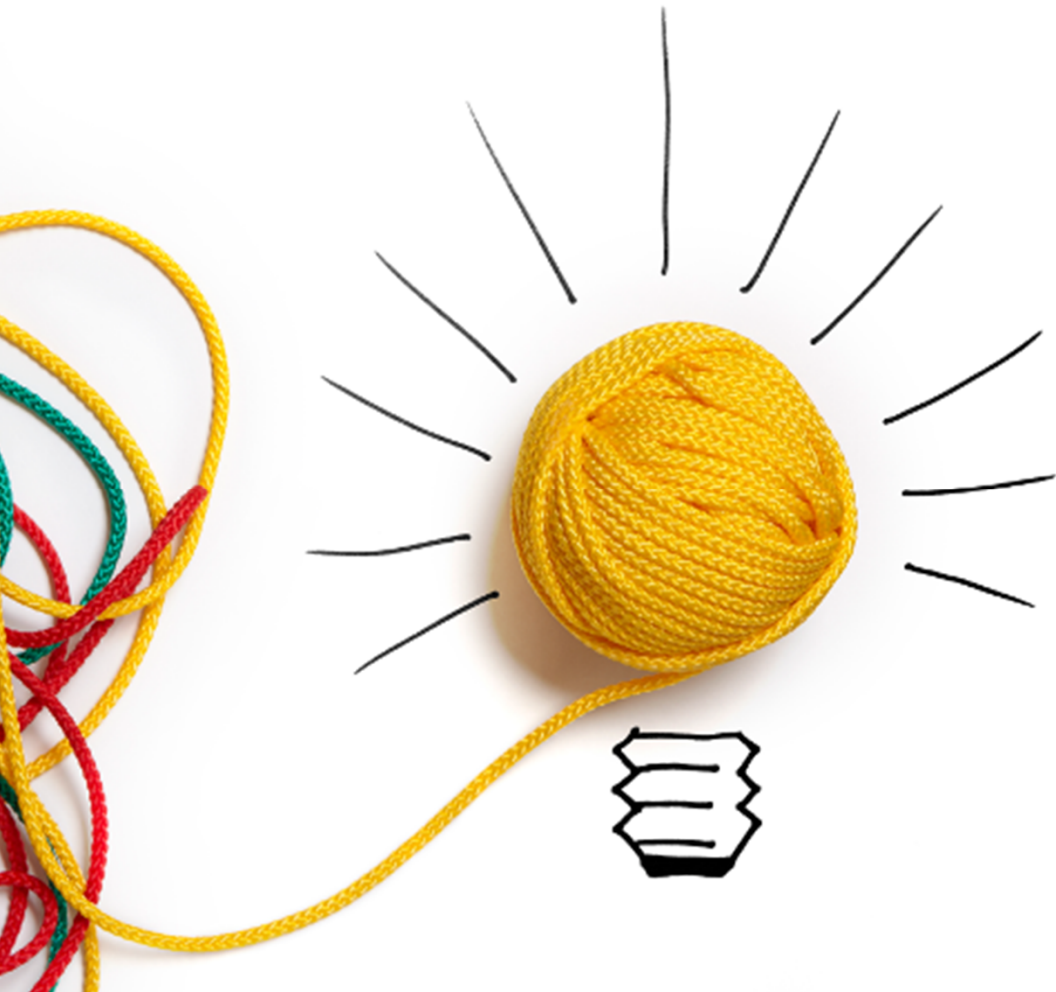
WE WANTED **BIM**... CENTRAL SOURCE OF DATA

## REALIZATION:

- **Creating** data and **storing** data wasn't the problem
- Missing a way to **manage** and **access** data at the project level
- Value in **owning** the data ourselves



# Refocus: What was Important to Us?



## DATA-DRIVEN PROCESSES

- Real-time equipment data
- We own the data, not a specific application

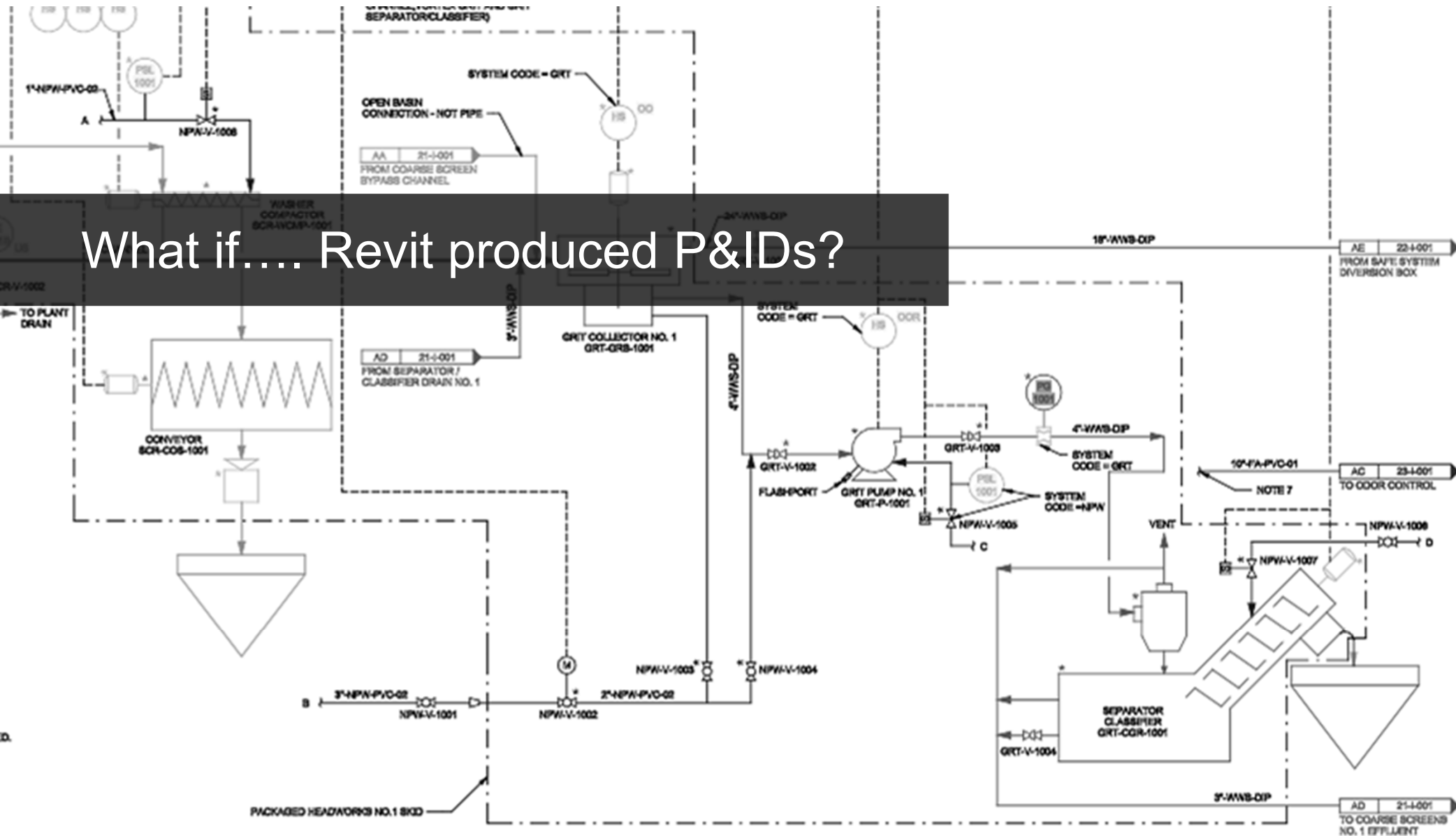
## SIMPLIFIED ACCESS

- No information should be more than a single click away

## MORE CONFIDENCE IN FULLY SYNCHRONIZED DESIGN

- Improved Awareness of Sync Status
- Proactive approach for QC
- Provide automation opportunities

What if.... Revit produced P&IDs?





+



+



=

**Game-Changing**

## What makes now different?

- We weren't first, we've heard of schematics being drawn in Revit previously.
- 3<sup>rd</sup> party add-ins exist that can help facilitate some parts of the schematic production within Revit
- Revit by itself, was interesting but not “game-changing”



- Wastewater and Water Treatment
- Replacement of Existing Facility
- Required to Meet Newer Water Mandates
- 8 Million Gallons per Day Peak Flow



- +/- 60 P&ID drawings
- +/- 3000 Tagged Assets

# Morro Bay Water Reclamation Facility

Design + Construction Schedule 2018 - 2021







- Project Information
- Project Notebook
- Issues
- Design Coordination
- Markups
- Reviews
- References

Project Files

Material Quantities

Autodesk BIM 360

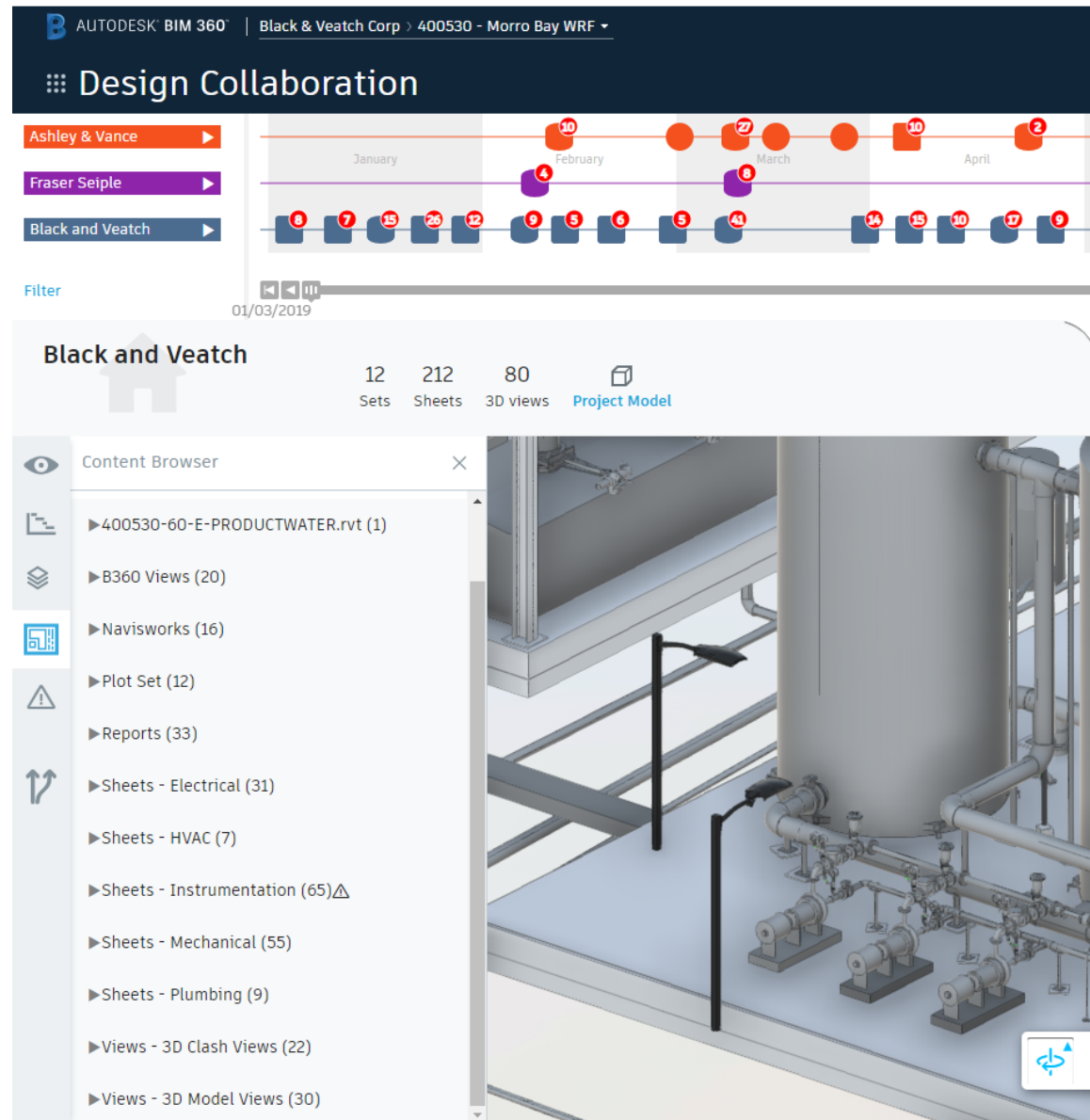
Assemble Systems

Custom App (Forge APIs)

# BIM 360 Out-of-the-Box

It works, use Revit & BIM 360

- Hosted workshared files
- Facilitated collaboration between several parties
- Simplified viewing of models and drawings via Web
- Provided Opportunity to use Forge



## Design Collaboration

Black and Veatch

12 Sets 212 Sheets 80 3D views Project Model



Content Browser



Search



Sets

► 400530-60-E-PRODUCTWATER.rvt (1)

► B360 Views (20)

► Navisworks (16)

► Plot Set (12)

► Reports (33)

► Sheets - Electrical (31)

► Sheets - HVAC (7)

▼ Sheets - Instrumentation (65)▲

21-I-001 - HEADWORKS AREA - HEADWORKS

21-I-002 - HEADWORKS AREA - HEADWORKS

22-I-001 - HEADWORKS AREA - FINE SCREE

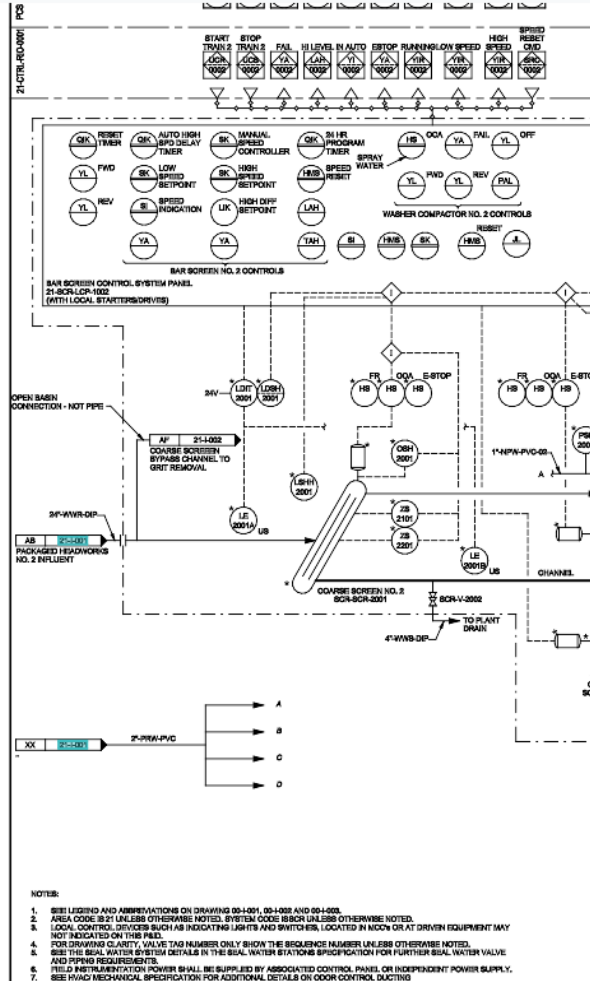
23-I-001 - HEADWORKS AREA - ODOR CONTR

31-I-001 - TREATMENT AREA - BNR BASINS P

31-I-001 - TREATMENT AREA - BNR BASINS P

31-I-002 - TREATMENT AREA - BNR BASINS P

31-I-002 - TREATMENT AREA - BNR BASINS P



## BIM 360 Out-of-the-Box

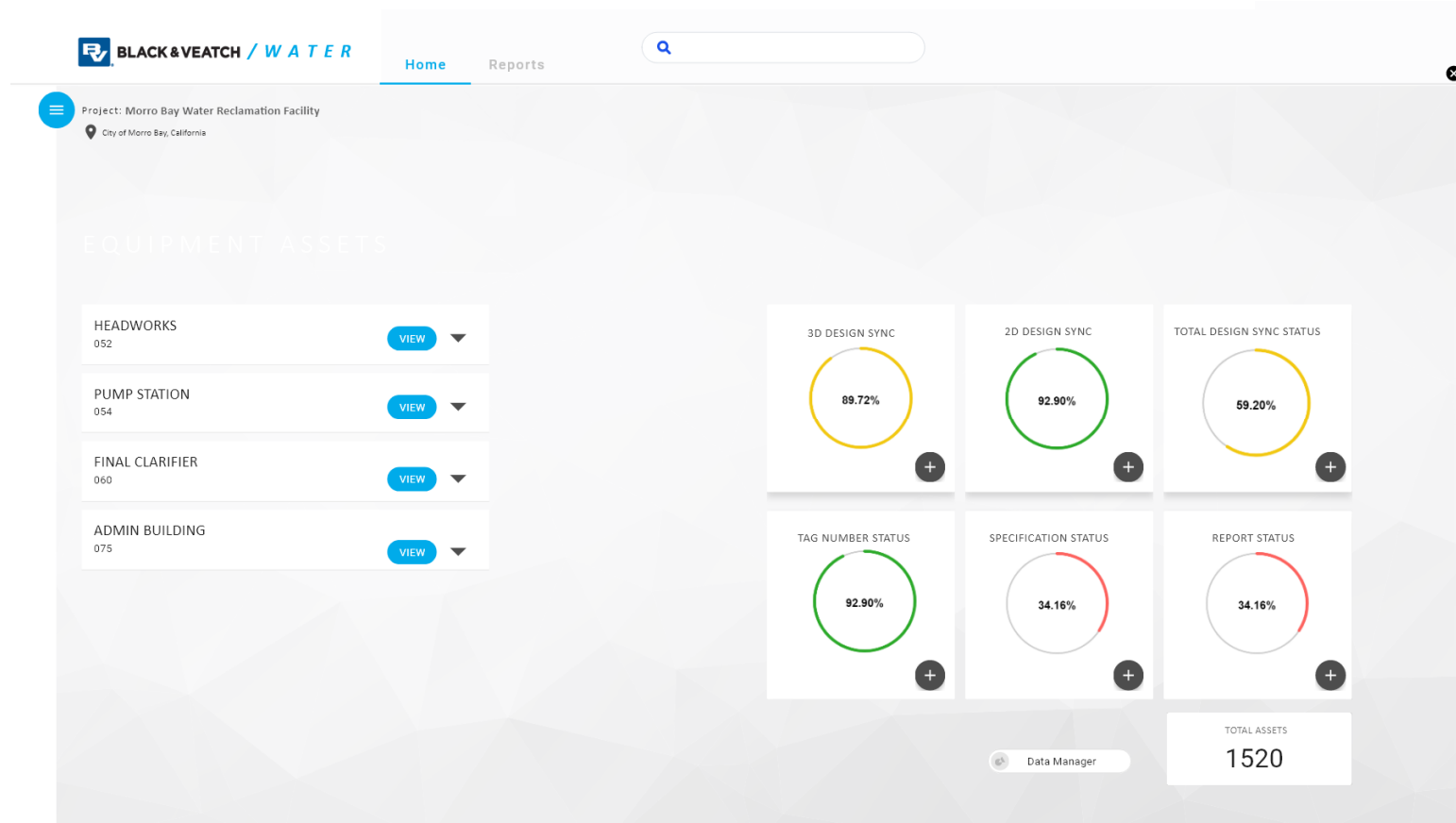
### Consolidating Design Platforms Added Value

- P&ID drawings via same web project as Revit data
- Intelligent Navigation
- Drawing Index Sheets

# Custom App | OneClick



- Real-time data
- Simplified access

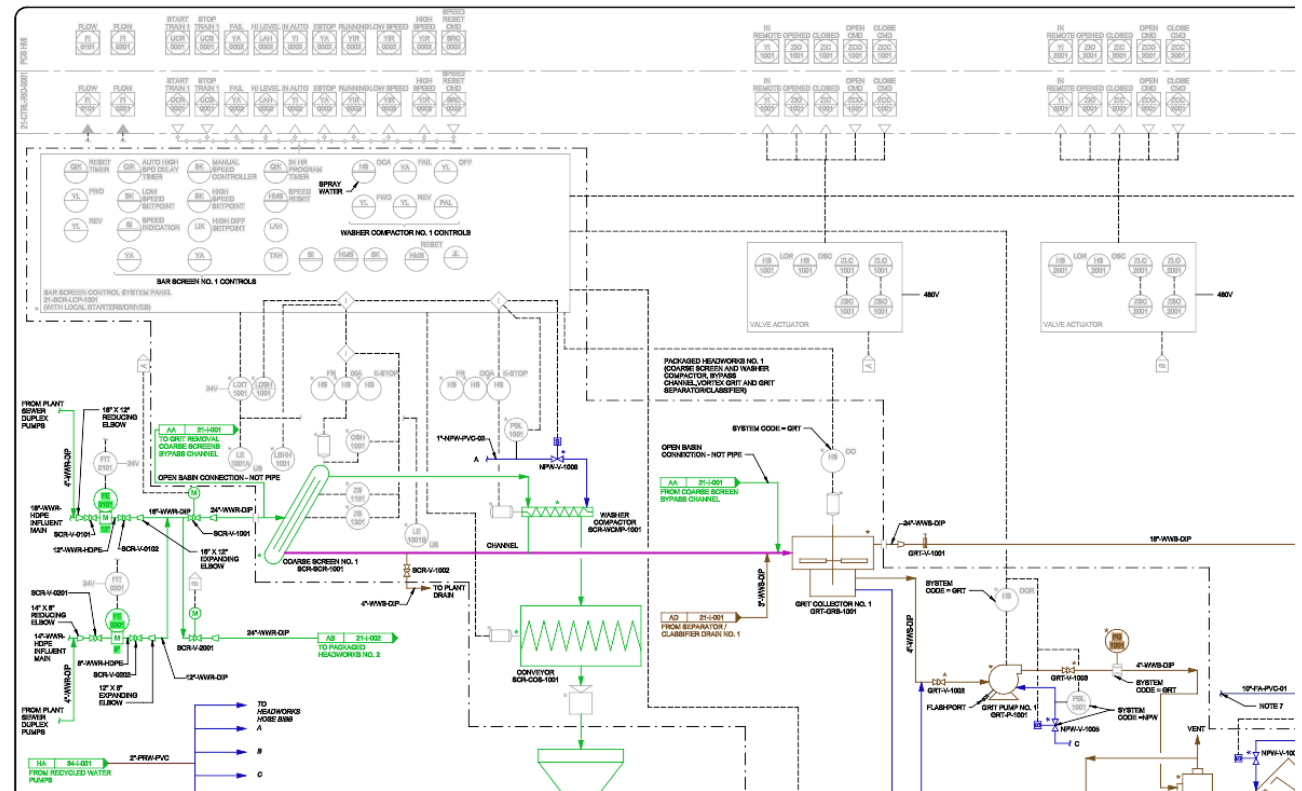




# Forge App | Visualize & Interact with Data

## What does data-driven look like?

- Change how people can visually see and explore data



Properties

31-I-001 - TREATMENT AREA

40 64 00 Input/Output (I/O)

Location: 30-MBR : V 87 Last Modified: 2019-11-02

☒ Filter by drawing

Item Number	I/O Type	Description	Field Device	Controller ID	Service Description	Analog Signal Type	Analog Range	Analog P
0	AO	SPEED SETPT	VFD1001	80-CTRL-PLC-0001	BASIN 1 MBR FEED PUMP SPEED SETPT	4-20 mA		2-WIRE
0	DI	IN REMOTE	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE IN REMOTE	NA	NA	NA
0	DI	OPEN	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPENED	NA	NA	NA
0	DI	CLOSED	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE CLOSED	NA	NA	NA
0	DO	OPEN CMD	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPEN COMMAND	NA	NA	NA
0	DO	CLOSE CMD	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE CLOSE COMMAND	NA	NA	NA
0	DI	IN REMOTE	31-BNR-V-1001	31-RIO-0001		NA	NA	NA
0	DI	OPEN	31-BNR-V-1001	31-RIO-0001		NA	NA	NA
0	DI	CLOSED	31-BNR-V-1001	31-RIO-0001		NA	NA	NA
0	DO	OPEN CMD	31-BNR-V-1001	31-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPEN COMMAND	NA	NA	NA
0	DO	CLOSE CMD	31-BNR-V-1001	31-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE CLOSE COMMAND	NA	NA	NA

Properties

Select a 2d view

31-I-001 - TREATMENT AREA -

Sheets

31-I-001 - TREATMENT AREA - BNR BASINS P&ID BASIN 1 & RAS DEOX

31-I-002 - TREATMENT AREA - BNR BASINS P&ID BASIN 2

31-I-003 - TREATMENT AREA - BNR BASINS P&ID WAS SYSTEM

31-I-004 - TREATMENT AREA - BNR BASINS P&ID PROCESS AIR BLOWERS

32-I-001 - TREATMENT AREA - MBR SYSTEM P&ID MEMBRANE BASIN 1

32-I-002 - TREATMENT AREA - MBR SYSTEM P&ID MEMBRANE BASIN 2

32-I-003 - TREATMENT AREA - MBR SYSTEM P&ID FILTRATE PUMP, BASIN 1

32-I-004 - TREATMENT AREA - MBR SYSTEM P&ID FILTRATE PUMP, BASIN 2

32-I-005 - TREATMENT AREA - MBR SYSTEM P&ID FILTRATE MANIFOLD

32-I-006 - TREATMENT AREA - MBR SYSTEM P&ID MBR SCOUR AIR BLOWERS

32-I-007 - TREATMENT AREA - BNR BASINS P&ID BASIN DRAIN PUMPS

32-I-008 - MBR AREA - AIR COMPRESSOR SYSTEM

33-I-001 - TREATMENT AREA - RO FEED TANKS P&ID RO FEED TANKS

34-I-001 - TREATMENT AREA - RECYCLED WATER PS P&ID RECYCLE WATER PUMPS

Views

PID\_31-I-001

PID\_31-I-002

PID\_31-I-003

40 64 00 Input/Output (I/O)

Location: 30-MBR : V 87 Last Modified: 2019-11-02

Filter by drawing

Tag Number	Tag Number	Item Number	I/O Type	Description	Field Device	Controller ID	Service Description	Analog Signal Type
31-BNR-SC-1001	31-BNR-1001	0	AO	SPEED SETPT	VFD1001	80-CTRL-PLC-0001	BASIN 1 MBR FEED PUMP SPEED SETPT	4-20 mA
31-WAS-YI-1001	31-WAS-1001	0	DI	IN REMOTE	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE IN REMOTE	NA
31-WAS-ZIO-1001	31-WAS-1001	0	DI	OPEN	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPENED	NA
31-WAS-ZIC-1001	31-WAS-1001	0	DI	CLOSED	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE CLOSED	NA
31-WAS-ZCO-1001	31-WAS-1001	0	DO	OPEN CMD	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPEN COMMAND	NA
31-WAS-ZCC-1001	31-WAS-1001	0	DO	CLOSE CMD	V-1001	31-CTRL-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE CLOSE COMMAND	NA
31-BNR-YI-1001	31-BNR-1001	0	DI	IN REMOTE	31-BNR-V-1001	31-RIO-0001		NA
31-BNR-ZIO-1001	31-BNR-1001	0	DI	OPEN	31-BNR-V-1001	31-RIO-0001		NA
31-BNR-ZIC-1001	31-BNR-1001	0	DI	CLOSED	31-BNR-V-1001	31-RIO-0001		NA
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Color Options

Installed By

Quality Control

Choose color option

Color Property

ex: DES\_Sub Classification

ExistsValue

Clear Coloring

DESIGN-BUILDER

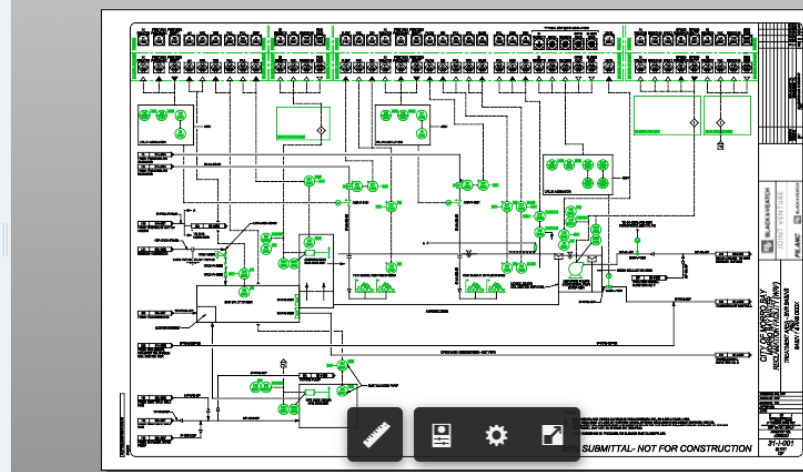
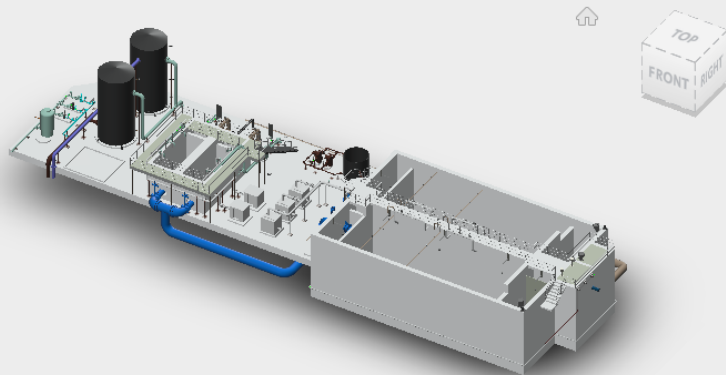
MBR SYSTEM SUPPLIER

PACKAGED HEADWORKS SUP

SAMPLE PANEL SUPPLIER

REVERSE OSMOSIS SYSTEM S

UV SYSTEM SUPPLIER



40 64 00 Input/Output (I/O) Location: 30-MBR : V 87 Last Modified: 2019-11-02

☒ Filter by drawing

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31-BNR-YI-1001	31-BNR-1001	0	DI	IN REMOTE	31-BNR-V-1001	31-RIO-0001		NA
31-BNR-ZIO-1001	31-BNR-1001	0	DI	OPEN	31-BNR-V-1001	31-RIO-0001		NA
31-BNR-ZIC-1001	31-BNR-1001	0	DI	CLOSED	31-BNR-V-1001	31-RIO-0001		NA
31-BNR-ZCO-1001	31-BNR-1001	0	DO	OPEN CMD	31-BNR-V-1001	31-RIO-0001	BASIN 1 SCUM COLLECTION BOX TO WAS WETWELL ISO VALVE OPEN COMMAND	NA
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### Color Options

Installed By

- Choose color option
- 2D/3D Sync Status
- Furnished By
- Include in Equipment List
- Include in Instrument List

Installed By

- Pipe Material Code
- Pipe and Valve Size
- Process Code
- System Code

Exists

Value

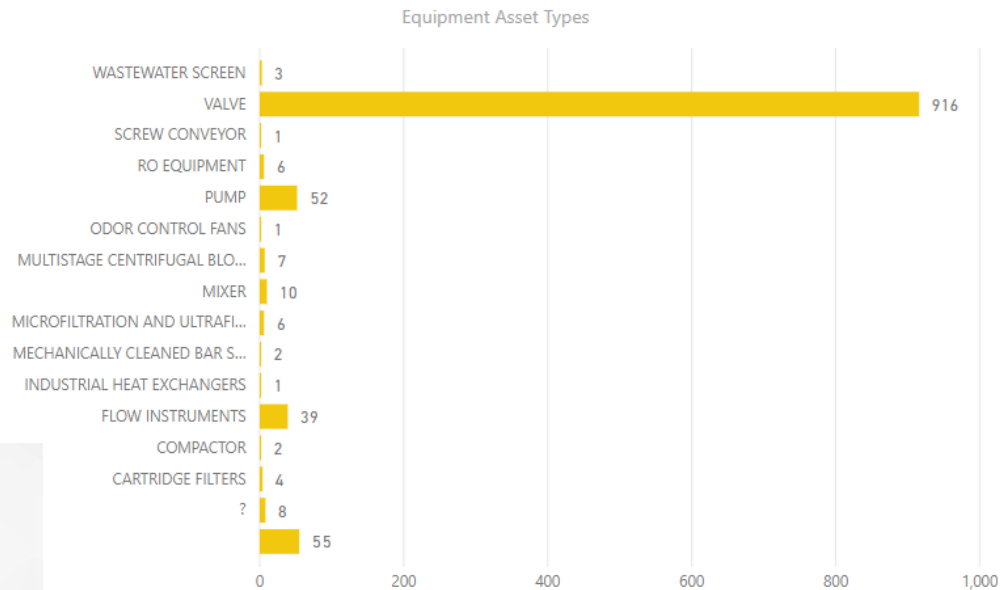
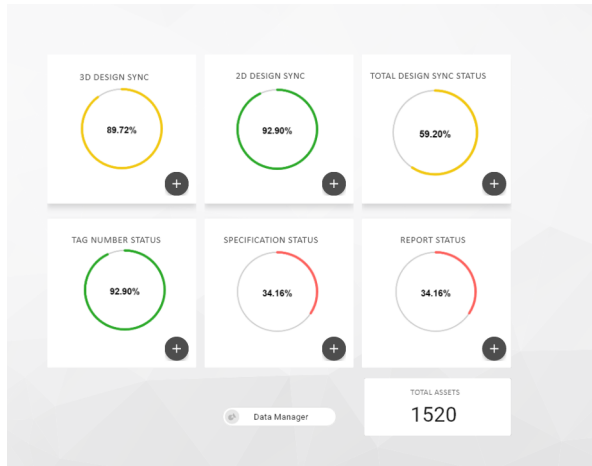
Clear Coloring

- DESIGN-BUILDER
- MBR SYSTEM SUPPLIER
- PACKAGED HEADWORKS SUP
- SAMPLE PANEL SUPPLIER
- REVERSE OSMOSIS SYSTEM S
- UV SYSTEM SUPPLIER

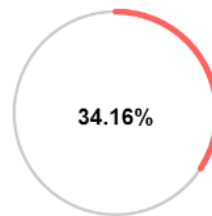
# Forge App | Proactive Quality Control

What does data-driven look like?

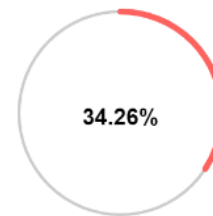
- Use the data to understand project health



% Assigned QTO Cost Code He...



% Assigned QTO Cost Code



Total Devices

1169

Total I/O

1191

Total Tagged Assets

1113



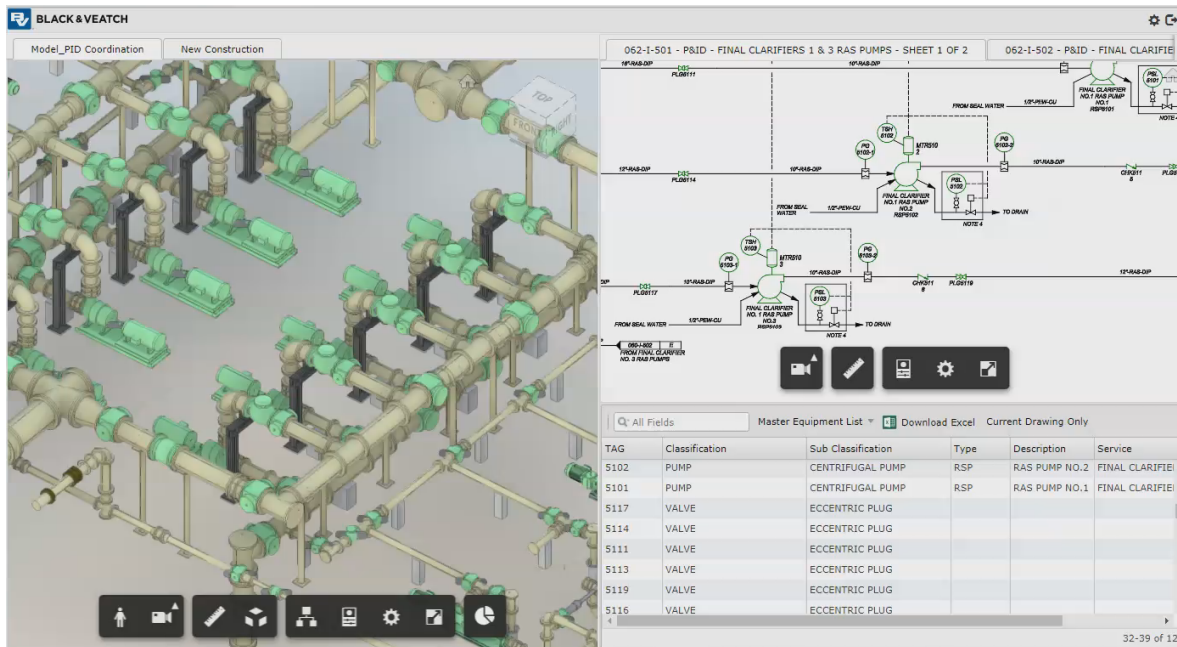
# HOW

The background of the slide features abstract, overlapping geometric shapes in shades of blue and orange. These shapes, which resemble stylized architectural structures or folded paper, are positioned primarily on the right side and bottom of the frame, creating a sense of depth and modernity. The overall color palette is light and airy, with the text and shapes standing out against a white background.

## Innovate and Experiment

DO SOMETHING, LEARN SOMETHING

# First we Prototyped it.... Prove it



Rapid prototype:

- Assistance Autodesk Forge Team
- Few conference calls
- 2-3 sprint cycles
- Relatively quick POC

## Scaled Solution... Plan it.



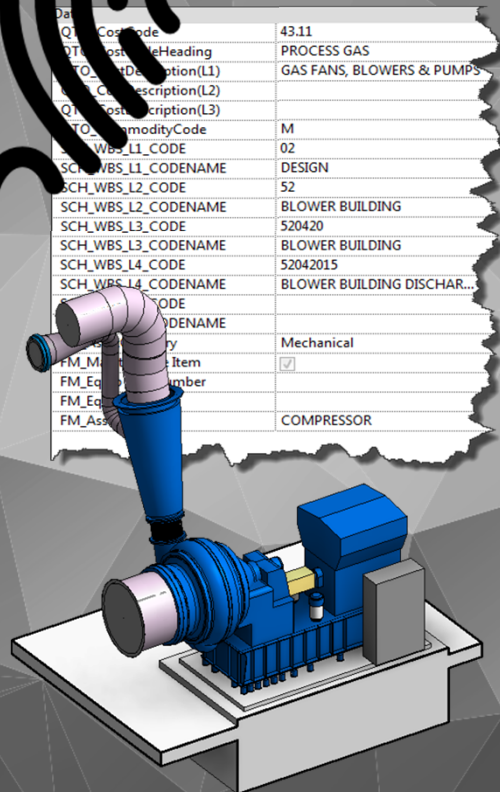
- Worked with Autodesk Consulting
- Couple of workshops

## Assembled a team... Do it



- Built internal team of several full-stack developers
- Autodesk consulting provided a few days of training on Forge APIs (via PAC credits)
- Learned agile scrum process on-the-fly
- 3 week sprint cycles
- MSFT DevOps supporting development workflows

# Digital Fingerprint for a Water Project



- What do we design?
- What do we need to know?
- When do you need it?
- Who is responsible for it?
- Where does it go?
- What is it used for?

**Estimated 30% of all data about an asset is reusable across projects.**



- Capturing assets and attributes
- Wrapping business logic around asset data and deliverables

Capturing assets and attributes

Wrapping business logic around asset data and deliverables

Project Phases										Responsibility/Ownership			Is this attribute reusable	When during the project lifecycle is	Deliverables						Comment or Description
Req. in this	Req. in this	Req. in this	Req. in this	Req. in this	Who is owner of entire system?	Who is responsible for populating attribute?	What system owns the attribute?	System Responsibility	Attribute Responsibility	Authoring Element	Shows on MEL?	Valve Schedule			Valve Schedule	Valve Schedule	Valve Schedule	Valve Schedule			

# What did we do in Revit | Content

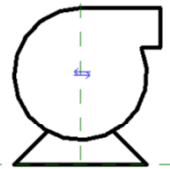


- All schematic elements created using “Detail Item” family category
- Detail Item for each asset class
- 2D objects with attribution built into family

- + PID-Pump-Centrifugal
- + PID-Pump-Vertical
- + PID-Valve-Actuator
- + PID-Valve-Air\_Release
- + PID-Valve-Ball
- + PID-Valve-Butterfly\_Industrial
- + PID-Valve-Check
- + PID-Valve-Combination\_Air
- + PID-Valve-Diaphragm
- + PID-Valve-Gate-Electric
- + PID-Valve-Globe
- + PID-Valve-Press\_Reducing-Self\_Act
- + PID-Valve-Rupture\_Disc
- + PID-Valve-Solenoid
- + PID-Valve-Vacuum\_Breaker

The screenshot shows the 'Family Types' dialog box in Revit. The 'Type name' is set to 'Standard'. The 'Search parameters' field is empty. The 'Parameter' and 'Value' columns are visible. The 'Data' section is expanded, showing various parameters and their values. The 'DES\_Specification Section' is set to '16 Div'. The 'DES\_Specification Section' is set to '16 Div'. The 'DES\_Specification Section' is set to '16 Div'.

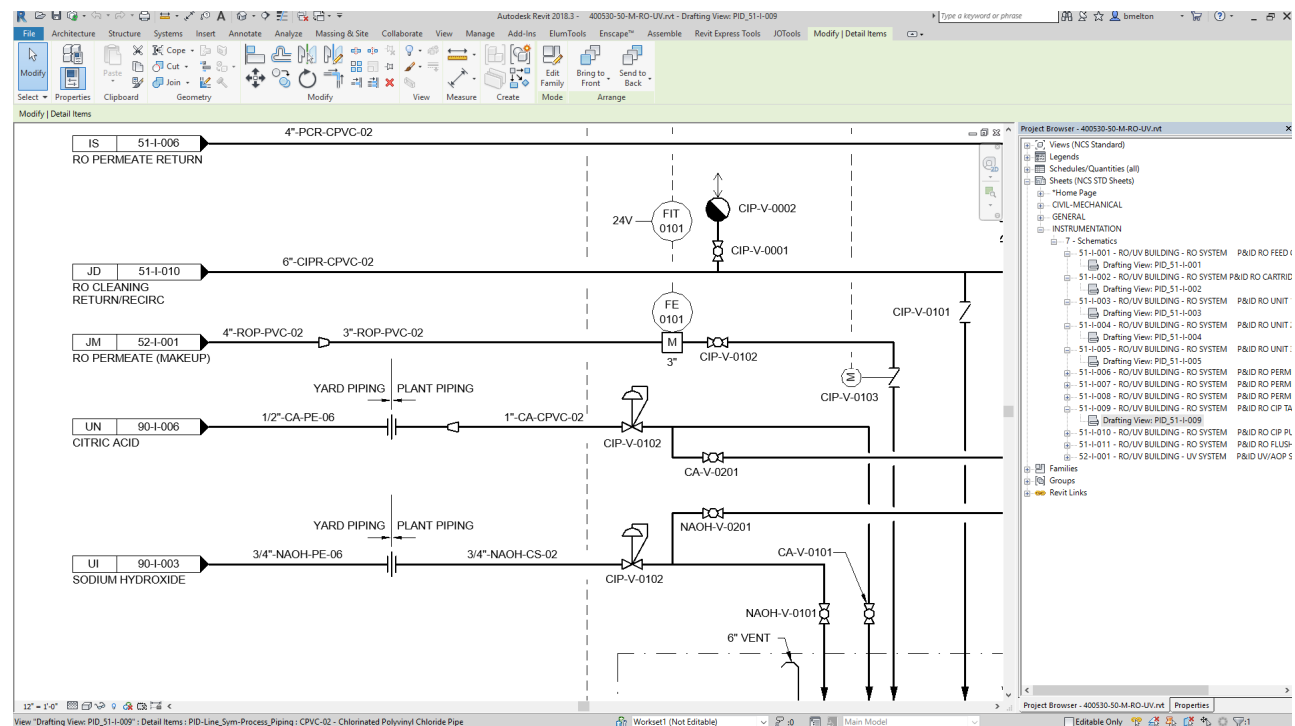
Parameter	Value
CON_Furnished By (default)	
CON_Installed By (default)	
DES_Category	PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT
DES_Classification	PUMP
DES_Comments (default)	
DES_Cost Assembly Code	
DES_Description (default)	
DES_Discipline Designator	M
DES_Drawing Number (default)	
DES_Equipment Service (default)	
DES_Location (default)	
DES_Notes (default)	
DES_Primary Engineering Data (default)	
DES_Process Code (default)	
DES_Project Number (default)	
DES_Specification Section	16 Div



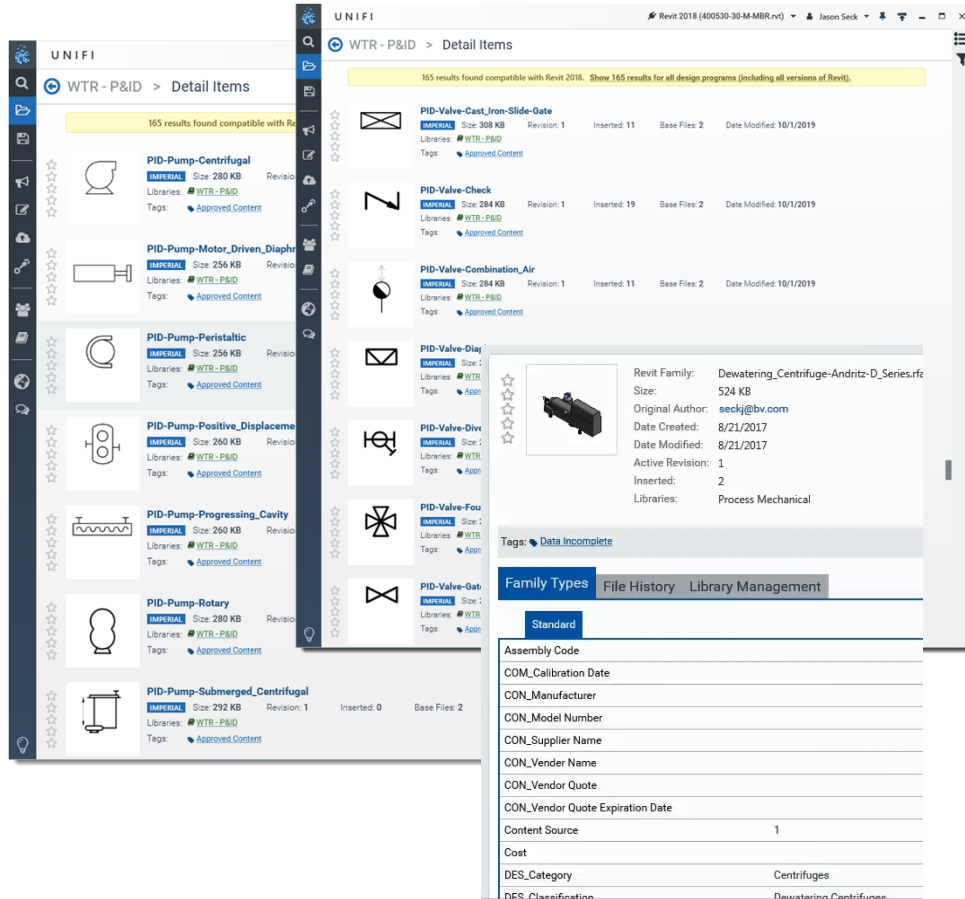
# What did we do in Revit | Workflow



- One drafting view for each P&ID drawing
- P&IDs created in same model as 3D spatial model
- Revit callout tags for drawing
- Workshare-enabled hosted on BIM 360
- Global professionals working on P&IDs



# Digital Content Warehouse



- Digital Asset Warehouse available for all to search
- Targeting 30% pre-populated data on all digital assets
- Consolidate 3D & 2D library
- Helping increase quality and efficiency
- Can store typical assemblies and layouts for drafting views

# Have you heard of: Dynamo



## DYNAMO REVIT

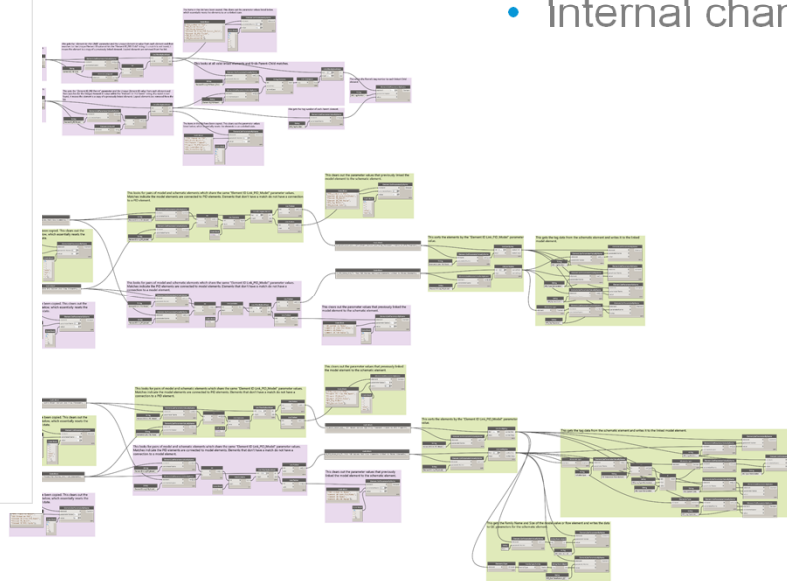
DynamoRevit is a graphical programming interface that lets you customize your building information workflow. DynamoRevit is an open source visual programming platform for designers and is installed as part of Revit.

- ✓ Rapid design iteration and broad interoperability
- ✓ Lightweight scripting interface
- ✓ Downloadable versions available for Revit 2017, 2018 and 2019
- ✓ **Automatically installed as part of Revit since Revit 2020**

To find out more about how Revit 2020 and beyond works with Dynamo please read the [Dynamo 2.1 Blog Post](#). For Revit versions 2017-2018 you can find the Dynamo4Revit installers on [Dynamo Builds](#).

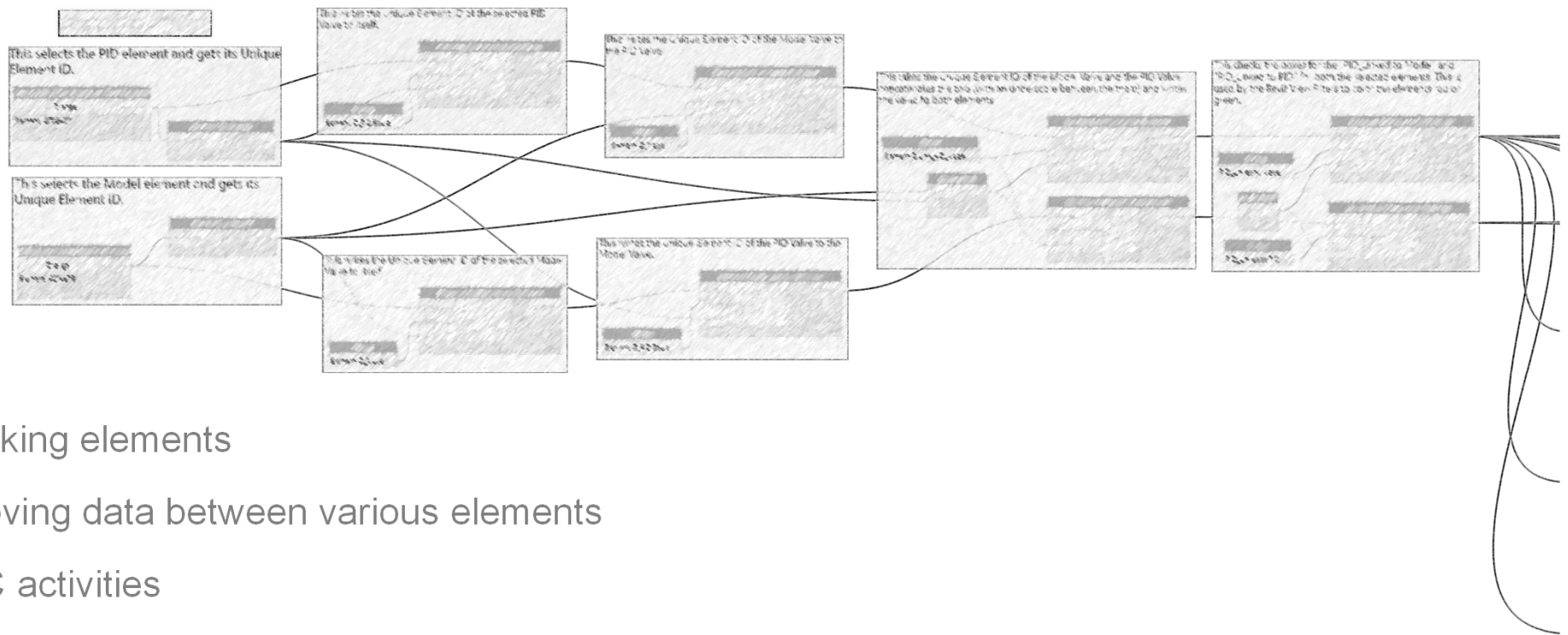
Version 2.2.0

- Visual programming service to automate, customize and extend capabilities
- DynamoRevit installed as part of Revit
- Internal champion learned on-the-fly



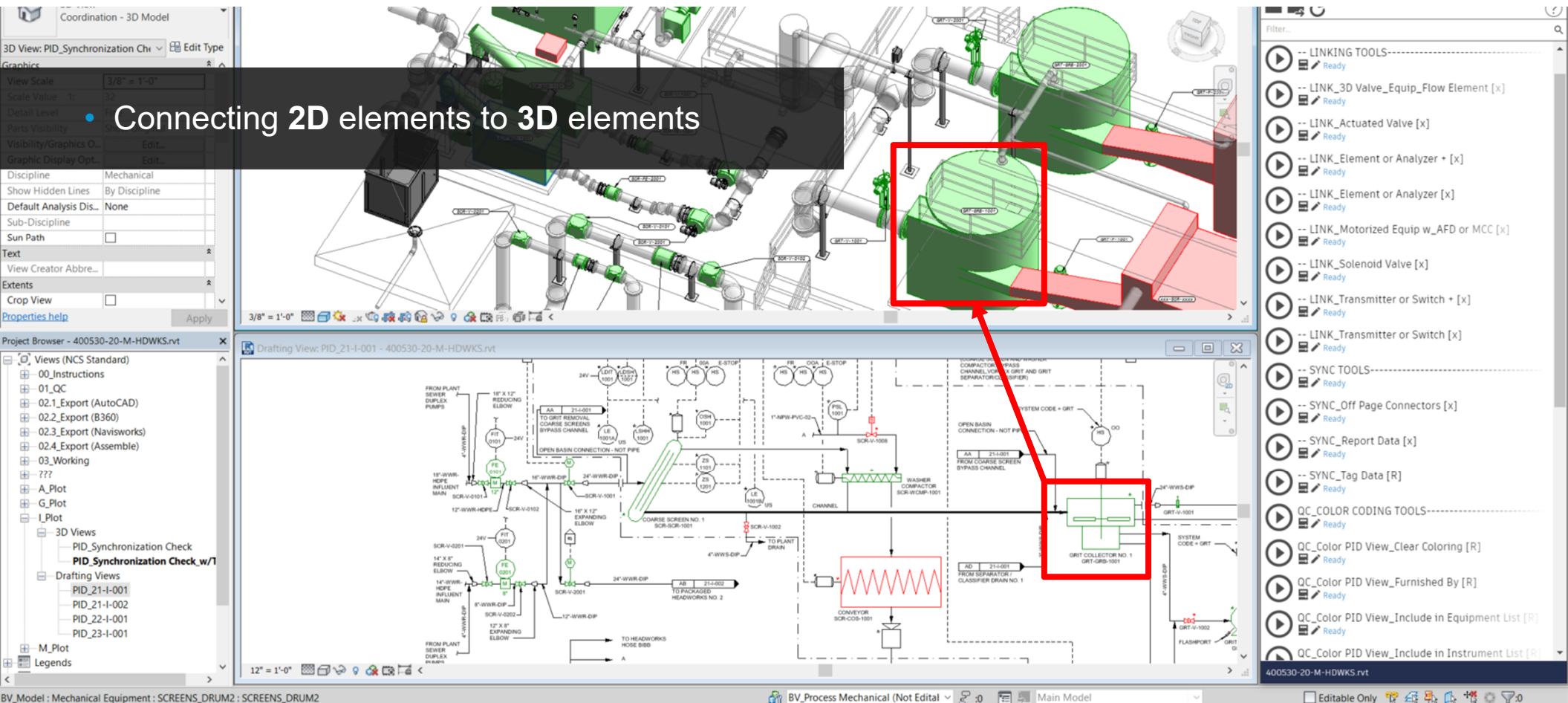


# What did we do with Dynamo



# What did we do with Dynamo

## Connecting 2D elements to 3D elements



The screenshot displays a software interface for a mechanical system, likely a wastewater treatment plant. The top half shows a 3D model of the system, including pipes, valves, and tanks. A red box highlights a green cylindrical component, which is a grit collector. A red arrow points from this component to a corresponding component in the 2D schematic diagram below. The 2D schematic shows various pipes, valves, and tanks, with labels indicating different components and their connections. The interface includes a Project Browser on the left, a Properties panel on the top left, and a Filter... panel on the right. The Project Browser lists various views and models, including 3D Views, Drafting Views, and M\_Plot. The Properties panel shows settings for the selected component, including View Scale, Scale Value, Detail Level, and Visibility. The Filter... panel lists various tools and components, including LINKING TOOLS, SYNC TOOLS, and QC\_COLOR CODING TOOLS.

3D View: PID\_Synchronization Check

View Scale: 3/8" = 1'-0"

Scale Value: 3.2

Detail Level: 3.2

Parts Visibility: Edit...

Visibility/Graphics Overrides: Edit...

Discipline: Mechanical

Show Hidden Lines: By Discipline

Default Analysis Dis.: None

Sub-Discipline: Edit...

Sun Path: ☐

Text: View Creator Abbr...

Extents: Crop View ☐

Properties help Apply

Project Browser - 400530-20-M-HDWKS.rvt

Views (NCS Standard)

- 00\_Instructions
- 01\_QC
- 02.1\_Export (AutoCAD)
- 02.2\_Export (B360)
- 02.3\_Export (Navisworks)
- 02.4\_Export (Assemble)
- 03\_Working
- ???
- A\_Plot
- G\_Plot
- I\_Plot
- 3D Views
  - PID\_Synchronization Check
  - PID\_Synchronization Check w/1
- Drafting Views
  - PID\_21-I-001
  - PID\_21-I-002
  - PID\_22-I-001
  - PID\_23-I-001
- M\_Plot
- Legends

Drafting View: PID\_21-I-001 - 400530-20-M-HDWKS.rvt

12" = 1'-0"

Filter...

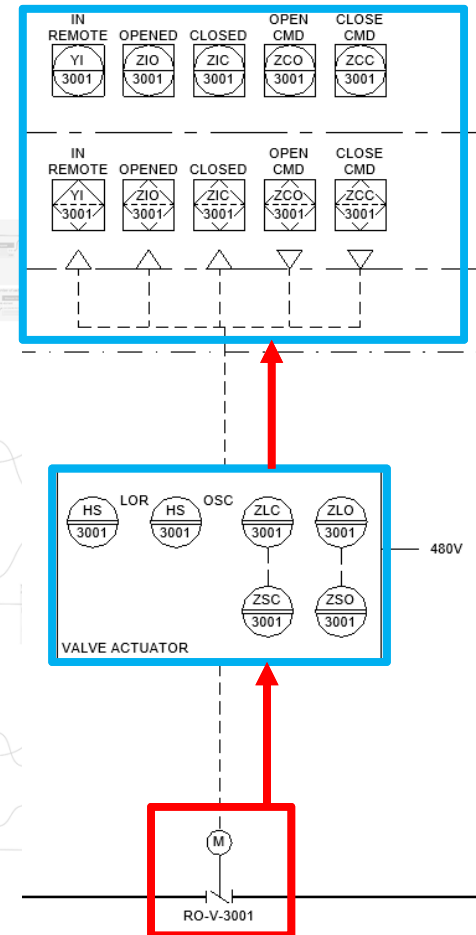
- LINKING TOOLS-----
- ☐ Ready -- LINK\_3D Valve\_Equip\_Flow Element [x]
- ☐ Ready -- LINK\_Actuated Valve [x]
- ☐ Ready -- LINK\_Element or Analyzer + [x]
- ☐ Ready -- LINK\_Element or Analyzer [x]
- ☐ Ready -- LINK\_Motorized Equip w\_AFD or MCC [x]
- ☐ Ready -- LINK\_Solenoid Valve [x]
- ☐ Ready -- LINK\_Transmitter or Switch + [x]
- ☐ Ready -- LINK\_Transmitter or Switch [x]
- SYNC TOOLS-----
- ☐ Ready -- SYNC\_Off Page Connectors [x]
- ☐ Ready -- SYNC\_Report Data [x]
- ☐ Ready -- SYNC\_Tag Data [R]
- QC\_COLOR CODING TOOLS-----
- ☐ Ready -- QC\_Color PID View\_Clear Coloring [R]
- ☐ Ready -- QC\_Color PID View\_Furnished By [R]
- ☐ Ready -- QC\_Color PID View\_Include in Equipment List [R]
- ☐ Ready -- QC\_Color PID View\_Include in Instrument List [R]

400530-20-M-HDWKS.rvt

Editable Only

# What did we do with Dynamo

- Controlling/updating loop numbers for I/O

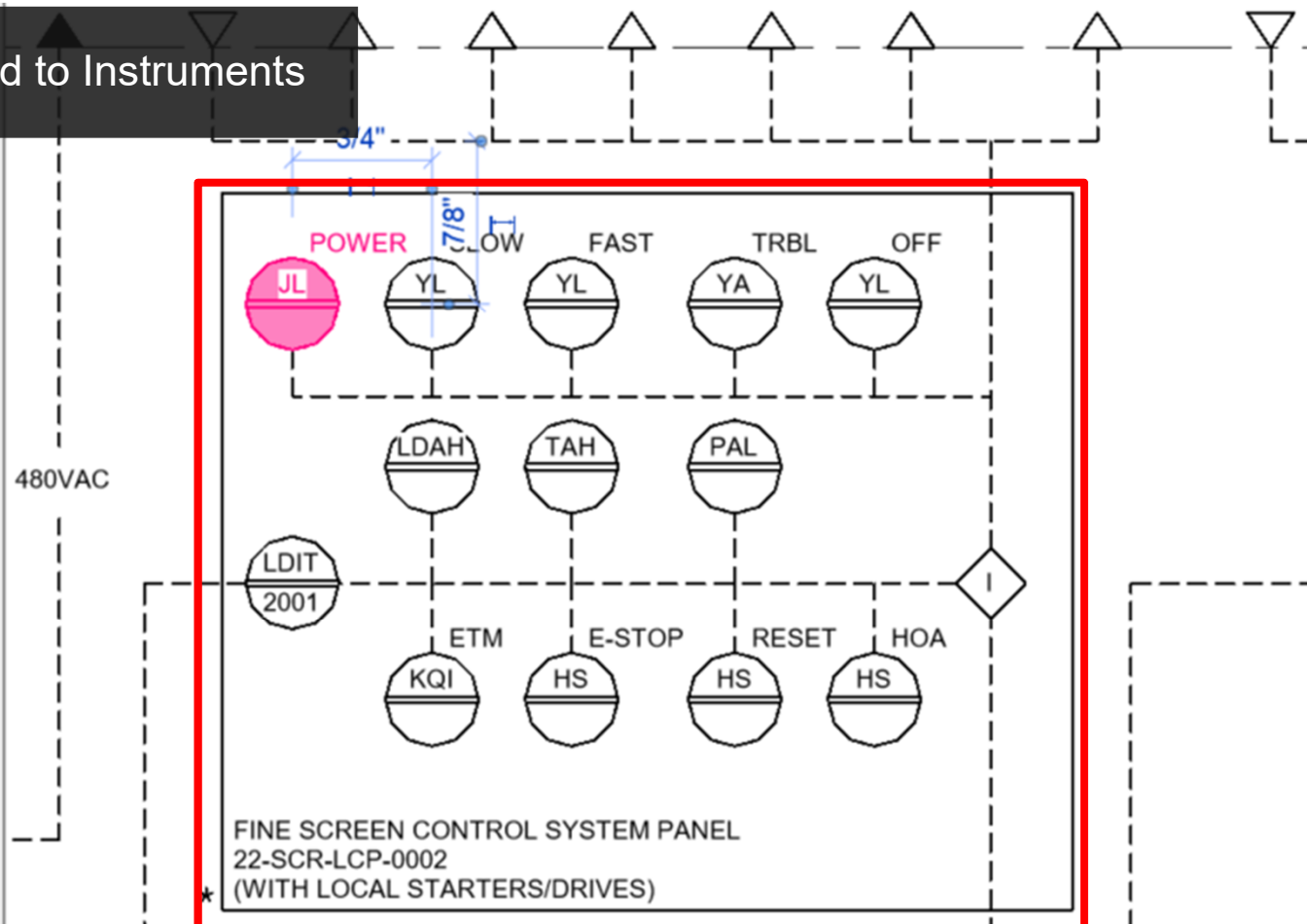


## What did we do with Dynamo

- Local Control Panel data pushed to Instruments

Detail Items (1)		Edit Type
Data		
CON_Furnished By	PACKAGED FINE SCREENS SUPPLIER	
CON_Installed By	DESIGN-BUILDER	
DES_Equipment Description		
DES_Inst_Function	POWER	
DES_Inst_Item Number	0	
DES_Inst_Location	22-SCR-LCP-0002	
DES_Inst_Meas Principle		
DES_Inst_Output Range	N/A	
DES_Inst_PG_Medium		
DES_Inst_PG_Mounting		
DES_Inst_PG_Range		
DES_Inst_PG_Service		
DES_Inst_PG_Special Reqs		
DES_Inst_PG_Stem Location		
DES_Inst_PG_Type		
DES_Inst_PG_Units		
DES_Inst_PG_kPa		
DES_Inst_Service Description		
DES_Inst_Size		
DES_Inst_System Code		
DES_Inst_Voltage		
DES_Location	22	
DES_Process Code		

[Properties help](#) Apply



# What did we do with Dynamo

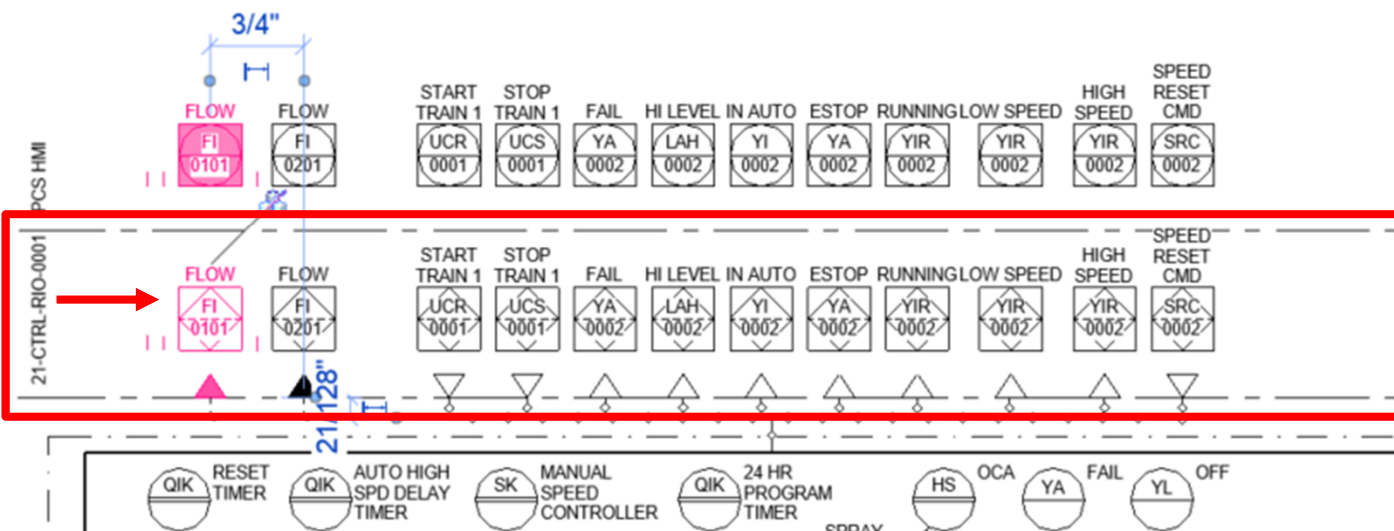
Modify | Paste | Cut | Join | View | Measure | Create | Edit Family | Mode | Bring to Front | Send to Back | Arrange

**Distribution of PLC/PCS info I/O**

Properties: PID-DSI-Input-Output  
FI - Flow (AI)

Search: FI - Flow (AI)

- FI - Flow (AI)
- FI - Flow (AO)
- IA - Motor Overload
- LAH - Differential Level
- LAH - High Level
- LAH - Upstream Level
- LAHH - High-High Level
- LAL - Low Level
- LI - Level
- PAH - HLow Spray Water Supply Pressure
- PAL - Spray Wash Low Pressure
- PDA - High Differential Pressure



21-CTRL-RIO-0001

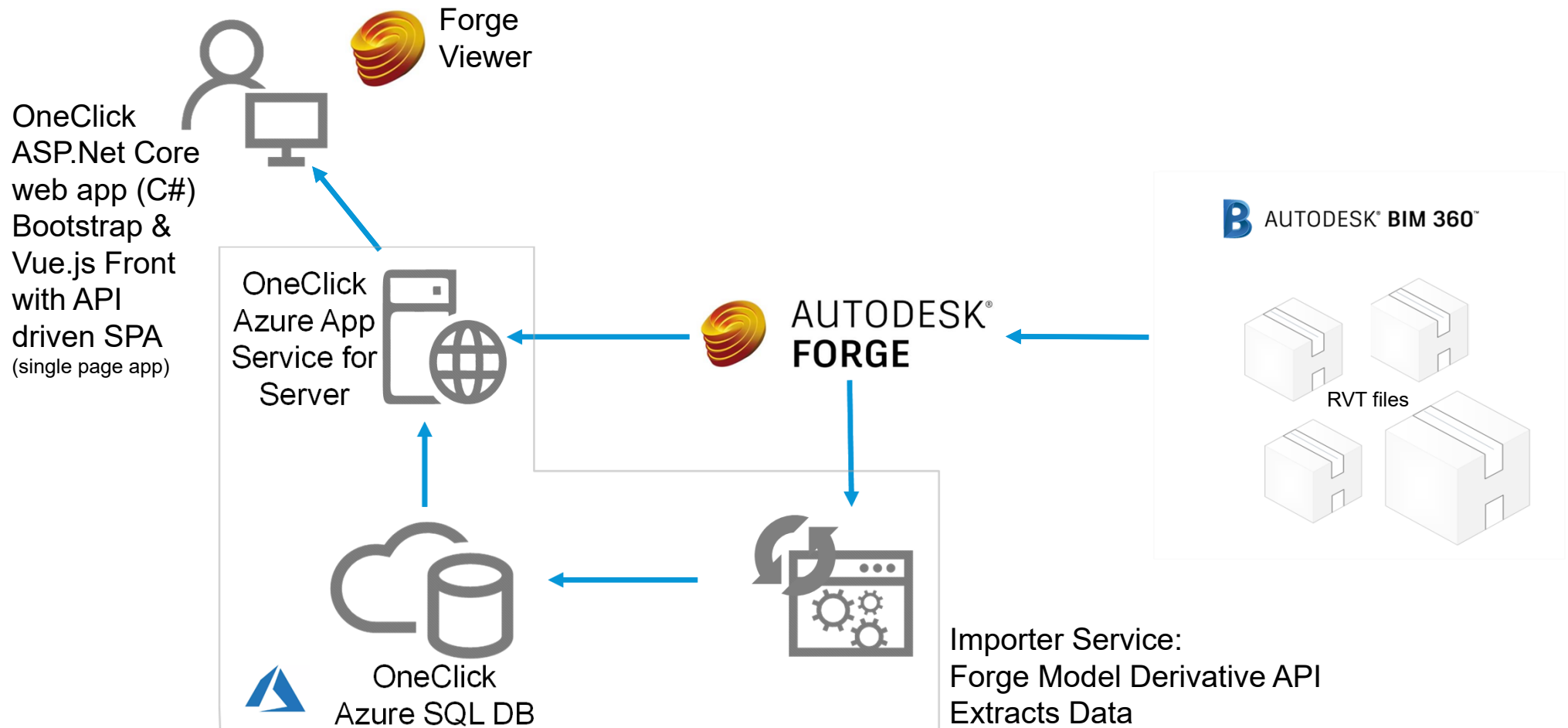
21-128"

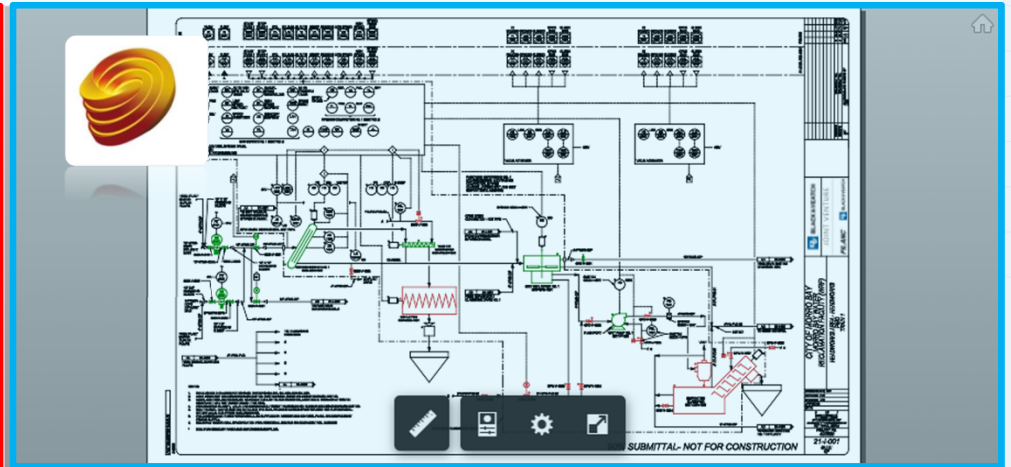
QIK RESET TIMER QIK AUTO HIGH SPD DELAY TIMER SK MANUAL SPEED CONTROLLER QIK 24 HR PROGRAM TIMER HS OCA YA FAIL YL OFF





# What did we do with:





Master Equipment List

Location: 20-HEADWORKS : V 67    Last Modified: 2019-10-25

Tag Number2

Specification Section\_50 Div

Tag Number

Classification

Sub Classification

Equipment Description

Primary Engineering Data

Drawing Number

Not

	21-NPW-V-1003	40 05 63.53	21-NPW-V-1003	VALVE	BALL VALVE		21-I-001	
	21-NPW-V-1004	40 05 63.53	21-NPW-V-1004	VALVE	BALL VALVE		21-I-001	
	21-GRT-V-1002	40 05 62.16	21-GRT-V-1002	VALVE	ECCENTRIC PLUG VALVE		21-I-001	
	21-NPW-V-1001	40 05 63.53	21-NPW-V-1001	VALVE	BALL VALVE		21-I-001	
	21-SCR-V-0101	40 05 62.16	21-SCR-V-0101	VALVE	ECCENTRIC PLUG VALVE		21-I-001	
	21-SCR-FE-0101	40 71 00	21-SCR-FE-0101	FLOW INSTRUMENTS	MAGNETIC FLOWMETER		21-I-001	
	21-SCR-V-0102	40 05 62.16	21-SCR-V-0102	VALVE	ECCENTRIC PLUG VALVE		21-I-001	
	21-SCR-COS-1001		21-SCR-COS-1001	WASTEWATER SCREEN		CONVEYOR	21-I-001	
	21-SCR-SCR-1001	46 21 12	21-SCR-SCR-1001	MECHANICALLY CLEANED BAR SCREENS	COARSE SCREEN	COARSE SCREEN NO. 1	21-I-001	
	21-SCR-V-1001	40 05 62.16	21-SCR-V-1001	VALVE	ECCENTRIC PLUG VALVE		21-I-001	

## Near-term updates



- Electrical
- Linking @ web level
- Edit data @ web browser
- Evaluating Dynamo vs. Revit API
- Flexibility to use alternate P&ID apps

# Lessons Learned

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- Understanding how a true data-centric process impacted our workflow
- Forge Updates: Model derivative API failed to query data, Autodesk added options to force a retry programmatically
- Viewer side Forge API, challenged us more than others.
- Easy things in schematic apps proved to be difficult in Revit schematics:
  - Multi-line segments
  - Line breaks are manual
  - Offpage connectors





## Feedback from Project Team

*“This approach eliminated several manual steps where I would have traditionally worked in excel and/or pdf files. Using data to color P&IDs in the web browser helped with QC.”*

*“Working with the data in Revit was a time-saver and having access to the data in the web browser reduced my time looking for information. I had more confidence in a synchronized design with our digital QC efforts”*

*“Creating P&IDs in Revit was similar experience to creating in ACAD P&ID... more comfortable using several automated features in Revit to speed up work and reduce chance for errors”*



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- Lead I&C Engineer



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- Lead Civil/Process Engineer



**Priya Rane**

- Mumbai, India
- I&C Technician

# Value



Order of Magnitude #'s

# How to Get More Involved

## Activities/Events

- Autodesk Hosted Industry Water Council

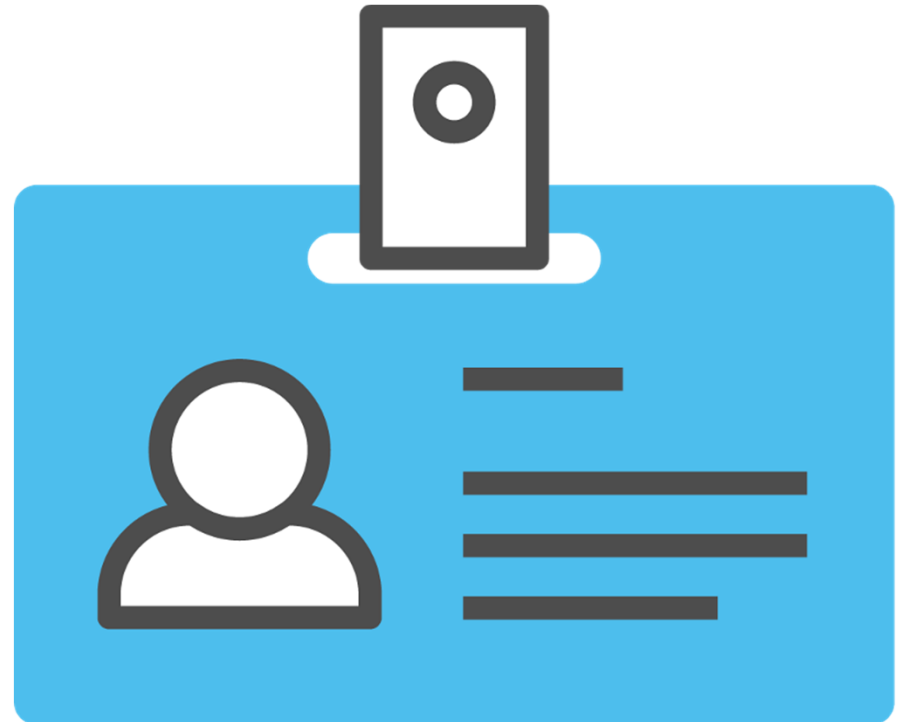
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