AUTODESK UNIVERSITY

Urban Master Planning Process and Modeling with Infraworks

황성철(SeongCheol Hwang)

Urban Planner | SAMOO Architects & Engineers

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About the speaker

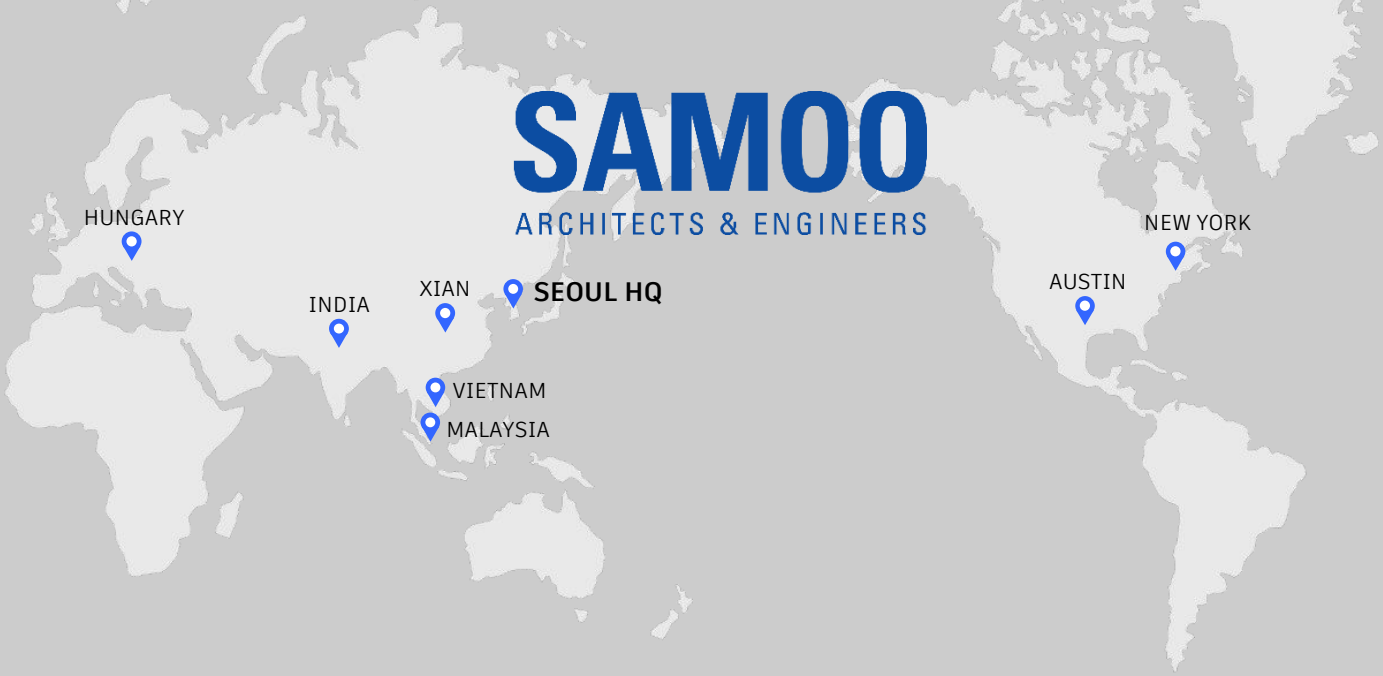
Urban Planner, SAMOO A&E

- Based in Seoul, Korea
- More than 15 years of experience in urban design & planning
- MRICS(Planning and Development)
- Engineer Urban Planning
- Specialist about CIM workflow(Civil 3D, Infraworks, Revit, ...)
- E-Mail: sc.hwang@samoo.com

About SAMOO

Firm Profile

SAMOO Architects & Engineers is an architectural firm in Seoul, Korea with diversified services including architectural design, urban planning, interior design, sustainable design and engineering services.



Design & Technology

SAMOO has been awarded more than a hundred architectural design awards including top 3 international design and ranked high in the global rankings.

Nat'l Library of Korea

Red Dot Award

Samsung Fire Global Campus

iF Design Award

The Presidential Archives

IDEA

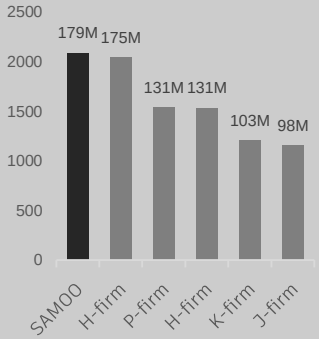
Total Employees	Professional Engineer	LEED AP
681	11	43

Korea Ranking

1

'20 Revenue(USD)

* 금융감독원 공시정보(DART) 자료 기준



Global Ranking

6th

Of The Top 10 by Market

* Manufacturing Sector Only

ENR
Engineering News-Record

Goal & Commitment

01

SUSTAINABILITY

Responding to climate change and pursuing goals for sustainable development.

02

RESPONSIBILITY

Realize corporate social responsibility for high quality of life and provide solutions.

03

COEXISTENCE

Provide a foundation for all residents to interact and work together to live.

AGENDA

Agenda

- Urban Master Planning Methodology
- Masterplan Modeling Process
- Improve Visualization

Urban Master Planning Methodology

3 Pillars for Master Planning

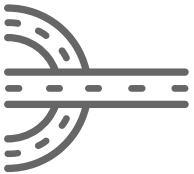
01

Public Realm

02

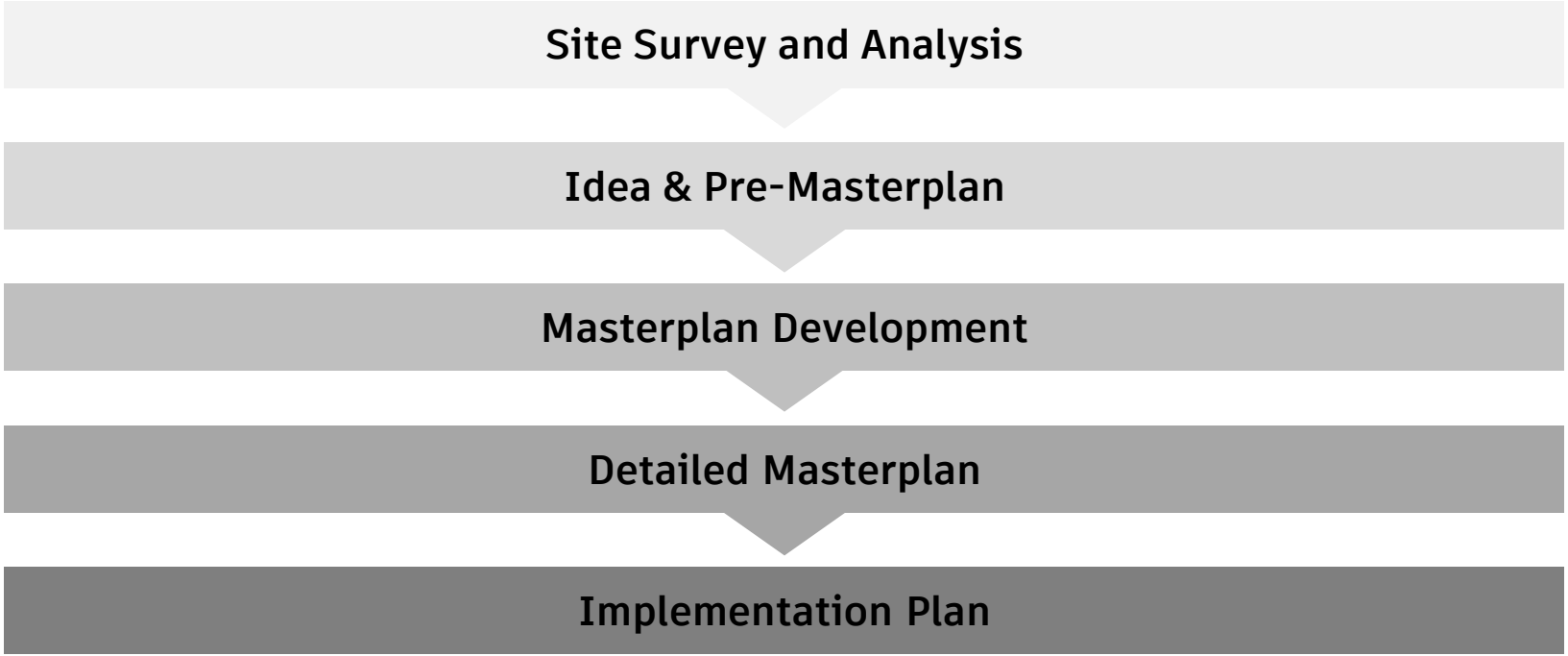
Building

03

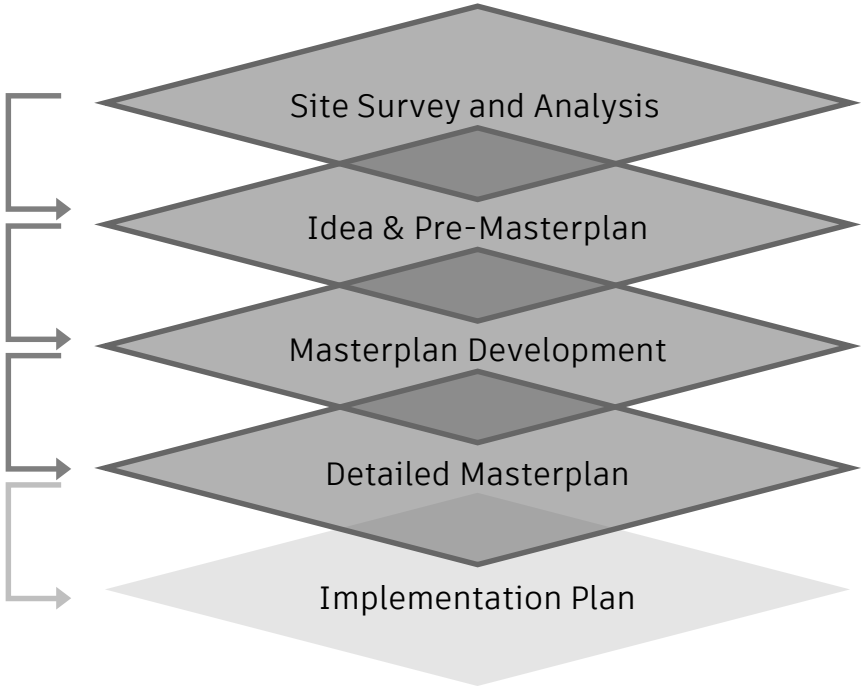


Transportation

Urban Masterplan Planning Process



Urban Masterplan Planning Process



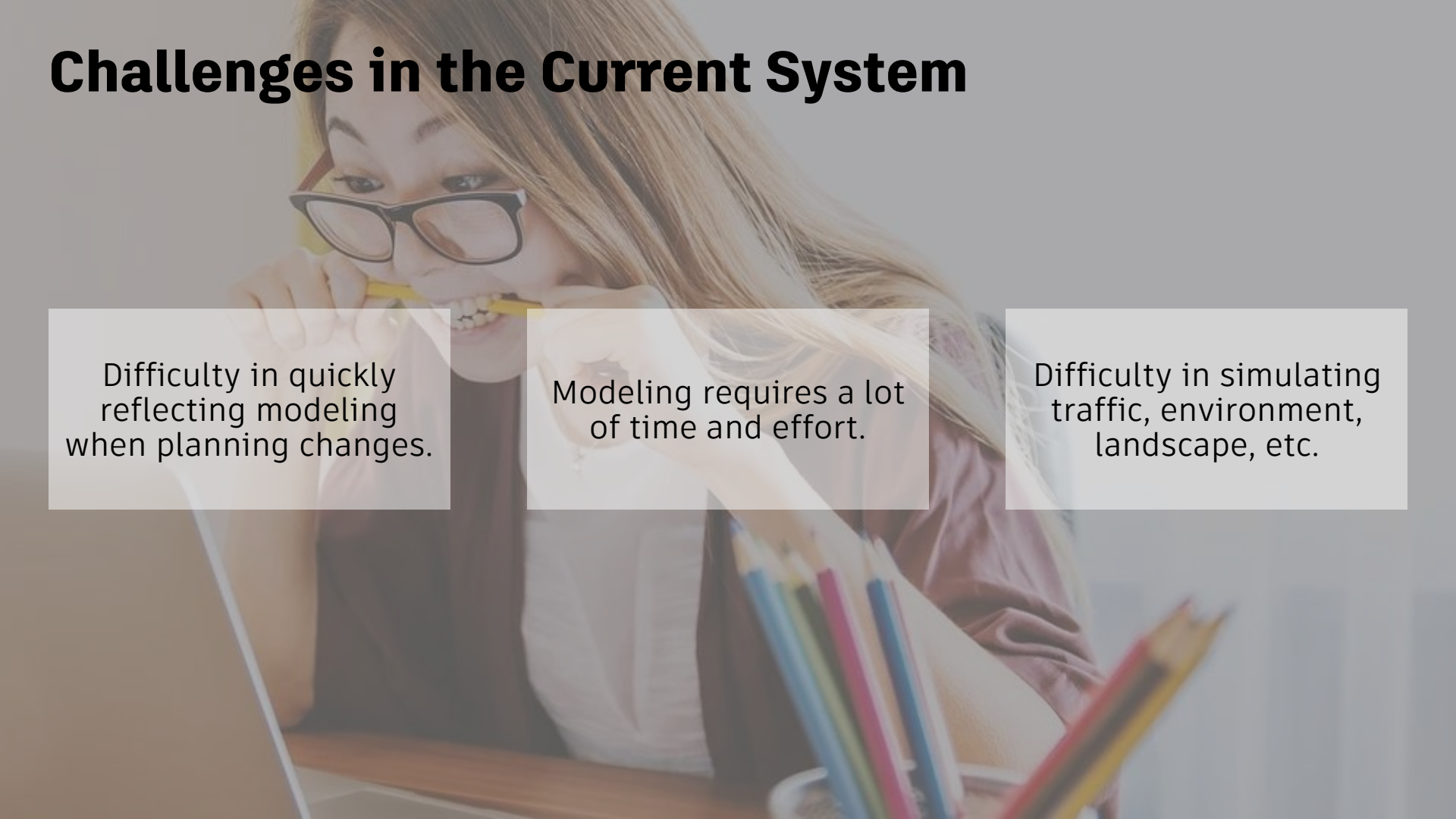
LAND USE PLAN

- GREEN & PARK
- ROAD SYSTEM
- INFRASTRUCTURE
- PEDESTRIAN NETWORK
- PROGRAM & STRUCTURE

Feedback

Alternative Design

Challenges in the Current System



Difficulty in quickly reflecting modeling when planning changes.

Modeling requires a lot of time and effort.

Difficulty in simulating traffic, environment, landscape, etc.

Requirements for Master Planning

Tools to implement vision and objectives

Rapidly present alternatives

Combined with GIS and big data

Compatibility with other programs

Quick Control at City Scale

AUTOCAD

3DS MAX

BIM 360

INSIGHT

REVIT

ALIAS

CIVIL 3D

DYNAMO STUDIO

INFRAWORKS

RECAP PRO

NAVISWORKS

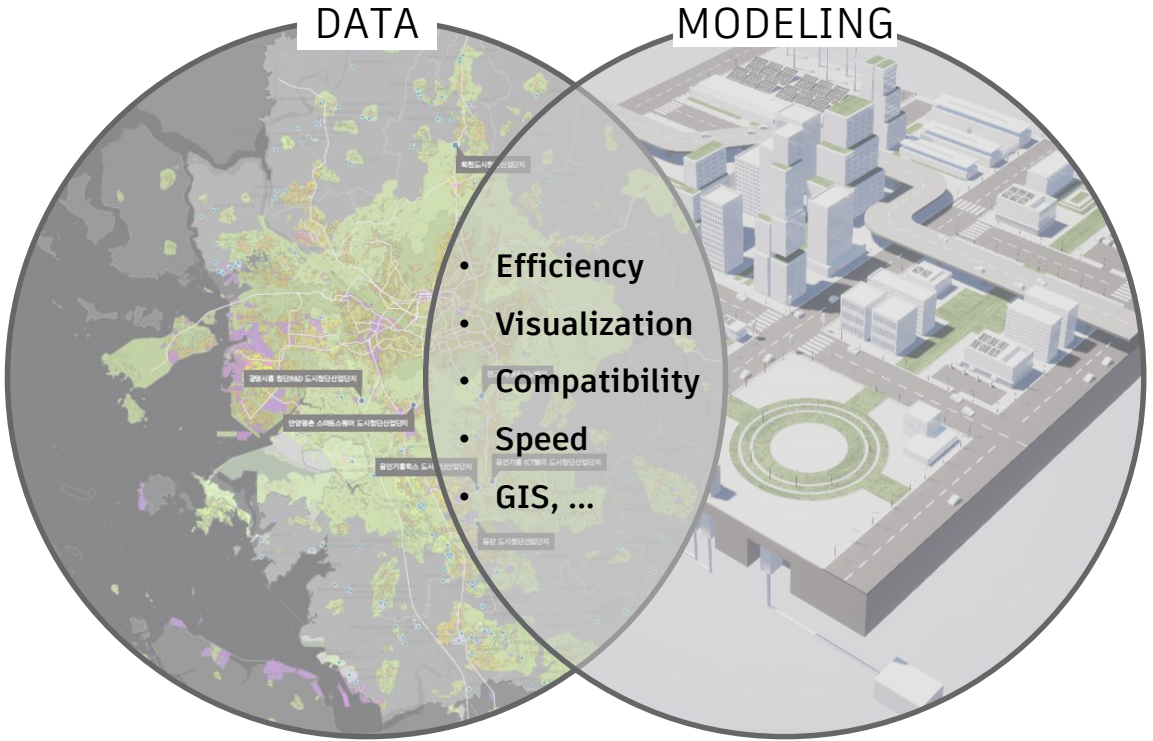
BIM COLLABORATE PRO

FORMIT

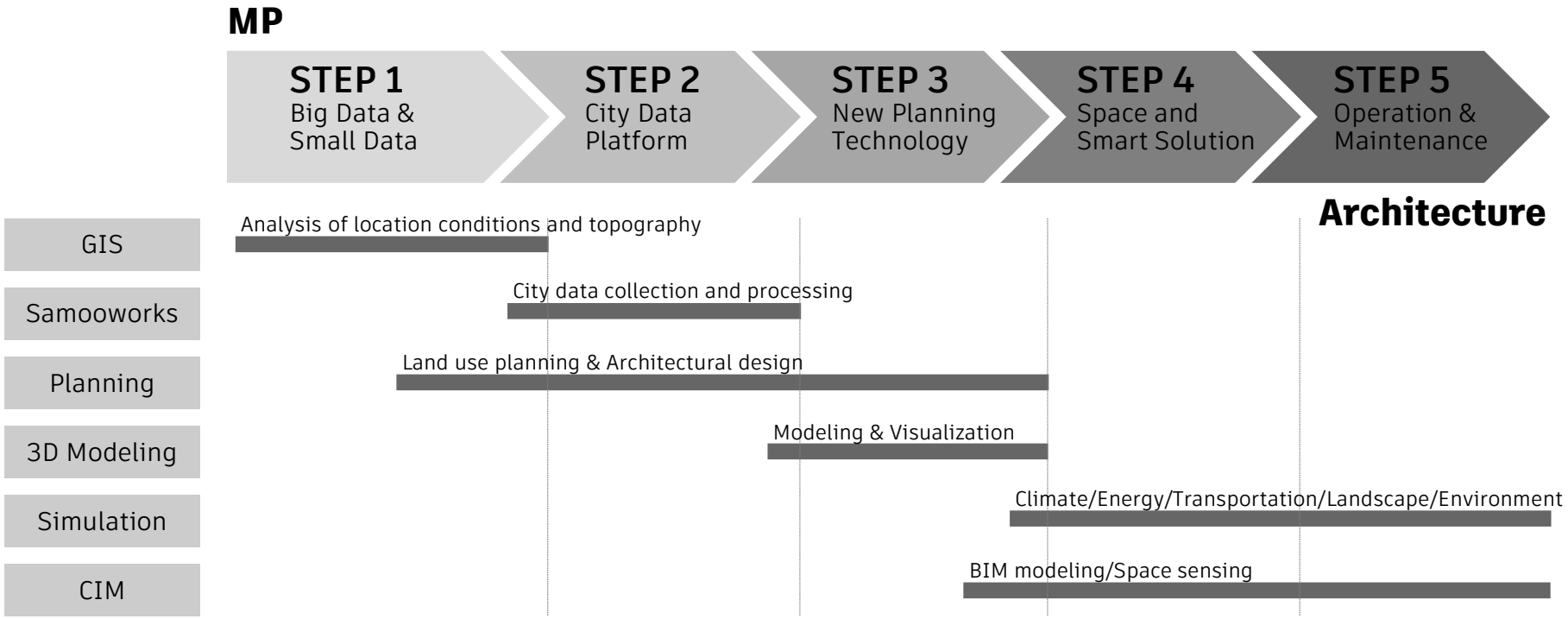
AUTODESK CFD

SAMOO developed a new methodology for urban master planning with GIS and modeling programs

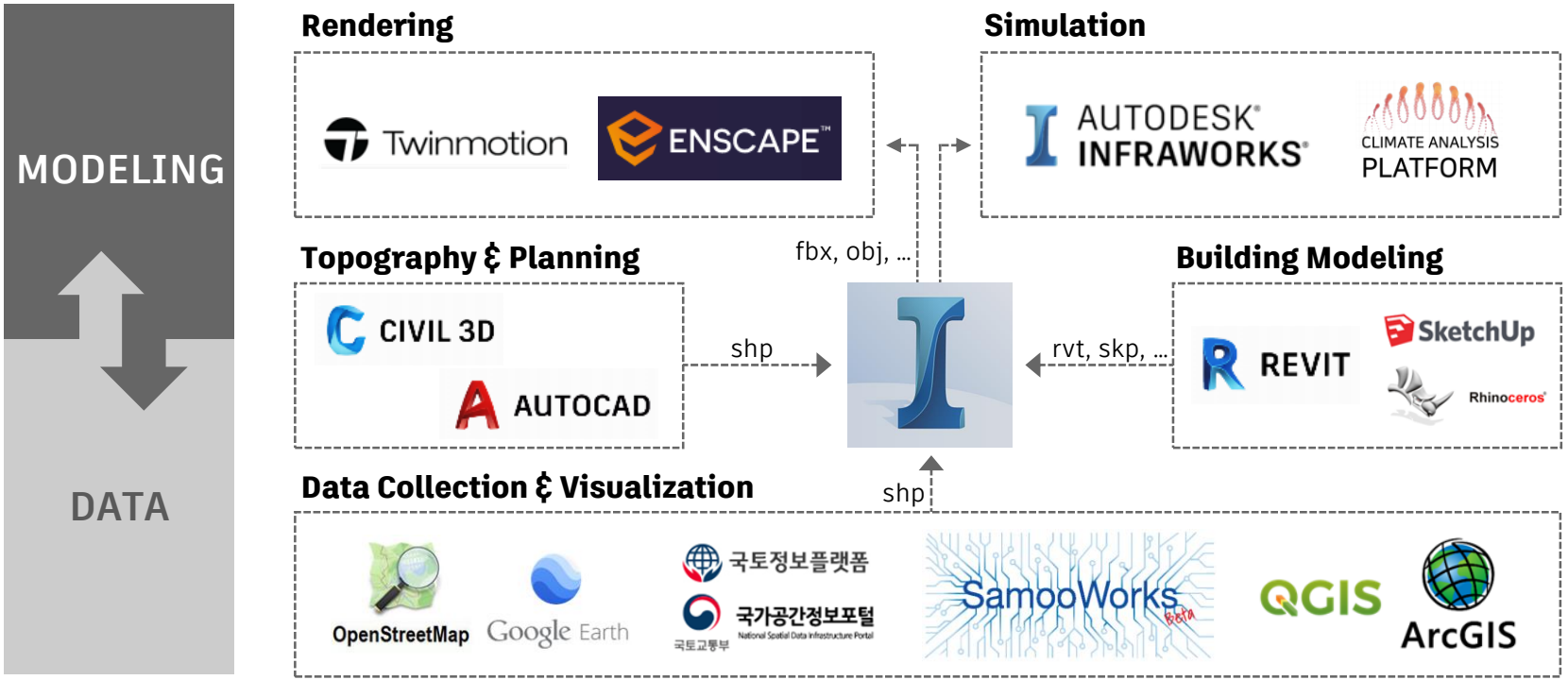
SAMOO New Methodology for Master Plan



SAMOO New Methodology for Master Plan



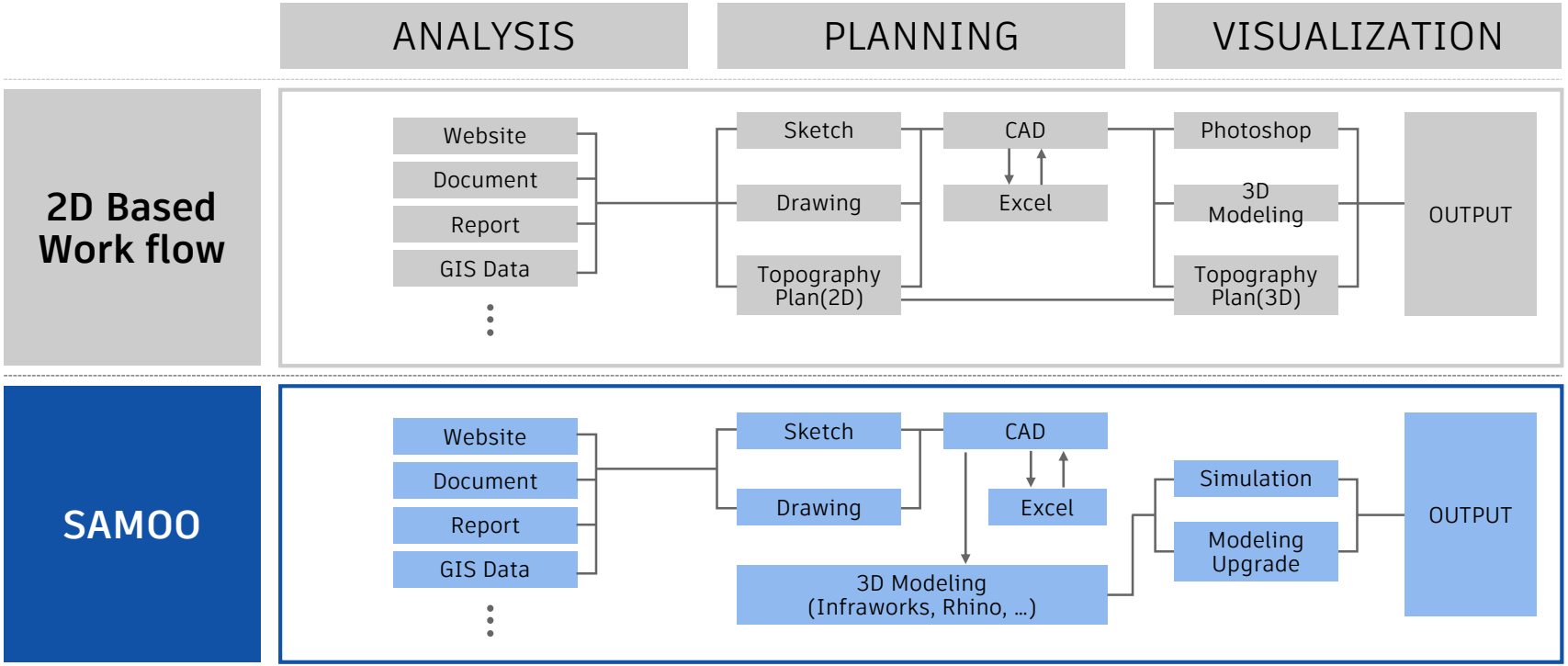
Data Driven Urban Integrated Modeling



Data Driven Urban Integrated Modeling

Master Plan Modeling Process

SAMOO Master Planning Work Flow



Master Planning Work Flow

Analysis Phase

Data Analysis and Application

Data Collection

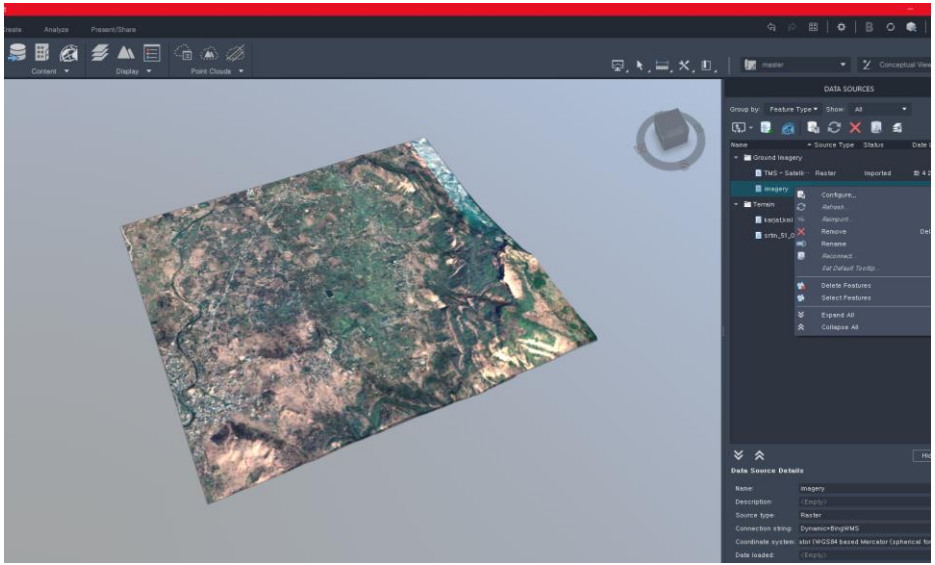
Gather geographical and coordinate systems in site

Create Topography

Modifying data to match local conditions

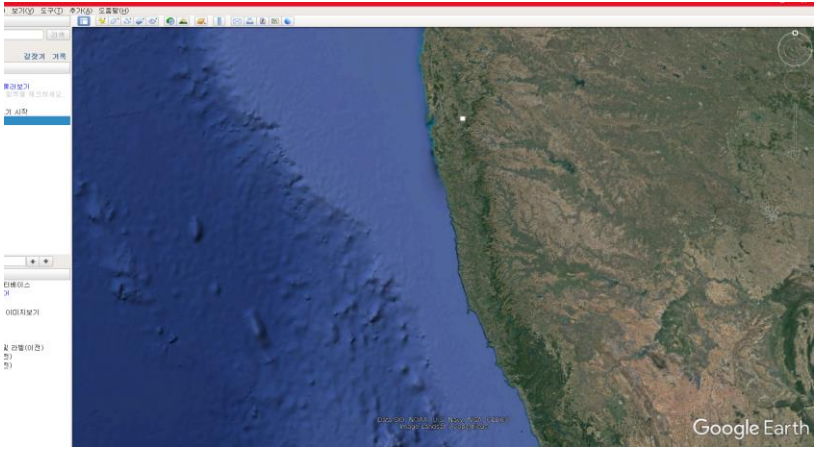
Complete Topography Map

Use Infraworks to complete site topography

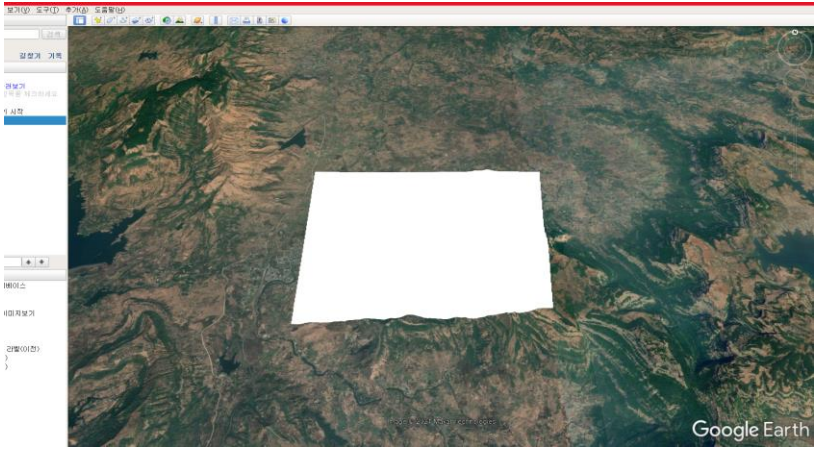


Master Planning Work Flow

Analysis Phase



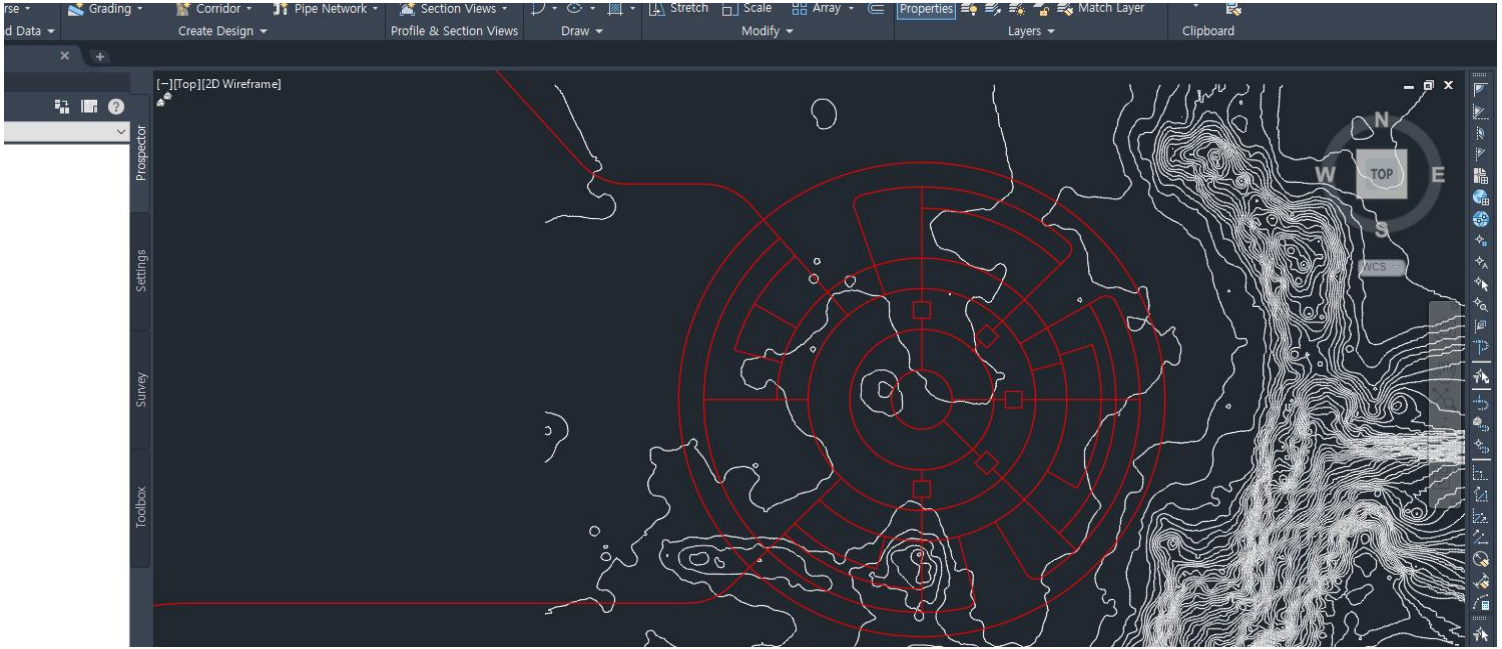
- Define a planning area to create terrain.
- Area designated by Google Earth, Geographic Information Platforms.



- GIS provides more detailed information than Infraworks model builder.
- Download files such as dxf, ngi, shp with geographic information.

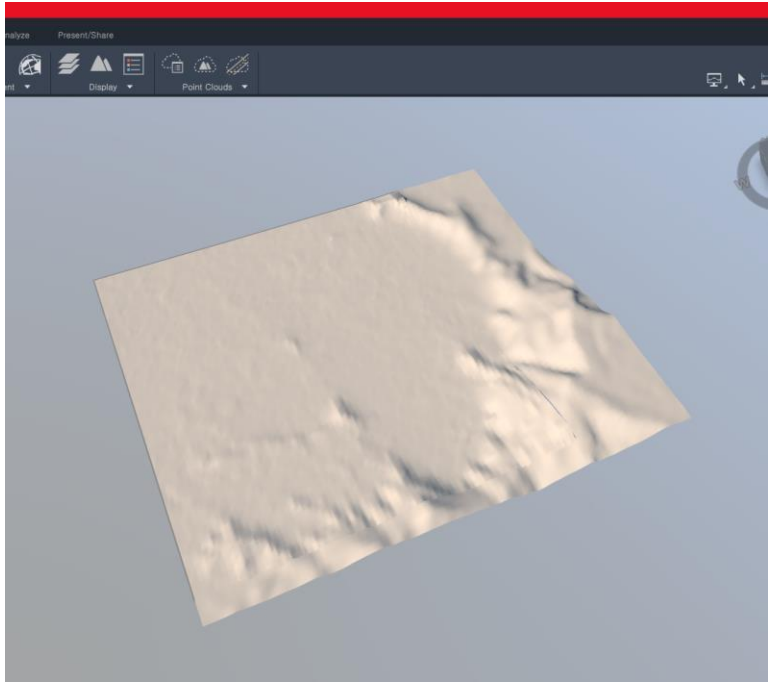
Master Planning Work Flow

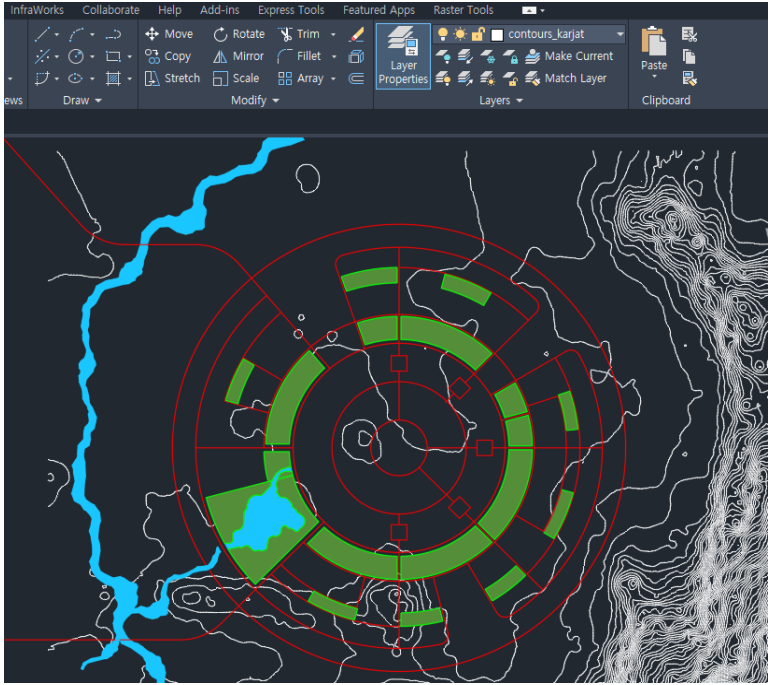
Analysis Phase



Master Planning Work Flow

Analysis Phase





Master Planning Work Flow

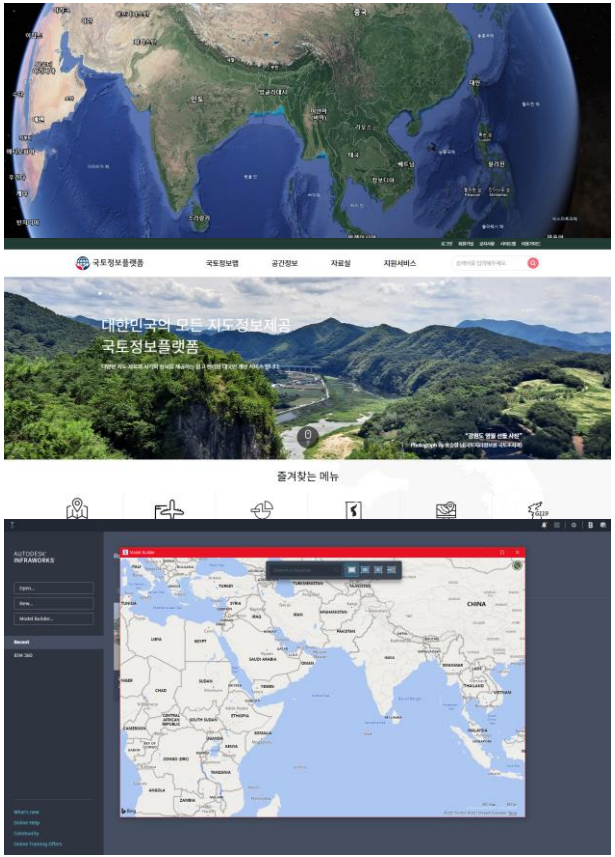
Analysis Phase

Strength

- For overseas projects, produce results suitable for local terrain.
- Transportation and urban landscape planning considering terrain.

Weakness

- Deliverables level gap depending on the level of data received.
- Data update times vary by region.



Master Planning Work Flow

Design Phase

Land Use Planning

Urban Spatial Structure Planning

Transportation, Community plan, Program, ...

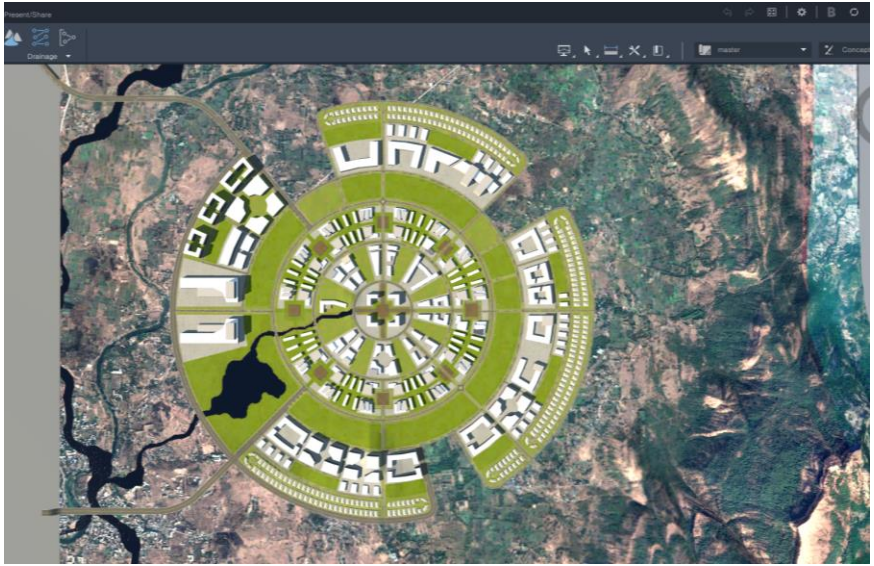
Urban Spatial Density Layout

Building density, Specialized plan, Landscape plan, ...

REVIEW

Land Use Plan Completion

Program, Building density, Block plan, ...

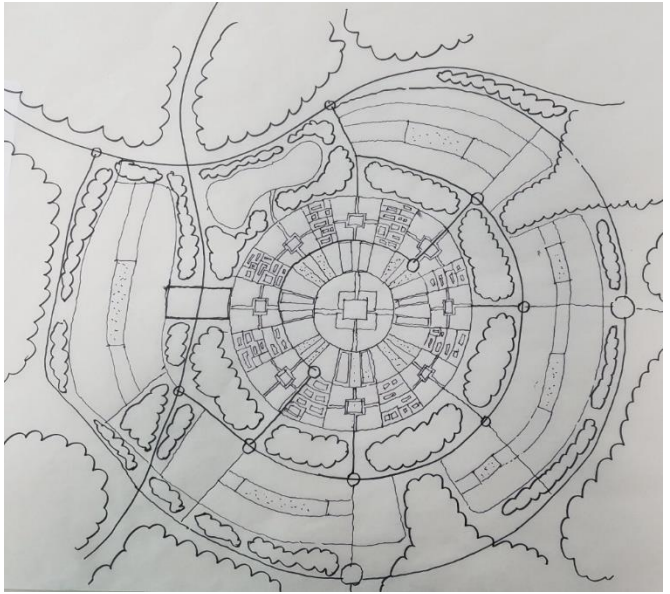


Master Planning Work Flow

Design Phase

Structure Planning → Density Layout → Plan Completion

- Steps to use sketching and drawing to plan.
- Road network system, block planning, open space layout and planning in and out of the city.
- Place green spaces in places of high conversation value based on analysis phase.

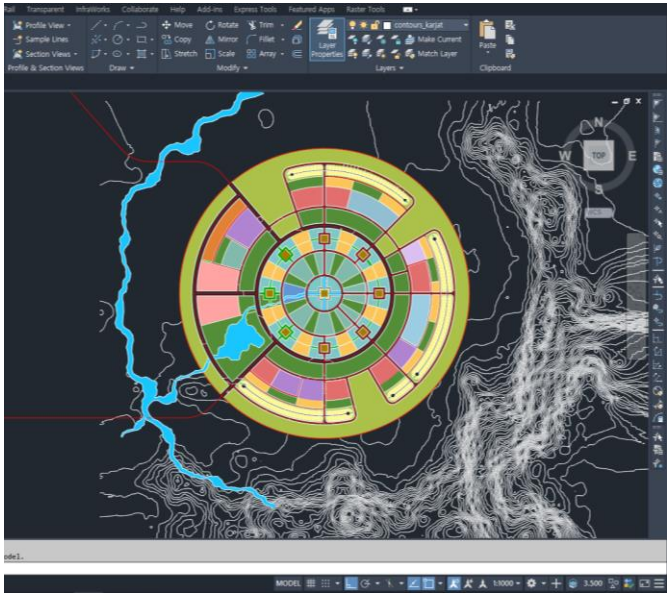


Master Planning Work Flow

Design Phase

Structure Planning → **Density Layout** → Plan Completion

- Steps to draw to a computer based on a sketched plan.
- Accurately apply program area, road spacing, and width to estimate area in the Civil 3D.
- Modify and supplement plans to maintain proper density.

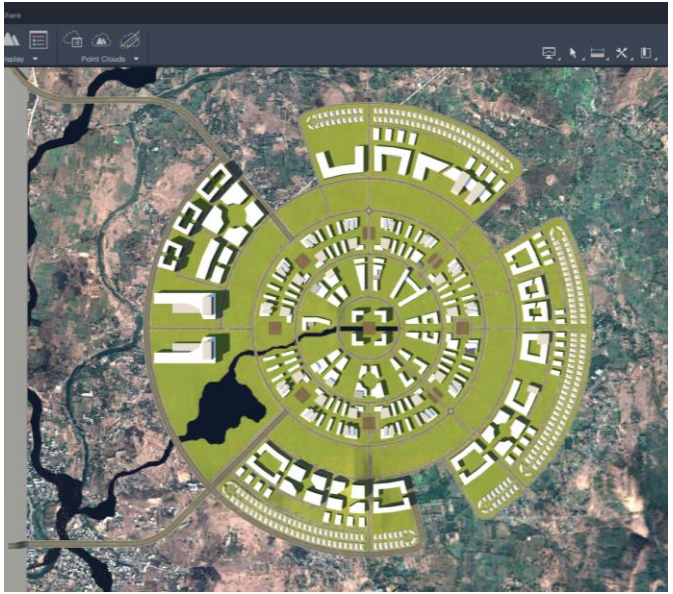


Master Planning Work Flow

Design Phase

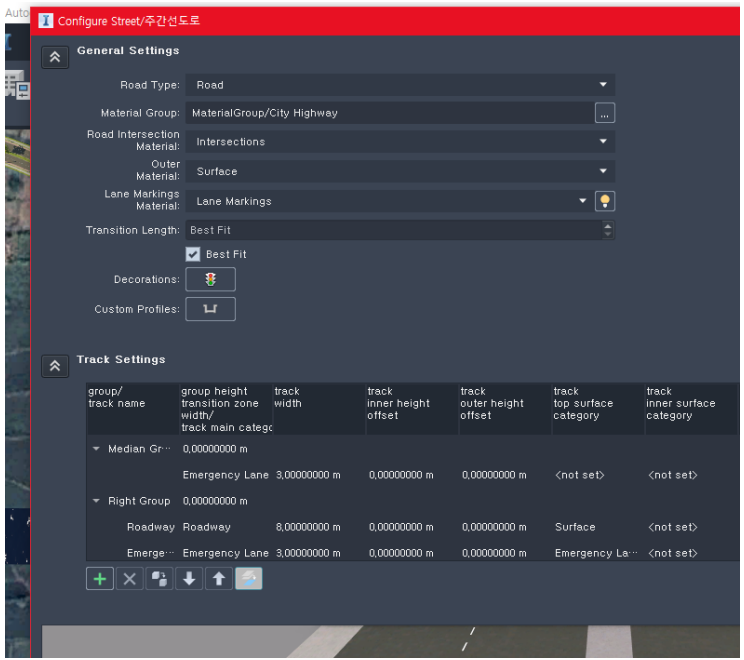
Structure Planning → Density Layout → Plan Completion

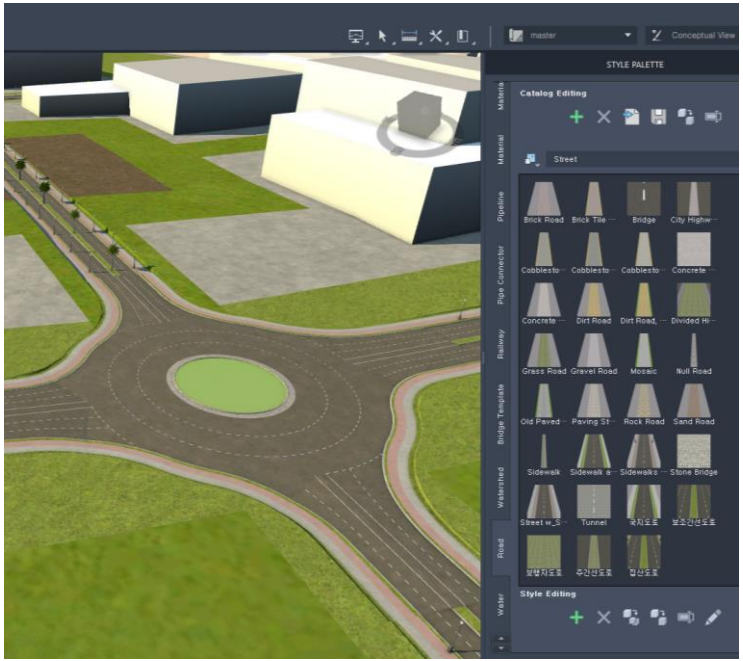
- Implementation of building mass plan after completion of land use plan.
- Land use planning and building mass modeling in Infraworks.
- Modification of building density, height, and land use location in consideration of surrounding terrain and landscape.



Master Planning Work Flow

Design Phase





Master Planning Work Flow

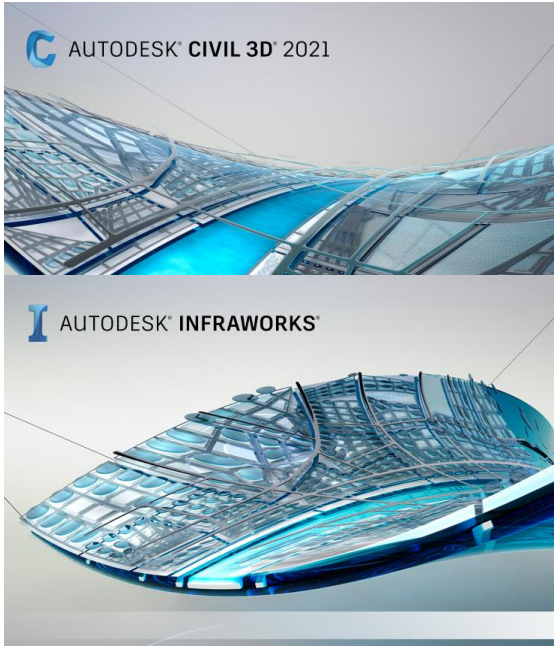
Design Phase

Strength

- Rapid modeling and plan modification(building height, tree, coverage, road, ...).
- Use GIS information without any other programs when planning.

Weakness

- Poor modeling output compared to other 3d modeling programs.
- Lack of libraries to produce deliverables for local environment.



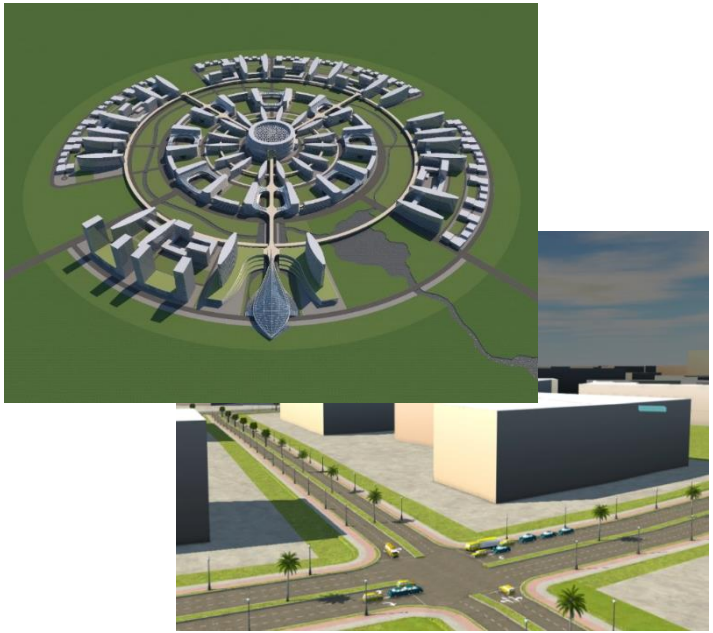
Master Planning Work Flow

Visualization Phase

Simulation & Visualization

Import 3D Modeling	Simulation
Modeling with Revit, Rhino, Sketch-up, ...	Transportation, Environment, ...

Upgrade Visualization
Using modeling programs and simulation



Master Planning Work Flow

Visualization Phase

Simulation

Simulate the factors that affect the plan to identify the problem and correct the plan to solve the problem.

- Traffic, Pedestrian
- Sun & Sky
- Urban Landscape, etc.

Getting the most realistic data and libraries is key to achieving reliable results.

Master Planning Work Flow

Visualization Phase

Simulation

Visualize information about changes in landscape based on building height, energy usage for each building, annual energy costs, etc.

Improves client understanding by visually showing changes.

Master Planning Work Flow

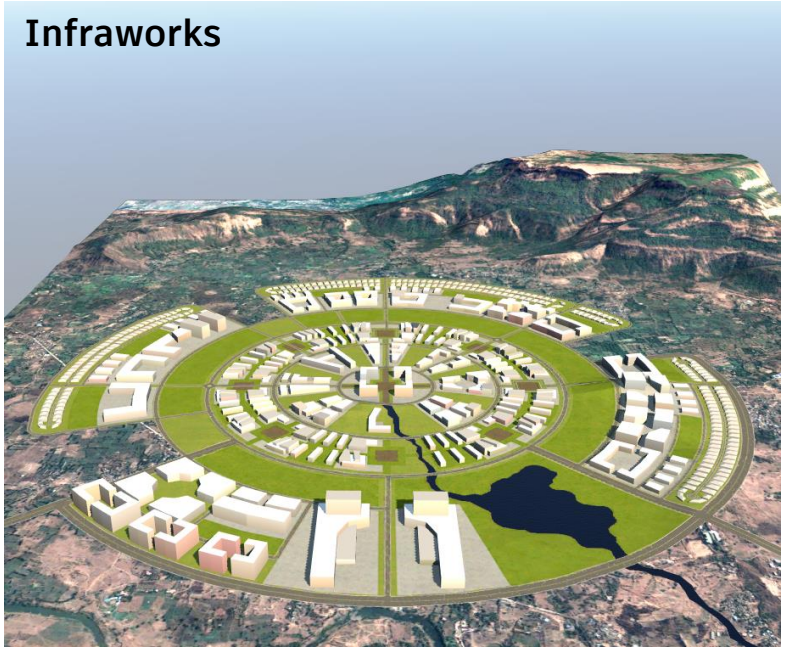
Visualization Phase

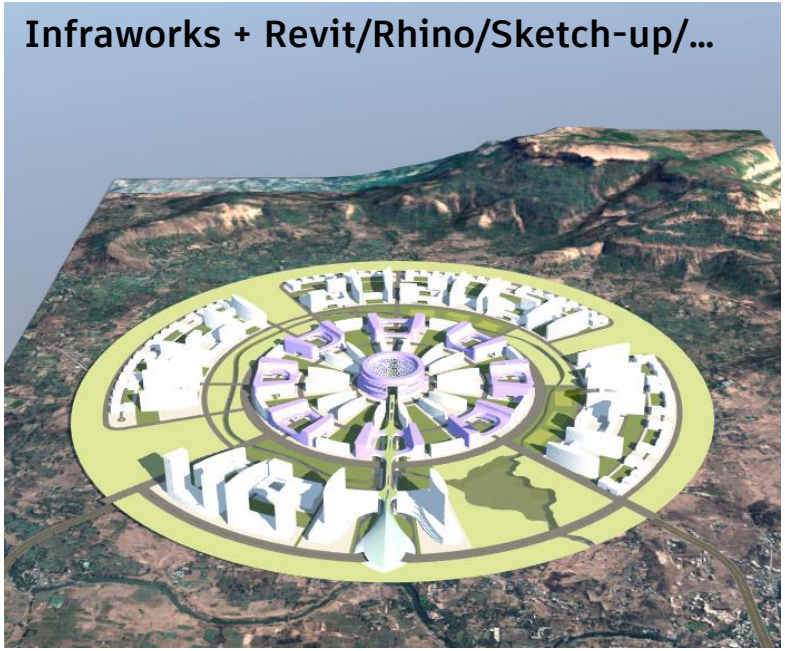
Visualization

- Use modeling programs such as Revit, Rhino and Sketch-up to complement visual effects on Infraworks 3D modeling.
- Upgrade modeling for density and landscape with infrastructure work-based modeling.

Master Planning Work Flow

Visualization Phase





Master Planning Work Flow

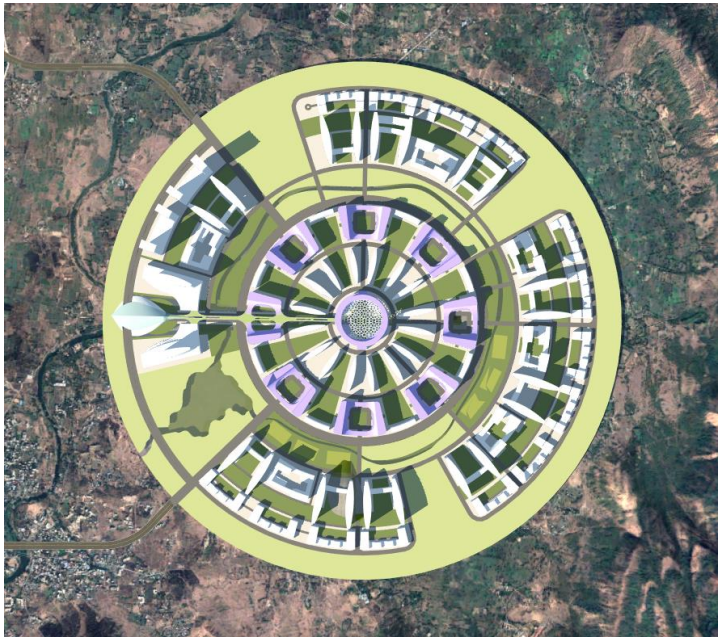
Visualization Phase

Strength

- Increase visual effects of 3D modeling and increase output levels.

Weakness

- Need time to create building modeling.
- Difficulties in fixing such as changing the height of a building within Infraworks.



Improve Visualization

Improve Visualization

Low — **Visualization** — High

Improve Visualization

What’s the next step?

Improve Visualization


VR

Improve Visualization

VR Workflow

Infraworks

Real-time Rendering

VR

CIM

- Land Use Plan & Building Modeling

VR

- Panorama VR Expor / User Meeting

Improve Visualization

Summary

Technological innovation can prevent climate disasters.

- Bill Gates -

2020 Environmental Doomsday Clock

9:47

Greenfund[Website]. (2021). Retrieved from http://www.greenfund.org

SAMOO

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