Modelling and Layout of The Independent House by Using Revit Software

M.Vamshi krishna[1], Aimeera Thirumal[2], Alampally Praveen Kumar[3], Angothu Sathish[4]

[1]*Asst. Professor, Dept. of CIVIL, Guru Nanak institutions technical campus, Ranga Reddy,Telangana, India.*

[2,3,4,5]*UG Student, Dept. of CIVIL, Guru Nanak institutions technical campus, Ranga Reddy, Telangana, India.*

Abstract- **Modeling and Layout of an Independent House in Revit This study presents the process of designing an independent house using Autodesk Revit, emphasizing efficient architectural modeling, layout planning, and BIM integration. The model incorporates key elements such as space planning, structural components, and material specifications to ensure a functional and visually appealing design. The workflow involves defining the building footprint, creating floor plans, and integrating structural frameworks while maintaining compliance with construction standards. Revit's parametric tools are utilized to enhance the flexibility of design iterations, allowing for modifications in dimensions and materials. The final model provides detailed documentation, including elevations, sections, and schedules, enabling a seamless transition from design to construction. This approach ensures a comprehensive and precise representation of an independent house, contributing to effective project execution and visualization.**

Keywords: **Autocad, Revit**

I. INTRODUCTION

Autodesk Revit is a software which help the create the modeling and layout of the tree dimensional building information modeling software for architects, landscape architects, structural engineering ,layout engineers, designers and contractors developed by Autodesk. It allows users to design a building and structure and shape of the 3d model by defaults furniture setup and its components in 3D, annotate the model with 2D drafting elements, and access building information from the building model's database. Revit is 4D BIM capable with tools to plan and track various stages in the building's lifecycle, from concept to construction and later maintenance and/or demolition Revit can be used as a very powerful collaboration tool between different disciplines in the building design sphere. The different disciplines that use Revit approach the program from unique perspectives. Each of these perspectives is focused on completing that discipline's task.

II. LITERATURE REVIEW

E. Rakesh Reddy. S. Kailash Kumar
In this project we are detailed explanation how do we design and modelling of G+3 commercial building by Autodesk revit architecture, which renders complete vision of construction. In general, for building design and model can be employed by the architecture of Autodesk Revit. In addition, it can give you an exact vision via design, construction and documentation
With the BIM new technology it is easy to model the building and we can connect to revit architecture, Revit MEP, Revit structure, Built for Building Information Modelling (BIM).

Dr. V. Ramesh Babu, VishnuVardhan, K. Peeraiah.
In this the building can be designed by using Autodesk Revit Software. The software allows users to design a building and its components in 3D annotate the model with 2D drafting elements and access building information from thebuilding model's database.

Shivadatta Yadav1, Prof. Gajanan Kanade 2
In this we study application of Revit as BIM for Integrated Project Delivery (IPD) for Building Construction Project. Also focus on current BIM trends, applications, benefits, possible risks and future challenges of BIM for the Construction industry
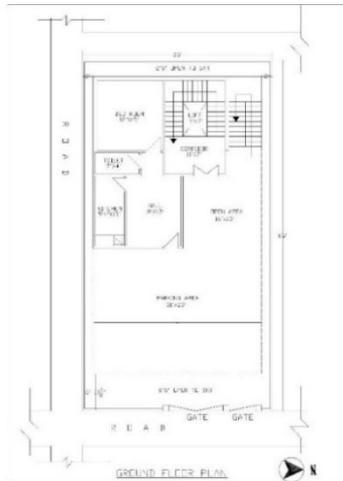
III. OBJECTIVES

The Modeling and Layout of a Independent house in Revit software are multifaceted, aiming to leverage
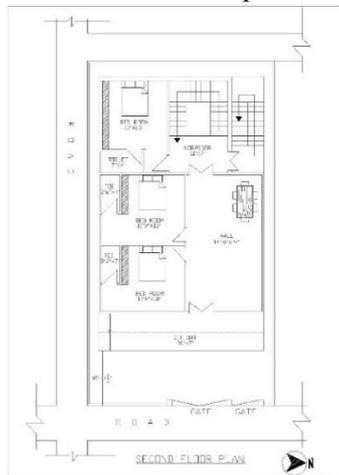
the full capabilities of BIM for a comprehensive design process. Firstly, a fundamental objective is to create an accurate and detailed 3D digital representation of the kitchen space, encompassing all architectural elements, casework, appliances, and finishes with precise dimensions and realistic proportions.

This detailed model serves as a foundation for achieving the second key objective: to optimize the Independent house layout for functionality and ergonomic efficiency, ensuring a seamless workflow and comfortable user experience within the space.

Thirdly, the process aims to facilitate superior visualization and communication of the design intent through high-quality 3D renders, walkthroughs, and interactive presentations, thereby enhancing client understanding and approval.

IV. METHODOLOGY

Auto Cad Plan: In that floors we have bed rooms and kitchens and living rooms and walls , Windows and Doors and Ventilation and common and attached wash rooms. We are giving Ramp and Stairs

Ground floor plan

First Floor plan

Second floor plan

Third floor plan

EXECUTION OF PROJECT:

Create a project:
In the drawing area, under Projects, click New.
In the New Project dialog, under Create New, verify that Project is selected. Under Template file, verify the second option is selected, and click Browse. In the left pane of the Choose Template dialog, click Training Files, and open \Imperial\Templates

[Metric\Templates]. Select default.rte [DefaultMetric.rte], and click Open. In the New Project dialog, click OK

Creating Walls
To create the wall in revit software- go to revit software and double over it. Then we enter into the file menu. In file menu select project browser.

1 In the Project Browser, under Floor Plans, double-click 00 Foundation to open that view in the drawing area.
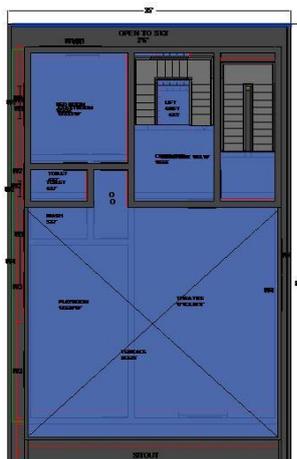
2 On the Design Bar, click Wall.

3 In the Type Selector, select Basic Wall : Retaining - 12" Concrete [Basic Wall : Retaining - 300mm Concrete].

4 On the Options Bar: Click (Draw). For Height, select 02 Entry Level. For Loc Line, verify that Wall Centerline is selected. Verify that Chain is selected
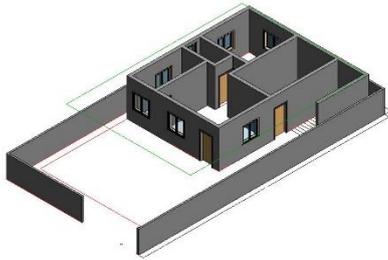
ROOF

The predominant roof type in the City is the pitched roof, and it should generally he used. Flat roofs may be considered in certain hillside locations, where this is a more common building form. The streetscape analysis should inform as to the type of roof appropriate to the site.

Adding FloorsIn this exercise, you create floors in the building model. To create floors in Revit Architecture, you must sketch them first in a sketch editor. You use 2 different sketching options, Pick and Draw, to sketch the floors.
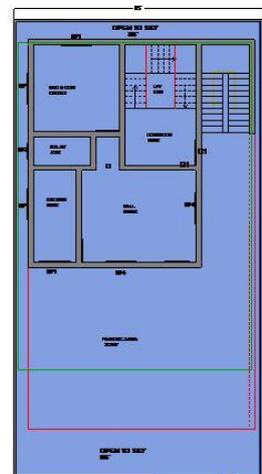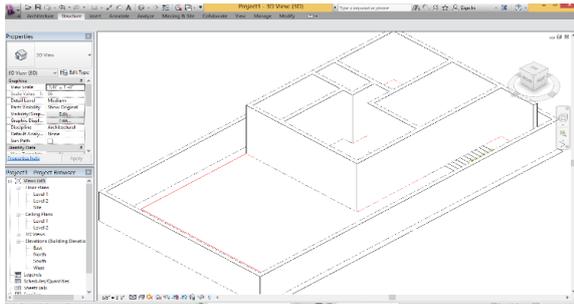

Ground floor

First floor
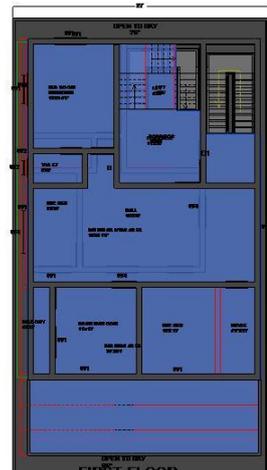
Second Floor

Third Floor

Adding Interior Walls

1 Open the 01 Lower Level floor plan.

2 On the Design Bar, click Wall.

3 In the Type Selector, select Basic Wall : Generic - 6" [Basic Wall : Generic - 200mm].

4 On the Options Bar:

■ Click (Draw).

■ For Height, select 02 Entry Level.

■ For Loc Line, select Wall Center

■ Using the following illustration as a guide, place additional walls to create rooms.

c) Exterior Wall Cladding

• Two or three types of cladding materials should be used in order to avoid large expanses of uniform material.

• Consideration should be given to incorporating a secondary material into vertical design features.
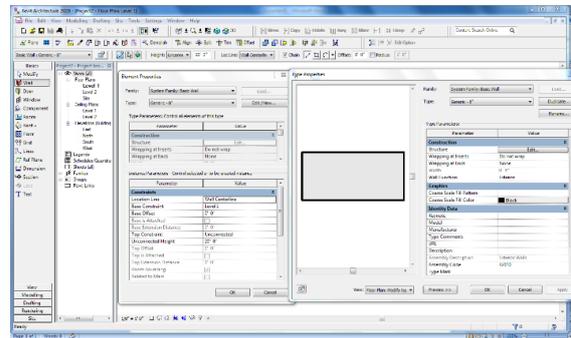

Door:

In this exercise, you load doors from the Training Files folder into the project, and then add interior and exterior doors to the model.
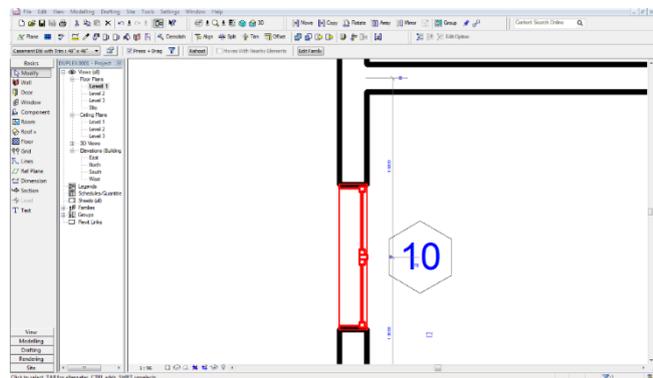

1 On the Basics tab of the Design Bar, click Door. There are a limited number of door types in the project because there were few in the default template. You can load additional door types from the Training Files folder.

2 Load doors from the Training Files folder:

■ On the Options Bar, click Load.

■ In the left pane of the Load Family dialog,

3 Add exterior doors:

 ■ On the Design Bar, click Door.

■ In the Type Selector, select Double-Glass 2 : 72" x 84" [M_Double-Glass 2 : 1830 x 2134mm]

 ■ Place the door in the north wall 7' [2100mm] from the end of the retaining wall, as shown

Adding Windows:

In this exercise, you work in elevation and plan views to add windows to the model. You use alignment and dimension tools to more precisely position the windows.

1 Add windows in an elevation view:

■ Open the South elevation view, and zoom in to the building.

■ On the Design Bar, click Window.

 ■ On the Options Bar, clear Tag on Placement.

■ On the Options Bar, click Load.

■ In the left pane of the Load Family dialog, click Training Files, and open
\Imperial\Families\Windows [Metric\Families\Windows].

■ Select Casement 3x3 with Trim.rfa [M_Casement 3x3 with Trim.rfa], and click Open.

■ Add 2 windows, approximately as shown. You will position them and align them with the top of the retaining wall later. If either of the windows spans an internal wall, a warning
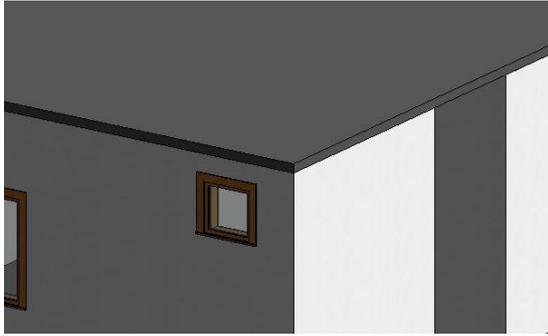
Attaching Walls to the Roof

1 Open the 03 Roof floor plan. 2 Attach the basic walls:

■ While pressing CTRL, select all the interior walls and exterior walls, except the curtain walls.

■ On the Options Bar, click Attach. In this exercise, you attach interior and exterior walls to the roof. When you attach the curtain walls, Revit Architecture warns you of consequences and modifies the placement of mullions.

■ For Attach Wall, verify Top is selected.

■ In the drawing area, select the roof.

■ Click in the drawing area, or click Modify on the Design Bar to end the command.

3 Attach the curtain walls: Open the North elevation view.

■ Move the cursor over the curtain wall, and press TAB until the status bar indicates that the curtain wall is selected, select the outside edge of the curtain wall, and then click Attach.

■ Select the roof. In the error dialog about curtain wall mullions, click Delete Elements.

■ Open the East elevation view, and attach the east curtain wall to the roof. 4 Open the To Building 3D view.

5 On the View Control Bar, click Shadows Off ➤ Shadows On. All walls extend up to the roof. Note the spacing of the top row of mullions/panels; because the spacing parameter cannot be satisfied, mullions are created where the walls and roof attach.

6 Save the project file.

Adding Stairs and Railings

In this exercise, you complete the interior of the model by adding a staircase on the lower level, and then adding and modifying railings on the lower level and the entry level.
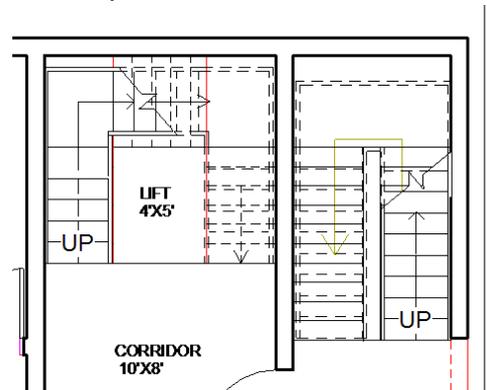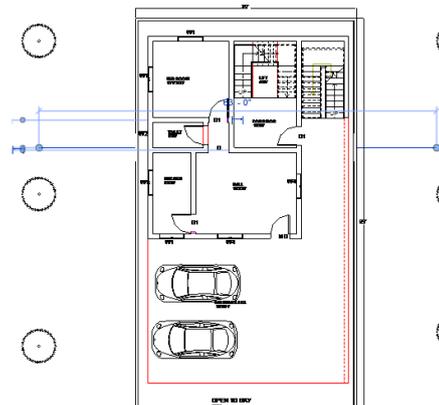

1 Open the 01 Lower Level floor plan.

Add stairs: Zoom in to the east side of the model.Click the Modelling tab of the Design Bar, and click Stairs. Click near the double doors to start the stair run.

3 Edit the floor profile:

Open the 02 Entry Level floor plan.

■ Zoom in to the east side of the model.

■ Select the floor, and on the Options Bar, click Edit. On the Design Bar, click Lines.

■ On the Options Bar, verify that Chain is selected.

5 Modify the railing type: Open the To Building 3D view.

Add door and window tags:

■ Open the 02 Entry Level floor plan. Click the Drafting tab of the Design Bar, and click Tag All Not Tagged. In the Tag All Not Tagged dialog, press CTRL, and under Category, select Window Tags. Click OK.

LIVING ROOMS:

This is the area is for general use. Hence the living & drawing room should be planned near the entrance south east aspects. During colder day the sun is towards the south & will receive sunshine which is a welcoming feature. During summer sunshine ti the northern side & entry of sunrays from southern or south – east aspects do not arise.
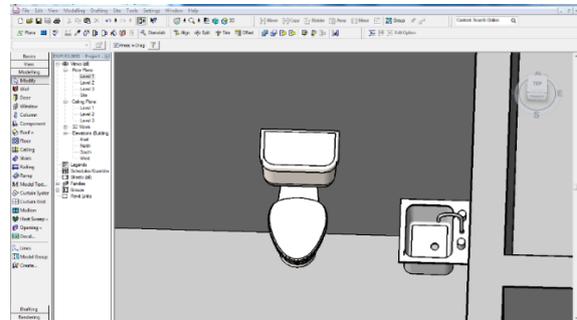

KITCHEN:

Eastern aspects to admit morning sun to refresh & purity the air.

BED ROOM:

Bed may also be provided with attached toilets, there size depends upon the number of beds, they should be located so as to give privacy & should accommodate beds, chair, cupboard, etc., and they should have north or – west south – west aspect.

BATH & W.C:

Bath and w.c are usually combined in one room & attached to the bed room and should be well finished. This should be filled with bath tub, shower, wash-hand basin, w.c, shelves, towels, racks brackets, etc., all of white glazed tiles. Floor should be mosaic or white glazed files. Instead of providing all bed room with attached bath and W.C separated baths & latrines may also be provided
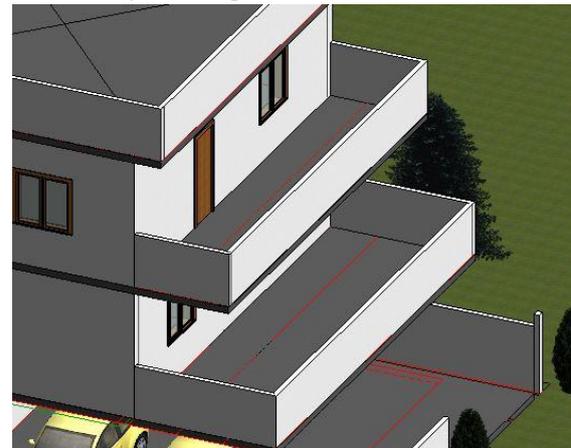
VERANDAH: There should verandah in the front as well as in the rear. The front verandah serves setting place for male members & weighting place for visitors. The back verandah serve a ladies apartment for there sitting, working controlling, kitchen works

etc., verandah project the room against direct sun, rain & weather effect. They used as sleeping place during the summer and rainy season & are used to keep various things verandah also give appearance to the building. The area of a building may vary from 10% to 20% of the building.

20ORIENTATION After having selected the site, the next step is proper orientation of building. Orientation means proper placement of rooms in relation to sun, wind, rain, topography and out look and at the same time providing a convenient access both to the street and back yard.

The factors that effect orientation most are as follows.

Revit Plan

SOLAR HEAT:

Solar heat means sun's heat, the building should receive maximum solar radiation in winter and minimum in summer. For evaluation of solar radiation, it is essential to know the duration of sunshine and hourly solar intensity on exposed surfaces.

SITE CONDITIONS:

Location of site in rural areas, suburban areas or urban areas also effects orientation, sometimes to achieve maximum benefits, the building has to be oriented in a particular direction.
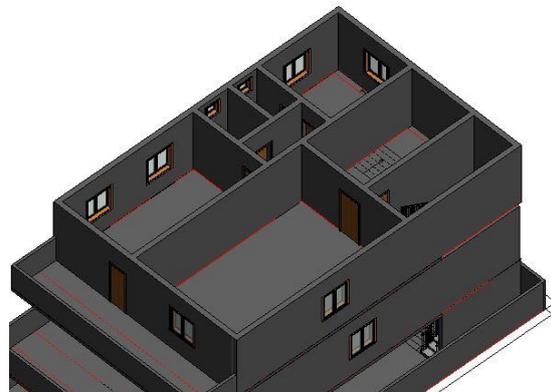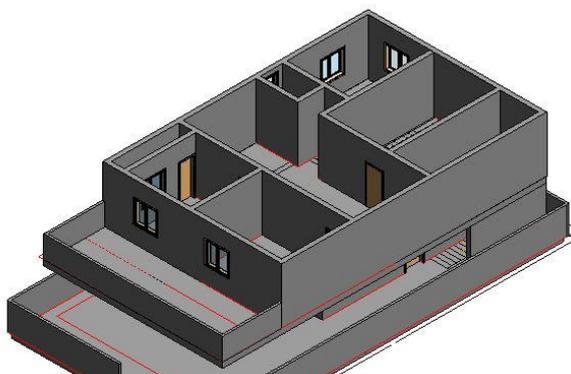

LIGHTING:

Good lighting is necessary for all buildings and three primary aims. The first is to promote the work or other activities carried on within the building. The second is to promote the safety of people using the buildings. The third is to create, in conjunction to interest and of well beings.
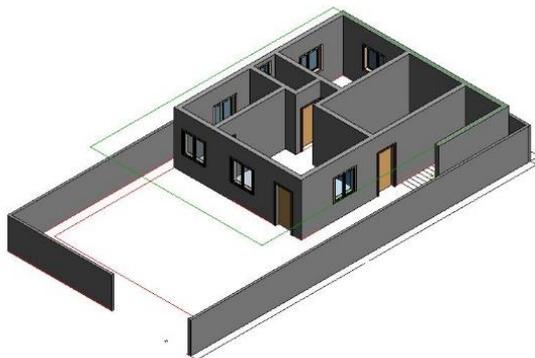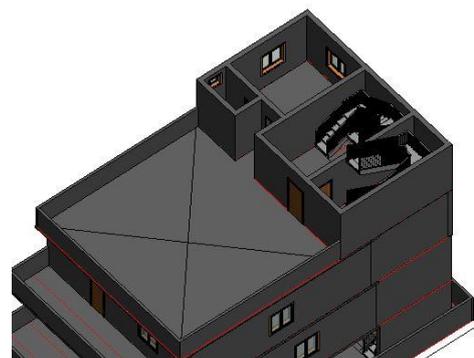

Ground Floor 3d plan

1nd Floor 3d Plan

2rd Floor 3d Plan

3rd floor 3D plan:

V. CONCLUSION

The Adoption of Revit software for the modeling and layout of independent house represents a significant advancement in architectural and interior design practices, moving beyond the limitations of traditional 2D drafting. By harnessing the power of Building Information Modeling (BIM), Revit enables the creation of intelligent, data-rich 3D models that significantly enhance the entire design-to-construction workflow. This comprehensive approach allows for precise spatial planning, optimized functional layouts, and realistic visualizations that facilitate clear communication and informed decision-making with clients. Furthermore, Revit's ability to automate scheduling and quantity take-offs ensures accuracy in cost estimation and material procurement, while its collaborative features promote seamless coordination across disciplines, ultimately reducing errors and costly rework. While the initial learning curve and the complexities of parametric family creation may present challenges, the overarching benefits in terms of efficiency, accuracy, and integrated project delivery firmly establish Revit as an indispensable tool for contemporary kitchen design.

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