Transforming Construction and Improving Efficiency Using BIM 360

Marco Bonelli – Shervin Dehbozorgi

BIM Manager – UK BIM Lead

BUILDERS SISK CONTRACTORS Established 1859

AUTODESK. UNIVERSITY

About the speaker

Marco Bonelli, MEng GMICE

BIM manager with 10 years of experience in the UK and Italy.

Formerly a structural engineer with experience in residential and educational schemes.

Currently managing the digital delivery of 2 major projects in Wembley with project value over 500m£. Responsible for increasing the Digital Capacity and BIM delivery of John SISK South UK Business unit.

About the speaker

Shervin Dehbozorgi

Shervin brings strong Digital Construction experience from major Construction and infrastructure background. In the last 5 years he has been working with major Contractors in UK to support the strategic implementation of BIM, Information management and use of innovative technologies across their organisation. Being part of business improvement core team enabled him to explore and develop cross-functional procedures that contributed into wider digital transformation across the business.

About Us

Five Generations Leading an International Business

John Sisk & Son, member of the SISK Group, is an International Construction Company who place a strong emphasis on performance, quality, teamwork and a “hands-on” management approach to ensure client satisfaction. Family ownership for five generations has set the cultural tone for John Sisk & Son. We have been Building Excellence for over 150 years by building trust, certainty and value for our clients.

1859

John Sisk establishes his business in Cork

1906

John V Sisk joins his father in running the company as equal partner

1931

John G Sisk joins the company after receiving a degree in Civil Eng. He moves the company to Dublin.

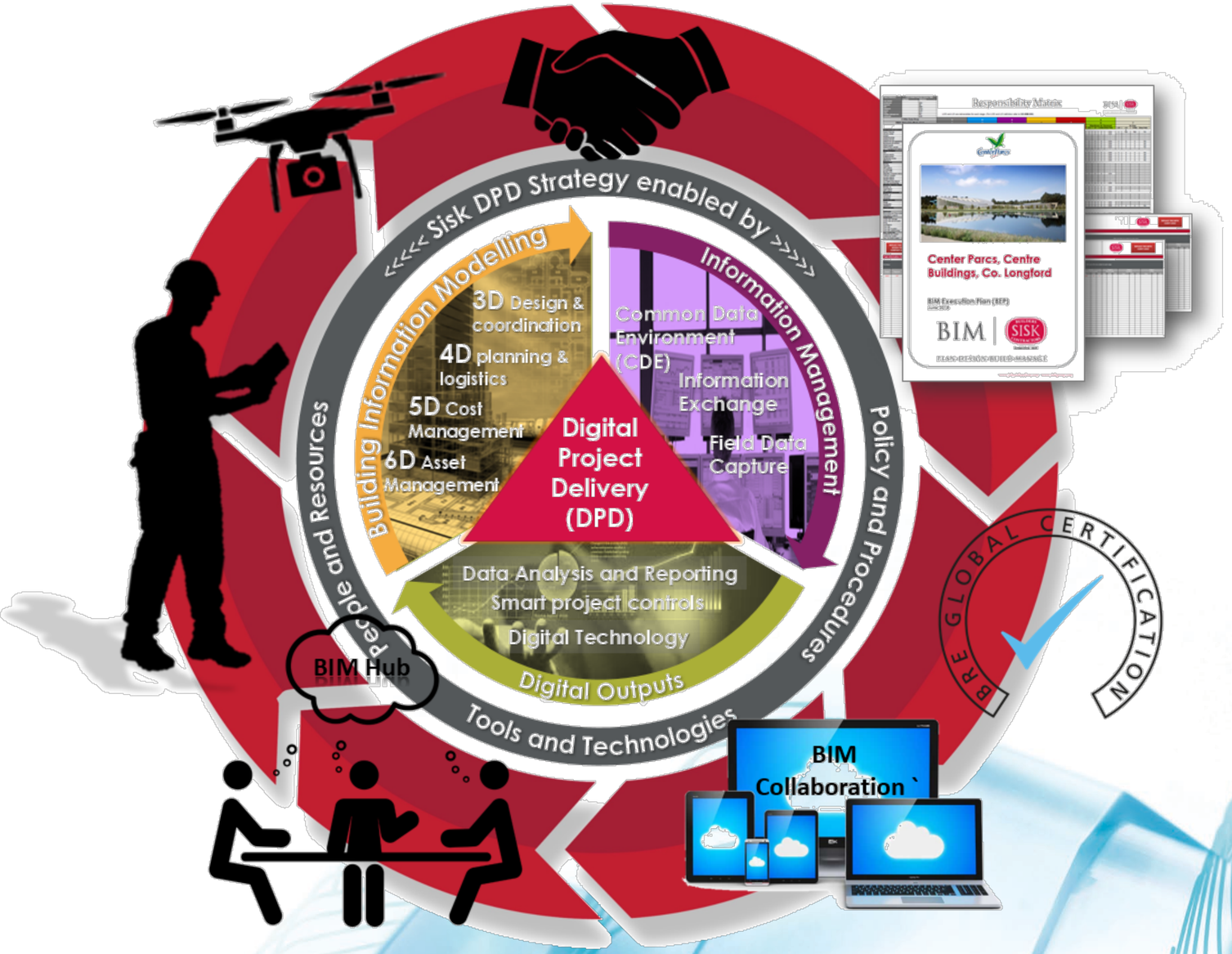
1966

George H Sisk joins the family business to lead it into the 21st Century

Present

The 5th Generation - continued ownership and management of business exceeding € 1 Billion.

Our Digital Project Delivery Approach



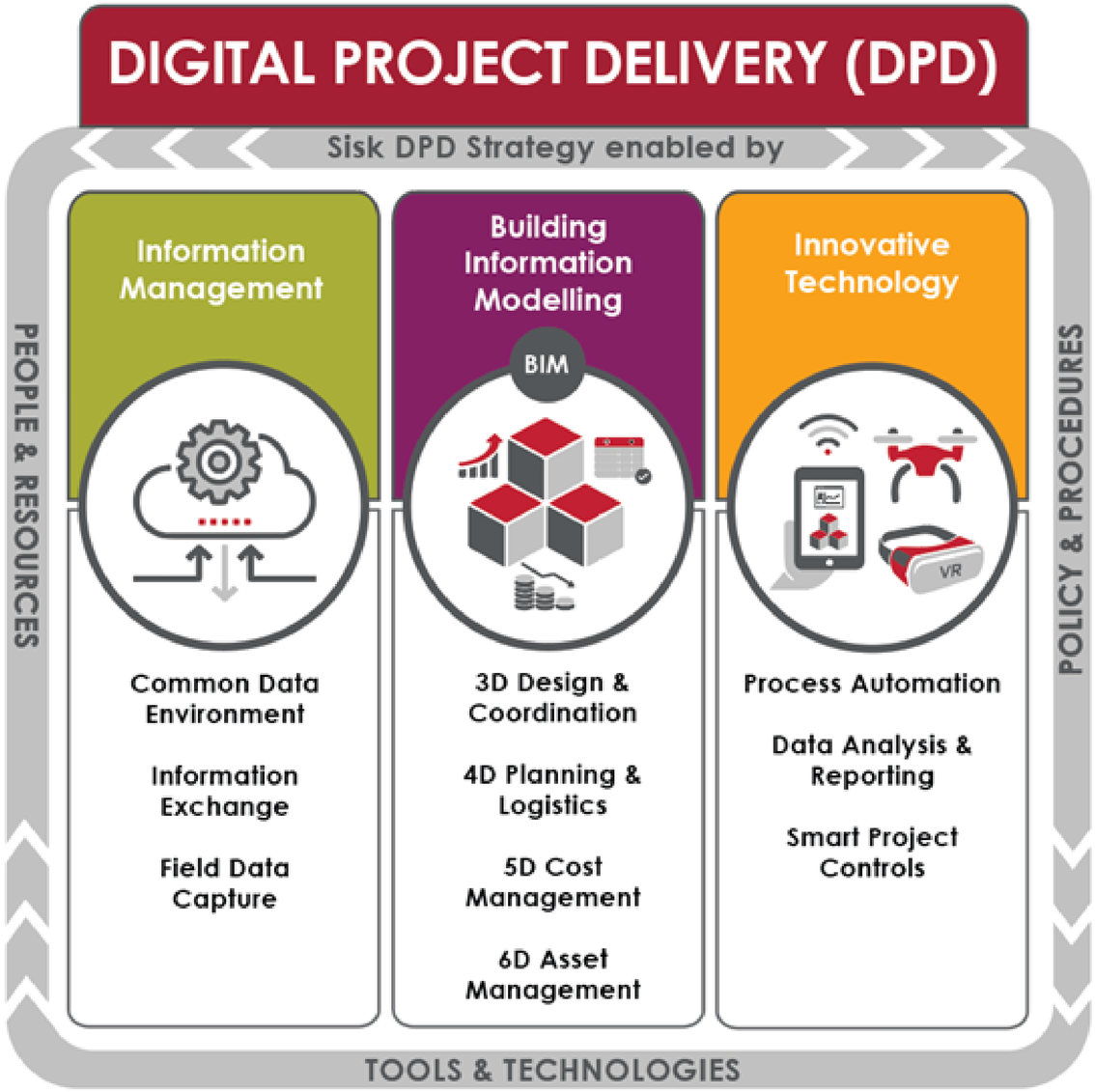
DPD Strategy

“Digital Project Delivery (DPD) enables the digitisation of the processes in which our projects are designed, constructed and handed over through collaboration and innovative technology.”

DPD maximises the benefits through:

- Enhanced **Collaboration**
- Identifying and mitigating **Risk**
- Improving **Productivity**
- Improving **Efficiency**
- Improving **Quality**

Throughout the whole lifecycle of a project.

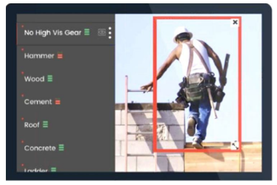


DPD Activities

Mobile BIM stations and Interactive screens
for enhanced collaboration with supply chain

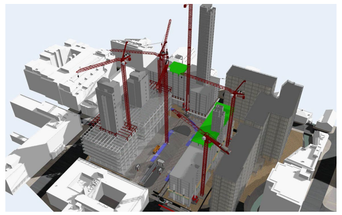
AI and Machine vision
for automated site hazard identification

SMARTVID.IO



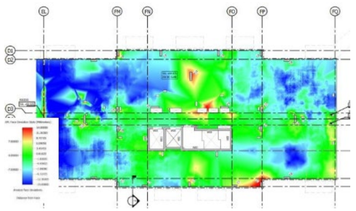
Field Digital tools
for Quality Assurance and site data capture

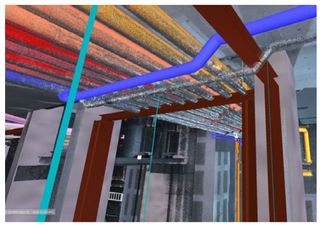
AUTODESK BIM 360™ FIELD



4D Planning
for programme tracking, Logistics & Construction sequencing

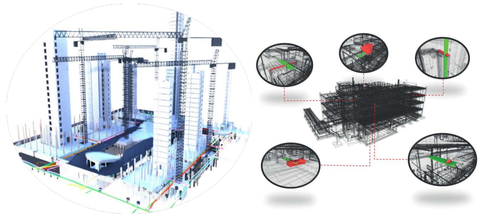
SYNCHRO SOFTWARE





3D laser scanning
for RC slabs & MEP installation

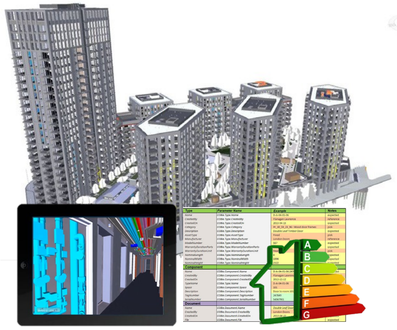
Leica Geosystems



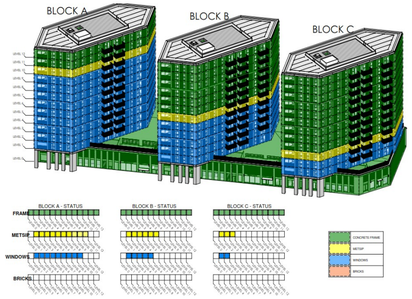
Integrated 3D Design coordination

Delivering Asset data for Facility Management

ZUTEC BUILDING KNOWLEDGE

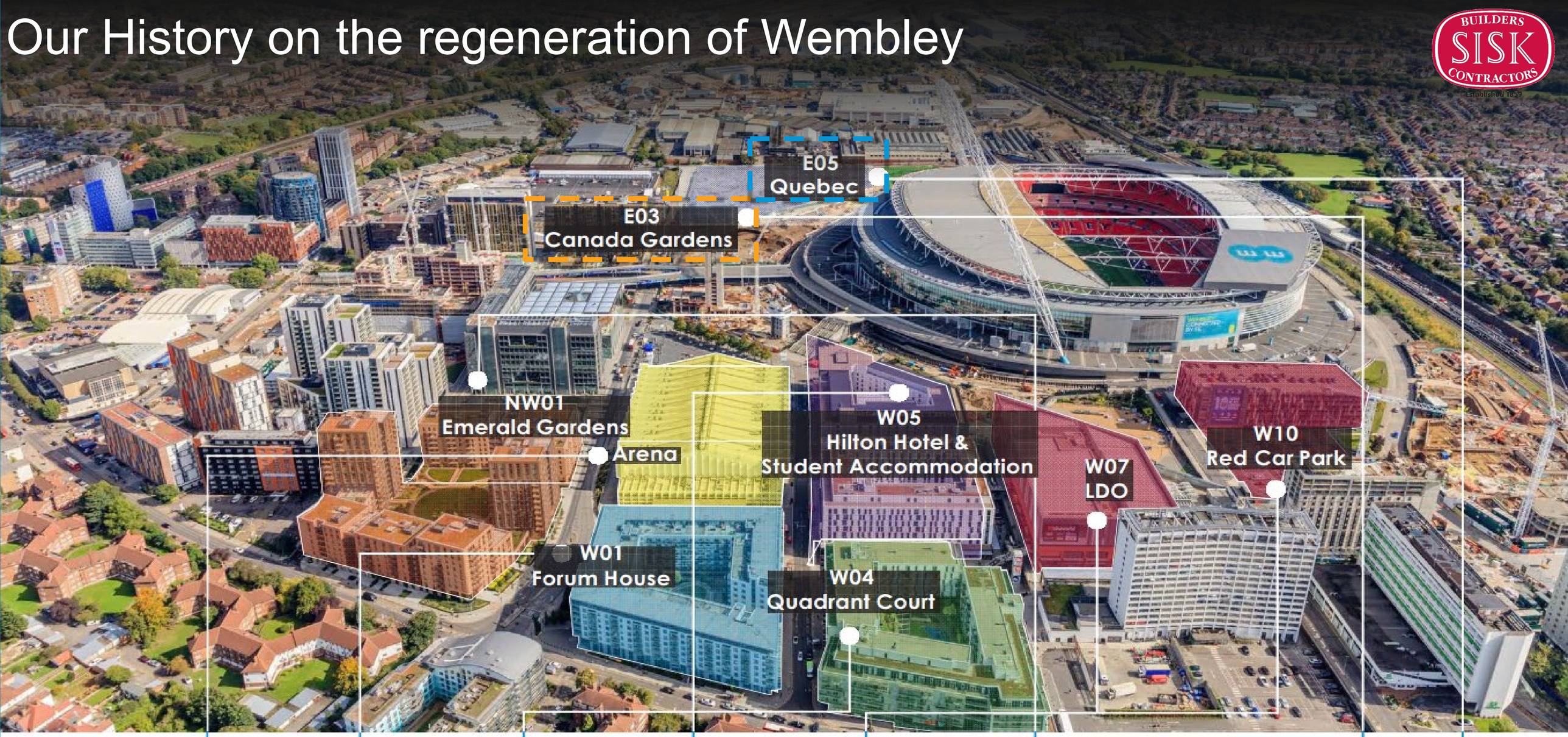


Smart 3D Progress Tracking



AUTODESK UNIVERSITY

Our History on the regeneration of Wembley



2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021

Arena — W01 — W04 — W05 — W07& W10 — NW01 — E03 — E05

In Partnership with:

Our History at Wembley

- Over 14 years relationship
- 7 project completed + 2 on-going
- Refurbished of Wembley Arena
- Nearly 1000 residential apartments + 1200 ongoing
- 351 Hilton hotel rooms

- 660 student accommodation
- 1000 space multi-storey car park
- 110 retail units
- 9 screen cinema

E03 Canada Gardens

- 743 apartments
- 7 blocks
- 1.2 acre landscape podium
- 29 storey residential tower
- 81 coach park spaces
- Energy center to provide energy to 10,000 flats
- Completion 2020

E05 Quebec

- 458 apartments
- 3 blocks
- 1 acre landscape podium
- 22 storey residential tower
- 60 coach park spaces
- 250 car park space in 2 levels underground basement
- Completion 2021

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Data is the new oil. It's only useful when it is refined!

Jess Greenwood

"Which is the current status of.."
Common query from PM/PD

"Can I pay the subcontractor? Has the job been completed?.."
Common query from commercial team

"We need a meeting to understand the overall status"
Common query from PM/PD

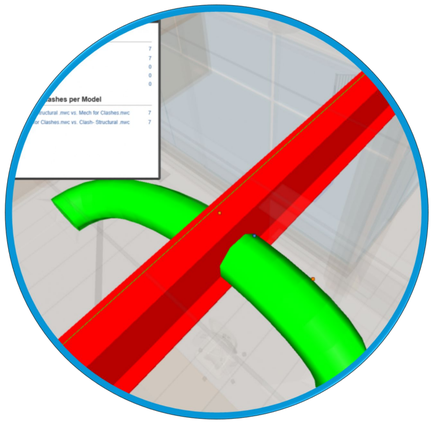
Can 3D Models help Us?

How are we using 3D Models?

VISUALISATION

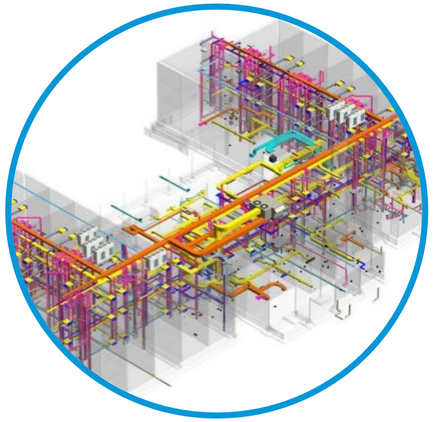
- Design / Drawing Production
- 3D Details
- CGI
- Virtual reality

CLASH DETECTION



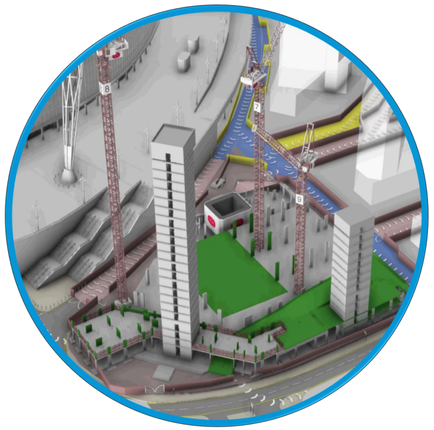
- Clash avoidance
- Cost Avoidance

MODEL COORDINATION



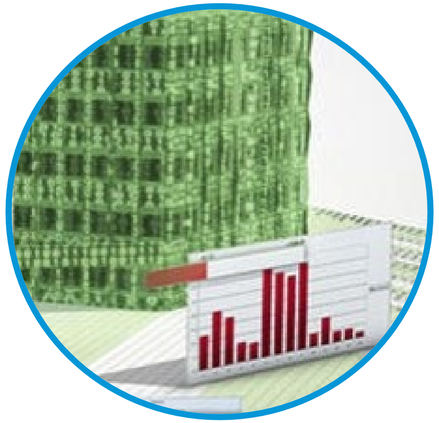
- Digital Twin
- Fully coordinated 3D Project

4D MODELLING



- Construction Simulation
- Logistic

5D MODELLING



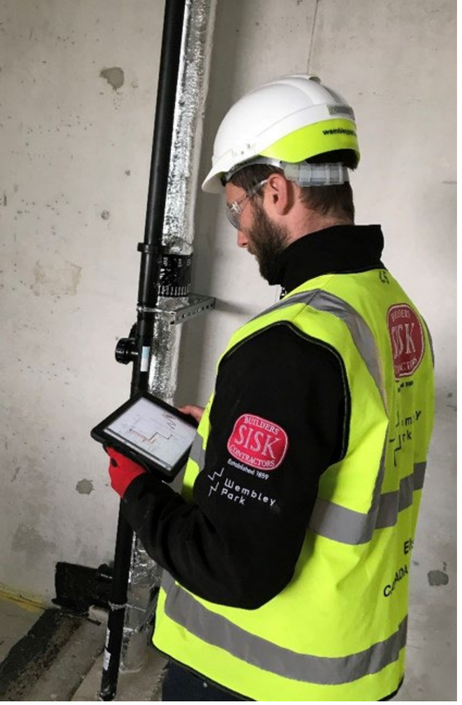
- Quantity take-off
- Costs

Where these models are mainly used?

Office

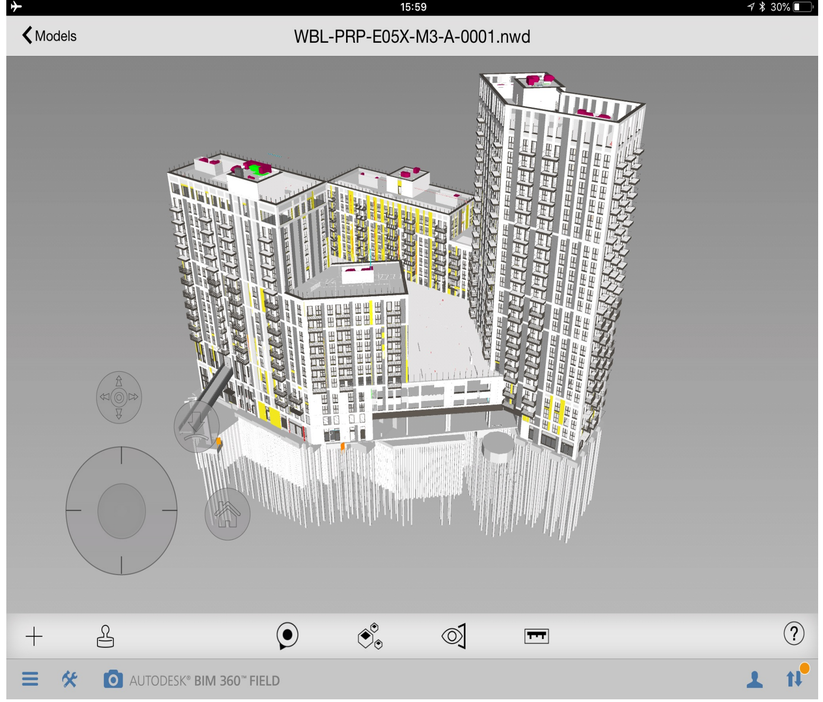
Construction Site

BUILDERS
SISK
CONTRACTORS
Established 1859
How to Digitalize
site activities ?



USE OF TABLET ON SITE

USE OF QR CODES ON MATERIAL



3D MODEL ON IPAD

DRONES

Current Digital sites activities

- We started our research from the common digital site activities;
- We focused on how to implement these existing activities to be able to have:

“The single source of truth”

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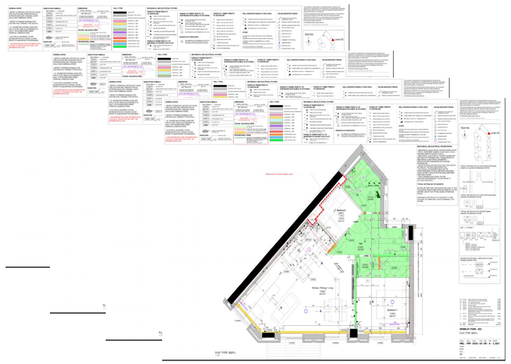
Key Starting points

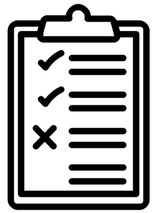
ONE SOURCE OF TRUTH

1.
USE OF 3D MODEL ON SITE

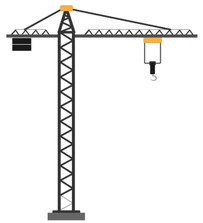
2.
LINK MOST UP TO DATE DRAWINGS



3.
LINK ALL SITE ACTIVITIES

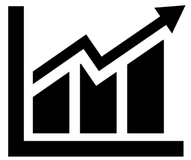


QA/QC



SITE TRACKING/ MONITORING

4.
LINK PROGRAM & PROJECT MANAGEMENT



PROJECT MANAGEMENT

DASHBOARD

Which Solution to use?

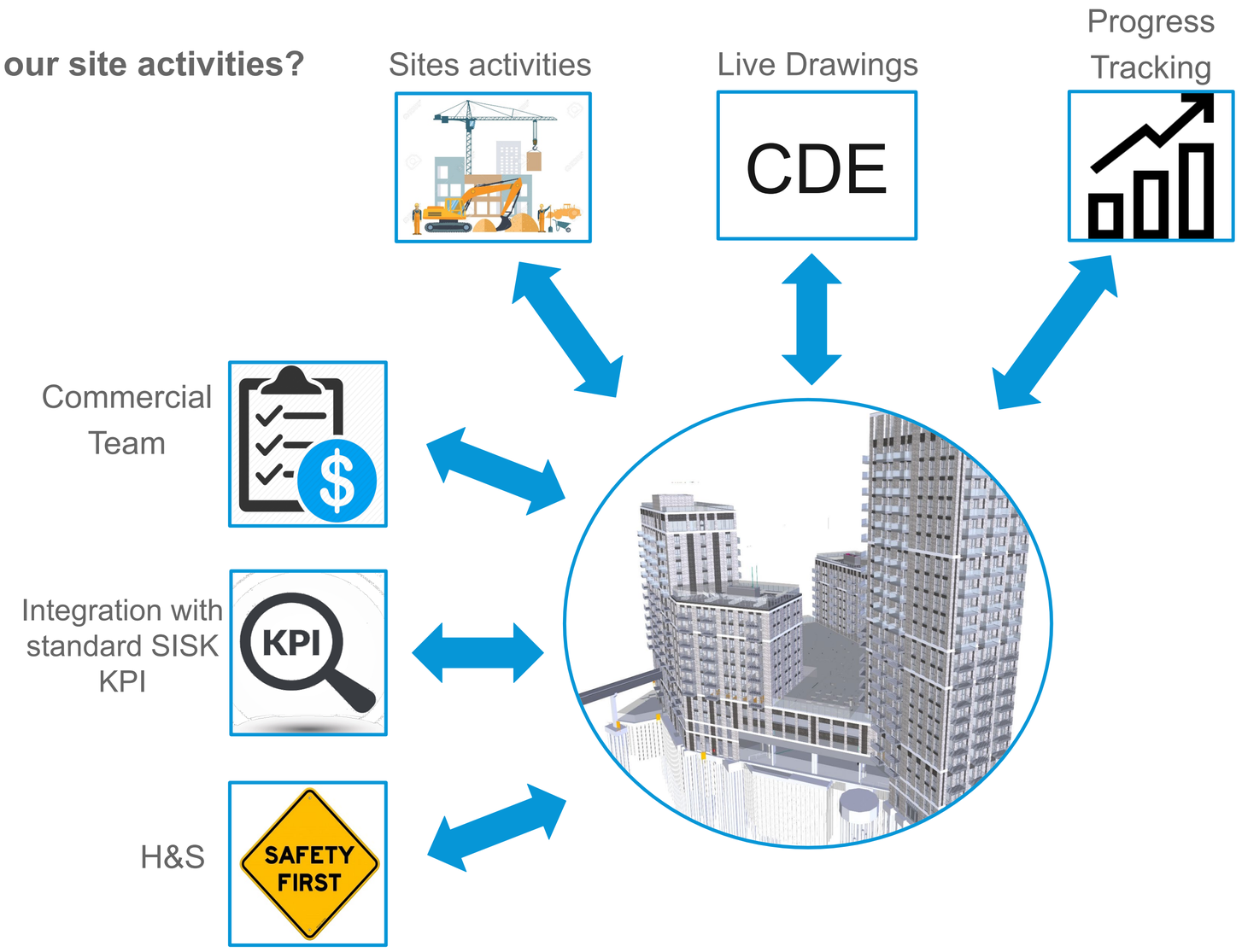
How these models can become the core of our site activities?

- 10 Architectural models
- 16 MEP models
- 6 Structural models
- 4 Landscape models

AUTODESK® BIM 360™ FIELD

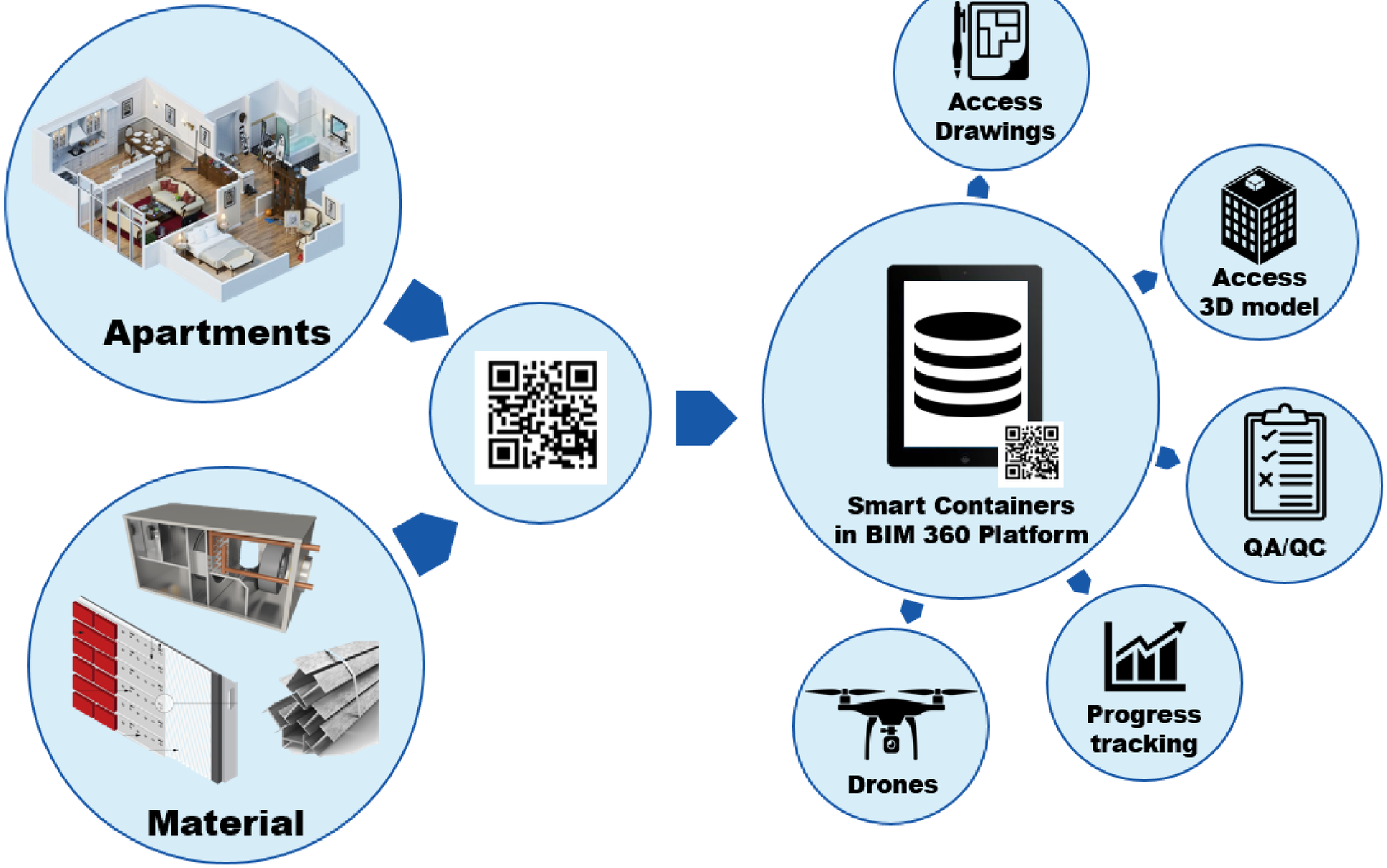
+

DIGITAL SMART CONTAINER (DSC)



Digital Smart Container

The Idea



Digital Smart Container Step by Step

1. Identify Key Project Figures

- BIM Manager

- Manage all the 3D BIM Information and integration
- Delivery digital innovation
- Coordinate the digital activities

Planner

- Plan all the site activities
- Coordinate the program VS site information

Project Manager

- Coordinate all site activities
- Manage Digital QA
- Manage completion status
- Define the use of the live dashboard

Document controller/Admin

- Manage the platform

H&S Manager/ Advisor

Site Manager/Engineer

2. Identify areas where to use it

Flats

- Entire flat volume is treated as an object;
- Flat linked to 2D color-coded drawings;
- Flat linked to contractual program;
- Flat linked to live dashboard.

Precast Façade Panels

- Panel linked to 2D color-coded drawings;
- Panel linked to contractual program;
- Panel linked to live dashboard.

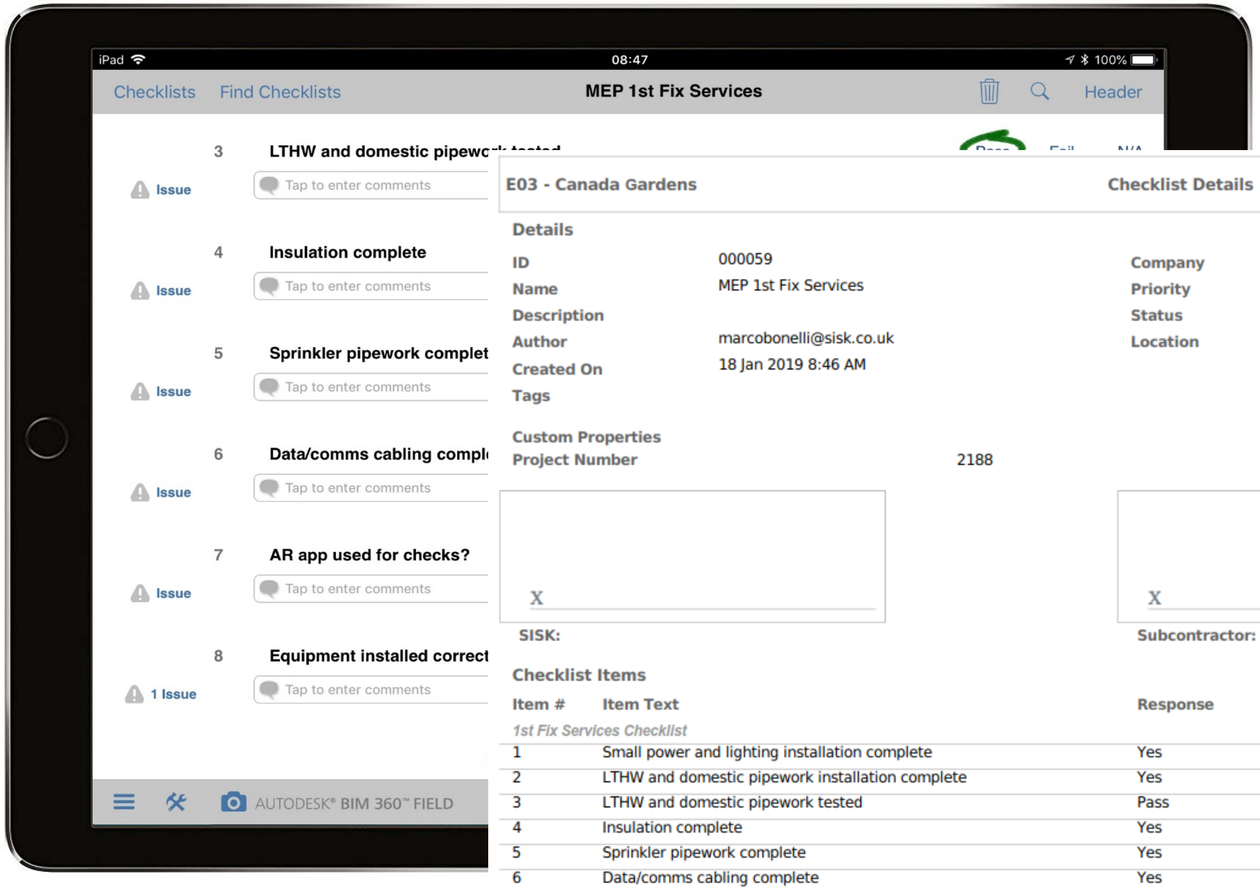
Bathroom Pods

- Bathroom linked to 2D color-coded drawings;
- Bathroom linked to contractual program;
- Bathroom linked to live dashboard.

3. Create Digital QA & Handover System

Types of checks

- 1,200 flats
- 18 different checks per flats
- **21,600 Total checks**



E03 - Canada Gardens — **Checklist Details**

Details

ID	000059	**Company**	John SISK
Name	MEP 1st Fix Services	**Priority**	
Description		**Status**	Open
Author	marcobonelli@sisk.co.uk	**Location**	Block A > Level 01 > A-1D
Created On	18 Jan 2019 8:46 AM		
Tags			

Custom Properties

Project Number 2188

X — **SISK:**

X — **Subcontractor:**

Checklist Items

Item #	Item Text	Response	# Issues
1st Fix Services Checklist			
1	Small power and lighting installation complete	Yes	0
2	LTHW and domestic pipework installation complete	Yes	0
3	LTHW and domestic pipework tested	Pass	0
4	Insulation complete	Yes	0
5	Sprinkler pipework complete	Yes	0
6	Data/comms cabling complete	Yes	0
7	AR app used for checks?	Yes	0
8	Equipment installed correctly as per 3D model? (AR check)	No	1

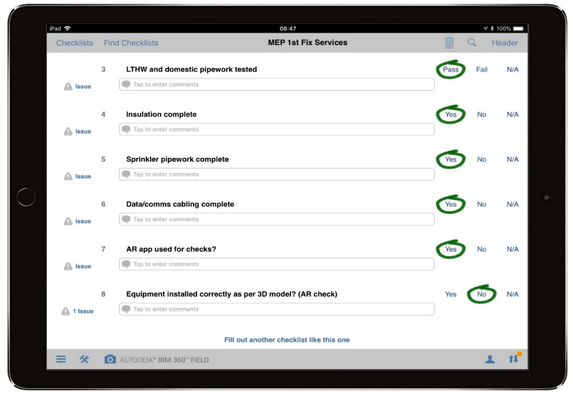
Issue ID	Description	Type	Status	Company	Date Created	Due Date
MB-00067	Equipment installed correctly as per 3D model? (AR check)	QA/QC	Open	John SISK	18 Jan 2019	

3. Create Digital QA & Handover System

Digital Handover to different Subcontractor

- 1,200 flats
- 18 different handover per flats
- **21,600 Total Handover**

Digital Handover



- Area (Flat, Floor)
- Which type of work to commence
- Which subcontractor
- Start of proposed works

Following Day

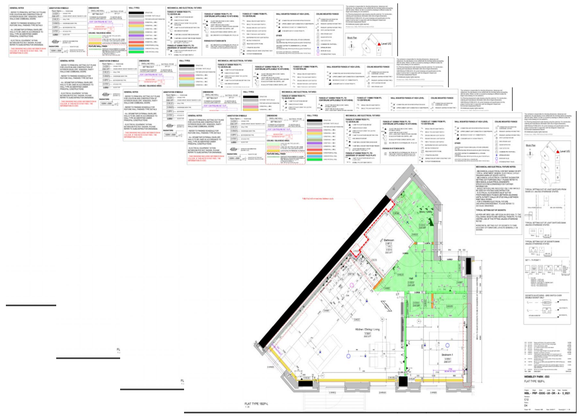
7:00 AM

Automatic Notification

- Subcontractor receive a notification with all needed information included

4. Link all the live information to the Digital Container

Drawings

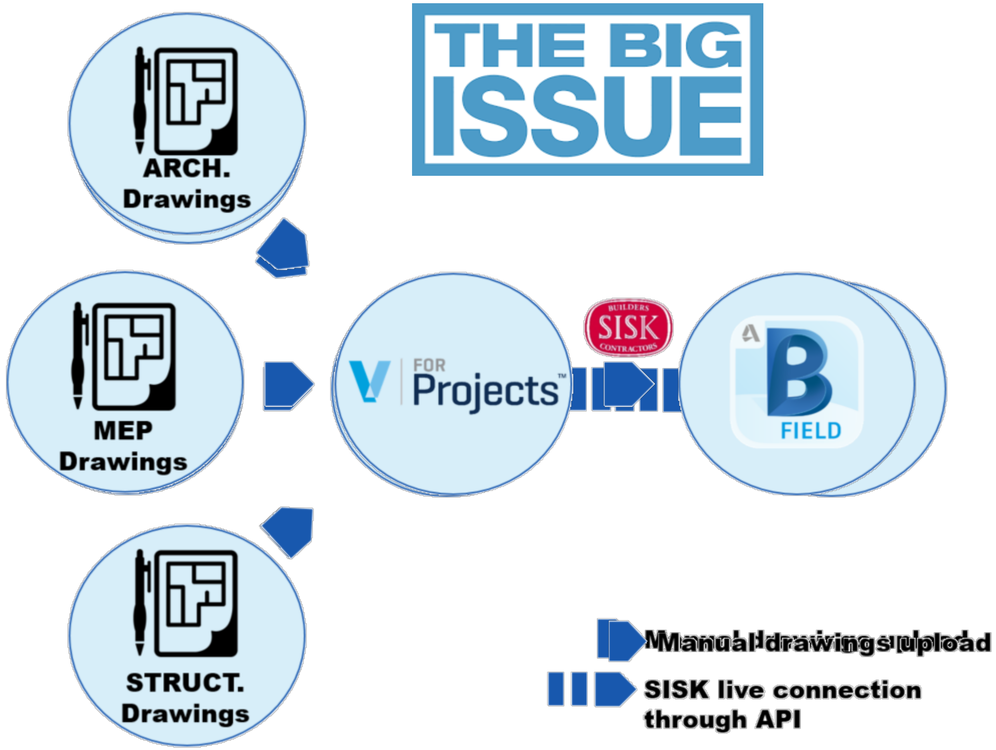


- 2,500 live drawings available on the IPad

3D Models

- 34 live models available on the IPad

How to keep up-to date the library



CRITERIA OF DRAWINGS UPLOAD

- Uploaded with Construction status
- Status A or B

Block	Floor	No of panels	Start	Finish
BLOCK I	0	25	24-Jun-19	01-Jul-19
	1	19	02-Jul-19	08-Jul-19
	2	21	09-Jul-19	15-Jul-19
	3	20	16-Jul-19	22-Jul-19
	4	30	23-Jul-19	01-Aug-19
	5	28	02-Aug-19	12-Aug-19
	6	30	16-Sep-19	25-Sep-19
	7	28	26-Sep-19	04-Oct-19
	8	30	07-Oct-19	16-Oct-19
	9	26	17-Oct-19	24-Oct-19
	10	27	25-Oct-19	01-Nov-19
	11	26	04-Nov-19	11-Nov-19
	12	27	12-Nov-19	19-Nov-19
	13	26	20-Nov-19	27-Nov-19
	14	27	28-Nov-19	04-Dec-19
	15	26	05-Dec-19	11-Dec-19
	16	27	12-Dec-19	18-Dec-19
	17	26	19-Dec-19	08-Jan-20
	18	27	09-Jan-20	15-Jan-20
	19	26	16-Jan-20	22-Jan-20
	20	27	23-Jan-20	29-Jan-20
	21	26	30-Jan-20	04-Feb-20
	22	98	05-Feb-20	26-Feb-20
	23	29	27-Feb-20	03-Mar-20

Block	Floor	No of panels	Start	Finish
BLOCK H	0	24	16-Sep-19	20-Sep-19
	1	33	23-Sep-19	30-Sep-19
	2	50	01-Oct-19	14-Oct-19
	3	24	15-Oct-19	21-Oct-19
	4	32	22-Oct-19	30-Oct-19
	5	33	31-Oct-19	08-Nov-19
	6	33	11-Nov-19	19-Nov-19
	7	33	20-Nov-19	28-Nov-19
	8	33	29-Nov-19	09-Dec-19
	9	33	10-Dec-19	18-Dec-19
	10	32	19-Dec-19	09-Jan-20
	11	21	10-Jan-20	15-Jan-20
	12	21	16-Jan-20	21-Jan-20
	13	21	22-Jan-20	27-Jan-20
	14	21	28-Jan-20	31-Jan-20
	15	21	03-Feb-20	06-Feb-20
	16	41	07-Feb-20	17-Feb-20
	17	32	18-Feb-20	26-Feb-20
	18	8	27-Feb-20	28-Feb-20

Block	Floor	No of panels	Start	Finish
BLOCK K	0	31	12-Aug-19	16-Aug-19
	1	23	19-Aug-19	23-Aug-19
	2	39	27-Aug-19	06-Sep-19
	3	27	09-Sep-19	13-Sep-19
	4	32	16-Sep-19	23-Sep-19
	5	32	24-Sep-19	30-Sep-19
	6	32	01-Oct-19	07-Oct-19
	7	32	08-Oct-19	14-Oct-19
	8	32	15-Oct-19	21-Oct-19
	9	29	22-Oct-19	29-Oct-19
	10	29	30-Oct-19	08-Nov-19
	11	34	11-Nov-19	15-Nov-19

We link the program to identify:

5. Planning

- Planner is a key figure to make the system works.
- Data included in DSC are linked to construction program.

FLATS:

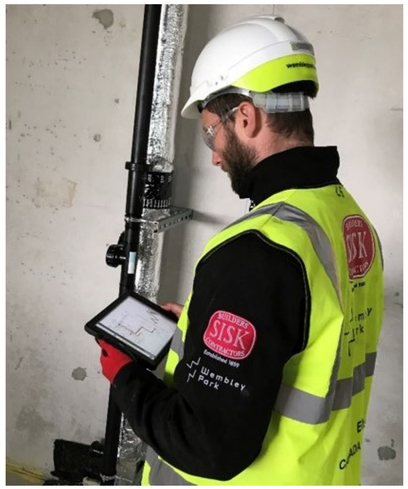
- Handover date;
- Completion date;
- Main key milestone;

FAÇADE:

- Delivery date
- Installation date

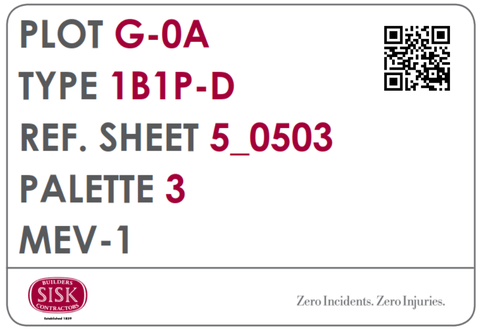
6. Data Capture

Use of Digital Tool



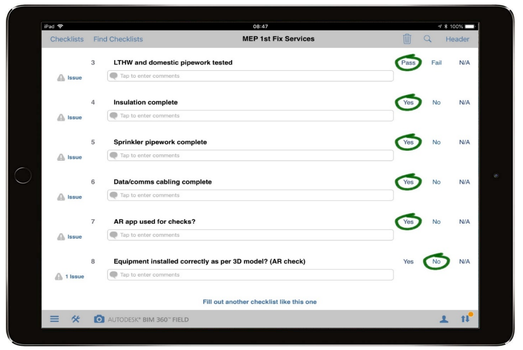
- All SISK site staff is equipped with a digital tool to be able to perform inspection

Scan of QR Code



- Label added at flat entrance to include QR Code

Required action on the iPad



- View most up to date drawings;
- View/interrogate 3D model of that area;
- Perform QA/QC;
- Perform QA on 3D model;
- Perform Handover;
- Update flat status;
- Permit;
- Material.

Sync Data

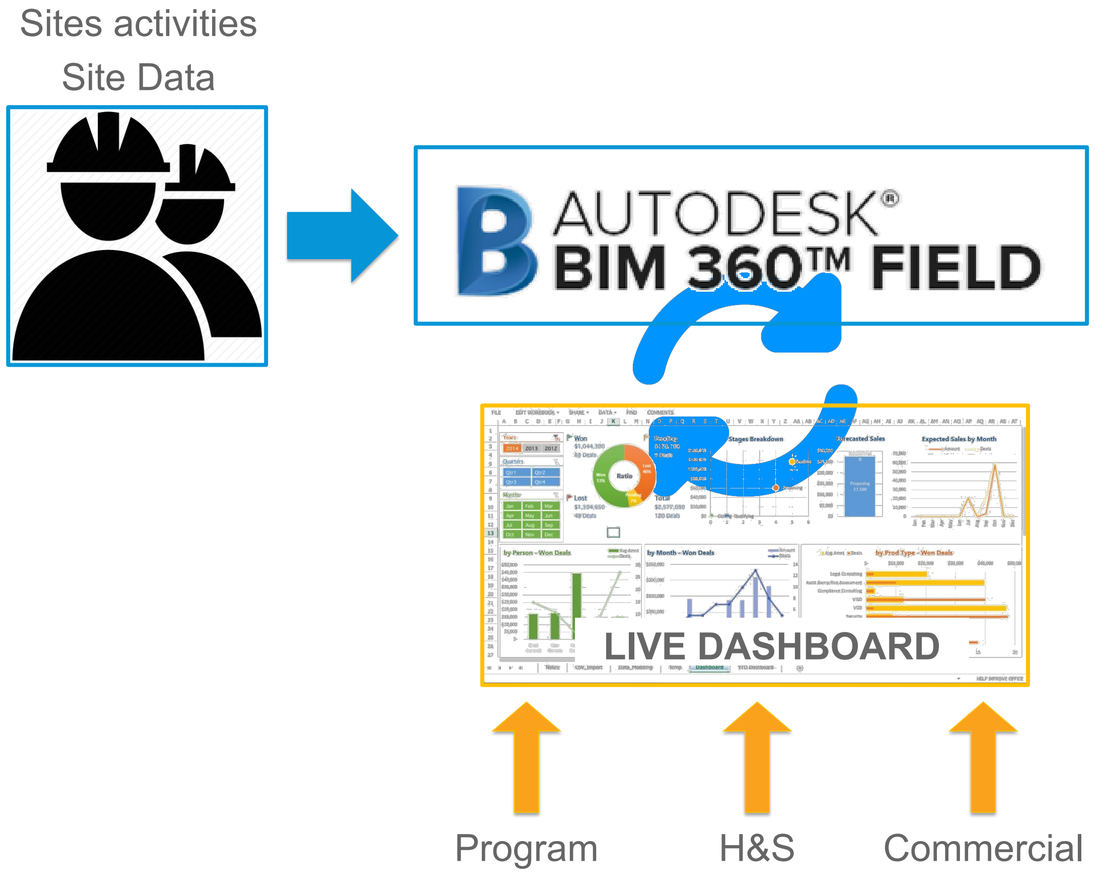
- Once in the office data get synchronized with cloud platform;
- Data pushed to live dashboard

7. Data Management

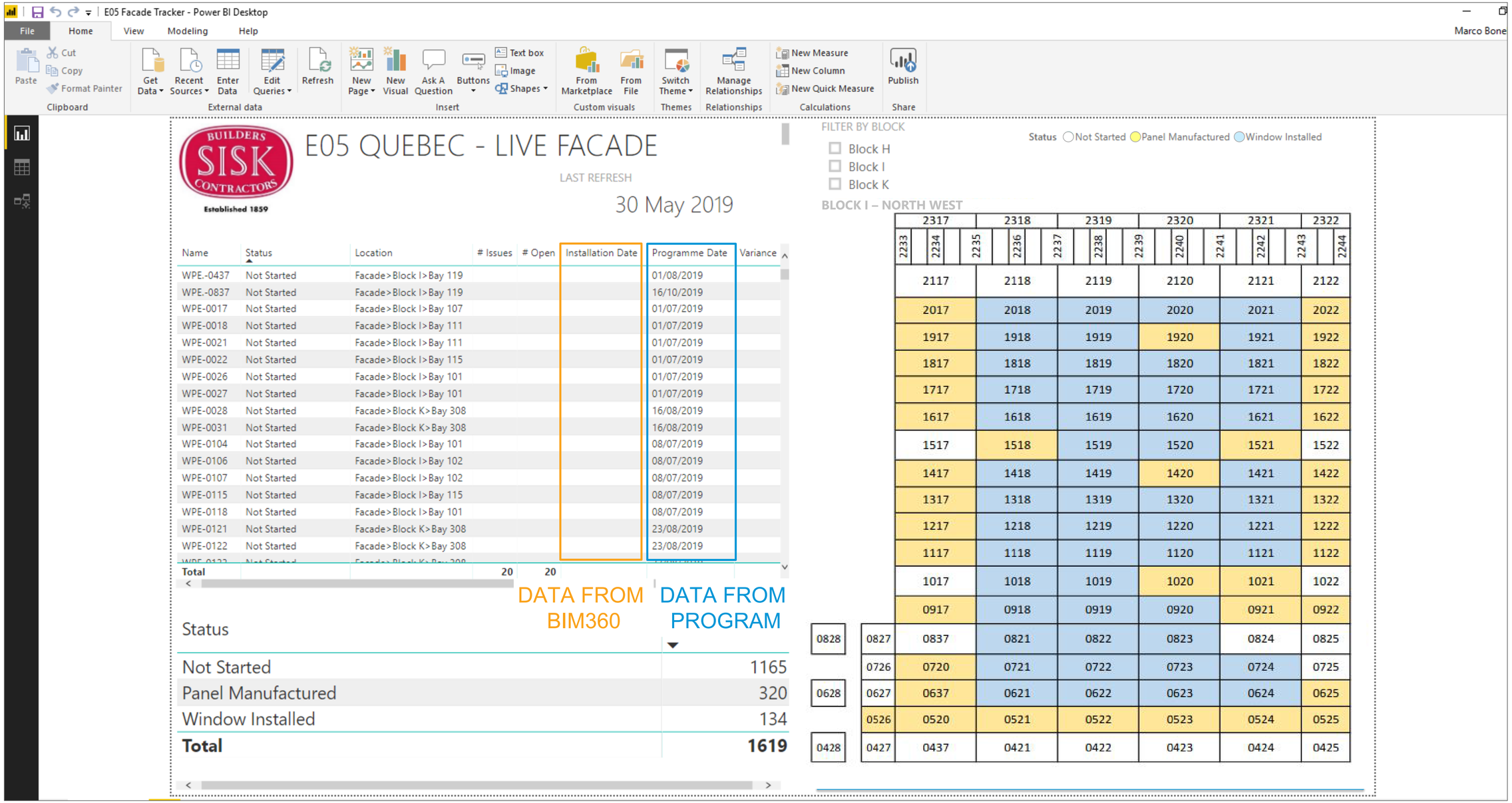
How we refine all the site data

FLAT

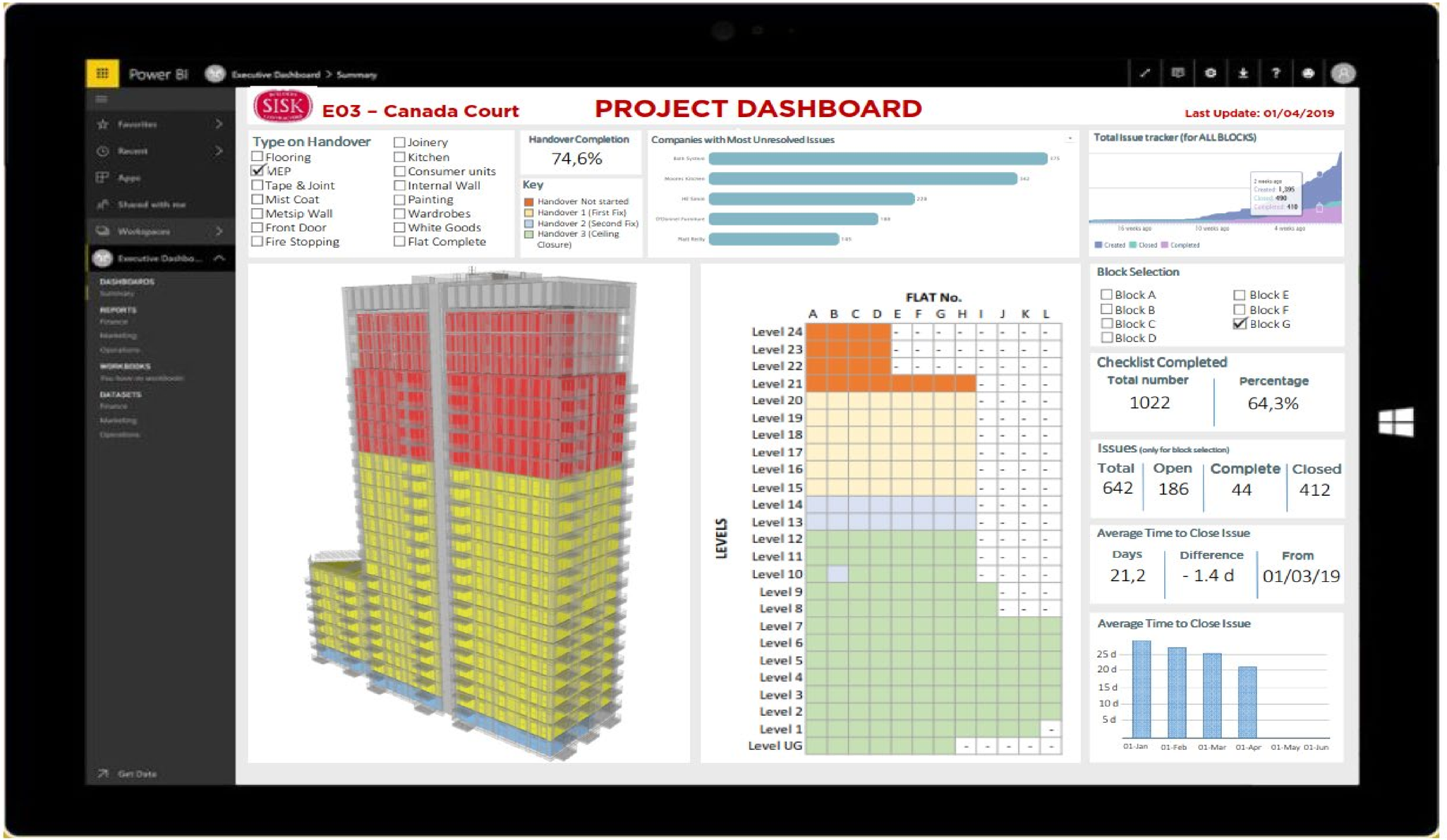
- Program information
- Commercial information
- 2D/3D information
- Start date
- Subcontractor involved
- Permit
- QA/QC data
- Issues – Open/ Work complete/Closed;
- Status/Handover
- Material
- H&S
- etc.…
- Completion date, program/actual



7. Data Management – Live Dashboard



7. Data Management – Live Dashboard

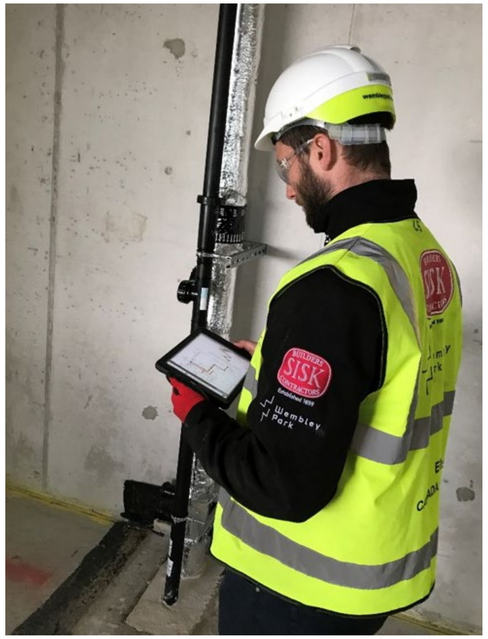


Added Values

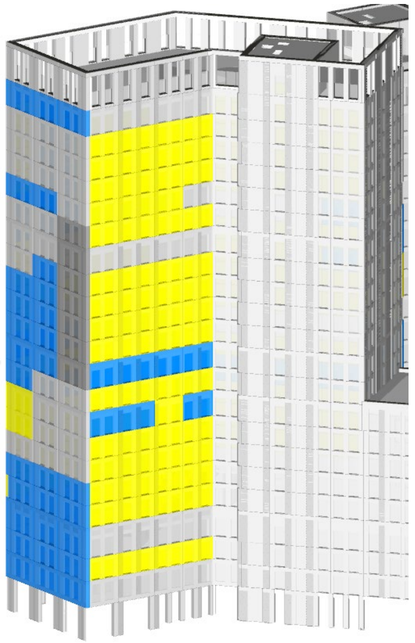
Precast Facade

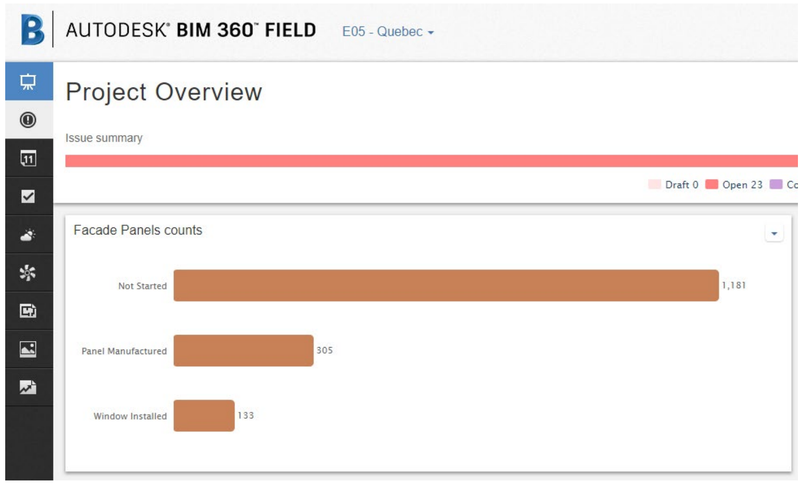
Tracking system – the standard approach

QR Code applied to the panel



QR Code scan by a site manager



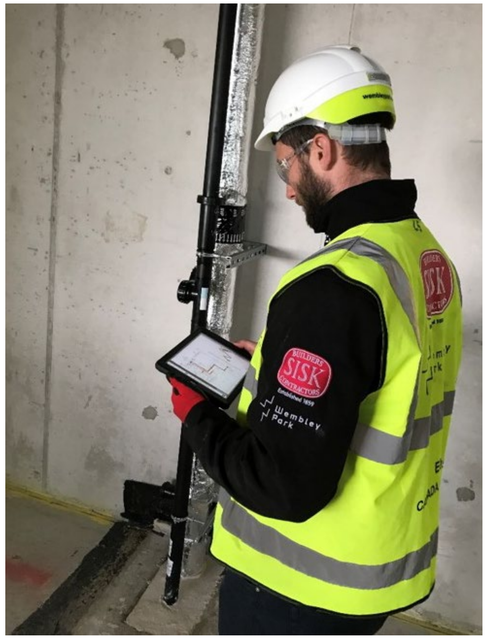


3D Model + BIM360 Dashboard updated with live data

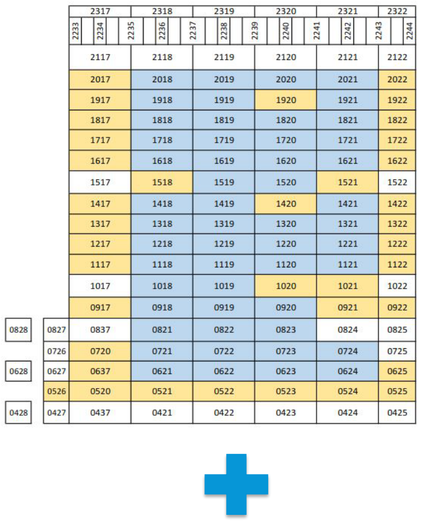
Precast Facade

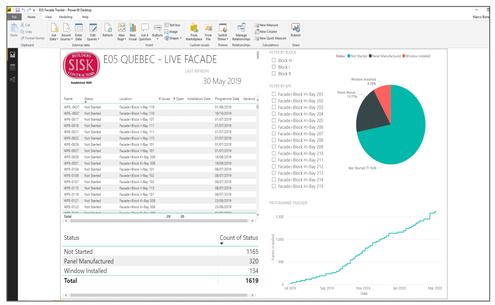
Tracking system – using Digital Smart Container + Live Dashboard

QR Code applied to the panel



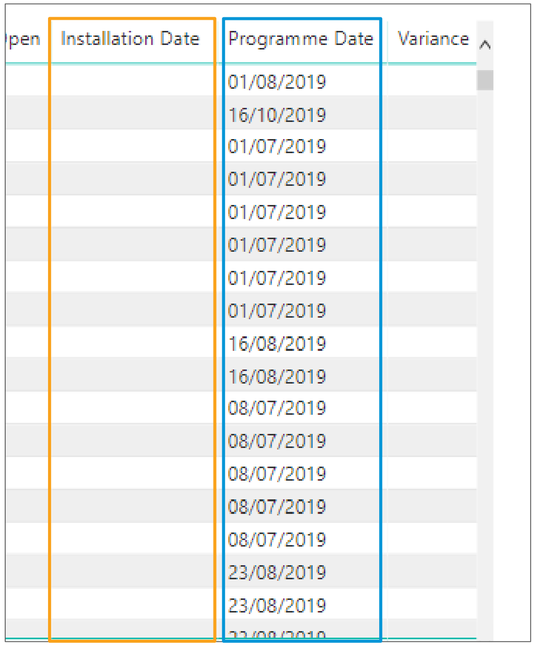
QR Code scan by a site manager





2D drawing + Power Bi Dashboard

updated with live data



pen	Installation Date	Programme Date	Variance
		01/08/2019	
		16/10/2019	
		01/07/2019	
		01/07/2019	
		01/07/2019	
		01/07/2019	
		01/07/2019	
		01/07/2019	
		16/08/2019	
		16/08/2019	
		08/07/2019	
		08/07/2019	
		08/07/2019	
		08/07/2019	
		08/07/2019	
		23/08/2019	
		23/08/2019	

DATA FROM BIM360

DATA FROM PROGRAM

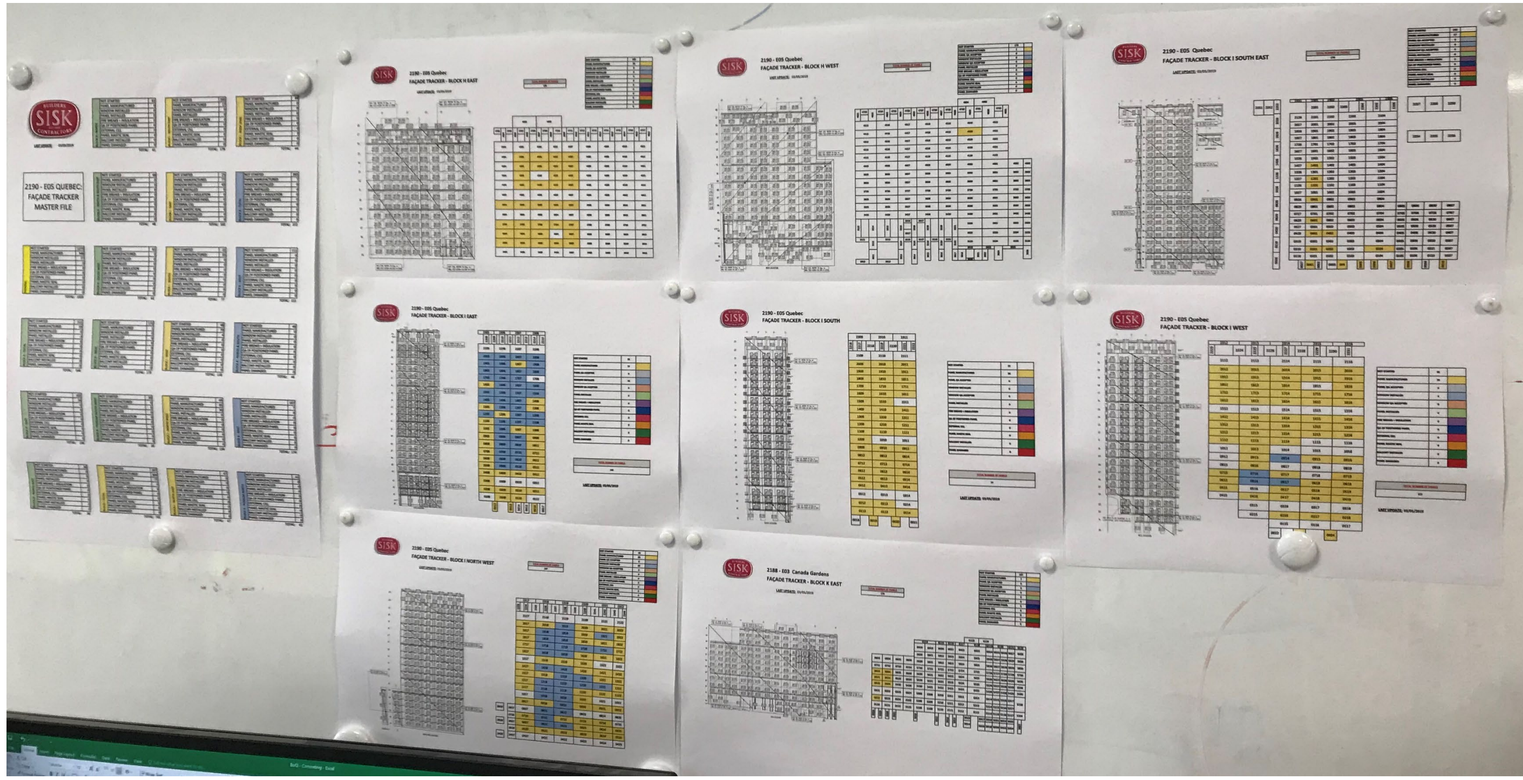
Panel installation linked to a

construction program

2D Dashboard at site office

Site requirements:

- Possibility to print status update for each side of facade;
- Keep weekly data as record for Commercial/PM purpose
- Possibility to bring this data to a meeting or to add these to a Project Report



Added Value

35%

MORE EFFICIENCY

Time saving on QA/QC process vs traditional methods

TASK (DAILY COMPARISON)	MANUAL PROCESS	DIGITAL CONTAINER
Print drawings	1.0 hour	0.0 (iPad sync)
Return to office to get new drawings	0.5 hour	0.0 hour
Perform Inspection	1.0 hour	0.75 hour
Document/archive	1.0 hour	0.0 hour
TOTAL	**3.5 hours**	**0.75 hour**

SAVING	TOTAL
Weekly time saving (per user)	13.75 h
Total number of users performing QA checks	15
Total weekly saving	206.25 h
EFFICIENCY	**35%**

Added Value

35%

MORE EFFICIENCY

Time saving on QA/QC process vs traditional methods

44%

PAPER SAVED

Reduction of A3 printed pages by 44%

SAVING	TOTAL
Weekly page printed before Digital Container	900
Reduction using Digital Container	44%
Weekly page saved	396
ANNUAL PAGES SAVED	**18,659**
Co^2 SAVED	**145.5 kg**

Added Value

35%

MORE EFFICIENCY

Time saving on QA/QC process vs traditional methods

44%

PAPER SAVED

Reduction of A3 printed pages by 44%

20%

PROJECT MANAGEMENT EFFICIENCY

Live dashboard has reduced time needed to retrieve all the needed information “one source of truth”

SAVING	TOTAL
Production meeting required	- 25%
Time required to find most up to date project status information	-15 %
Time needed to update project status information	-20 %
EFFICIENCY	**20%**

Added Value

35%
MORE EFFICIENCY

Time saving on QA/QC process vs traditional methods

44%
PAPER SAVED

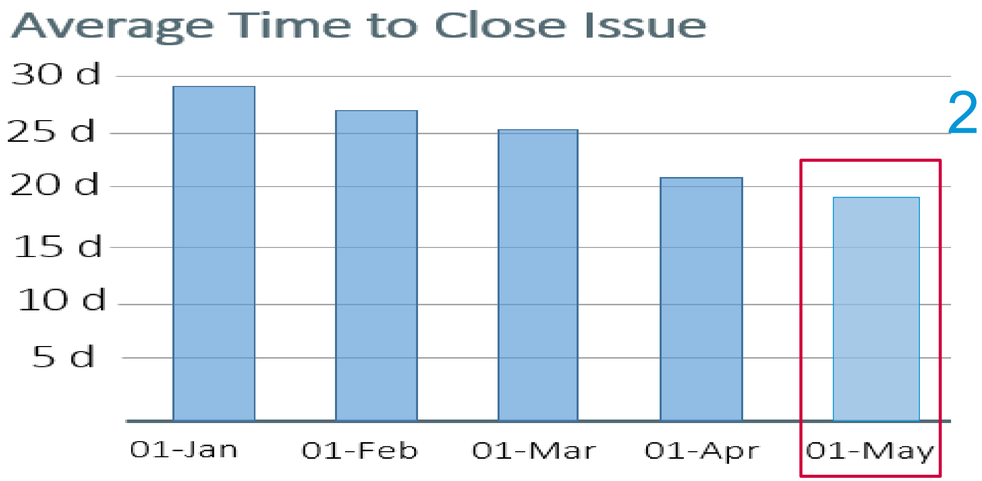
Reduction of A3 printed pages by 44%

20%
PROJECT MANAGEMENT EFFICIENCY

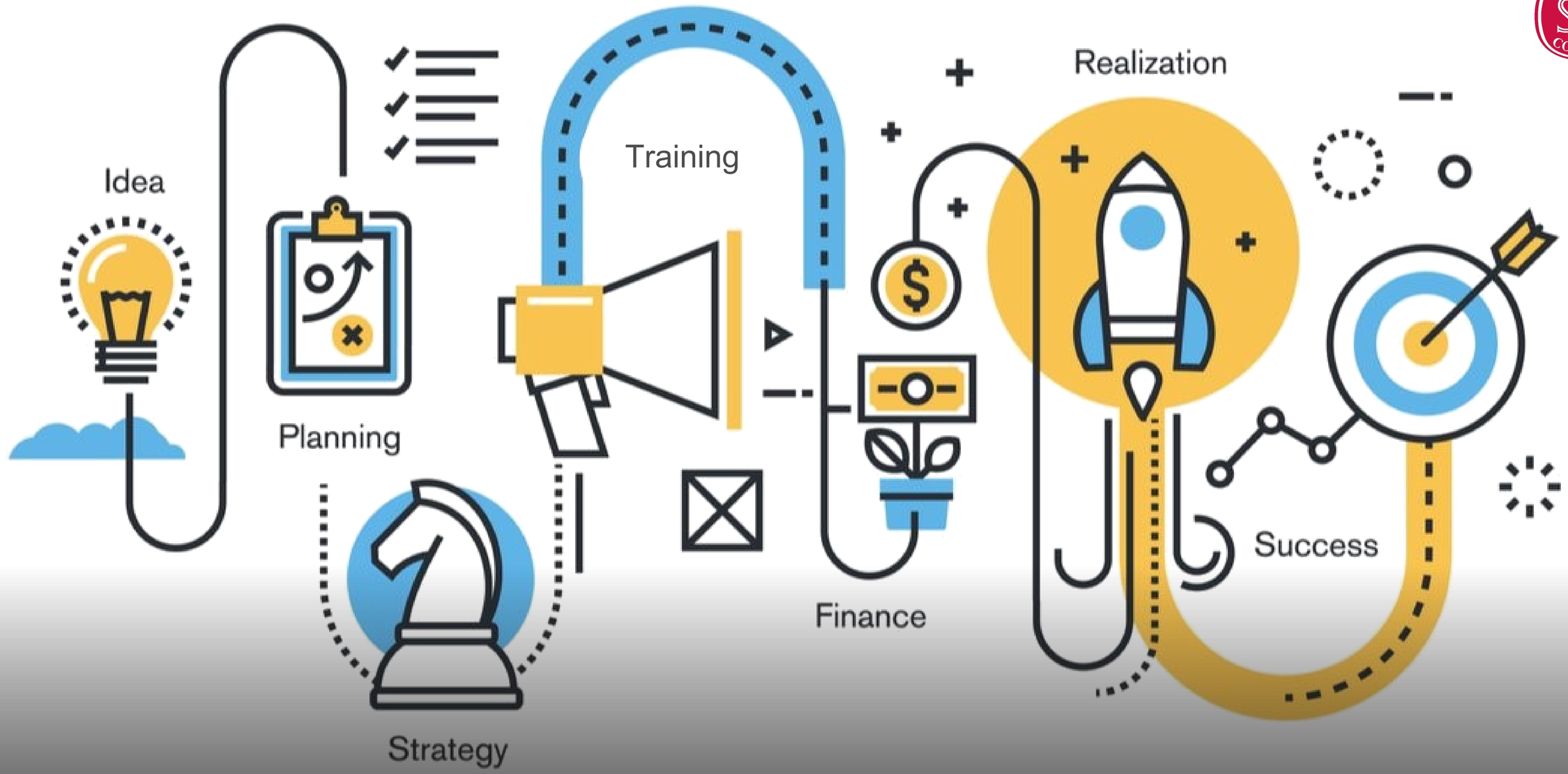
Live dashboard has reduced time needed to retrieve all the needed information “one source of truth”

21%
OVERALL PRODUCTION EFFICIENCY

Increase of production efficiency including the full supply chain (target of 35 by end of 2019)



21.1% time reduction



How did we move from an **Idea** to **successful workflow**?

BUILDERS SISK CONTRACTORS Established 1859
AUTODESK UNIVERSITY

“I have worked in this industry for more than 30 years, why do I need to change the way I work?”

General comment from site users

“Why do I need to learn a different software and to use an IPad on site?”

General comment from site users

A two steps' success

Illustrating the full plan to the Management

- Key figure to be involved;
- Achievable benefits realization;
- Short/Long terms target;
- Time saving;
- Cost/benefits plan;
- Dashboard mockup.

Have all the site users to believe in the system

CASTOR – GOOD APPROACH

- We have explained how it works
- We have decided to use this solution
- We did 1 to 1 site training showing the system
- It must to be used from now on
- We made realize the site team how easy was to use it, and the time saving they had

Ok Ok What's Next?

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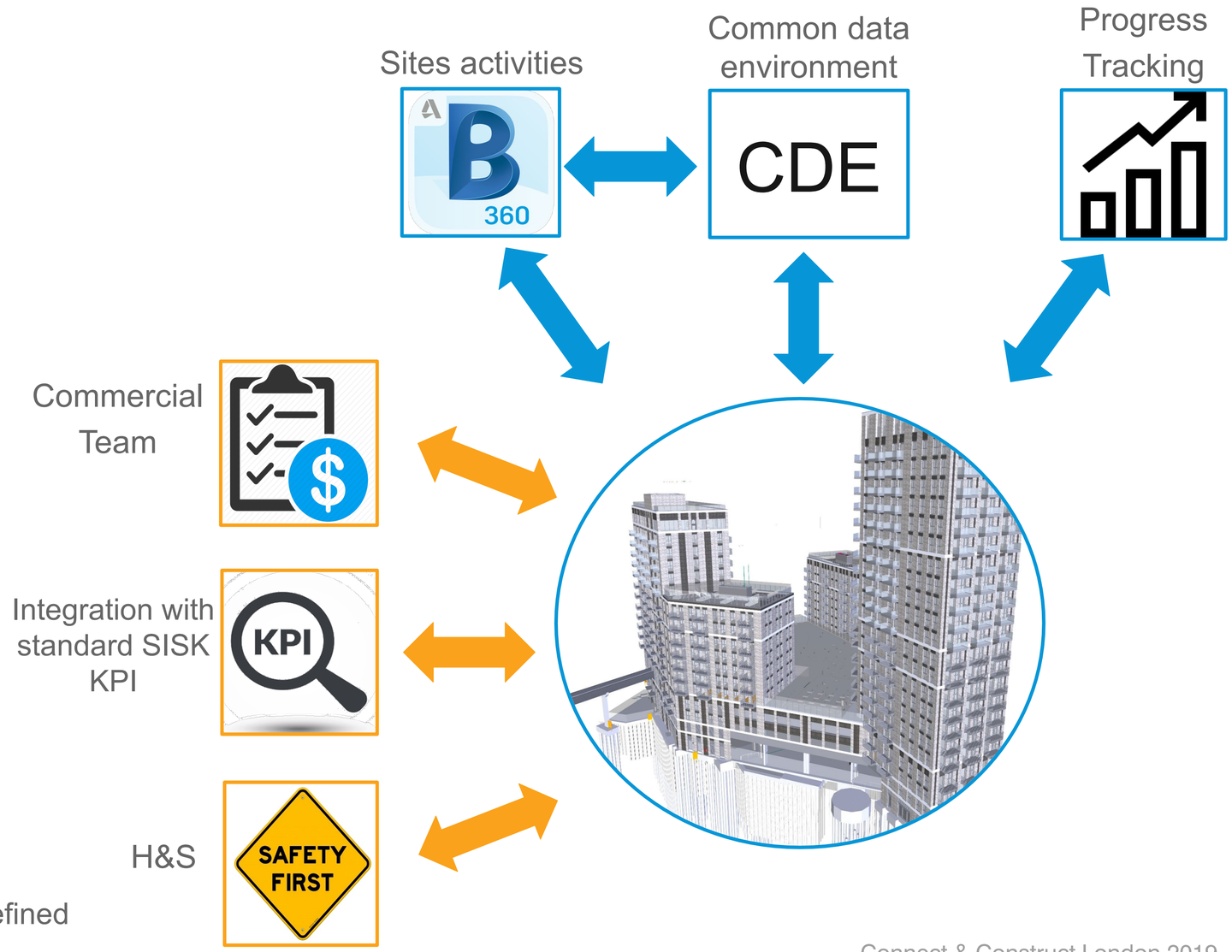
Established 1859

Next Steps

Data is the new oil.

It's only useful when it is refined!

Jess Greenwood



TRANSFORMNG
THE 3D MODEL IN
“THE SINGLE SOURCE OF TRUTH”

BUILDERS SISK CONTRACTORS
Established 1859

AUTODESK. UNIVERSITY

Thank You.

LET’S GET SOCIAL

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