

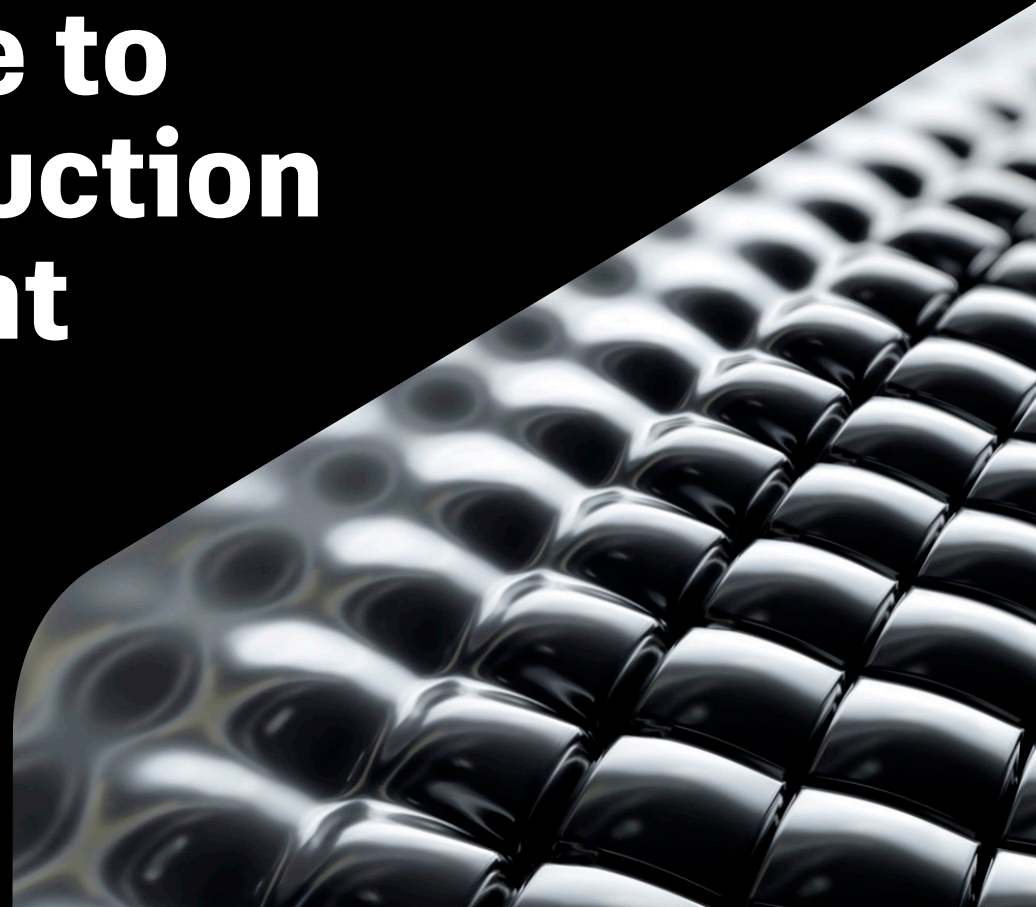


The Secret Sauce to Effective Construction Cost Management

Adam Schilling, Arcadis

Ian Turner, Autodesk

Josh Cheney, Autodesk



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Agenda

- Speaker Introductions
- Current state of cost management
- Cost Management with Autodesk Build
- Integrations
- Q&A





Josh Cheney

Sr. Manager,
Strategic Alliances



Ian Turner

Sr. Product Manager,
Cost Management



Adam Schilling

Project Designer





Arcadis is the leading global design & consultancy organization for natural and built assets.

We maximize impact for our clients and the communities they serve by providing effective solutions through sustainable outcomes, focus and scale, and digitalization.

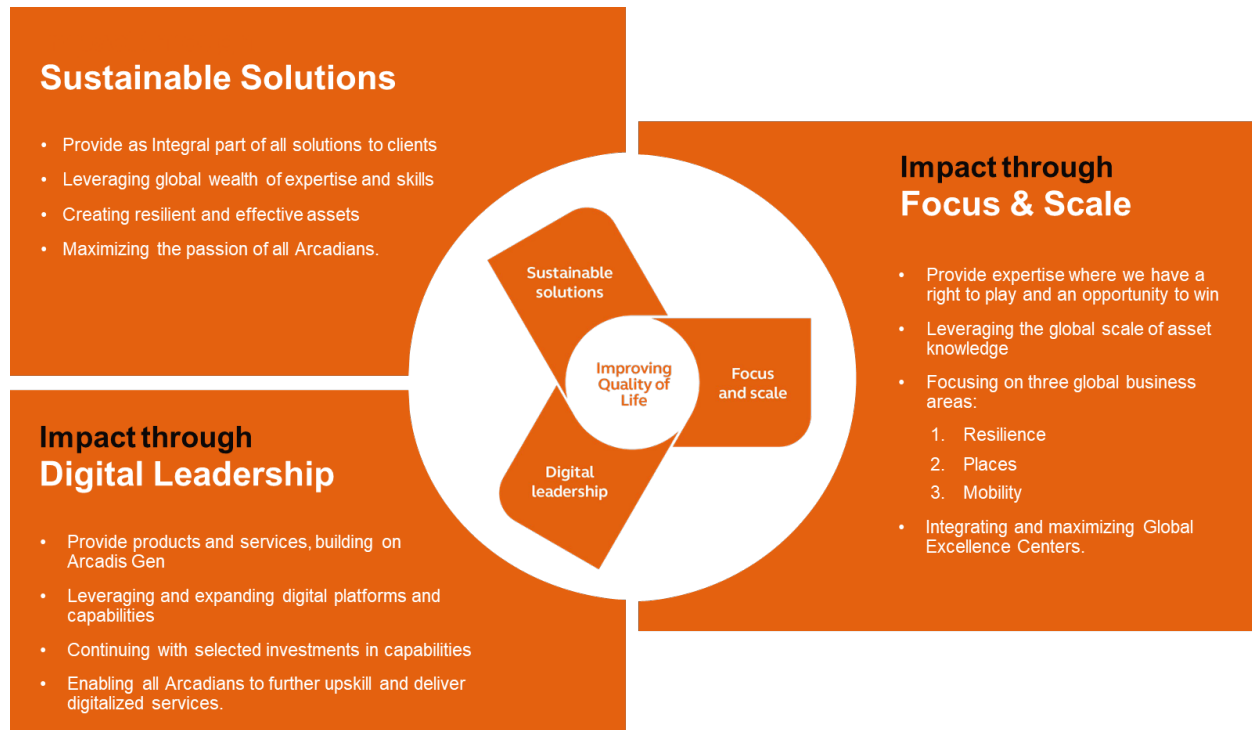
We are 29,000 people, active in more than 70 countries that generate €3.4 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.





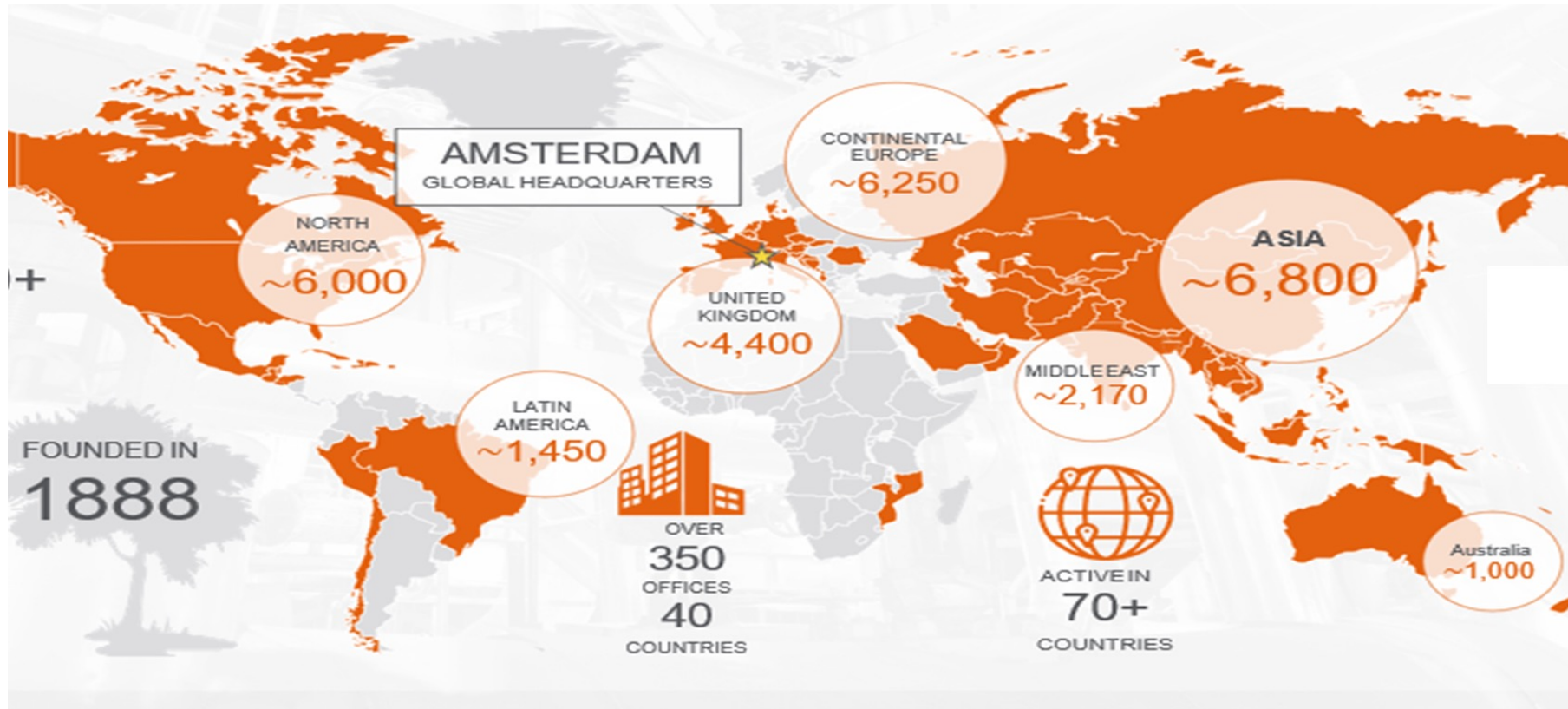
Improving Quality of Life

- Arcadis is focused on delivering results that are sustainable and resilient, digitalized and efficient, scalable, and human centric.
- This strategy will help us achieve our objective as well as those of our clients.
- It will be achieved by the following 3 key areas of our business:
 - Focus and scale
 - Sustainable solutions
 - Digital leadership.



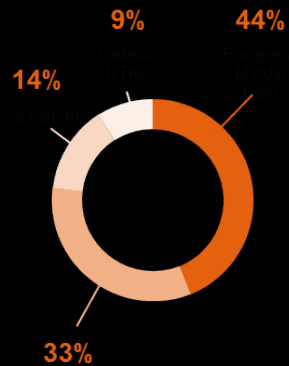


Global

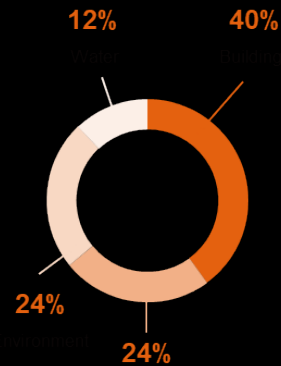


Arcadis at a glance

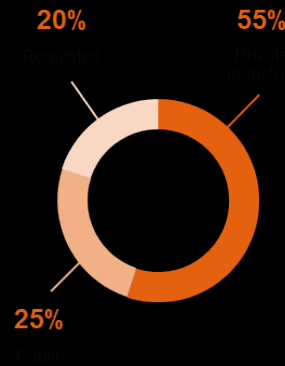
Geographies



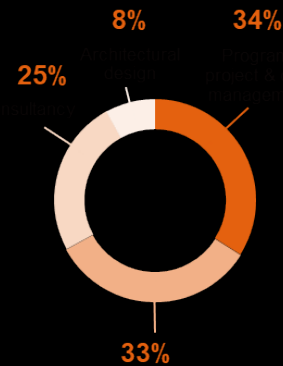
Businesses



Clients



Services



- Fourth largest Design/Engineering & Consulting Organization
- €600+ billion market annually (excl. Construction)
- Services provided during all phases of asset creation



€ 3.5bn

Gross Revenues



~28,000

People Globally



35,000+

Projects Annually



#1 In our industry

Sustanalytics
ESG Risk Rating score

A close-up photograph of a black, glossy, ribbed surface, likely a cable or hose, curving upwards from the bottom left towards the center of the frame. The surface has a repeating pattern of rounded ridges and grooves, creating a strong sense of depth and texture. The lighting is dramatic, with highlights on the ridges and shadows in the grooves.

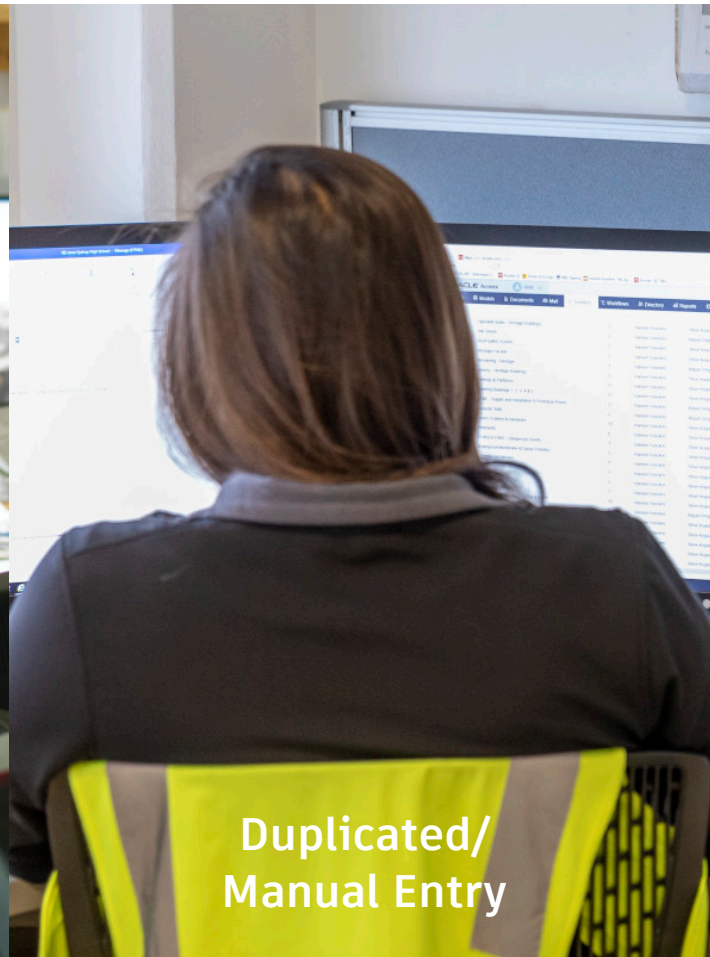
Current State of Cost Management

Subtitle

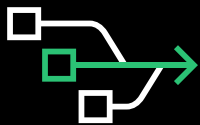
How well **cost activities
are executed ultimately
determines a
project's **financial
outcome.****



Opportunity for cost management optimization



Position Yourself for Success



Workflows



Data



Teams

How Autodesk Build can help deliver this



Centralization

Provides a single source of truth for all cost related information.



Integration

Supports connection of data/workflows across the system & with 3rd parties.



Automation

Adds automation to typically manual & repetitive processes.

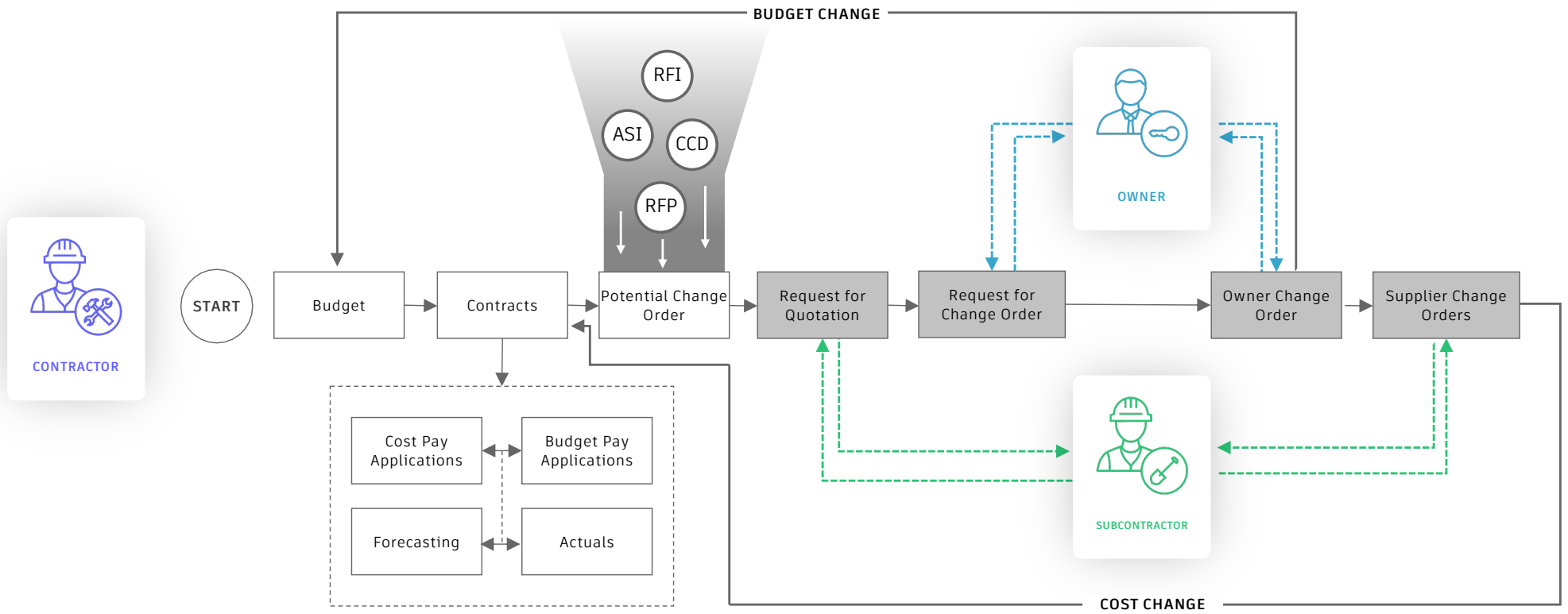


Insights

Brings real-time visibility to cost-related risk & project financial health.

A close-up photograph of a textured surface, possibly a metal mesh or a series of rounded, metallic-looking elements arranged in a grid pattern. The image is partially obscured by a black diagonal shape that serves as a background for the text.

Cost Management with Autodesk Build



Key Characteristics



Customization &
Flexibility



Connected
Workflows



Collaboration



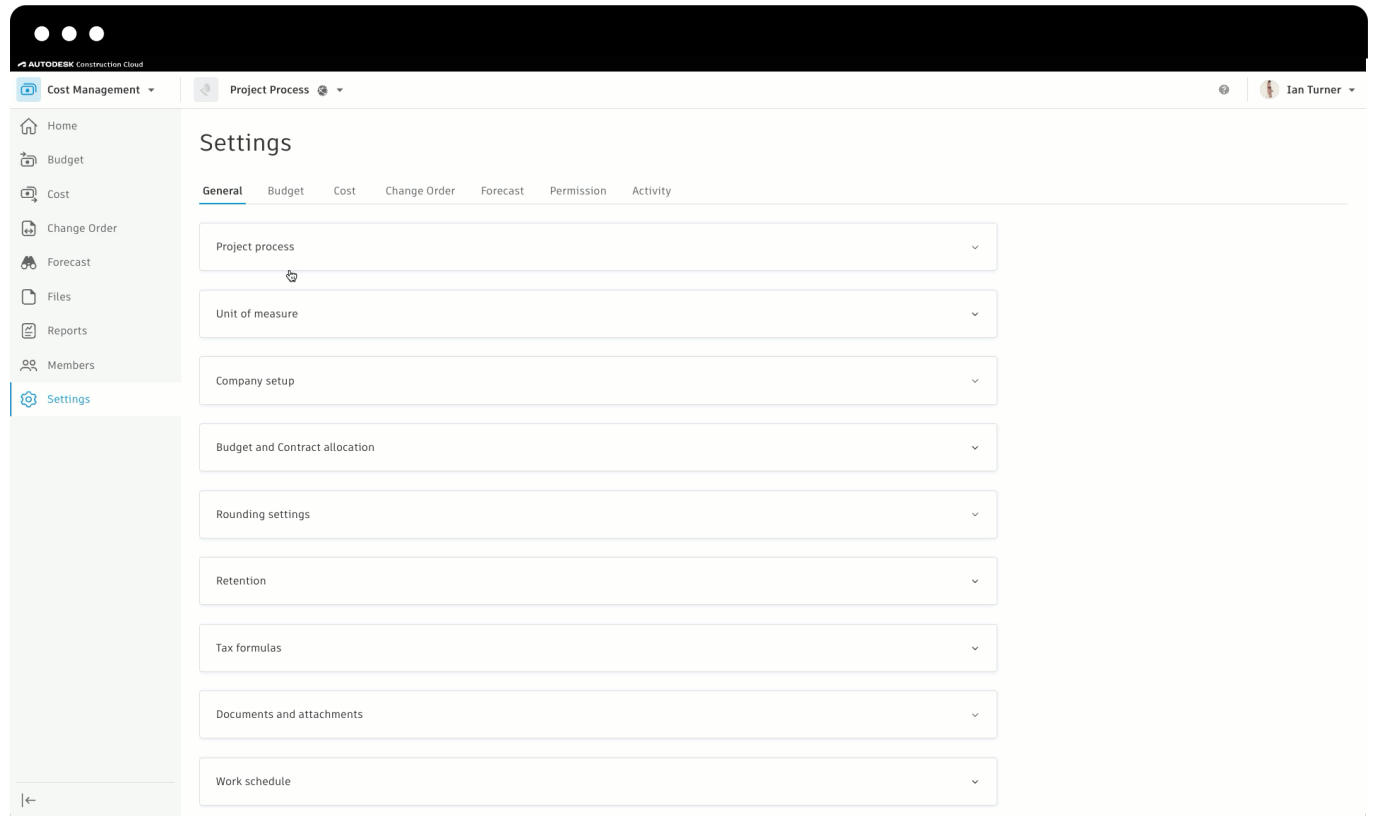
Cost & Time



Optional setting to speed up system configuration

- Provides a more straightforward setup process for different user cohorts
- Enables a collaborative Potential Change Order workflow

Project Process

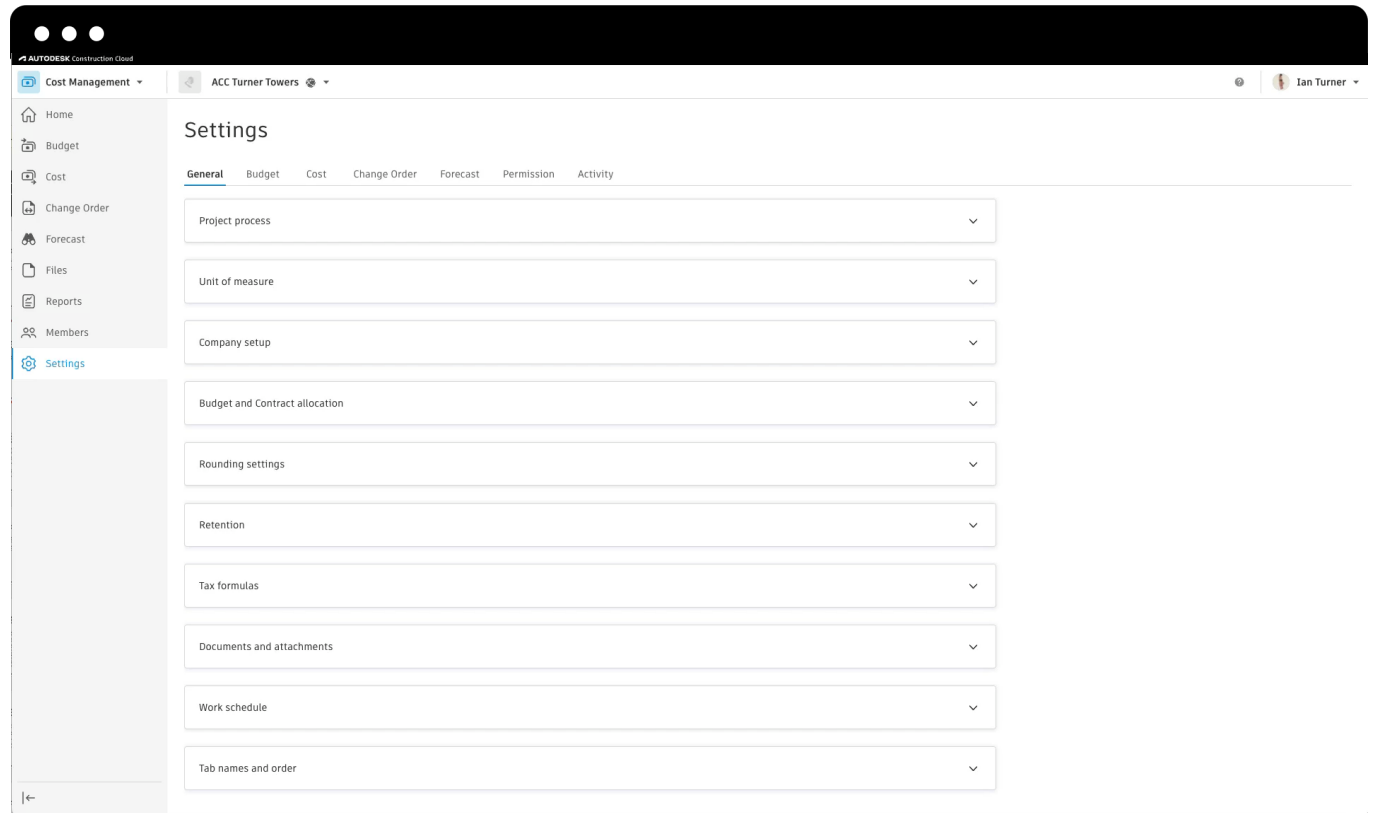




Customize terminology throughout the system to align with your company standards

- In Settings easily change tool / tab names and display order

Terminology Customization

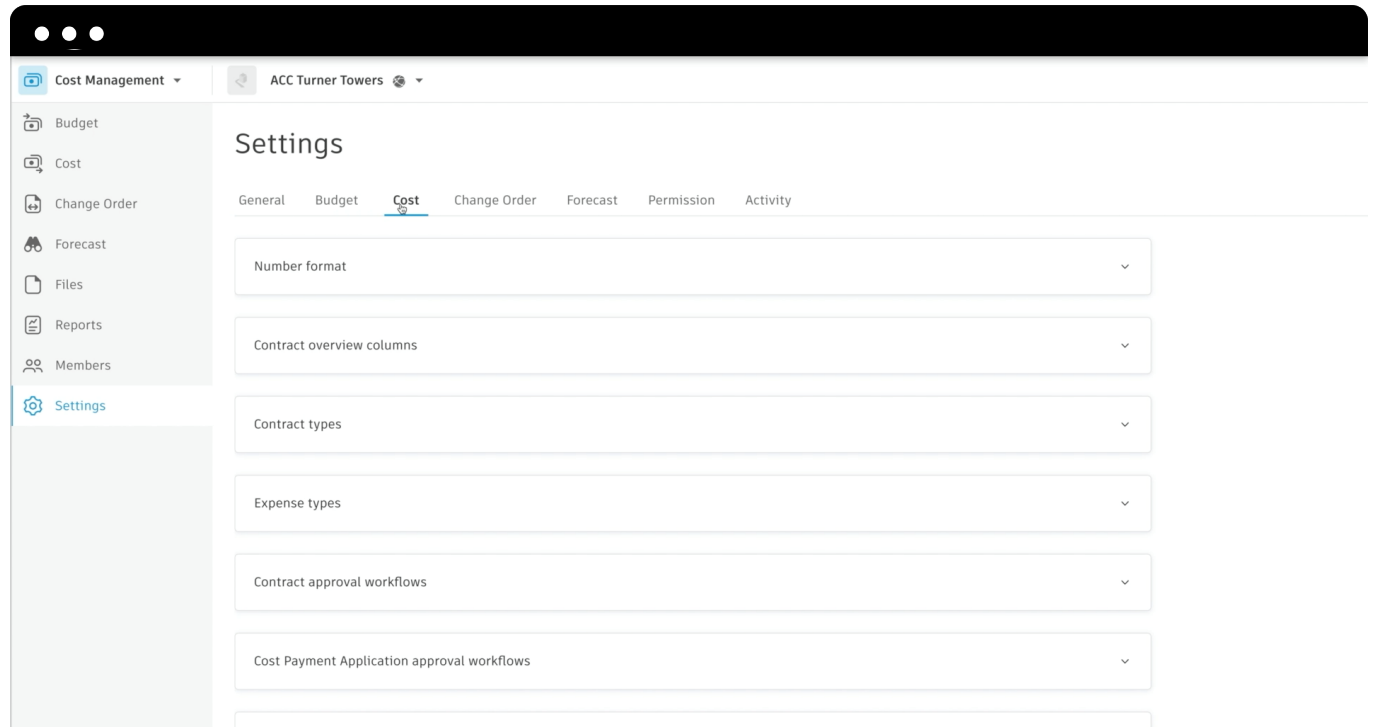




Utilize a decision-based workflow engine to speed up internal reviews through automated routing

- Create approval workflows for Contracts, Change Orders, Pay Apps, & Expenses
- Reviewers can be users, roles or companies
- Email alerts reviewers
- Workflow bar automatically displays item's status, ball-in-court, and expected due date
- Activity captured in the activity log

Custom Approval Workflows

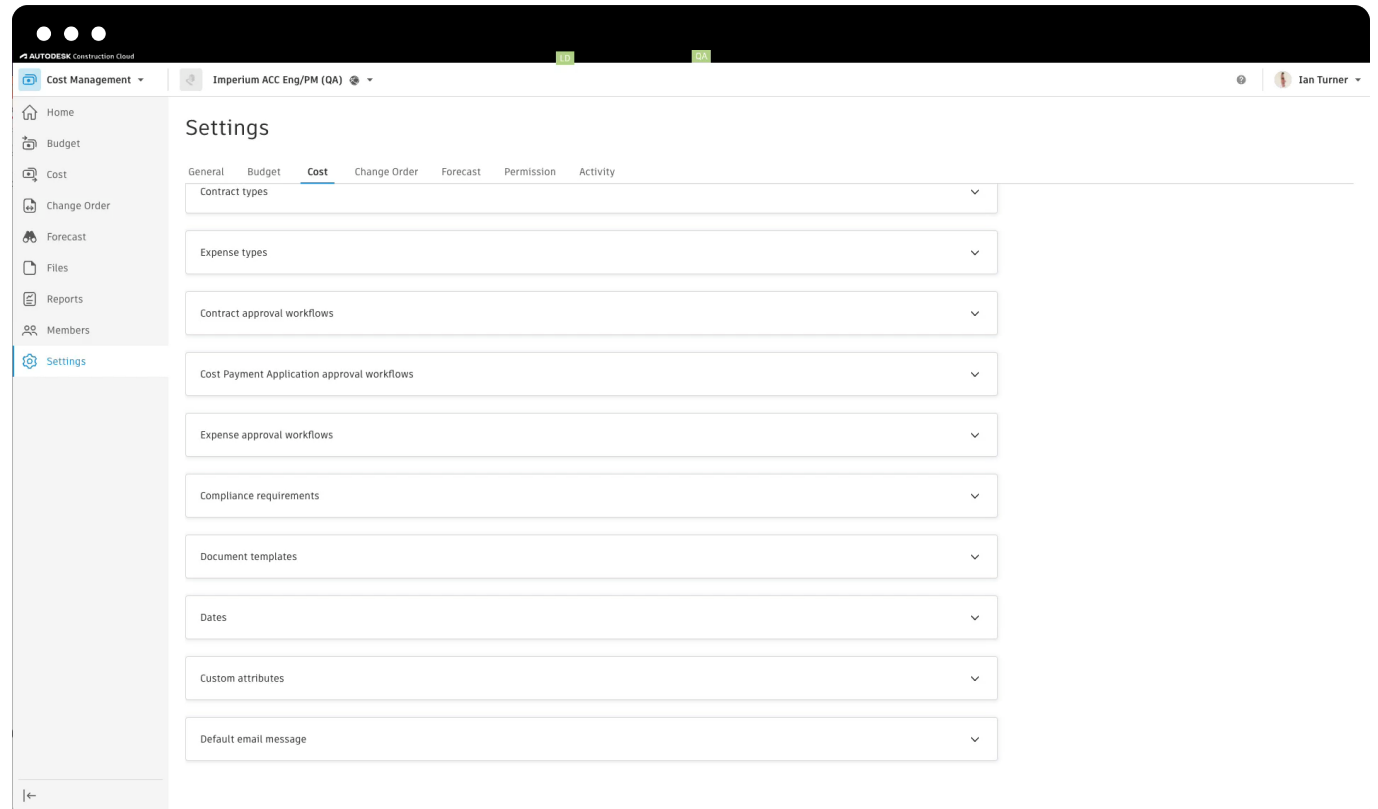




Compliance Requirement Checklist (NEW!)

Configure custom checklists for compliance requirements to speed up approvals

- Create checklists for contract and pay app compliance document requirements
- Suppliers with collaborate access can populate required documents directly in the system





Document Templates

Create standard documentation formats and automate generation for quick distribution

- Manage MS Word/Excel templates at the project or account level
- Templates auto-populate with data when generated
- Document templates can be created for:
 - Contracts
 - Payment Applications
 - Potential Change Orders
 - Request for Quotations
 - Request for Change Orders
 - Owner Change Orders
 - Supplier Change Orders

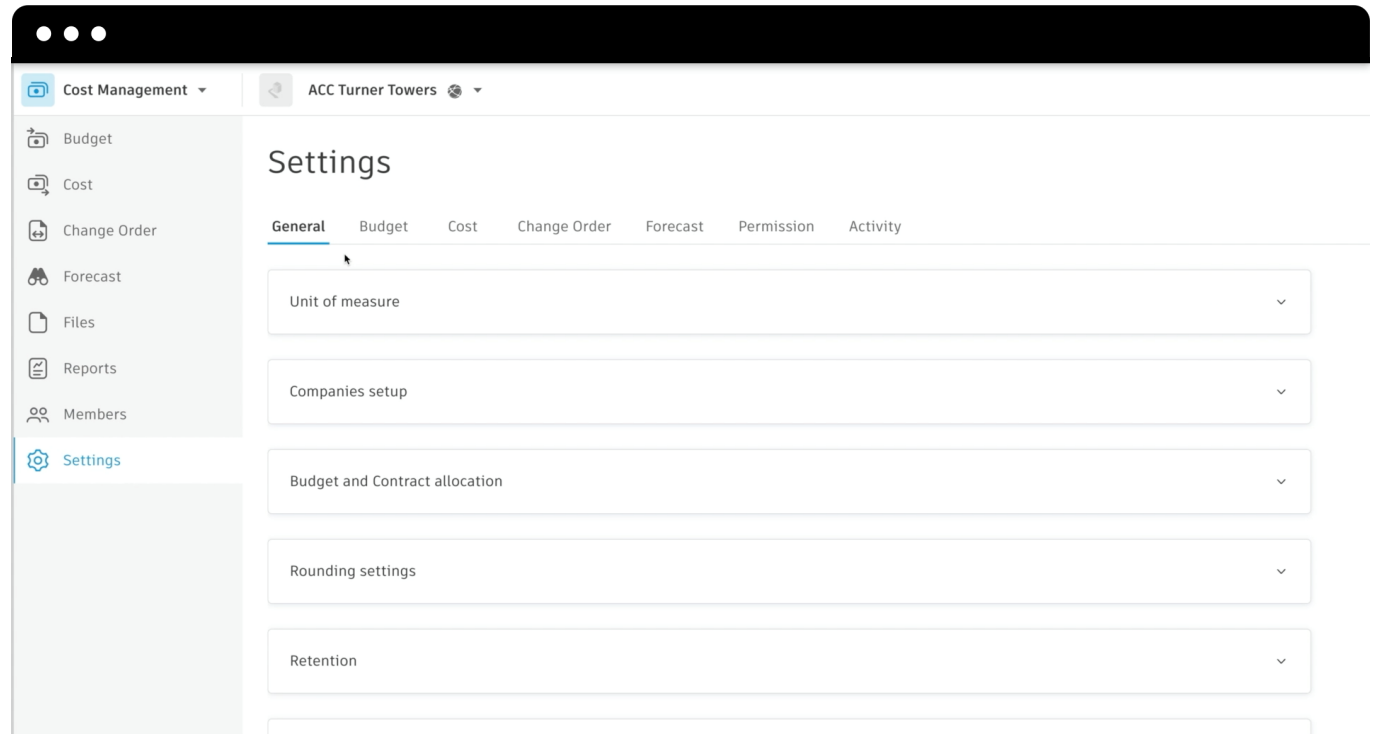
	A	B	C	D
1	Application and Certificate for Payment			
2	OWNER: {owner.name}	PROJECT: {project.name}	APPLICATION NO: {payment.number}	
3			PERIOD TO: {payment.endDate}	
4	FROM CONTRACTOR: {contractor.name}	ARCHITECT: {architect.name}	CONTRACT DATE: {mainContract.createdAt}	
5			PROJECT NO.: {project.jobNumber}	
6				
7				
8	Application is made for payment, as shown below, in connection with the Contract:			
9	A. ORIGINAL CONTRACT SUM.....	\$ {payment.contractAmount}		
10	B. NET CHANGE BY VARIATION ORDERS.....	\$ {payment.netChangeByCO}		
11	C. CONTRACT SUM TO DATE (Line A + B)	\$ {payment.contractSumToDate}		
12	D. TOTAL COMPLETED & STORED TO DATE	\$ {payment.totalCompletedAndStored}		
13	E. RETENTION:			
14	a. {payment.completedWorkRetentionPercent} % of Completed Work	\$ {payment.completedWorkRetention}		
15	b. {payment.materialsOnStoreRetentionPercent} % of Stored Material	\$ {payment.materialsOnStoreRetention}		
16	Total Retention (Lines Ea + Eb)	\$ {payment.allTotalRetainage}		
17	F. TOTAL EARNED LESS RETENTION	\$ {payment.totalEarned}		
18	(Line D minus Line E Total)			
19	G. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$ {payment.previousPayment}		
20	H. CURRENT PAYMENT DUE	\$ {payment.currentPayment}		
21	I. BALANCE TO FINISH, INCLUDING RETENTION	\$ {payment.balanceToFinish}		



Create custom calculated budget and contract columns to further customize your view

- Easily build formulas with drag and drop terms
- Copy existing columns and modify formulas
- Rename default columns
- Change the order columns appear and hide unnecessary columns

Custom Calculated Columns





Reduce data entry and capture the origin of change orders

- Elevate an Issue or RFI to a PCO or link existing PCOs to Issues & RFIs
- Increase access to critical information

Issue > RFI > PCO

Build

Home

Sheets

Files

Issues

Forms

Photos

RFIs

Submittals

Meetings

Schedule

Assets

Reports

Members

Bridge

Settings

ACC Turner Towers

Issues

Create Issue

Export all

Search by issue title or ID

Title	ID	Status	Type	Assigned to	Due date	Start date	Placement
Shower door does not comply with c...	#3	Open	Building Code	Klain Qin	Sep 1, 2022	-	064000-03.0 - PL03 Sh...
Commissioning	#2	Open	Commissioning	-	-	-	-
Underground Plumbing	#1	Pending	Installation	Christine Acker	-	-	-

Showing 1 - 3 of 3



Ensure supplemental information is available to process payments

- Add photo references like delivery tickets or receipts to expenses

Expense Photo References

ACC Turner Towers

Cassie Bustos

Cost

ContractCost Payment ApplicationExpense

+ Add from Contract

Export

Unsaved view

	Number ^	Name	Status	Supplier	Contract	Qty	Unit	Unit Cost	Amount	Paid Amount	Tj		
	Expand... Collapse...									35,932.00			
<input type="checkbox"/>	> INT-0001	General Labour Crew - February	Approved	Imperium Constructi...		1	ls	9,200.00	9,200.00		In		
<input type="checkbox"/>	> INT-0002	General Labour Crew - March	Approved	Imperium Constructi...		1	ls	10,200.00	10,200.00		In		
<input type="checkbox"/>	> INV-0001	Office Supplies	Approved	Office Supplies R Us	Office Supplies	1	ls	10,000.00	10,000.00		In		
<input type="checkbox"/>	> INV-0002	Sundry Materials	Approved	Sundry Supplies R Us		1	ls	6,532.00	6,532.00		In		



Increase access to critical cost information and reduce the risk of data loss

- Autodesk Build’s strength is it’s connected workflows and data.
- Link cost information across the system as References
 - Issues
 - RFIs
 - Submittals
 - Schedule
 - Meeting Items

System Wide Linked References

Autodesk Construction Cloud

Cost Management

ACC Turner Towers

Ian Turner

Home

Budget

Cost

Change Order

Forecast

Files

Reports

Members

Settings

Change Order

PCO RFQ COR OCO SCO Cost Item

+ Add

Export

Unsaved view

	Number	Name	Scope	Budget Status	Cost Status	Type	Budget Code	Budget Name	Contract Name
		Expand Collapse							
	P-0001	Conflict between Arch layout for floor 3 and specification...	Out	Open	Open				
	P-0002	Shower door does not comply with construction code [L...	Out	Draft	Draft				
	P-OCO-0001	Additional Floor Openings	Out	Approved	Approved	Owner Change Order			
	P-OCO-0002	Revised Main Entrance Layout per ASI002	Out	Approved	Approved	Owner Change Order			
	P-OCO-0003	Men's Restroom ADA Requirement Revision	Out	Revise and Resu...	Open	Owner Change Order			
	P-OCO-0004	MOT for new offsite work	Out	Executed	Open	Owner Change Order			
	P-SCO-0001	Revised Signage	Out	Approved	Open	Subcontract Change...			



Increase collaboration while keeping the right information in the right hands

- Set user, role, and company-based permission levels for each component Cost
- Bring Owners and Suppliers into the system to increase collaboration and streamline workflows

Controlled & Collaborative

The screenshot shows the Autodesk Construction Cloud interface. The top navigation bar includes 'Cost Management' and 'ACC Turner Towers'. The left sidebar lists navigation options: Home, Budget, Cost, Change Order, Forecast, Files, Reports, Members, and Settings (highlighted). The main content area is titled 'Settings' and has tabs for General, Budget, Cost, Change Order, Forecast, Permission (active), and Activity. Below the tabs is a search bar with the text 'Enter user, role or company' and a dropdown arrow, followed by a 'Select permission preset' dropdown and an 'Add' button. The main table lists permissions for various roles:

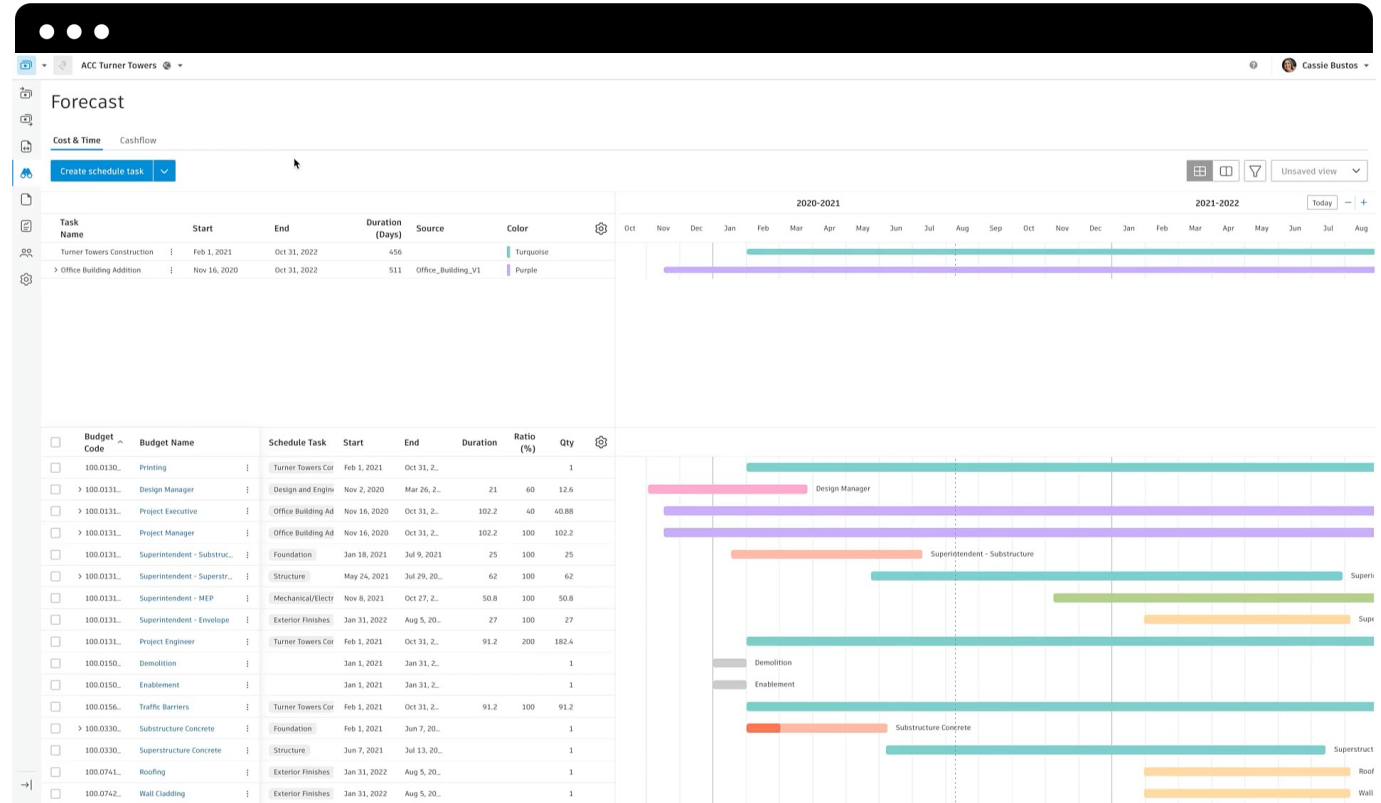
Name	Type	Contract	Cost Payment Application	Expense	Cost Item and PCO	RFQ	COR	OCO	SCO
> Admin	-	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control	Full Control



Connecting Schedule & Budget Items

Plan time-based allowances, such as General Conditions, in a visual way utilizing a Gantt chart view

- Directly connect schedule tasks to budget line items to quickly determine duration then enable calculations for annual price increases

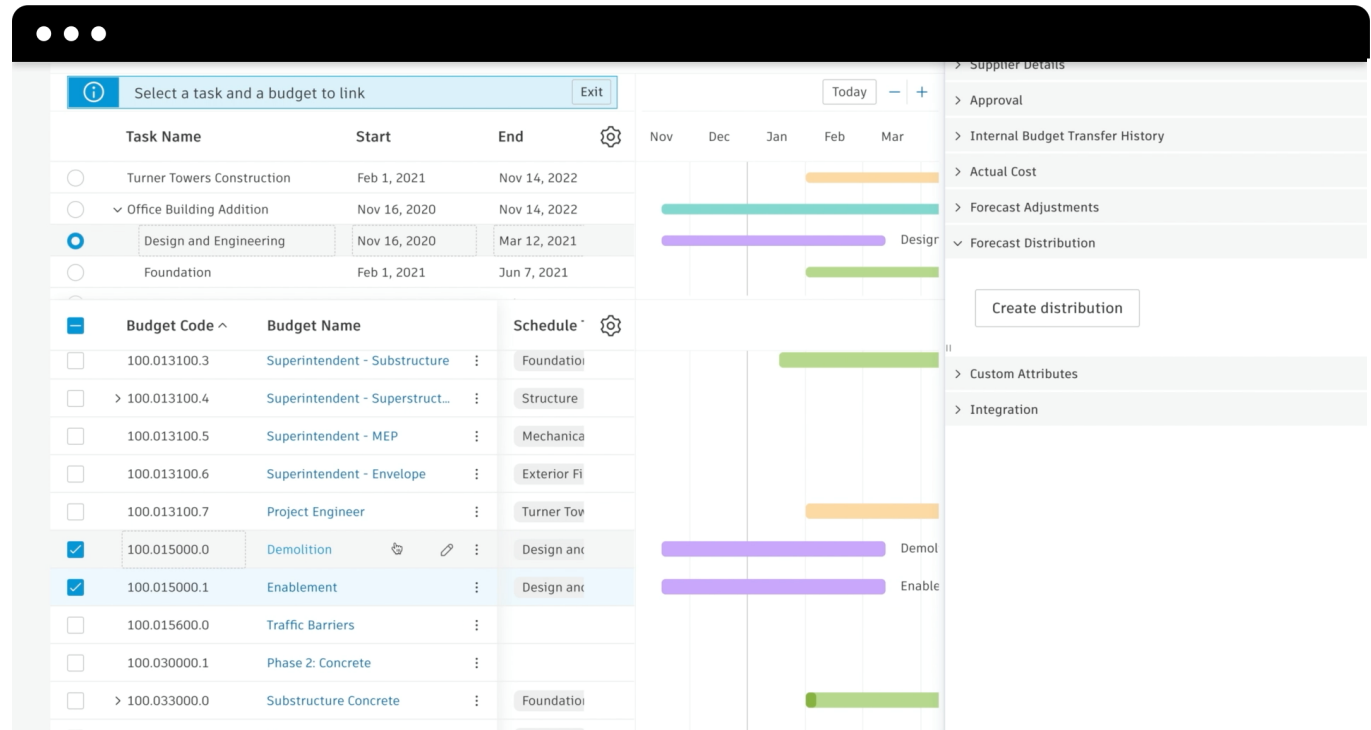




Forecasting

Easily plan and track cash flow throughout the duration of the project

- Perform forecast distributions for each budget line items using built-in forecast distribution curves.
- Access a project-level cash flow analysis to visualize the difference between planned actual and forecast quickly.





Performance Tracking (NEW!)

In real-time track and forecast performance in relation to the plan to reduce risk

- Connect manpower data to budget items. Utilize integrations to automated flow of data
- Break data down into instances (e.g., Locations) track performance on a granular level
- Visual cues to support quick and easily risk identification
- Automatically see required performance needed and make forecast adjustments if needed

Cost Management

Performance Tracking

Home

Budget

Cost

Change Order

Forecast

Files

Reports

Members

Settings

Forecast

Cost & TimeCash FlowPerformance Tracking

Tracking itemItem instanceAdd tracking item

General		General		Tracked		Forecast		
Number	Name	Budget Code	Planned Start	Planned End	Input Used (%)	Output Completed (%)	Performance Ratio	Forecasted Input Qty Variance
Expand Collapse					26.75	24.08	0.90	(705.02)
> 100.033000.0.LAB	Cast-in-Place Concrete- Labor	100.033000.0.LAB	16 Dec 2020	9 Mar 2021	26.75	23.83	0.89	(244.76)
> 100.033000.1.LAB	Pouring Concrete to Pile Caps	100.033000.1.LAB	16 Dec 2020	22 Jan 2021	27.5	27.63	1.00	4.52
> 100.033000.2.LAB	Pouring concrete to Ground B...	100.033000.2.LAB	11 Jan 2021	12 Feb 2021	26	17.75	0.68	(464.79)

Home

Budget

Cost

Change Order

Forecast

Files

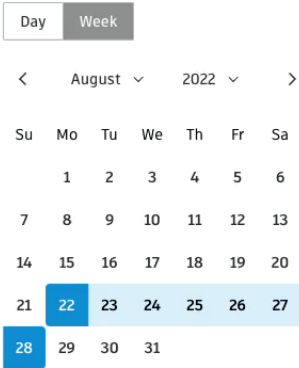
Reports

Members

Settings

Welcome, Ian

Calendar



22/08/2022 - 28/08/2022

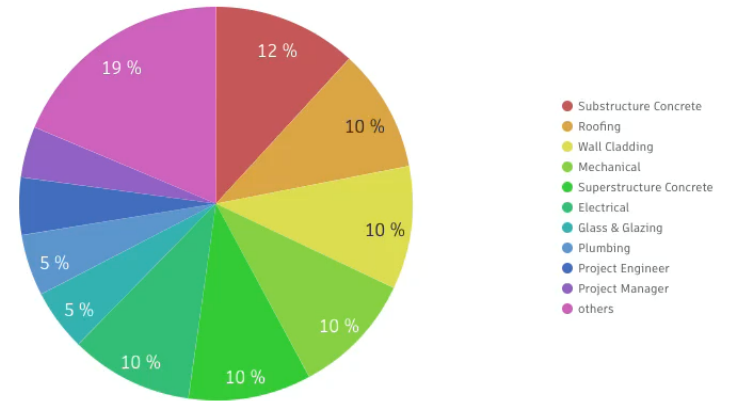
23/08 Today

25/08

On Site

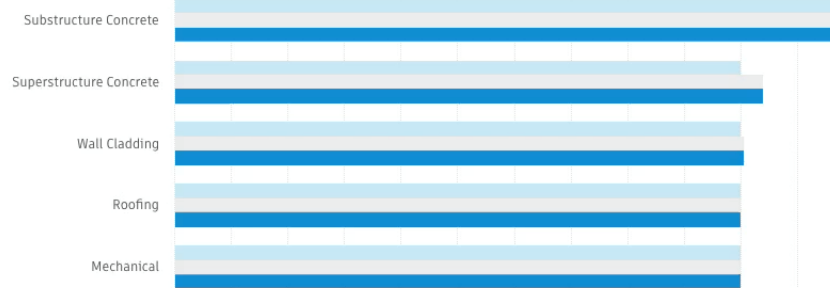
Contract : Superstructure

Original Budget



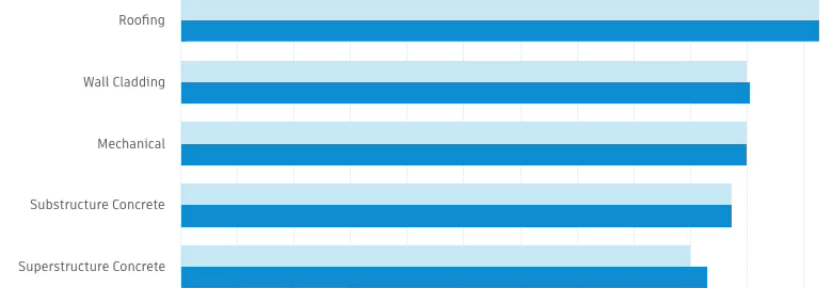
Budget Trend

Original Revised Projected



Cost Trend

Original Forecast



Why Arcadis chose Autodesk for cost management



How Arcadis Leverages Customization

The Challenge

- Cost Management of Ohio Turnpike's Tolling Collection System
 - 4 different individual projects
 - New toll collection equipment infrastructure at 20 Interchanges (Green locations), extending a total of 157 miles
 - Toll Plaza widenings at Interchanges
 - New Weigh-In-Motion detection equipment at 3 locations
 - New Automatic Traffic Recording equipment at 9 Interchanges.
- Daily field reports
- Real-time expense and budget tracking

How Arcadis Leverages Customization

The Workflow



How Arcadis Leverages Customization

Forms > Expenses



DAILY OBSERVATION REPORT

Ohio Turnpike
Project Name:

Date:
OTIC Contract #:
Toll Plaza #:

Day of Week: ☐ Sunday ☐ Monday ☒ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday

Weather: ☐ Clear ☒ Cloudy ☐ Overcast ☐ Rain ☐ Drizzle ☐ Snow ☐ Sleet ☐ Fog ☐ High Winds
High Temperature: _____ Low Temperature: _____ Precipitation Amount: _____
Time Lost: _____ Hrs
Comments:

Site Conditions: ☐ Excellent ☐ Good ☐ Fair ☐ Poor
Comments:

ACTIVITIES / CREWS / LOCATIONS (Prime Contractors)

Number of Personnel Onsite

Contractor	Supervisor	Operator	Laborer	Tradesman

Equipment	In Use	Not In Use	Equipment	In Use	Not In Use

Construction Activity:

Lanes Complete:

Comments:

Observed By: _____

Attachments: ☒ Photo Log
☐ Additional Information - See Comments

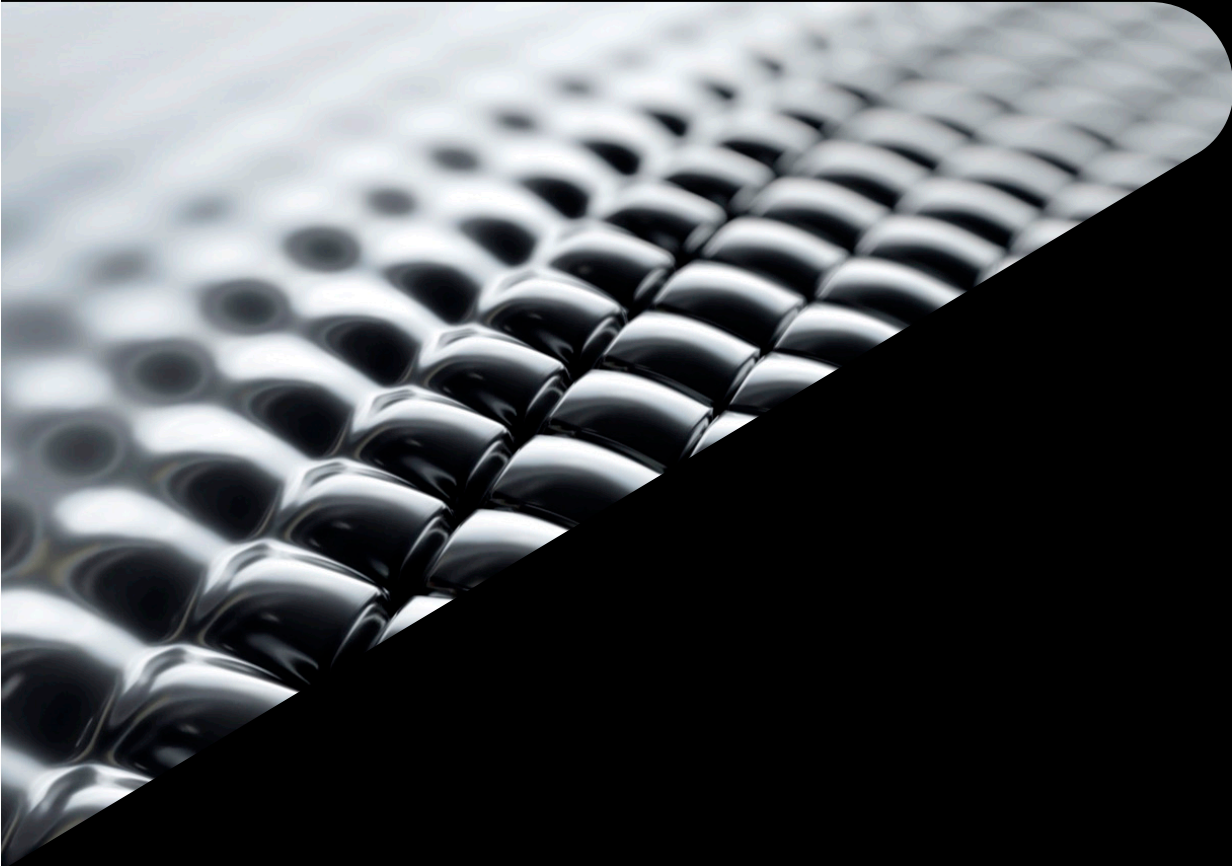
Cost

Contract Cost Payment Application Expense

+ Add from Contract

Import Export

Number	Name	Status	Budget Code	Budget Name	Qty	Unit	Unit Cost	Amount
Expand Collapse								
> #049 - 2022-07-21	#49 - 2022-07-21	Approved			1	ls	2,153.85	2,153.85
> #051 - 2022-07-22	#51 - 2022-07-22	Approved			1	ls	1,690.00	1,690.00
> #056 - 2022-07-25	#56 - 2022-07-25	Approved			1	ls	8,490.43	8,490.43
0001	33 - 632 - Conduit Riser Gantry, 4' ...		33.632.MTL	CONDUIT RISER GANTRY, 4', AS PE...	1		2,127.05	2,127.05
0002	33 - 632 - Conduit Riser Gantry, 4', ...		33.632.LBR	CONDUIT RISER GANTRY, 4', AS PE...	1		1,448.78	1,448.78
0003	53 - Special - AVI Cabinet Mounting...		53.SPECIAL.LBR	LANE CONTROL SIGNAL ENCLOSURE	2		119.34	238.68
0004	53 - Special - AVI Cabinet Mounting...		53.SPECIAL.MTL	LANE CONTROL SIGNAL ENCLOSURE	2		473.70	947.40
0005	33 - 632 - Conduit Riser Gantry, 4', ...		33.632.MTL	CONDUIT RISER GANTRY, 4', AS PE...	1		2,127.05	2,127.05
0006	33 - 632 - Conduit Riser Gantry, 4', ...		33.632.LBR	CONDUIT RISER GANTRY, 4', AS PE...	1		1,448.78	1,448.78
0007	49 - Special - Gantry Cabinet Mount...		49.SPECIAL.LBR	CABLE TRAY	1		127.14	127.14
0008	49 - Special - Gantry Cabinet Mount...		49.SPECIAL.MTL	CABLE TRAY	1		25.55	25.55
> #065 - 2022-07-26	#65 - 2022-07-26	Approved			1	ls	12,716.49	12,716.49
> #069 - 2022-07-27	#69 - 2022-07-27	Approved			1	ls	96.00	96.00
> #072 - 2022-07-28	#72 - 2022-07-28	Approved			1	ls	2,501.80	2,501.80
> #073 - 2022-07-28	#73 - 2022-07-28	Approved			1	ls	1,086.97	1,086.97
> #074 - 2022-07-29	#74 - 2022-07-29	Approved			1	ls	2,504.04	2,504.04
> #078 - 2022-08-02	#78 - 2022-08-02	Approved			1	ls	835.30	835.30
> #080 - 2022-08-03	#80 - 2022-08-03	Approved			1	ls	487.96	487.96
> #083 - 2022-08-03	#83 - 2022-08-03	Approved			1	ls	49.12	49.12
> #087 - 2022-08-05	#87 - 2022-08-05	Approved			1	ls	5,317.08	5,317.08
> #093 - 2022-08-08	#93 - 2022-08-08	Approved			1	ls	1,595.85	1,595.85



Integrations

Subtitle

Leading Integration Ecosystem

Breadth

210+ direct integration partners

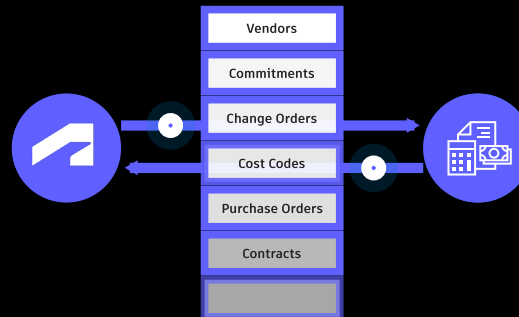
- APIs
- Partner Cards



Depth

Connects key critical workflows

- Growing list of ERPs



Flexibility

Supports custom workflows

- 100s of horizontal SaaS tools
- Templated workflows
- Consulting & support



Breadth: Over 210 Integration Partners



Partner Cards

Embedded browser-based applications

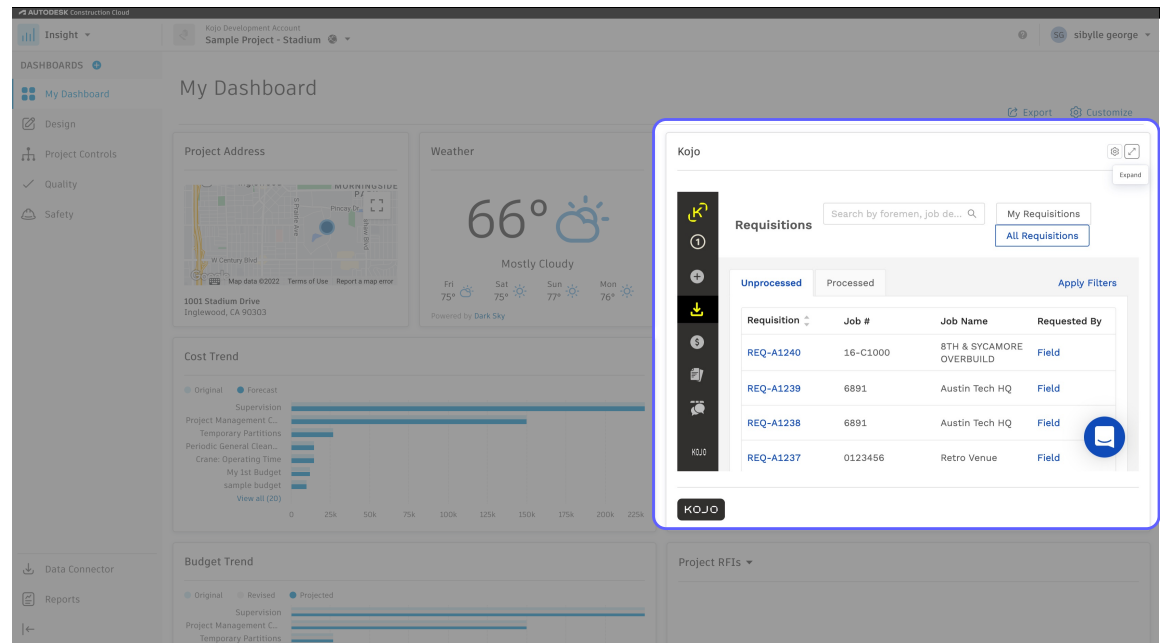
- Available in Autodesk Build & BIM 360
- BI & AI, Jobsite Cameras, Drones, Scheduling, etc.



API Integrations

Partners code prebuilt integrations

- Data & document workflows
- Primarily Build, Docs, Takeoff, BIM 360 & PlanGrid



The screenshot shows the Autodesk Construction Cloud 'My Dashboard' for a 'Sample Project - Stadium'. The dashboard includes sections for Project Address (1001 Stadium Drive, Inglewood, CA 90303), Weather (66°F, Mostly Cloudy), Cost Trend (bar chart comparing Original and Forecast), and Budget Trend (bar chart comparing Original, Revised, and Projected). A Kojo overlay window is open, displaying a 'Requisitions' table with columns for Requisition, Job #, Job Name, and Requested By. The table lists four requisitions, all requested by 'Field'. The Kojo overlay also includes a search bar, tabs for 'Unprocessed' and 'Processed', and an 'Apply Filters' button.

Requisition	Job #	Job Name	Requested By
REQ-A1240	16-C1000	8TH & SYCAMORE OVERBUILD	Field
REQ-A1239	6891	Austin Tech HQ	Field
REQ-A1238	6891	Austin Tech HQ	Field
REQ-A1237	0123456	Retro Venue	Field

“By having our schedule and our accounting cost management open next to Kojo, project managers will be able to align expenses, align purchase orders contracts, write a change order, and do RFQs.”

Jonathan Mabe, Eckardt Group

Depth: Growing ERP Integrations

Directly integrate your accounting data from your ERP system with your cost data in Autodesk Build, keeping your project and accounting teams in sync and your financial information completely up to date.

 Spectrum®

 sage Intacct

 ORACLE®
JD EDWARDS

 SAP

 xero

 Vista™

 sage 300

 CMiC
CONSTRUCTION SOFTWARE. EVOLVED

 intuit quickbooks.
Online

 MORPHEUS
TECHNOLOGY GROUP

 hh² Cloud
Services

 boomi

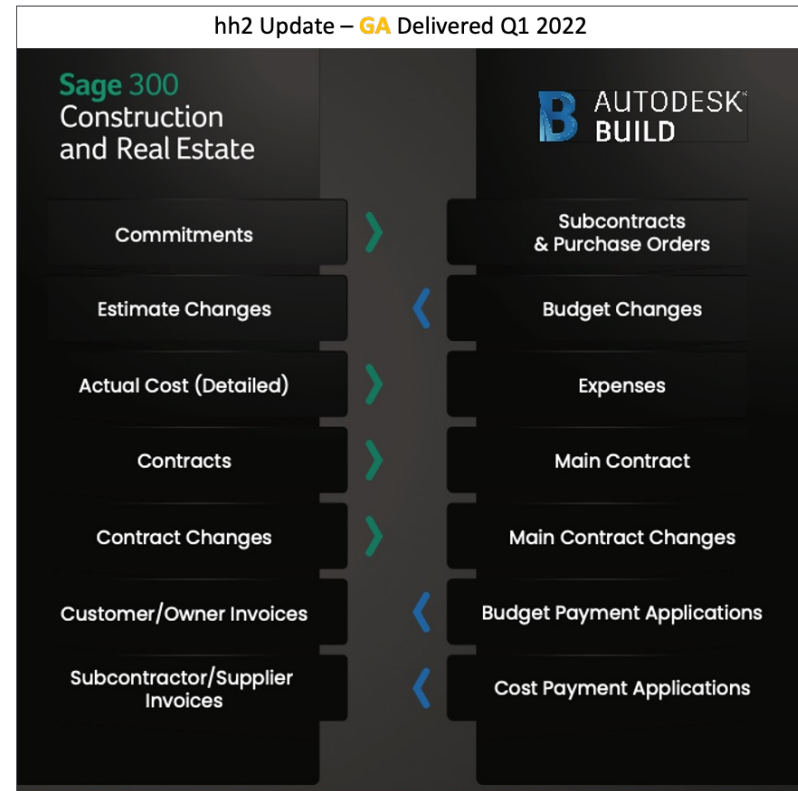
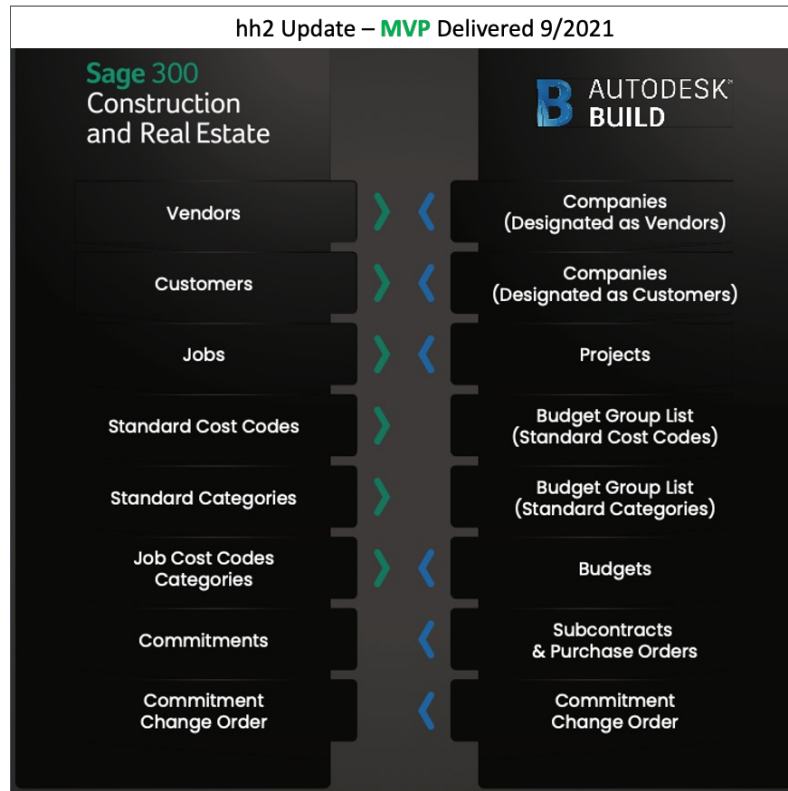
 AUTODESK
Construction Cloud Connect



HH2

Hh2 – Autodesk Build

Sage 300 CRE



UCM Integration

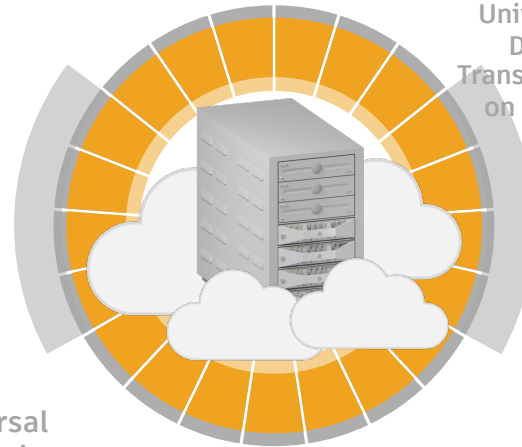


End User

Cost
Management



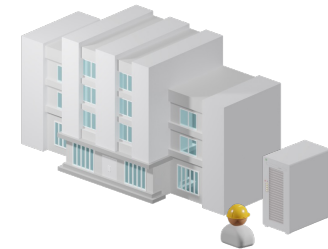
Universal
Integration
Controller



Universal
Construction
API
(REST-Based)

Universal
Data
Transformati
on Layer

Can auto-
recover from
intermittent
outages or
from IT
issues.



Sage 300 CRE
Customer

HH2 Demo






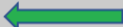

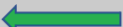



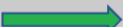


Morpheus Technology Group

Morpheus Technology Group

Viewpoint Vista, Viewpoint Spectrum, and JD Edwards



Data Flows – Autodesk Build + JD Edwards/Viewpoint

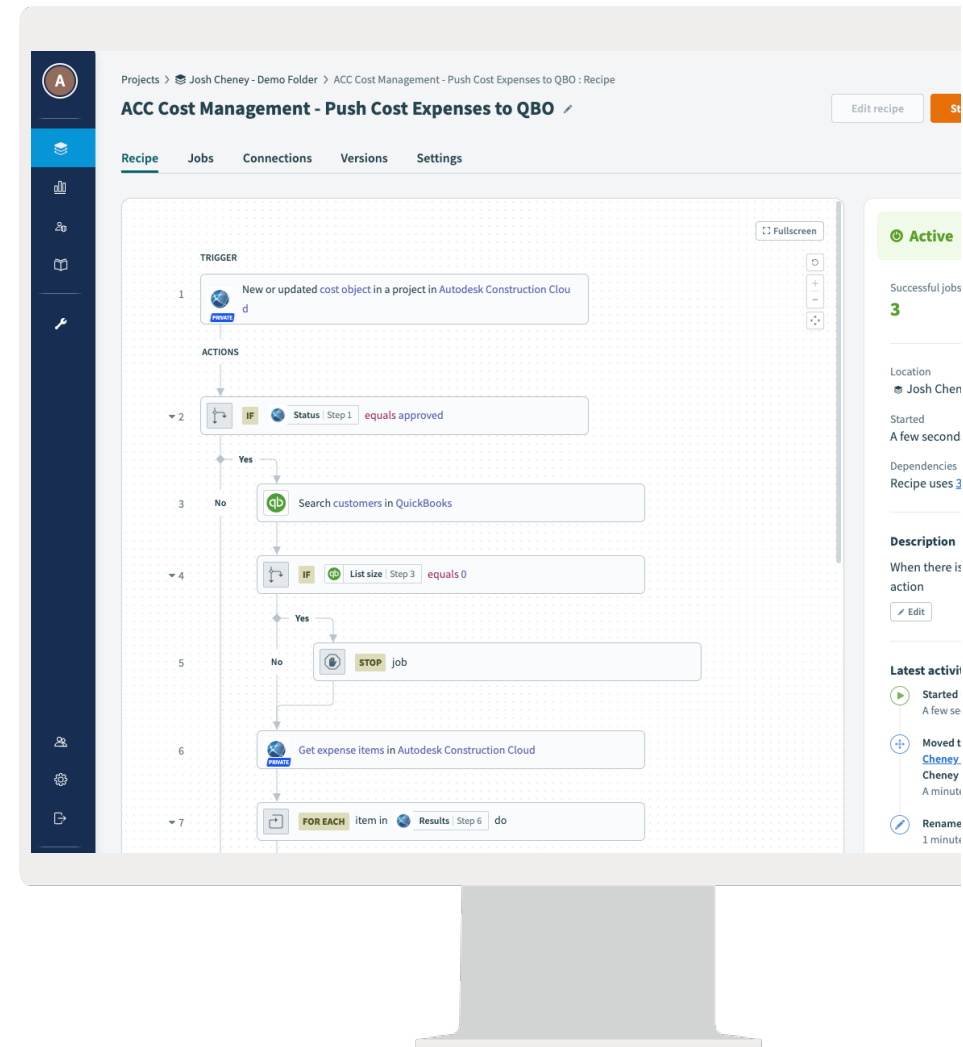
 AUTODESK® BUILD	Build → ERP	Build ← ERP	 ORACLE JD EDWARDS 
Projects			Jobs
Companies			Vendors
Prime Contract			Prime Contract
Original Budget			Original Budget
Division/Phase Codes/Cost Type			Division/Phase Codes/Cost Type
Revised Budget			Revised Budget
Commitments (POs & Subcontracts)			Commitments (POs & Subcontracts)
Commitment Change Orders			Commitment Change Orders
Budget View – Summary Actual Cost			JTD Costs - Summary

Flexibility: ACC Connect

Autodesk Construction Cloud Connect is an out-of-the-box, no-code platform that allows you to create flexible integrations with critical software systems such as ERPs, eSignatures, CRMs, etc.

BENEFITS

- Library of 200+ applications
- Create integrations in minutes, not months
- Route files and data per your processes
- Leverage triggers between systems
- Automate daily tasks & reduce error
- Drive productivity



Questions?



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