Architecture & Town Planning

Lecture 4: Building Design Process

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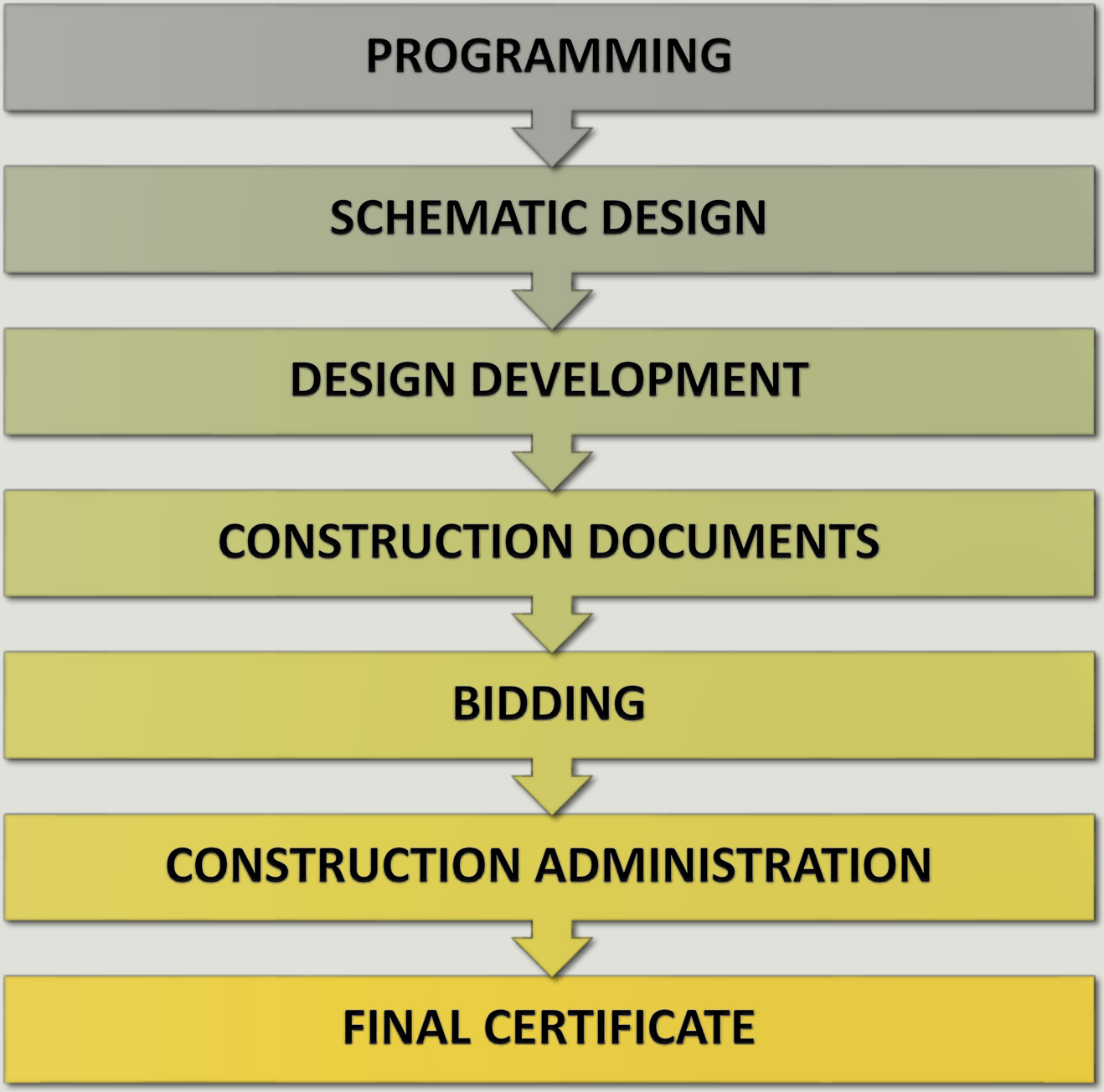

PROGRAMMING
SCHEMATIC DESIGN
DESIGN DEVELOPMENT
CONSTRUCTION DOCUMENTS
BIDDING
CONSTRUCTION ADMINISTRATION
FINAL CERTIFICATE

PROGRAMMING

PHASE - 1

PROGRAMMING

Programming is the activity of determining the "program", or set of needs that a building needs to fulfill or project needs of the user.

1- INITIAL DISCUSSIONS

- Client Meeting
- Building Program: Building Program are the specific uses intended for the building. It also includes nature of the project, the current state of the building market, site availability, the Client's time requirements and our office workload.
- Project Scope: The client provides the architect with a list of what spaces are going into the building.
- Brief of Architectural Services to be provided
- Showing Previous projects for reference

1- INITIAL DISCUSSIONS

- Client's likes and dislikes: way of life, images from books, magazines or internet. Our task at this stage is to look and listen.
- Understand how client live/ work/ eat/ sleep/ meditate/ play in the building.
- Responsibilities of the architect at each stage and Estimates of fees to be charged for each stage
- Selection Of Project team

2- SITE ANALYSIS

- Advice regarding the selection of a suitable site based on the Client's needs
- Zoning Permits (Planning Report)

Planning Report: detailing the permitted uses, site occupation, height restrictions, conservation and environmental issues

- Legal requirements: Building Byelaws
- SWOT (Strength, Weakness, Opportunities and Threats) Analysis

MACRO SITE ANALYSIS

- ❖Location & distances from different Areas
- ❖Population
- ❖Climate & Weather
  - Rain fall / Snow
    - Average Annual
    - Minimum Precipitation (Month)
    - Maximum Precipitation (Month)
  - Humidity
  - Temperature
    - Average Annual
    - Minimum Temperature (Month)
    - Maximum Temperature (Month)

MESO SITE ANALYSIS

- Key plan
- Latitude, Longitude
- Area
- Geological Zone (Earthquake Zone)
- Altitude
- Height of Neighboring Buildings

Meso Site Analysis (Contextual Analysis)

- Culture
- Social Factors: Population, intensity, educational level, economic & political factors, ethnicity, cultural typology etc.
- Historic notes: Archeological sites, landmarks
- Architectural Style
- Heritage implications: Conserving urban heritage - historical buildings, art forms etc.
- Land Use: Usage of site, adjacent site use, zoning restrictions etc.

MICRO SITE ANALYSIS

Studies are conducted to evaluate existing conditions. These studies include geotechnical reports, hydrology studies, land surveys (including boundaries, topography, and utilities), existing building analysis

Levels (Typography/ Slope), available services or utilities (Gas, Electricity, Telephone & Water), site boundaries, Soil conditions & bearing capacity, Wind direction (both Prevailing and arbitrary Winds), sun direction, noise level, views from and to the site, location, pedestrian and vehicular access, drainage, sewage, site orientation- north marked etc.

- Site dimensions and road widths, height of neighboring buildings, height of trees and type of vegetation

Micro Site Analysis (Subsurface Features)

- **Geology:** Geological history of the area, bedrock type & depth etc.
- **Hydrology:** Underground water table, aquifers, springs etc.
- **Soil Genesis:** Erosion susceptibility, moisture, organic content, bearing capacity etc.

Micro Site Analysis (Natural Surface Features)

- **Vegetation:** Type, size, location, shade pattern, aesthetics, ecology etc.
- **Slopes:** Gradient, landforms, elevations, drainage patterns
- **Wild Life:** Ecology, species etc.

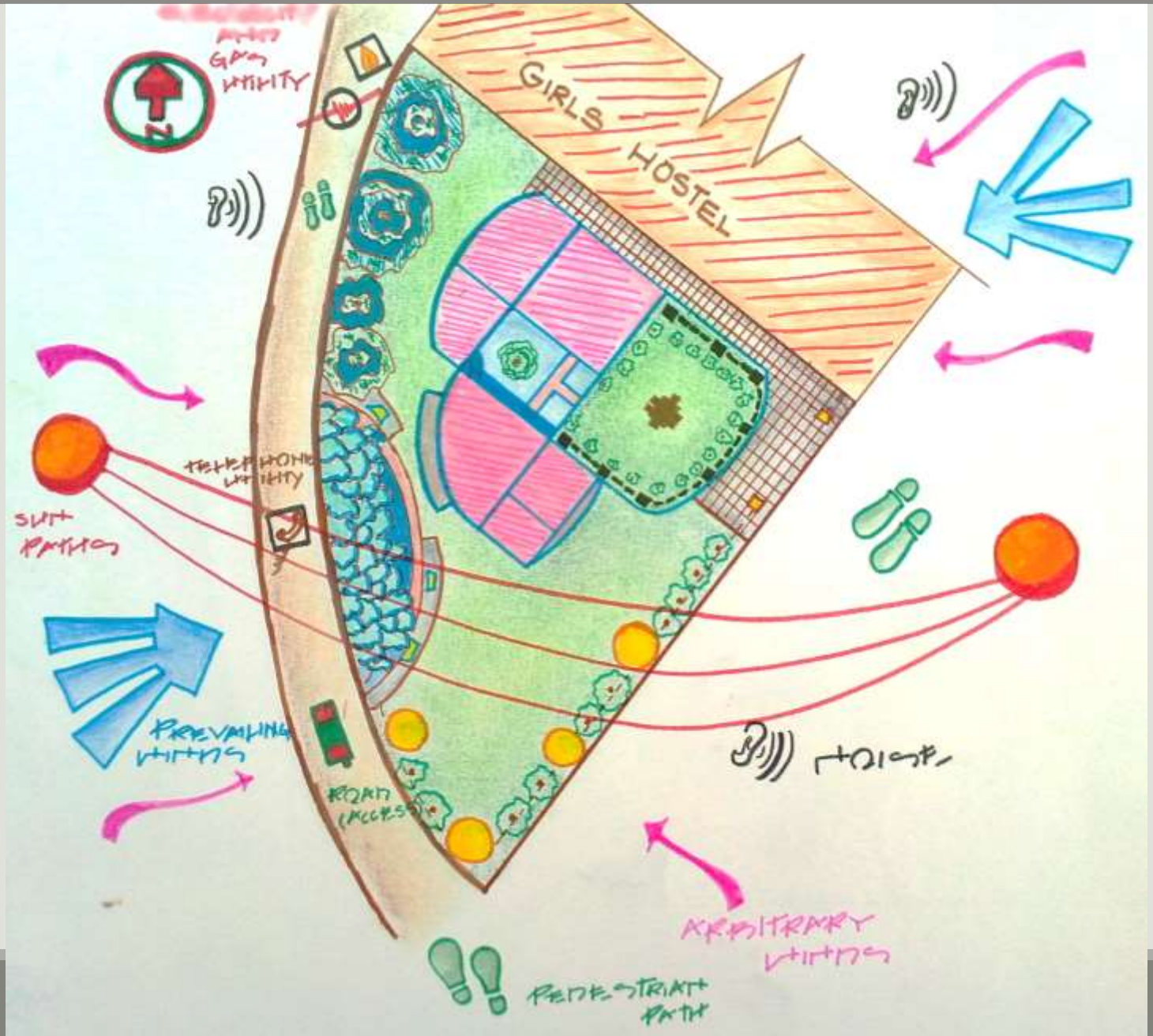
Micro Site Analysis (Man-made Features)

- **Utilities:** Sanitary, water supply, gas, electrical etc.
- **Circulation:** Linkages and transit roads, auto & pedestrian access, mass transit routes etc.

Micro Site Analysis (Aesthetic Factors)

- **Perceptual:** From an auto, by pedestrian, by bike etc.
- **Spatial Pattern:** Views of the site, views from the site, spaces existing, potential for new areas
- **Natural Features:** Significant natural features of the site, water elements, rock formations, plant materials

SITE ANALYSIS



3- PRE-DESIGN STUDIES

- Architectural Brief (Realization of Clients objectives)
- Project Budgeting: The construction cost analysis provides a construction budget. It includes costs for different phases of the building project such as site development costs, construction costs, furniture and fitting out, landscaping and consultants fees.
- Project Schedule
- Feasibility Report: The main objective of a project feasibility report is to ensure that the project is legally and technically feasible, economically justifiable and to determine the viability of a project. Viability means ability of the project to work successfully

SCHEMATIC DESIGN

PHASE - 2

PRELIMINARY DESIGN

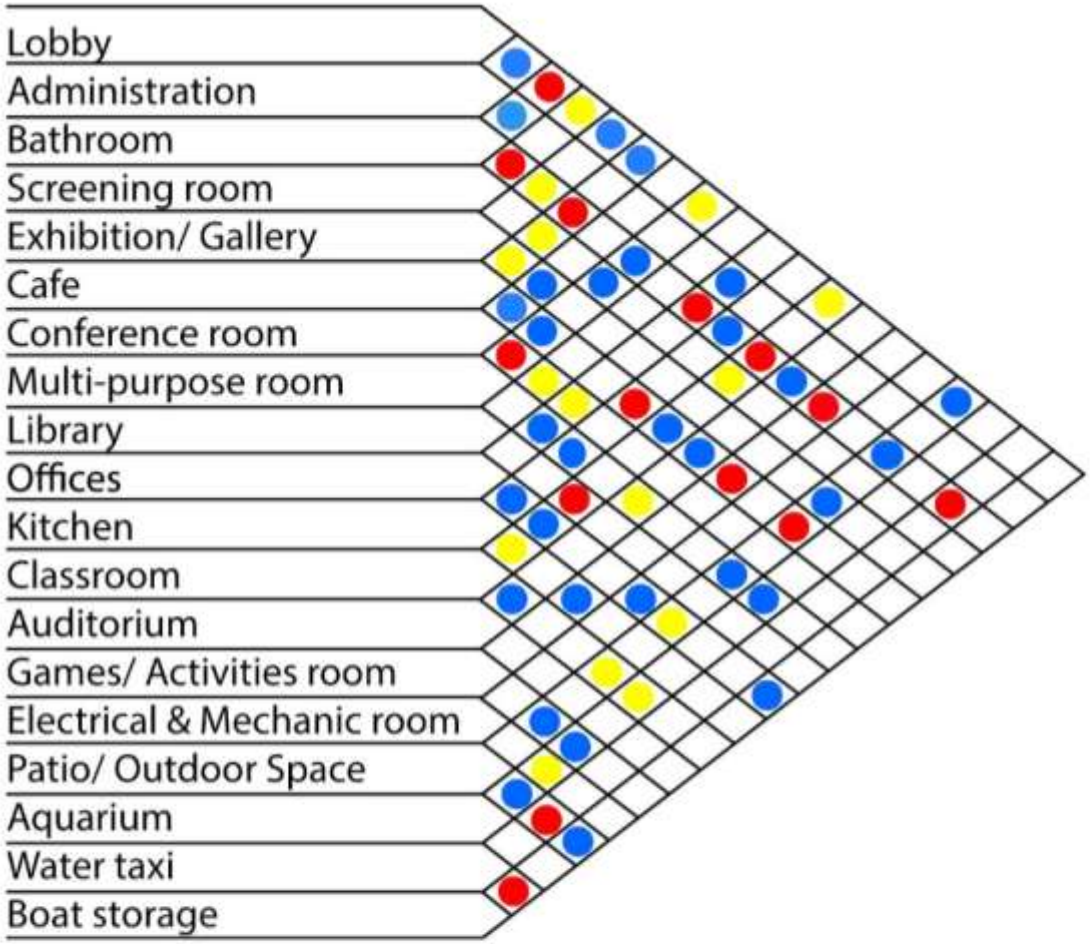
After establishing the program for a project, the focus in the architectural design process shifts from what the problems are to how to solve those problems. During schematic design, the focus is on the "scheme", or overall high-level design. Here, minor details are ignored to focus on creating a coherent solution that encompass the project as a whole.

The architect starts with the conceptual design, establishing the size, location, and relationships between all the spaces. Schematic is where we figure out more or less how the building will look and operate. It includes rough drawings of a site plan, floor plans, elevations and often illustrative sketches. General form of the building and its relationship with the site and surrounding environment is established.

Initial cost estimations are also investigated based on total project size and complicity.

- Proposing spatial relationships and diagrams, defining these as scaled layouts
- Three dimensional study models are made at this stage
- Approximately 80% of the decisions that influence a building's appearance and energy efficiency are made by the architect and client during the preliminary design phase; the remaining 20% are made by engineers at the later phases of design.
- Orientation, volumetric composition, location and protection of glazing will determine both the energy consumption and the overall feel of the building. Selecting the right design at the concept stage will improve energy performance, and will greatly reduce the need for expensive engineering solutions later on in the design process.

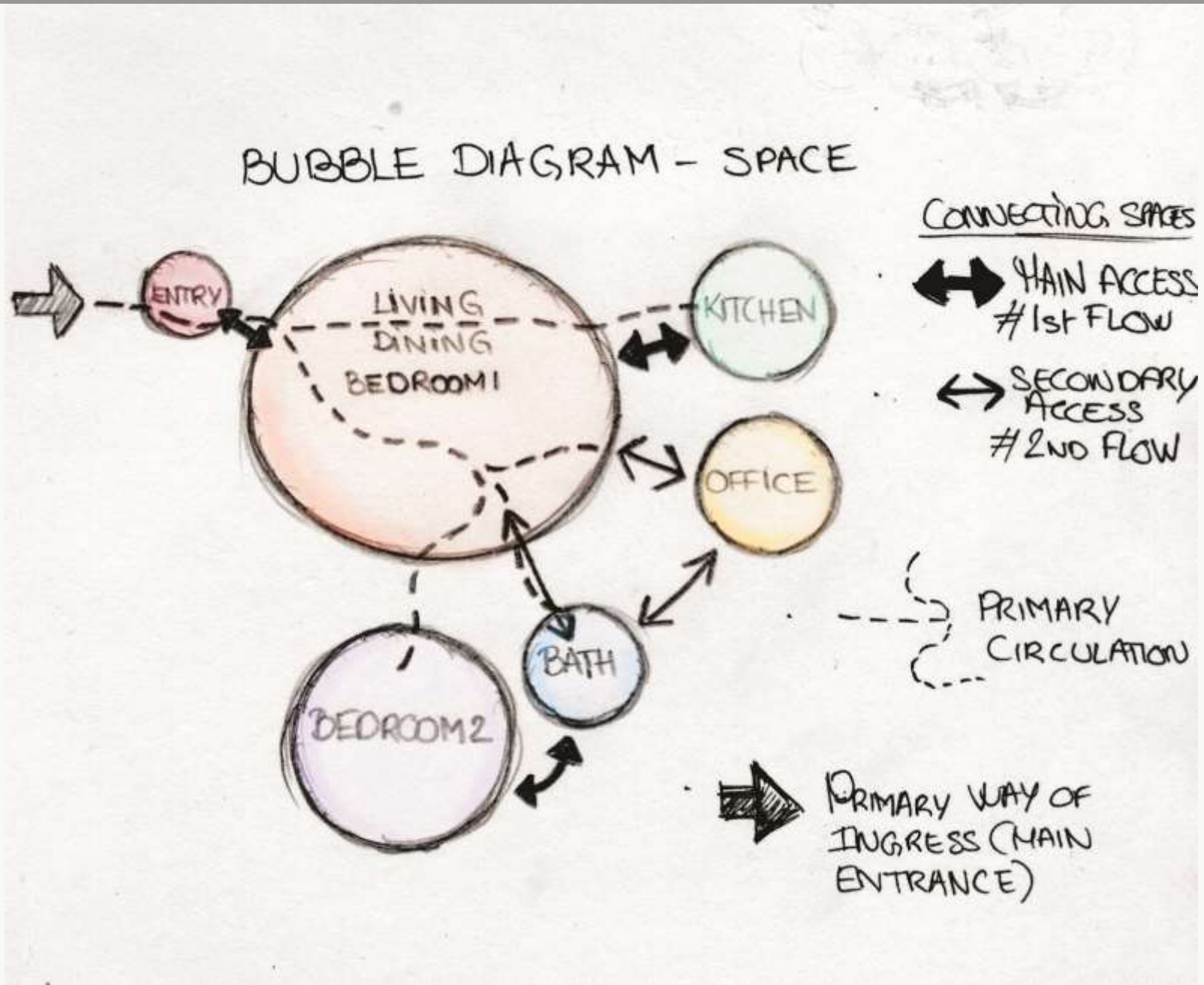
Space Relationship Diagram



Adjaceny Matrix
- Must
- Should
- Would be nice

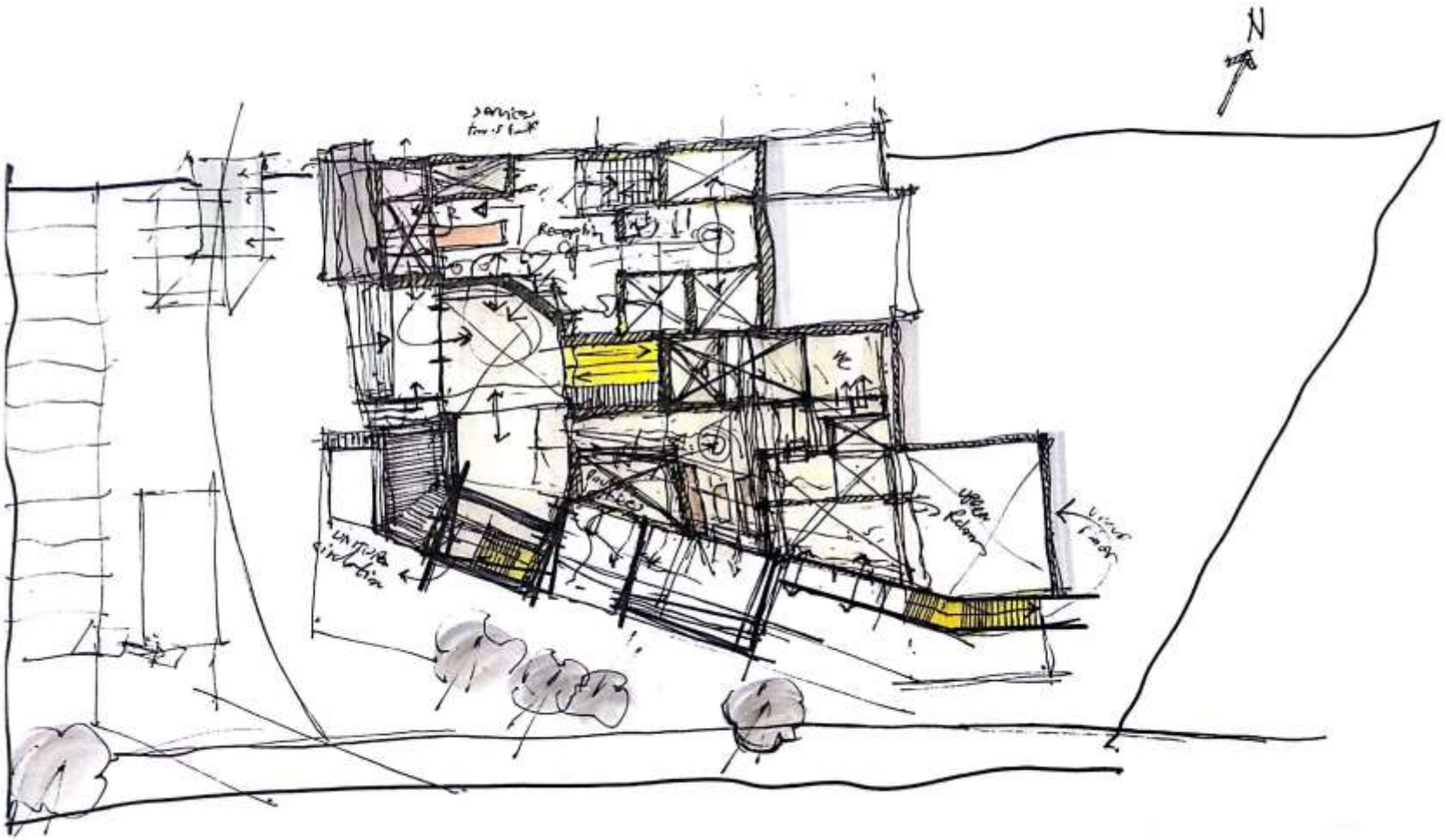
Adjaceny Matrix

BUBBLE DIAGRAM

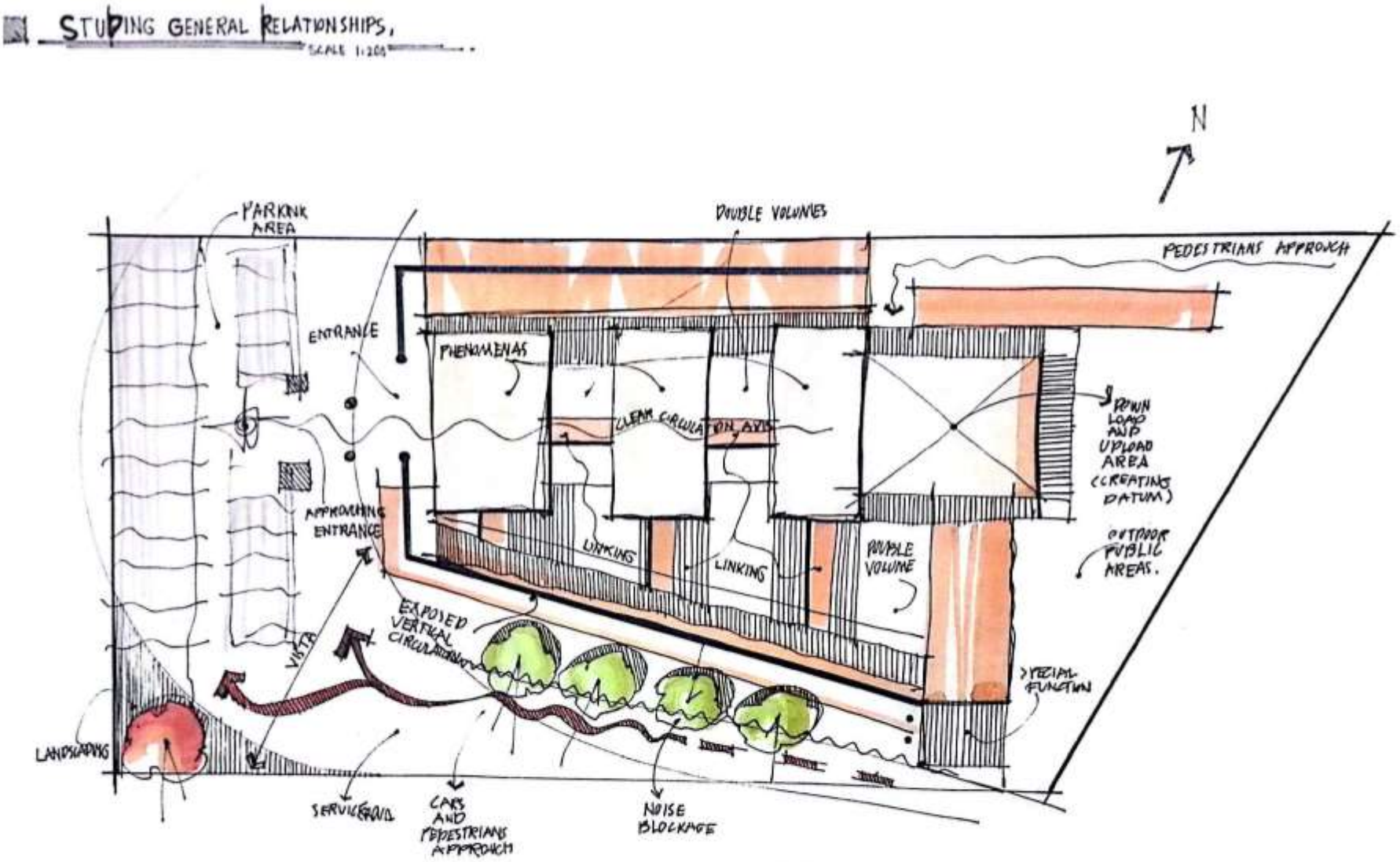


CONCEPTUAL PLAN (Building Zones)

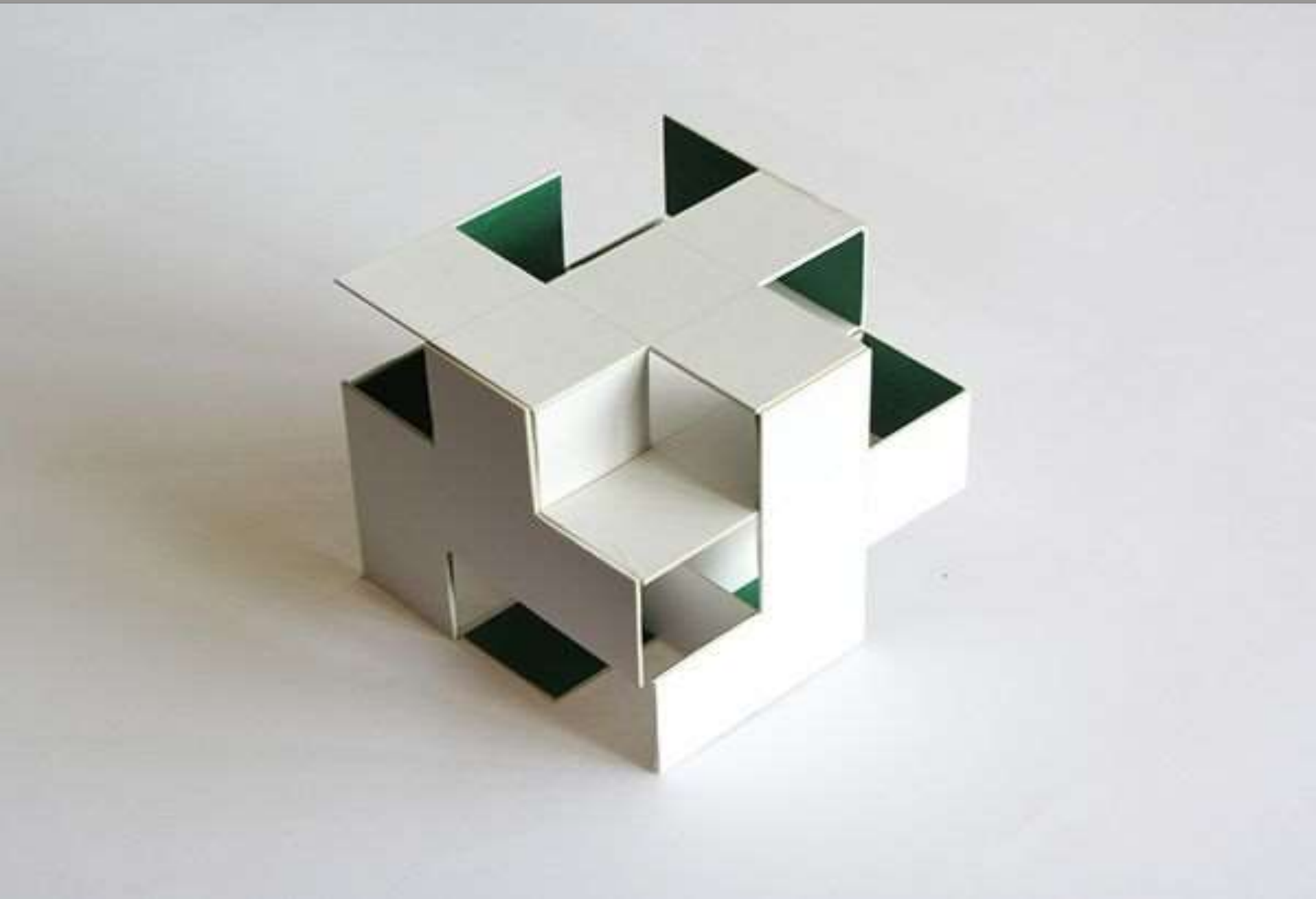
INITIAL FLOOR PLAN



INITIAL FLOOR PLAN



STUDY MODEL



DESIGN DEVELOPMENT

PHASE - 3

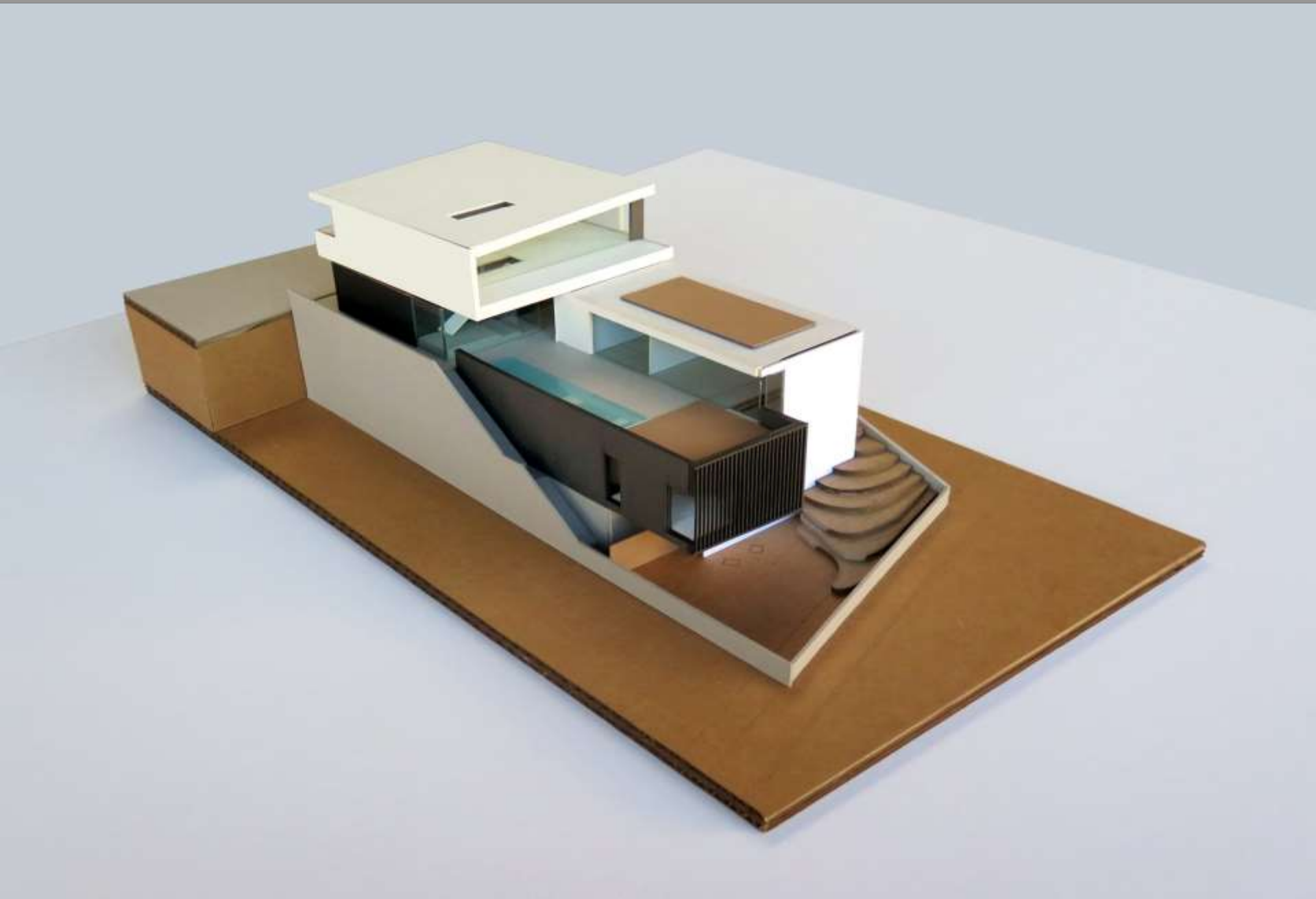
DESIGN DEVELOPMENT

During this phase Schematic Design is refined into the final design. In previous phases, the focus has been on the project as a whole. During Design Development, it becomes important to give individual attention to each aspect, each space and each detail of the project.

- Detail plans with furniture and fixtures, interior finishes and products, computer model showing selected materials, use of the available floor area, relationships between different areas of the building, and the building's relationship with its surroundings.
- Outline compliance with the building and planning regulations
- At the conclusion of the **Detailed Design**, the building is sufficiently defined to give a clear understanding of the scope of work, approximate costs, and the architectural look and feel of the building.

FINAL MODEL

FINAL MODEL



CONSTRUCTION DOCUMENT

PHASE - 4

CONSTRUCTION DOCUMENT

At this stage, the focus shifts from design to communicating the design and providing all information necessary for construction. The final documents will be sent out to additional specialists like structural and mechanical engineers, landscape architects. All the technical designs are finalized including HVAC systems, plumbing, electrical, gas, energy calculations and all products and materials are selected and scheduled.

Multiple drawing sets are produced for final approvals from the Building Authorities and these documents will be used by the Contractors for the preparation of their competitive tender documents.

Separate drawings are made for each work type, e.g. the electrician gets his own drawings that only show the electrical work, and the concrete contractor only gets drawings for foundations and concrete work. This reduces confusion on job sites and makes it easier for everyone and know exactly what they are responsible for.

- This includes general arrangement drawings, detail drawings, schedules, specifications and BOQ's (Bill of Quantities).
- Environmental calculations as well as the thermal performance of the building is defined, and the electrical and heating requirements are detailed.
- The Client is advised on the durability of the materials and solutions adopted at this stage, and on the relative maintenance and Life Cycle costs associated with these decisions.

BIDDING

PHASE - 5

TENDERING & NEGOTIATION

At this time the owner prepares to select the contractor and sign contracts to proceed with construction. Multiple contractors submit bids or the client can directly hire a contractor without getting competitive bids. The architects role here will be to assist the client, answer contractors questions provide any additional documentation if requested by or needed by the contractor. This phase can be started at the beginning of the project it does not need to wait until all of the construction documents are completed.

If you have an exact budget in mind at the begging of the process, it is recommended for the client to hire a contractor to consult and review the schematic design, design development, and construction drawings from the beginning in order to ensure the project is within the specified budget. Only a contractor can guarantee a price of construction; architects and cost estimators who provided budgets cannot guarantee those prices.

- In the construction industry, the process of selecting a contractor is generally referred to as ‘tendering’ and involves preparing tender documents that describe the project, and then inviting tender submissions from prospective contractors from which as selection can be made.
- A tender is a submission from a contractor making an offer to carry out the works.
- The tender documents describing the project and what is required from the contractor are then issued to the short-listed contractors.
- Contract documents are provided to each of the Contractors from which they calculate their price. Selection of a minimum of four tenderers is recommend.
- The tender period is usually three weeks, during which we answer questions and provide clarifications of the contract documents.
- Once tenders are opened, they are review for compliance with the **Contract Documentation**, analyzing the comparative costs, clarifying any exclusions and making recommendations. Once a contractor has been appointed, the local council will issue the construction license.

CONSTRUCTION ADMINISTRATION

PHASE - 6

SITE SUPERVISION

- This is the construction stage of the project. The building will be built under a contract between the Client and Contractor.
- On typical projects the architect does NOT supervise construction. The architect will periodically visit the site to ensure that the work is executed in accordance with the contract documents
- The architect can review contractor's monthly invoices to confirm work completion. The architect will be available to answer questions and provide additional information to issues that arise. During this phase it is common that some additional services for the architect arise due to change orders.
- Architects perform multiple progress inspections and special inspections during construction and submit Technical Reports to the authority.

FINAL CERTIFICATE

PHASE - 7

FINAL CERTIFICATE

- The Architect stays on the project until the building is completed
- With the completion of the construction works, the calculation of the final statement of costs is undertaken, As-Built drawings incorporating any modifications to the original project are prepared, final inspections are all completed, and the owner obtains a certificate of occupancy and any other certificates required for operation and use of the building.
- Cyclical maintenance and Building Use manuals should be read and understood by all building owners. Maintenance within the specified periods will avoid increased energy consumption, blocked drains, leaking roofs and creaking timber.