

Revolutionary Change in an Evolutionary Culture, BIM Case Study for Ananda Development

Mr. Sarat Don Nisaratanana

Head of Advanced Research & Development
Ananda Development Public Company Limited

Mr. Andrew Hill

BIM Practice Leader APAC
Autodesk



Class summary

Ananda's Knowledge Sharing from a Real Estate Developer's perspective on the strategies and challenges in the adoption of BIM; and how BIM can create value to both businesses and customers.

Key learning objectives

At the end of this class, you will be able to:

- Understand the processes for implementing BIM successfully
- Learn how to develop an inclusive and structured BIM system
- Learn how to strategize a road map for the development and implementation of BIM
- Define the requirements of BIM within an organization



Overview of Ananda Development

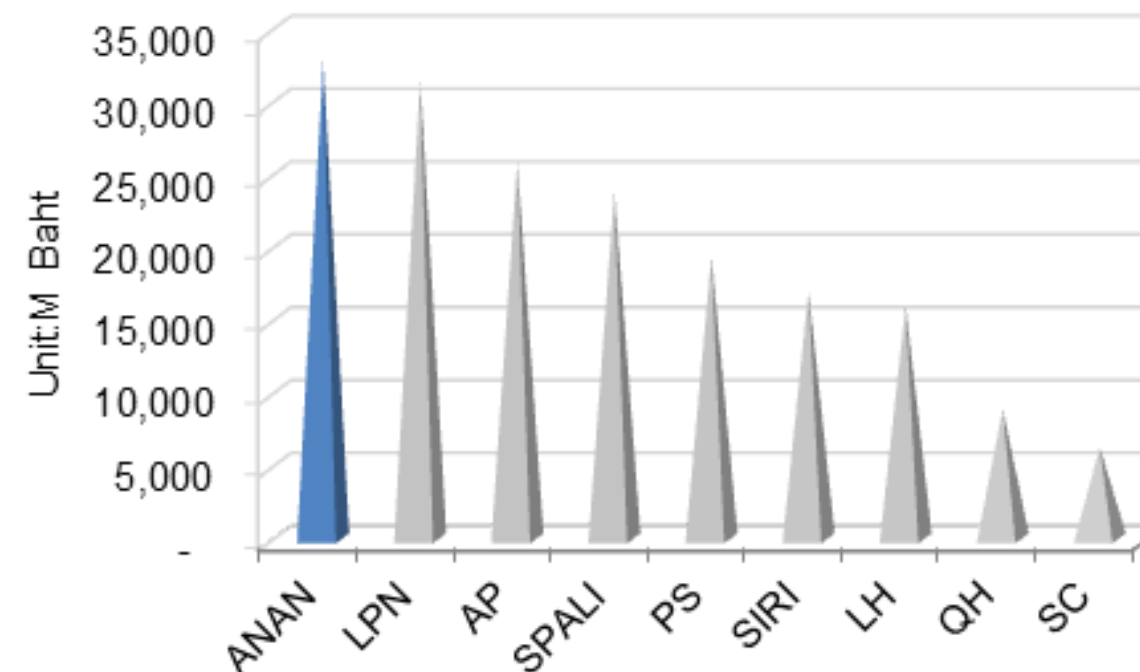
- Stock Exchange of Thailand listed SET 100 Index company.
- Number one in mass transit condos.
- Number one seller of condos in Thailand
- Multiple award winner
- Awarded Outstanding Achievement in Investor Relations at 2014 SET Awards



Strong Portfolio of Brands

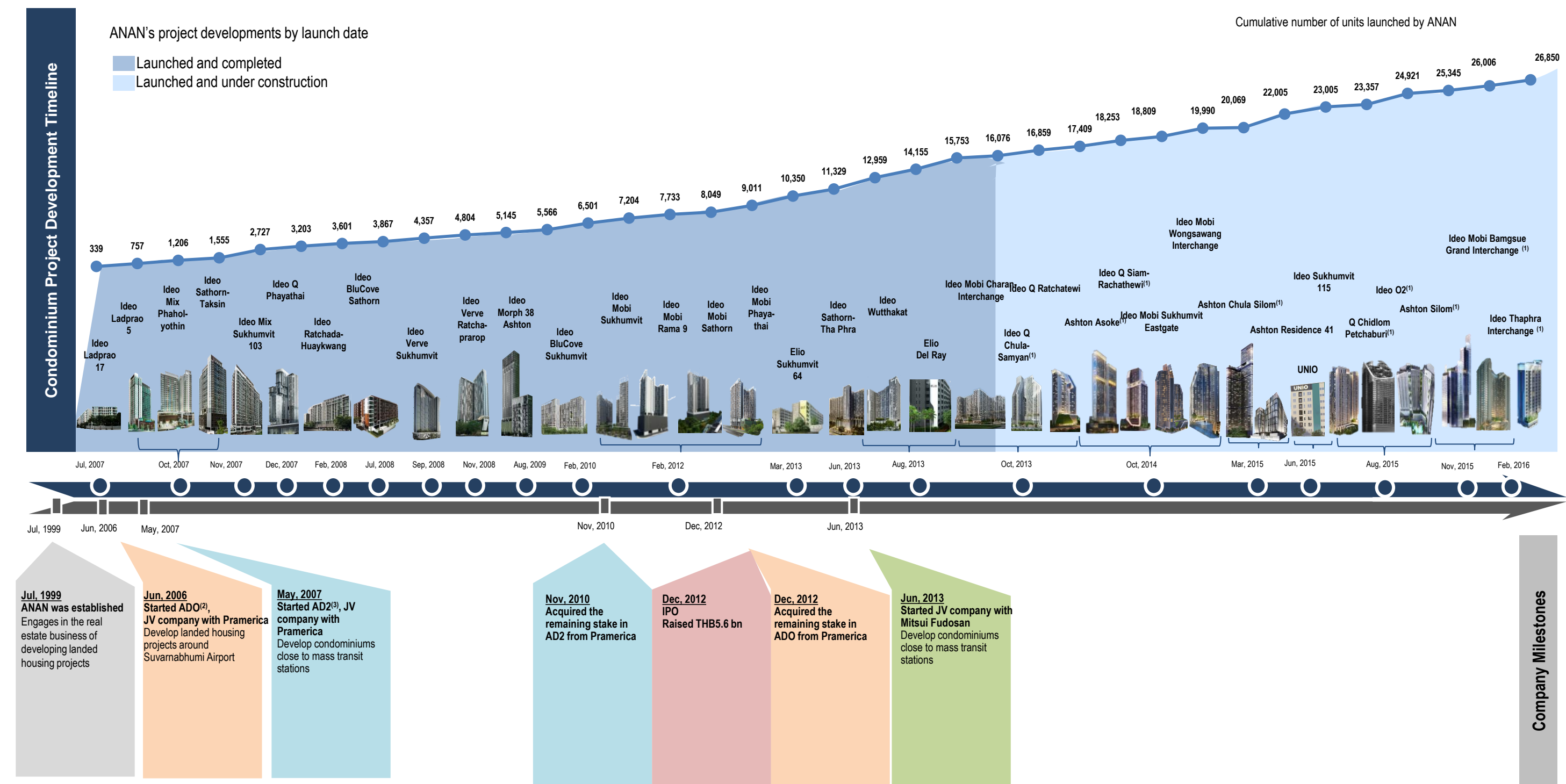
| Categories | Brands |
|-------------------|------------------------------|
| Luxury | ASHTON |
| High-end | IDEO Q |
| Up-scale | VERVE, IDEO INOBI |
| Mid-range | IDEO, IDEO MIX, IDEO BLUCOVE |
| Low-range | ELIO |
| Super value-range | UNIO |

No.1 Combined Seller: 2014 + 2015



Note: 2014 and 2015 Anan's net presales with Peers' presales from BLS Research

Key Company Milestones



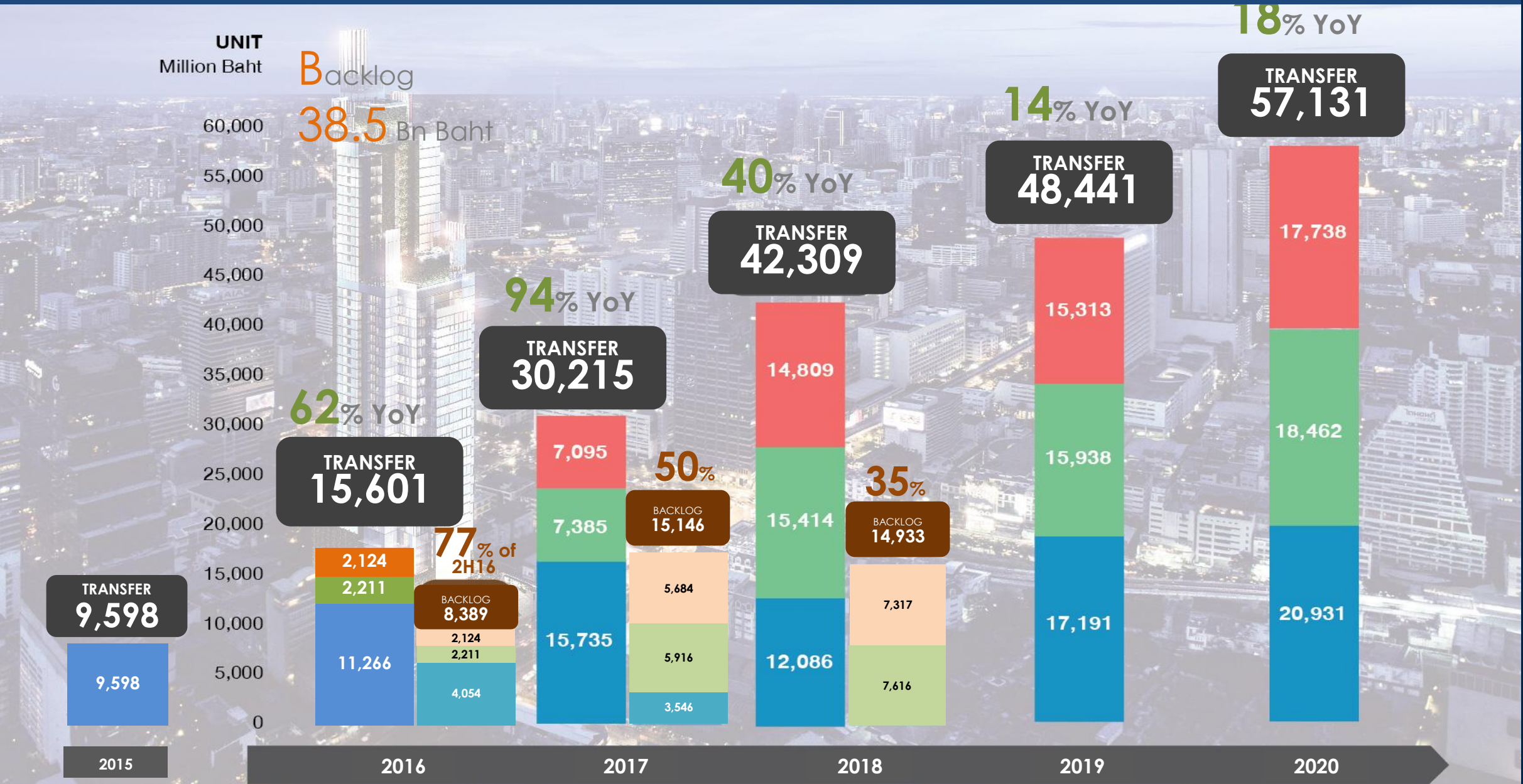
Source: Ananda Development PCL.
Note:
1. Projects under JV company with SEA Investment Five Pte. Ltd., a subsidiary of Mitsui Fudosan Co. Ltd. ANAN owns a 51.0% interest in the JV.
2. Refers to Ananda Development One.
3. Refers to Ananda Development Two.

Ananda Business Plan

5-YEAR BUSINESS PLAN

- Mitsui's share in JV
- Ananda's share in JV
- Ananda's revenue
- Mitsui's backlog in JV
- Ananda's backlog in JV
- Ananda's backlog

5 years almost 6X growth



Thailand's Mass Transit Infrastructure Rollout

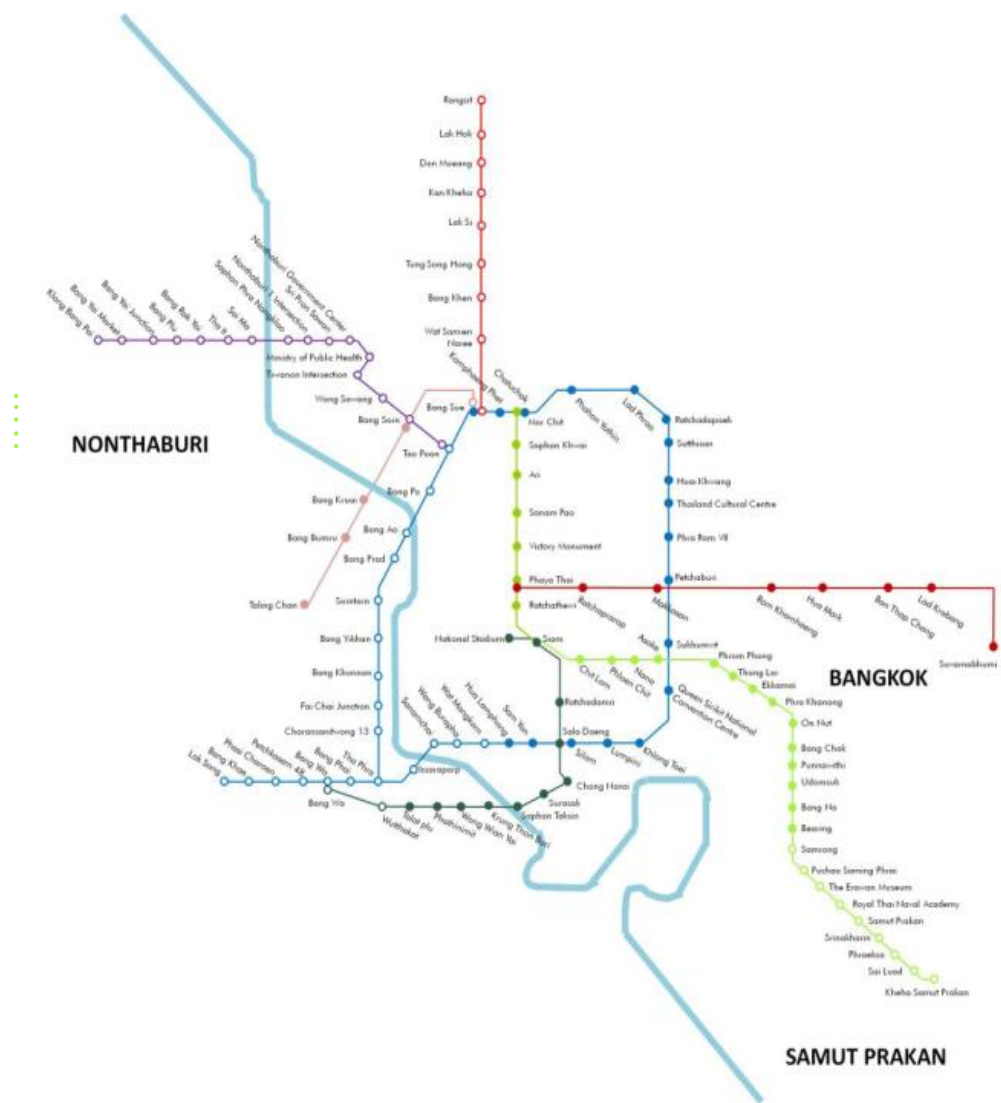
Current Line (2015)

67 stations



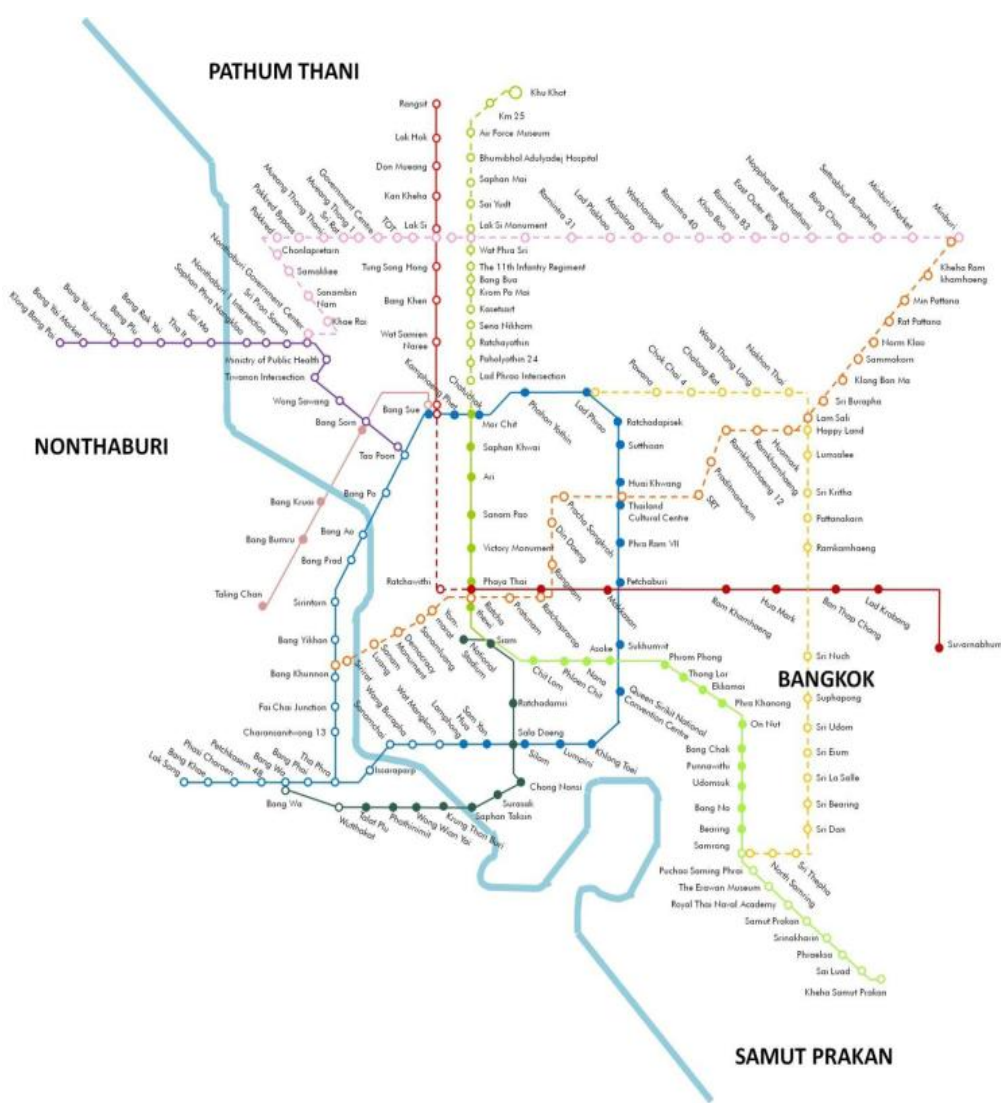
Under Construction

119 stations



Future Plan (2022)

222 stations



Bangkok's mass transit network is expected to expand significantly from **a present 67 stations to 222 stations in 2022**

Source: CBRE Research and Consulting.



16 Years Plan (2029) = 254 Stations

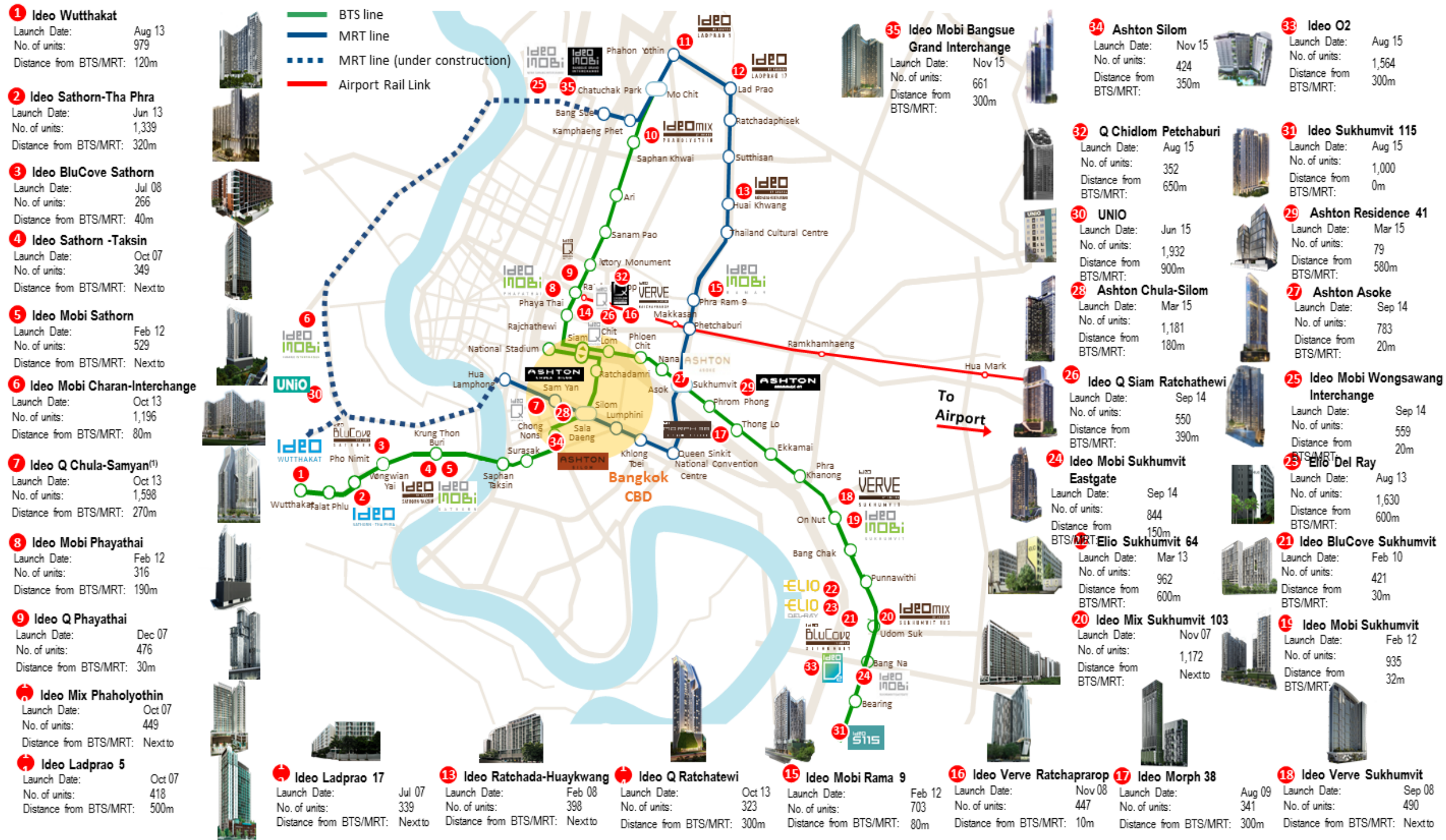


Bangkok's mass transit network is expected to expand significantly from 67 stations in 2015 to **254 stations in 2029**

New stations are being developed providing additional development opportunities

Source: CBRE Research and Consulting.

Condominium Developments are Strategically located along the Mass Transit Network



Source: Ananda Development PCL.

Note: Number of units is as of 30 December 2014.

1. A project under Ananda MF Asia Co., Ltd, a joint venture company with SEA Investment Five Pte. Ltd., a subsidiary of Mitsui Fudosan Co. Ltd. ANAN owns a 49.0% interest in the joint venture.

Ananda Innovation Company



- Mass Transit Location
- Target Gen C
- Marketing including distance
- Switch marketing to social media
- Target bloggers



- Smaller unit size
 - First 35 sqm
 - First 21 sqm (Innovate wide units)
- Several design firsts (270 degree glass, smart furniture etc)
 - ✓ Better common facilities for price range
 - ✓ Double volume space all unit - Morph38
 - ✓ Starbucks / True Coffee in every building - Q phayathai
 - ✓ Max Valu in every building
 - ✓ First TCDCS
 - ✓ Indoor outdoor space
 - ✓ Smart Furniture - Mix103
 - ✓ Unique facade design - All ideo



Financial Innovation

- First to market Remminbi Perpetual Security
- First Thai Baht Perpetual Security by Real Estate



Strategic Innovation

- Partnership with large Japanese developer
- Introduction of Keiretsu supply chain management
- Introduction of TQPMS
- Introduction of BIM
- Introduction of Samsung Smart Home
- Samsung / Cisco / Ananda collaboration to make smartest office in Asia
- Launch of Urban Living Solutions Incubator (Coming Soon)

Reputable Joint Venture Partners



Joint Venture Overview

- In June 2006, ANAN established ADO, a JV with Pramerica, to develop a landed housing project around Suvarnabhumi Airport
- In May 2007, ANAN established AD2, a JV with Pramerica, to develop mass transit condominiums
- Pramerica is the real estate investment management business of Prudential Financial which manages ~US\$53.0 bn of assets globally with ~US\$8.1 bn in Asia as at 31 March 2013
- ANAN acquired the remaining stake in ADO and AD2 from Pramerica in December 2012 and November 2010, respectively

Joint Venture Projects with Pramerica

| | Type | Projects | Targeted GDV ⁽²⁾ (THB bn) |
|-----|----------------|----------|---|
| ADO | Landed Housing | 7 | ~11.7 |
| AD2 | Condominium | 12 | ~20.1 |

Source: Ananda Development PCL.
 1. Market data as of June 2013.
 2. As of 30 June 2014.

Joint Venture Overview

- In June 2013, ANAN entered into a joint venture agreement with Mitsui Fudosan.
- Mitsui Fudosan Number One Real Estate Developer by Revenue in Japan
- One Trillion Baht Market Cap
- Number one in Nikkei Quality Survey 2014
- ANAN is expected to benefit from the best practices of Mitsui Fudosan in the areas of risk management, construction, property management, and sales and marketing (targeting Japanese buyers)

JVs with Mitsui

| Year | Project Name | Units | Project Value (THB mn) |
|------|--|-------|---------------------------|
| 2013 | Ideo Q Chula-Samyan | 1,598 | 6,773 |
| 2014 | Ashton Asoke, Ideo Q Siam Ratchatewi | 1,333 | 10,511 |
| 2015 | Ashton Chula-Silom, Q Chilom Petchaburi, Ideo O2, Ideo Mobi Bangsue Grand Interchange and Ashton Silom | 4,186 | 25,228 |
| 2016 | Ideo Thaphra Interchange | 844 | 2,976 |

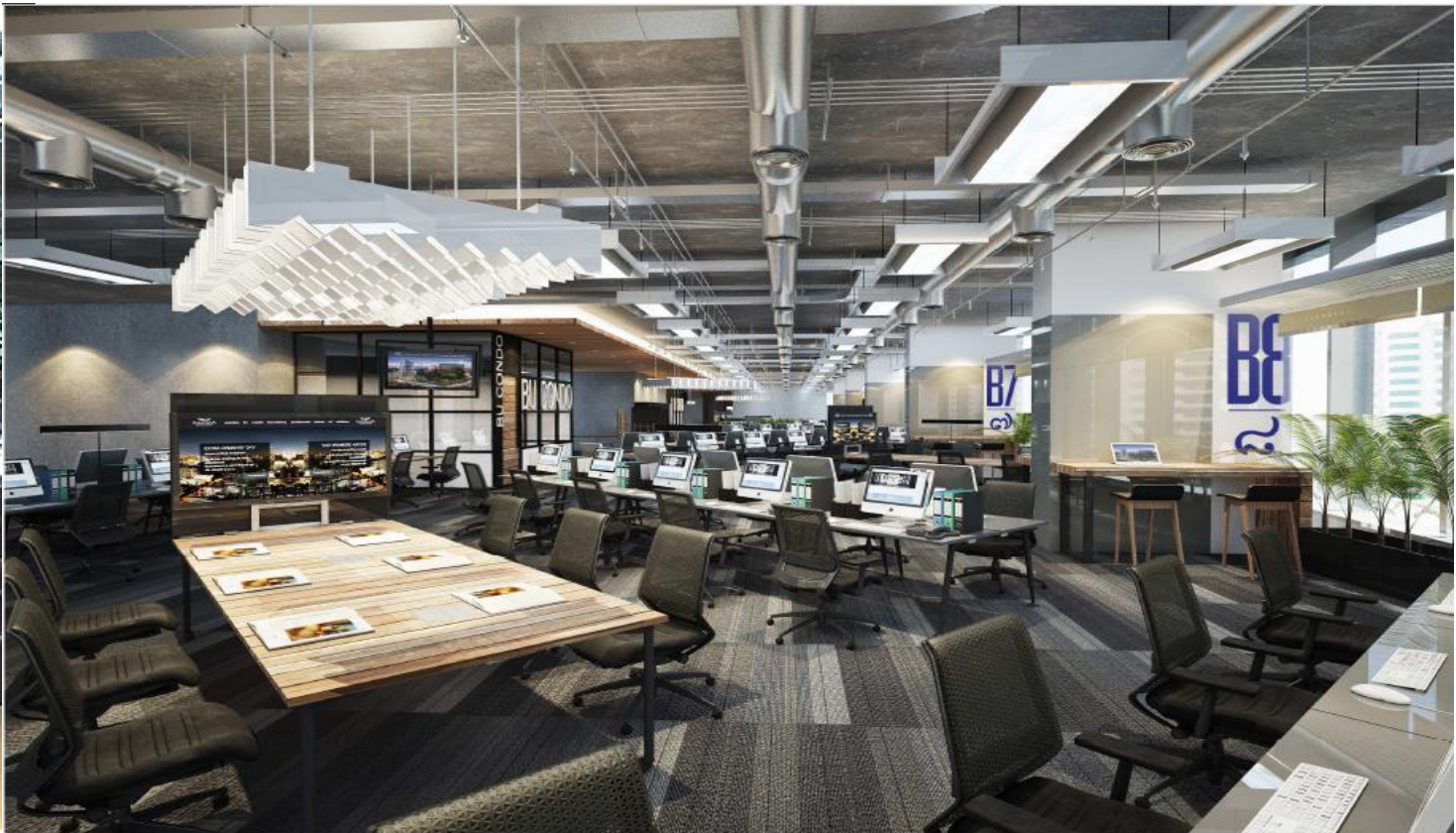


Smart Condo: Ananda-Samsung IoT Smart Home, 08 August 2015

ANANDA SAMSUNG



Smart Office: Ananda 2.0 Office, 01 August 2016



Smart Office: Ananda 2.0 Office, 01 August 2016

Digital is all around

Collaboration with Samsung and Cisco has allowed development of smartest office in Asia as part of goal of increasing employee productivity 500% in 5 years

Smart Booking Seat and Room



Digital Signage



Wireless Printer cloud based



Interactive Meeting Room



E-board by Samsung



Ananda Urban Living Solutions



ASHTON       

Ashton Sukhumvit 38, 2012



Ideo Q Chula-Samyan, 2016



Ananda Customers – The Connected Generation



Gen – C

Creativity

Cash Smart

Convenience

Casual lifestyles

Control

+ Convergence of Hi-tech Lifestyles

+ Connectivity to Content

Individuality

Intelligence-Productivity

Interaction

Ananda Customers



Why is Ananda doing BIM?

Ananda's BIM Vision & Mission

- Vision:

To transform Real Estate's Design & Construction into an Industrialised Production System.

- Mission:

To use BIM as a Smart Building Information System & deploy throughout Ananda's Supply Chain/Eco-system for all projects.

Ananda Launches 10+ Projects/Year



There are 3 fundamental reasons

1. Deliver Quality Products to Customers
2. Improve & optimise Business Operational Efficiency
3. Sustainability



**We believe in
'Continuous Improvements'**

“KAIZEN”

**From TOYOTA Production System
(TPS)**

**Real Estate Industry to
continuously improve
product deliverables by using**

“Industrial Production Principles.”



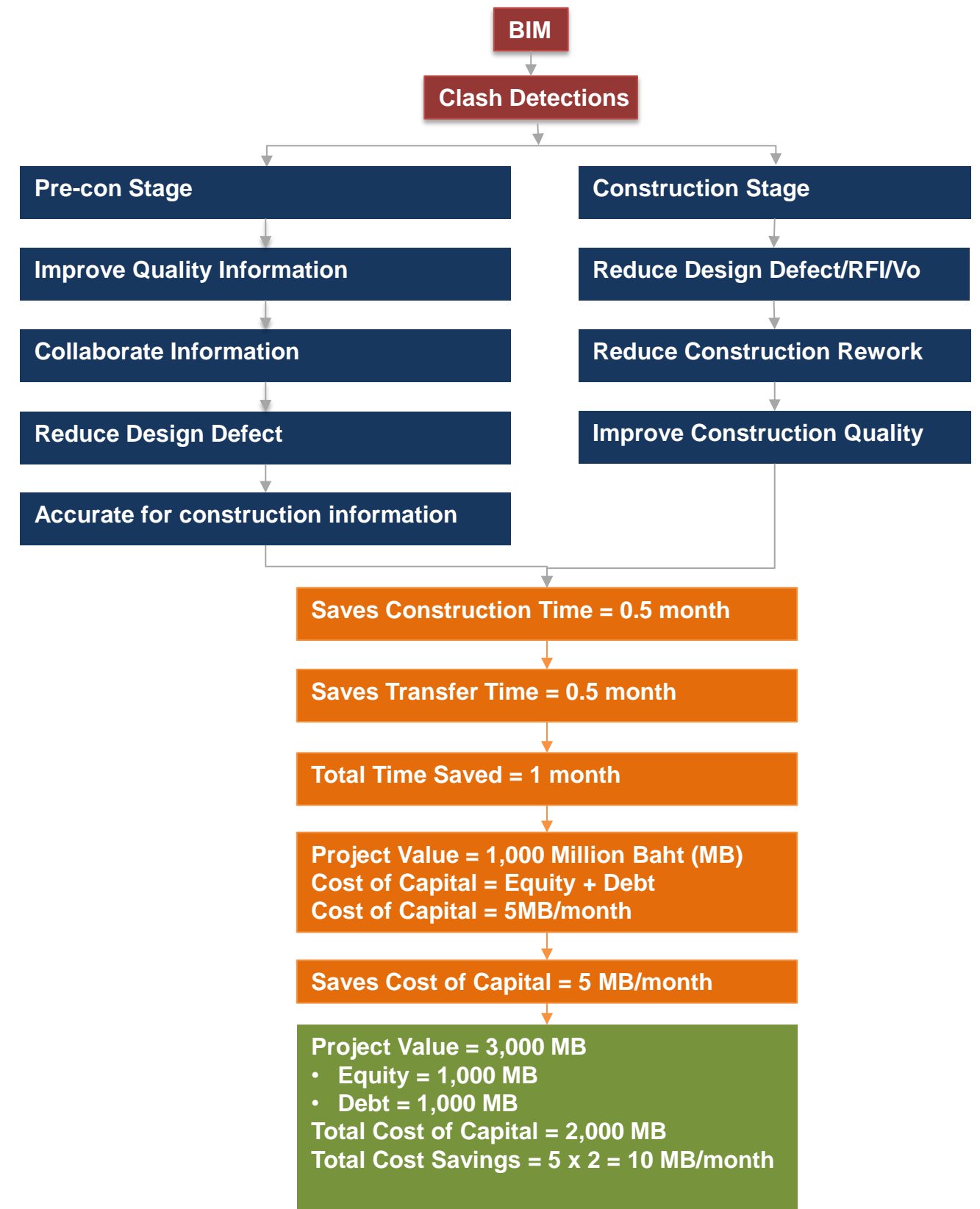
We need a **SMART** Production Information System

“BIM”

(Building Information Modeling)

BIM Value Creation for Developers

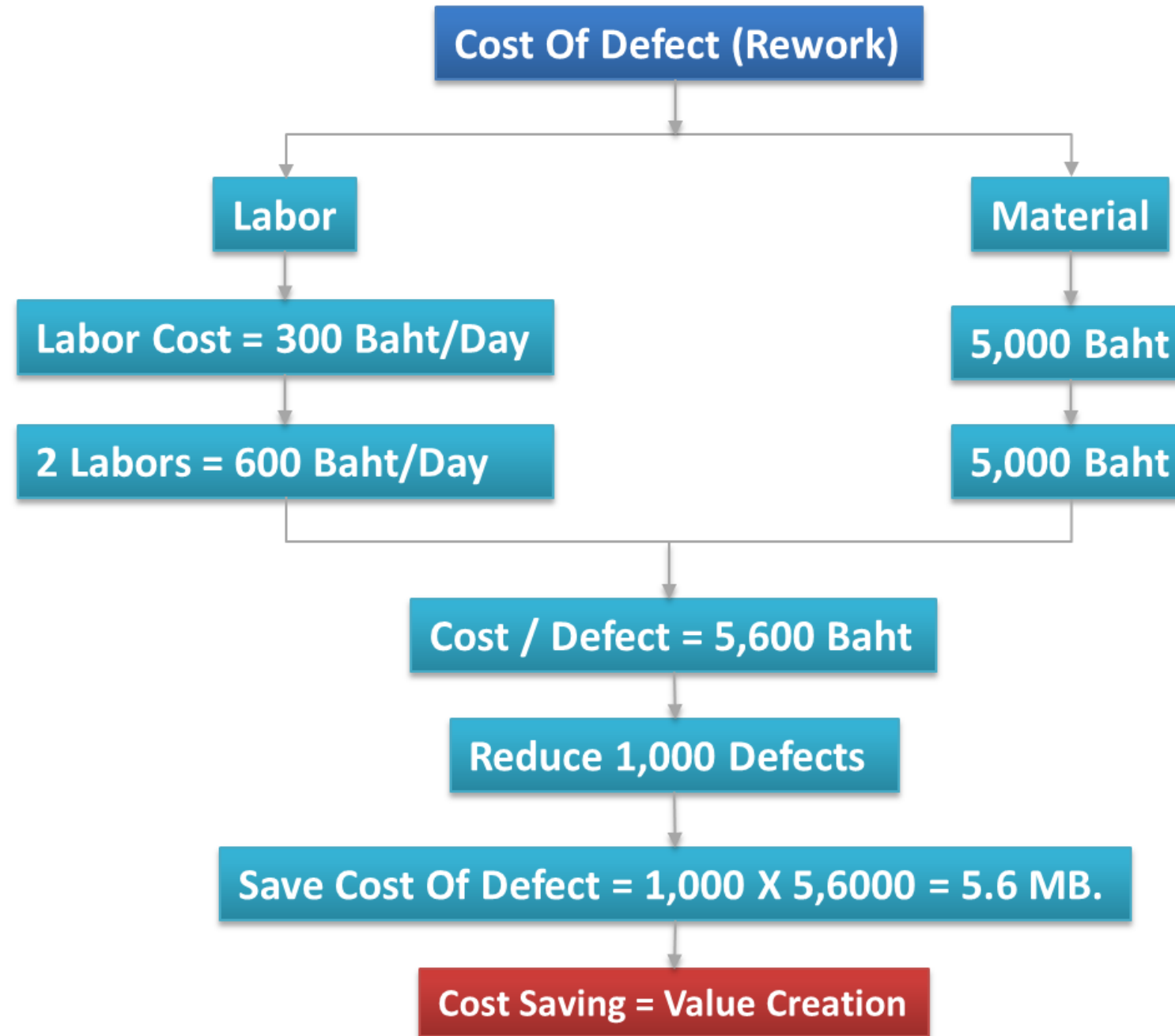
- **Time**
 - Reduce Construction Reworks = Saves time
- **Cost**
 - Save Time = Save Cost
- **Quality**
 - Reduce Design Defects = Improve Construction Quality



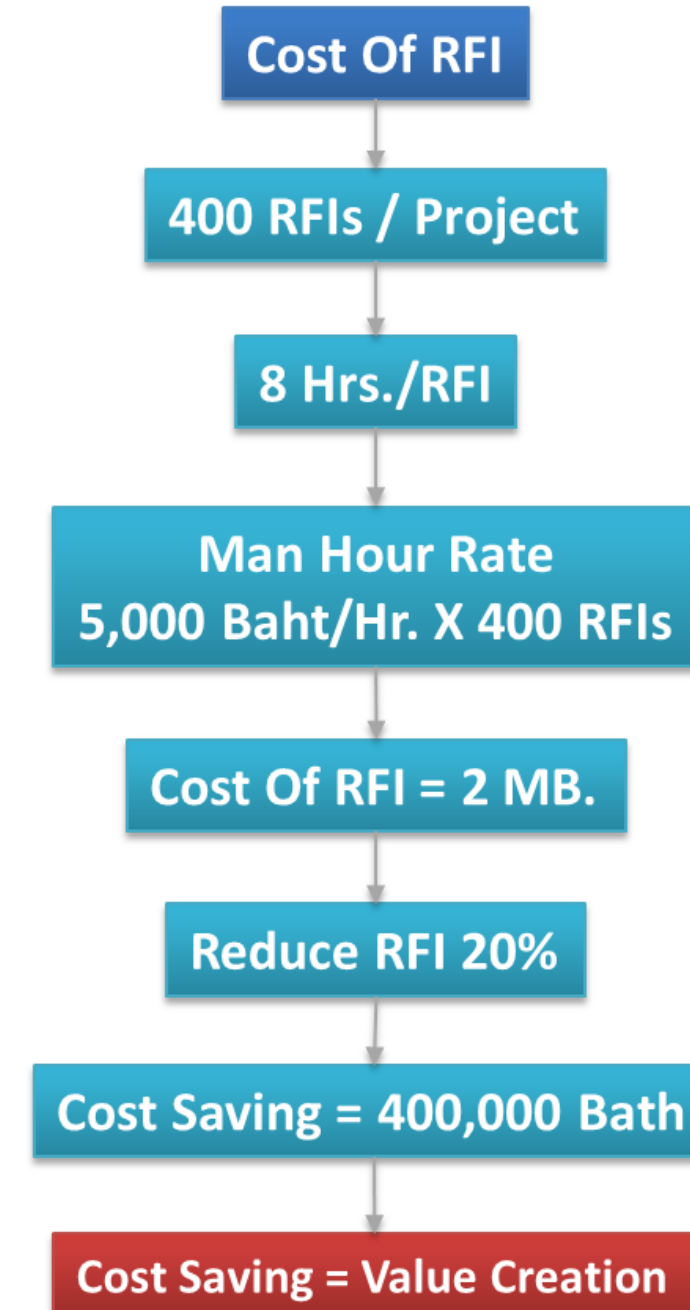
Notes: Numbers are not factual & are made-up assumptions for discussion purposes only.

BIM Value Creation for Contractors and Designers

Contractors

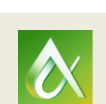


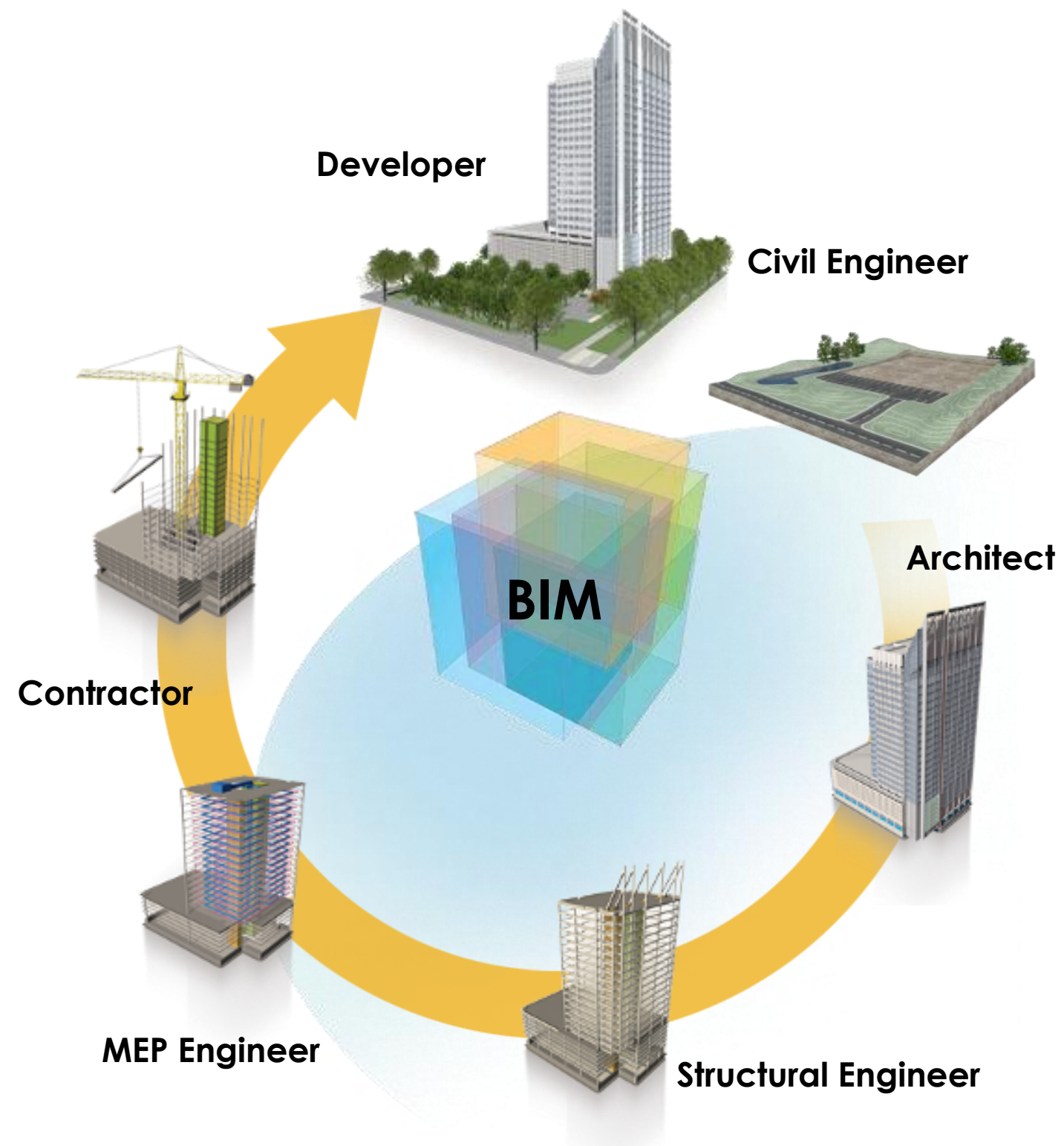
Designers



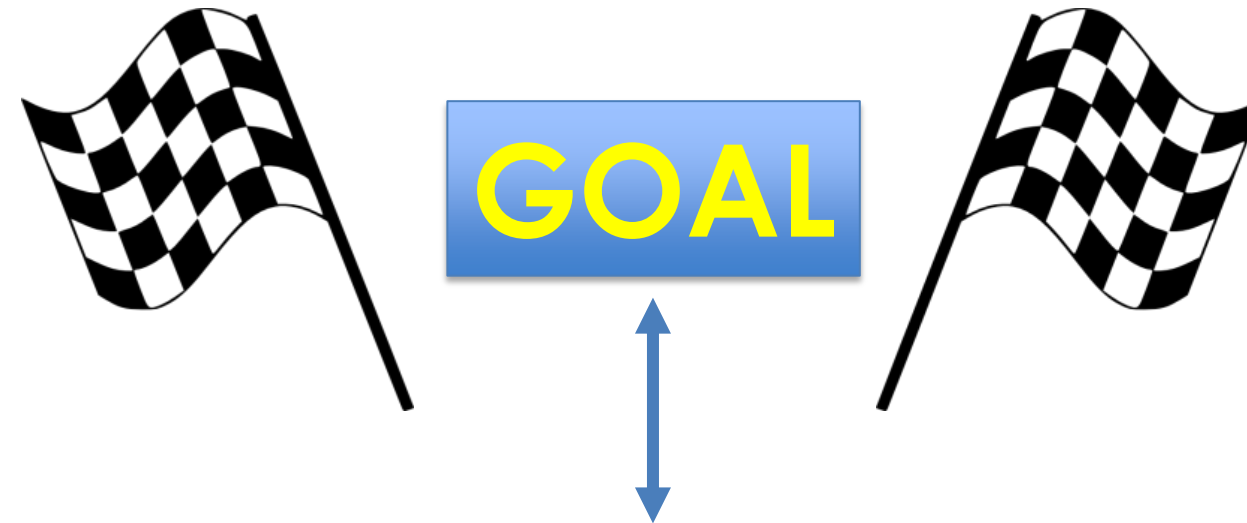
Notes: Numbers are not factual & are made-up assumptions for discussion purposes only.

How is Ananda implementing BIM?





BIM Stakeholders Synchronisation: Source by Autodesk



ALIGNMENT

COLLABORATION

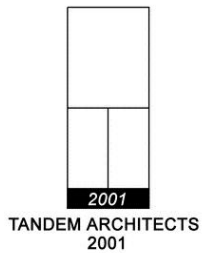
COMUNICATION

CO-ORDINATION

CO-ORPERATION



MARU 360° Forum



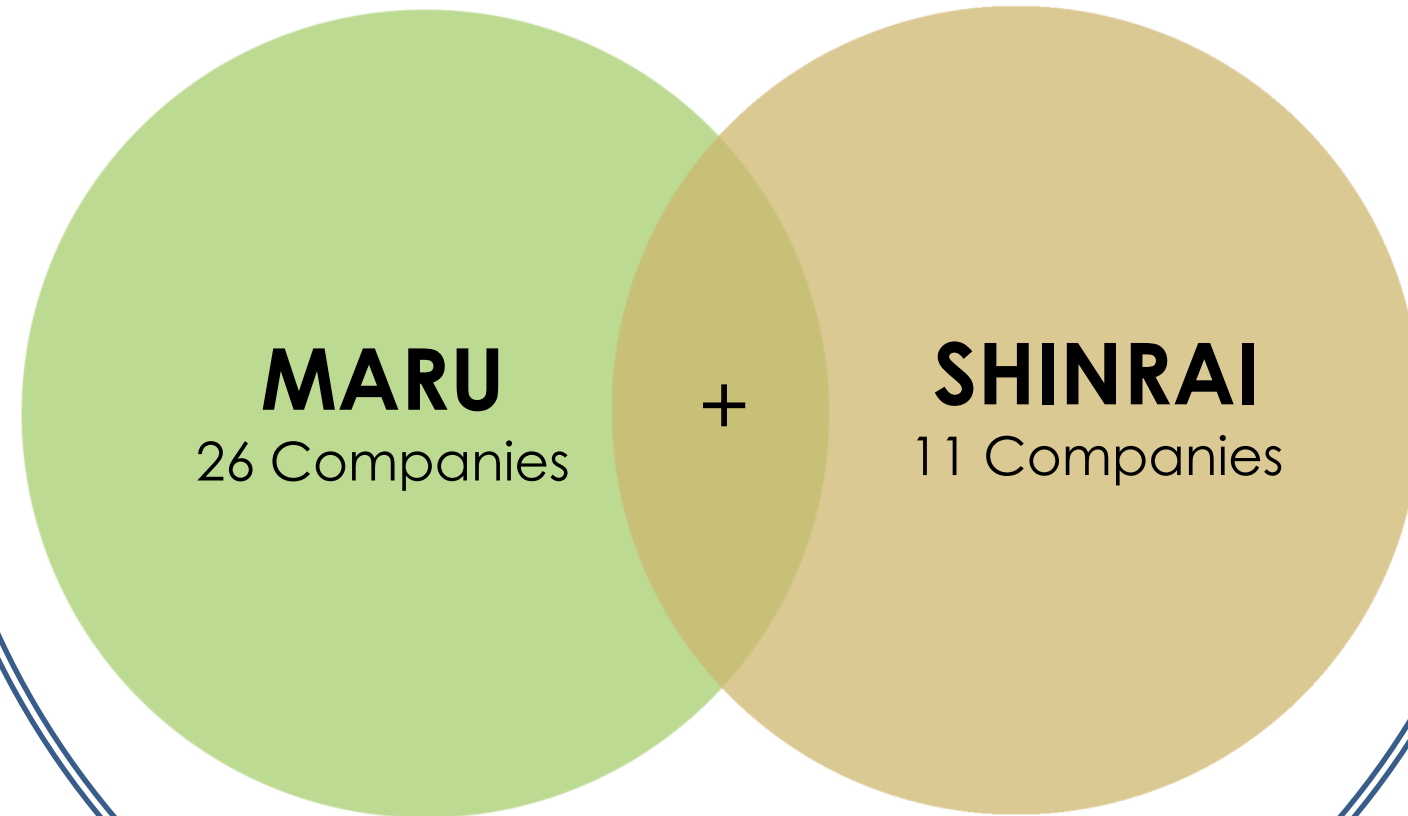
design worldwide partnership







Eco – System
37 Companies



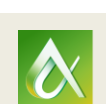
Issues Feedback from Maru 360° Forum

1. Working in Silos vs. Collaboration
2. Design Defects
3. Construction Defects
 - Time
 - Cost
 - Quality

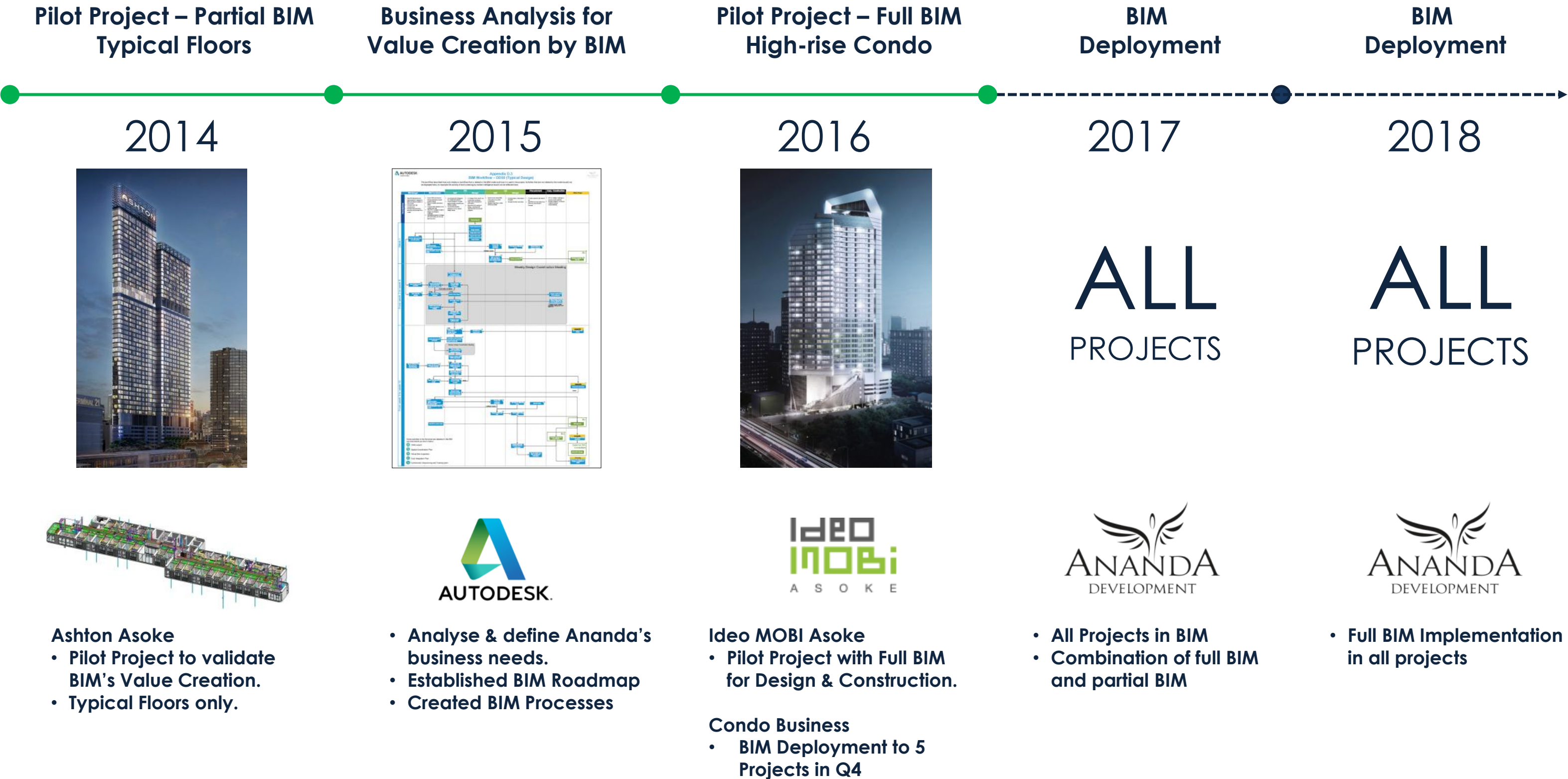




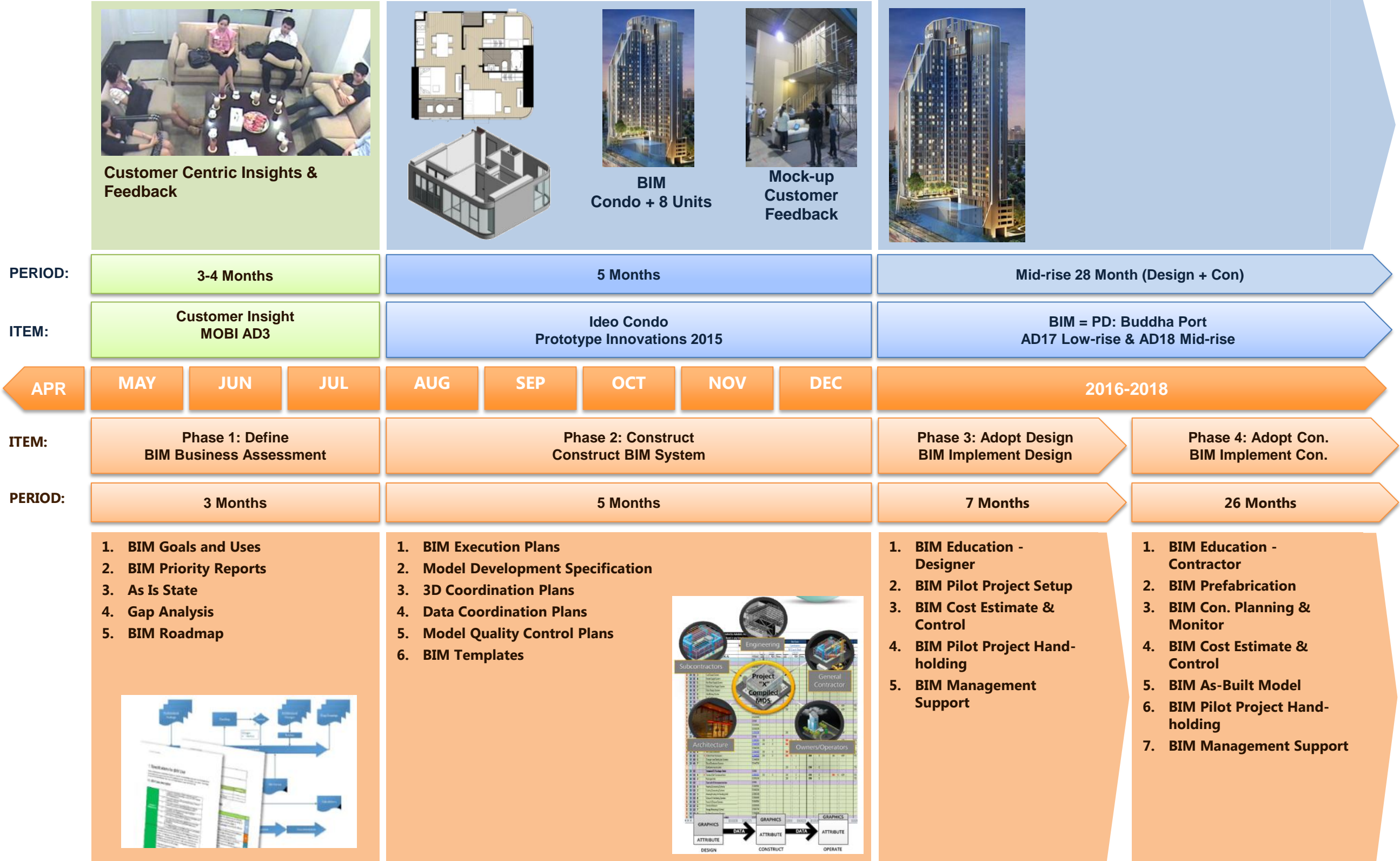
What is Ananda doing to implement BIM?



BIM Roadmap



BIM Pilot Project Strategy 2015 – 2018



Comparative Analysis: Current Process VS BIM Process



BIM System Documentation

Corporate BIM documents

- Internal workflow
- Adopting BIM in Ananda

CORPORATE DOCUMENTS

- CORPORATE BIM EXECUTION PLAN
- VIRTUAL SITE INSPECTION PLAN
- SPATIAL COORDINATION PLAN
- COST INTEGRATION PLAN
- DWG EXPORT FOR EIA SUBMISSION
- CONSTRUCTION SEQUENCING AND TRACKING



No. of Documents

6

No. of Workflows

14



CORPORATE WORKFLOWS

- BIM DELIVERABLES TIMELINE
- OVERALL BIM PROCESS
- NEW DESIGN
 - Overall BIM Process (Feasibility)
 - Overall BIM Process (Kick-off)
 - Overall BIM Process (DD0 to DD50)
 - Overall BIM Process (DD50 to DD75)
 - Overall BIM Process (DD75 to DD100)
 - Overall BIM Process (Construction)
- TYPICAL DESIGN
 - Overall BIM Process (Feasibility)
 - Overall BIM Process (Kick-off)
 - Overall BIM Process (DD0 to DD50)
 - Overall BIM Process (DD50 to DD75)
 - Overall BIM Process (DD75 to DD100)
 - Overall BIM Process (Construction)

SAP Integration

SAP INTEGRATION DOCUMENTS

- BIM SAP INTEGRATION



No. of Documents

1

PROJECT DOCUMENTS

- PROJECT BIM EXECUTION PLAN
- MODEL DELIVERY SPECIFICATION
- MODEL DATA SCHEDULE
- MODEL BREAKDOWN STRUCTURE
- MODEL QUALITY PLAN
- TYPICAL UNITS INTEGRATION
- DATA COORDINATION PLAN
- MODEL DEVELOPMENT SPECIFICATION - TABLE
- MODEL DEVELOPMENT SPECIFICATION
 - Architecture
 - Interior Design
 - Structure
 - Electrical
 - Fire
 - HVAC
 - Sanitary
 - Civil and Landscape



No. of Documents

16

No. of Workflows

3



PROJECT WORKFLOWS

- ANANDA DESIGN DEVELOPMENT PHASE WORKFLOW
 - Concept Development DD50
 - Design Development DD75
 - Design for Construction DD100

Project BIM documents

- Project workflow
- Using BIM in projects
- Interaction with designers
- Designers requirements

TYPICAL UNITS DOCUMENTS

- TYPICAL UNITS BIM EXECUTION PLAN
- MODEL QUALITY PLAN
- DATA COORDINATION PLAN
- MODEL DEVELOPMENT SPECIFICATION
 - Architecture
 - Interior Design
 - Structure
 - Electrical
 - Fire
 - HVAC
 - Sanitary



No. of Documents

10

No. of Workflowss

3



TYPICAL UNITS WORKFLOWS

- TYPICAL UNITS BIM WORKFLOW
 - DD50 / LOD 200
 - DD75 / LOD 250
 - DD100 / LOD 300

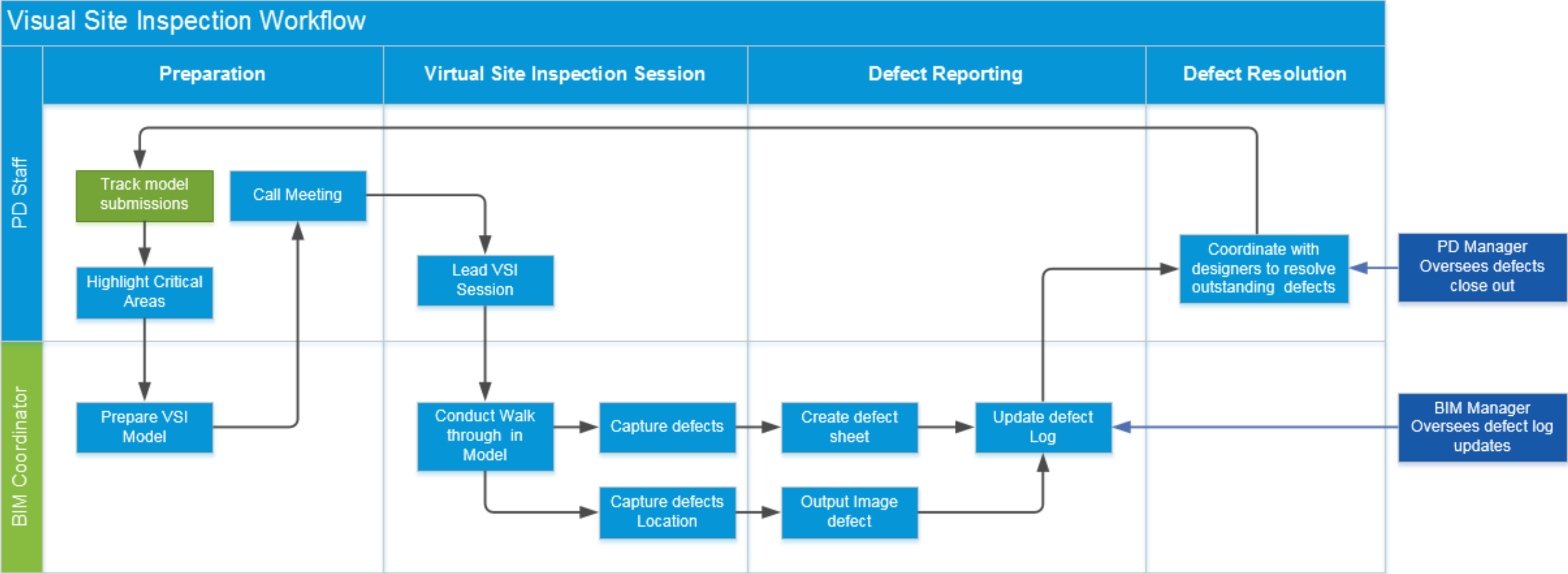
TOTAL DOCUMENTS

33

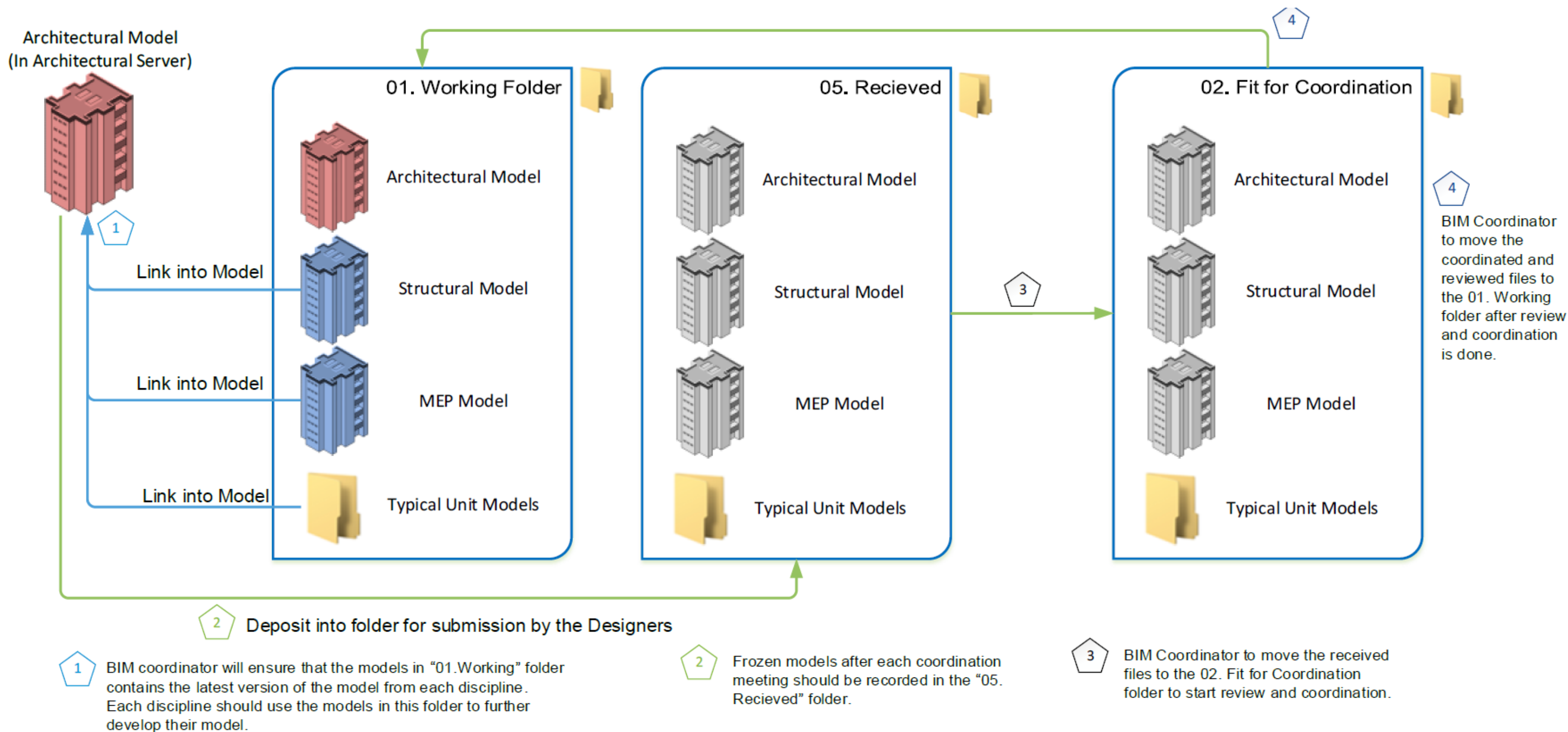
20

TOTAL WORKFLOWS

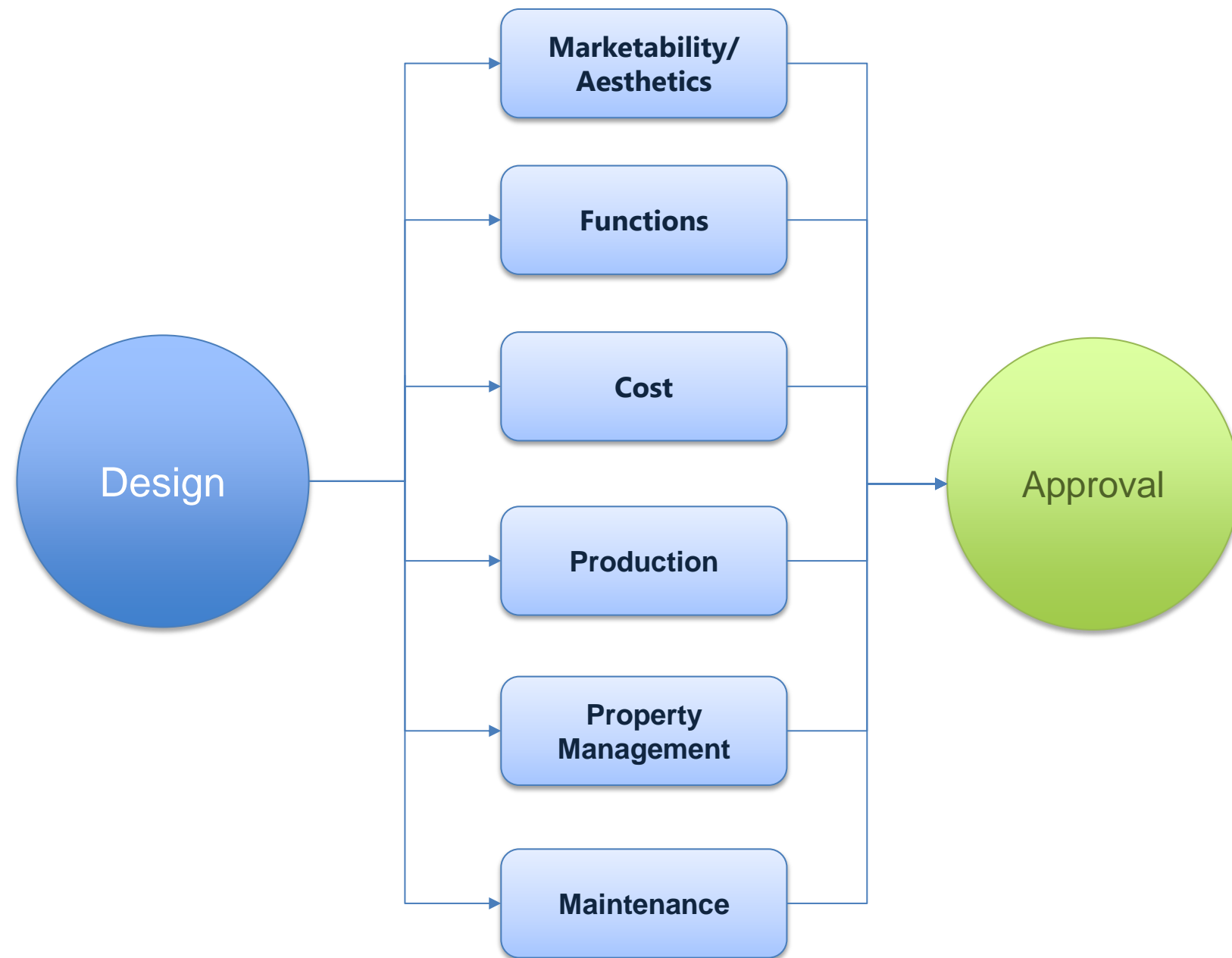
Pilot Project Virtual Site Inspection Workflow



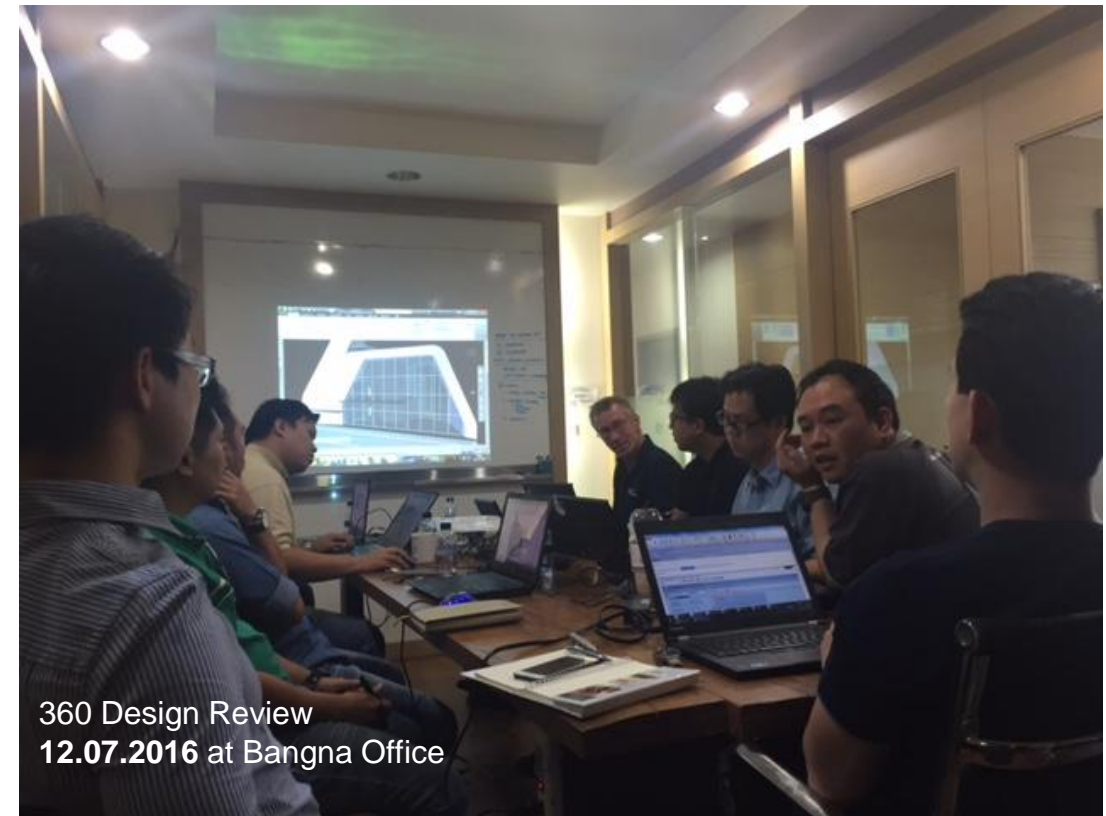
Model Co-ordination Workflow




360° Design Review with BIM




| Collaboration Team | Property Management Checklist |
|---|-------------------------------|
| Advanced R&D, PD, PM, Teka, The Works, Autodesk | 32 topics |





WORKS
SPECIALTY IN MAINTENANCE

1.



2

THE WORKS REF. SHEET

| ITEM | AREA | DESCRIPTIONS | NOTE |
|------|---------------------------------|--|------|
| 1 | JURISTIC PERSON CONTROL ROOM | <p>ส่วนพื้นที่ JURISTIC PERSON</p> <ul style="list-style-type: none"> • ทำเลที่ตั้งเป็นพื้นที่ที่กว้างขวาง ไม่มีความลึกซึ้ง • ฐานอาคารเป็นแบบคอนกรีตเสริมเหล็ก ใต้ดินด้านล่าง Guideline พื้นที่เป็น Property โฉนดกรมที่ดินจำนวน ๑๖๖ และจำนวน ๑๖๗ และพื้นที่ ๑๖๗ และพื้นที่ ๑๖๗ และพื้นที่ ๑๖๗ • ประตูเหล็กและผนังคอนกรีตเสริมเหล็กทำด้วยเหล็กและคอนกรีต ทำตามแบบกรมที่ดิน • จัดให้มีตู้รับแจ้งเหตุฉุกเฉินที่มีปุ่มกดแจ้งเหตุฉุกเฉินในลักษณะที่กดปุ่ม MAIL BOX ได้ • จัดให้มีพื้นที่ WAITING AREA สำหรับนั่งรอผู้มาติดต่อ • จัดให้มีพื้นที่รอผู้มาติดต่อและนั่งรอผู้มาติดต่อ ทำตามแบบกรมที่ดิน • ติดตั้งกล้องวงจรปิด • จัดให้มีพื้นที่ 1 เมตร สำหรับนั่งรอผู้มาติดต่อและพื้นที่รอผู้มาติดต่อ และพื้นที่รอผู้มาติดต่อและพื้นที่รอผู้มาติดต่อ <p>ส่วนพื้นที่ CONTROL ROOM</p> <ul style="list-style-type: none"> • มีตู้แสดงสถานะระบบระบบต่างๆ ดังนี้ <ul style="list-style-type: none"> - การทำงานของระบบไฟฟ้า - ระบบบำบัดน้ำเสีย และ Drainage - ระบบดับเพลิง - ระบบกล้องวงจรปิด - ระบบ 2111 DOOR ALARM MONITORING - ระบบแจ้งเตือนภัยจากระบบ Underground tank and Roof Tank - ติดตั้ง intercom Lift • ติดตั้งตู้ Fire Alarm Control Panel • จัดให้มีตู้ ASBULL DRAWING • ติดตั้ง 2111 Access Control • จัดให้มี LOCKER สำหรับเก็บของส่วนตัว • ทำตามแบบที่ส่งมาของกรมที่ดินและกรมที่ดินและกรมที่ดิน และพื้นที่รอผู้มาติดต่อและพื้นที่รอผู้มาติดต่อ และพื้นที่รอผู้มาติดต่อและพื้นที่รอผู้มาติดต่อ | |

| | | | |
|---|-----------------------|--|--|
| | | <ul style="list-style-type: none"> • ติดตั้งระบบความปลอดภัย 2 ชั้นของอาคาร 24 ชม. | |
| 2 | Reception Counter | <ul style="list-style-type: none"> • ปลูก ต้นไม้มงคลบริเวณหน้าอาคาร และทำสวนดอกไม้บริเวณหน้าอาคาร • ติดตั้งตู้ Graphic Annunciator ๒๒๒๒๒ Fire Alarm • ติดตั้ง Monitor ๒๒๒๒๒ CCTV • ติดตั้ง intercom Lift • ติดตั้ง Graphic Annunciator ๒๒๒๒๒ Fire Alarm • มีตู้แสดงสถานะระบบต่างๆ ดังนี้ <ul style="list-style-type: none"> - 2111 DOOR ALARM MONITORING - ระบบแจ้งเตือนภัยจากระบบ Underground Tank and Roof Tank | |
| 3 | GENERATOR ROOM | <ul style="list-style-type: none"> • พื้นที่ของเครื่องจักร • ไม่มีการระบายอากาศจากเครื่องจักรในห้อง • มีระบบระบายอากาศที่ดี • มีตู้แสดงสถานะของเครื่องจักร • มีระบบแจ้งเตือนจากระบบไฟฟ้า • ประตูเหล็กและผนังคอนกรีตเสริมเหล็ก • ติดตั้งกล้องวงจรปิด • ติดตั้ง Emergency Light | |
| 4 | TRANSFORMER ROOM/ MDB | <ul style="list-style-type: none"> • พื้นที่ของเครื่องจักร • ไม่มีการระบายอากาศจากเครื่องจักรในห้อง • มีระบบระบายอากาศที่ดี • มีตู้แสดงสถานะของเครื่องจักร • ติดตั้งกล้องวงจรปิด • ติดตั้ง Emergency Light | |
| 5 | POOL CONTROL ROOM | <ul style="list-style-type: none"> • พื้นที่ของเครื่องจักร • ไม่มีการระบายอากาศจากเครื่องจักรในห้อง • มีระบบระบายอากาศที่ดี • มีตู้แสดงสถานะของเครื่องจักร • ติดตั้งกล้องวงจรปิด • ติดตั้ง Emergency Light | |

BIM Real Estate Industry - Knowledge Sharing Days

| Day No. | Activity | Attendees | Date | Output |
|---------|------------------|---|---------------|---|
| 1 | Real Estate Day | Adv. R&D, Autodesk | 21 June 2016 | Team Collaboration |
| 2 | Construction Day | Adv. R&D, PM, Teka, A-Build, Autodesk, | 15 July 2016 | Team Collaboration |
| 3 | Design Day | HBU, Adv. R&D, PM, PD, Designers, Teka, Abuild, Autodesk, | 4 August 2016 | Design Defect Checklist <ul style="list-style-type: none">- AR/ST = 22- M&E = 14 |



- DEFECT งานสถาปัตยกรรม, โครงสร้าง
- ขนาดประตู เหล็ก / เล็กไปไม่เหมาะกับการใช้งาน เปลี่ยนใหม่ตอนหลัง / เช่นห้องเครื่อง PUMP MDB GEN
 - อุปกรณ์ วัสดุที่ใช้ไม่ตรงตามวัตถุประสงค์การใช้งาน เช่นสุขภัณฑ์ และอุปกรณ์ประตูลูก
 - งานสีตำแหน่งไม่ชัดเจน ไข่เจ็ดสีไม่เหมาะสม ทำให้ต้องแก้ไขและเปลี่ยนสี
 - ประตูส่วนกลางอยู่ภายนอกไม่กันน้ำเข้าอาคาร รวมถึงอุปกรณ์ฝังสำหรับบาน ติดตั้งแล้วล้ม ธรณีหรือไม่มีตัวจับขอ
 - ตำแหน่งท่อไป และ OUT LET มีแบบ TYPICAL ให้ แต่ความจริงตำแหน่งอาจติดตั้งไม่ได้ เช่น ห้องมี MILLOR หรือตำแหน่งเสาหรือ SHER WALL
 - รวบรวมเป็นแบบฝัง DETAIL ไม่ชัดเจน / ฝังเหล็กหลักยาก / เก็บงานยาก
 - ตำแหน่งรอยต่อ PRECAST ไปอยู่ในห้องพัก
 - วัสดุต่างประเภทกันอยู่ใกล้กัน เช่น หินขัดใกล้ทรายล้าง สีผิวสีด้าใกล้สีขาว
 - แบบไม่ตรงกับโปรเจกต์ / ซัดแบบไหนเป็นหลัก
 - แผงเกล็ดระบายอากาศในห้อง MDB , น้ำเข้า
 - ตำแหน่งวาง เครื่องลิฟท์ ไม่ Comble กับงานแบบ AR ต้องปรับเปลี่ยนตอนหลัง
 - ท่อแอร์เบียดคานระยต่ำกว้าฝ้าเพดาน
 - งานระบบร้านค้าที่ต้องเตรียมไว้ให้ / ส่วนมากทราบตอนหลัง (เพิ่มยากปัญหาติดตั้งชั้นพื้นดิน)
 - งานแบบชุดครัว จากผู้ผลิต ตำแหน่งท่อไม่ตรงกับตำแหน่ง งานสถาปัตยกรรม, งานระบบ
 - ขอบเขตงานลิฟท์ เช่น แผ่น PLATE ฝัง SHERWALL , แทนเครื่องลิฟท์ ระบบระบายอากาศห้องลิฟท์เพิ่มและปรับภายหลัง ค่าใช้จ่ายเพิ่ม
 - ช่อง SERVICE ชั้น TRANSFER ไม่มีแต่แรก
 - งานระบบ กับ งาน LAND SCAPE ที่ออกแบบมาไม่สอดคล้องกัน / เช่นหน้าโครงการ บ่อพักขยะ ไม่ไว้วางในแบบ
 - ช่องระบายอากาศงาน AR แบบไม่ตรงตามต้องการใช้งาน ของรายการคำนวณงานระบบ ต้องเปลี่ยนขนาดตอนหลัง
 - งานออกแบบ Precast กลุ่มไม่รอบคอบ งานชนกับผนังงานก่อฉาบ มักซึมน้ำ

BIM Day 01 at Bangna

BIM Day 02 & 03 at Ideo 115, BJMK Lab Rooms

Checklist = 36 issues



Design Defect Issues Example



- Different wall materials



- AC pipe through door frame



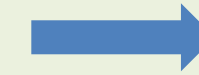
- Kitchen pipe at column



- Wall strength between conduit & sound problems

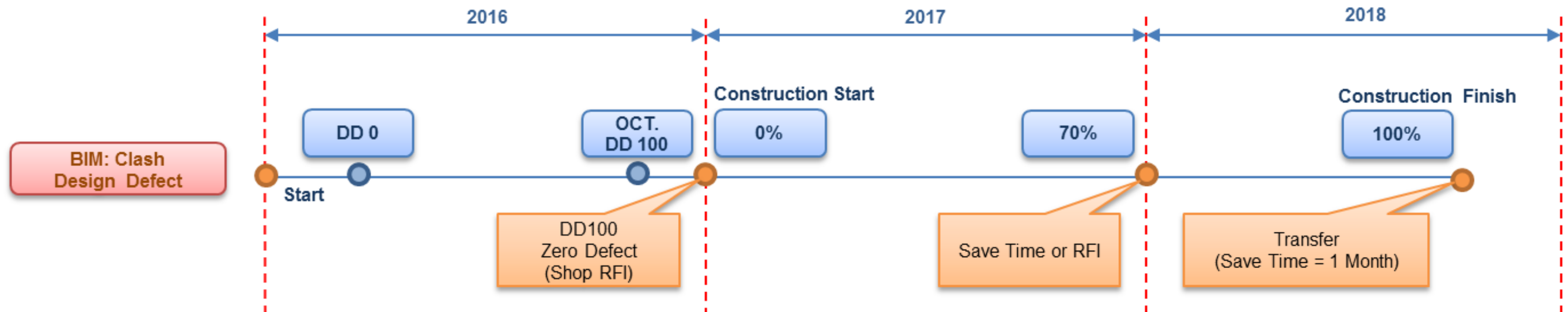
BIM Value Creation & KPI Measurements

Value Creation = Time Savings
Preventative Defect Resolutions & Speed to Resolve Defects



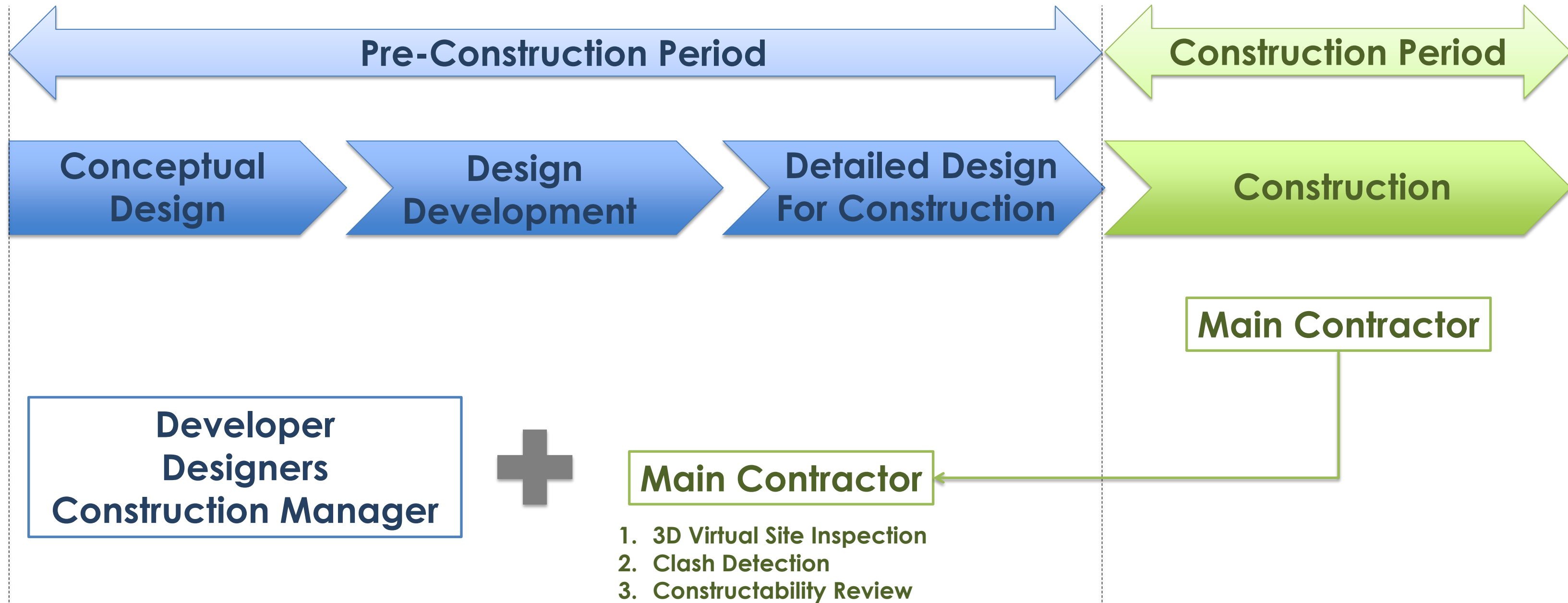
BIM KPI

Finding & resolving problems sooner in Pre-Construction stage, NOT in Construction stage.

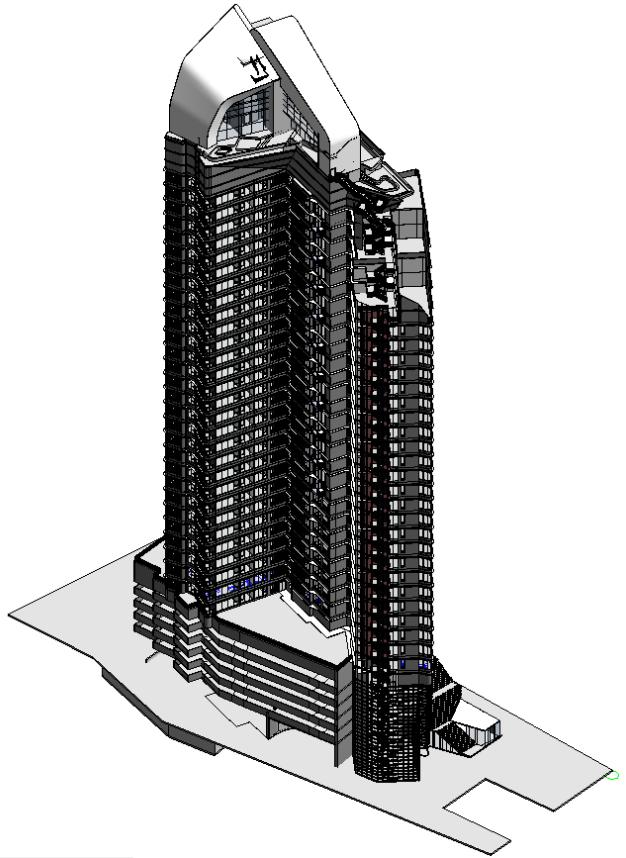


Process changes

Kick-off



Pilot Project Transformation Change Management



LOD200

Conceptual Design

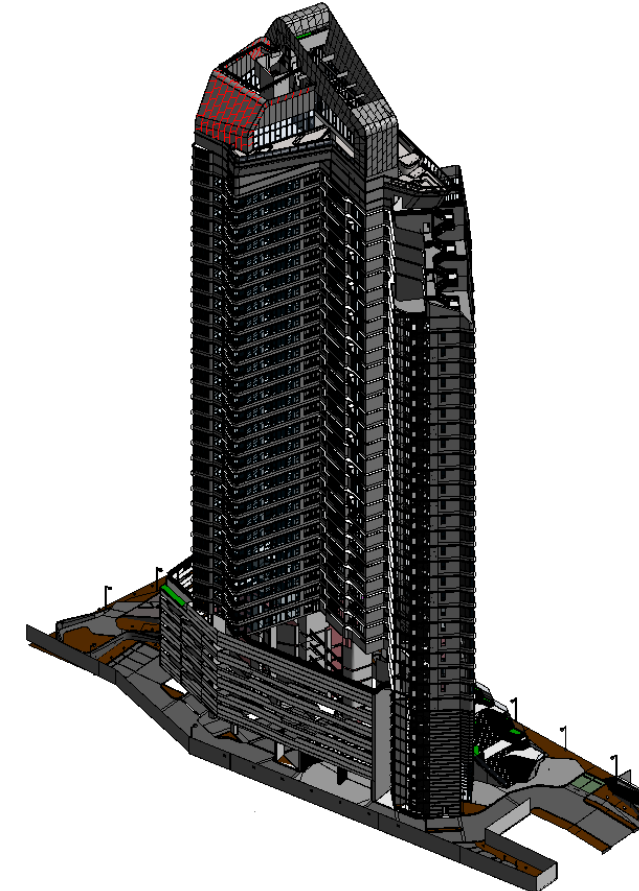
- Engage designers to deliver BIM outputs
- Enhance team collaborations
- BIM Training



LOD250

Design Development

- Start collaboration in BIM
- Design co-ordination workshops
- Contractor training/preparation

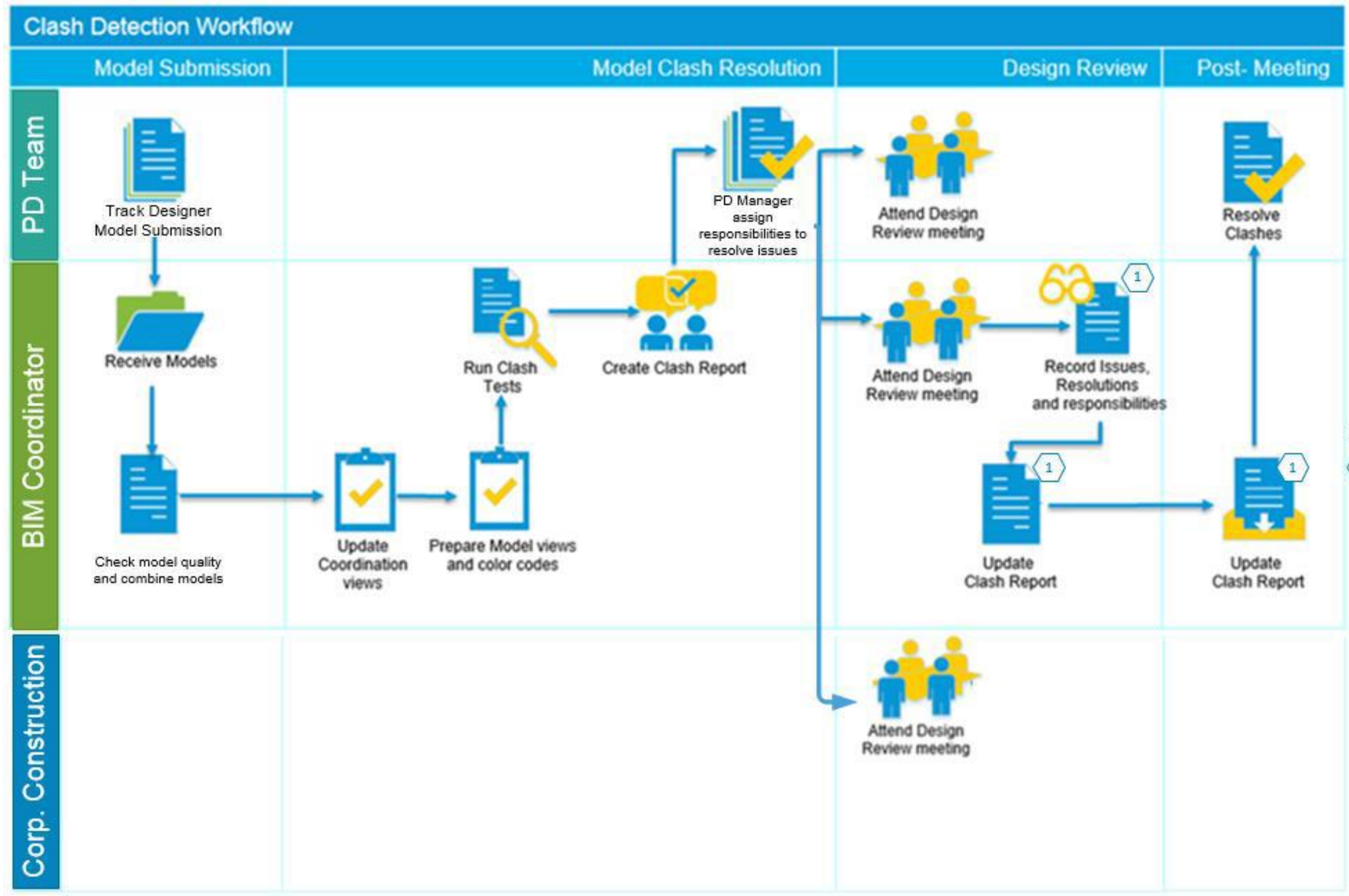


LOD300

Detailed Design For Construction

- Full BIM collaborations
- Contractor training/preparation

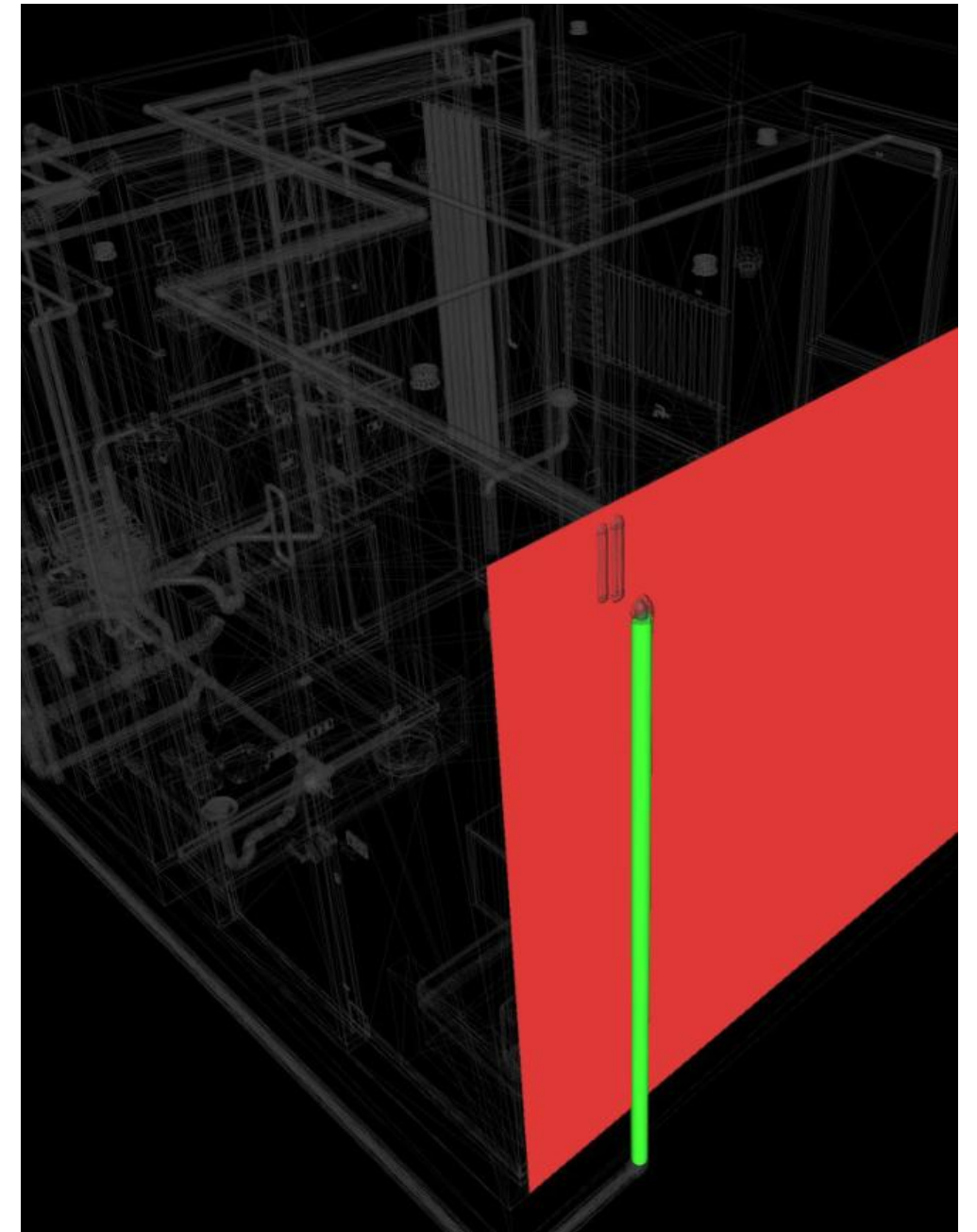
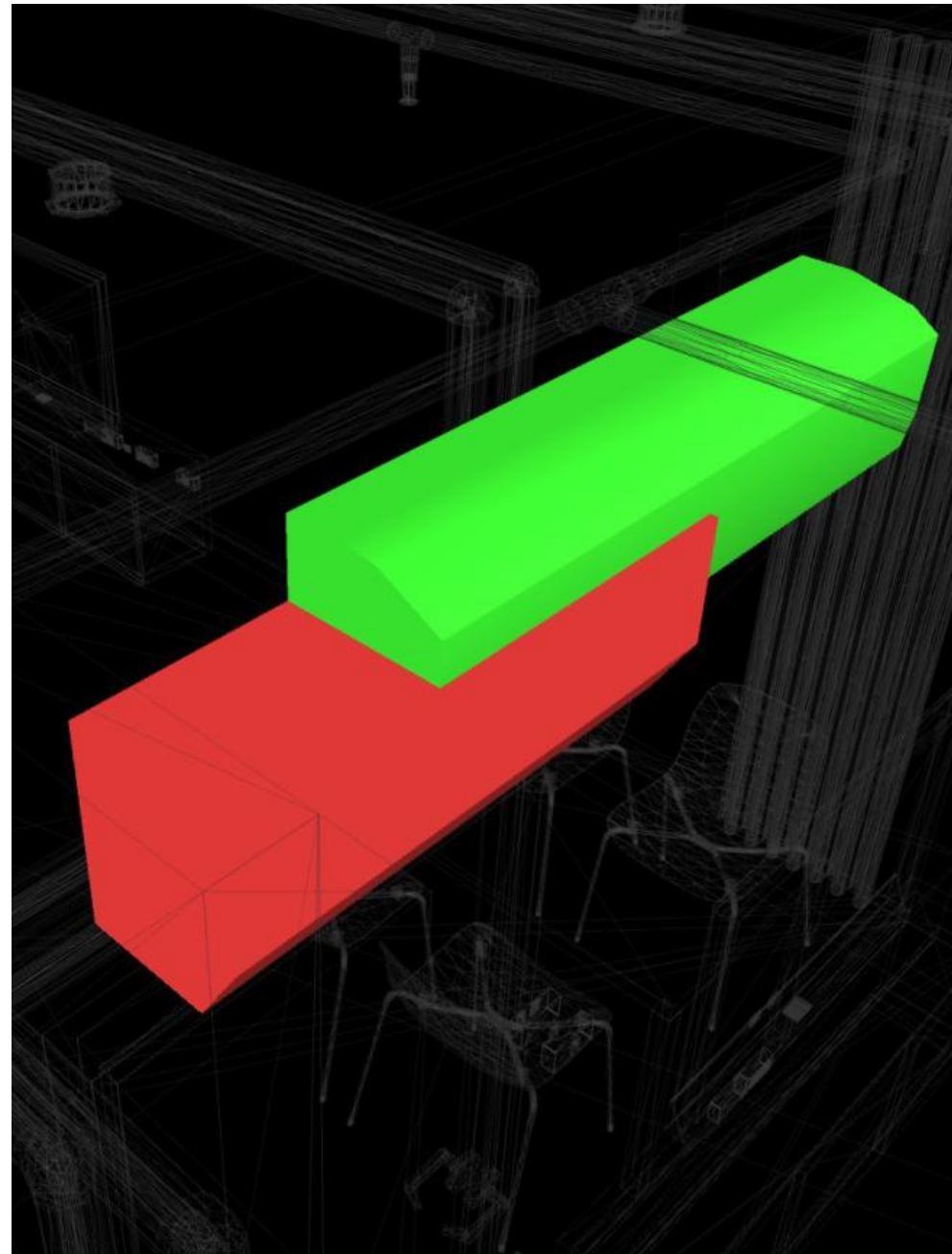
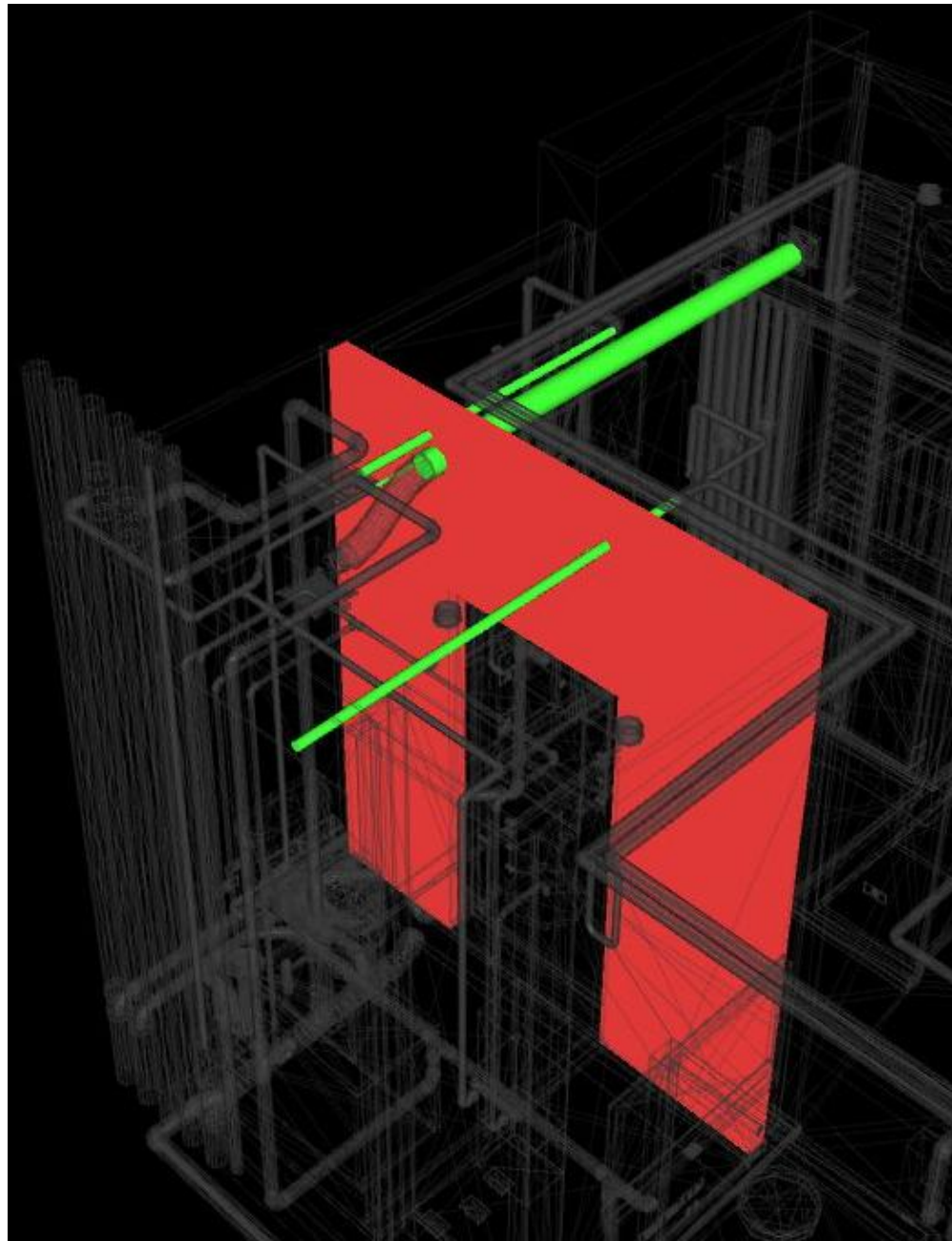
Clash Detection Workflow



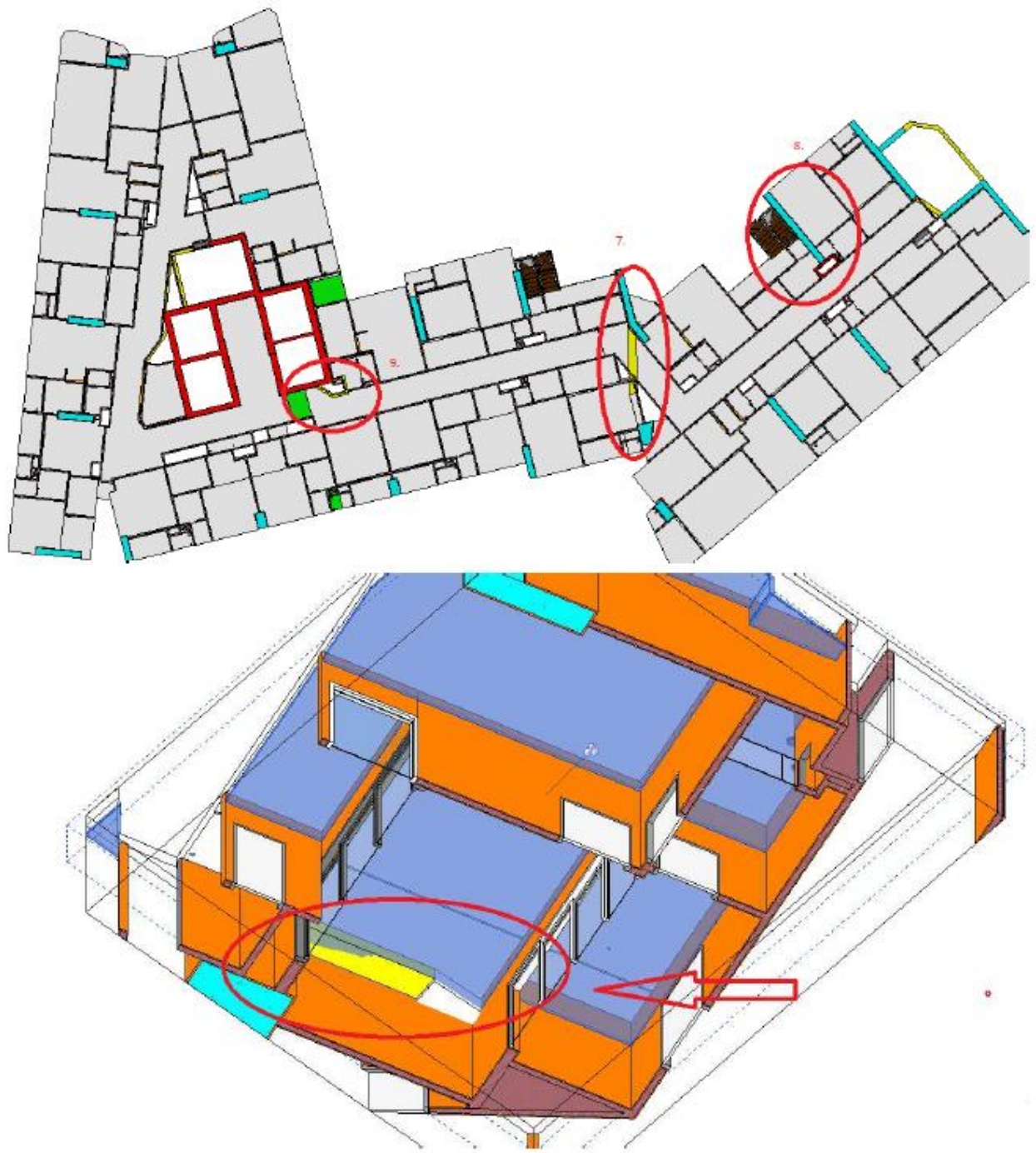
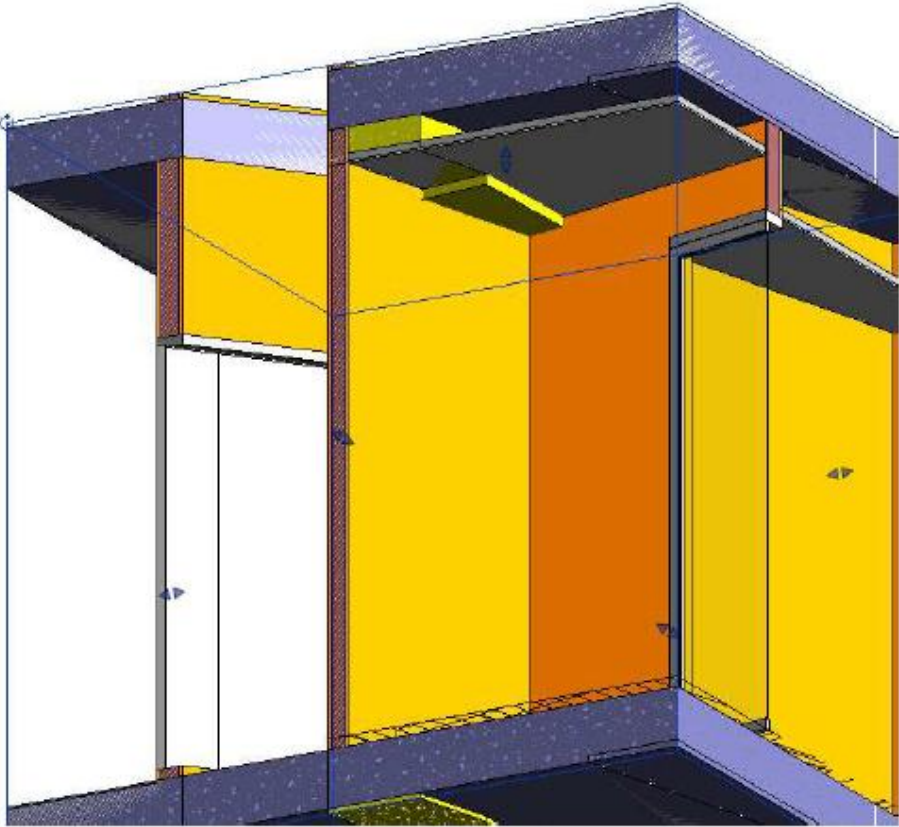
Note:
1 BIM Manager to oversee BIM Coordinator defect log before submission to PD team

Pilot Project Clash Detections

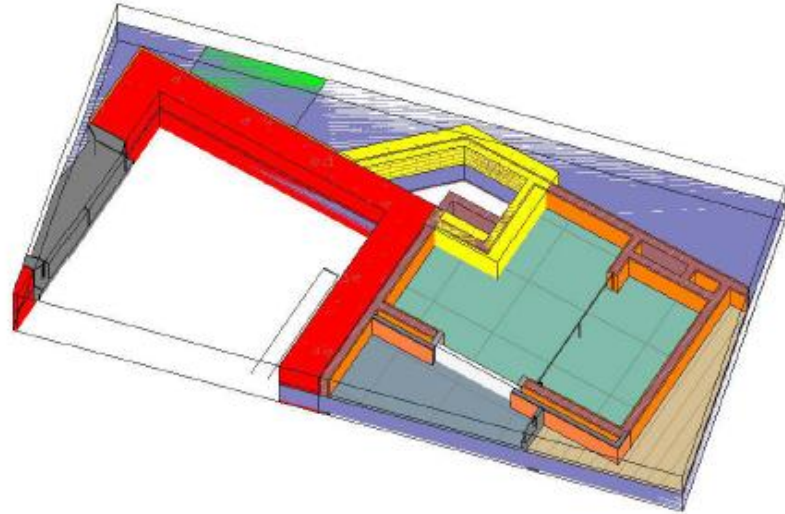
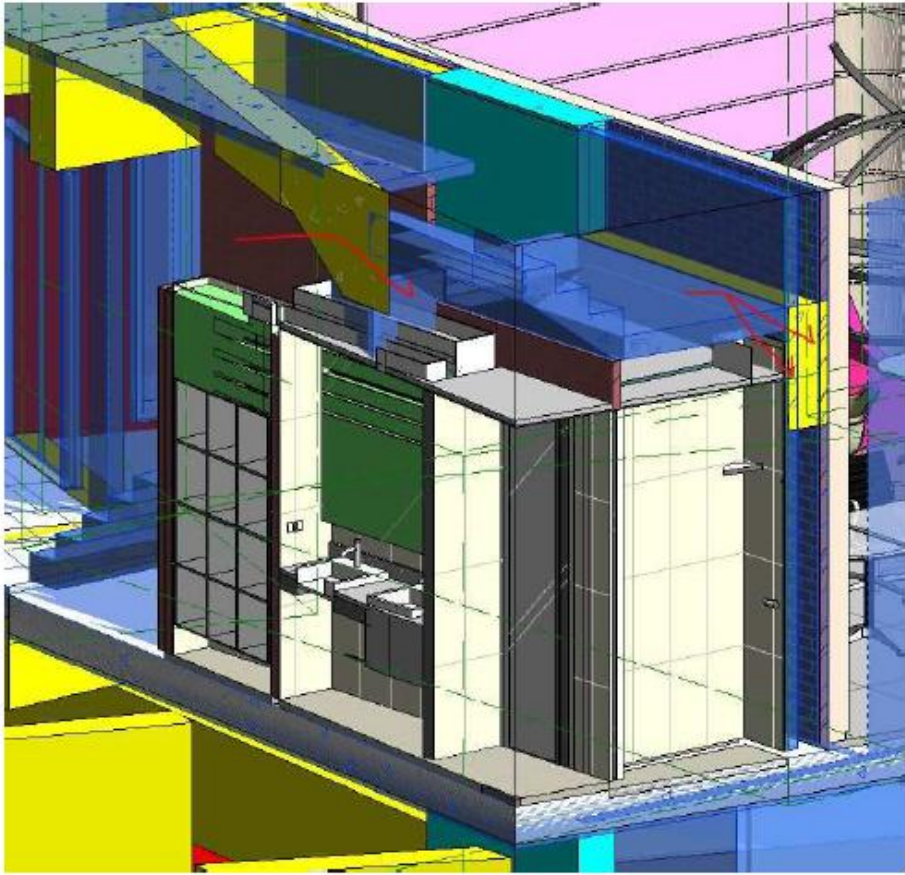
PILOT PROJECT : Full High-Rise Condo
Clash Detections



Pilot Project 3D Co-Ordination Review

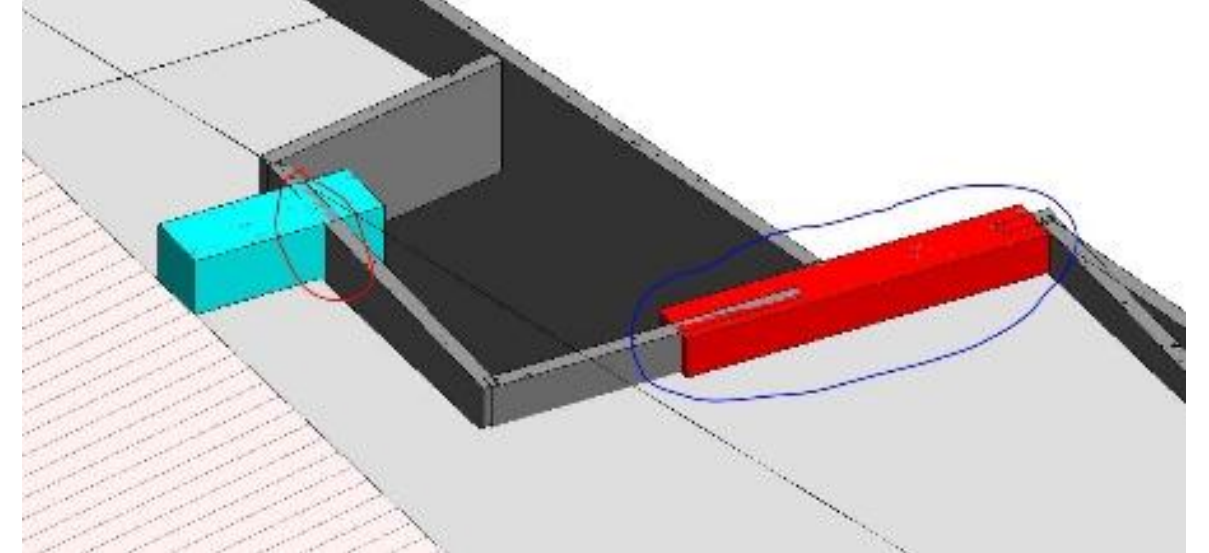
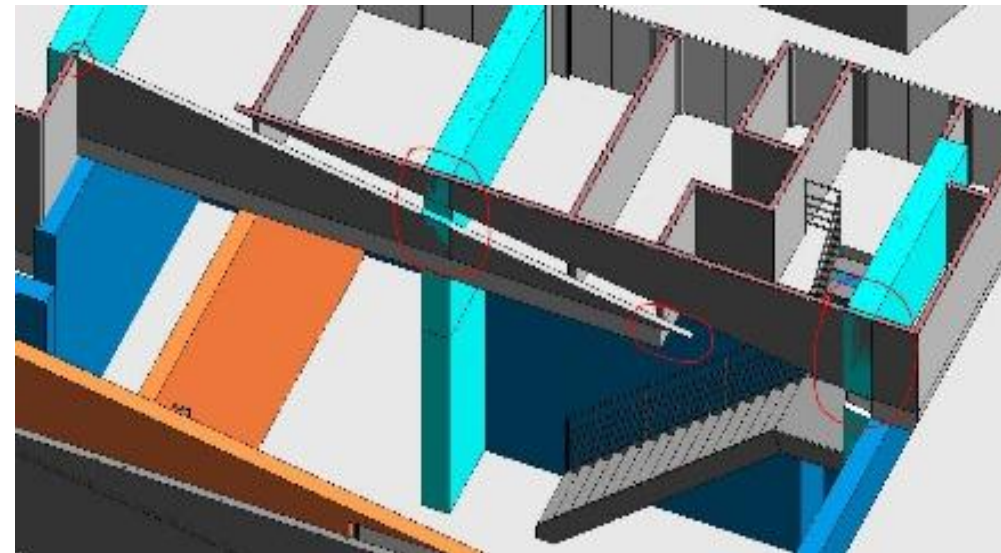
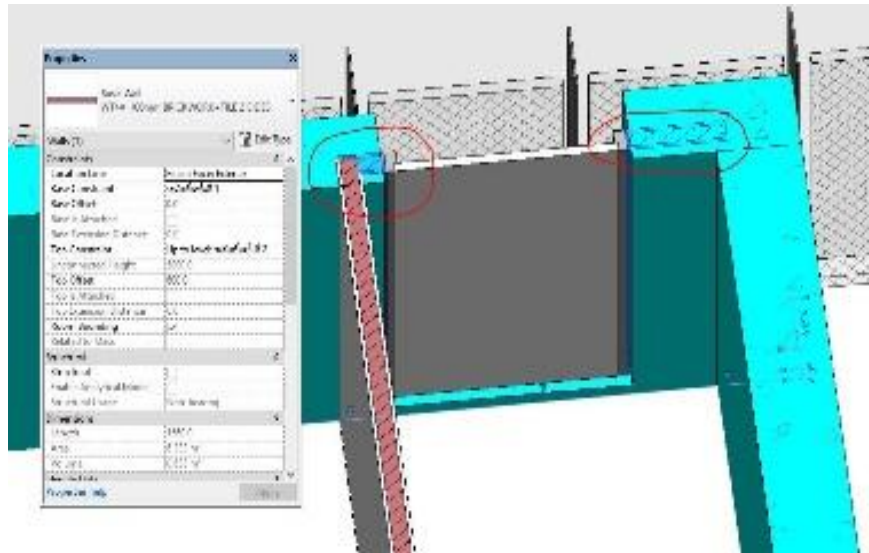
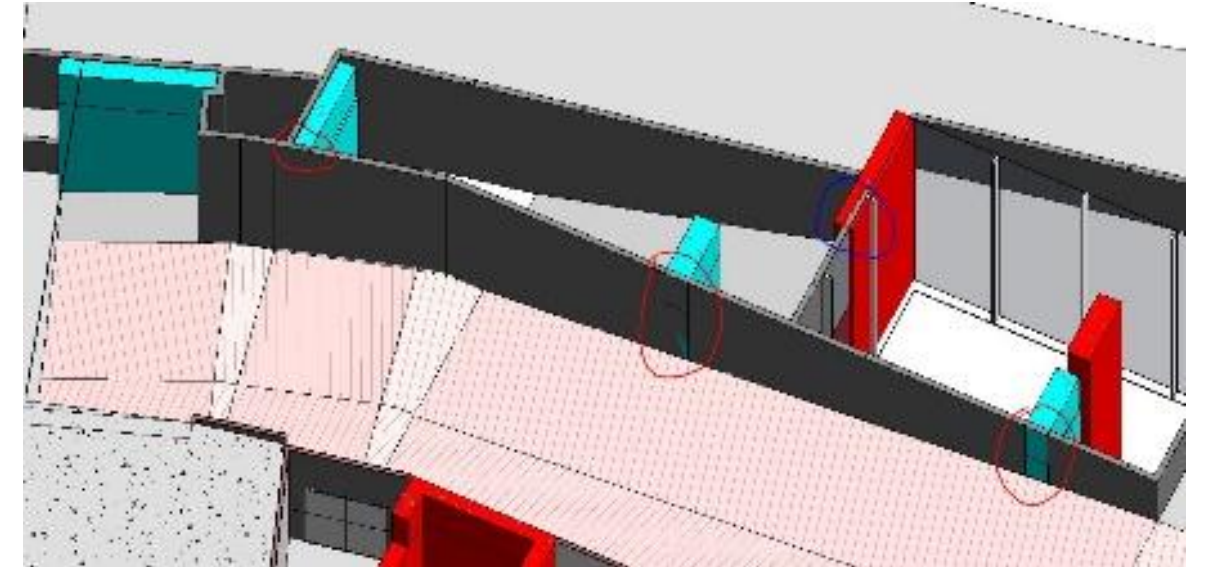
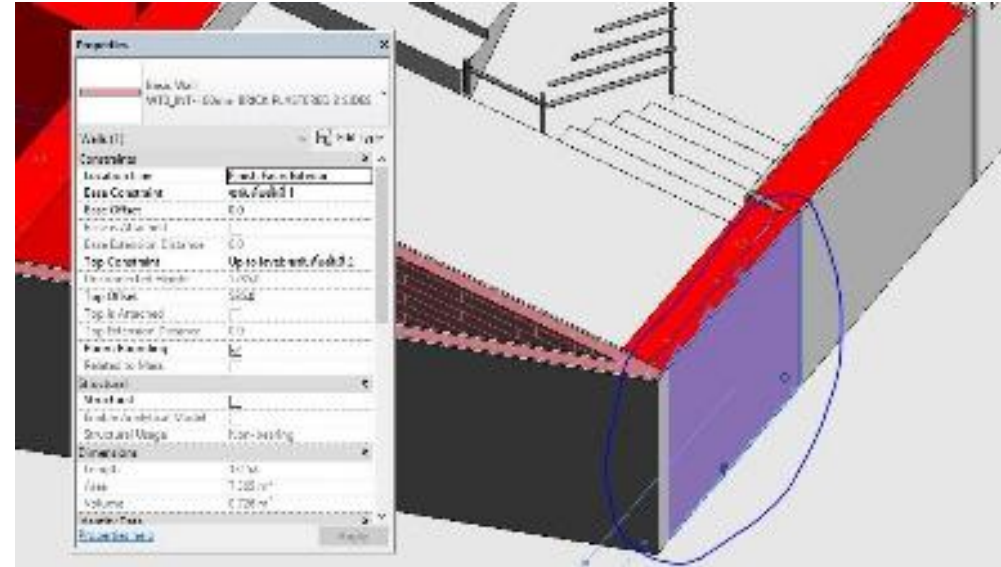
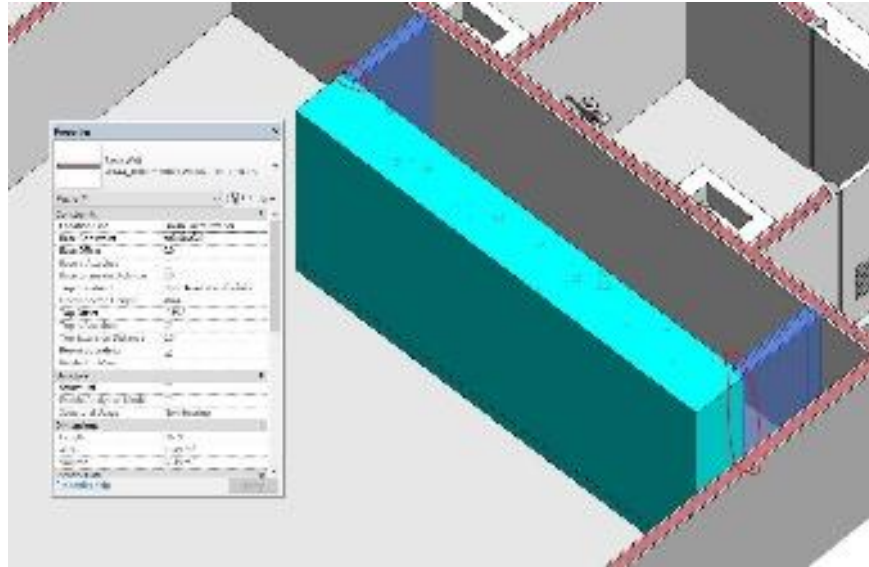
| | | | |
|--|--------------------------|--|---|
| <div>1.</div> <div></div> | <p>TYPICAL UNITS</p> | <p>IN ceiling IN walls &ST framing</p> | <p>CLASH : Collision between structural framing and internal ceilings and walls.</p> <p>Job Action Description: ANANDA : - INT : - ST: check and redesign frame AR: -</p> <div></div> <p>Room 32-10 on every level</p> |
|--|--------------------------|--|---|

Pilot Project 3D Co-Ordination Review

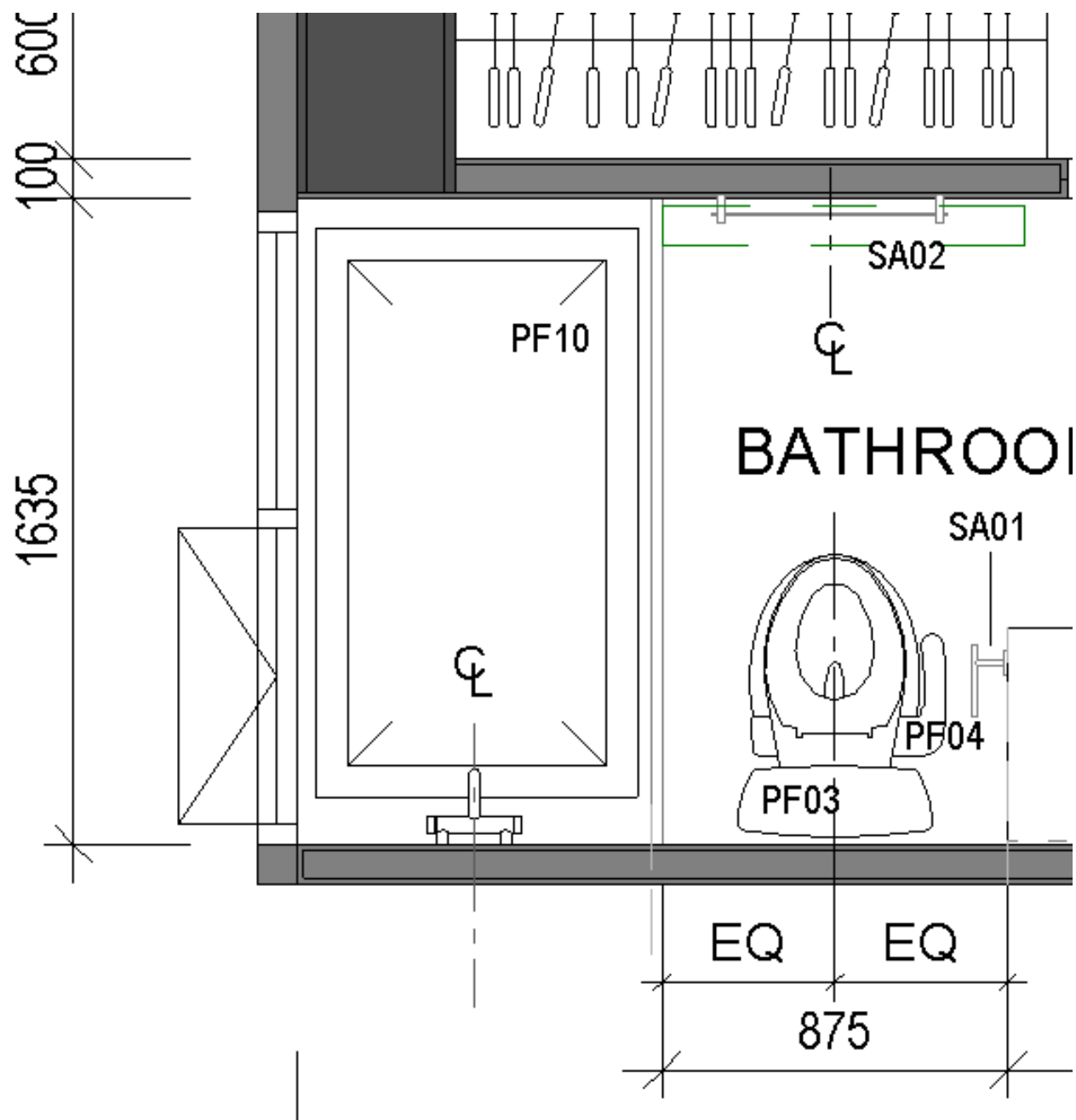
| | | | | | |
|----|---|---------------|--|--|--|
| 3. |  <p>Room 24-19 on every level</p> | TYPICAL UNITS | IN ceiling IN walls &ST framing | CLASH : Collision between structural wall and internal ceilings and walls. Effect on room area. Job Action Description: ANANDA : - INT : - ST: check and redesign wall AR: - | |
| 4. |  | 36 FL. | IN WALL, ST AND AR STAIRS | CLASH : AR wall clash to ST beam(RIGHT) and IN ceiling Clash to AR stair(LEFT) | |



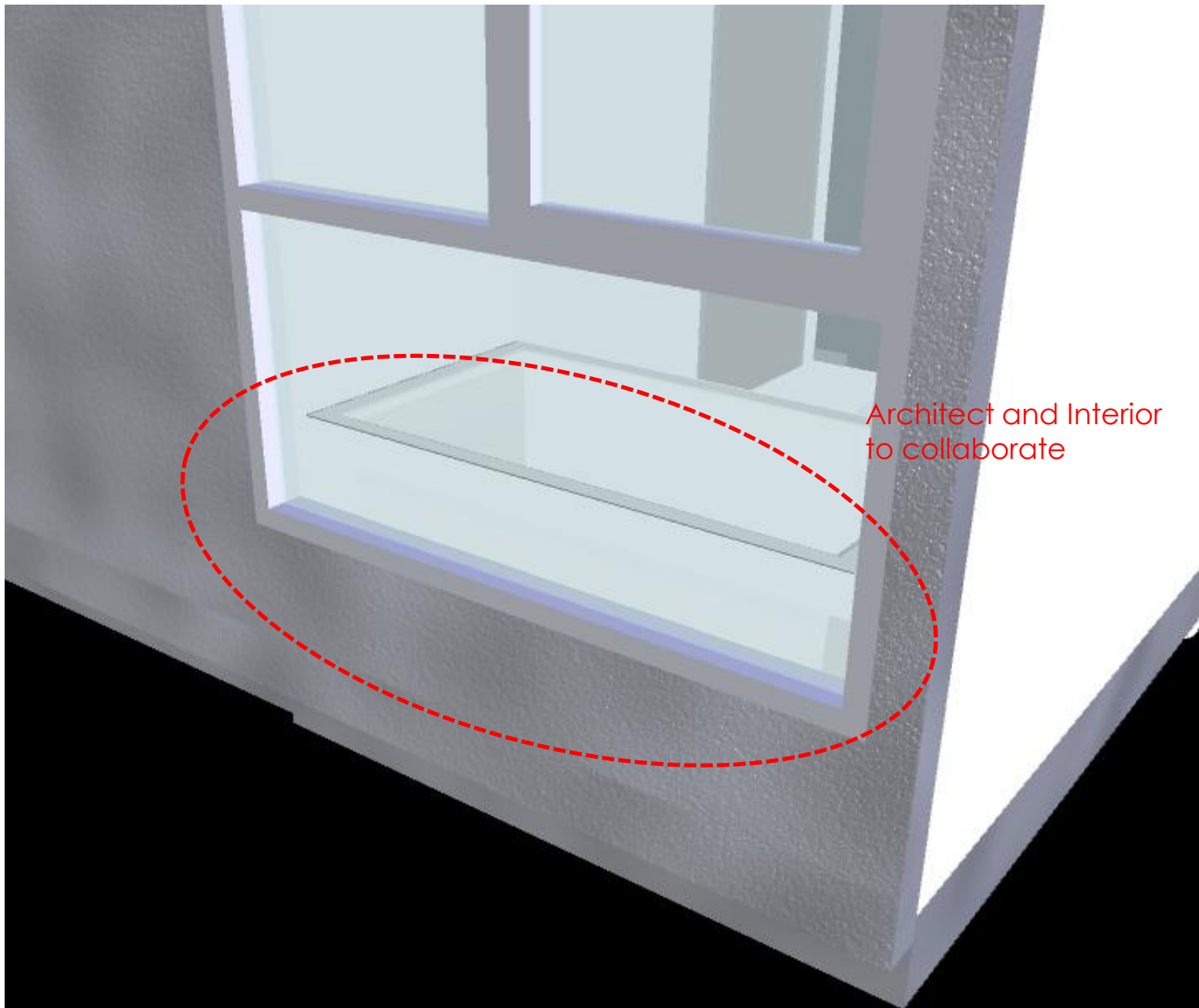
Pilot Project 3D Co-Ordination Review



Pilot Project 3D Visual Review

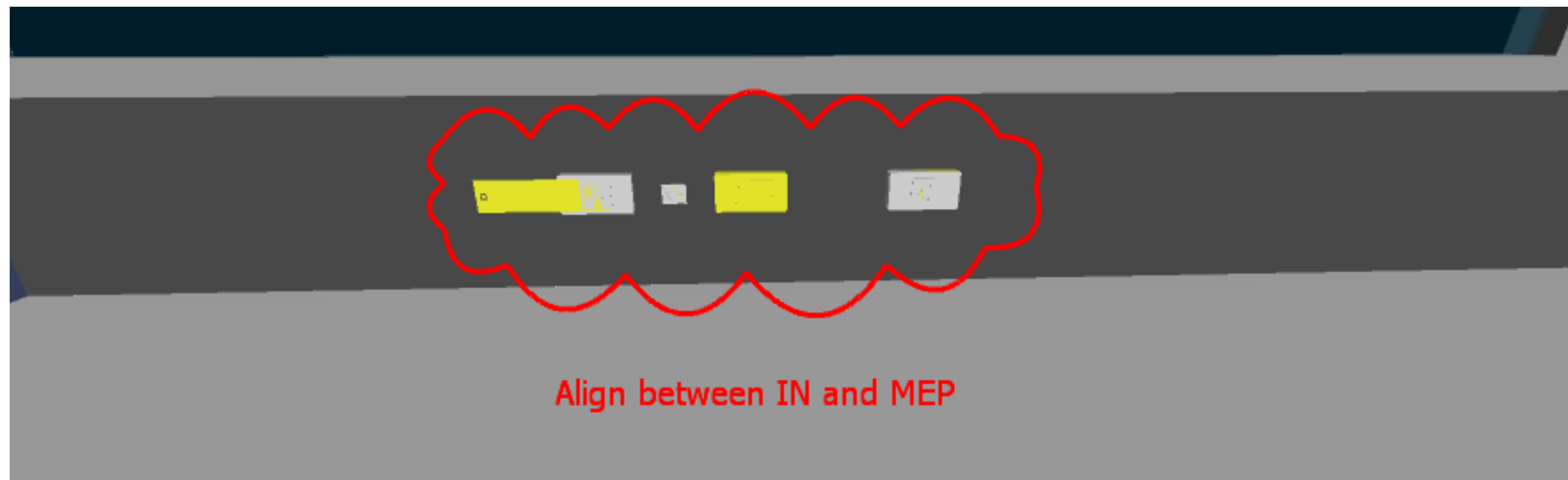
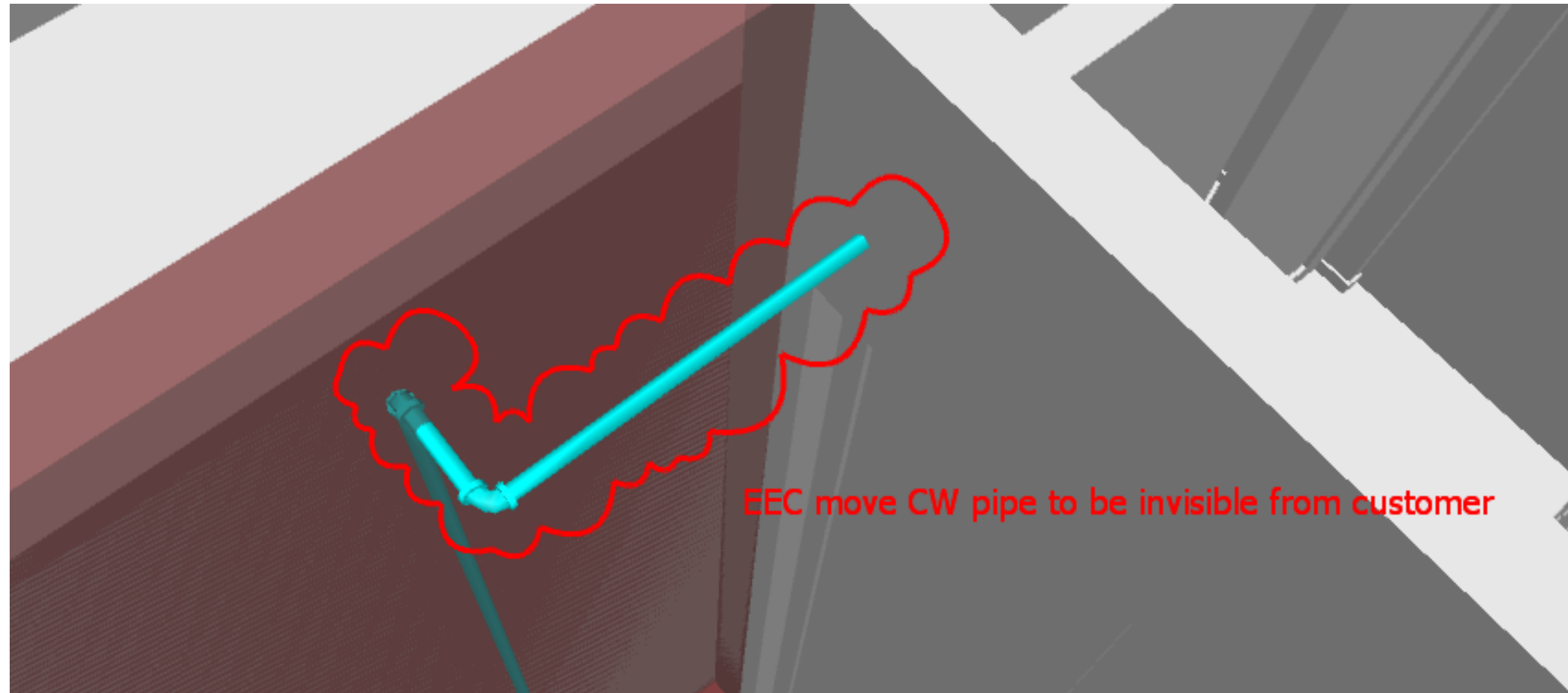


Revit
Plan



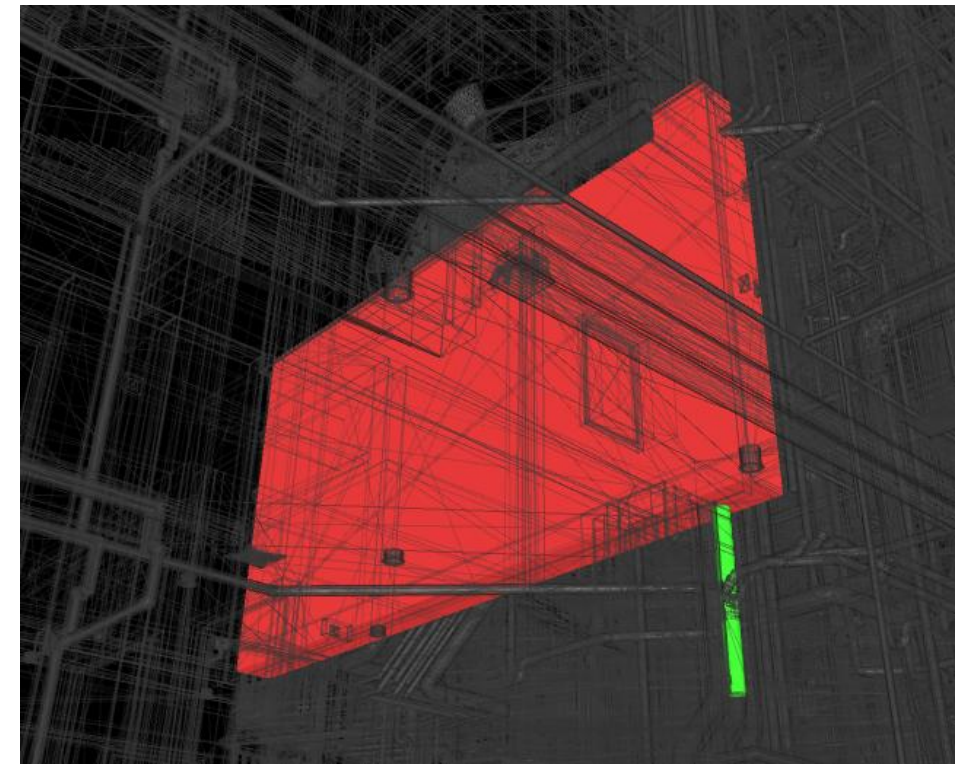
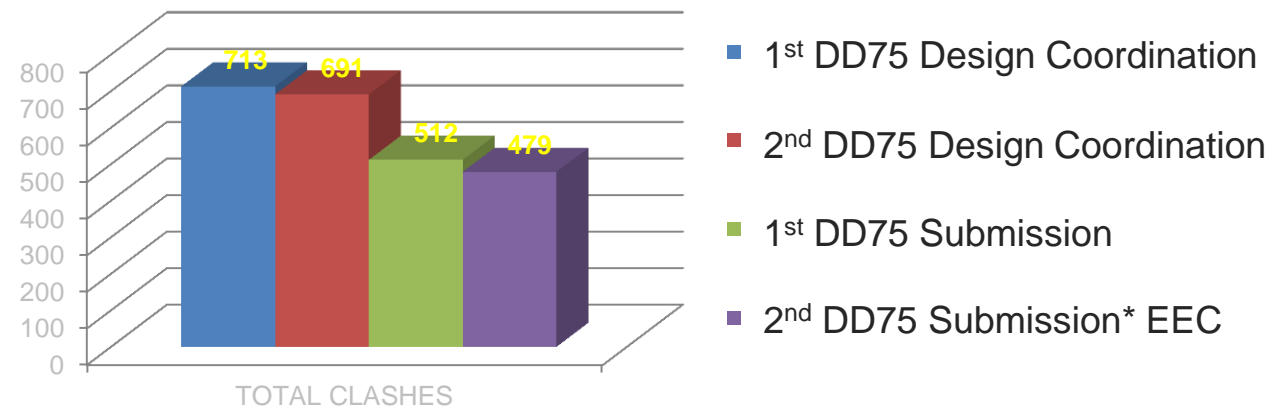
Navisworks
3D Visual Review

Pilot Project 3D Visual Review

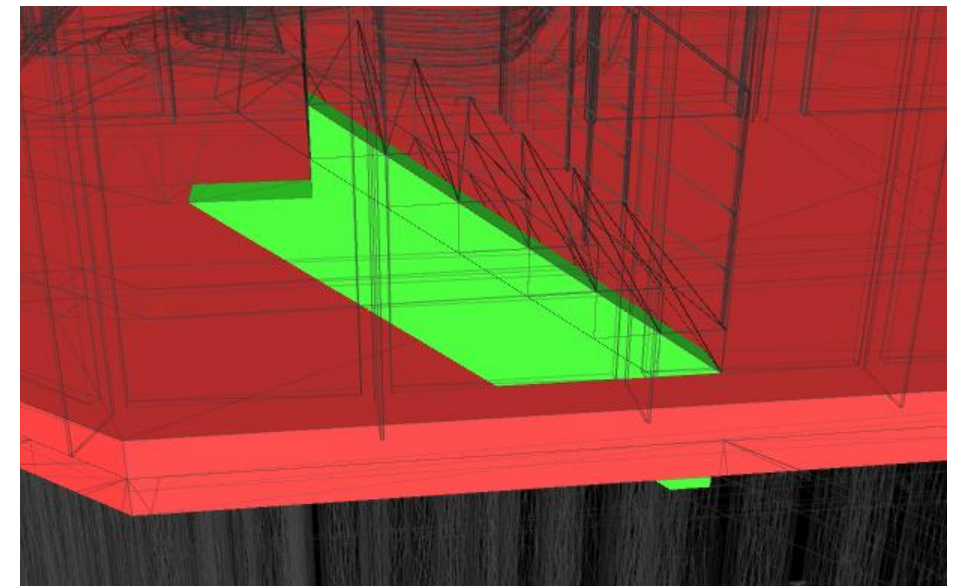


Ideo MOBI - Pilot Project Clash Report LOD 250

| Typical Units Type | Defects Clashes Identified | | | |
|-------------------------|----------------------------|---------------------|---------------------|---------------------|
| | DD75 Design Co. 1st | DD75 Design Co. 2nd | DD75 Submission 1st | DD75 Submission 2nd |
| ST Wall vs ST Slab | 499 | 51 | 0 | 0 |
| ST Wall vs ST Framing | 16 | 14 | 0 | 0 |
| ST Wall vs ST Column | 1 | 1 | 0 | 0 |
| ST Wall vs MEP pipe | 2 | 118 | 109 | 118 |
| ST Slab vs ST Framing | 34 | 47 | 32 | 32 |
| ST Framing vs MEP pipe | 2 | 106 | 131 | 240 |
| ST Column vs ST Slab | 12 | 58 | 24 | 24 |
| ST Column vs ST Framing | 157 | 134 | 47 | 47 |
| ST Column vs MEP pipe | 8 | 162 | 169 | 18 |
| HVAC vs ST Wall | 0 | 0 | 0 | 0 |
| HVAC vs ST Framing | 0 | 0 | 0 | 0 |
| HVAC vs ST Floor | 0 | 0 | 0 | 0 |
| HVAC vs ST Column | 0 | 0 | 0 | 0 |
| HVAC vs MEP pipe | 0 | 0 | 0 | 0 |
| TOTAL CLASHES | 713 | 691 | 512 | 479 |



ST Wall vs MEP pipe

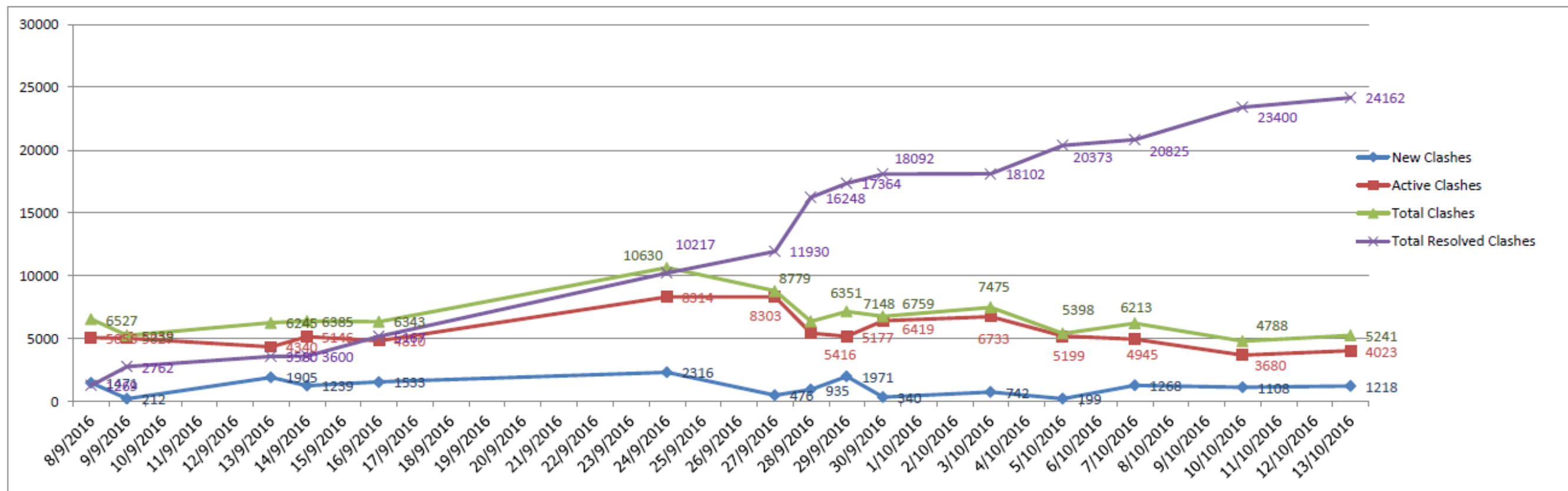


ST Slab vs ST Framing

Ideo MOBI Asoke - Pilot Project Clash Report

All CLASHS (All Building)

| Clash type/Date | 13/10/2016 | 10/10/2016 | 7/10/2016 | 5/10/16 | 3/10/16 | 30/9/16 | 29/9/16 | 28/9/16 | 27/9/16 | 24/9/16 | 16/9/2016 | 14/9/2016 | 13/9/2016 | 9/9/2016 | 8/9/2016 |
|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|
| New Clashes | 1218 | 1108 | 1268 | 199 | 742 | 340 | 1971 | 935 | 476 | 2316 | 1533 | 1239 | 1905 | 212 | 1471 |
| Active Clashes | 4023 | 3680 | 4945 | 5199 | 6733 | 6419 | 5177 | 5416 | 8303 | 8314 | 4810 | 5146 | 4340 | 5027 | 5056 |
| Total Clashes | 5241 | 4788 | 6213 | 5398 | 7475 | 6759 | 7148 | 6351 | 8779 | 10630 | 6343 | 6385 | 6245 | 5239 | 6527 |
| Total Resolved Clashes | 24162 | 23400 | 20825 | 20373 | 18102 | 18092 | 17364 | 16248 | 11930 | 10217 | 5167 | 3600 | 3580 | 2762 | 1269 |
| Resolved Clashes/Day | 762 | 2575 | 452 | 2271 | 10 | 728 | 1116 | 4318 | 1713 | 5050 | 1567 | 20 | 818 | 1493 | |



Key Take Aways

DIGITAL BUILDING INFORMATION MODELING



GOAL

To make decisions in a timely manner



Question: How to integrate BIM into “*Digital Platforms*”

3Ps of People

1. People's **Trust** = Gain their **Trust**
2. People's **Knowledge** = **KMS** = Top \longleftrightarrow Down
3. People's **Collaboration** = Cloud based for **Real time**



SINGLE POINT OF TRUTH

Ideo Mobi Asoke – The Revolutionary Smart Condo



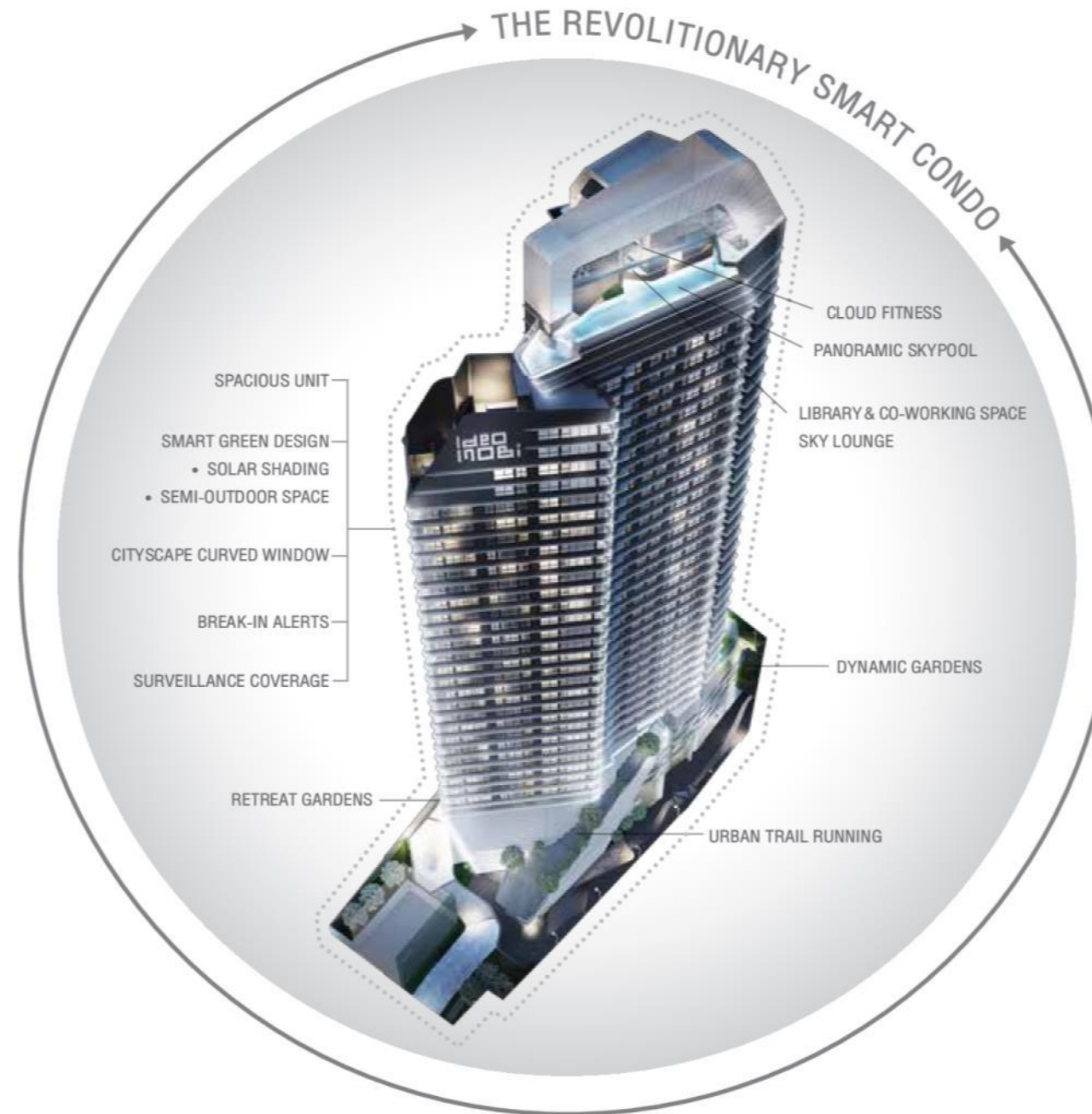
Ideo Mobi Asoke






Ideo MOBI Asoke

SMART LOCATION




- Links to two of Bangkok's central business districts (CBD)
- Near Mass Transit System
- Connectivity to four of Bangkok's main roads
- The Heart of Convenience
- Close to Nature



SMART SAFETY

-  Alerts System
-  Surveillance Coverage
-  Smart Hub

SMART DESIGN

-  Spacious Unit Plan Design
-  Facility
-  Eco-Urban Life

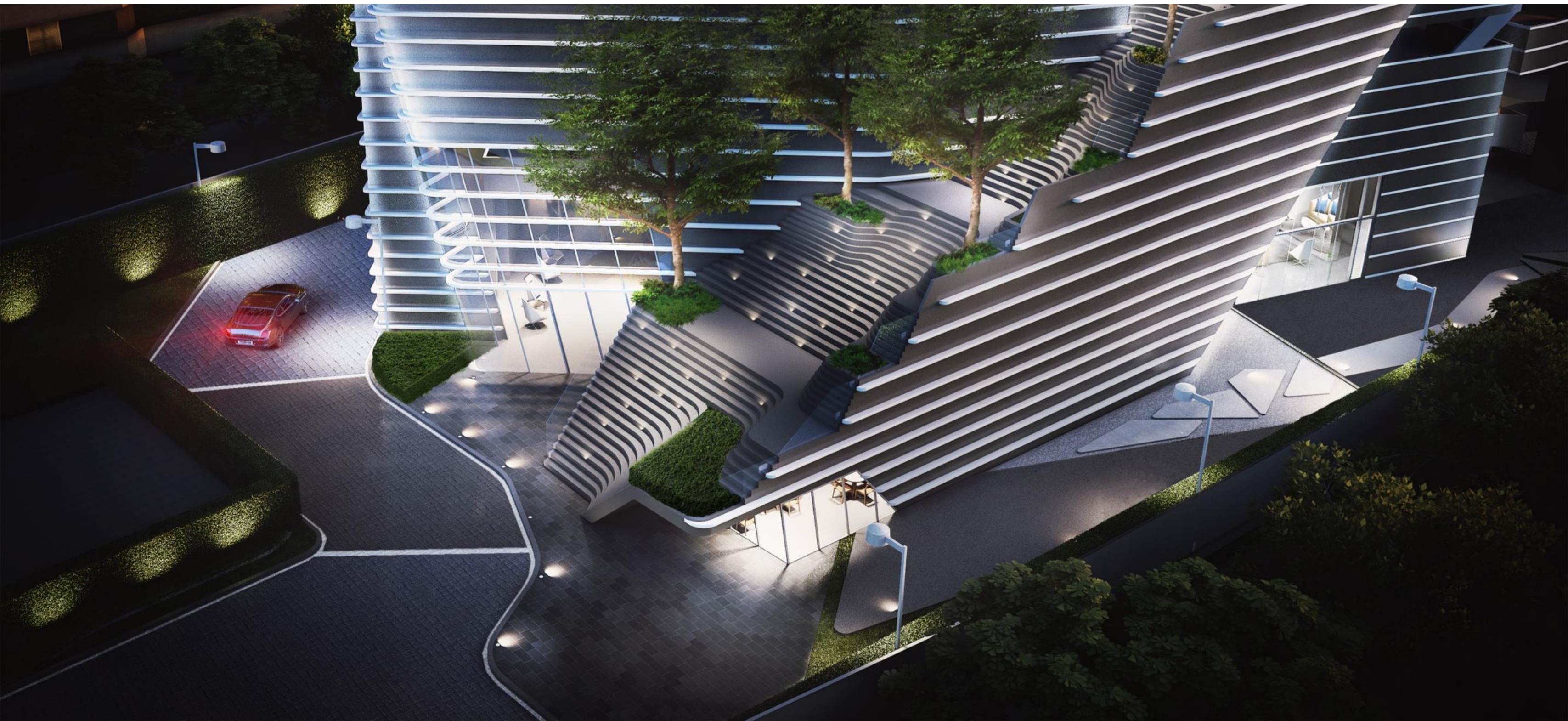
Ideo Mobi Asoke



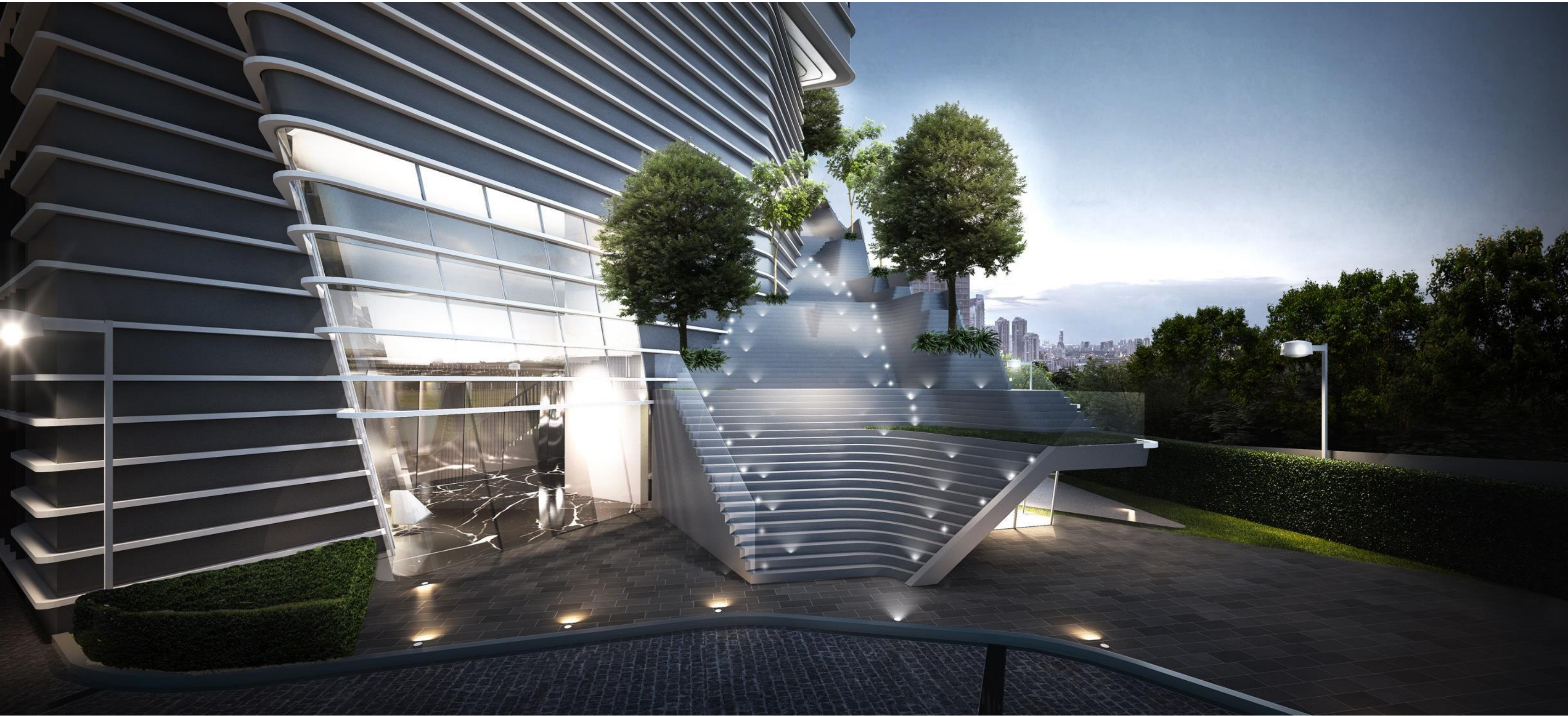
Ideo Mobi Asoke



Ideo Mobi Asoke



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Ideo Mobi Asoke



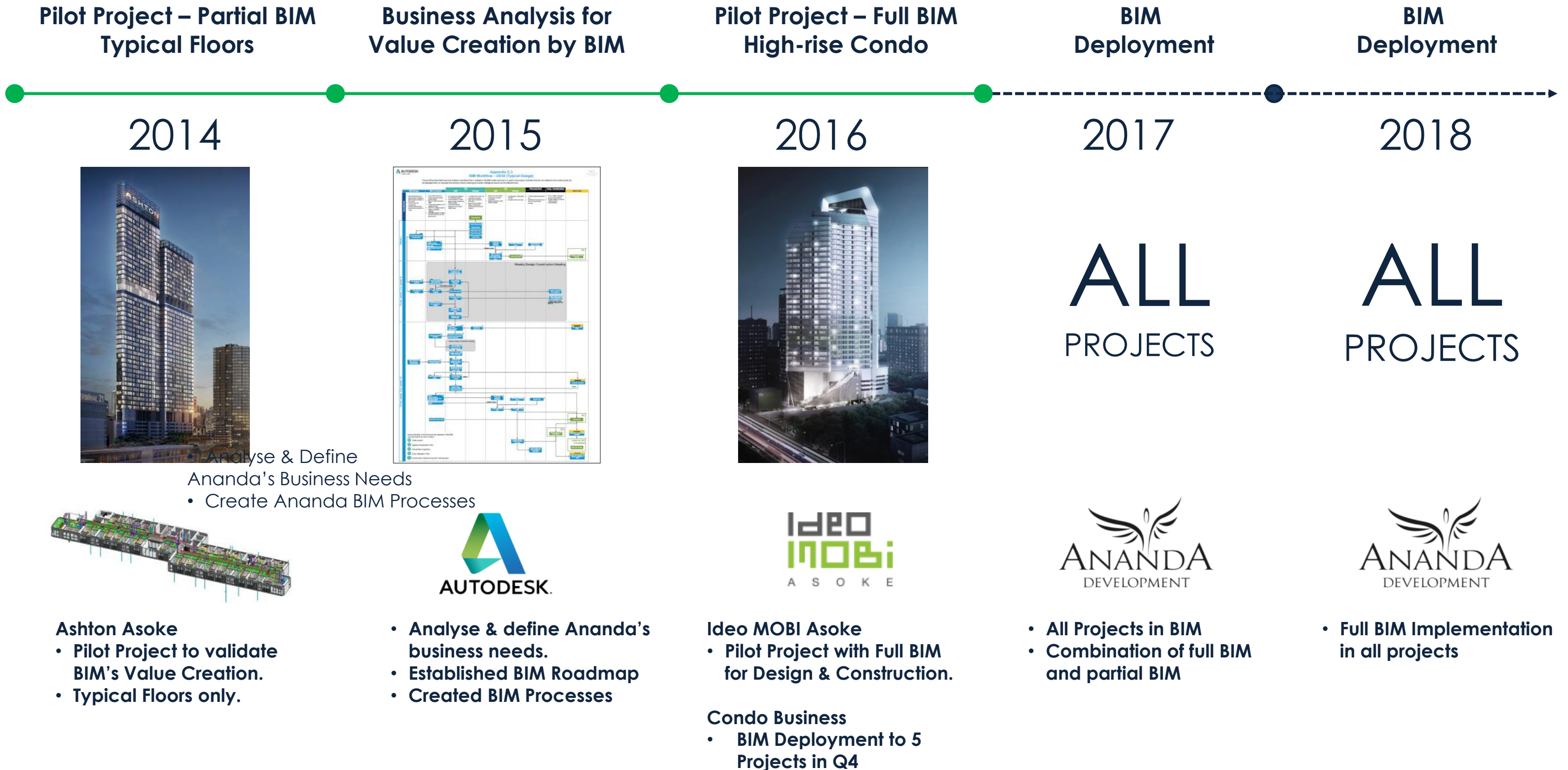
Ideo Mobi Asoke



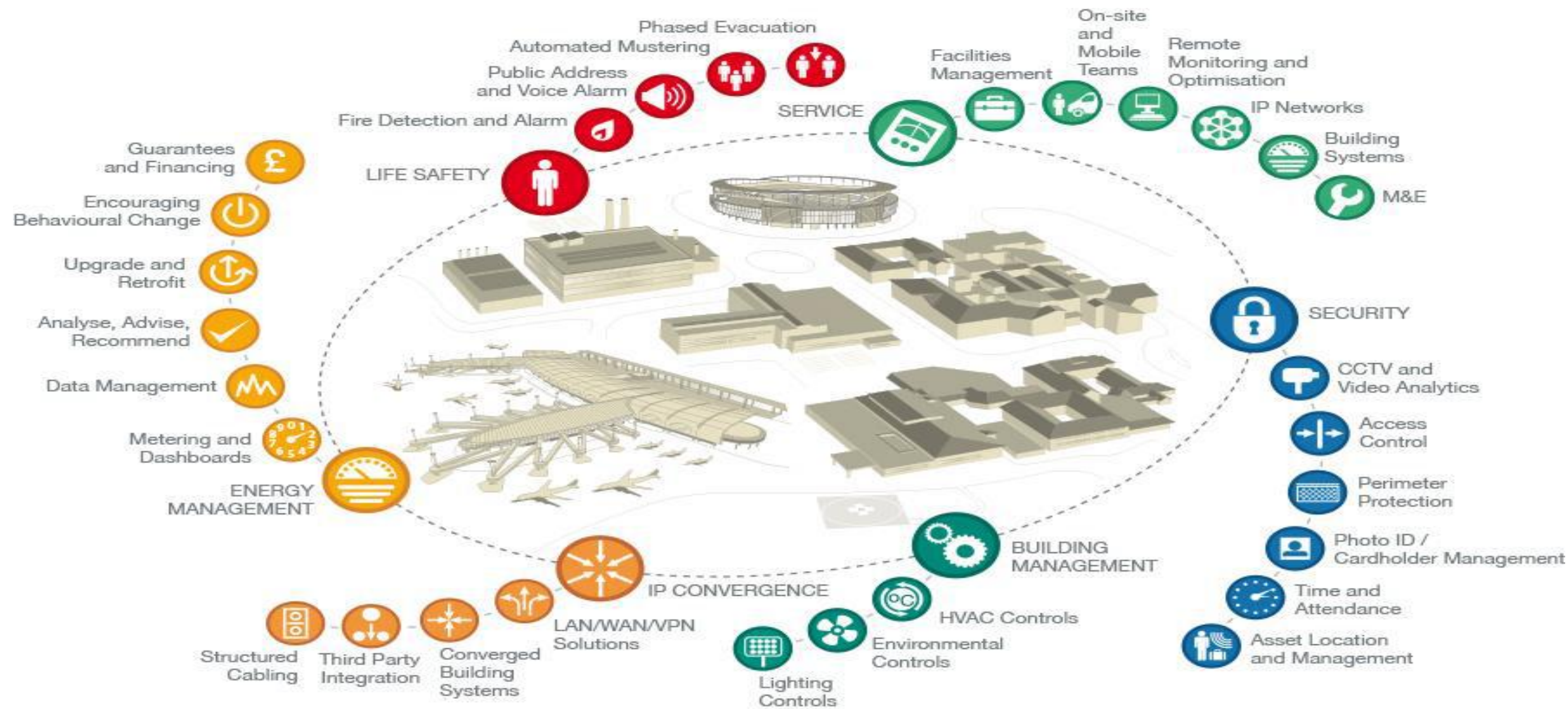
Where is Ananda going?

The Exploration of Real Estate's Digital Future

BIM Roadmap

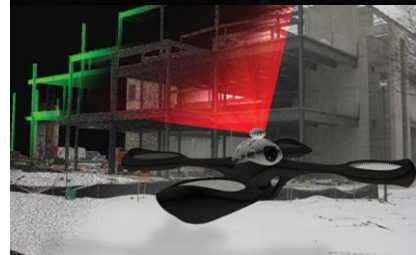



Digital Urban Living Solutions



Digital Urban Living Solutions

Redefining construction with machine vision





Fly & Capture Images

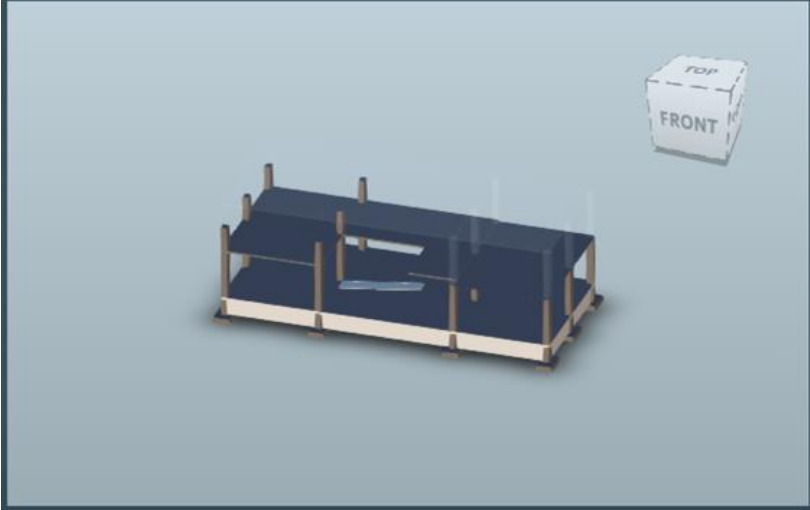


Map & 3D Models



Explore, Analyze & Share





Who We Are

Born out of research at Stanford, we are a collaborative effort between experienced construction managers, software engineers, and computational methods specialists.

What We Offer

Our software automatically produces detailed **schedules** and **resource allocations**, which accurately estimate the cost and time frame for a project. Users understand the construction process through an **interactive visualization**, and can quickly **tweak** or **modify** a schedule to reflect the shifting realities of the construction cycle.

✓ Automated Scheduling

✓ Resource Allocation

✓ BIM Integration


✓ 4D Visualization


✓ Cost+Time Estimation

✓ Parametric Optimization

✓ Progress Tracking

✓ Rapid Iteration





Digital Urban Living Solutions





Thank you

Contact:

Sarat Don Nisaratana
Head of Advanced R&D
Ananda Development Public Company Limited
sarat@ananda.co.th
Tel: +66-2056-2222 Mobile: +6689-818-0077

Contact:

Andrew Hill
BIM Practice Leader APAC
Autodesk
andrew.hill@autodesk.com
Mobile: +61-404-831-863



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