TEC Engineering Services

P.O. Box # 239166, www.taibaengineering.ae
Tel. 04-2696027 / 0503693428 / 0503693474
Fax : 04-2696029 Email: info@taibaengineering.ae

- **BIM Overview**

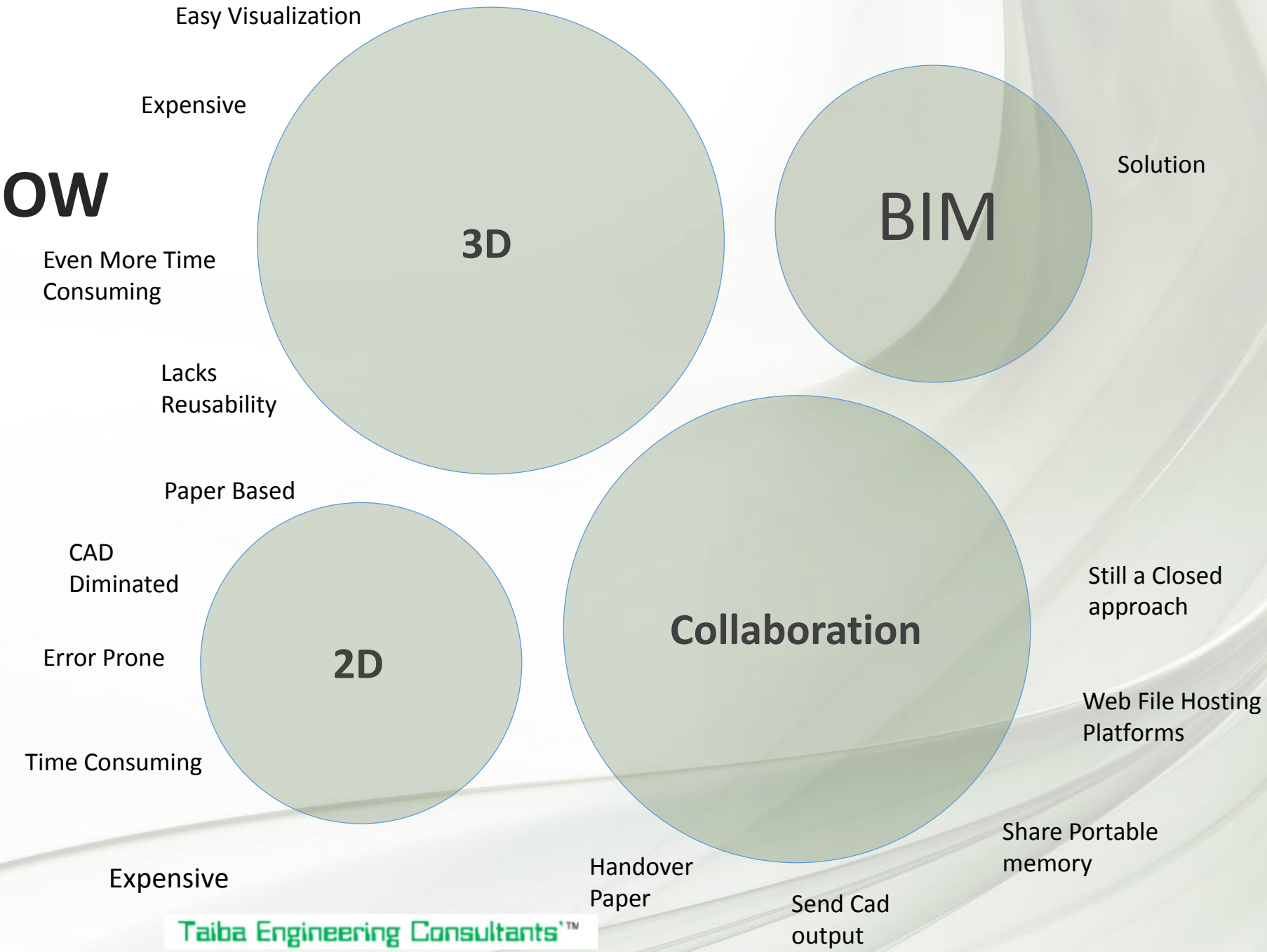
The **WHAT's** of BIM

Bim is an Activity

Bim is not an Object

BIM is a modeling technology and associated set of processes to produce, communicate, and analyze *building models*

AEC **NOW**


Easy Visualization
Expensive
3D
Even More Time Consuming
Lacks Reusability
BIM
Solution
Paper Based
CAD Diminated
2D
Error Prone
Time Consuming
Expensive
Collaboration
Still a Closed approach
Web File Hosting Platforms
Share Portable memory
Handover Paper
Send Cad output

The **WHAT's** of BIM

Paperless

Legacy Support
For Cad based Software

3D model
based

Result Oriented
Approach

Flexible

Easy Cost Analysis

Reduced Redundancies
In Deliverables

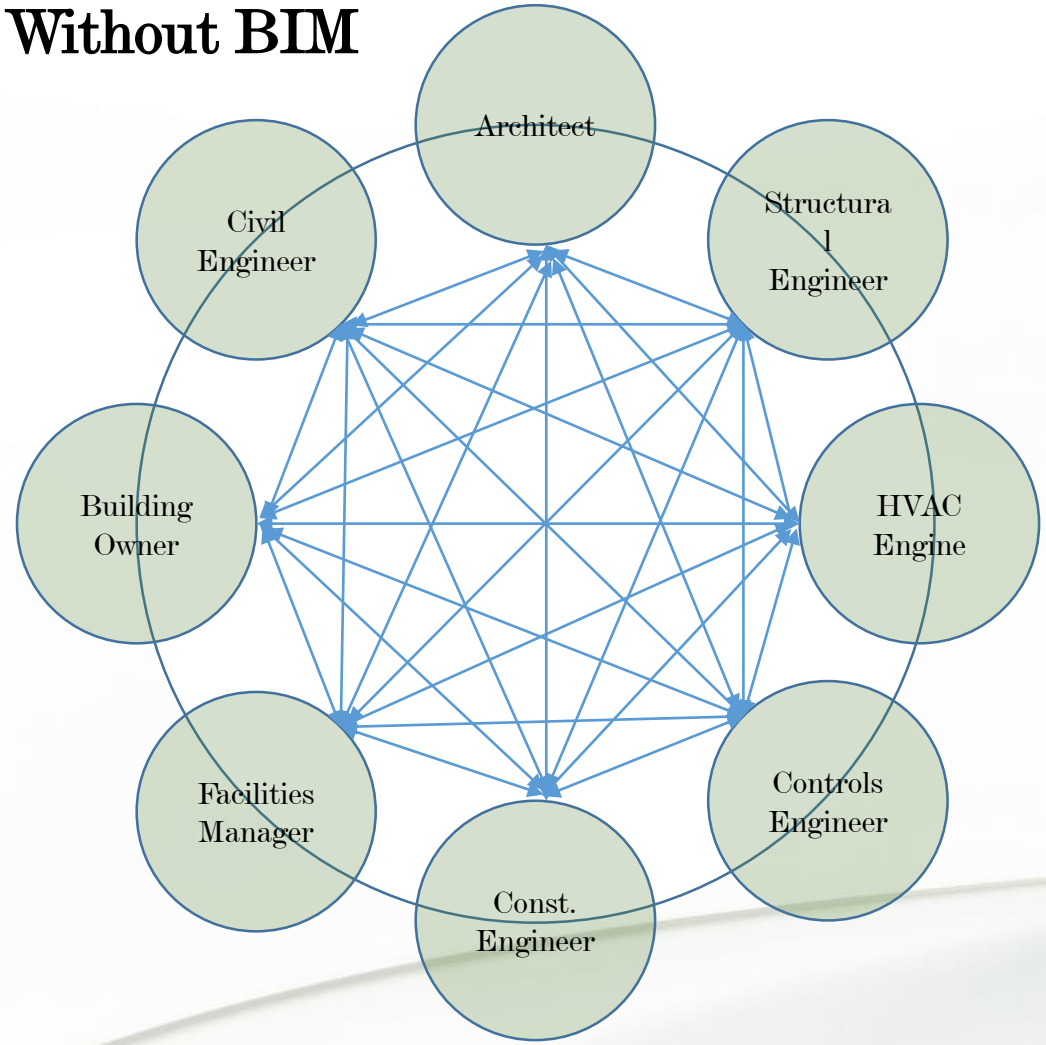
Optimized
quantification

Cost Effective Modifications

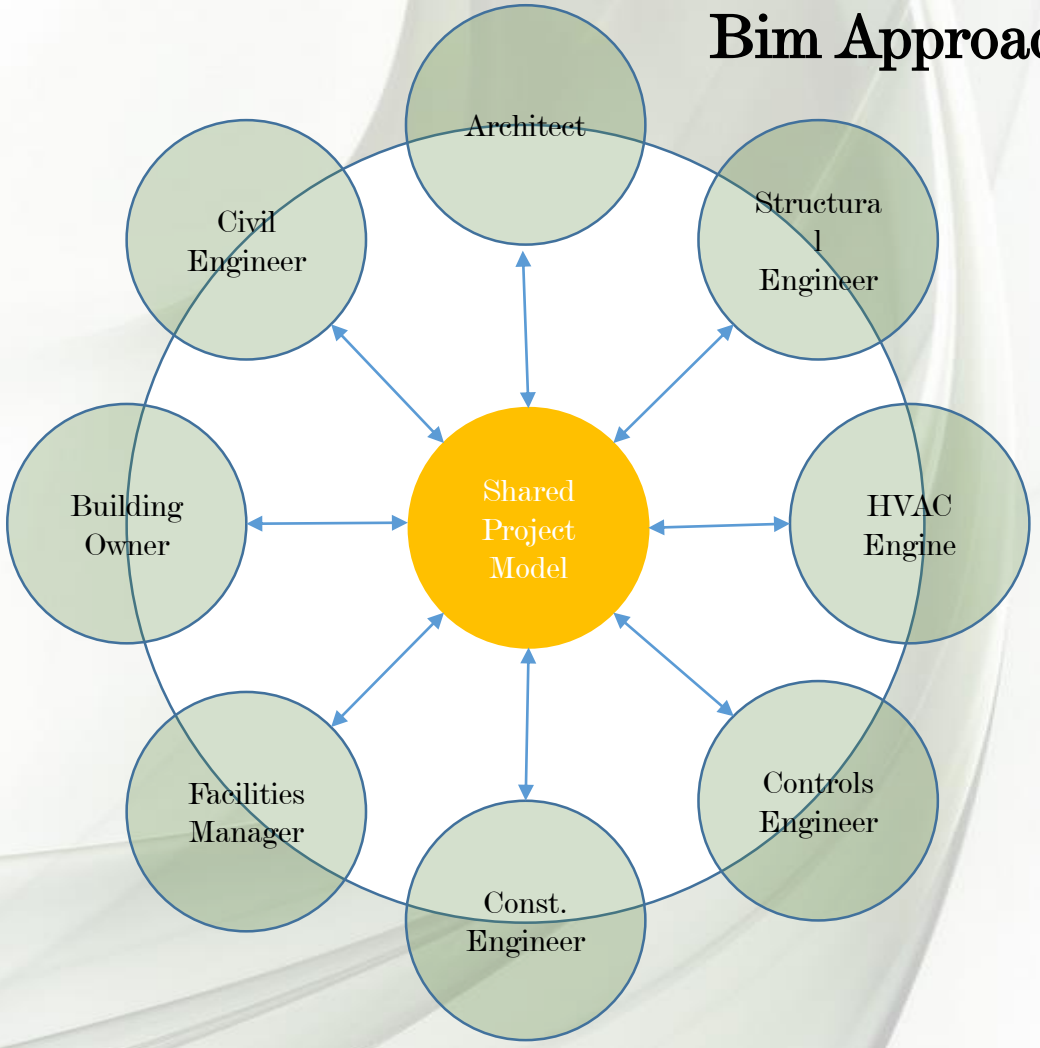
Faster delivery

Conflict Detection
Between various elements

Without BIM



Bim Approach



Disarrayed Information transf

Organised Flow

The **WHAT's** of BIM

Service Categories

3D

- Existing Conditions Models
  - Laser scanning
  - Ground Penetration Radar (GPR) conversions
- Safety & Logistics Models
- Animations, renderings, walkthroughs
- BIM driven prefabrication
- Laser accurate BIM driven field layout

4D

SCHEDULING

- Project Phasing Simulations
- Lean Scheduling
  - Last Planner
  - Just In Time (JIT) Equipment Deliveries
  - Detailed Simulation Installation
- Visual Validation for Payment Approval

5D

ESTIMATING

- Real time conceptual modeling and cost planning (DProfiler)
- Quantity extraction to support detailed cost estimates
- Trade Verifications from Fabrication Models
  - Structural Steel
  - Rebar
  - Mechanical/Plumbing
  - Electrical
- Value Engineering
  - What-if scenarios
  - Visualizations
  - Quantity Extractions
- Prefabrication Solutions
  - Equipment rooms
  - MEP systems
  - Multi-Trade Prefabrication
  - Unique architectural and [illegible] elements

6D

SUSTAINABILITY

- Conceptual energy analysis via DProfiler
- Detailed energy analysis via EcoTech
- Sustainable element tracking
- LEED tracking

7D

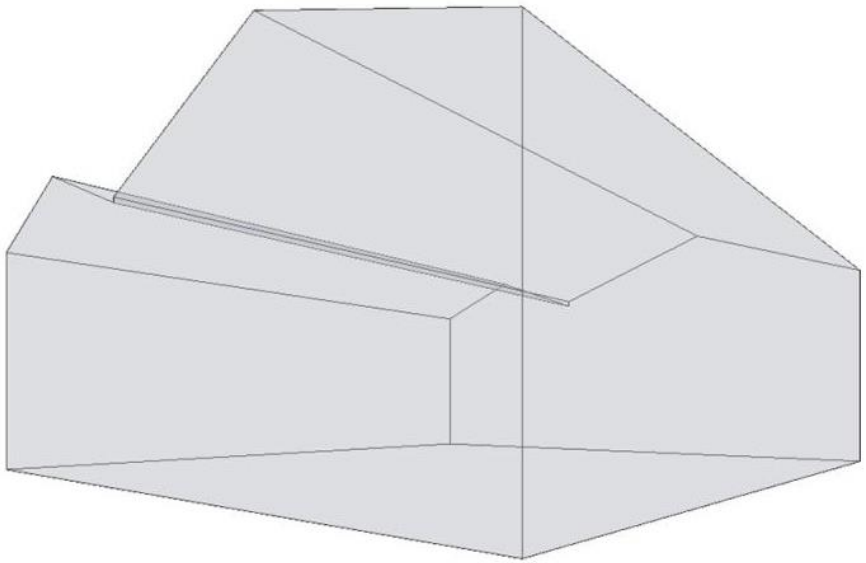
FACILITY MANAGEMENT APPLICATIONS

- Life Cycle BIM Strategies
- BIM As-Builts
- BIM embedded O&M manuals
- COBie data population and extraction
- BIM Maintenance Plans and Technical Support
- BIM file hosting on Lend Lease's Digital Exchange System

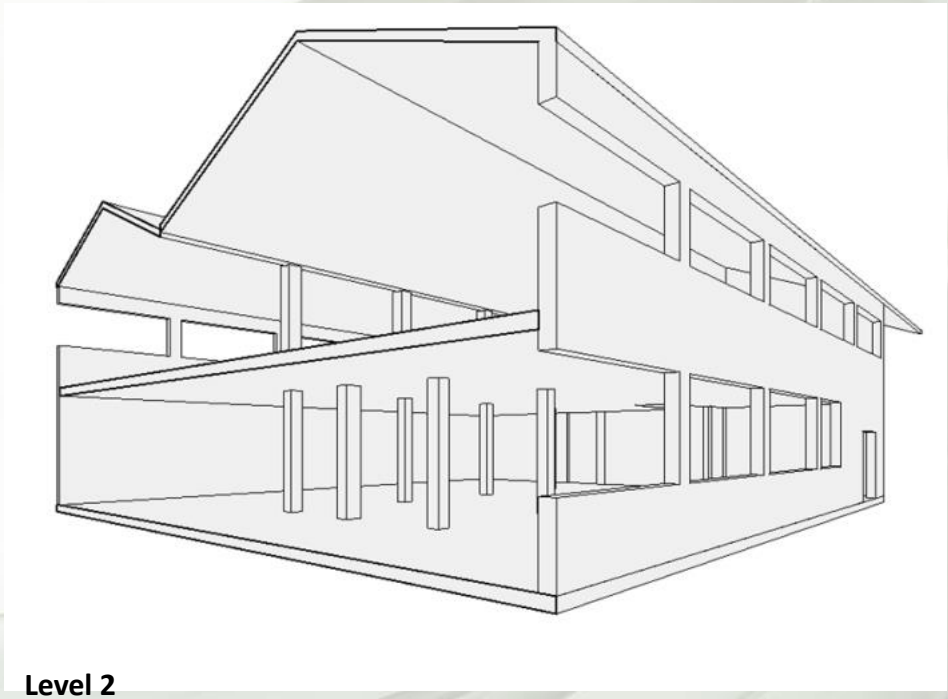
The **WHAT'S** of BIM

Level Of Detail and Development

Our team specializes in outputs in all levels of details



Level 1
Contains overall mass

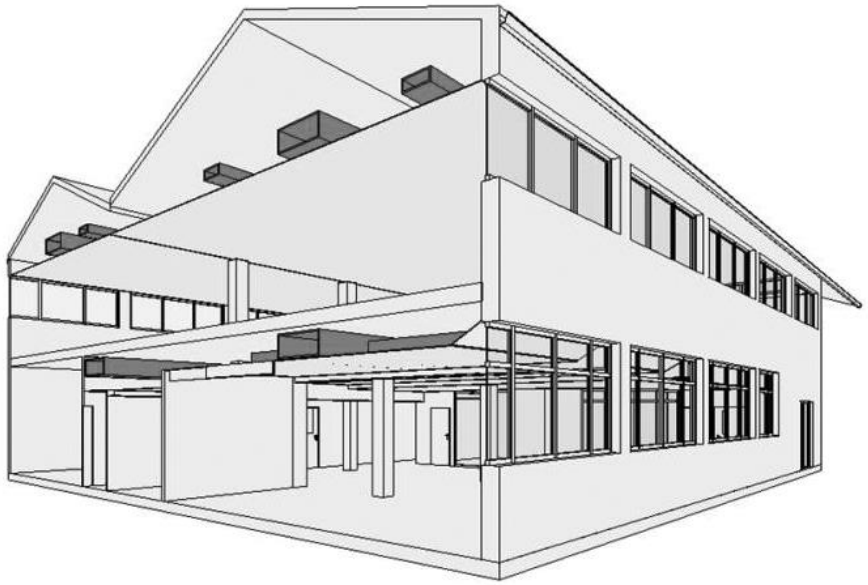


Level 2
Contains Shell with openings

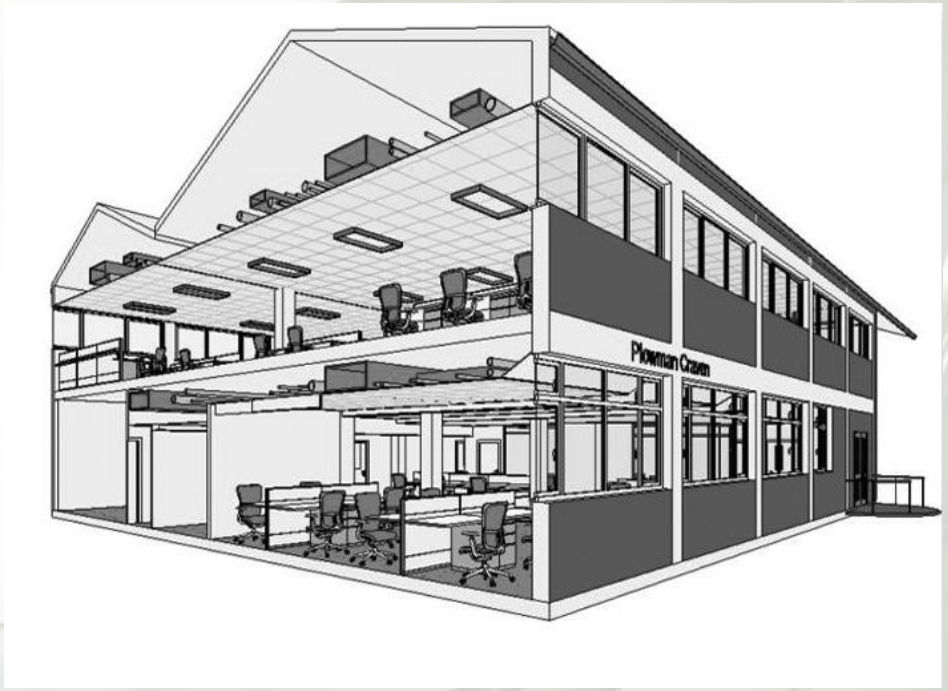
The **WHAT'S** of BIM

Level Of Detail and Development

Level 3
Basic Architectural Details but no surface finishes



Level 4
Detailed Architectural and Structural Details



Level 5
Identical to a Level 4 model
However this model will be enhanced by including **non-geometric meta-data**, or **textual information** data relating to the modelled objects

The **WHAT's** of BIM

We Model in upto LOD 400

LOD 100: **Generic representation**.

LOD 200: **Generic system.**

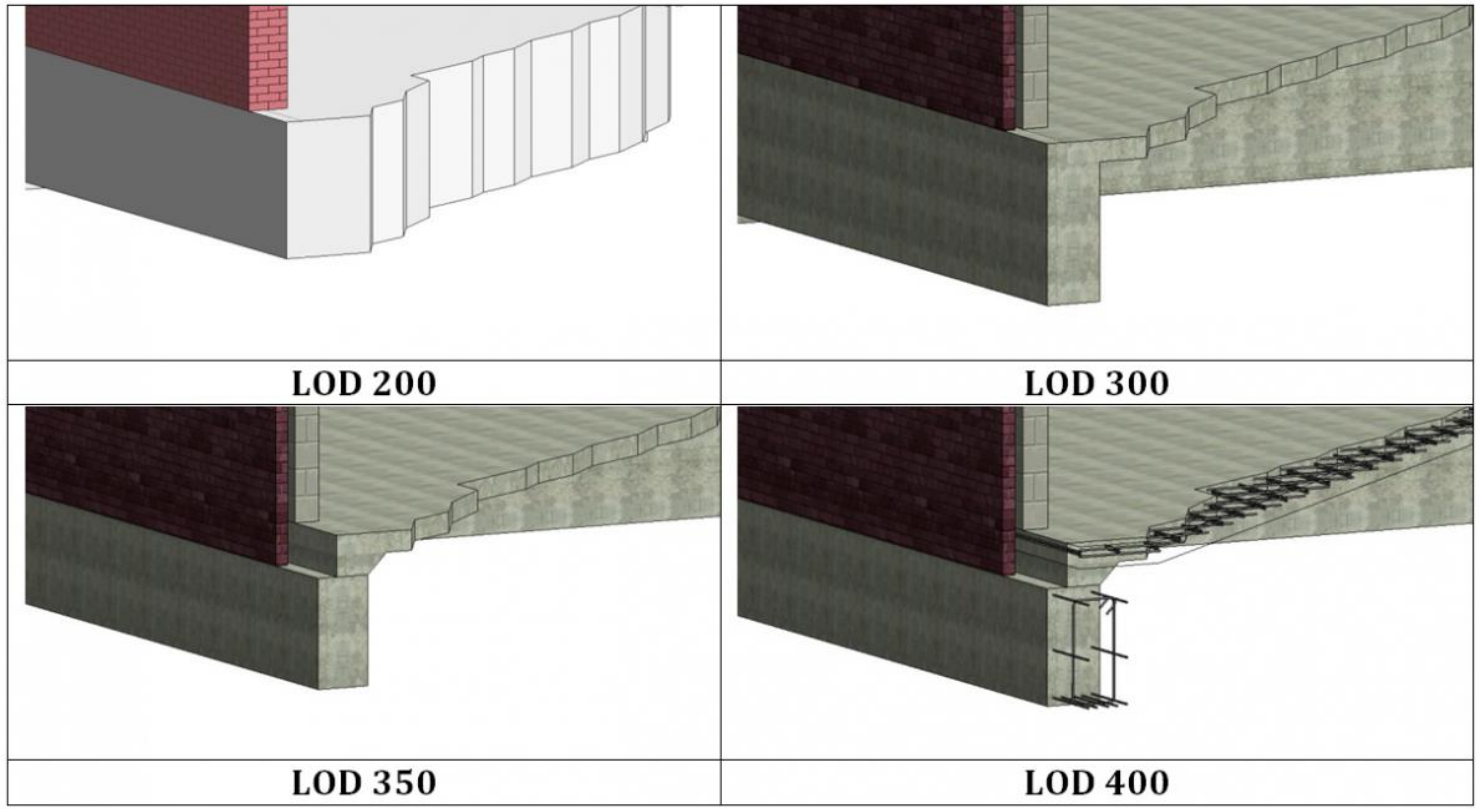
LOD 300: **Specific system**..

LOD 350: **Element Interaction**

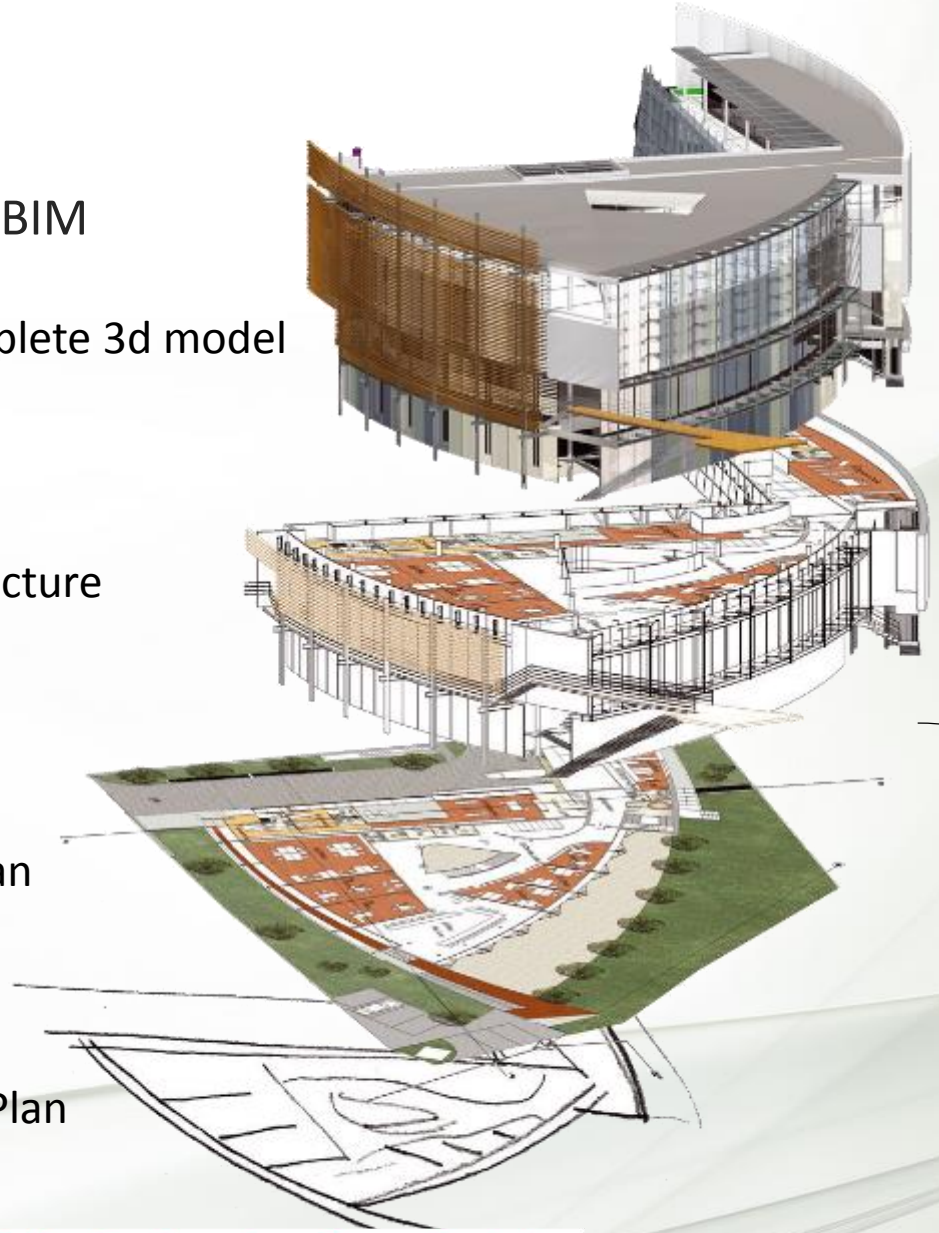
LOD 400: **With detailing**

LOD 500 : **Field verified**

Level Of Detail and Development



The **HOW's** of BIM



Complete 3d model

Structure

Cad Rendered Plan

Architects Drafted Plan

BIM
Approach

BIM

3d Model +
Information

Information
stored as
Database

Current AEC

Plans –No Relation
with 3D

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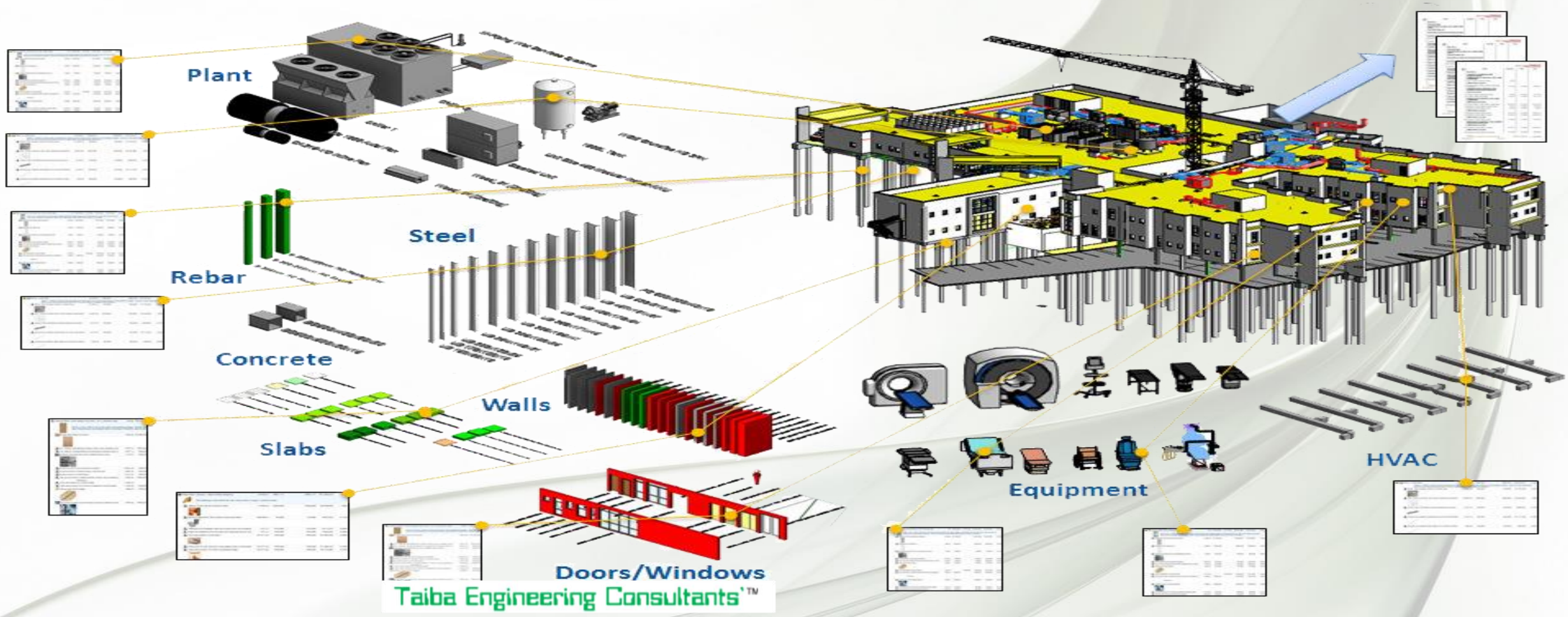
The **HOW's** of BIM

Classes- Parent Categories like Doors

Objects- Children of classes like a specific type of door

Parallel with Object oriented programming

Objects used to create the Virtual Models



The **HOW's** of BIM

Parameters and Properties

Variables that differentiate various Objects

Change Variable
Change Design

Increased Reusability

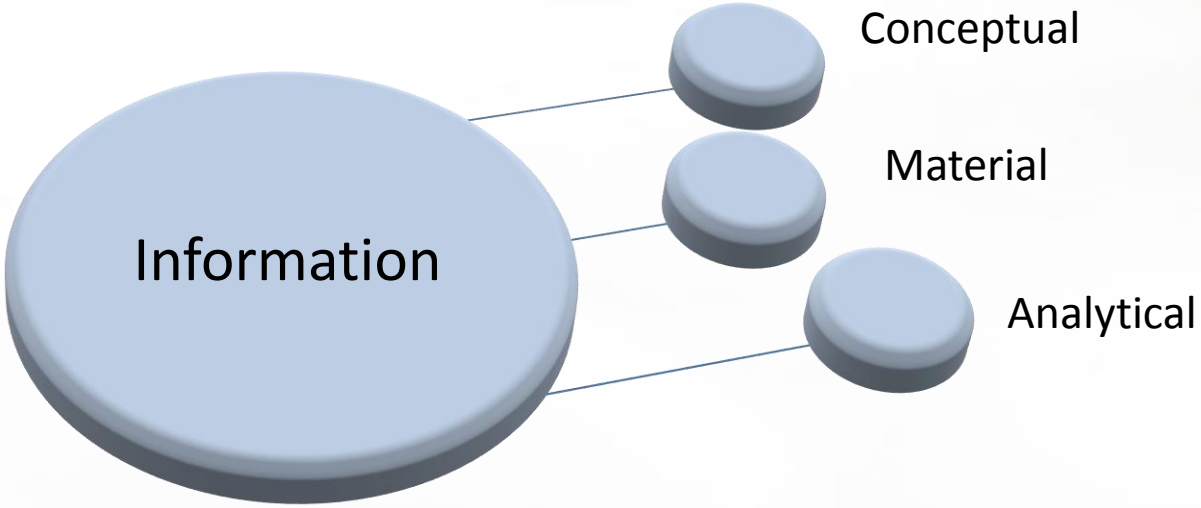
Bidirectional Relation with the database

Quick Design Exploration

Warning Mechanism for invalid parameters

Applies to Part And Whole Building too

The **HOW's** of BIM

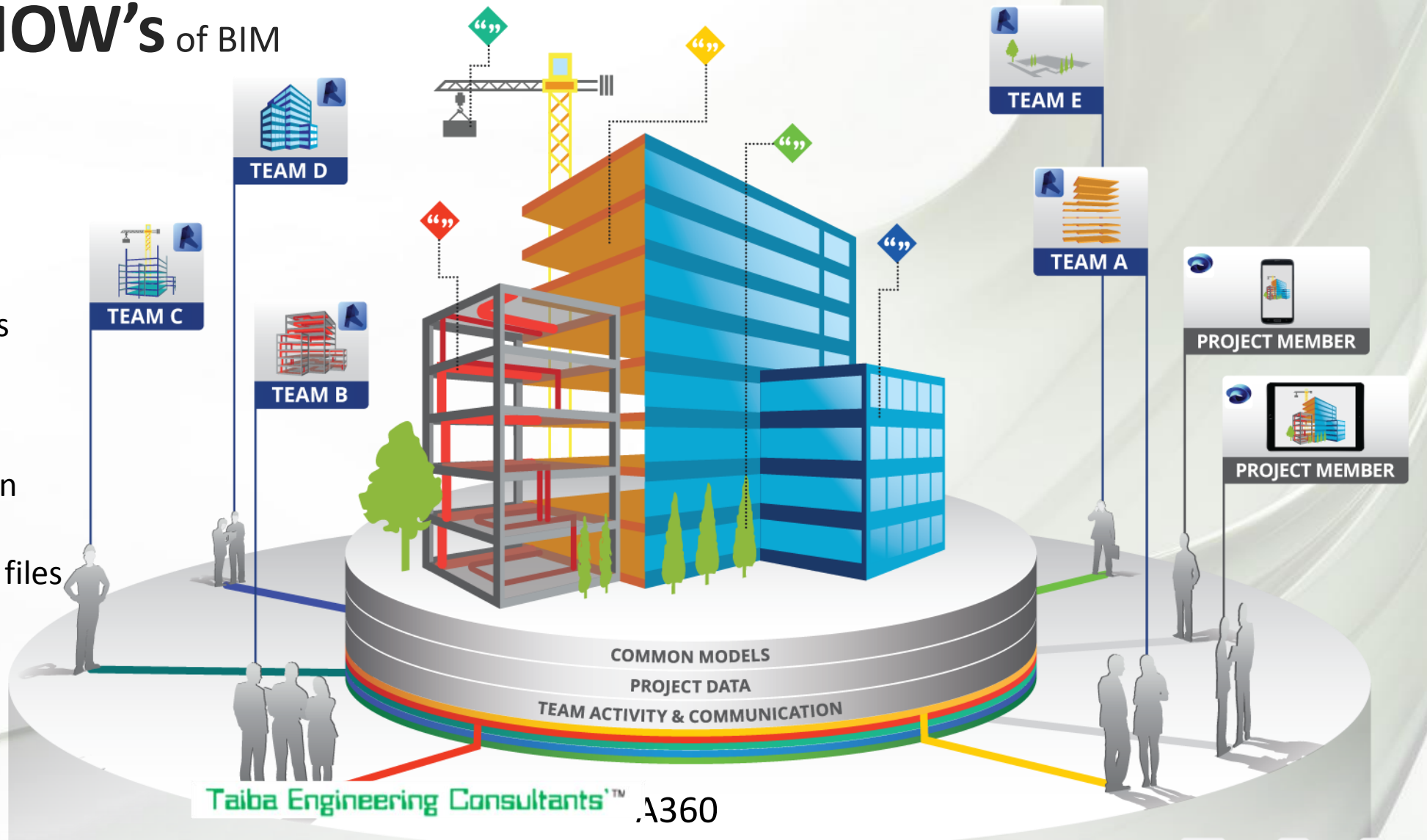


Types of information required for the Digital Model

AUTODESK® A360
COLLABORATION FOR REVIT®
Project teams working better with BIM

The **HOW's** of BIM

Collaboration



Heterogeneous file structure

Easy Synchronization

Time Stamped files

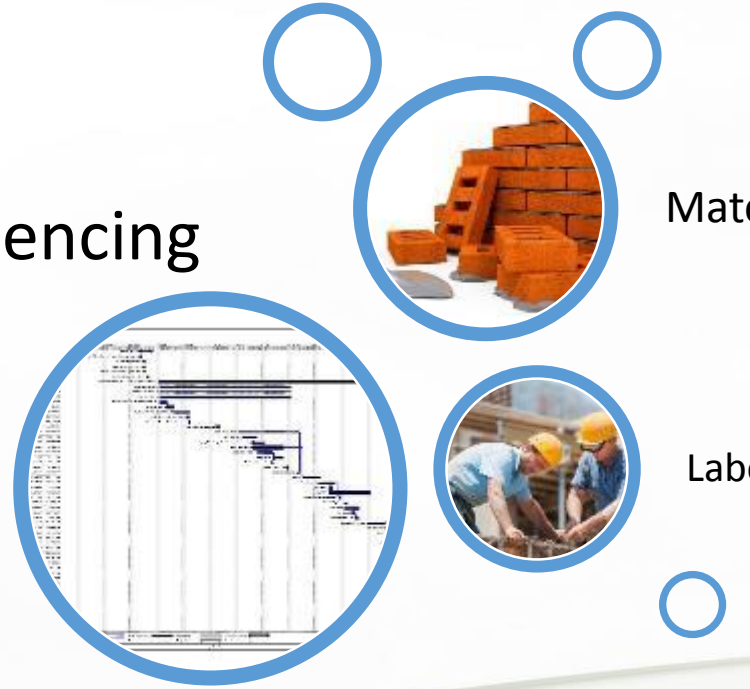
Ownership Defined

Access Control

Taiba Engineering Consultants™ A360

The **HOW's** of BIM

Sequencing

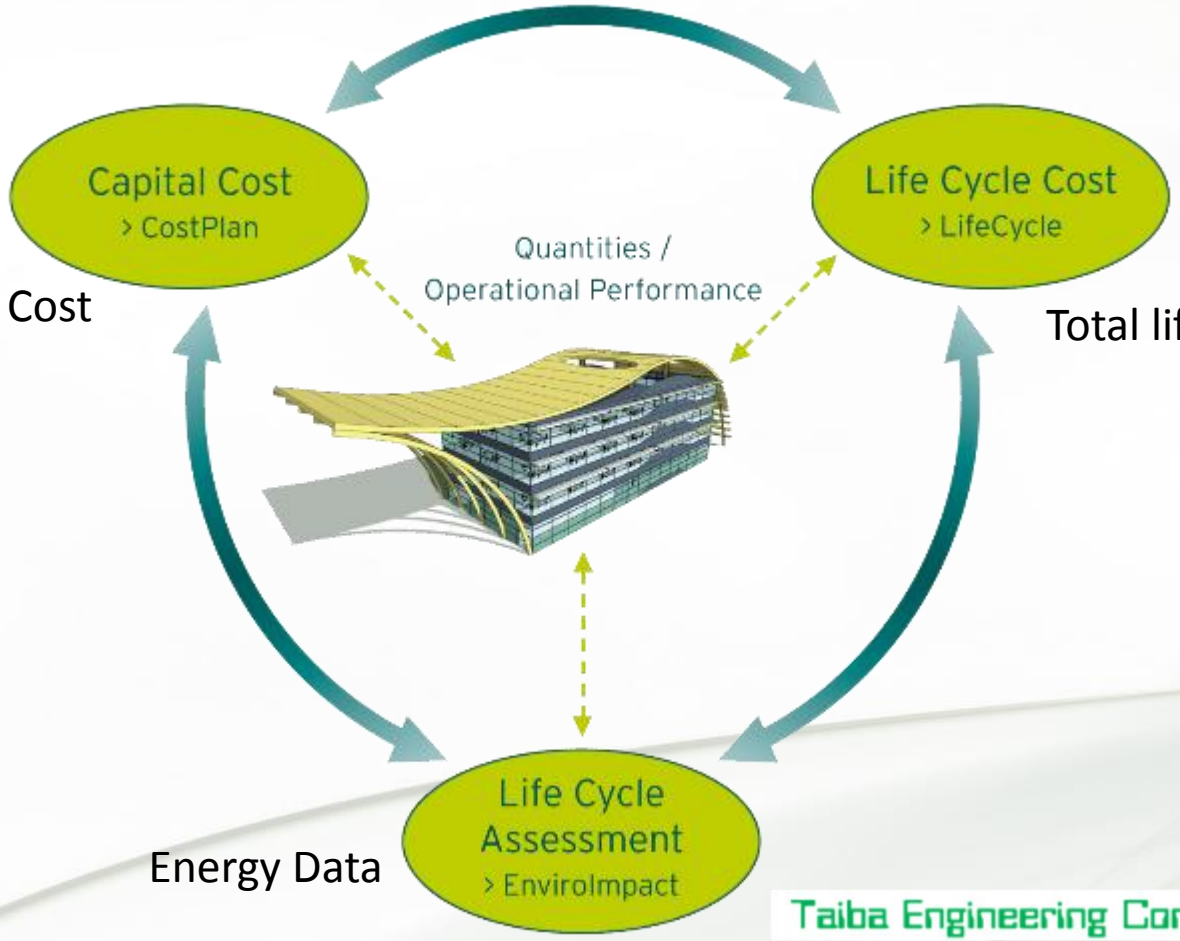


Material

Labor

Add TIME variable to 3d model

The **HOW's** of BIM



Cost

Total lifecycle

Energy Data

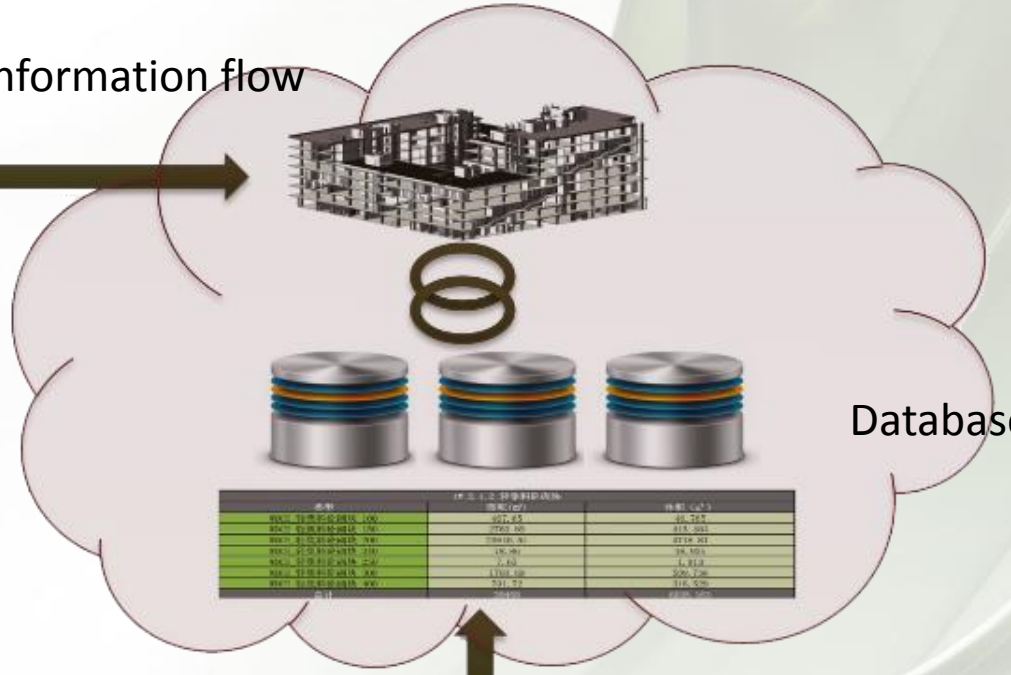
Digital Model

Add Cost variable to 3d model

The **WHY's** BIM

Bi directional Information flow

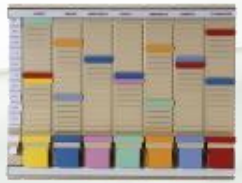
3d Model



Database Generation

Total Cost

Total Material

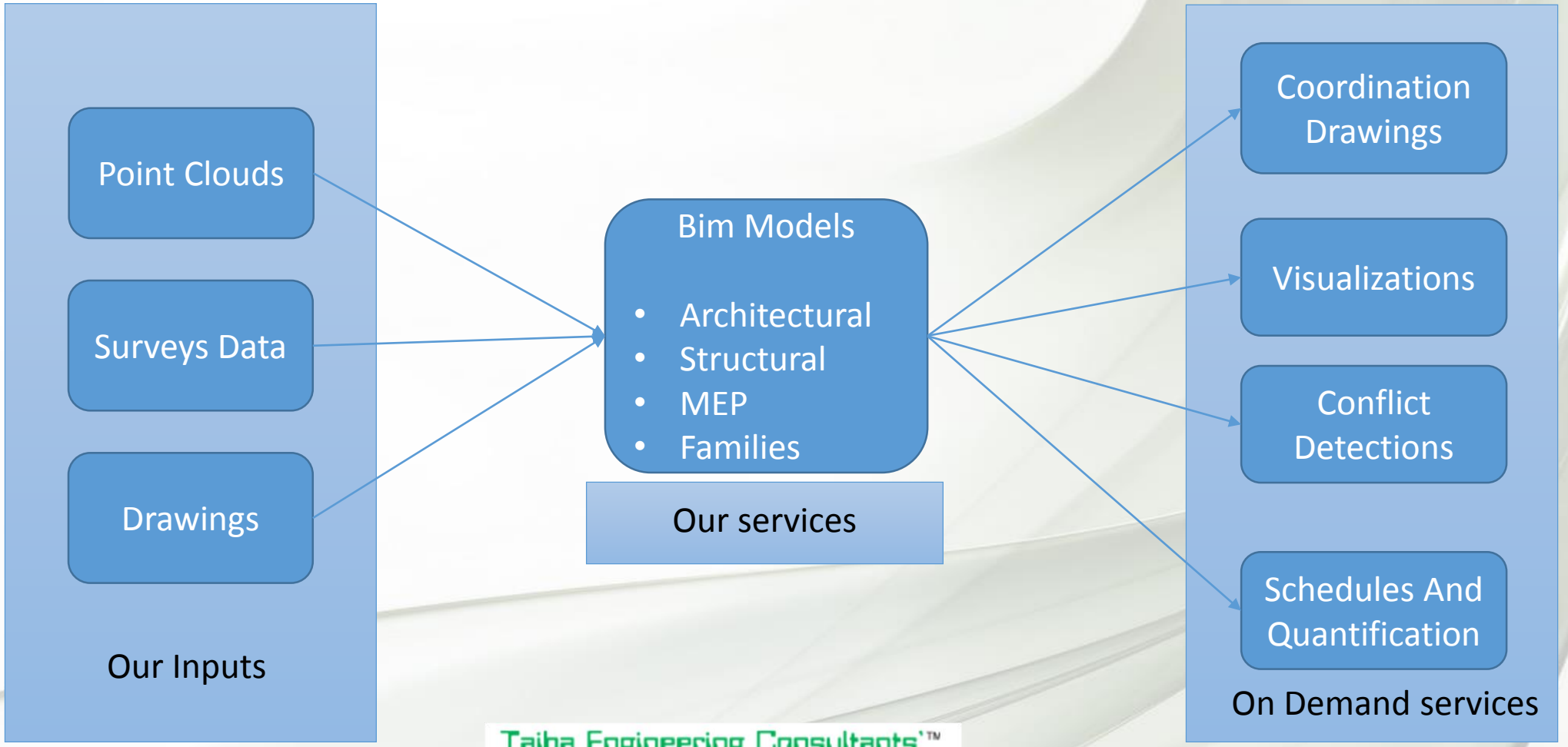


Automated reports

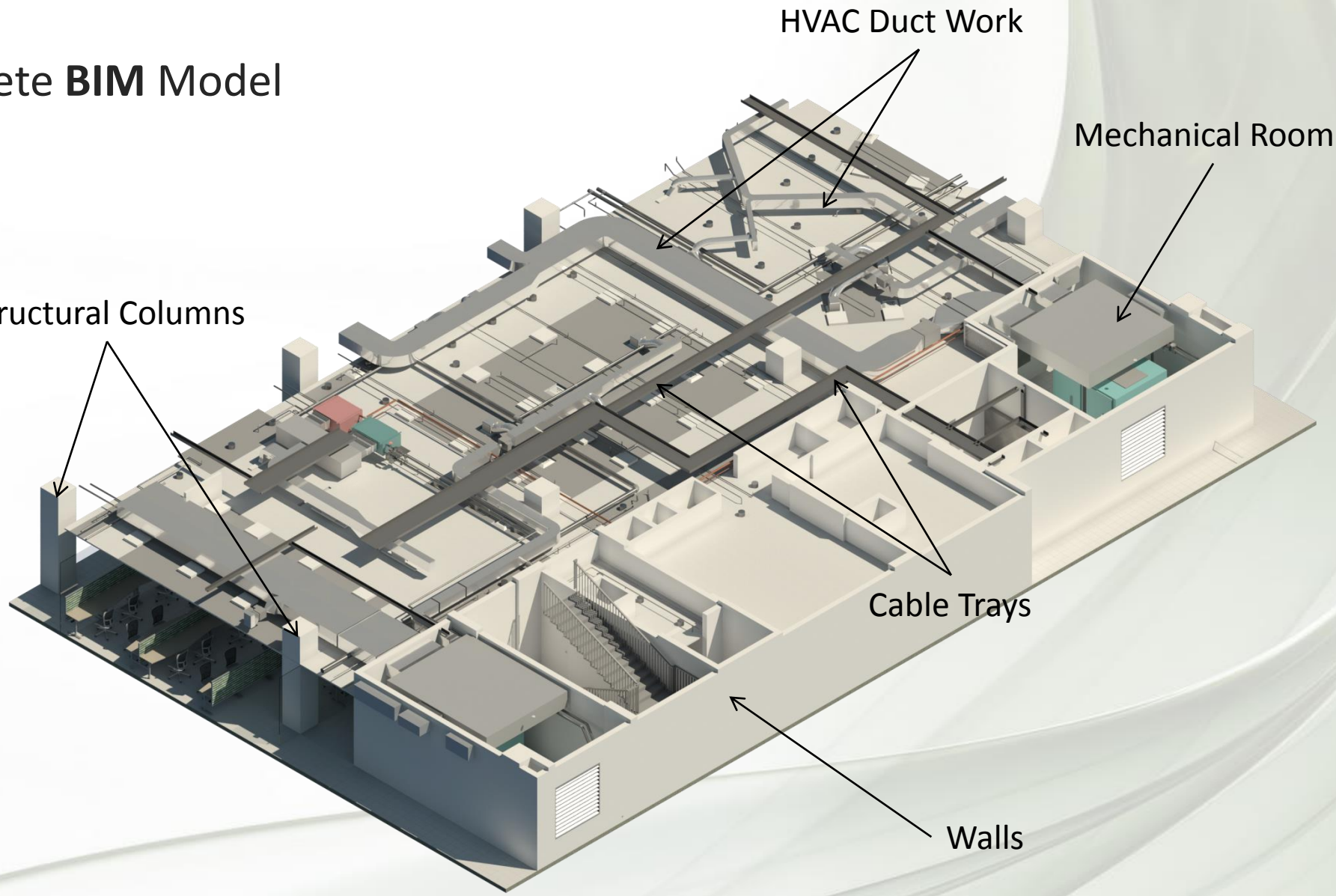
Labor Cost

Repair Cost

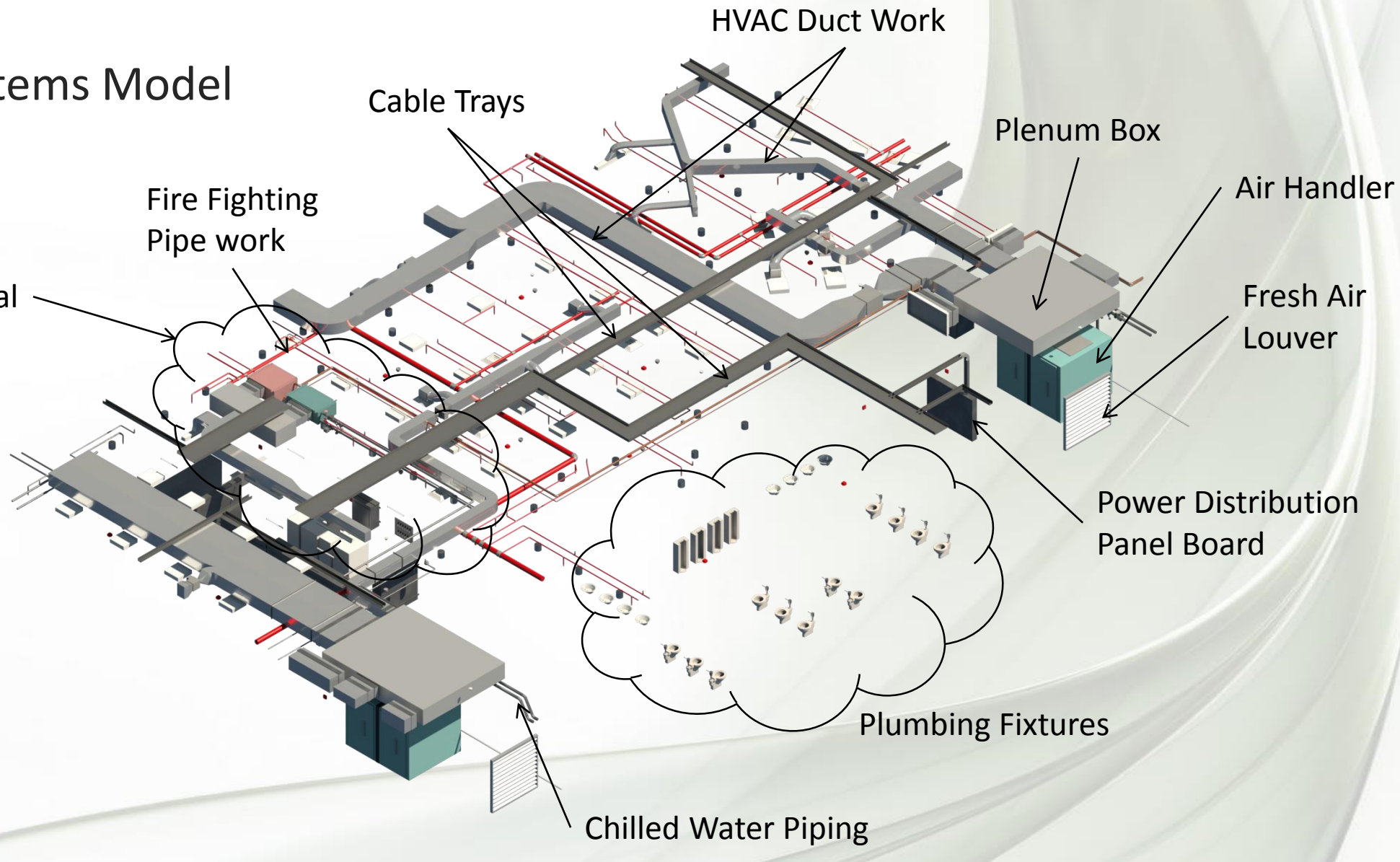
BIM SERVICES



Complete **BIM** Model



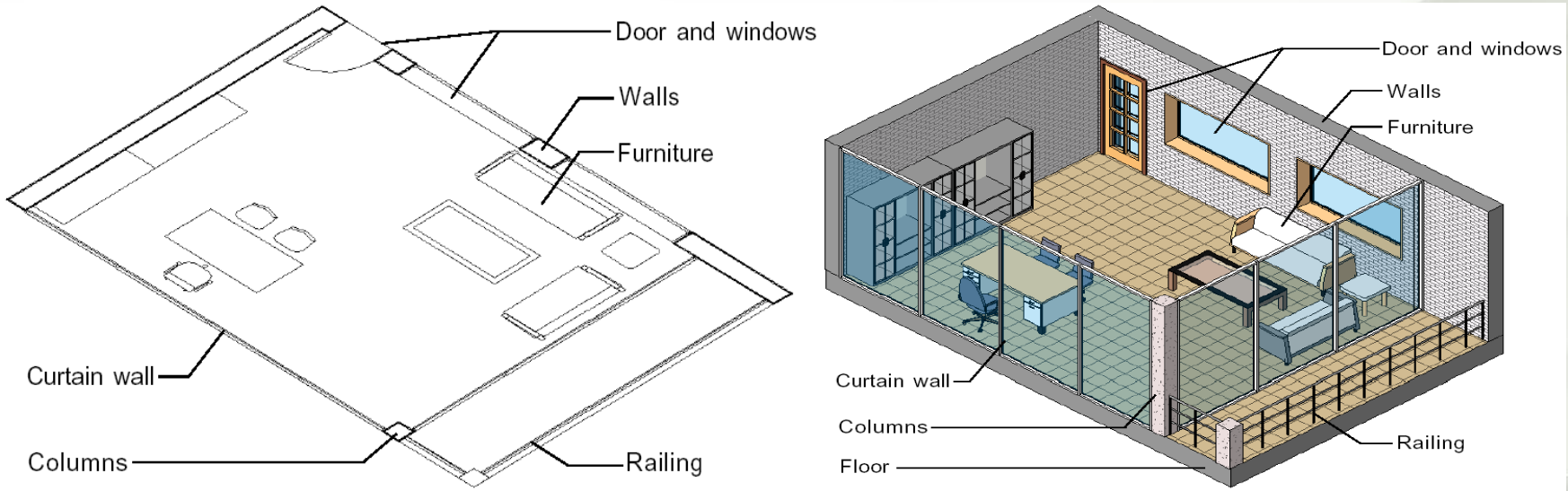
MEP Systems Model



Capabilities in BIM

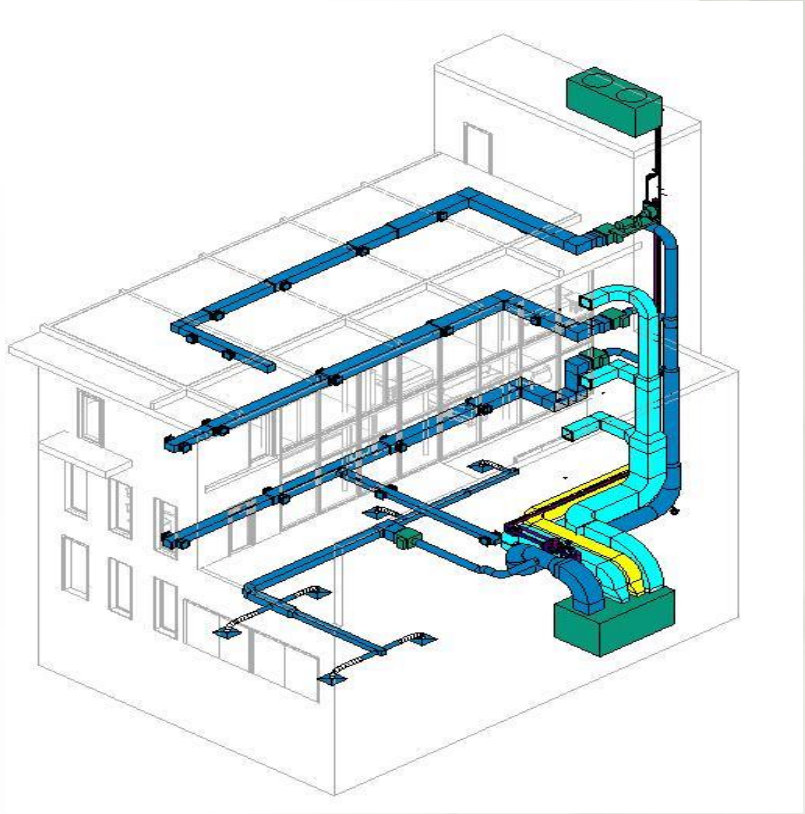
• **CAD** - Import and link of AutoCAD files in REVIT , Tracing AutoCAD with all MEP Services File.

•**Creating an MEP Project** :- Linking Projects, Creating and applying a view to Template



Capabilities in BIM

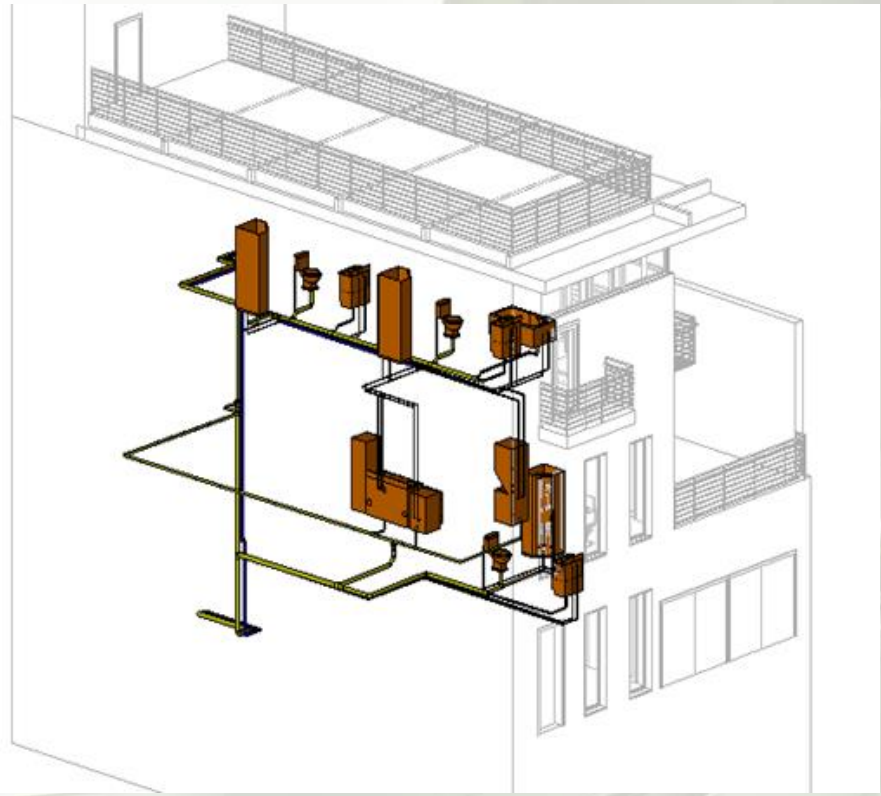
- **Planning Mechanical System:-** Preparing Spaces, Creating Zones in different levels, Analyzing Heat and Cooling Load, Creating a Air Flow Schedule.



- **Designing Mechanical Air System:-** Placing Hosted and Non Hosted Air Terminals, Creating supply Air Systems, Creating Duct Work manually and Automatically.

Capabilities in BIM

- **Designing a Mechanical Piping System:-** Adding Mechanical Equipment , Creating a Piping System, Adding Pipe using Auto Or Manual Layout, Sizing Pipe, Adding Valves, Inspecting a System.

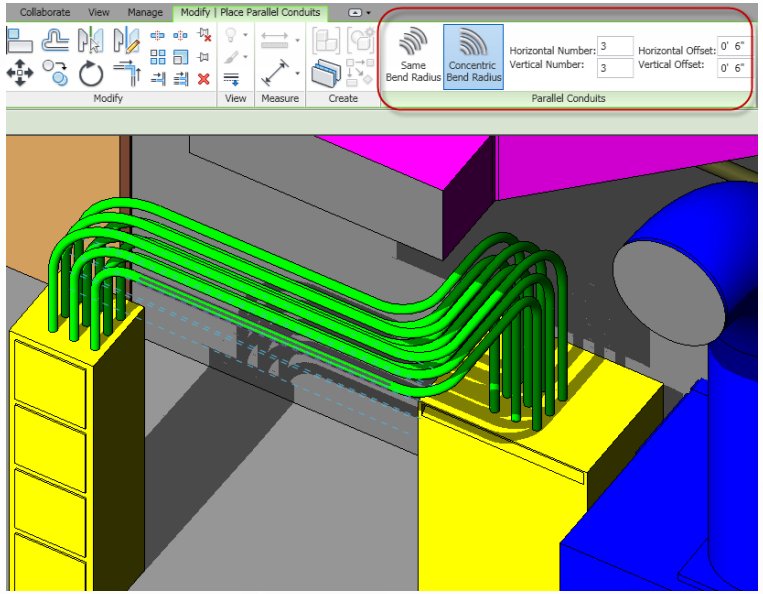


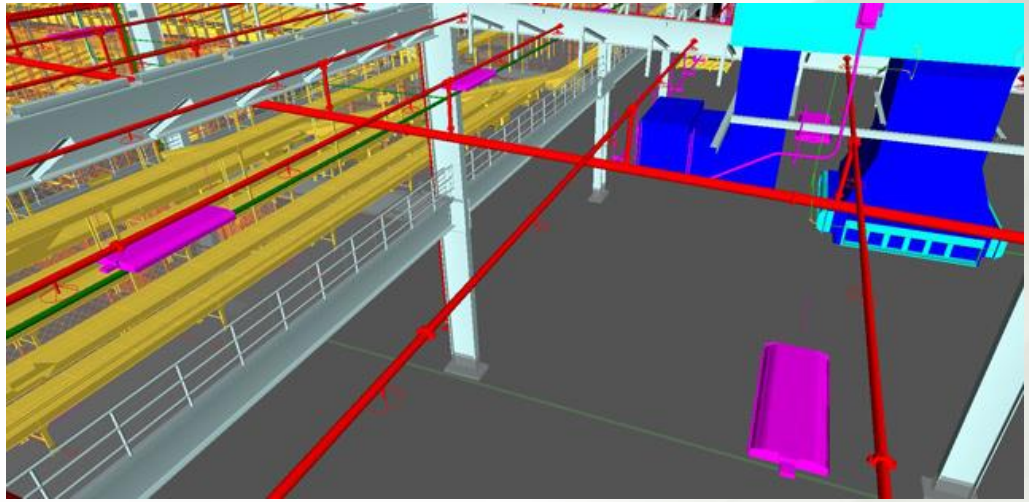
- **Designing a plumbing System:-** Adding Sanitary Fixtures, Creating a Sanitary System, Refining the Sanitary Stack, Creating Cold Water System, Creating the Hot Water System, Creating A plumbing Isometric Riser.

Capabilities in BIM

- **Designing Electrical System:-** Specifying Electrical Settings, Defining Required Lighting, Creating Color Fills and Load Schedule

- **Designing a fire Protection System:-** Adding Sprinklers, Creating a piping System, Modifying Pipe Materials.





Capabilities in BIM

•**Creating Documentation Views:-** Duplicating plan Views, Creating Sections, Elevations, Callouts, Scope Box, 3D Views by Camera, Walkthroughs, Rendering.

•**Working with Annotations and Dimensions:-** Creating Construction Documents, Annotating Construction Documents, Adding Tags, Schedule, Using Filters.

•**Quantity take off** for Ducting, Duct fitting and Accessories, Piping, Pipe fitting and Accessories, Cable Trays, Equipments etc.

Capabilities in BIM

- **Coordination :** Interference Check / Coordinating all services by linking.

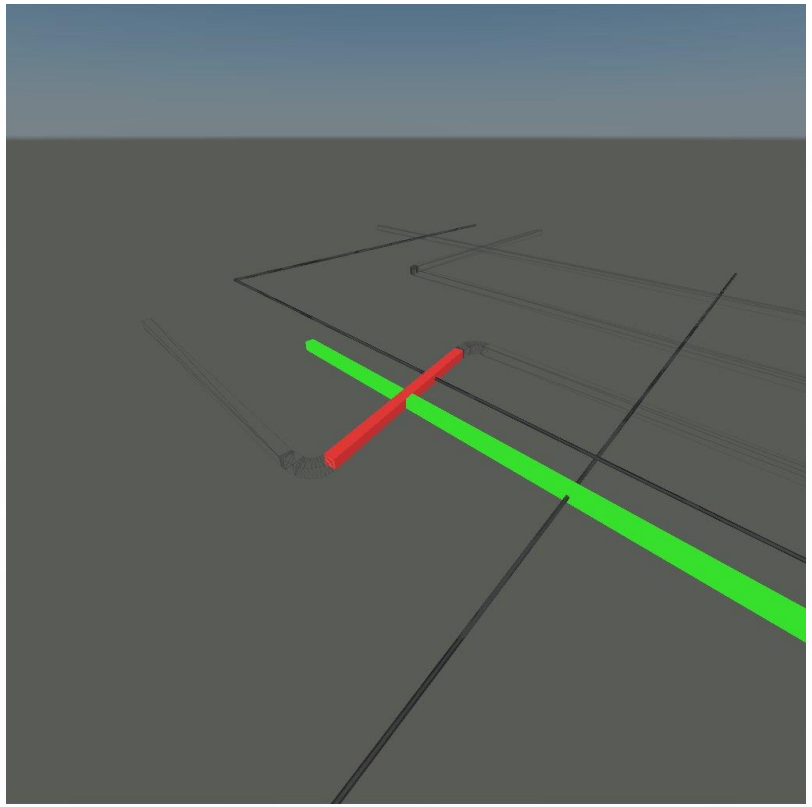
- **Working with Sheets** : Creating and editing sheets with Title Blocks.

- **Working with Work sharing** : Creating Work sets , Central File, Work Sharing file.

- **Working With Families :** Creating families of all MEP Equipments, Lighting, Sanitary Fixture , Tagging etc

Capabilities in BIM

Working with NAVIS WORK : Conducting A Clash Test, Clash Test Rules, Clash Test Results, Clash Test Reports, Import And Export Clash Tests



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HardStatus: New

Clash Point: 14.20m, -0.11m, 2.72m

Date Created: 2015/1/1117:50:58

Item 1

Element ID: 630067

Layer: Level 1

Item Name: Rectangular Duct

Item Type: Ducts: Rectangular Duct: Radius Elbows / Tees

Item 2

Element ID: 630168

Layer: Level 1

Item Name: Pipe Types

Item Type: Pipes: Pipe Types: Standard

Case Study

De Anza High school School
Design & Development Case Study

USA

March 2010

Taiba Engineering Consultants™

The Project

De Anza High school , USA

Completed early April 2010

Value $ 5.5m

Team - a multi-disciplinary team

All team members working in BIM (Autodesk Revit Software)

First fully integrated BIM project involving designers, construction and supply chain

Client's Requirement

Retain school in same location

Maximizing use of a very tight site

Increasing amount of open space

Increasing sports facilities

Use of BIM to ease decision making

Project Issues

Very constrained site

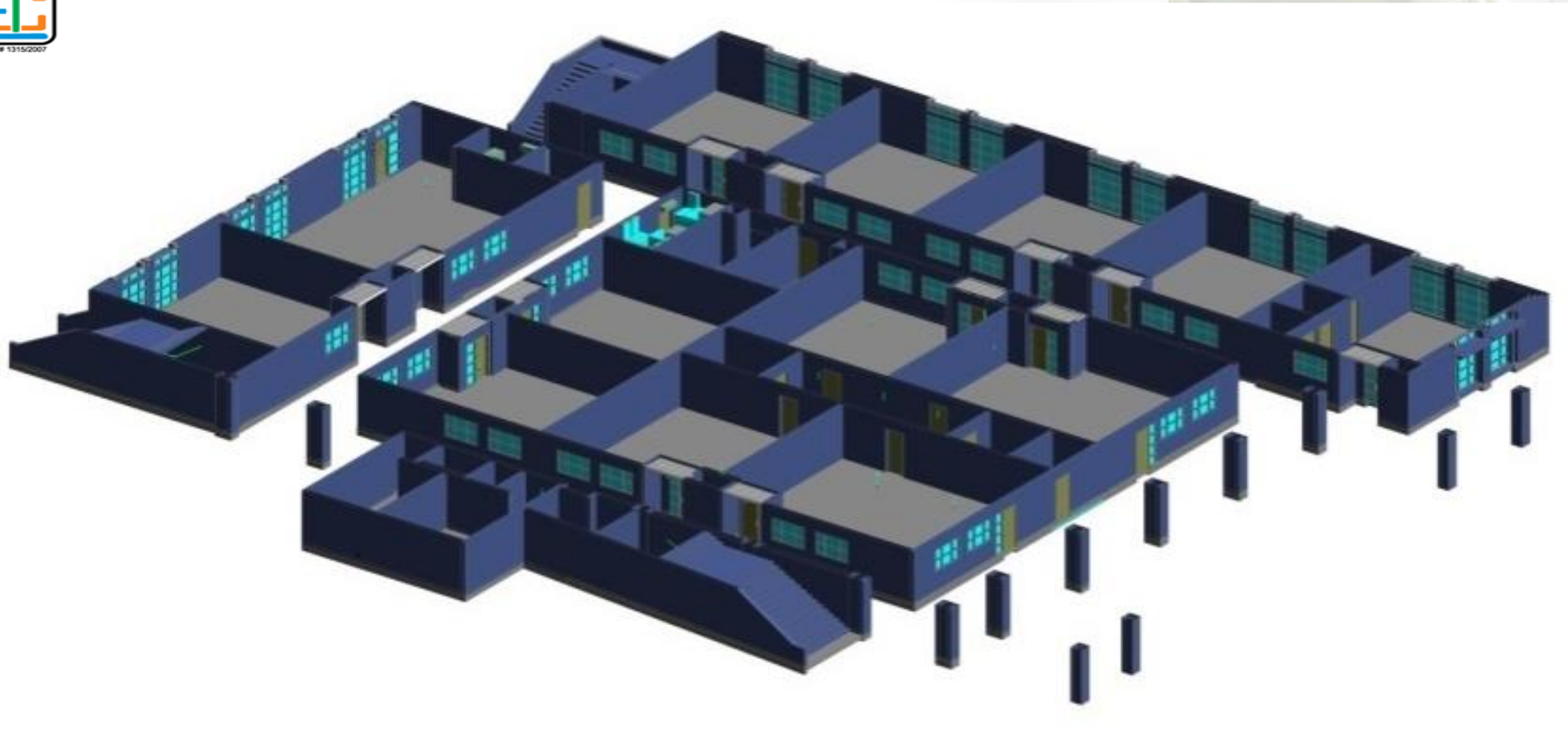
Steeply sloping site

Culvert running across centre

Narrow Roads on all 4 sides

In midst of Housing Estate

Poor ground conditions



Proposed Hours Distribution

Hours	20%	10%	30%	20%	20%
	SD	DD	CD	PR	CA
Project Phase					

SD-Schematic design

DD-Design Development

CD-Construction Documentation

PR-Procurement

CA-Construction Administration

Actual Hours Distribution

Hours	20%	10%	10%	10%	20%
	SD	DD	CD	PR	CA
Project Phase					

NOTE: Saved 30%

Project Results

- Design Integration
- Shorter programmed to planning
- Reduced RFIs
- Zero M&E Clashes on site
- Visibility of Programming
- Integration of Temporary Works
- Increased safety-managing public interfaces on tight site
- Aid to client decision making
- Saved % of Rework cost

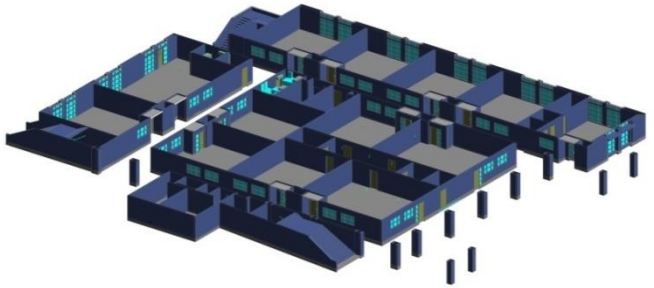
Client Testimonial

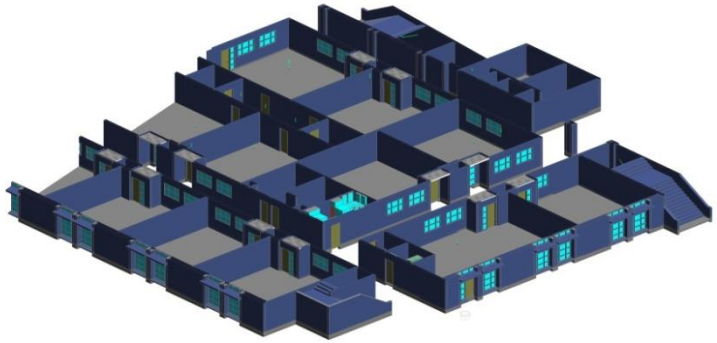
Client Testimonial “Because we have been able to see exactly what it looks like we have been able to order the furniture now in advance with BIM, which would never have been able to with the use of flat plans.”

A lot of consultation has gone on, I certainly feel more confident because we can actually see what it’s going to look like.

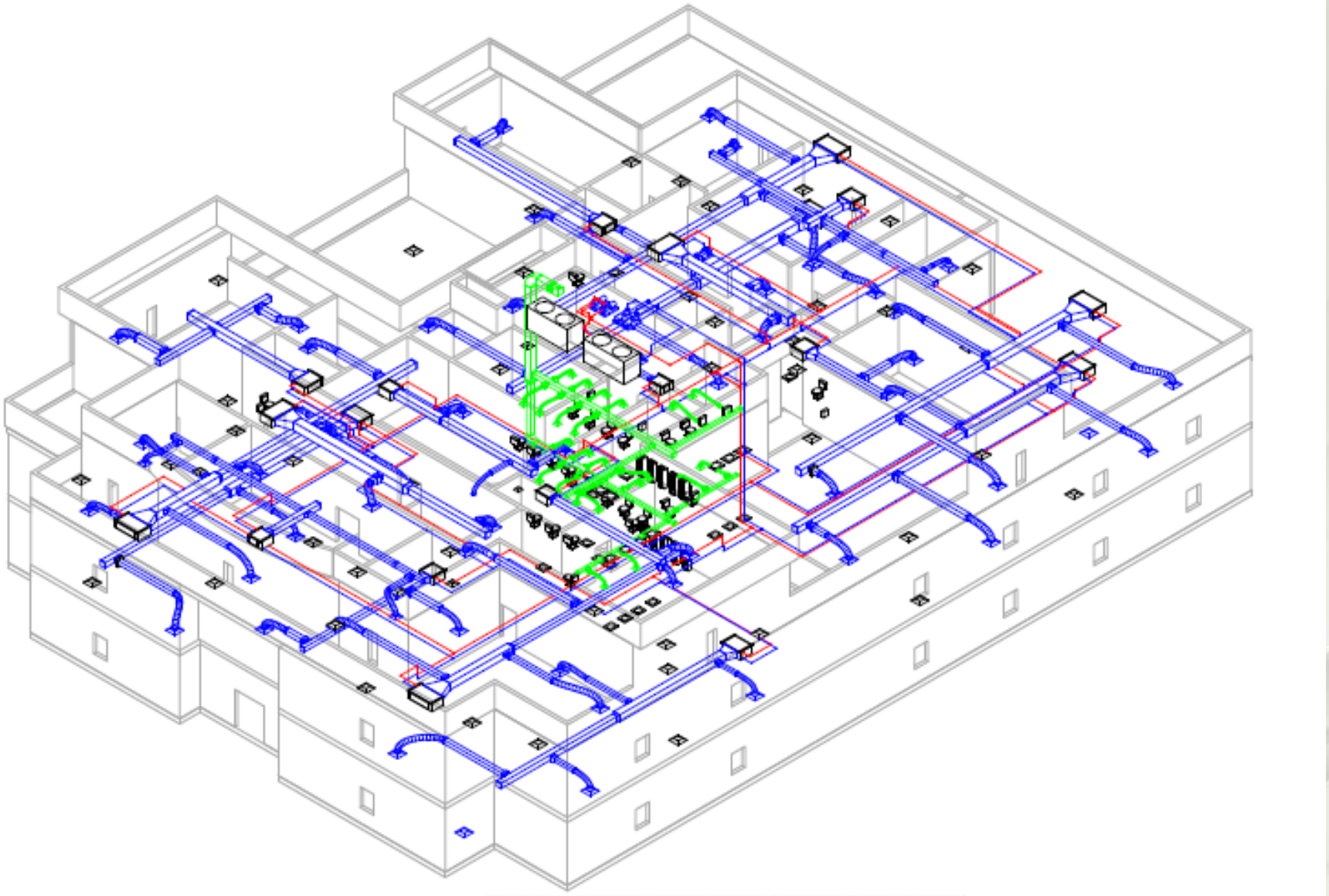
They have used the BIM model to help understand how to “Keeping the school looking good,Knowing how much that’s going to cost, sustainability, knowing how long things will last, all of those have been within the conversations we have had and very much built into the planning”

BIM Views





PROJECT
OFFICE BUILDING
@RIYADH - KSA



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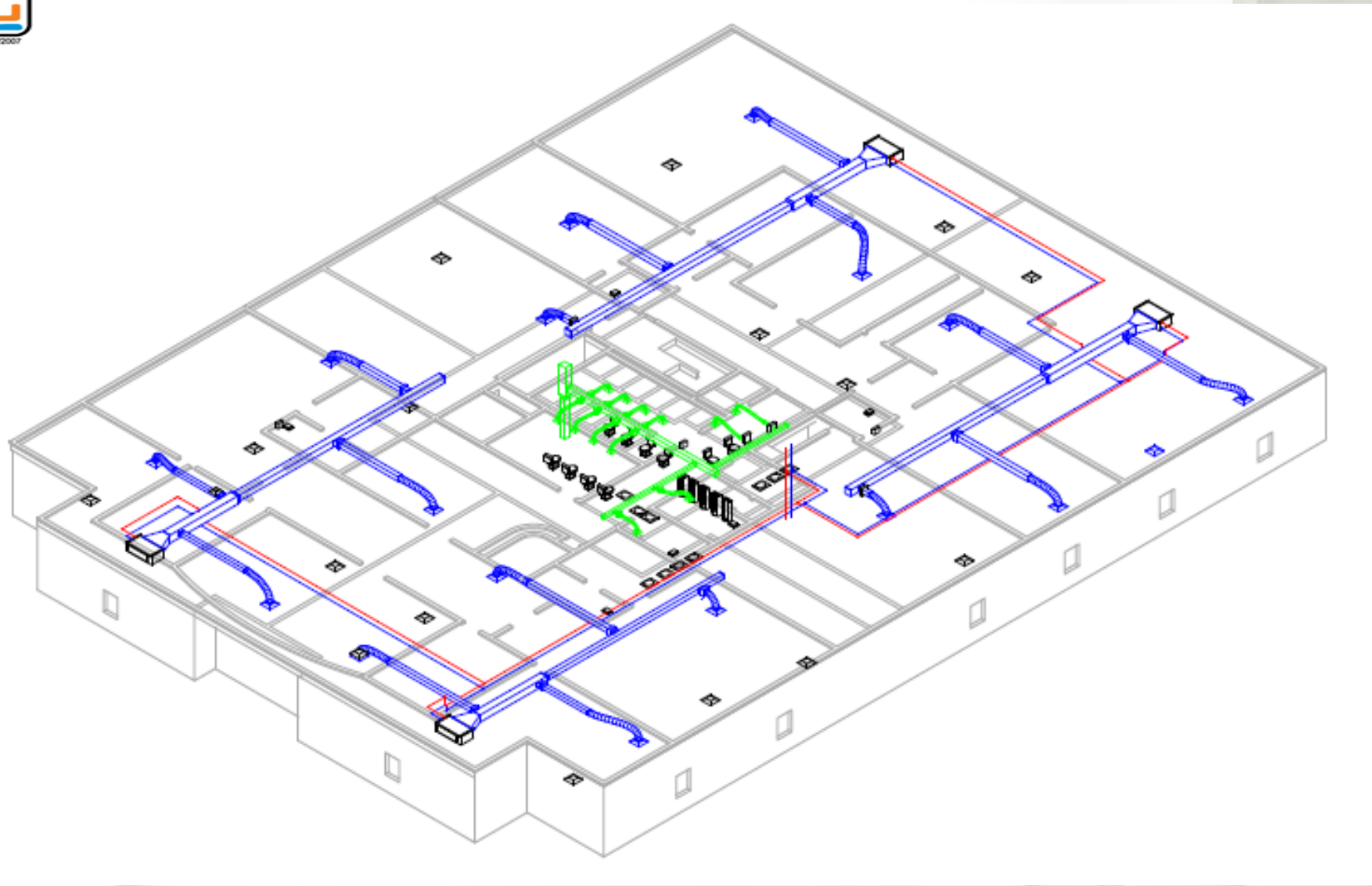

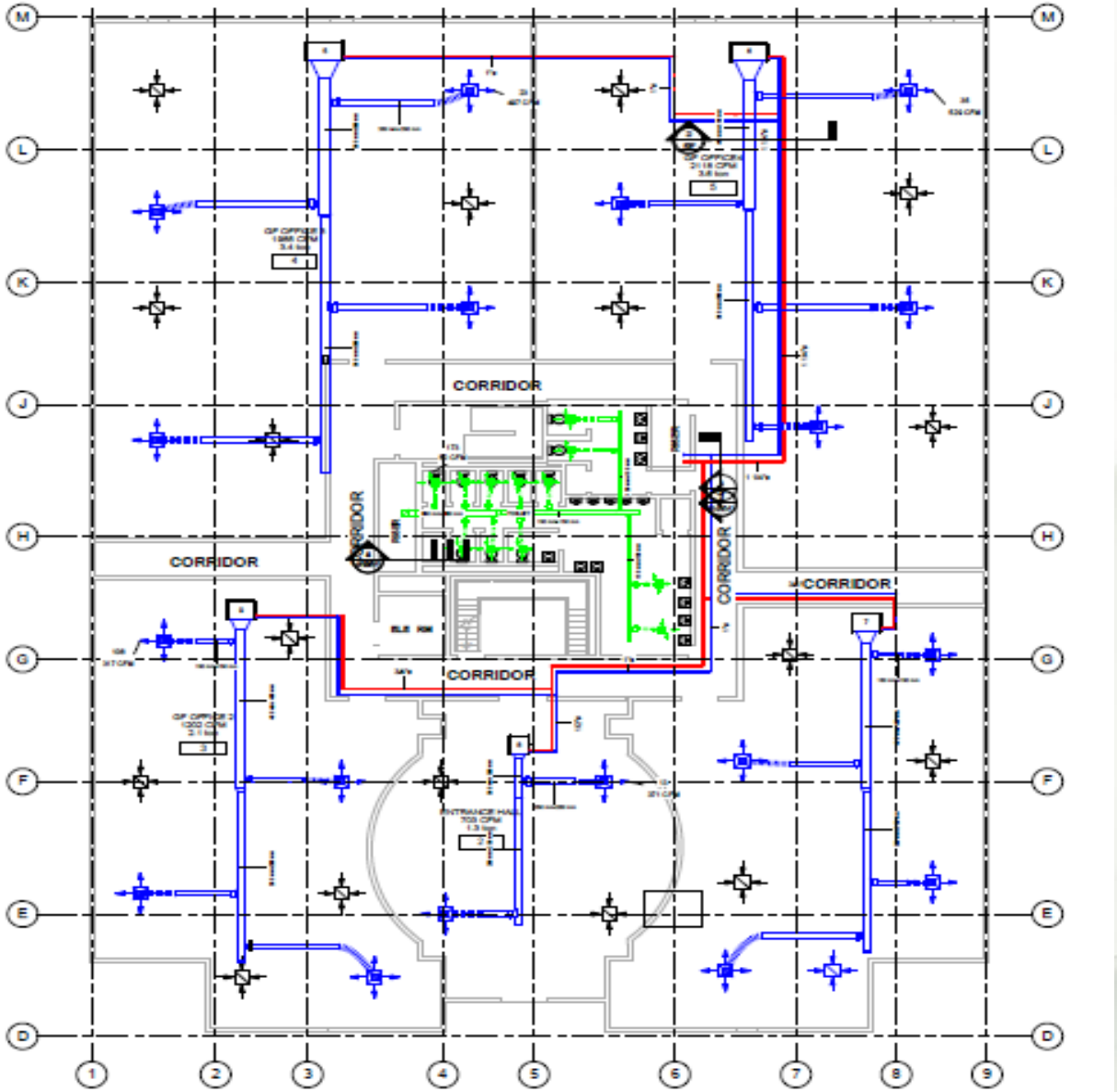
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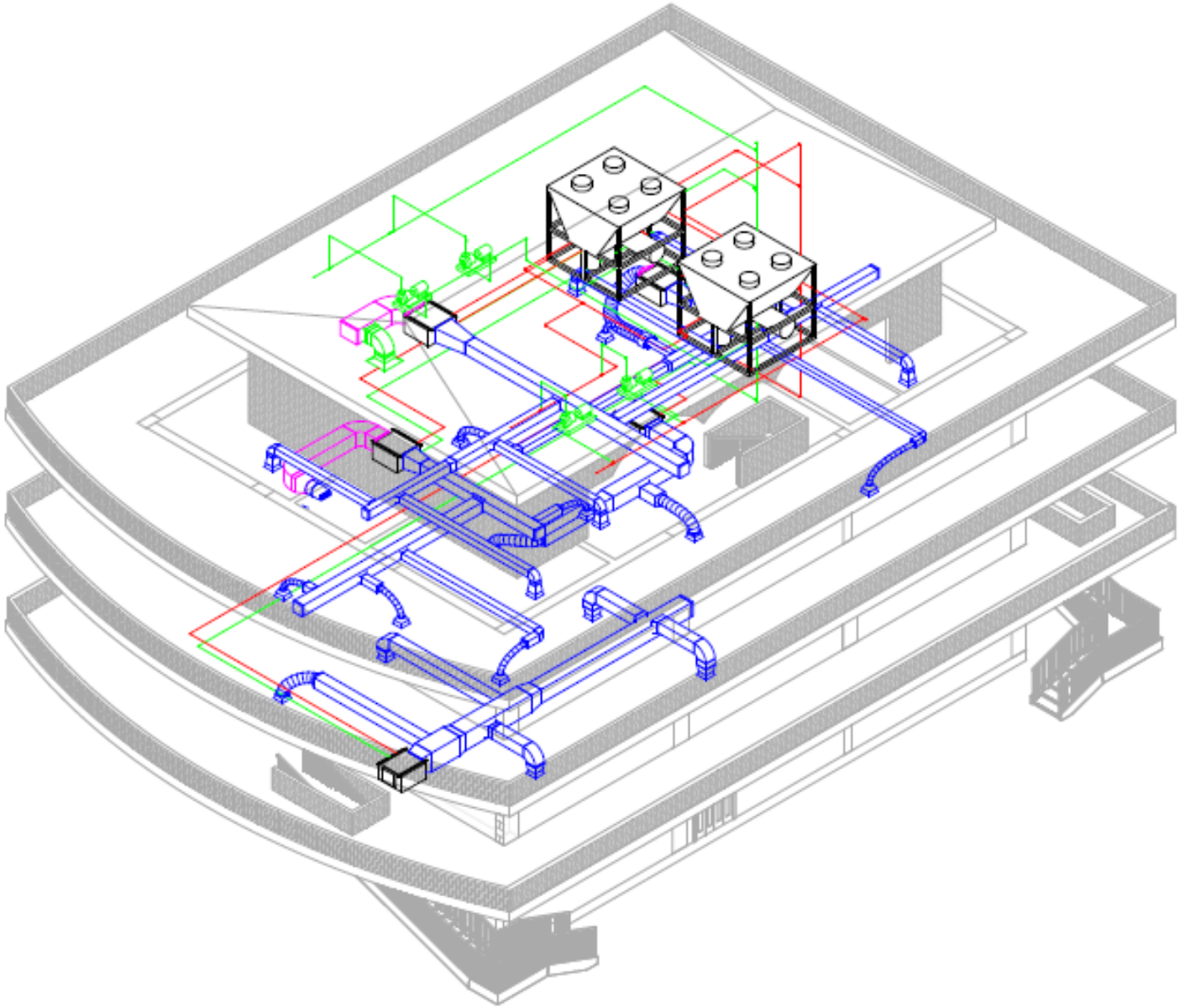
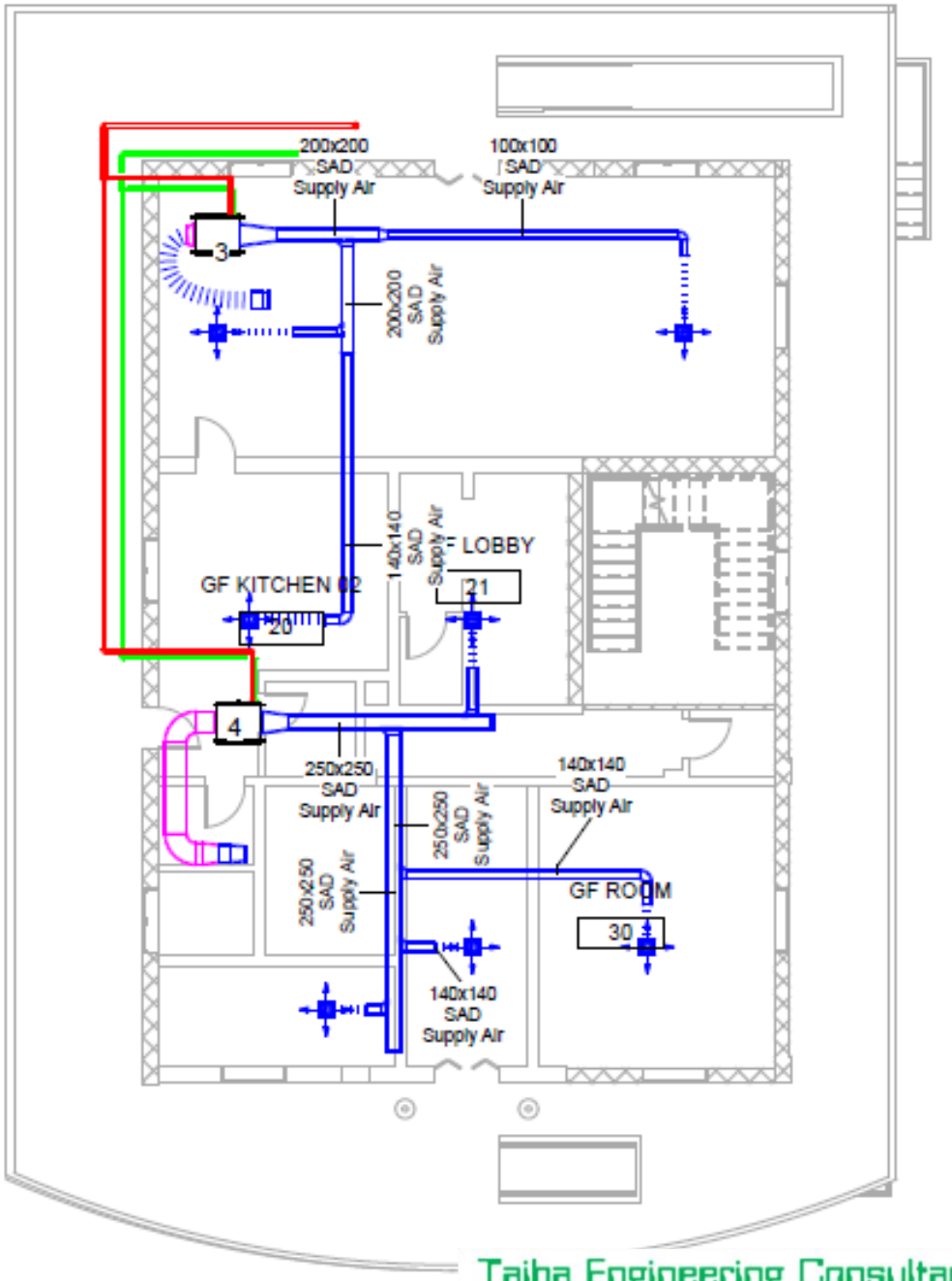
PROJECT
VILLA
@DOHA - QATAR

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PROJECT
OFFICE BUILDING
@HYD - INDIA