DIGITAL CONSTRUCTION AND BIM

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Assignment tutor	Dr Seoung Whang		
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Additional information	

BIM MODELLING OF RESIDENCE HOUSE (USING REVIT)

Table of Contents

Introduction 6

Grid and levels 6

Optimization in Design Practices 7

Grids and Levels the Backbone of Revit Modelling 9

Landscape Integration and Terrain Estimation 10

Legitimacy and Elegant Clarity 11

Accommodation and Made Plan 11

Importance of Landscape Design in Revit 12

Appraisal of Land and Domain Nuances 13

Contraptions and Features in Revit for Scene Plan 13

- Scene Stuff Instruments 13
- Checking on Limits 13
- Site Materials Integration 13

Compromise with overall Development Model 13

- Acceptability Considerations 13
- Upscale and Comfort Mix 14

Sewage and Utility Considerations 14

- Foundation Types and Soil Considerations 14

Revit Tools for Foundation Design 16

Structural Considerations and Load Distribution 16

Inserting Doors and Windows 17

Basic Schedule 18

Space Planning (Kitchen, Bathroom, Toilet) 19

Producing External/Internal or Curtain Walls 20

Inserting Stairs, Railings, and Balcony Slabs 21

Conclusion 23

References 24

Introduction

Grids and levels serve as the key elements of structure that provide the building model with its very initial framework. They establish the floor heights, which helps to establish a logical and well-organized structure in the world of virtual reality. The significance of these elements' stems arriving the capacity to guarantee consistency and precision all the way across the design process. Grids help with precise arrangement and laying of different architectural components by providing an identical framework related to reference. In the meanwhile, levels are essential for determining the rise and fall of various floors along with structural parts.

Grid and levels

Grids and levels promote collaborate across interdisciplinary teams by imposing a uniform a system. They provide architects, builders, and other professionals a common language so they are able to interact easily. A unified approach towards planning and construction is facilitated by a common foundation (Acampa *et al.* 2021).

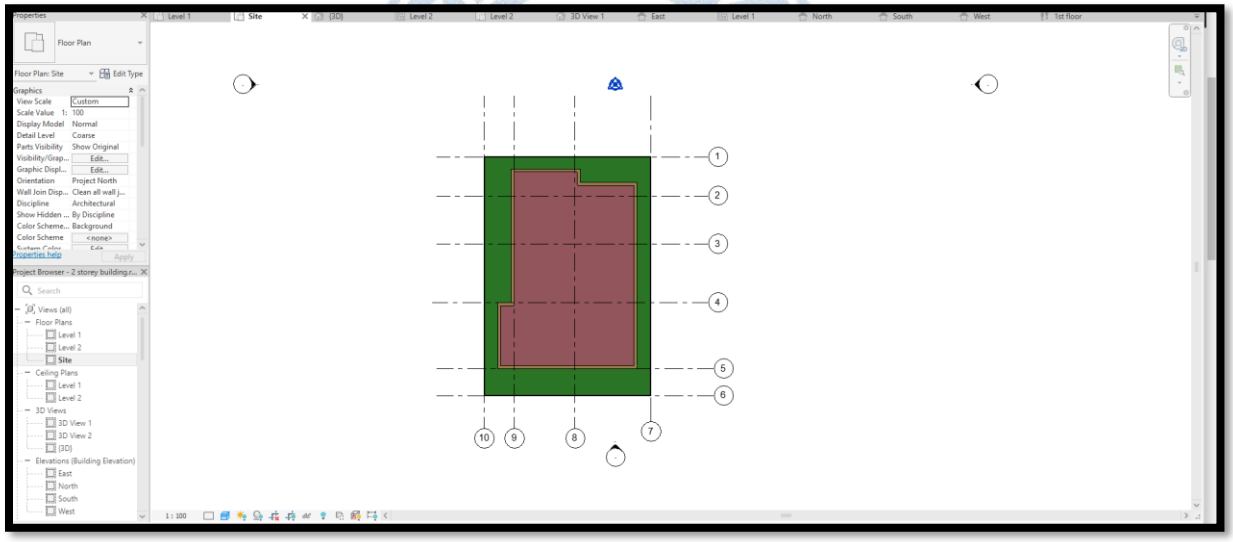

Figure 1: Construction grids and its various levels

(Source: REVIT)

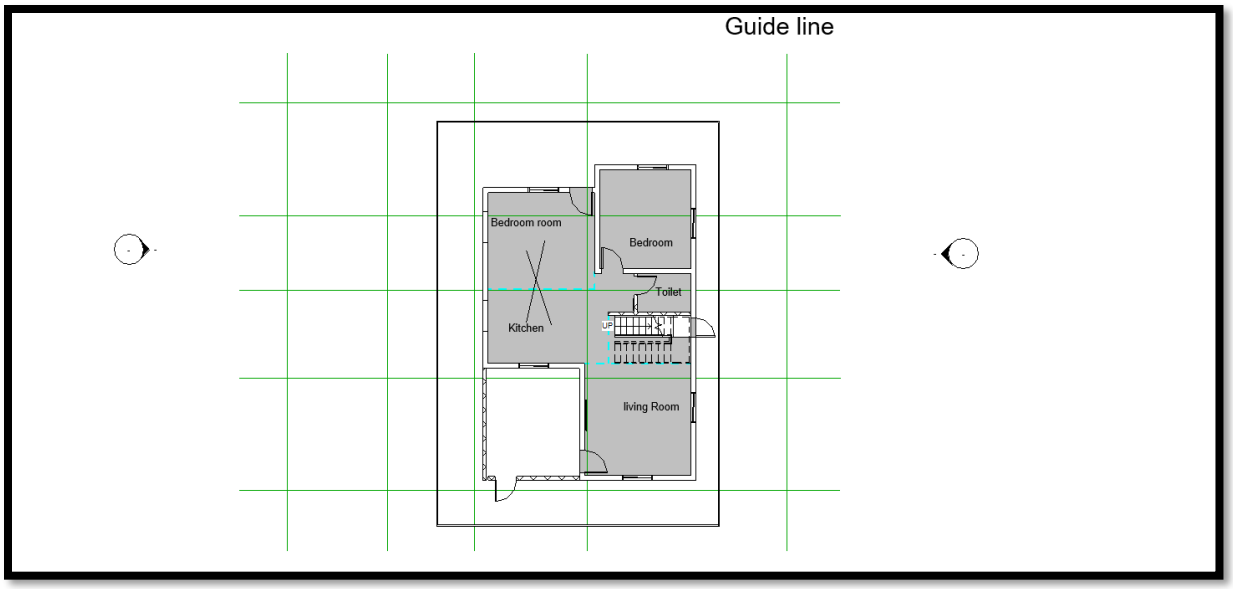

Figure 2: Ground floor plan

(Source: REVIT)

Optimization in Design Practices

The level system and grid allow for precise positioning of parts of the construction. By doing this, designers are able to ensure sure that all the things' lines up properly and prevent errors or misalignments in the model that has been produced. As a result, during the whole building process, the design's integrity is preserved.

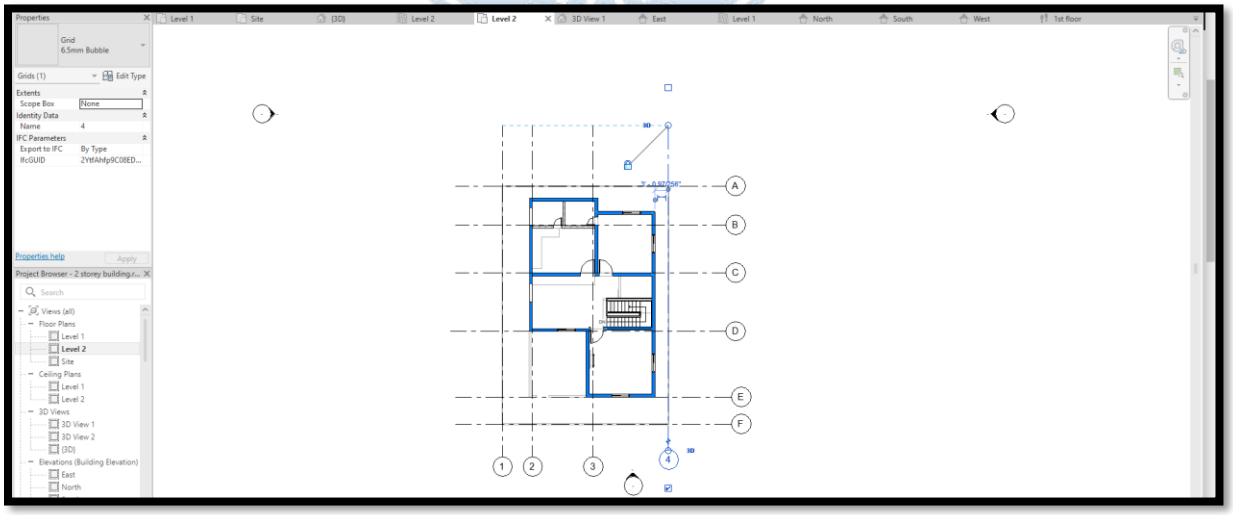

Figure 3: Ground floor plan

(Source: REVIT)

By optimizing design procedures, their employment facilitates precise structural details, effective space planning, and adherence to conceptual standards. Designers and architects use the grid and levelling system as a basis for working to develop a strong and ordered building model.

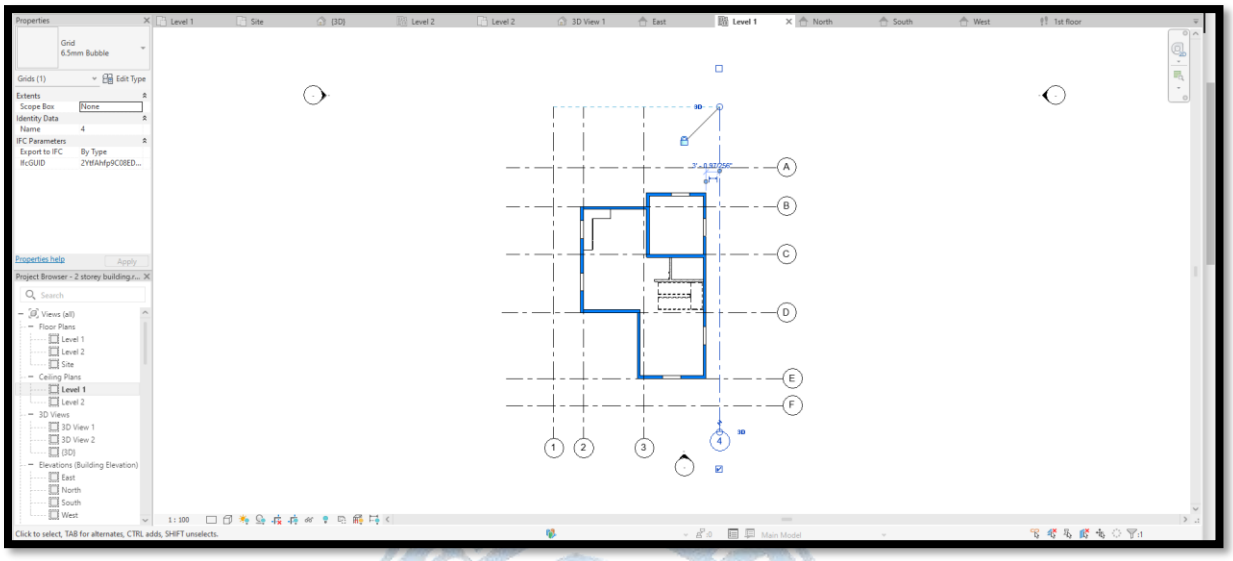

Figure 4: floor plan of level 1 of 2 storey House

(Source: REVIT)

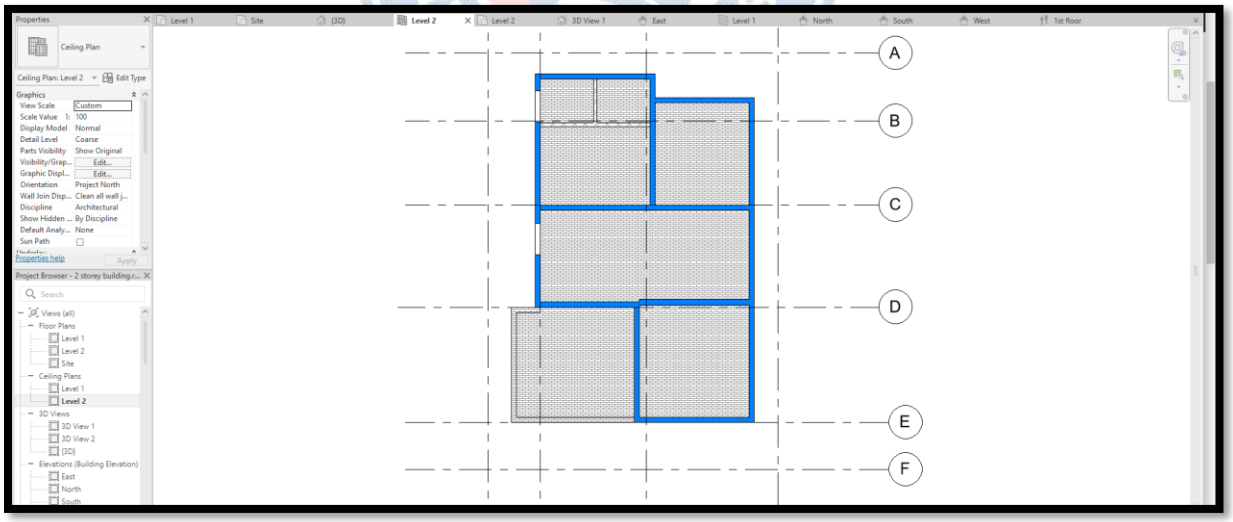

Figure 5: floor plan of level 2 of 2 storey House

(Source: REVIT)

Figure 6: 3D view of entire 2-storey House

(Source: REVIT)

Essentially, levels and grids act as basic components that the whole Revit model is built all around. Their painstaking design as well as utilization play a crucial role in establishing the foundation for an all-encompassing, precise, and useful dimensional in form depiction of the structure.

Grids and Levels the Backbone of Revit Modelling

The core components of Revit that direct every phase of the design process are the construction of floor level and level 1 grids. They are important for the development of a cohesive and clean structure that merges the disciplines of engineering, construction, and MEP (Mechanical, Electrical, and Sewage) systems.

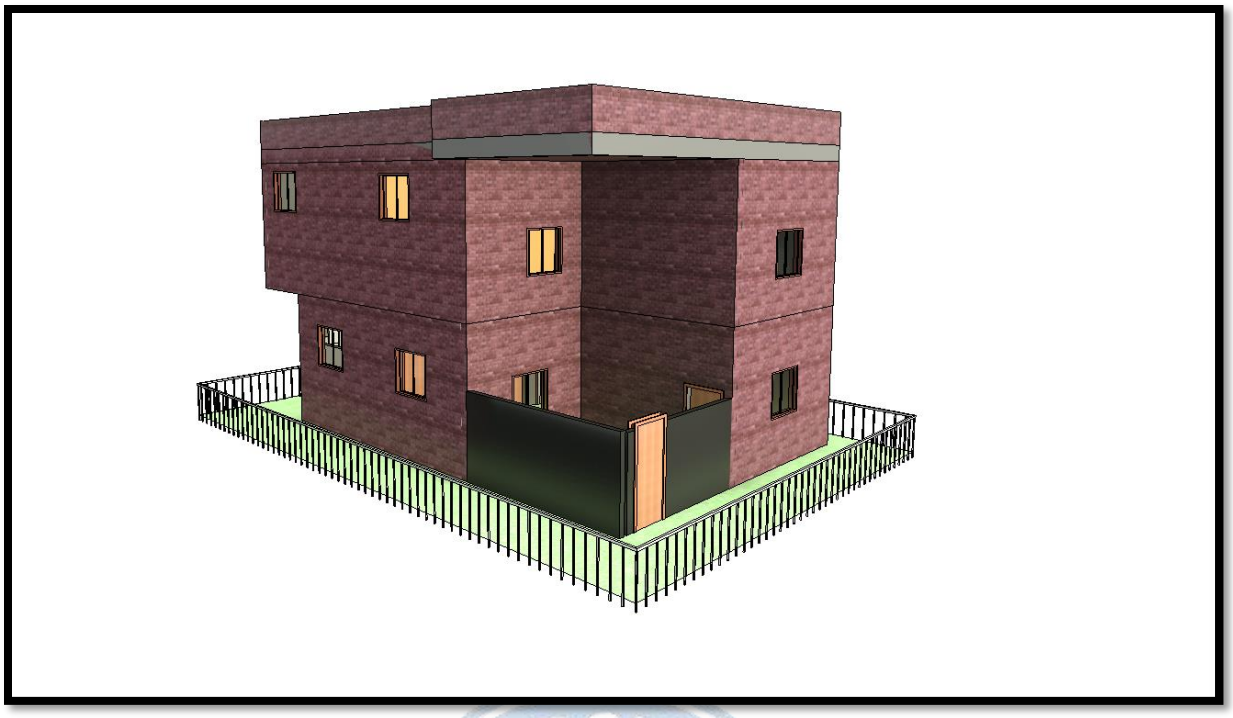

Figure 7: 3D view from front side of 2 storey House

(Source: REVIT)

Building Floor Levels und Grids Building Harmony and Integration in Supervision Coordination. The level 1 grids and construction floor levels serve as a standard point of reference for all the different building professions. They make coordination easier by offering a common framework to enable engineers, architects, and construction workers to collaborate well. Integrating Structural and MEP Systems (Sarman *et al.* 2021).

These principal parts ensure reliable fuse of essential parts and MEP systems inside the construction plan. The specific course of action given by levels and organizations considers exact circumstance of fundamental parts like shafts, areas, and MEP parts, for instance, ventilation work and piping.

Landscape Integration and Terrain Estimation

Moving past the designs inside framework, Revit's scene fixing instruments, including evaluating gadgets and site materials, become conceivably the main element. They engage originators to make reasonable geology, unite trees, shrubs, hardscape features, and different scene points inside the Revit environment.

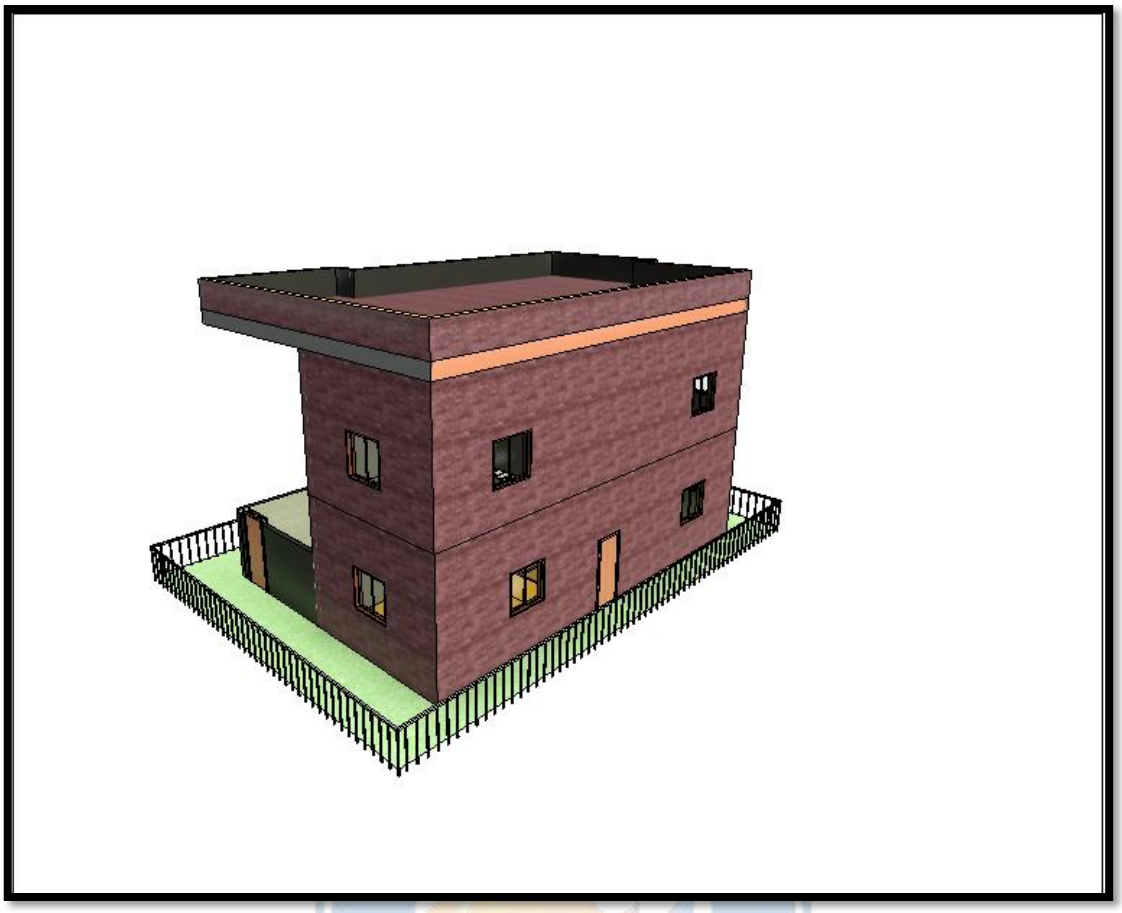

Figure 8: 3D view from back side of 2 storey House

(Source: REVIT)

Legitimacy and Elegant Clarity

The compromise of outside district structures with the general construction model is fundamental. Revit's domain devices help in considering viability factors, sewage systems, accommodation of outside spaces, and ensuring upscale perception. This thorough philosophy watches out for regular concerns while redesigning the general arrangement's visual appeal and value (Malik *et al*. 2022).

Accommodation and Made Plan

The use of these contraptions doesn't just focus in on classy parts yet moreover ponders accommodation and coordination. They think about the development of outside spaces that supplement the construction's arrangement, ensuring a widely inclusive and simple to utilize environment (Sarman *et al.* 2021).

.

By utilizing Revit's domain fixing mechanical assemblies and using the improvement floor level and organizations, planners can reliably arrange the external environment with the entire construction (Sarman *et al.* 2021). This coordination redesigns the visual charm as well as ensures a firm and utilitarian arrangement that lines up with viability, comfort, and trendy discernment norms.

Importance of Landscape Design in Revit

Coordinating scene plan inside a Revit model adds a layer of convenience, feel, and credibility to the environment. This is an improvement on how scene setup is basic and the devices/features inside Revit for achieving this compromise

Figure 9: Isometrical view from front side of 2 storey House

(Source: REVIT)

Overhauling Usability and Style

Scene plan in Revit isn't just about visual appeal its basic for chipping away at the helpfulness and convenience of outside spaces inside the modernized environment. It thinks about the creation of sensible domains, green spaces, and external parts that clients can speak with, overhauling the overall understanding (Ekasanti *et al.* 2021).

Appraisal of Land and Domain Nuances

Revit's scene setup contraptions enable the appraisal and arrangement of various land features, including topography, land shapes, vegetation like trees and brambles, water bodies, and hardscape parts. This evaluation gives a total understanding of the external environment's characteristics (Changsaar *et al.* 2022).

By using Revit's region fixing instruments, auditing limits, and material joining, scene originators can immaculately integrate outside conditions into the general plan model. This coordination contemplates practicality, style, sewage, and usability factors, achieving a comprehensive and obviously captivating mechanized depiction of the scene (Li *et al.* 2020).

Contraptions and Features in Revit for Scene Plan

Scene Stuff Instruments

Revit's domain fixing mechanical assemblies offer capacities to control and shape regions, allowing fashioners to cause reasonable situations. These gadgets consolidate features for modifying rises, making inclines, and making different landforms.

Checking on Limits

Checking on gadgets inside Revit engage the change and control of surfaces, thinking about the creation of inclinations, banks, and other land assessing features. This ensures exact depiction of real-world scenes inside the high-level model.

Site Materials Integration

Revit gives a wide show of materials that can be applied to different scene parts. From grass and soil surfaces to black-top and water surfaces, these materials add genuineness to the scene setup, overhauling its visual depiction.

Compromise with overall Development Model

Acceptability Considerations

The compromise of outside parts inside the general plan model records for practicality factors. Planners can do ecofriendly completing practices, for instance, water gathering, green spaces for standard cooling, and viable water leakage systems (GIRISH, 2022).

Upscale and Comfort Mix

The outside locale's coordination incorporates changing scene parts to the design's style and usability. This consolidates considerations for pathways, seating districts, lighting, and various accommodations that further develop usability while enhancing the structure plan, by and large.

Sewage and Utility Considerations

Revit's scene setup gadgets think about the joining of sewage structures, utility lines, and establishment parts inside the external spaces. This blend ensures a widely inclusive method for managing arrangement, considering both the design and its ecological elements.

Foundation Types and Soil Considerations

A building's foundation acts as its fundamental support structure. Numerous foundation types are employed according to the needs on the structure and the state of the soil (Bektaş and Özköse, 2022).

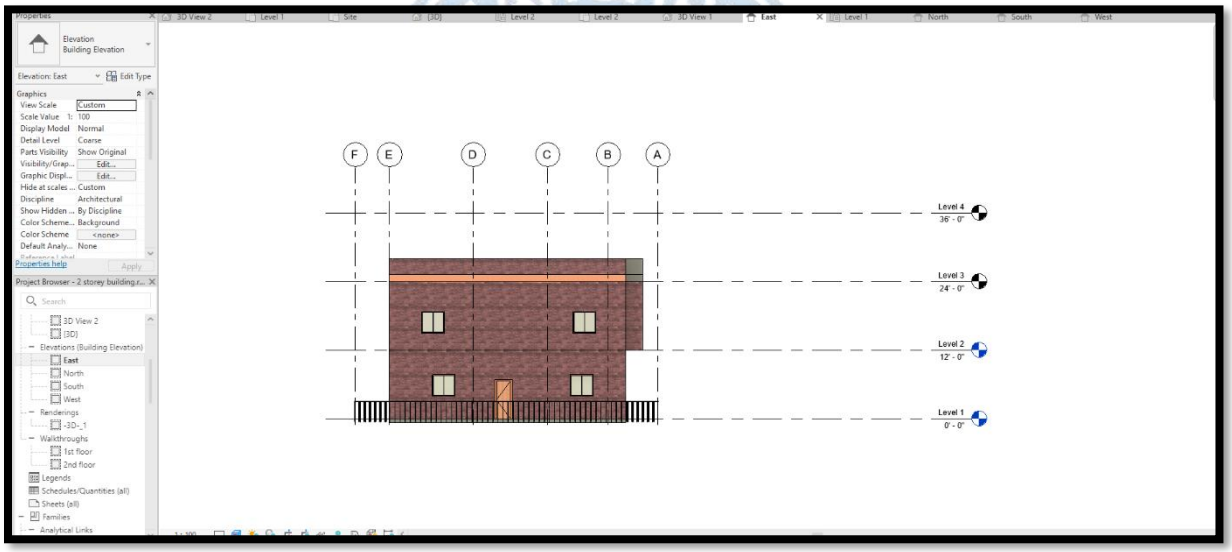

Figure 10: East side elevation view of 2 storey House

(Source: REVIT)

Types of foundations describing several types of foundations, which include extensive foundations (like piles or piers) for deep or unstable soil conditions and superficial foundations (similar to strip, pad, or raft foundations) for stable soils (Ahmed and Megahed, 2021).

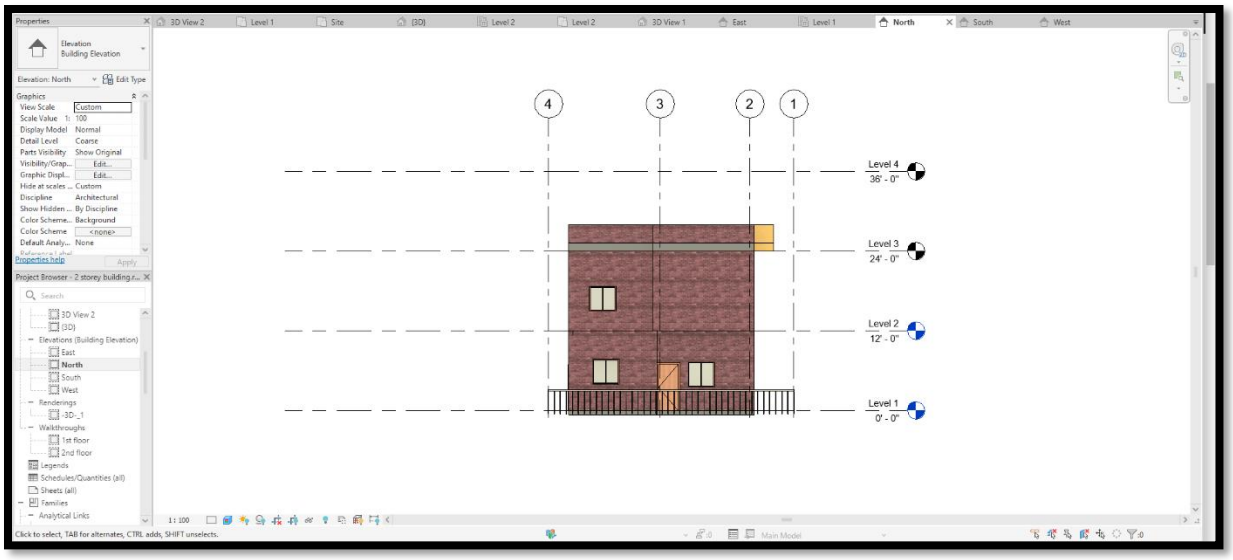

Figure 11: North side elevation view of 2 storey House

(Source: REVIT)

Soil Considerations Talking in regards to how different types of soil (including rock, sand, or clay) affect the sort of foundation which functions best for a particular location, and how inspection of the soil may aid with that decision.

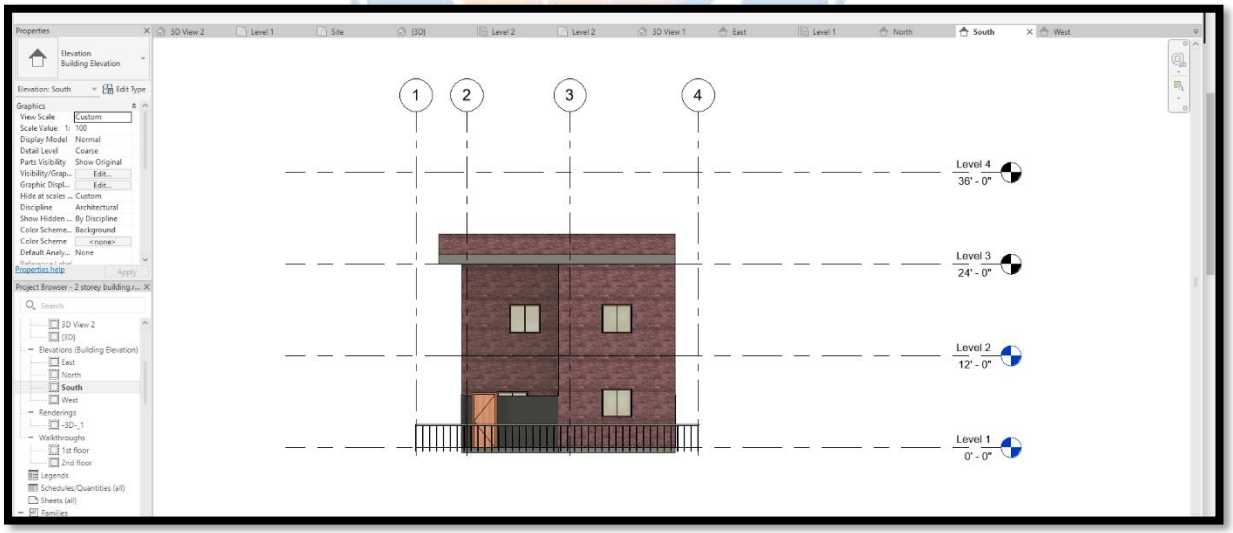

Figure 12: South side elevation view of 2 storey House

(Source: REVIT)

Integrating Various Foundations Types and explaining how various foundation types are blended back to the Revit model to assure precise positioning, measurements, and linkages with the building elements (Balo *et al.* 2021).

This article explores the use of Revit's parametric design tools to adjust and change underpinnings in response to shifting site events or design specifications.

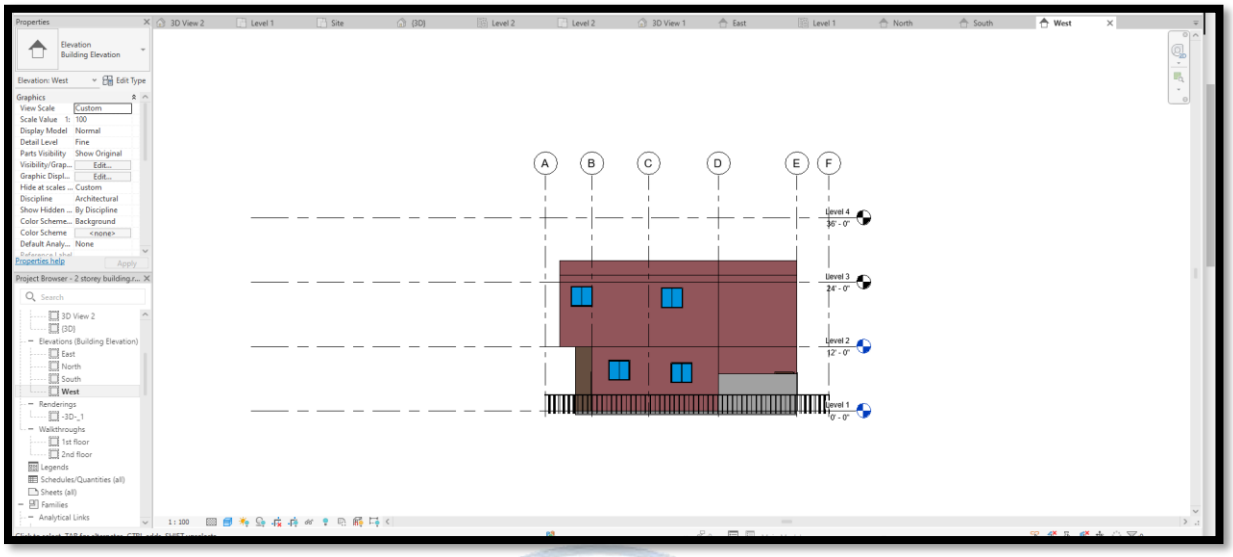

Figure 13: West side elevation view of 2 storey House

(Source: REVIT)

Loadbearing Capacity describing how the capacity of the dirt to carry the weight of the construction and its predicted loads affect the foundation type chosen.

Revit Tools for Foundation Design

In Revit, particular steps and the instruments are needed to describe and include foundations into a building model. Detailing the Footings that mainly covers how to use Revit's tools and functionality to develop numerous footing formats, such as isolated or spread footings.

Structural Considerations and Load Distribution

Foundation setup goes past contribution help; it ensures load movement and essential likeness

Load Transport Highlighting how foundation design ensures even course of the construction weights to prevent essential issues like settlement or disproportionate settling, ensuring security and strength.

Dynamic Weights and Adaptability Considering dynamic weights (like breeze or seismic powers) and how the foundation setup addresses these powers to overhaul the design's adaptability and essential reliability (Sarman *et al.* 2021).

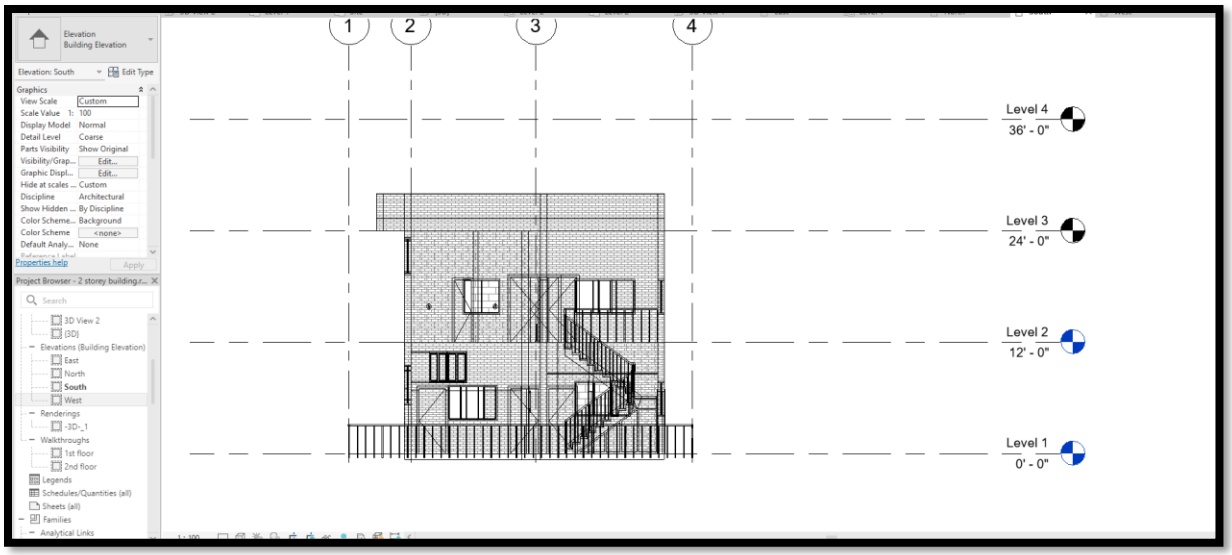

Figure 14: Stairs, railing and balcony view of 2 storey House

(Source: REVIT)

The foundation is without a doubt the bedrock of any development, and in Revit, its point-by-point plan and compromise inside the design model expect a basic part in ensuring essential steadfastness, load dissemination, and flexibility in various soil conditions and under different construction requirements.

Inserting Doors and Windows

Doorways and windows are essential parts in compositional arrangement. In Revit, uniting them incorporates contemplating various styles, precise judgments, and essential circumstance to work on ordinary light, ventilation, and receptiveness. This integrates

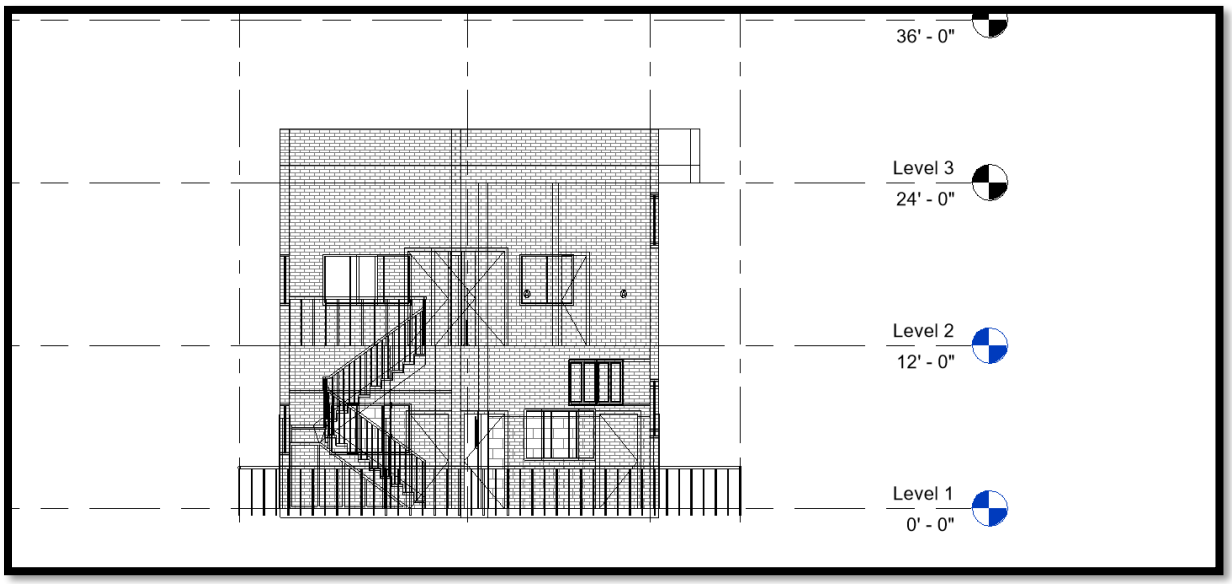

Figure 15: Doors and windows view of 2 storey House

(Source: REVIT)

Basic Schedule

Element	Quantity	Material	Size/Type	Location
Floors	10	Concrete	6 inches	Throughout
Walls	100	Brick	8-inch thickness	Various rooms
Slab	1	Reinforced	8 inches	Ground Floor
Door	15	Wood	Standard 80x36 inches	Room Entries
Window	30	Aluminium	Double-glazed	Rooms
Kitchen	1	Tiles	Ceramic	Kitchen Area
Bathroom	2	Tiles	Porcelain	Bathrooms
Toilet	3	Tiles	Vinyl	Toilets

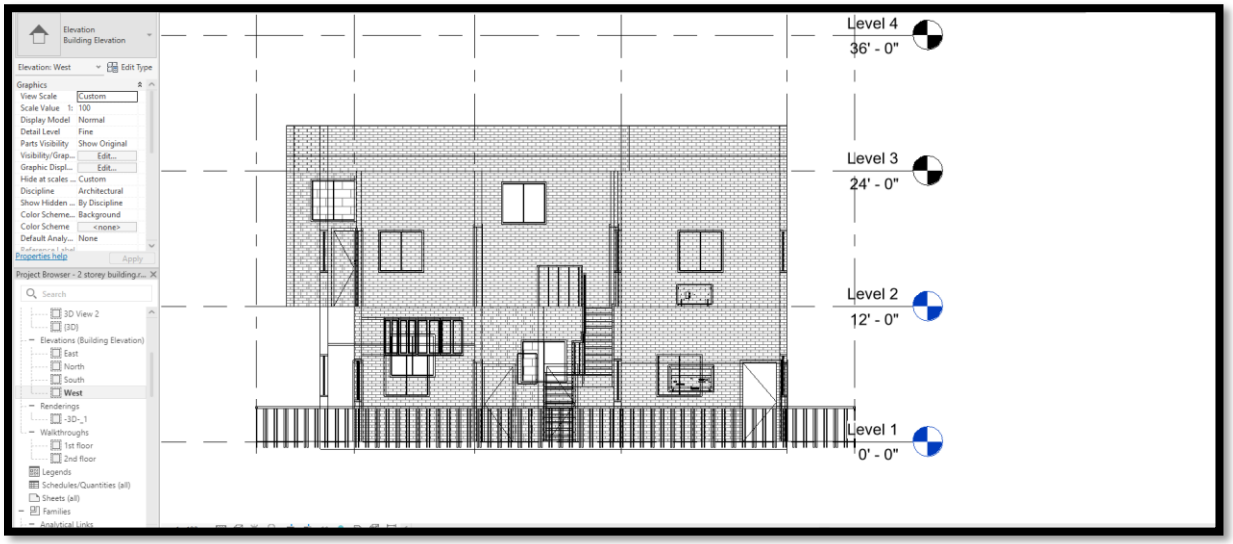

Figure 16: walls and levels view of 2 storey House

(Source: REVIT)

Doorway and Window Families Portraying various families open in Revit, similar to casement, sliding, or turn entrances, and different window types like shade, limits, or picture windows.

Plan Techniques Specifying the methodologies for careful situation inside the model, considering course, commonsense necessities, and elegant harmony (Baldauf *et al*. 2020).

Figure 17: wall and floor interior view of 2 storey House

(Source: REVIT)

Parametric Changes Figuring out how doorways and windows can be adjusted parametrically to fit unequivocal arrangement rules, such as advancing angles, materials, or opening instruments.

Space Planning (Kitchen, Bathroom, Toilet)

Useful space organizing is critical for functional living spaces. In a BIM model, this incorporates

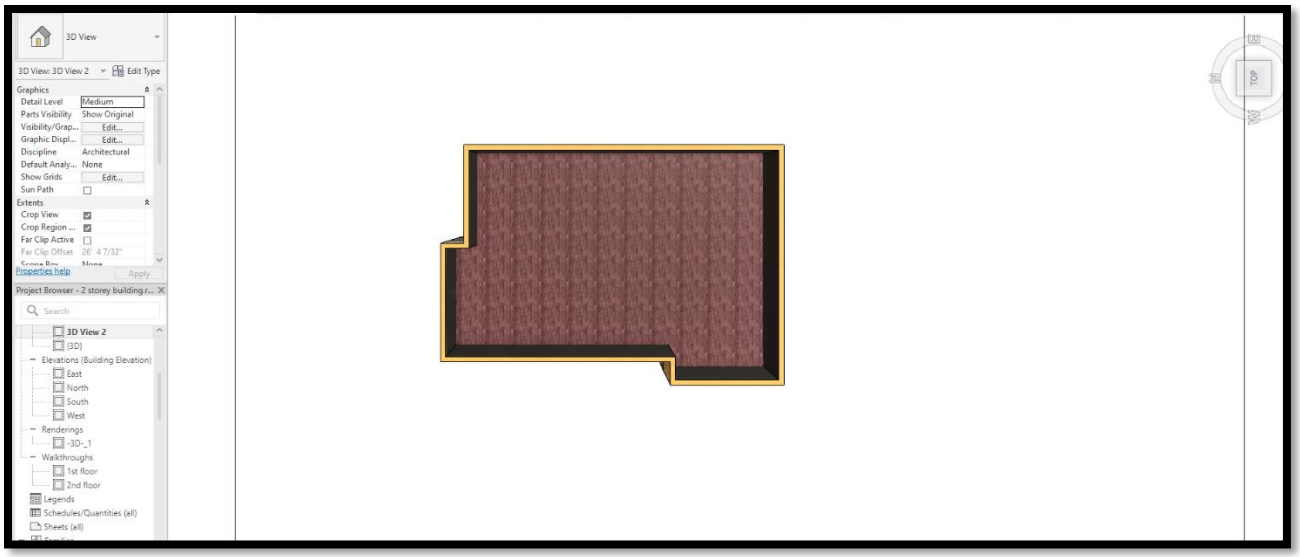

Figure 18: Bird eye view of 2 storey House

(Source: REVIT)

Client Driven Plan Getting a handle on how these spaces are needed to address client issues, considering factors like work process in the kitchen, security in bathrooms, and transparency in lavatories. Consistence and Standards Underlining consistence with building guidelines, prosperity and security rules, and industry standards in the organization and plan of these spaces (Balo *et al.* 2021).

Producing External/Internal or Curtain Walls

Walls are essential in describing a design's development and feel. In Revit, making these walls incorporates.

Material Assurance and Security Determining the most well-known approach to picking materials, levels, and assurance requirements for inward, outside, or shade walls considering plan and execution rules.

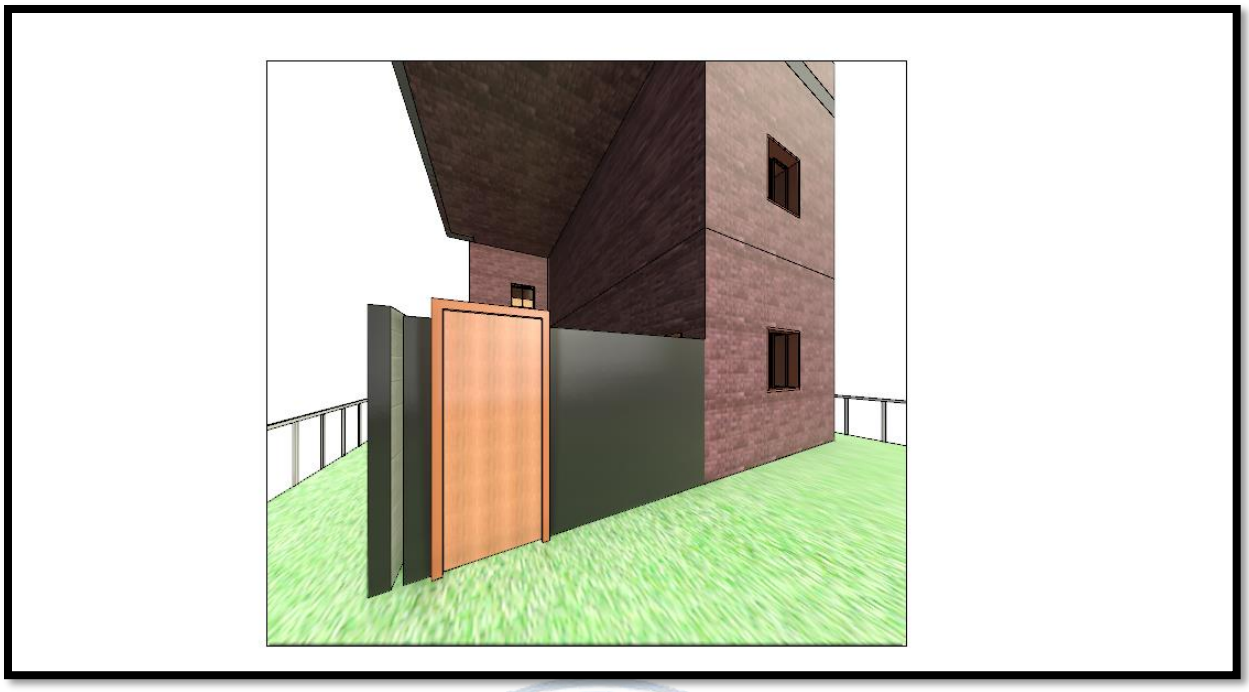

Figure 19: external wall view of 2 storey House

(Source: REVIT)

Rule and Blend Watching out for how rules, utilities, and client demands impact wall plan, and showing their joining inside the model using Autodesk contraptions.

Arrangement Impact Discussing what different wall types and their features mean for the general construction plan, feel, and convenience.

Inserting Stairs, Railings, and Balcony Slabs

These parts add both comfort and visual enticement for a plan. In Revit, their association unites

Security Contemplations Sorting out the joining of steps, different railing types, and display regions while guaranteeing consistence with success codes and norms.

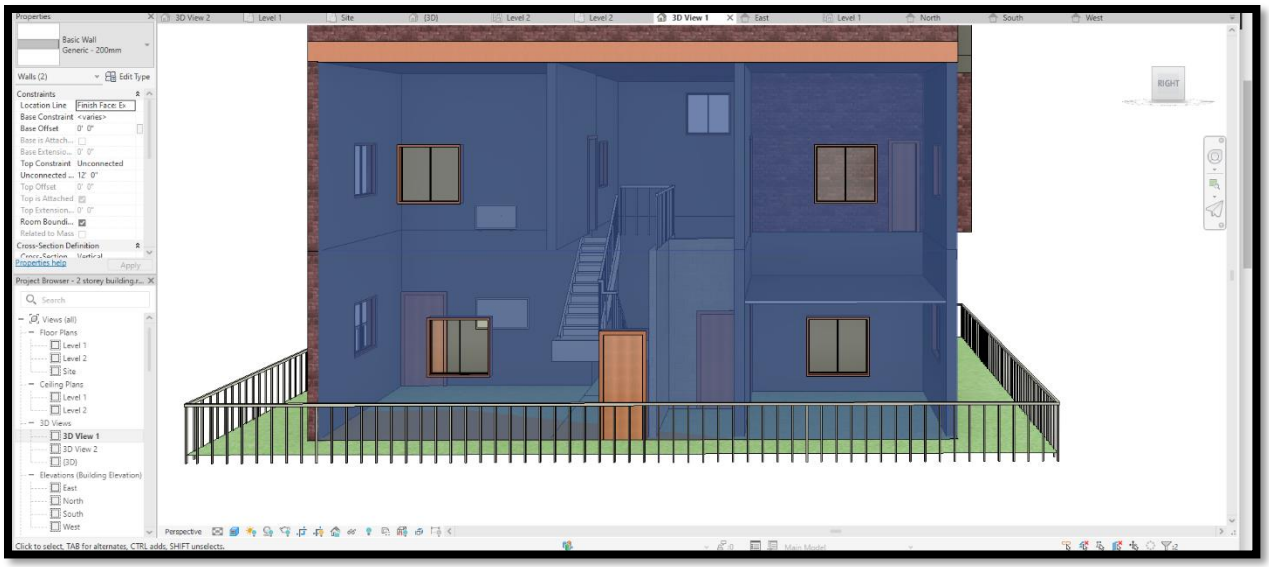

Figure 20: 1st Sectional view of 2 storey House

(Source: REVIT)

Materials and aesthetics: The dissection the selection of substances and designs for various components in accordance via the overall company's mission and continuous requirements.

Establishing a Plan revealing these components are used inside the building information modelling (BIM) structure in order to emphasize the build's most a priority and secure aspects (Mostafa and Aljarbou, 2022).

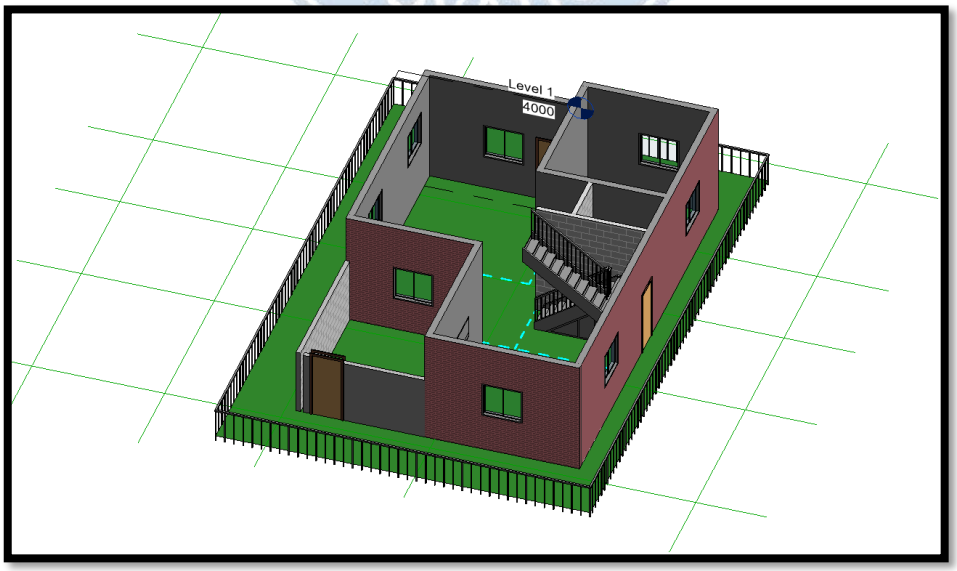

Figure 21: 2nd Sectional in 3D view of 2 storey House

(Source: REVIT)

This comprehensive breakdown intends to ensure a scrupulous process while creating a building information modelling (BIM) template in Revit, according to regulations and guidelines, and optimal comfort while taking what's required of consumer and plan feel into consideration.

Conclusion

The foundation of hidden authenticity remains the establishment, implying that method and execution both refer to reference thinking. Comprehending the various forms of assembled offices and their adaptability to shifting conditions of the terrain is essential to ensuring satisfactory assistance and efficient pressure transfer. The cause for integrating the establishment's strategy plan, agreeing with the action's store bearing segments, and taking care of dynamic boosts to ensure adaptability is focal clarity. A careful consideration of the soil funds, load path, and significant resemblance during the building plan maintains the plan's integrity as well as fortifies its future. The strange harmony achieved between Revit's devices, core ideas, and design plans of 2 storey house.

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