# Conceptual Design with Pre-BIM Tools: Autodesk Forma

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## Introduction to Conceptual Modeling

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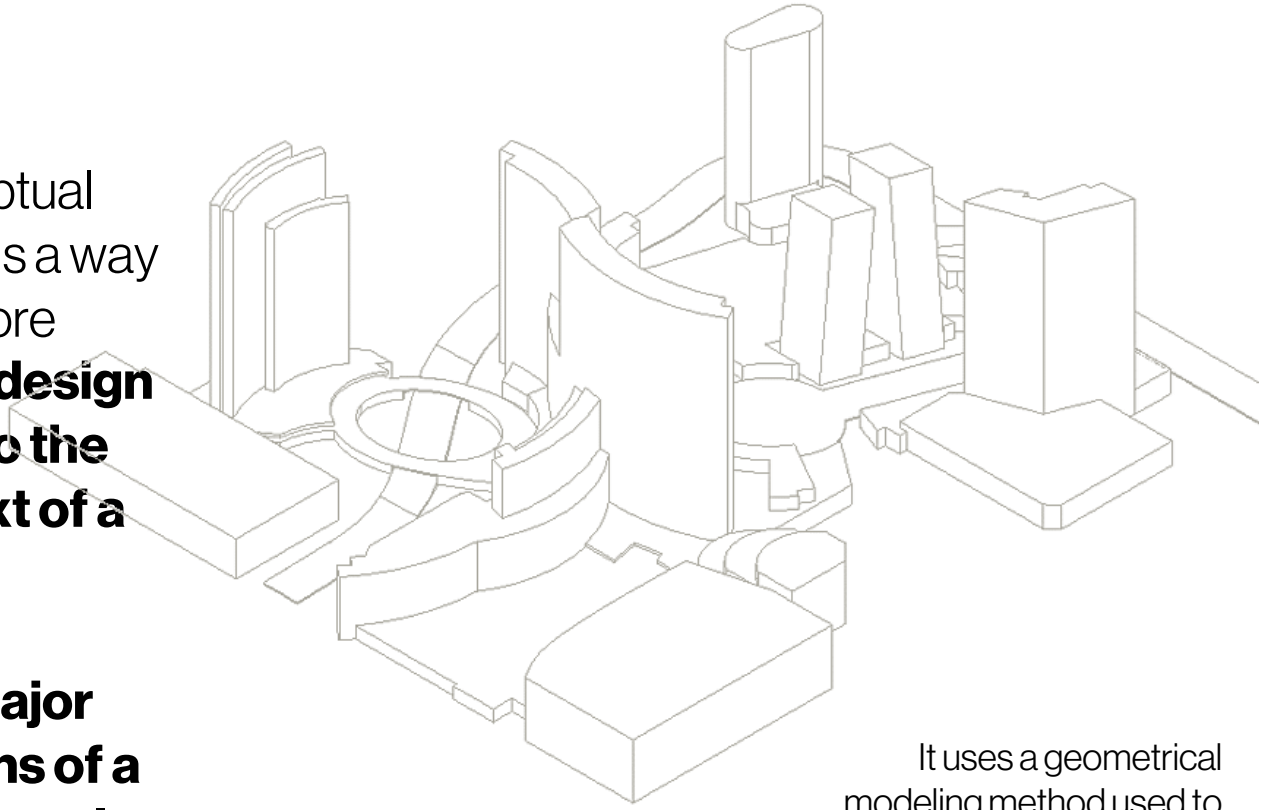
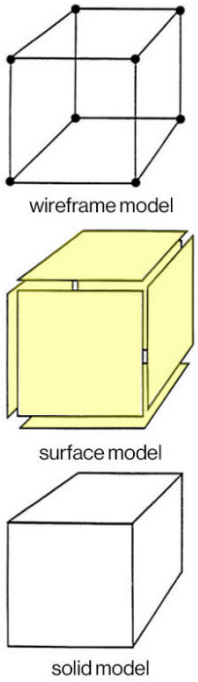
# Conceptual Modeling



Conceptual design is a way to explore **how a design fits into the context of a site** and **how major portions of a building relate to one another.**

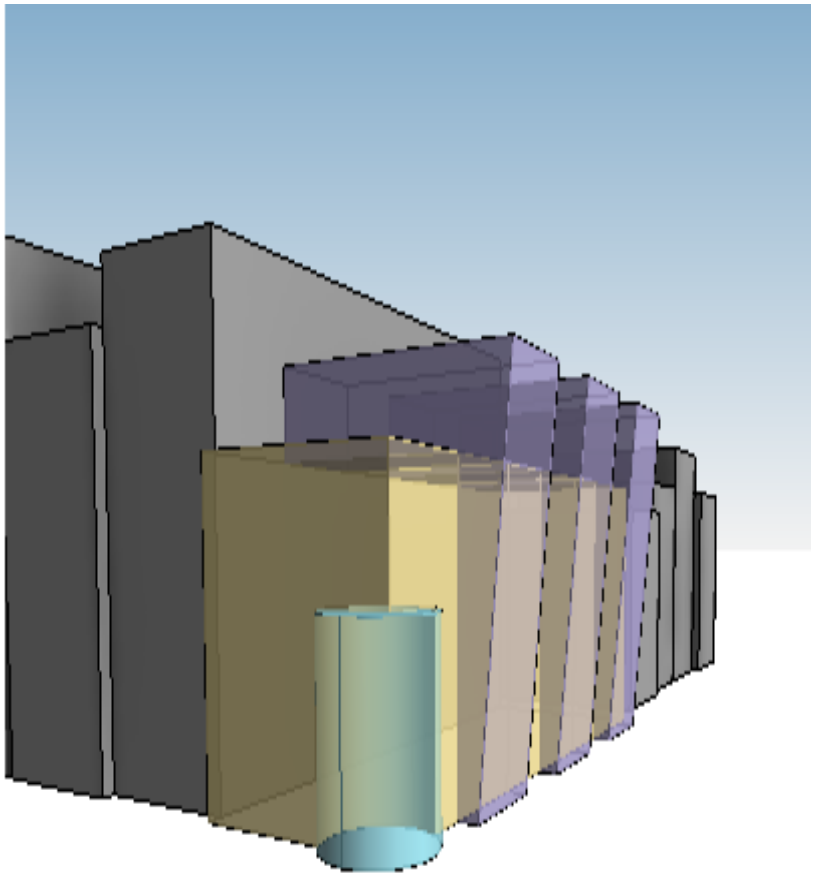





It uses a geometrical modeling method used to develop **3D conceptual models in Architectural Design**. It is also referred to as **surface modeling** in CAD applications.

# Conceptual Modeling Studies



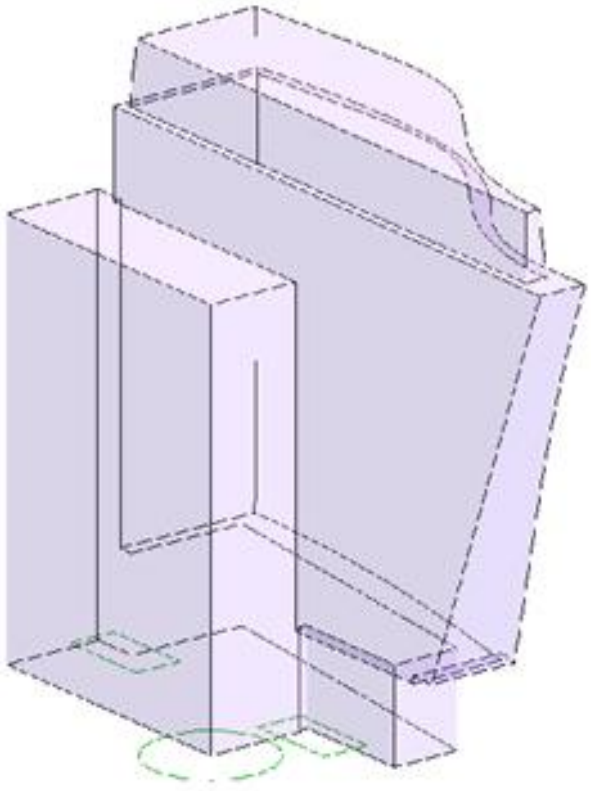


Conceptual massing studies can help :

- **Massing**
- **Analysis**
- **Design Development**

# Massing for Design





**Massing** helps **to understand** the **overall proportions** of the design,

**how the design fits into the surrounding context**

and

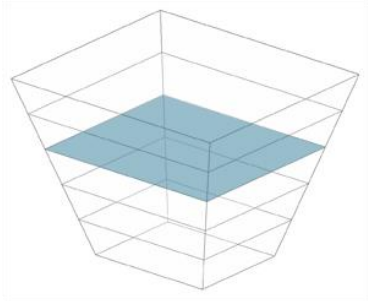
**to explore** and **evaluate** many **potential design solutions**

# Quantity/Area Analysis using Mass Models

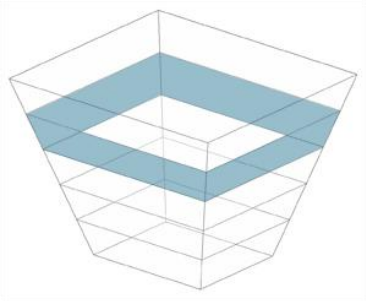


**Quantity/Area Analysis** is used to understand if the **design meets programmatic and performance needs.**

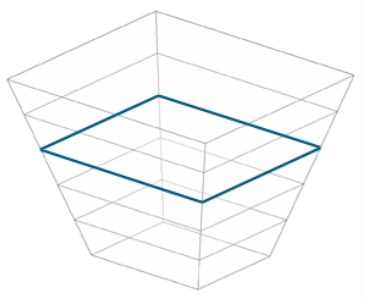
Mass forms can be divided by the levels to create mass floors. **Each mass floor is quantified for**:



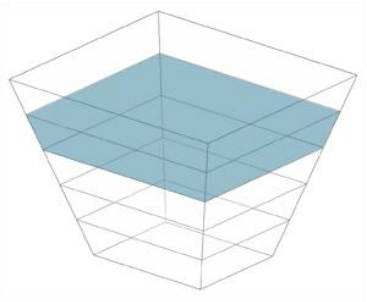
**Area** of each mass floor, in square units. Used for rough design estimates



**Exterior surface area** from the mass floor upward to the next mass floor. Used to create rough cost estimates for the exterior of the building.



**Perimeter** of each mass floor. Used to create rough cost estimates based on linear dimensions



**Volume** of each mass floor, in cubic units. Used to estimate HVAC loads.

# Quantity/Area Analysis using Mass Models



**Schedules** can be helpful to understand **how the conceptual model is meeting design requirements**.

| Mass Floor Schedule | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mass: Type | Level | Usage | Floor Area | Floor Area % | Floor Perimeter | Exterior Surface Area | Floor Volume |
| Offices | | | | | | | |
| Square | 3 | Offices | 352 m² | 5% | 75 | 227 m² | 1,061.61 m³ |
| Square | 4 | Offices | 356 m² | 5% | 76 | 552 m² | 965.60 m³ |
| Wedge | 4 | Offices | 288 m² | 4% | 73 | 219 m² | 846.24 m³ |
| Wedge | 5 | Offices | 277 m² | 4% | 72 | 216 m² | 818.27 m³ |
| Wedge | 6 | Offices | 269 m² | 4% | 71 | 479 m² | 799.55 m³ |
| Offices: 5 | | | 1541 m² | 22% | 367 | 1694 m² | 4,491.27 m³ |
| Parking | | | | | | | |
| Square | 1 | Parking | 342 m² | 5% | 74 | 224 m² | 1,033.59 m³ |
| Wedge | 1 | Parking | 339 m² | 5% | 78 | 235 m² | 985.75 m³ |
| Rectangle | 1 | Parking | 638 m² | 9% | 116 | 348 m² | 1,935.24 m³ |
| Parking: 3 | | | 1319 m² | 19% | 268 | 807 m² | 3,954.57 m³ |
| Residential | | | | | | | |
| Rectangle | 2 | Residential | 652 m² | 9% | 116 | 348 m² | 1,974.15 m³ |
| Rectangle | 3 | Residential | 664 m² | 9% | 116 | 348 m² | 2,011.07 m³ |
| Rectangle | 4 | Residential | 676 m² | 9% | 116 | 347 m² | 2,046.36 m³ |
| Rectangle | 5 | Residential | 688 m² | 10% | 115 | 408 m² | 2,058.08 m³ |
| Rectangle | 6 | Residential | 620 m² | 9% | 101 | 783 m² | 1,176.26 m³ |
| Residential: 5 | | | 3300 m² | 46% | 563 | 2234 m² | 9,265.93 m³ |
| Retail | | | | | | | |
| Square | 2 | Retail | 347 m² | 5% | 75 | 226 m² | 1,048.83 m³ |
| Wedge | 2 | Retail | 319 m² | 4% | 76 | 229 m² | 929.98 m³ |
| Wedge | 3 | Retail | 302 m² | 4% | 74 | 224 m² | 883.48 m³ |
| Retail: 3 | | | 968 m² | 14% | 225 | 678 m² | 2,862.29 m³ |
| Grand total | | | 7129 m² | 100% | 1,423 | 5413 m² | 20,574.06 m³ |

# Energy Analysis using Mass Models

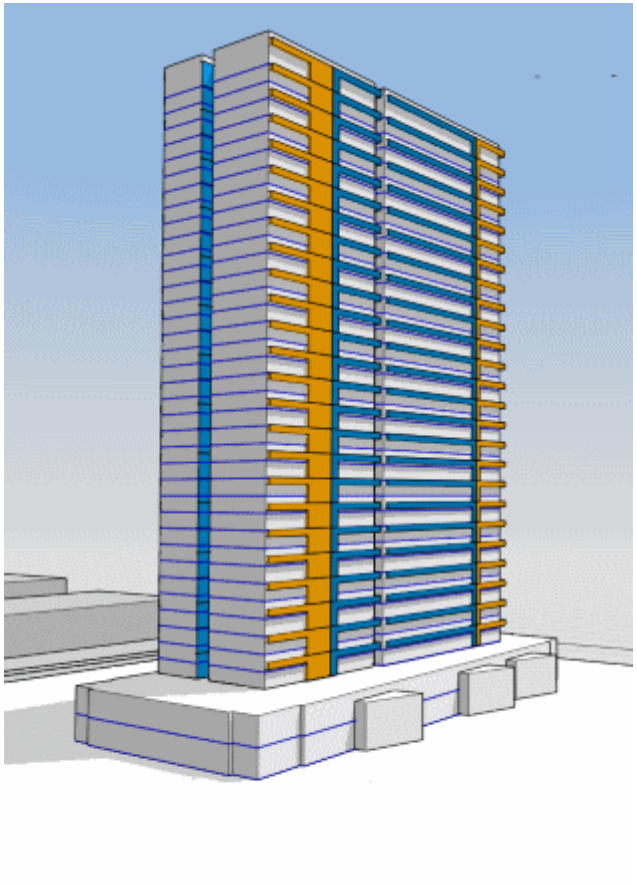


**Energy analysis** can be conducted on a conceptual model early in the design process.

The building massing has the most impact on a building's energy performance

# Design Development





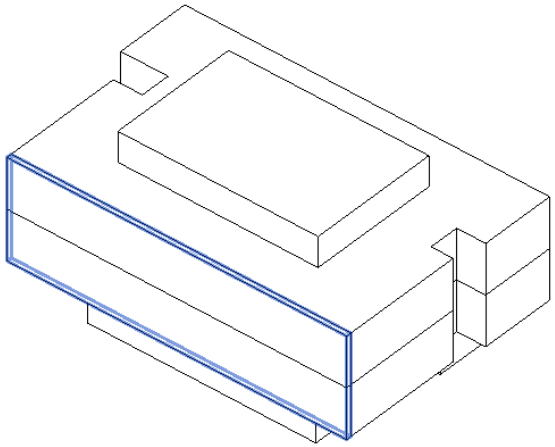
Mass modeling is considered a **Pre-BIM process.**

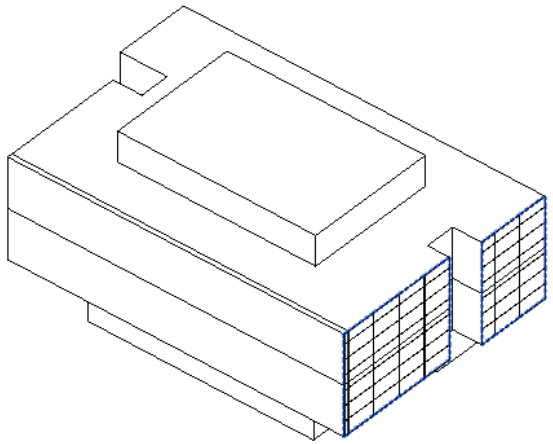
Once the conceptual model is complete, **mass surfaces can be transformed into building** or **BIM elements**.

# Design Development



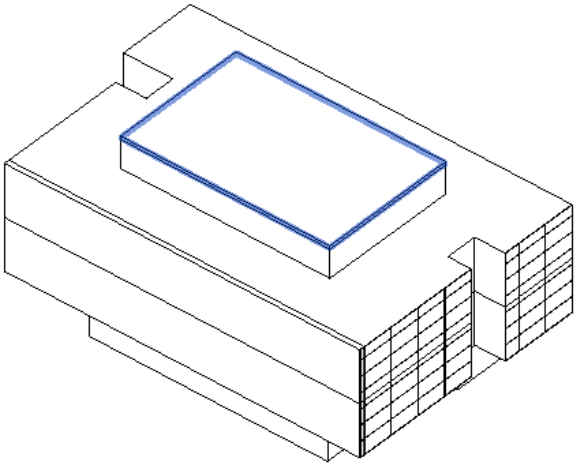
**Mass to Wall**

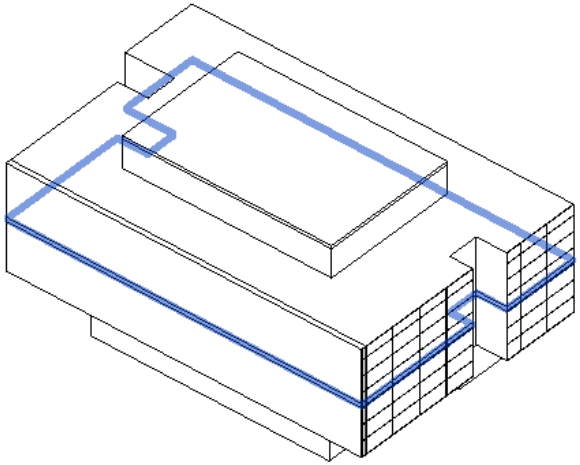




**Mass to Curtain System**

**Mass to Roof**

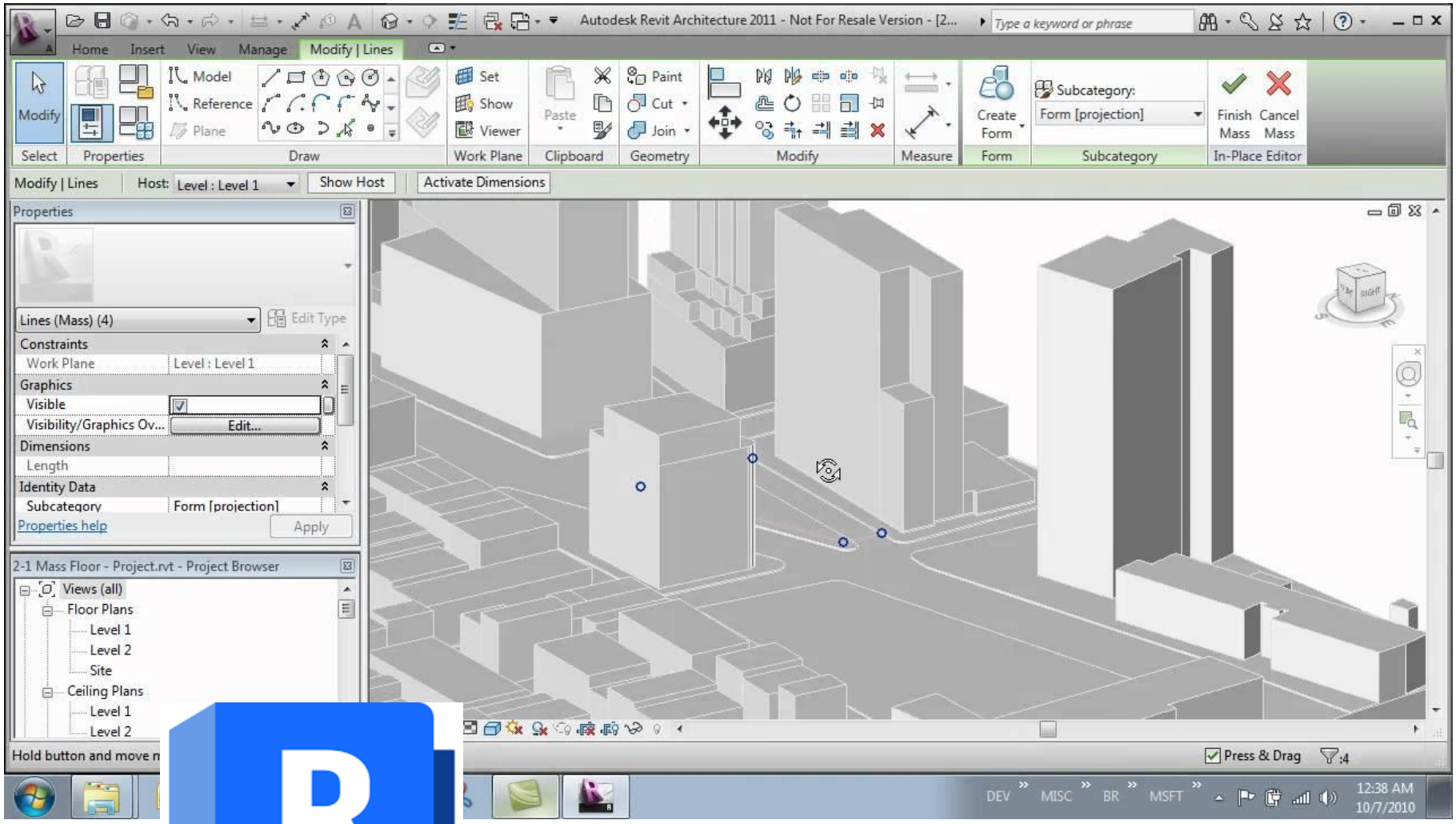




**Mass to Floor**

# Conceptual Modeling in Revit



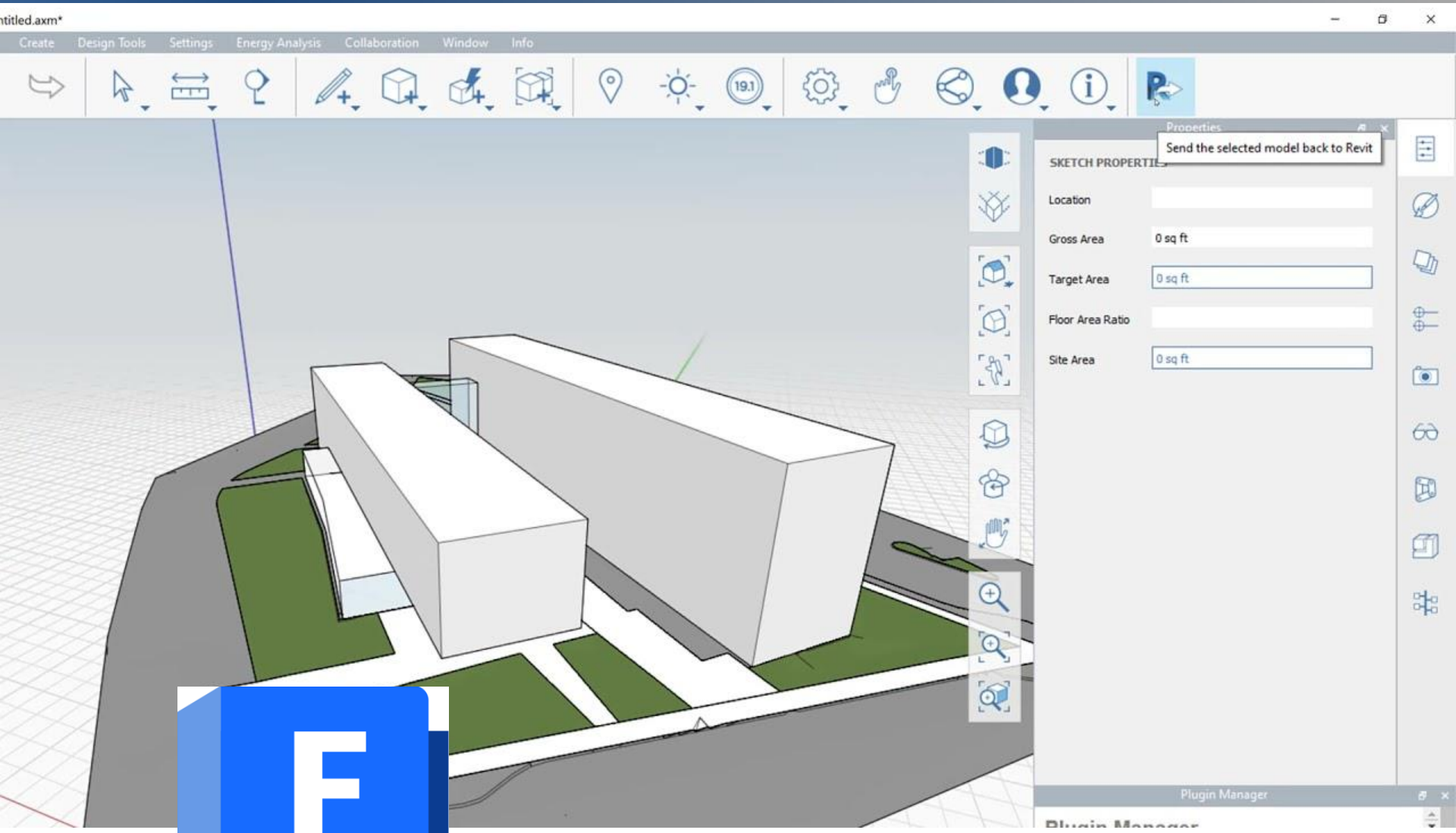



RVT

Revit or Formit can be used to develop conceptual models as Autodesk line of products,

# Conceptual Modeling in Formit






Revit or Formit can be used to develop conceptual models as Autodesk line of products,

# Autodesk Forma Resources

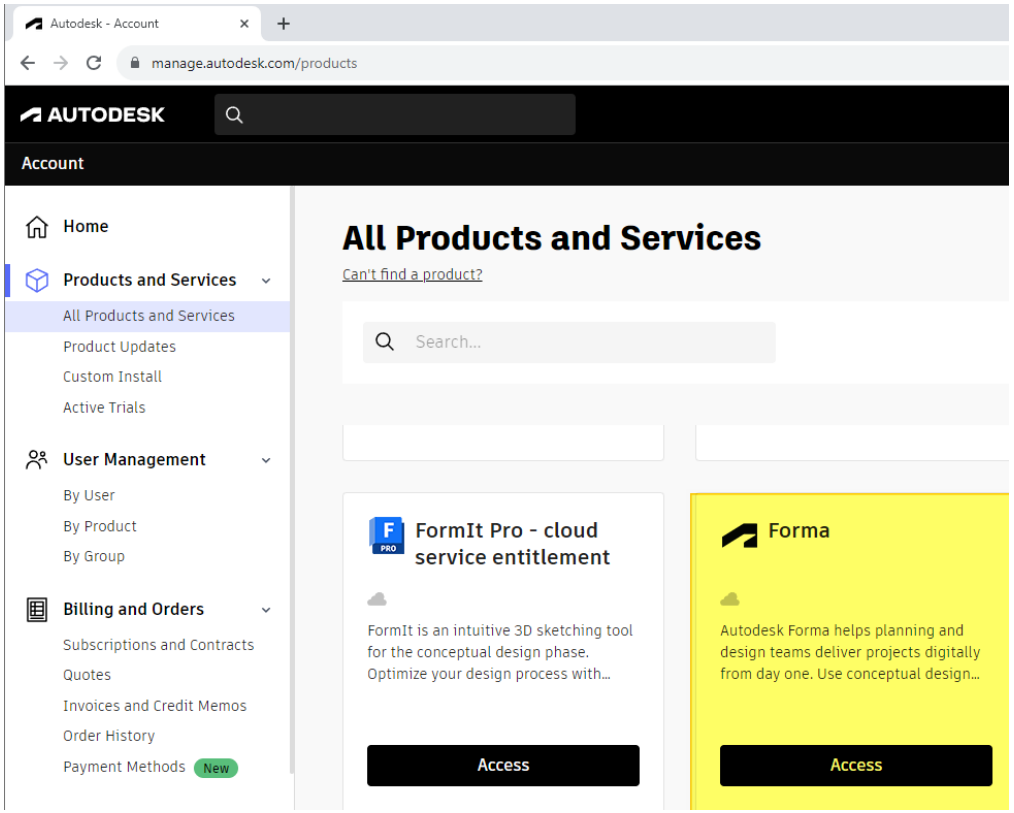


A cloud-based software for early design. It was formerly known as Space Maker.

It is part of Autodesk AEC Collection

All Autodesk software is available at https://manage.autodesk.com/products

Also directly accessible from: https://app.autodeskforma.com/



# Autodesk Forma Resources



**Rhino vs. Forma? No, Rhino + Forma!**

Rhino is widely used by architects for early-stage massing and visualization, but environmental analysis remains a complex challenge for many users. That's where Forma comes in, providing detailed environmental analyses without requiring extensive technical expertise. In a live demonstration of the new Rhino-Forma plugin, we'll show you how to easily move geometry between the two programs, share best practices for structuring data, how to incorporate Grasshopper, and other tips and tricks. Learn how early environmental feedback can free up more time for creativity and reduce the CO2 emissions of your design by up to 34%, and see how you can scale those benefits across your projects and organization.

Kevin Walsh, Krzysztof Jedrzejewski

36p

Instructional Demo / Las Vegas 2023

**From Forma to Revit and Back Again: A CUBE3 Story**

Due to our unique involvement in the Forma pilot program we would like to share our experience with the AECO community. The Forma-to-Revit-and-back-to-Forma workflow (via Forma Plugin) is a powerful tool for architects and designers seeking to streamline their design process. Forma provides an intuitive platform for creating complex geometries and analysis while Revit's advanced BIM tools enable designers to create detailed building models. The ability to seamlessly transfer between the two programs allows for easy collaboration and communication between team members, resulting in a more efficient and effective design process. This workflow is particularly useful for architects and designers looking to create complex designs in a fraction of the time it would take using traditional methods. By integrating the strengths of Forma and Revit, designers can create more accurate, energy efficient and detailed models, which can be used for construction and documentation purposes.

Tony Fiorillo, Tino Freitas, +1 more

20p

Industry Talk / Las Vegas 2023

**Disrupting Feasibility on a Next-Generation Platform: TestFit and Autodesk Forma**

Early stage design has arguably the biggest impact on project cost. By nature, these decisions are based on scarce information, which results in tons of repetitive work and a massive waste of resources. Historically, both Forma and TestFit saw an opportunity to reinvent early stage planning to create better cities. While tackling different sides of the problem based on their respective markets, both companies focused on maximizing automation to make better-informed decisions faster, saving time and money. Now, with Forma being created as a platform, new partnerships are possible. Brought together by a hackathon, a new collaboration was born bringing new capabilities to Forma and TestFit users. Come hear the story behind the partnership, vision, and journey, and learn about TestFit's parking generator that is now available as beta on the Autodesk Forma platform.

Krzysztof Jedrzejewski, Clifton harness

**"Turn Every Stone" in Your Conceptual Design Using Autodesk Forma**

Fail fast, as they say in tech. Our mantra for conceptual design is "Turn every stone." That's why we've used Autodesk Forma as a tool for optimization and design evolution since it was conceived as a startup in Oslo, Norway. Autodesk Forma has played a pivotal role in the development of our 10-step methodology, which aims to increase the sustainability ambition in our projects. It has finally provided the much-needed support for data aggregation and seamless integration with our modeling software. The implementation of Autodesk Forma in our practice, from sketch to detail phase, has helped us create a transparent dialog with our clients and regulatory authorities, based on rich and objective information. It empowers us to find the best architectural solutions tailored to the unique characteristics of each site. In this session, we're excited to share a selection of large-scale urban projects in Norway that have been shaped up in Autodesk Forma and are transforming the urban fabric, leaving a lasting impact for generations to come.

Phil Langley, Andrés D'Silva

16p

Instructional Demo / Las Vegas 2023

**Simplify Sustainable Design with Autodesk Forma**

The easiest and most cost-effective time to address sustainability is at the start of a project. With increasing challenges around climate change, it's essential that we understand the impact of our projects on the environment from the start of the design process. We'll share resources to help you set operational energy targets for your project and understand the local climate needs. We'll demonstrate how you can use Autodesk Forma software's analysis tools to get instant feedback on sustainability metrics for your proposals including operational energy and solar panel analysis. We'll reveal what design decisions have the biggest impact on achieving your operational energy targets.

Caoimhe Loftus, Simon Irgens

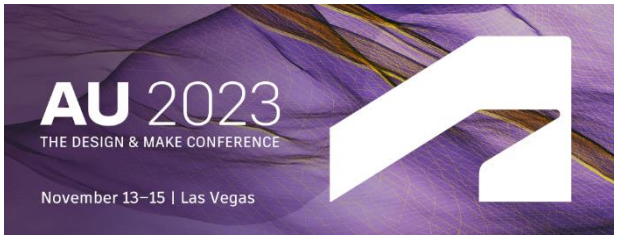
14p

Panel / Las Vegas 2023

**Extending the Autodesk Forma Ecosystem**

The most important part of the extendable platform are people who contribute to extending the functionality. Come listen to the stories of the development teams that have successfully built their solutions on top of Autodesk Forma. Learn not only about functionality provided, but also about motivation behind extending the ecosystem and ideas about where the industry is heading next!

Krzysztof Jedrzejewski, Nate Kaylor, +3 more




AUTODESK UNIVERSITY 2023
Nov. 13-15
www.autodesk.com/autodesk-university/

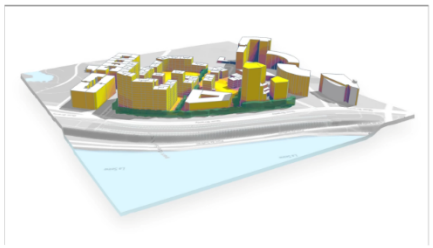
# Autodesk Forma



**FORMA NATIVE CAPABILITIES**

**CONTEXTUAL DATA**

Rapid setup of BIM model with real world contextual data



**DESIGN & AUTOMATIONS**

Design, explore and optimize solutions with ease of use

**ANALYSES**

Perform real time analysis to evaluate and improve designs

**THIRD-PARTY ECOSYSTEM**

**DATA MARKETPLACE**

Get data specific for your region

**AUTHORING ENVIRONMENT**

Use your preferred tool to create geometry and data

**ANALYSES PLATFORM**

Customize existing and create new analyses to best suit your needs

# Autodesk Forma




**HELP DOCUMENTATION**

https://help.autodeskforma.com

**YOUTUBE CHANNEL**

https://www.youtube.com/@AutodeskForma

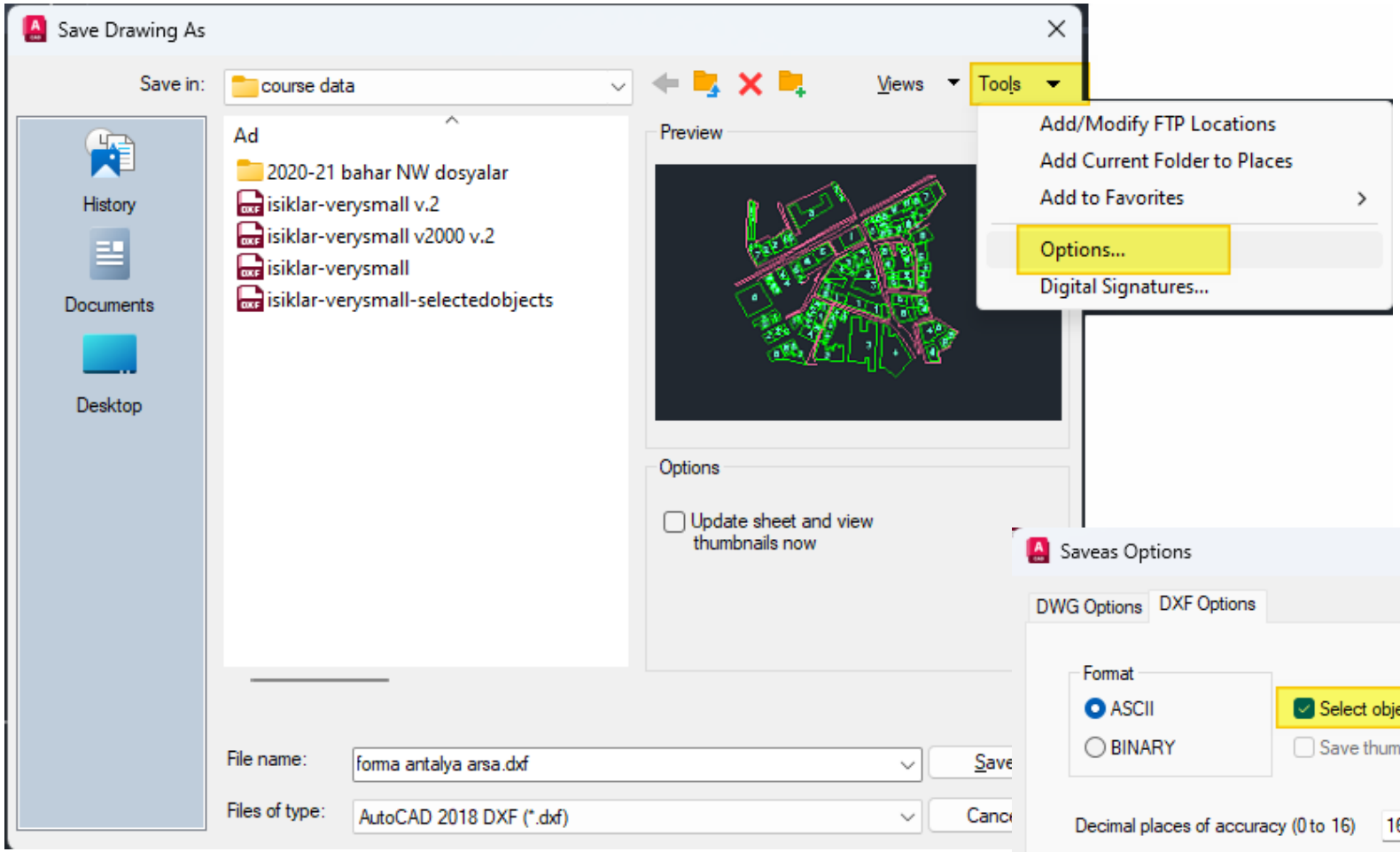
**USER FORUM**

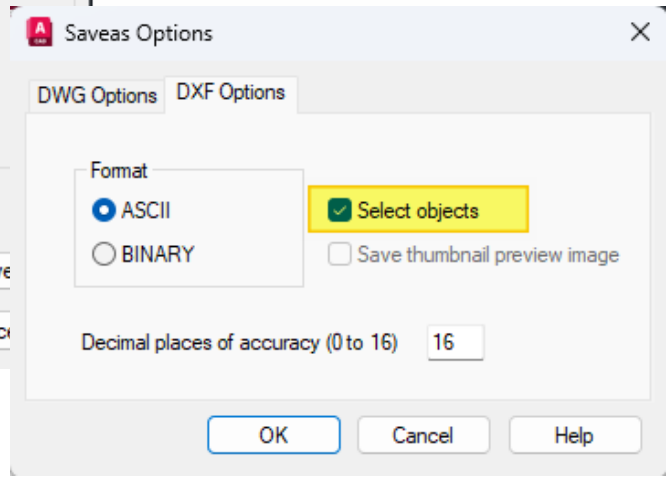
https://forums.autodesk.com/t5/forma-forum/bd-p/6140

# Importing Propety Boundaries



These lines are usually not present in libraries; therefore need to be imported.
They can be transfered in the .DXF format from the AutoCAD site data.




This process reduces the size of these files to be used online

# Files



EXERCISE FILE

http://sayisalmimar.com/2023/11/28/workshop/