

CIC BIM Competition 2022 – Submission Poster Template

Revitary

Location Plan 1:2000



About the New Transitional Housing

Design Concept: The design of transition housing estate is to accommodate 800 people. To achieve the goal of providing a better living standard and quality, the transitional housing estate consists of recreational area, community farm, convenience store, and office.

Building Form: To achieve the concept of sustainability, the orientation of buildings is set to capture the maximum amount of sunlight to generate electricity by solar panels located on the roof, fully utilizing the natural light aiming at reducing usage of energy in lighting. Apart from the lighting system, the orientation of buildings also provides a cooling effect by allowing natural wind to pass through the building.

Spatial Arrangement: The transitional housing is built to accommodate 800 people with convenience store, recreation zone, management office, and parking space. The recreation area is located beside the main road. Each building block consists of 2 staircases, allowing an accessible route to each floor. The larger unit, designed for disabled people, is located on the G/F to allow convenient accessibility.

Connectivity: Provide 10 car-parks at the 2 sides of the main entrance for 10 private cars and a loading and unloading bay each. Pedestrian where the entrance is located near the office is connected to the main road. Each building block consists of 2 staircases, allowing an accessible route to each floor.

BIM Uses in Design, Collaboration, Engineering, Analysis and Optimisation: Use of BIM provides a faster workflow and data transformation of the entire project. The multi-discipline of real-life data gives better accuracy of design decisions. Apart from that, the design collaboration with engineering to construction aspects allows to achieve communication to minimize the time of solving foreseeable problems to achieve a better outcome.

BIM Collaboration approach: Our team organized meetings weekly to update the schedule of the project with the assistance of Trimble Connect. We used Revit and AutoCAD to design the layout of the building. We also used Navisworks, Autodesk Insight, and Enscape for rendering.

Quality of Design: Use of Enscape Asset Library to accelerate the interior and landscape design in 3D visualization.

Sustainability: Use of Autodesk Insight to simulate the solar analysis in the design stage. Obtain the best orientation to capture the maximum amount of sunlight so as to give the maximum energy conversion efficiency by the solar panel. Apart from capturing the light, the orientation also allows to capture the wind from the offshore wind in summer and onshore wind in winter.

MiC/ DfMA: Most rooms of the building consist of wall and slab to form a module. The compression force is supported by structural wall, and shear force is supported by collection reinforcements.

Constructability: Use of Navisworks Manage to identify obstacles and clashes between different disciplines.

Summary: BIM accelerates the design stage of the whole project by reviewing multiple simulations from BIM software. The online platform such as Zoom provides effective communication between teammates.



1st Reclaimed Wood Facade Design



Final Reclaimed Wood Facade Design

Conceptual Diagram The first facade design aims for a subtle outlook for the project site. But the first design increases the cost burden due to the usage of aluminium facade. The final design can provide both aesthetic look and warming vibes at the same time with lower cost being spent by the client.

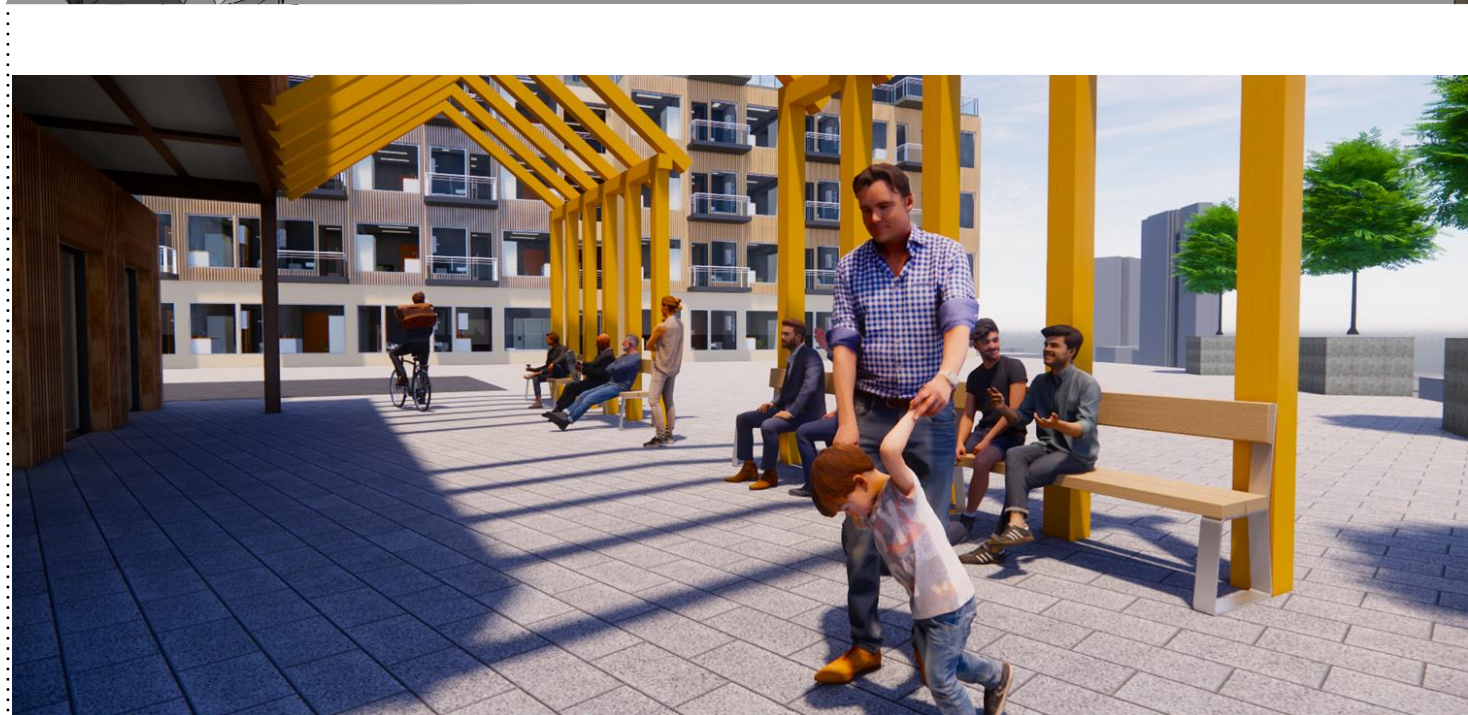
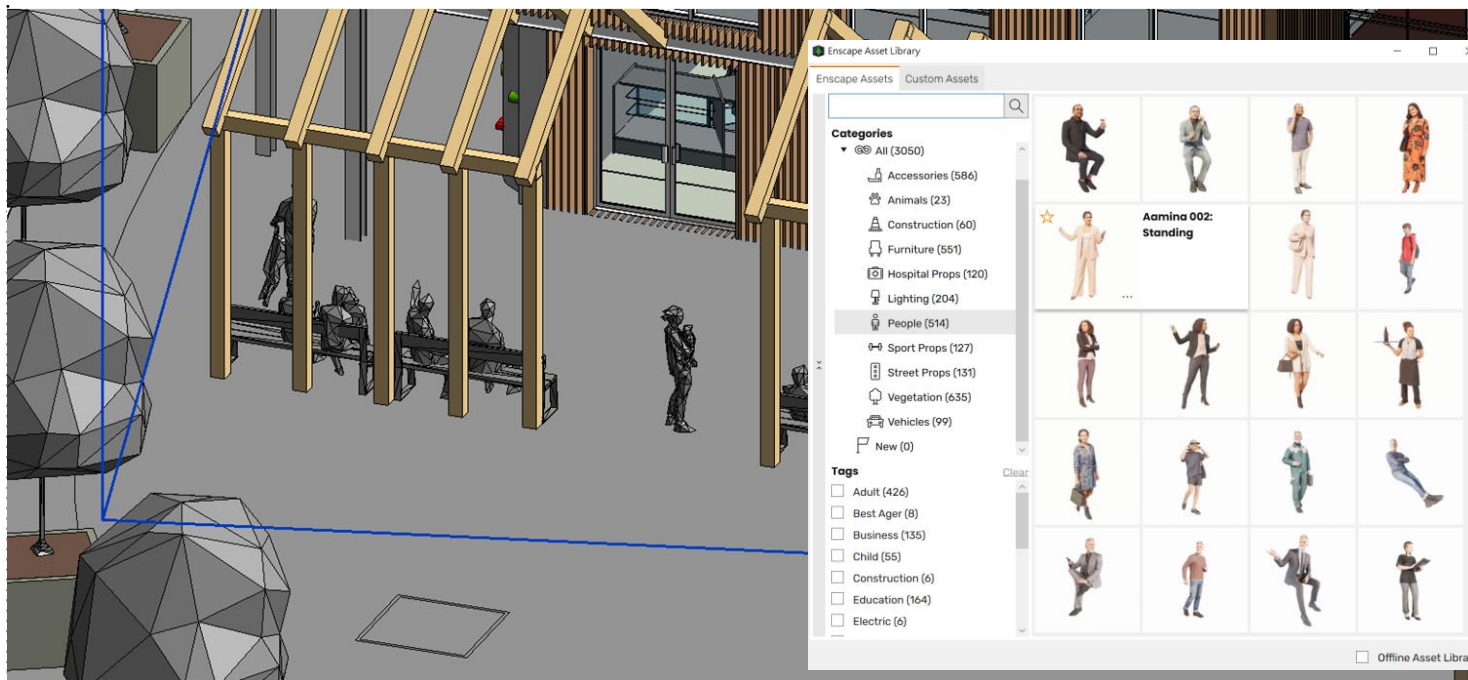


Overall Bird Eye view

The project is a community-based transitional housing project with the provision of large Common Areas at the center for residence. Vegetations and plants are surrounding the transitional housing to create a relaxing, comfortable, and self-healing living environment for the residence. Combining with the design of wood facade, every building element and component are closely binding with nature by itself.

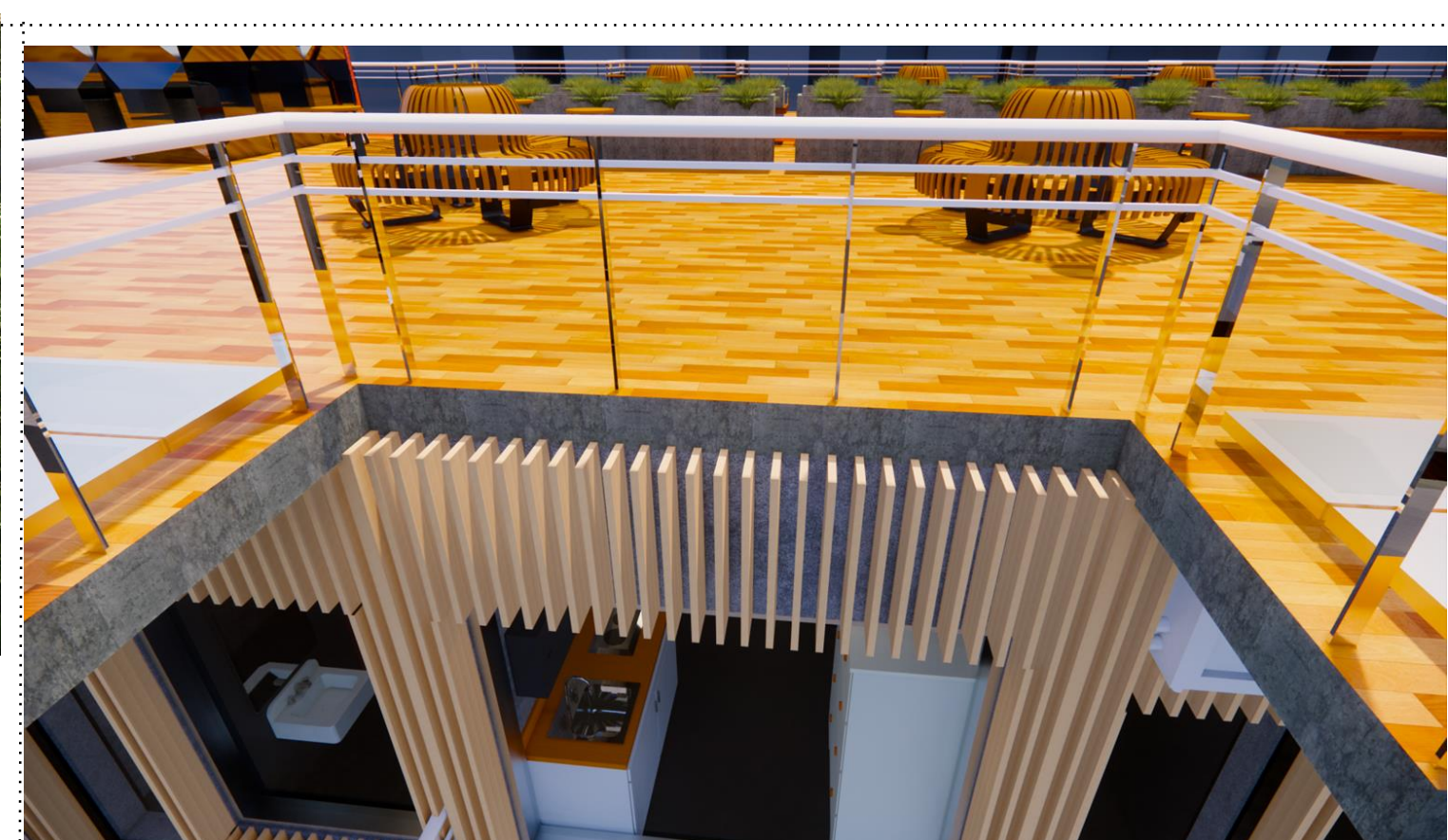


Building Form and Space All spaces at G/F are provided to the transitional residence and communities to enjoy the facilities. Management Office also utilizes the space at G/F to provide Common Area (e.g., climbing wall) for the residence with its left-protruding shape.

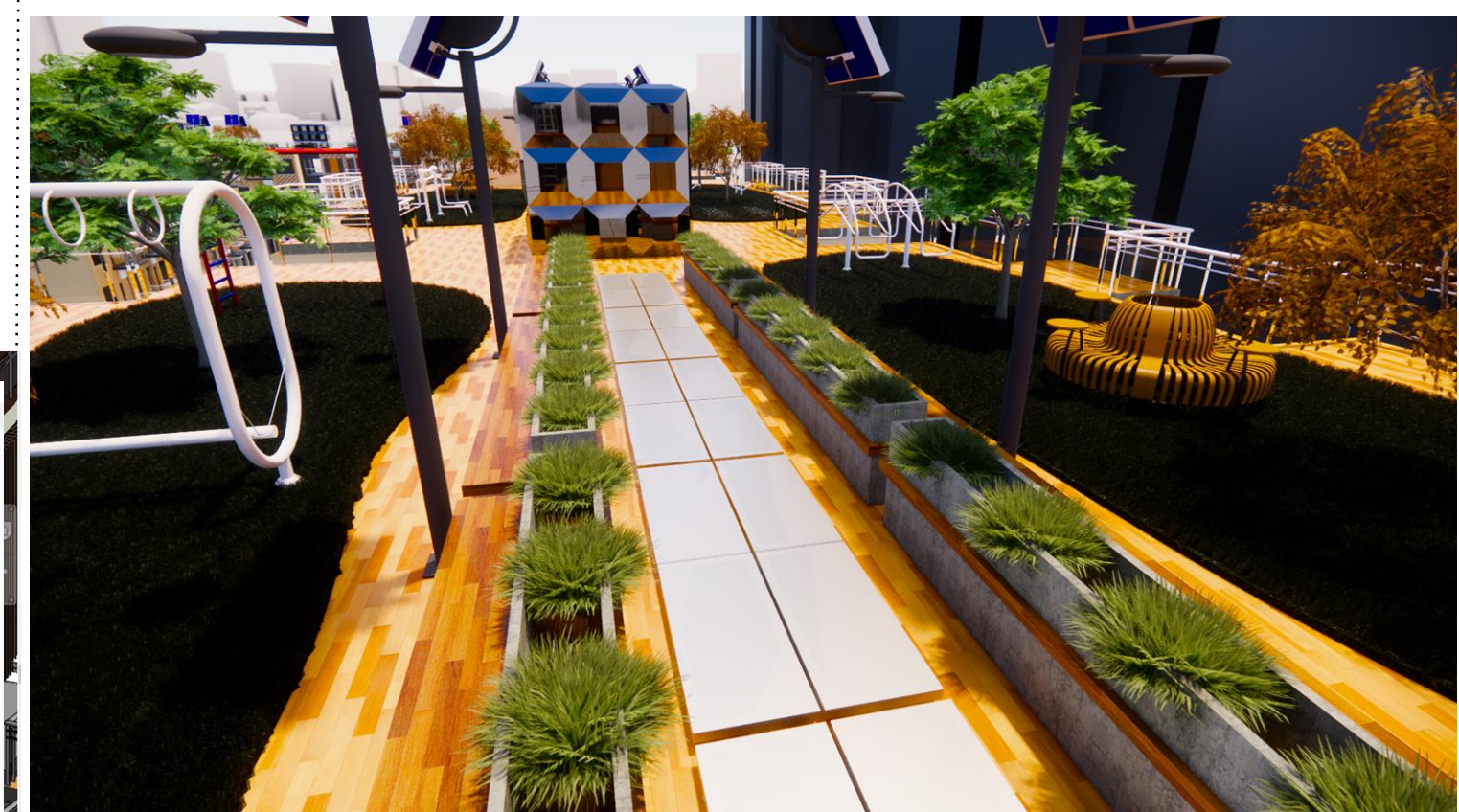


Quality

Asset Library from Enscape 3.3 provides various categories of components, which enhances the visualization of project. “People”, “Vegetation” and “Furniture” from Asset Library are imported into Revit to create a lively environment for visualization and rendering process.



Reclaimed Wood Adopted in both transitional house and management office as facade and flooring materials. These materials are easily installed and removed during the demolition stage. After demolition, the facade and flooring materials can be further reused in other projects. Wood materials ensure the interaction between the residence and the built environment.



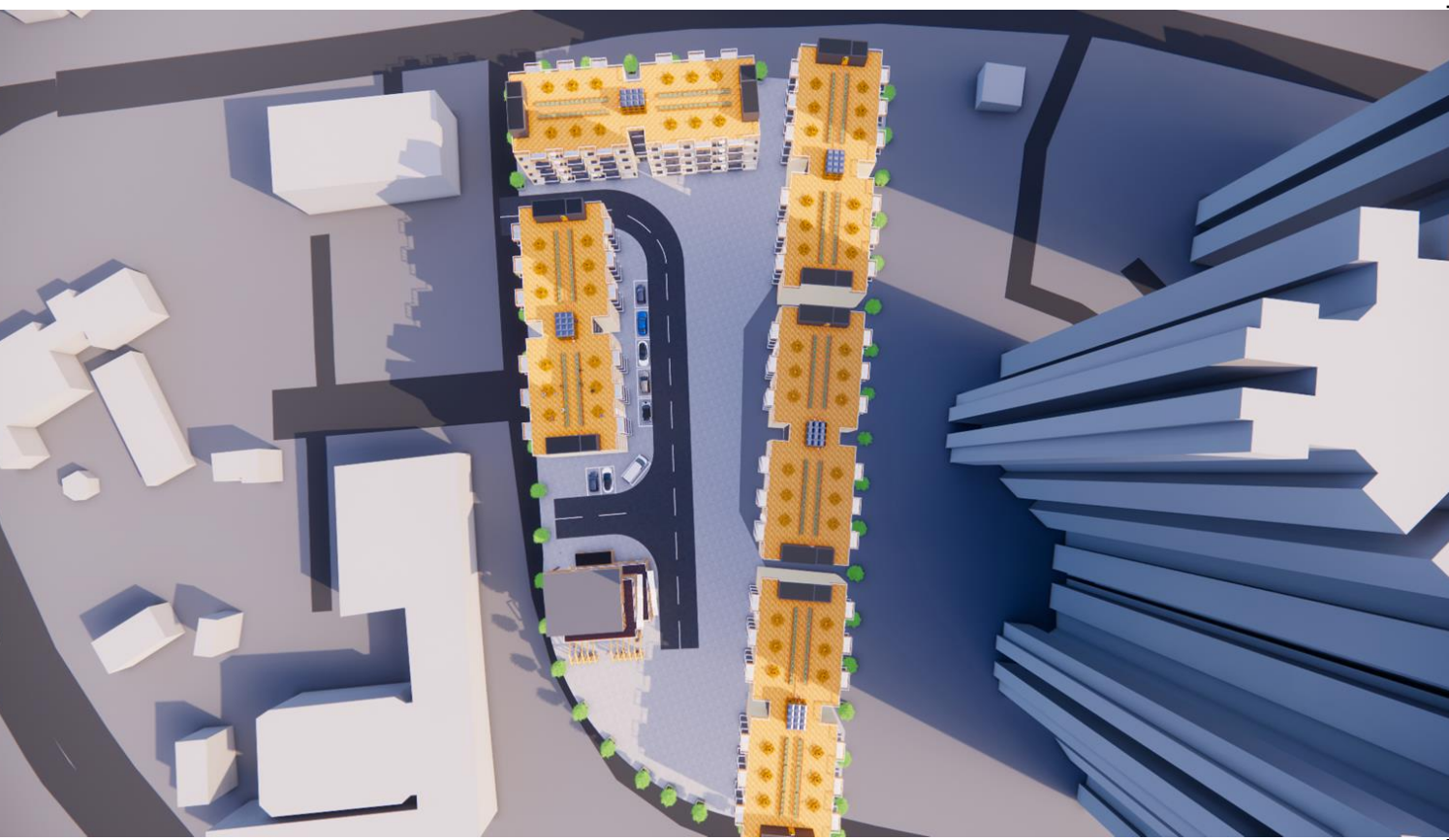
Solar Panels and Analysis Solar panels assist in generating electricity for minor electricity-consuming devices such as water heaters for each unit. The panels are also lightweight and hence provide quick installation or removal of solar panel components. Solar analysis through Autodesk Insight assists in deciding the location and placement of solar panels. The green roof absorbs the most effective solar energy to generate electricity for the residence on a daily basis. Compared with other locations such as floor levels and balconies of different units, the green roof is chosen to be the best location through Insight solar study and analysis.

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Modularity & Adaptability in Transitional Housing Design with Use of BIM

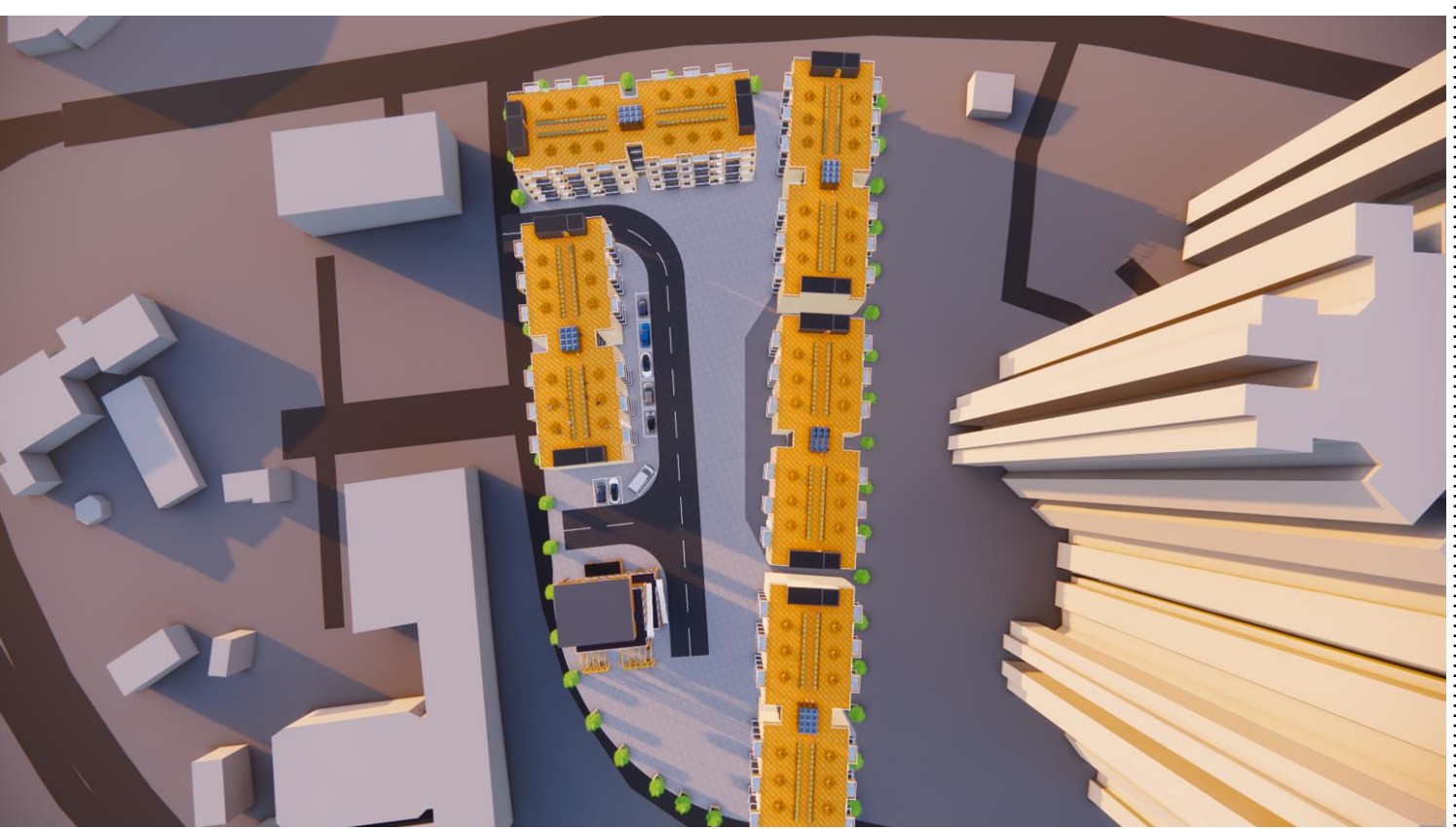
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Site Layout Plan 1:1000



Site Layout in the Morning: Sky view of this project site was taken at 7:00am. The project site is providing sufficient solar access to the transitional residence, plants and environment. No impacts of low daylight to the transitional house are caused by the neighbouring residential house site.

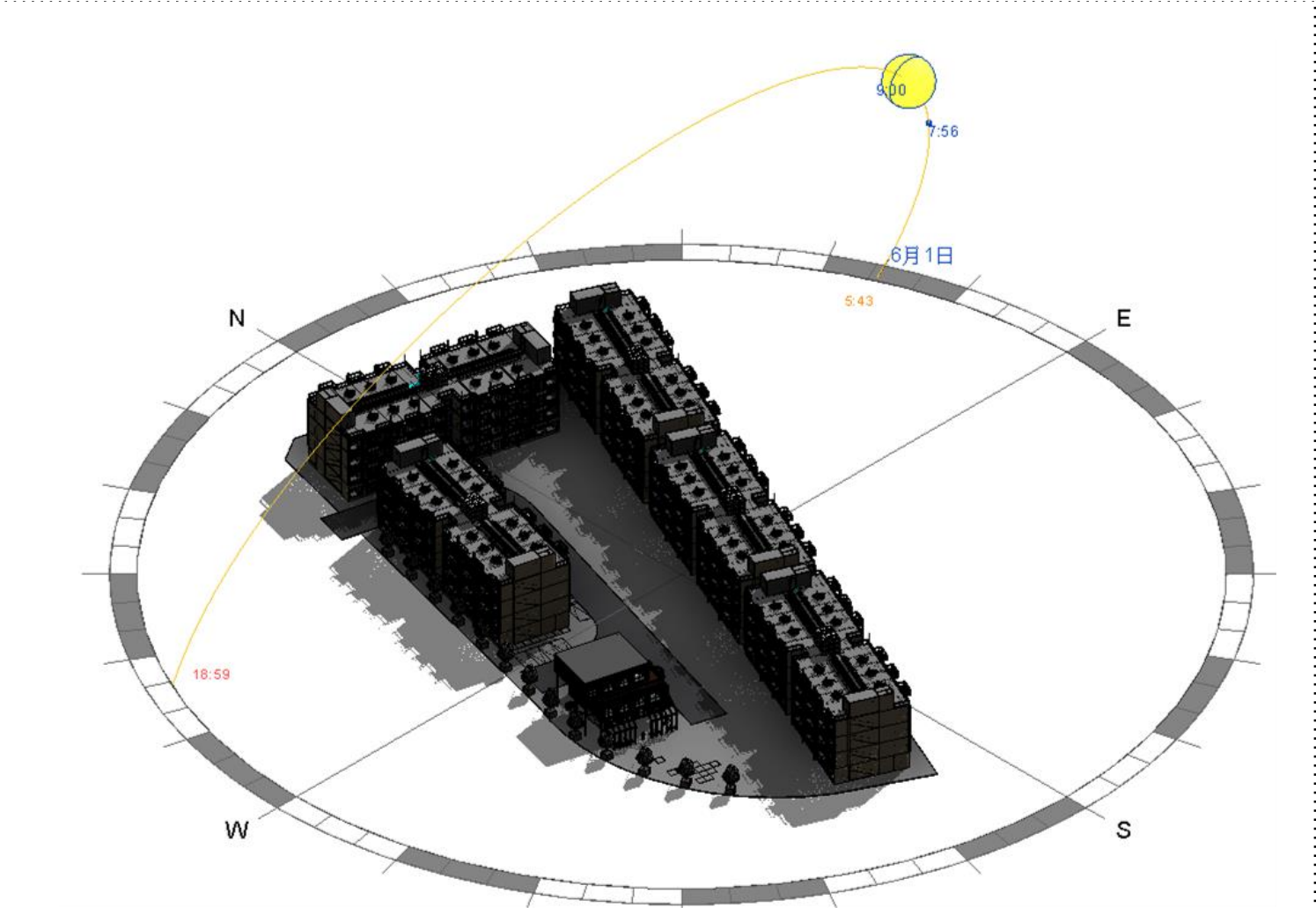


Site Layout in the Evening: Sky view of this project site was taken at 5:30pm. The project site is still providing enough sunlight access and minimizing the impacts of shadows to the surroundings.

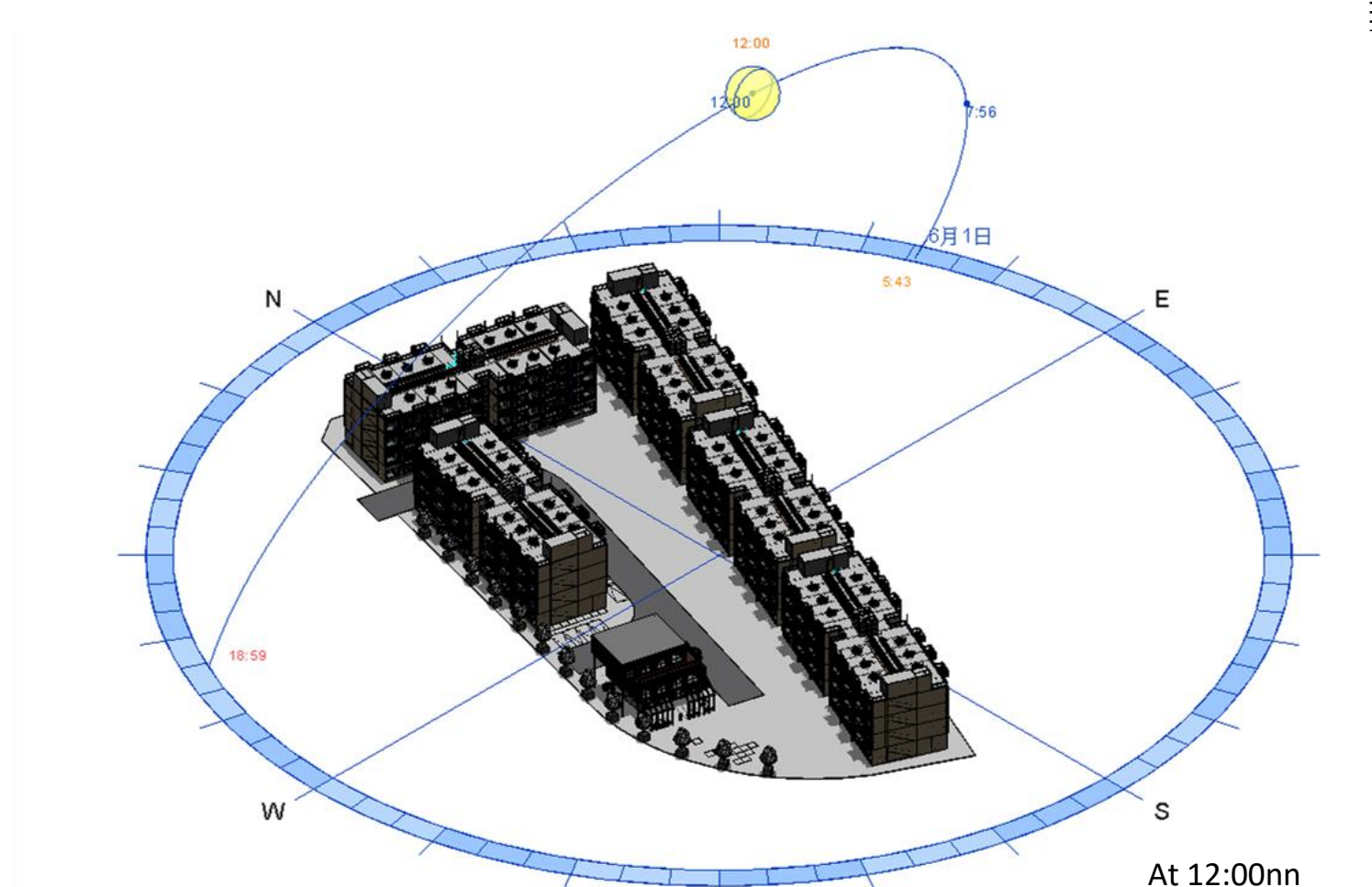


Perspective View

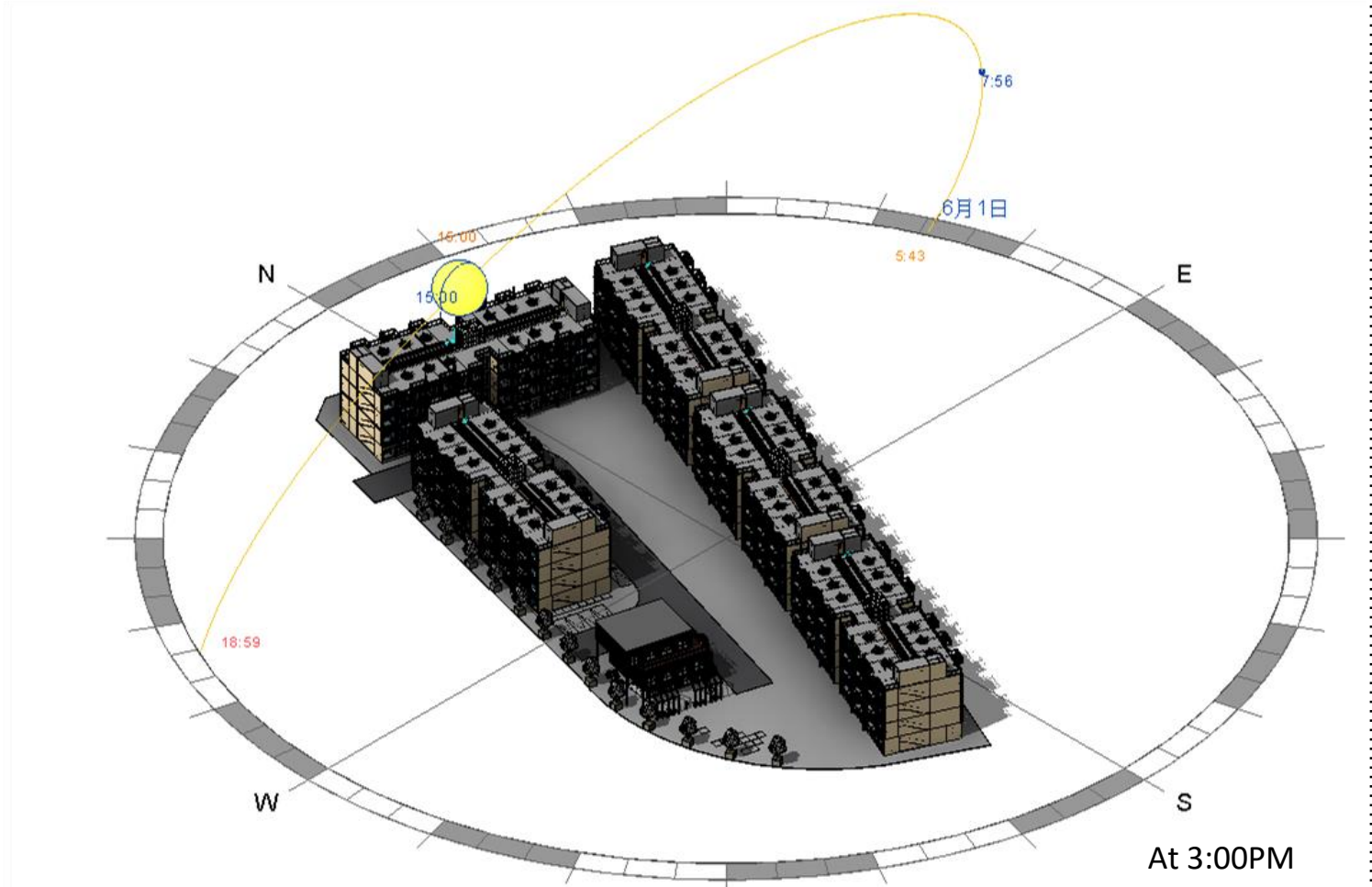
Landscape elements, which plays an important role within the site, provides various kind of active and passive recreational activities for the future residence. Including community farm, multifunction lawn, basketball court, modular type sitting out area which benefits to later removal or transfer of furniture, and children playground. To benefit nearby cycling user, the site also provided bicycle rack for use.



At 9:00AM

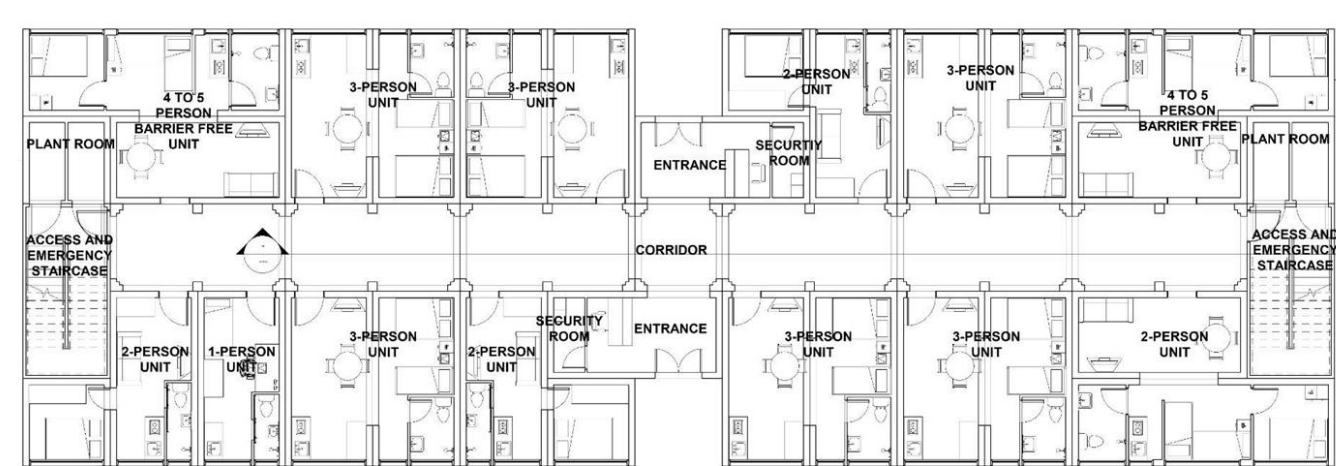


At 12:00nn

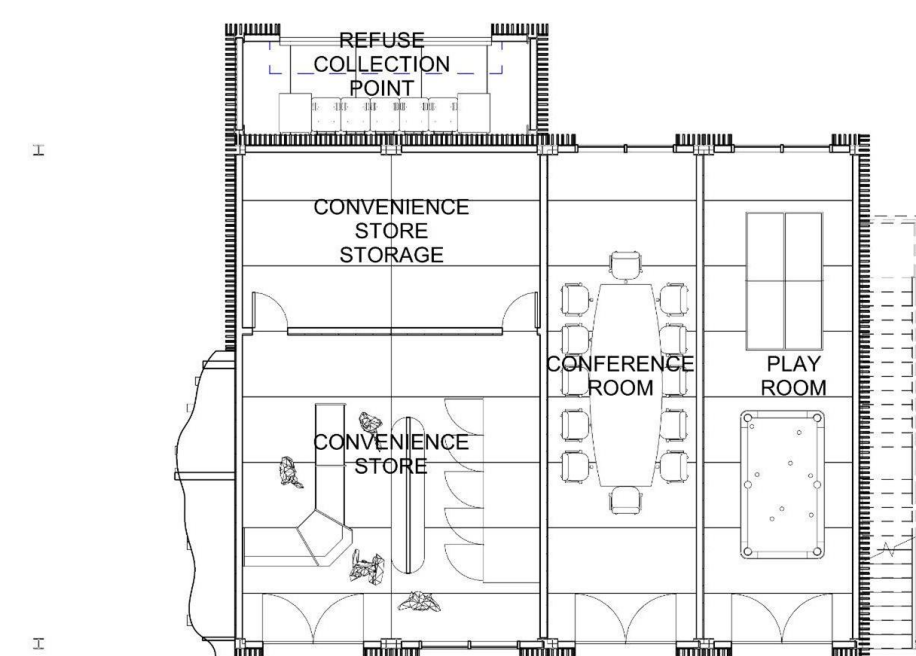


At 3:00PM

Computational Design: The best orientation to capture the maximum amount of sunlight in daytime. Through solar study, the period and location of overcasting can be estimated.

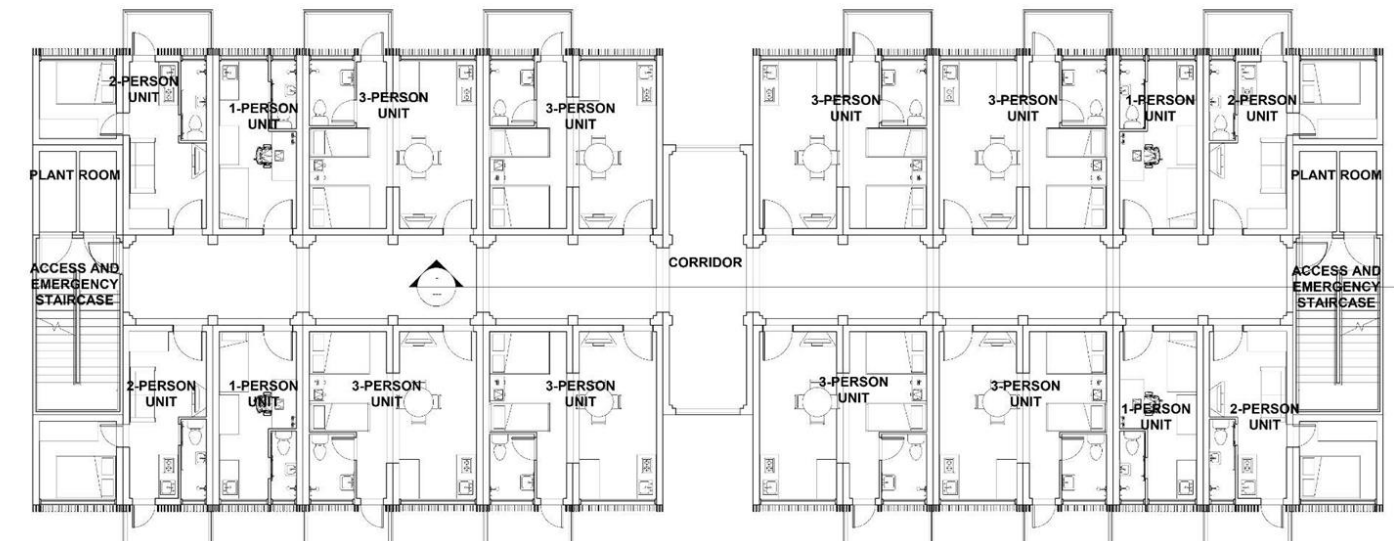


Transitional Housing

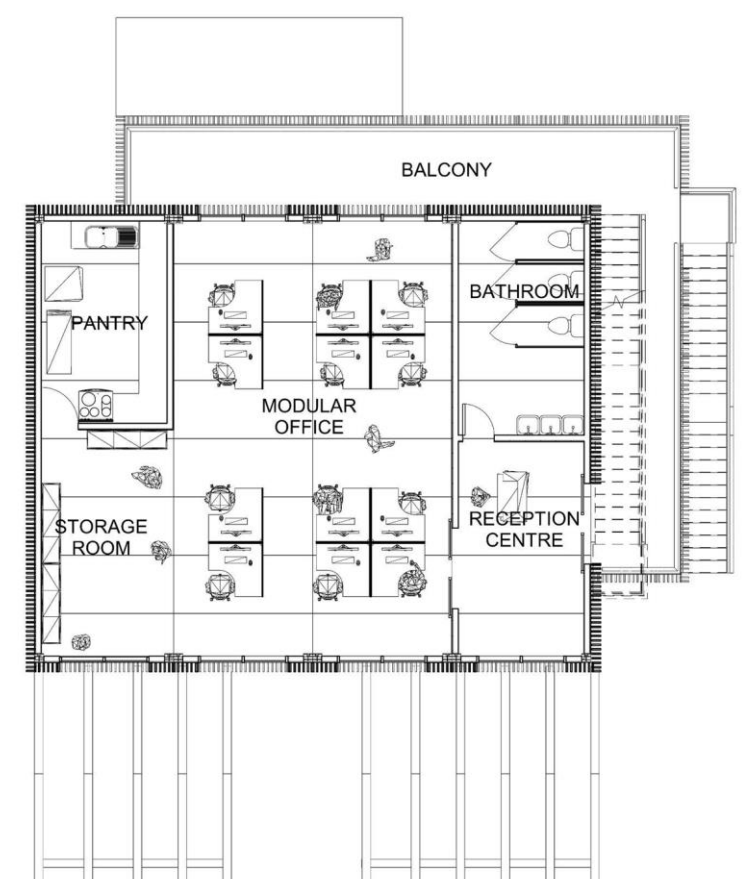


Management Office

Ground Floor Plan 1:500



Transitional Housing

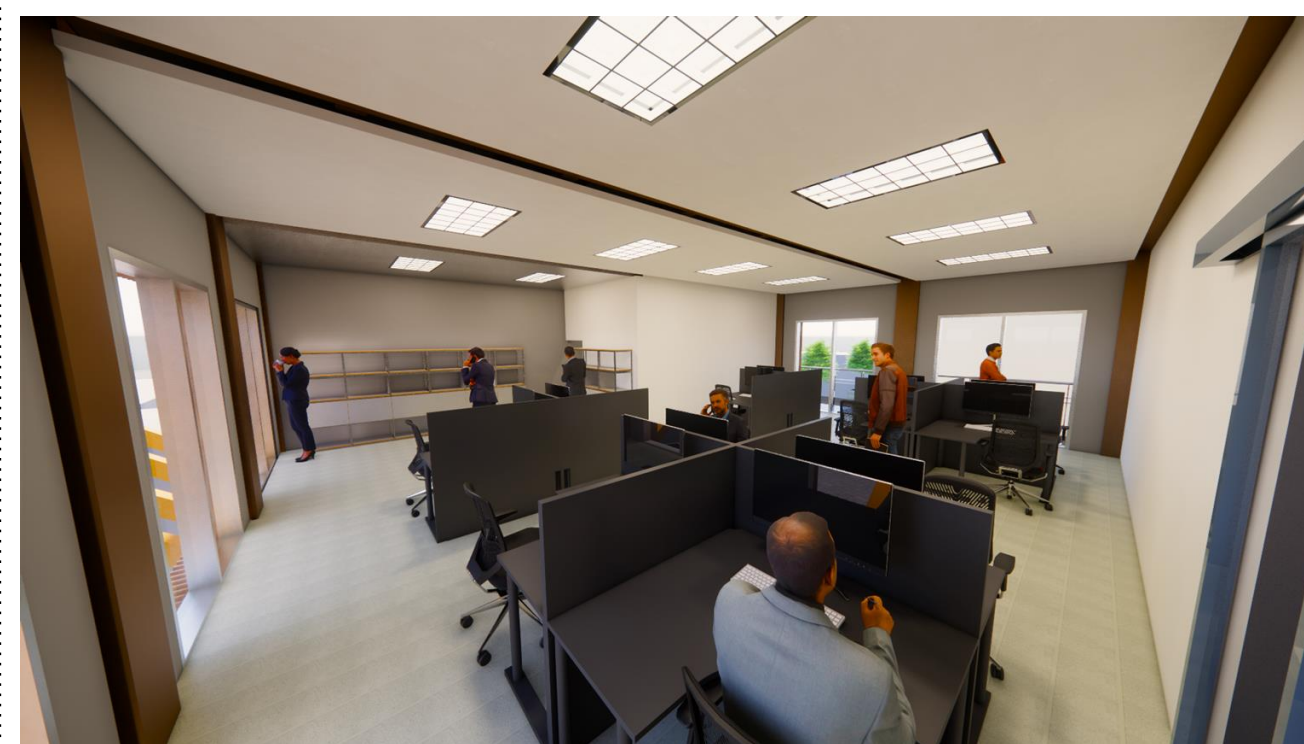


Management Office

Typical Floor Plan 1:500



Transitional Housing (3-person Unit)



Management Modular Office

Internal Perspective 1:500



Overall Bird Eye view (Night View)

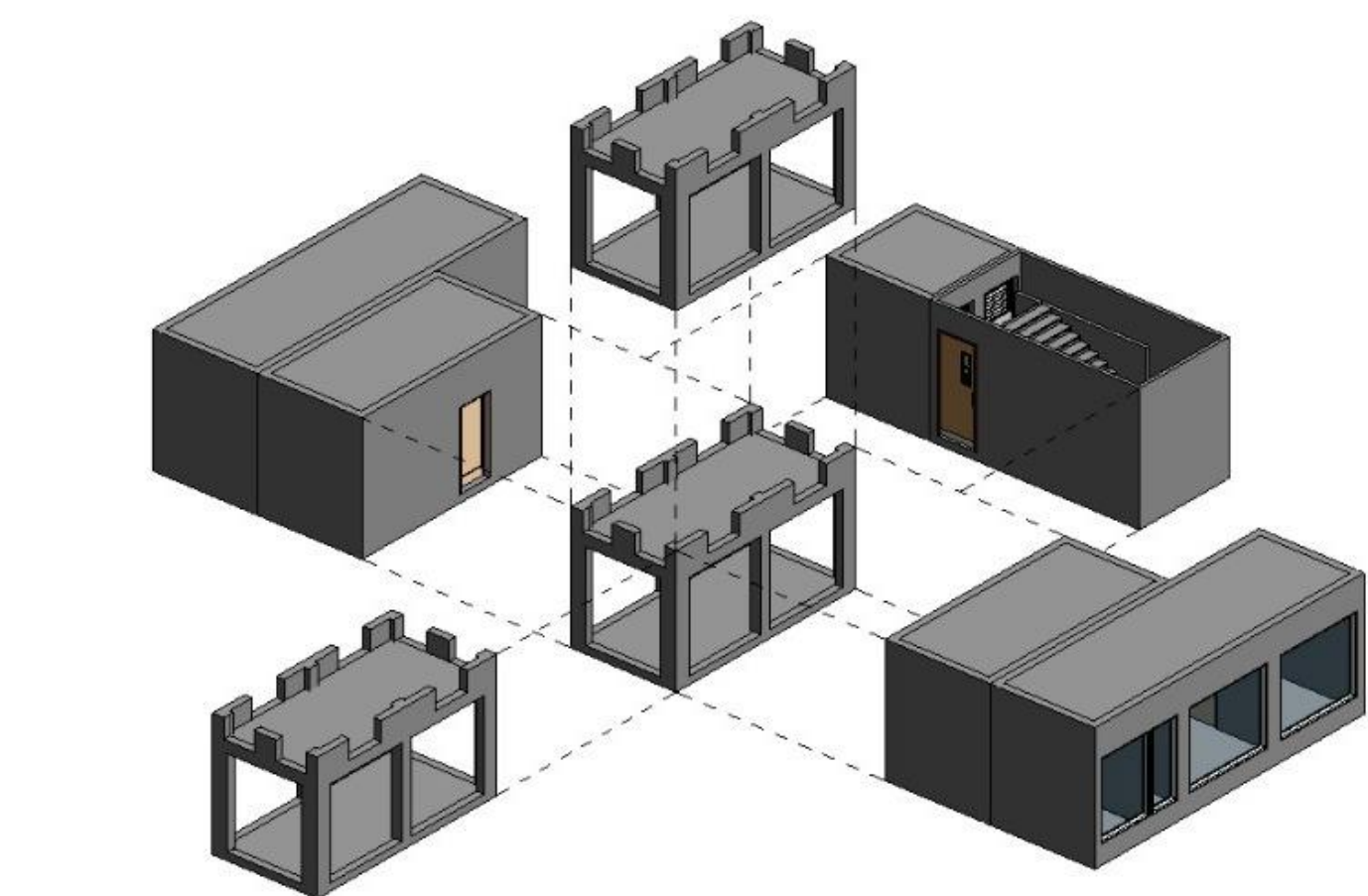
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Housing Design with Use of BIM

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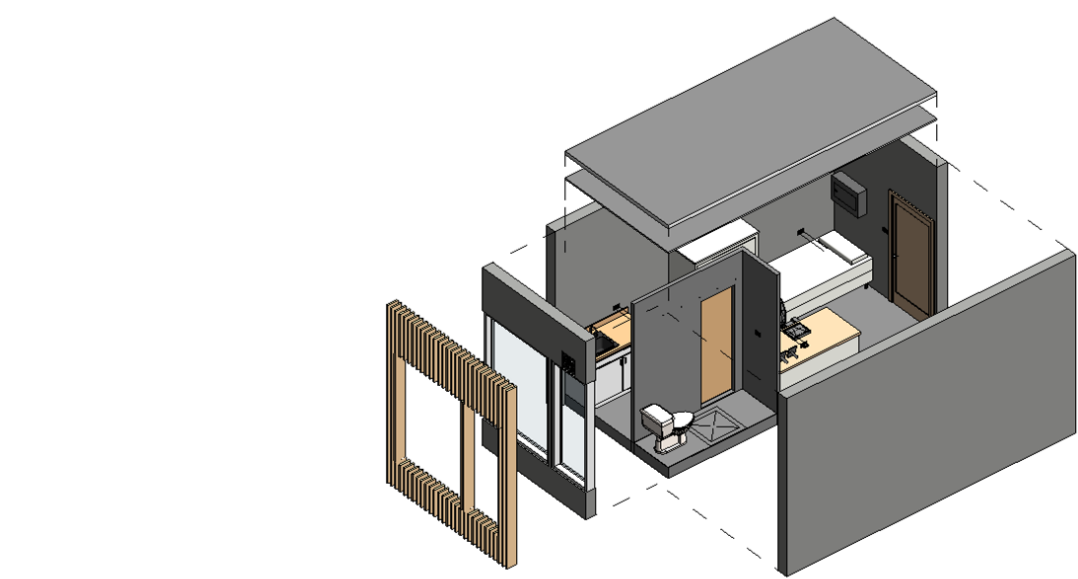
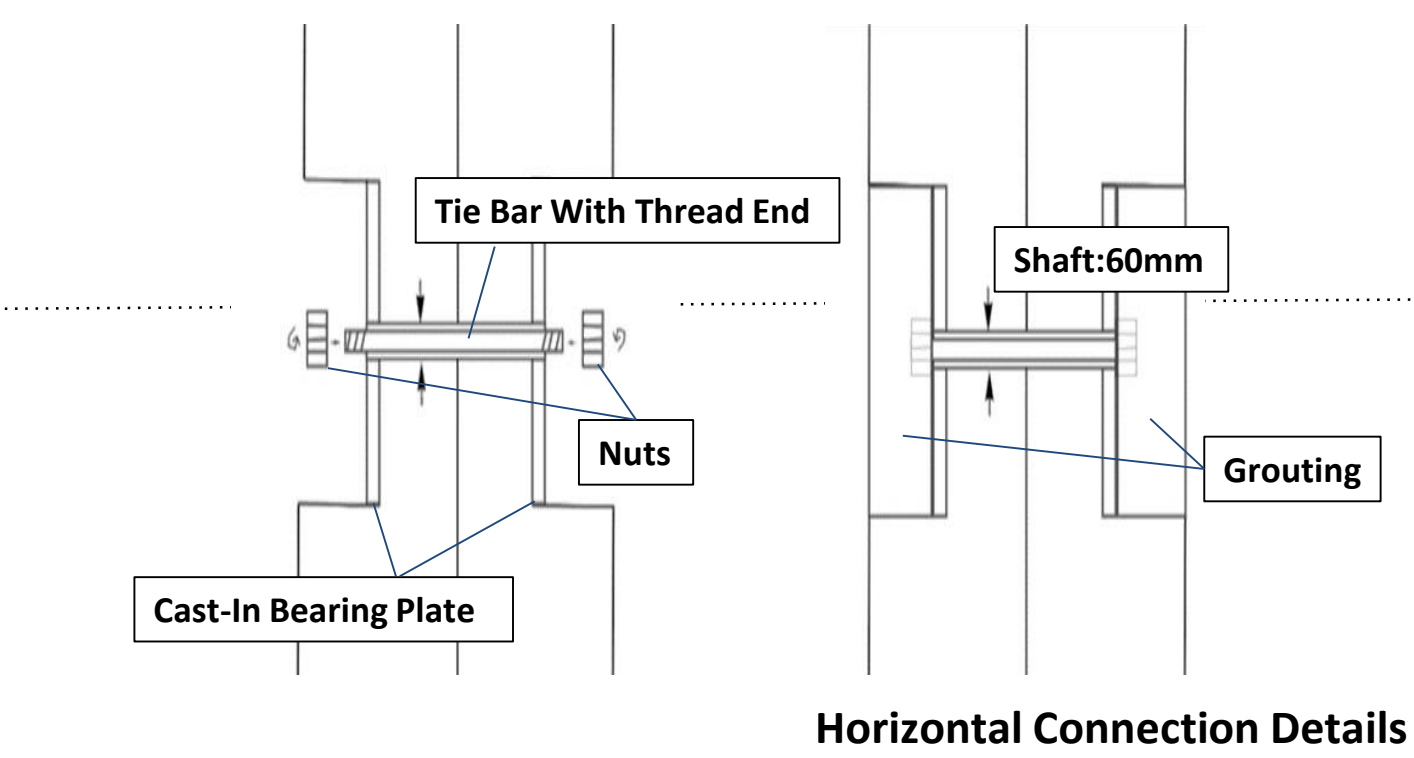
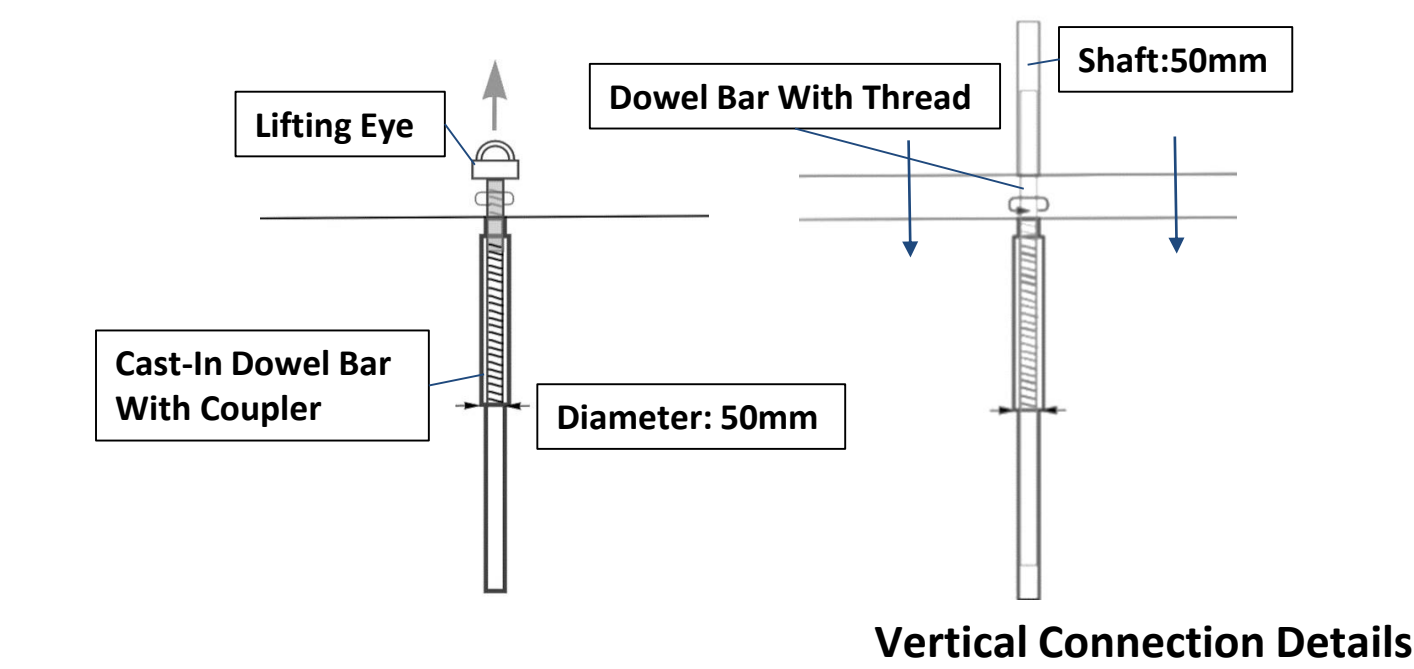
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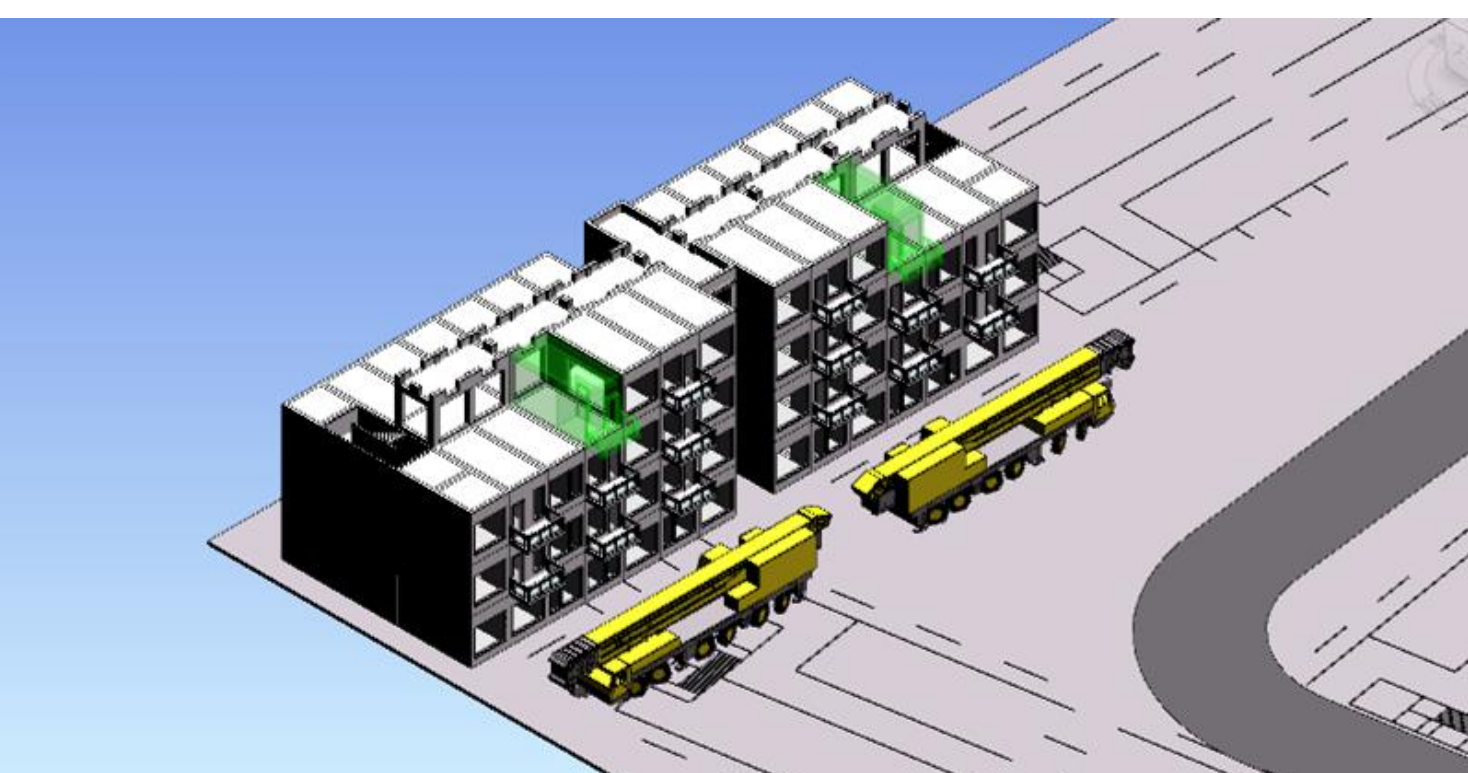
Logistics Plan: Deliver from the MiC factory in Foshan, via Hong Kong-Zhuhai-Macau Bridge to the site. Land transport is selected, where just-in-time delivery could be achieved.



MiC/DfMA: By adopting full MiC method, the efficiency, quality and construction speed can be increased significantly, as it allows simultaneous progression between insitu and factory. However, the structural integrity of a MiC building greatly depends on its rigidity as a whole, the connection between modules would be critical.



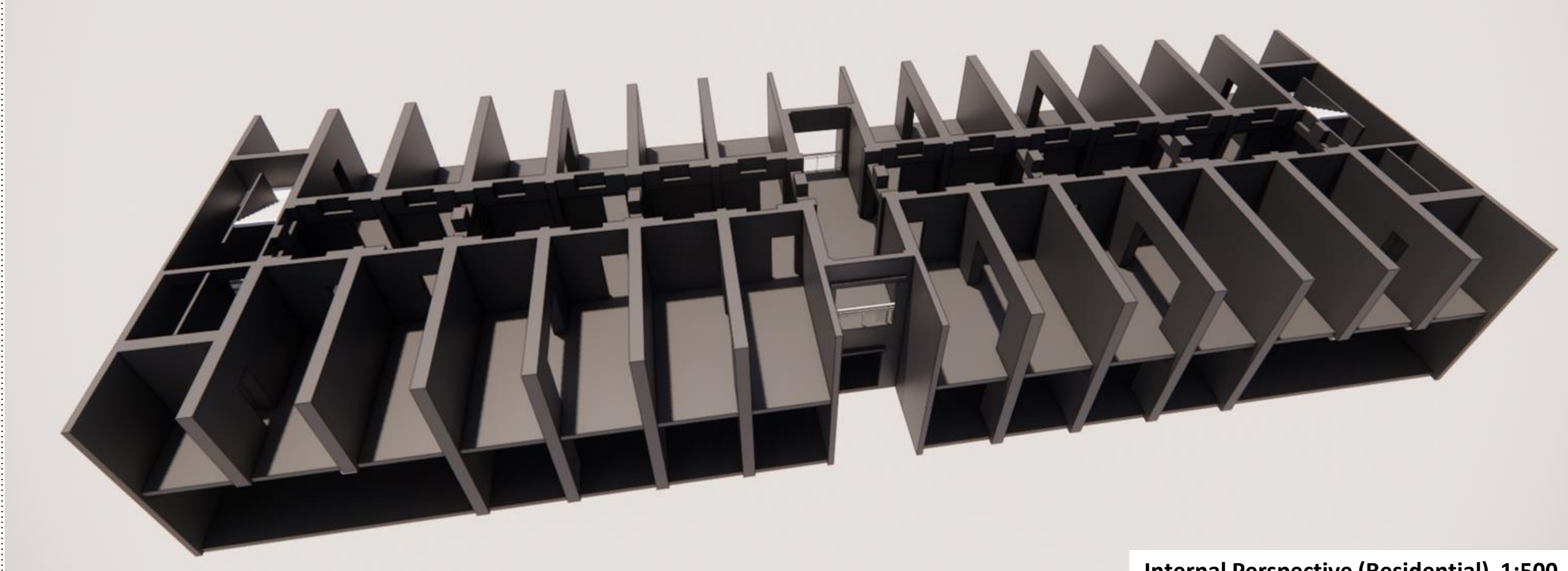
Computational Design : Preliminary designs are approached based on the loading simulation, code of practice and design consideration. The framework of each module are created, and with the aid of revit tool, iteration and revision are made,



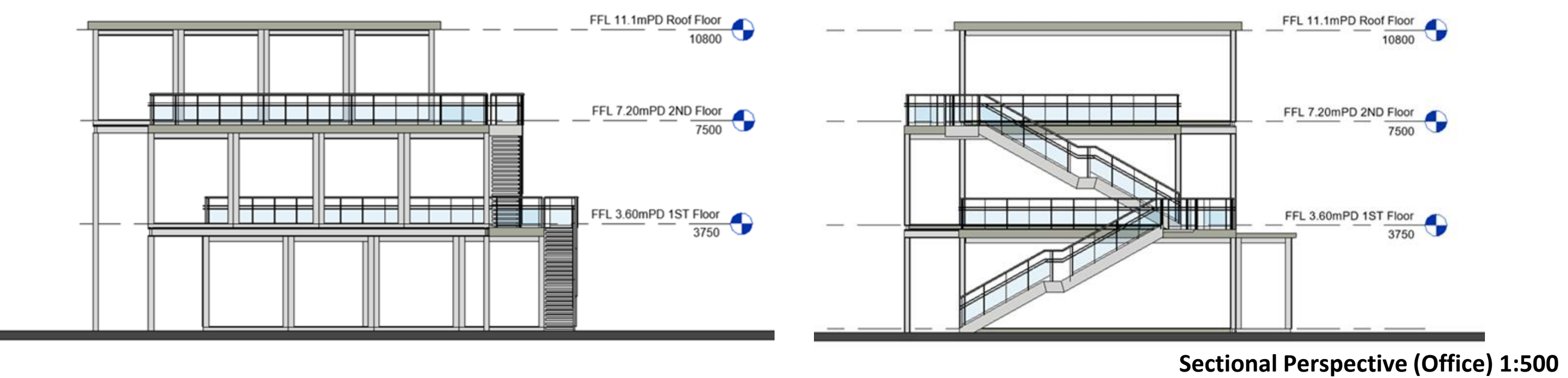
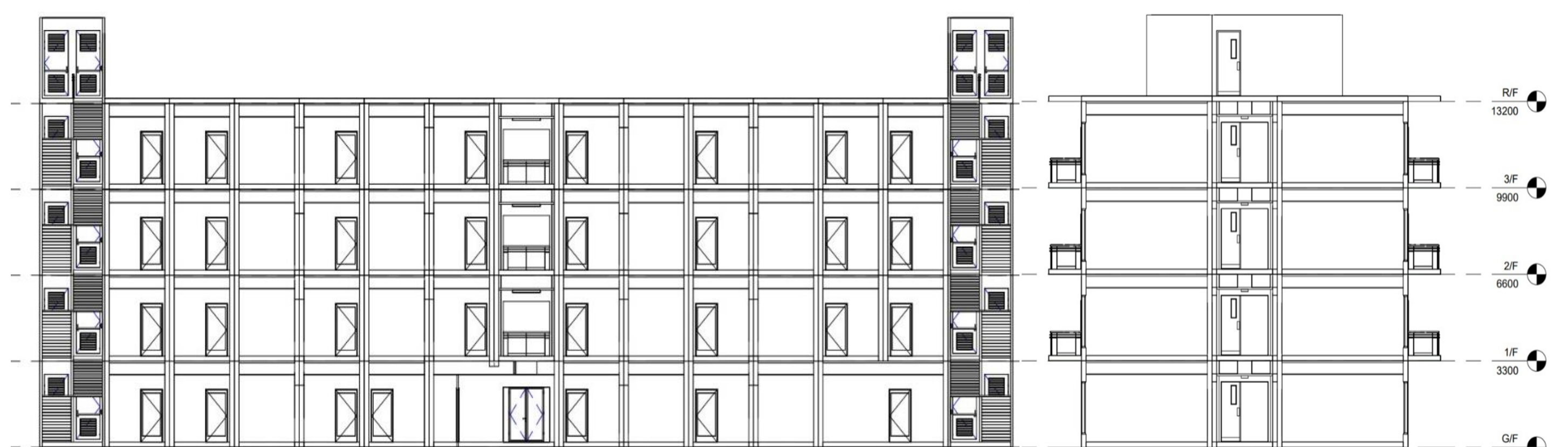
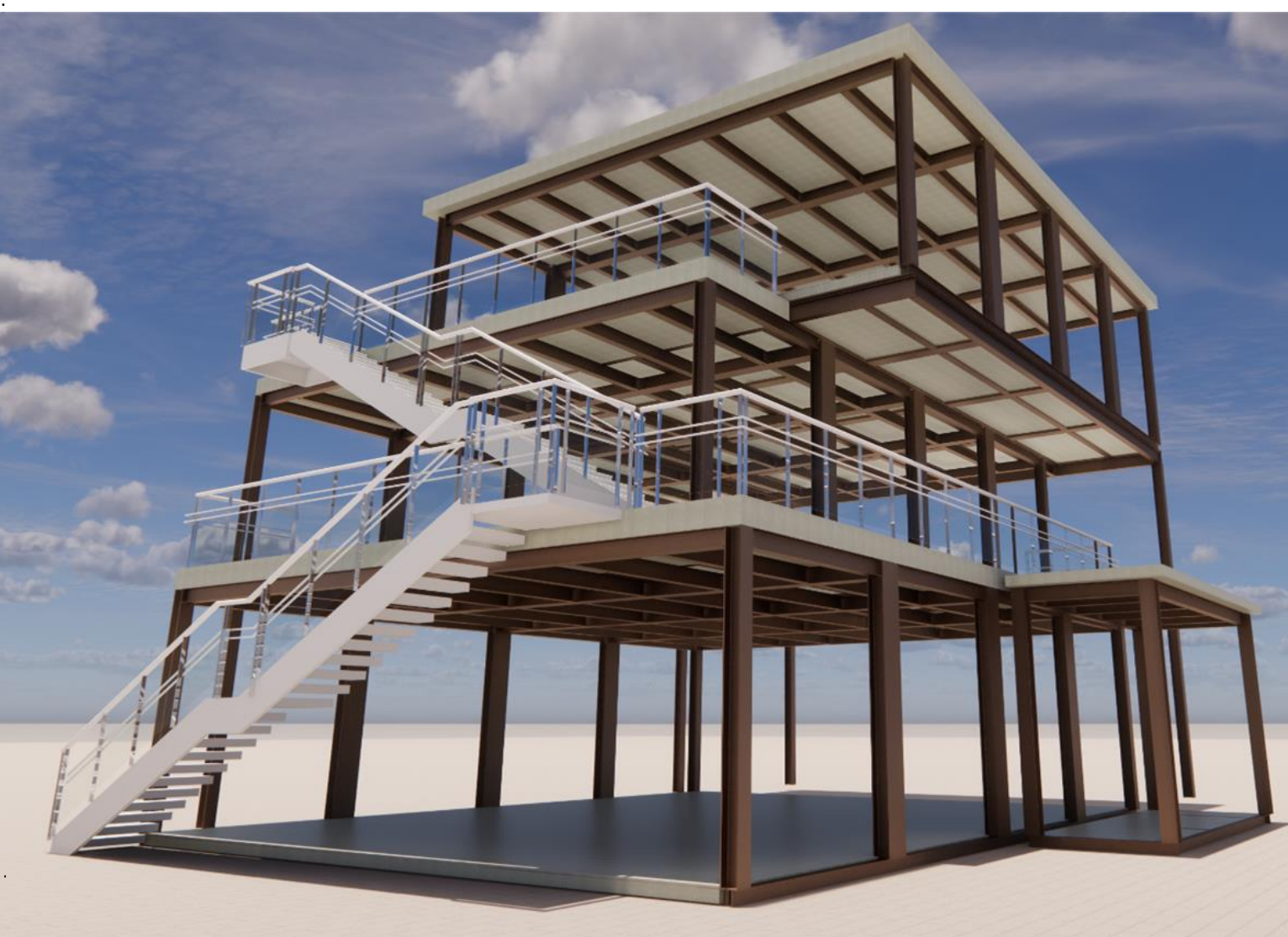
4D construction: Visualize the construction sequence and ease of streamlining workflow, reducing construction time.



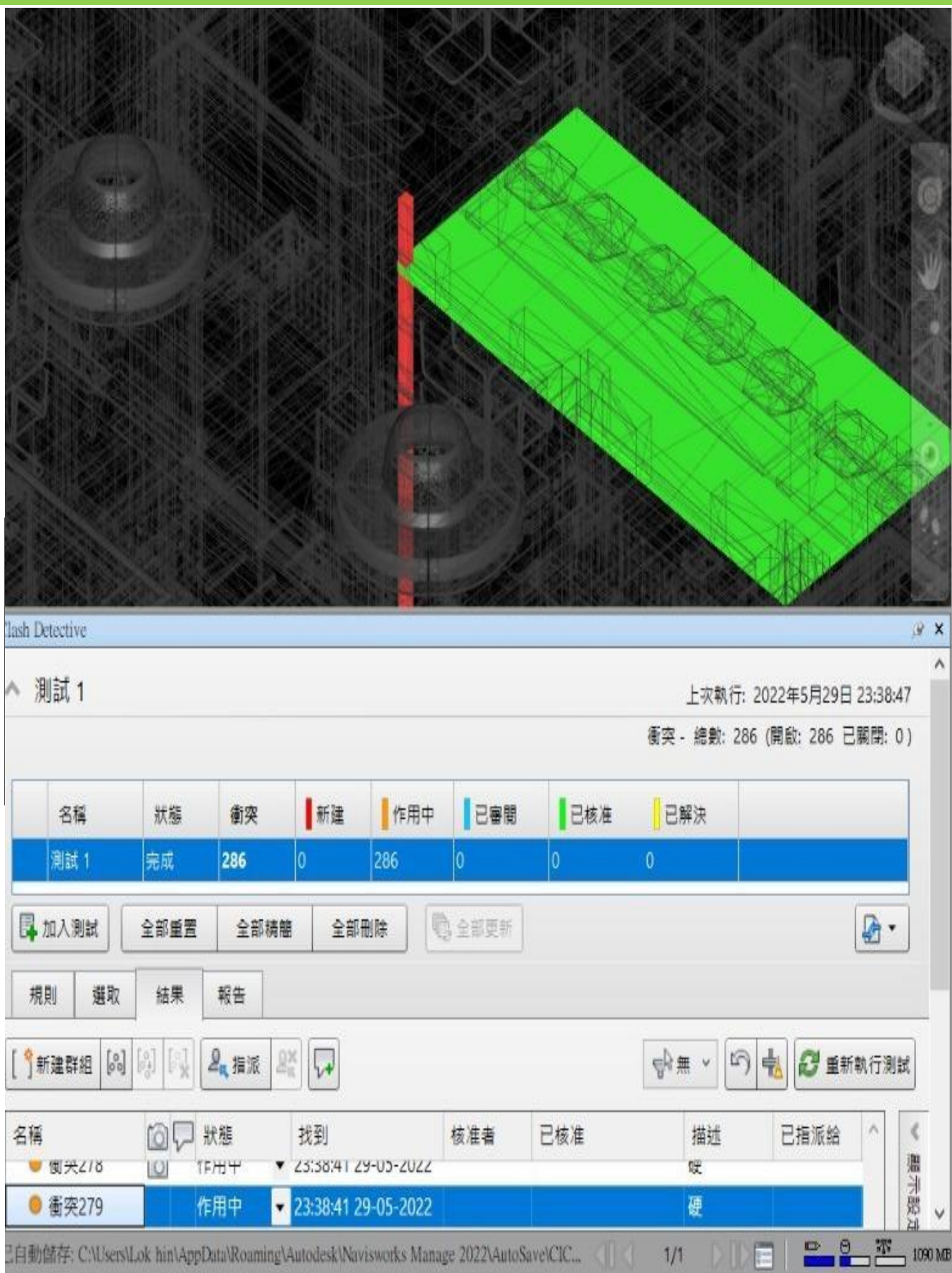
Perspective View: For residential block, the structure consists two structural systems: Crosswall System (External units) and Column & Beam (Corridor). With proper connection of modules, the crosswall could act as shear wall and resist lateral movement (eg. Wind ,etc.). Reinforced concrete modules are selected for its fire resistance and relative durability.



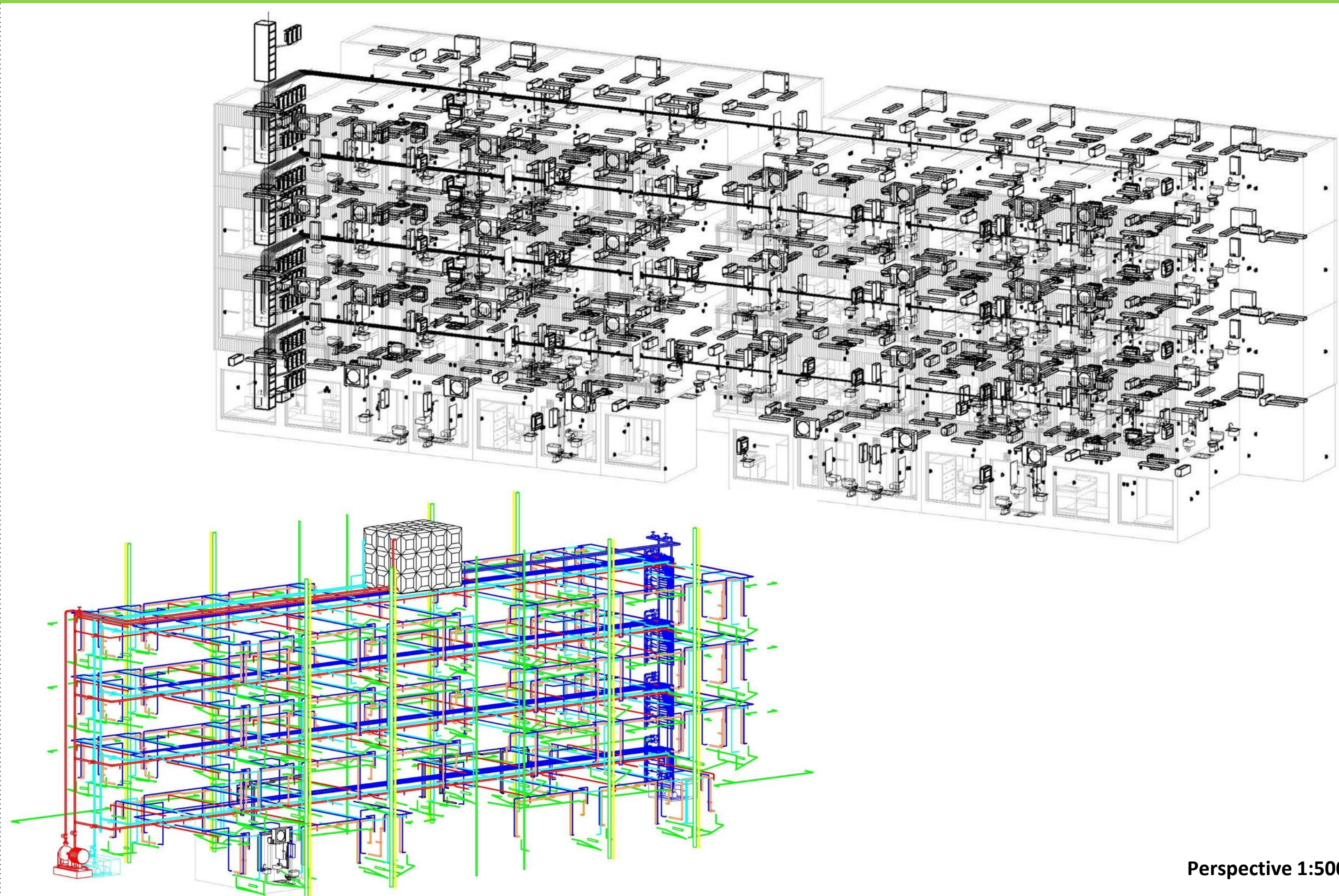
Perspective View: For office, a steel frame structure is considered, where the interior of the building can be more spacious. The relative light weight of steel also provide more opportunities for unorthodox design, such as offsetting and overhanging. The steel modules are connected to a steel grid system, then the beams and columns below. This can prevents the toppling of the overhanging element and increase its rigidity.



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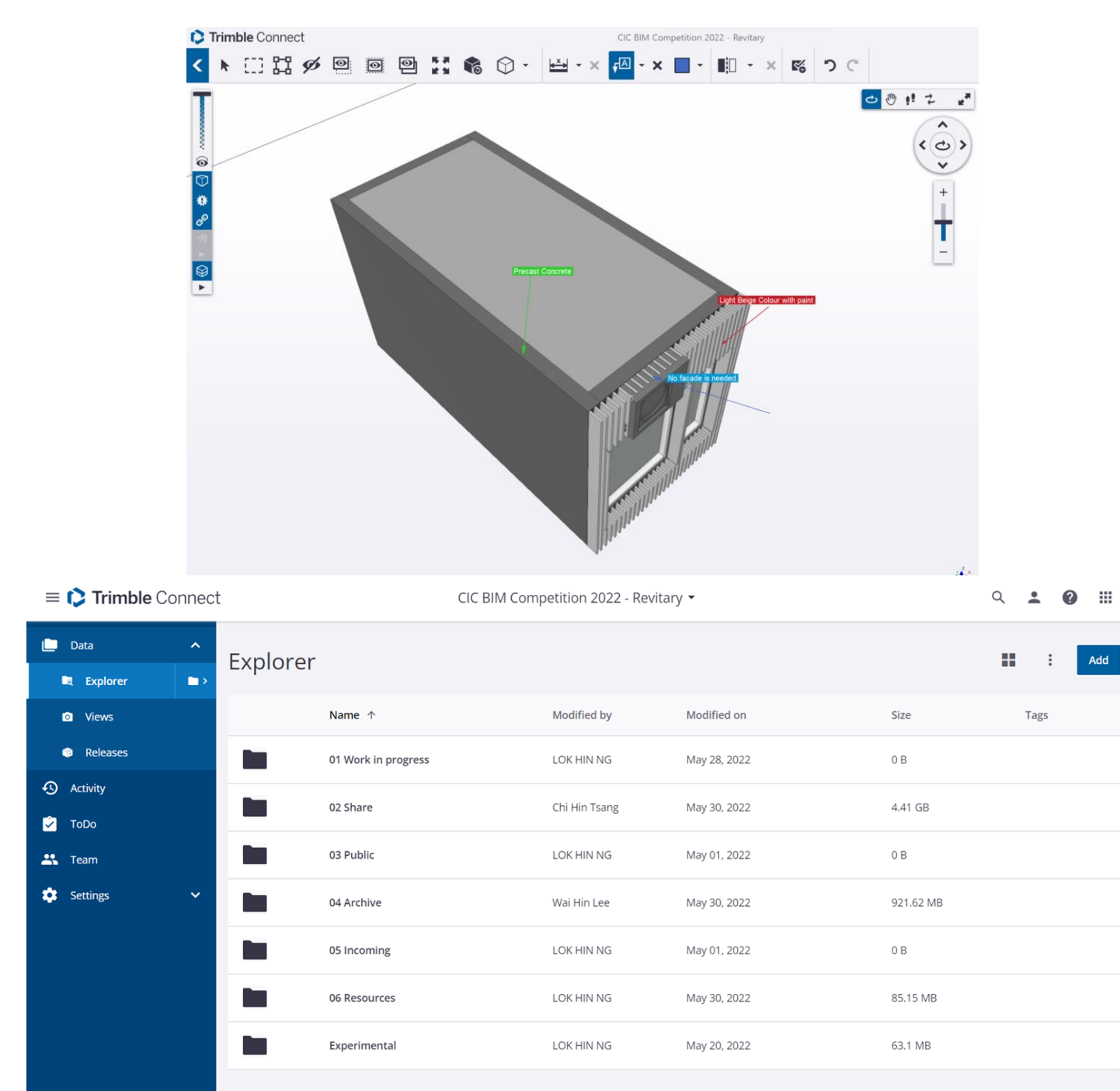


Design Coordination: Structural, Electrical and Mechanical (SEM) carried out coordination with Architecture discipline. Clash Detection can be carried out by Autodesk Navisworks Manage to review clashed objects in the BIM model.

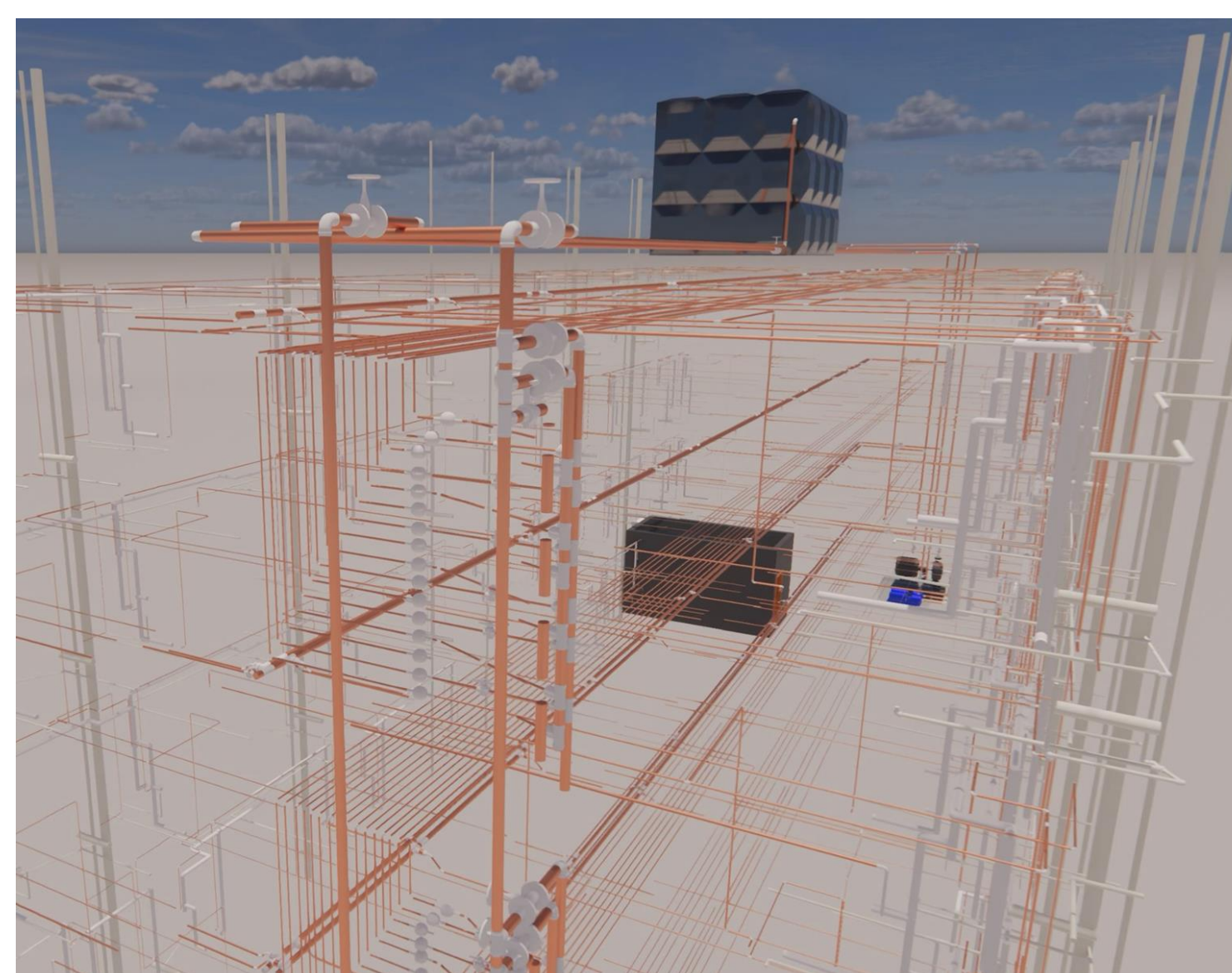


Perspective 1:500

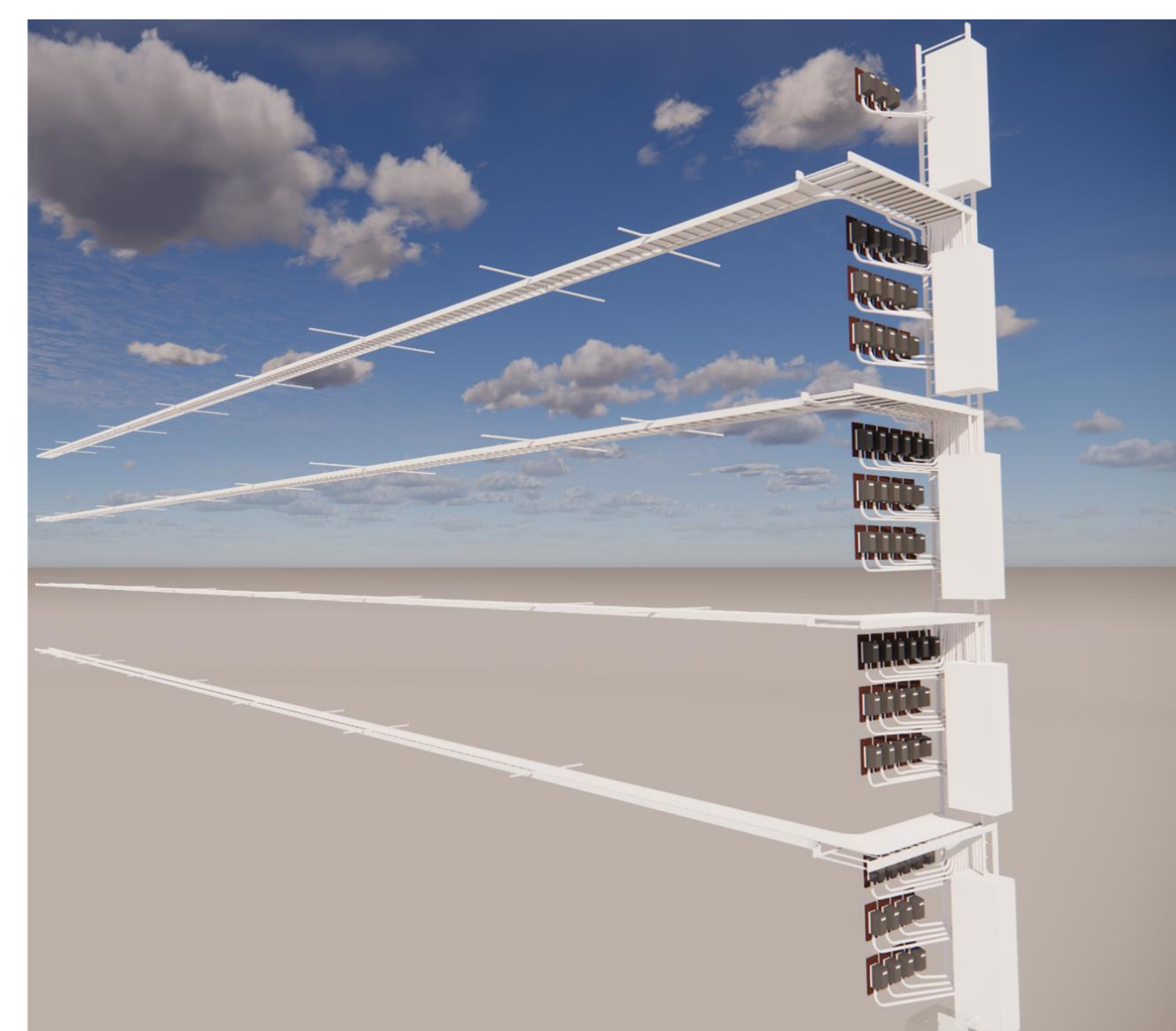
Perspective View: Whole Building Design including Fire Service system, Electrical system, Fresh water and Flushing water system.



Project Team Collaboration: Clear communications between teammates are maintained through the use of Trimble Connect as CDE Platform. Instant issues or opinions can be raised by teammates through the “arrow function” and “markup” function at Trimble Connect.

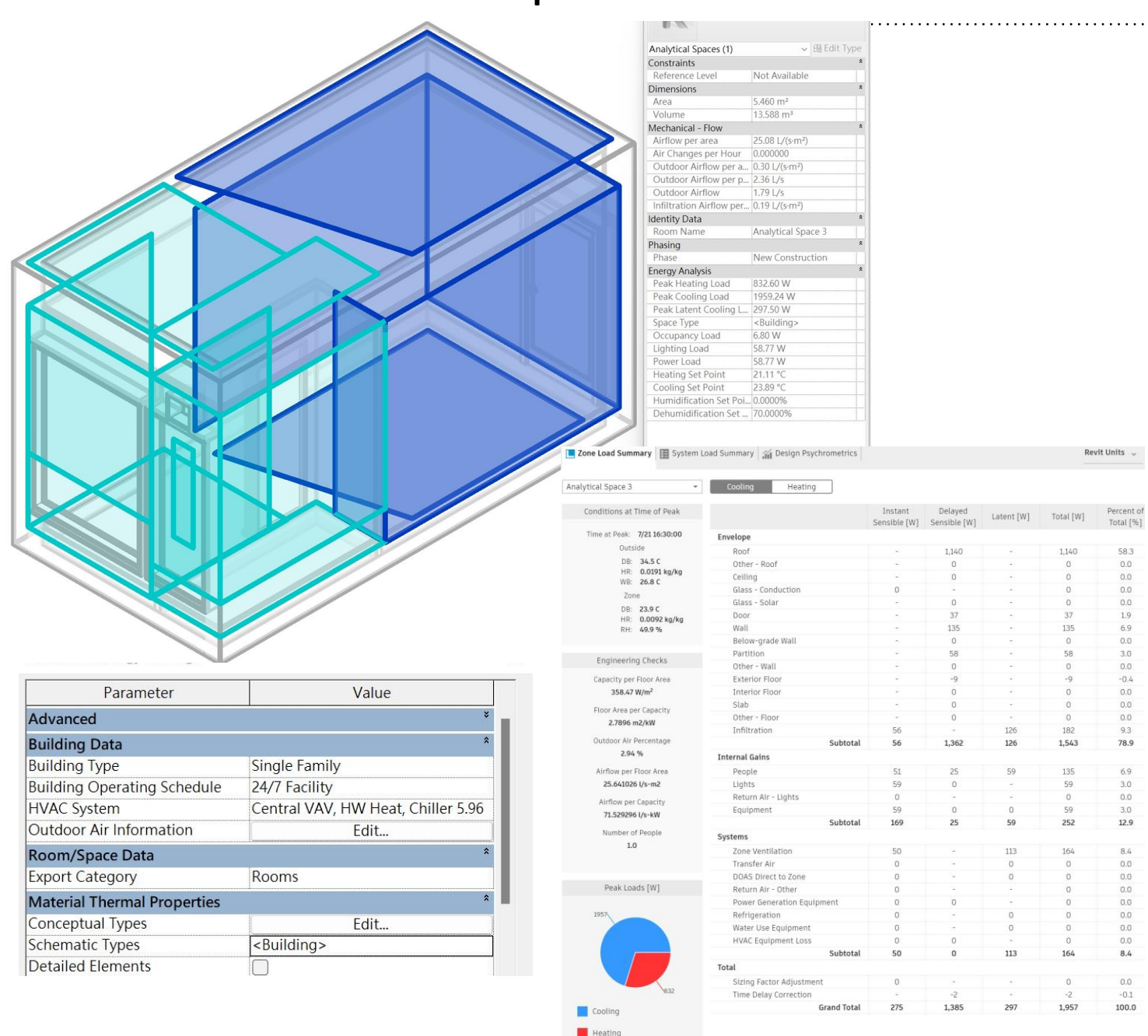


Internal View of the Water Meter Room Pipework



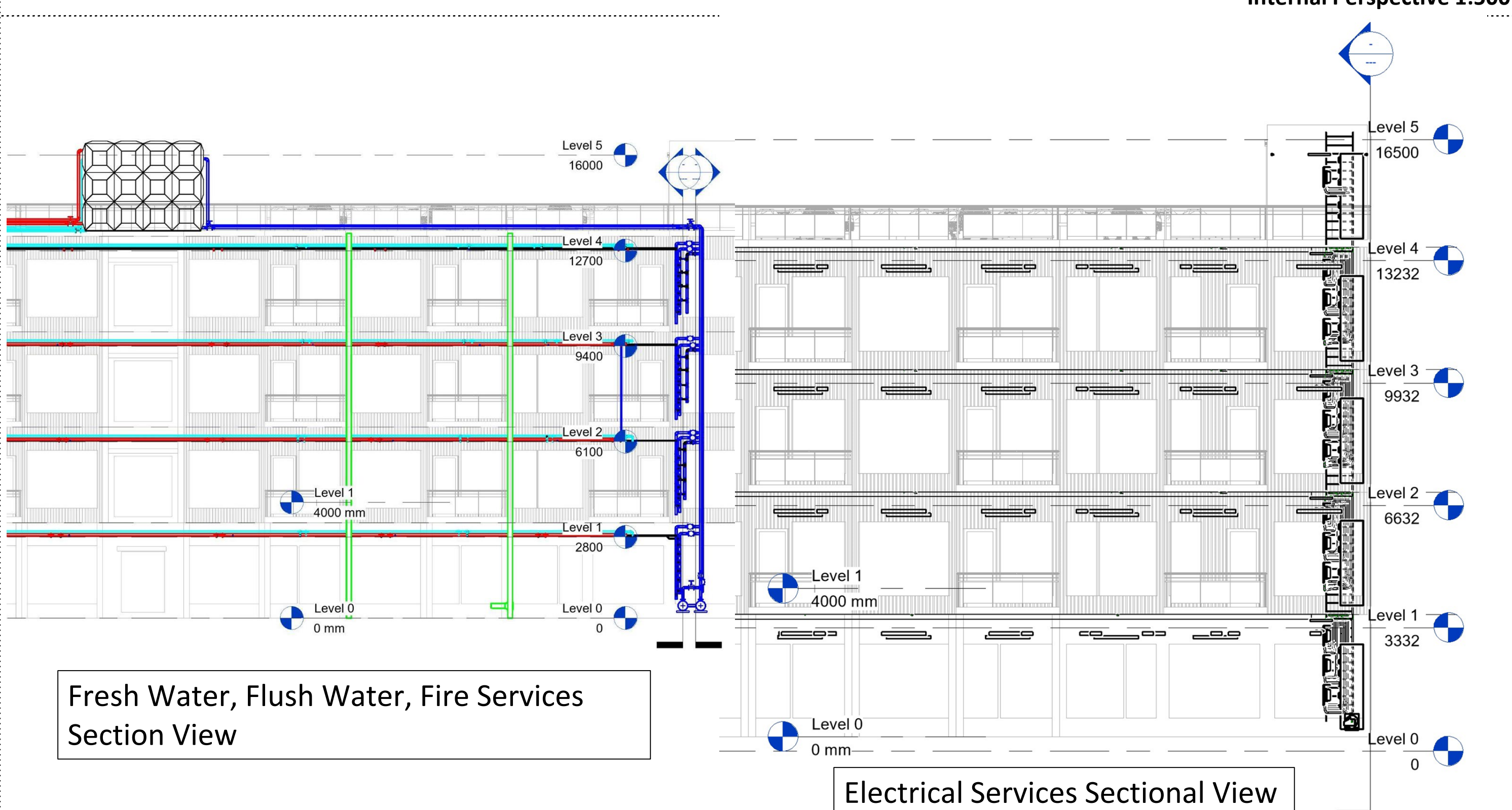
Internal View of Electrical equipment in a block

The building Service system in all areas of the building was developed by inserting the Architectural plan and design the specific areas by their purposes.



Energy Analysis of GF 1 Person Unit

Computational Design: Heating, Cooling and Light load analysis was used to determine the desired cooling and lighting load and Revit generate layout function was used to generate the preliminary layout of ducts and lighting.



Fresh Water, Flush Water, Fire Services
Section View

Electrical Services Sectional View

Sectional Perspective 1:500

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