

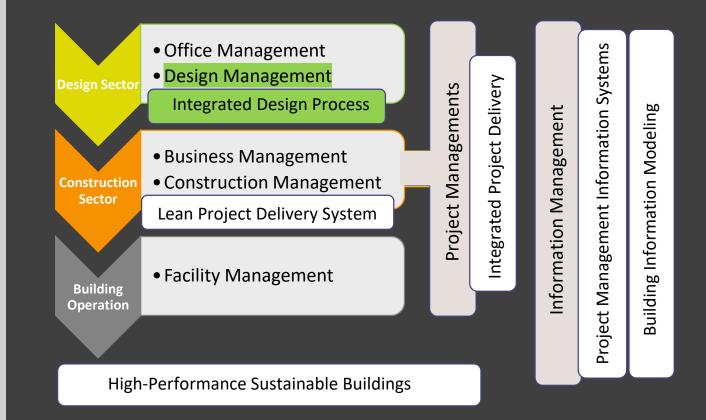
### Advanced Design & Construction Management Techniques-Integrated Project Delivery- The Discovery Phase

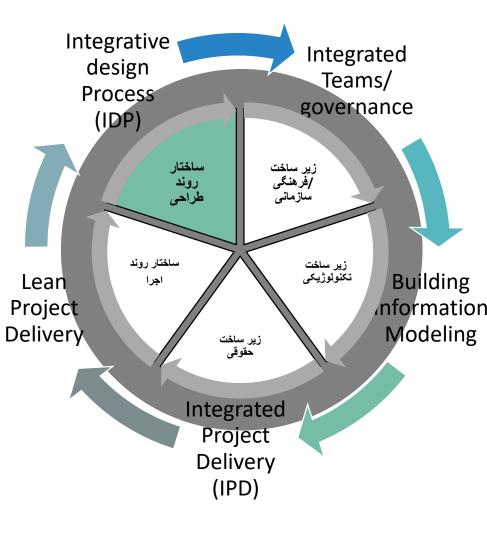
جلسه هفتم- ارديبهشت ماه 1398- مديريت پروژه

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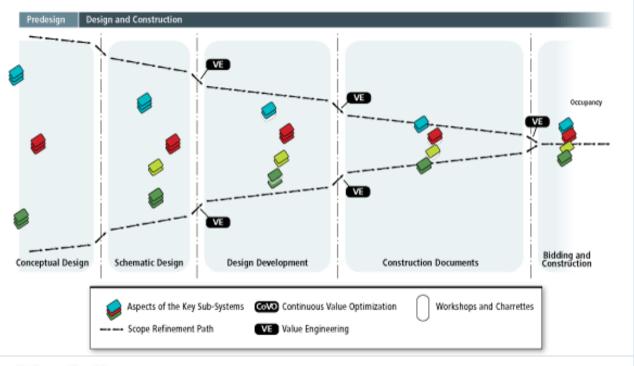
### Introduction

- The Discovery Phase
- The Four Key sub-systems (Habitat, Water, Energy, Materials)
- Finding the core-values of the project
- The preparation-Phase

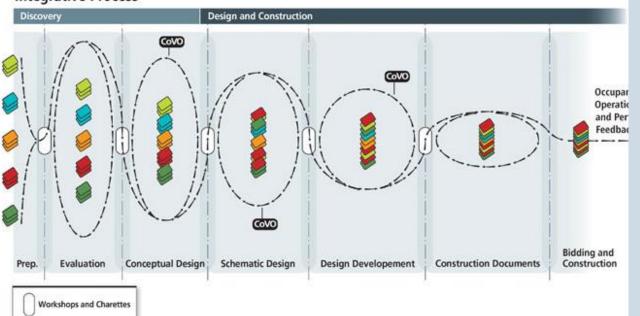




### Integrated Design Process



#### **Integrative Process**



## IDP vs. Traditional Design Process

- Same time scale
- Discovery twice the predesign
- After each charrette the scope of options becomes more focused.
- Continuous value optimization as opposed to discreate value engineering

# مدل ذهني: از تكنولوژي و محصولات تا طرز تفكر



**MENTAL MODEL** Client, design, and building teams' mind-set, attitude, and will

### PROCESS

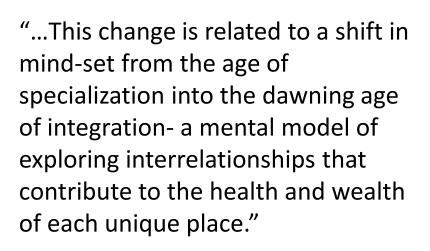
Integrated, all parties engaged-system optimization through iterative analysis

### TOOLS

Metrics, benchmarks, modeling programs- analytical methods for materials and costing

#### **PRODUCTS/ TECHNOLOGIES**

Things and stuff, technologies and techniques





### Three part Structure

Discovery

Design and construction

Occupancy, Operations, and performance feedback

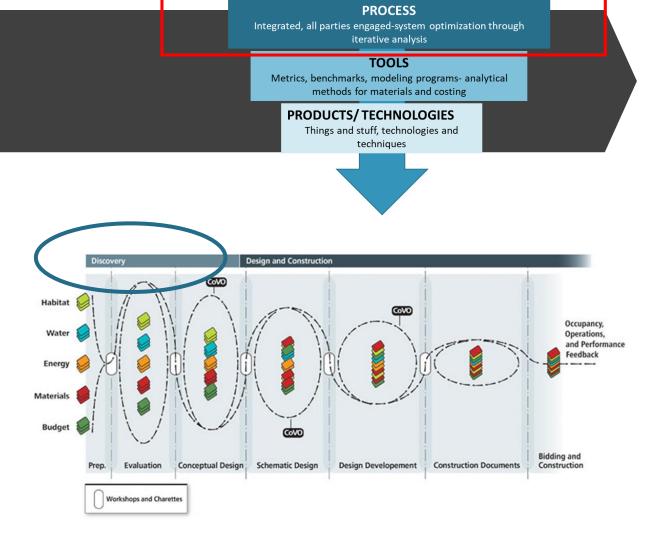
# The Discovery Phase

### Roadmap to Success

• Creating the foundation for working together:

Everybody Engaging Everything Early

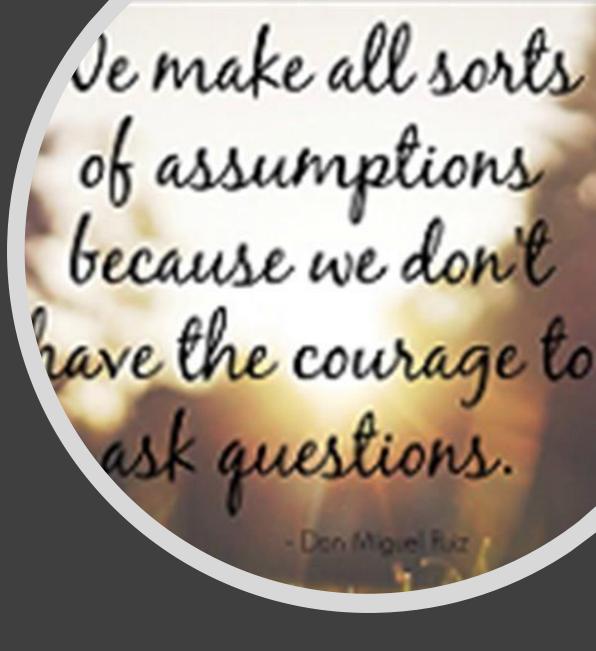
- The Key relationships: building systems, project and the larger system it inhabits
- To illuminate these relationships:
  - Question assumptions
  - Create alignment
  - Foster an iterative process
  - Integrate intentions with purpose



MENTAL MODEL Client, design, and building teams' mind-set, attitude, and will

# Questioning Assumptions

- Fundamental role of questioning in learning
- Engaging in the process for finding the right questions.
- Having a clear view of all possibilities.
- Sometimes assumptions are so deeply ingrained that we do not recognize them as assumptions.





Knowledge is having the right answer. Intelligence is asking the right question.

## Questioning Assumptions

The story of the international corporate headquarters project
-Why do you need this building? we need more space.

-Why do you need to house the workforce?

To achieve a higher level of effective communication.

-Why will they interact better if you build the design concept that's already up there on the wall?!!

"Building Less-or not at all- is generally the most environmentally responsible choice."

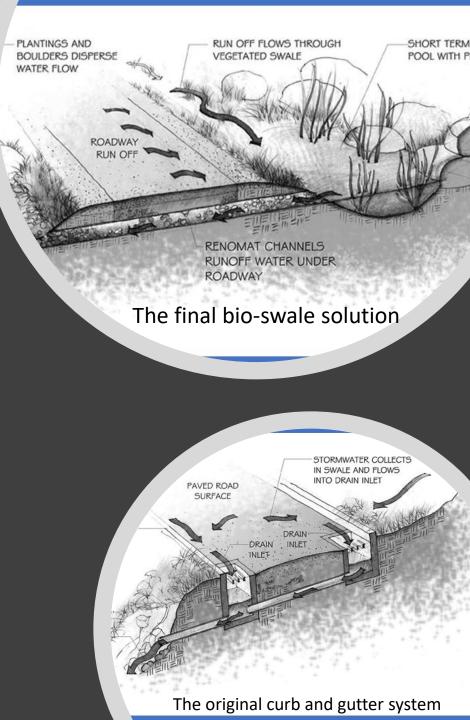


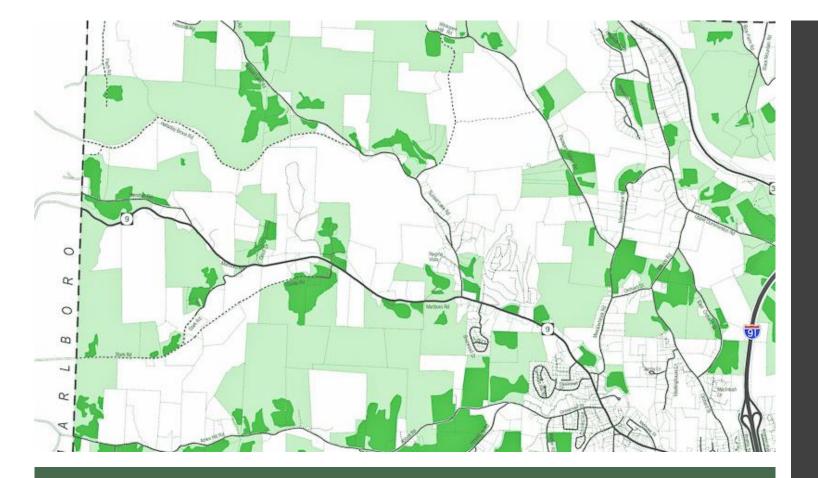
# Aligning the Team

- Diversity of values, opinions, expectations, and perspectives.
- Diversity can be either an asset or a liability.
- An intentional process for helping clients and team members understand how and why the design process must be employed differently is critical.
- The story of teaching laboratory and operable windows:
  - Discussing the idea of indemnification (aligning values, aspirations, and objectives)
  - Addressing the problem of short-circuiting of the cooling system

## Fostering an Iterative Process

- Allows communication at every level
- Each team member's design decisions can be informed by an understanding of how their work relates to the whole.





Integrating Intentions with purpose: The Story of the Brattleboro Co-op Grocery Store Looking at the more fundamental issues of sustainability before jumping into defining a building program.

- ⇒The question that aligns stakeholders: "What's the project purpose?"
- ⇒Identify the changing dynamics that posed key threats to the future viability of the project.
- ⇒Grounded itself in a profound awareness of place and its vanishing food heritage, by promoting local farming.
- ⇒Included other local organizations to build a resilient business network, aligned around a shared regenerative vision of place.
- ⇒The purpose of the project shifted from simply building a grocery store to taking a key role in creating a sustainable community.

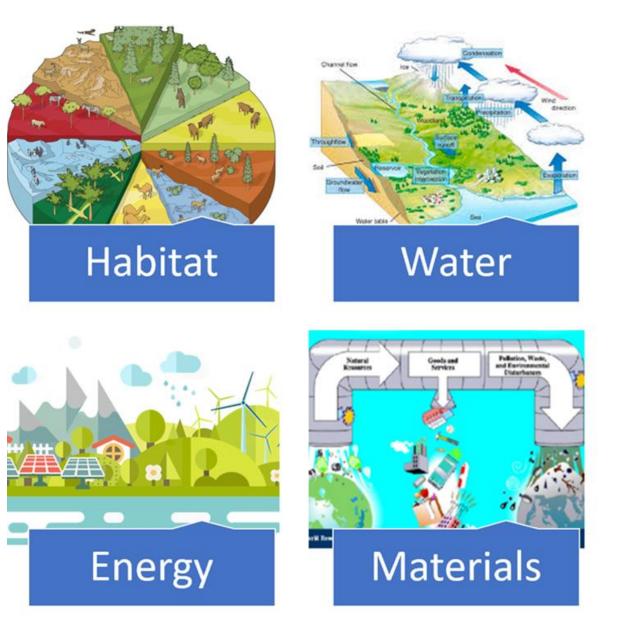


Integrating Intentions with purpose: The Story of the Brattleboro Co-op Grocery Store The program of the building expanded to potentially include:

- an agricultural and soil extension service;
- a food canning operation for local produce;
- A place for hunters to dress their meat;
- A credit union to support local agriculture and trading
- Sustainable agriculture education
- Mixed-income housing for employers
- A day-care center
- And an award winning highly energy efficient grocery store!

### The Four Key Subsystems

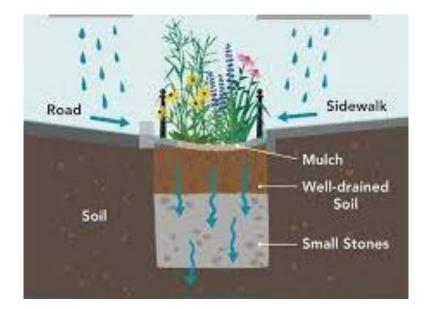
- Each project has a distinct, purposeful contribution to make to the larger whole.
- All Developments are inherently linked and inextricably bound not only to larger nested systems but to primary subsystems within that whole.
- Looking through the lens of each can help us discover purposeful relationships between smaller and larger systems.

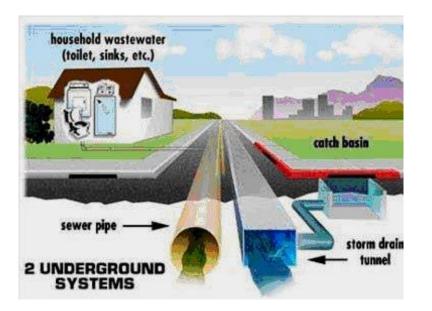


### Water

- In Massachusetts, at least two towns are currently building expensive, energy-intensive, and pollutiongenerating desalination plants in an effort to compensate for failing groundwater supply. Given the fact that Massachusetts receives an ample 40 inches of rain per year, why is this necessary?
- How does the earth get its ground water?
- Healthy soils generated by healthy habitat are required for healthy water.
- Our failure to design in harmony with the natural system has put us in a position where we are forced to implement new and expensive technologies to produce the clean water that the Earth produces all by itself.
- The burning of fossil fuels to generate the high levels of energy required to operate desalination plants produces pollutants and other toxicants, that in turn, contribute to phenomena like acid rain further polluting the Earth's primary source of fresh water.

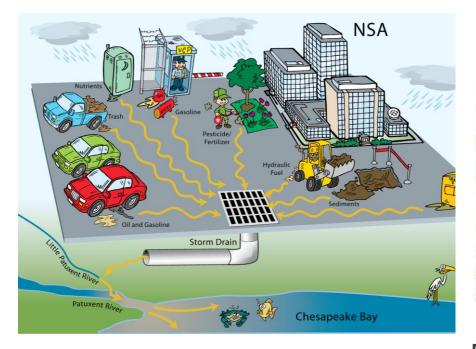


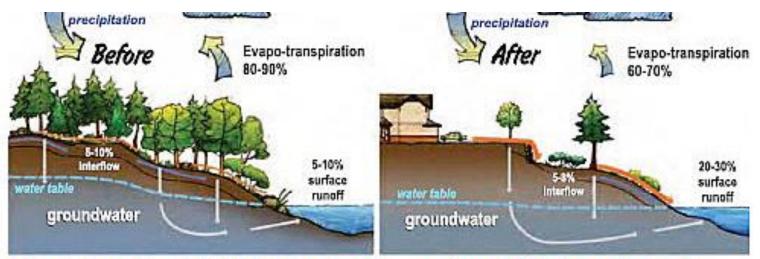




# Water- Materials systems

instead of utilizing natural bioswales and rain gardens to capture, store, and infiltrate rain water, we build complex and materials intensive stormwater conveyance systems to take water away- and the embodied energy to fabricate, install, and maintain them ties back to energy again.





Before development almost all rainfall is taken up by plants, evaporates or infiltrates through the ground. After development, surface runoff increases significantly, carrying with it nutrients and contaminants.

Adapted Imagery caurtesy of the Puget Sound Partnership



# Ecology of Water

# Restoring a Cultural Relationship with the Land and water

- What do we mean when we say we want to restore the landscape, or restore the health of the earth?
- Regard a culture healthy so long as it continues to renew itself with each new generation.
- Much of our contemporary infrastructure and conventional planning methodologies are products of a contrived visual aesthetic with little understanding, relationship, or grounding in the unique realities of place.
- Once we understand the realities of place, there are infinite opportunities for creative expression; true design freedom is possible only within these limits.



# Water- Principles

- Make the annual water budget equal to or less than annual rainfall on site.
- Use less water; reuse water when possible
- Retain all rainwater on site.
- Manage water (rainwater or wastewater) to replicate natural flows in order to minimize water leaving the site.
- Recharge groundwater table (where possible).
- Clean all water to potable standards before it leaves the site.

### **Potential Solutions:**

- Integrating rainwater-harvesting systems into our building designs.
- Reducing impervious surface areas, installing a green roof, constructing a retention basin,...
- Constructing bioswales, raingardens, etc to clean the wastewater & recharge groundwater table







# Habitat (human, Earth, and other biotic systems)

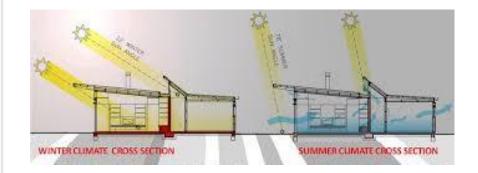
• We must take responsibility for developing in harmony with these other biotic systems in order to sustain life- all life.

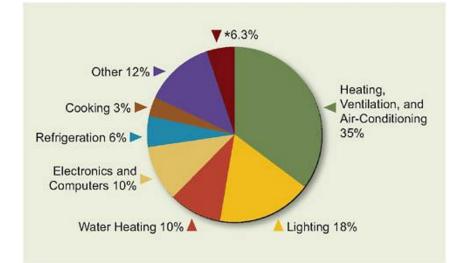
### **Principles:**

- 1. Partner all human activities with living systems in mutually beneficial relationships- a project should contribute to supporting the systems of life on its site and within its watershed.
- 2. Understand and respect local ecological and social systems.
- 3. Build in essential feedback mechanisms to continuously evolve these relationships.

### Energy- Principles

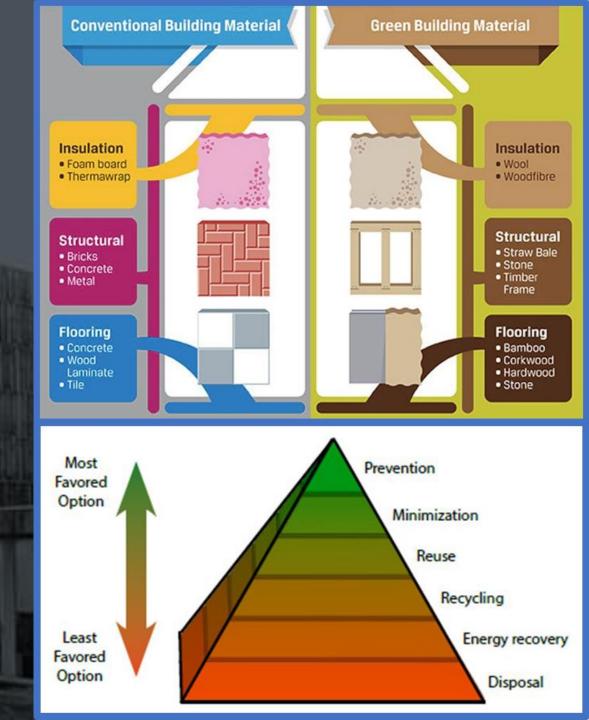
- Create less demand via use of insulation, demand patterns, reduced loads, etc.
- Use available site energies, and diurnal cycles.
- Increase the efficiency of what is left
- Minimize or neutralize carbon footprint.





## Materials- Principles

- Use less- that which is not used has no environmental impact.
- Use materials that are abundant and renewable and that do not destroy human and/or earth systems in their extraction, manufacture, and disposal.
- Strive to use locally sourced, recyclable, nontoxic, and/or lowembodied-energy materials.



### Aligning Dollars and Resources

Natural systems are capable of providing "free services" to us; but only if we work to sustain their generative capacity.

Resources include not just dollars but also the land the project is built on, the water that would hit the site, the solar energy, and the materials in the building....

Exploring opportunities for maximizing the potential for utilizing all the resources, including the "free services".

Through the practice of development, we need to connect our values to the vast array of noncapital resources that are at our disposal.

# Aligning with Values

- A truly integrative process is not just passing information back and forth but actually creating something together and collectively identifying and holding onto principles and core values-purpose.
- How would a successful project be defined for this place not only at this time, but also for its evolution into the future?
- Each team member becomes more engaged on a personal level. The project is no longer just another building project or a job.



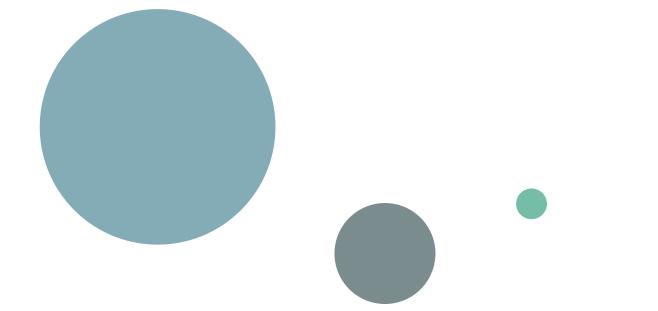
### The "core Value" Exercise

- Identifying the team's values through the lens of the following five key environmental imperatives:
- 1. Climate Change
- 2. Potable water
- 3. Resource destruction
- 4. Habitat destruction
- 5. Pollution and toxins
- Open a discussion about how teams think a successful project would address each of these issues.
- The results contribute to creating the owner's Project Requirement.
- The story of Phipps Conservatory



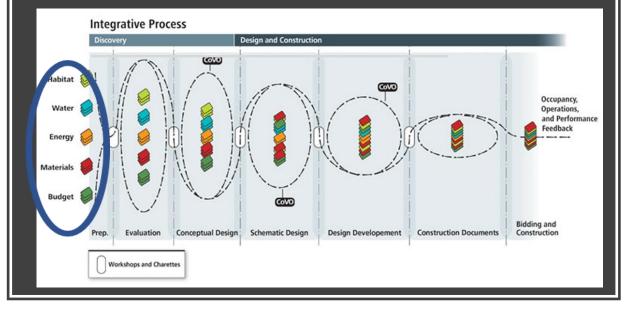
Phipps Conservatory

	Design Elements/Issues	# of votes
1.	Financially sustainable	85
2.	_ Functional efficiency that encourages team collaboration	75
3.	Building as a teaching/research tool	65
4.	Transferability to the market	56
5.	Model for beyond green	50
6.	Quantifiable results over building life cycle	39
7.	Pittsburgh's new icon of sustainable development	37
8.	Dissolve the boundaries between inside and outside	34
9.	Systems transparent to the public/visitors	31
10.	Provide a roadmap for improving future sustainable projects	31
11.	Demonstrate the connection between buildings and the environment	31
12.	Inform the development of future codes	28
13.	Influence societal behavior	27
14.	Beacon of hope related to climate change	25
15.	Create a destination venue	24
16.	Flexible/adaptable design	24
17.	Optimization of project's structure with the site	23
18.	Demonstrate achievement of the triple bottom line	22
19.	Expand project boundaries to improve health of the regional ecosystem	21
20.	Memorable spatial experience	14
21.	Encourage the question of sustainable	13
22.	Dynamic building information model	11
23.	Spark to ignite change	11
24.	Create clear linkages with adjacent park/universities/local amenities	11
25.	Engage the larger public in design and planning	11
26.	Catalyst for future innovations	9
27.	Showcase the integrative design process	8
28.	Zero construction waste	8
29.	Tangible example of the effects of human/environment interface	7
30.	Redefining building health	7
31.	Incorporate biomimicry	7



# The Preparation Phase

# Preparation Phase



### Stage A.1

**Research and Analysis: Preparation** 

### A.1.0 Prepare Proposal A

Establish scope and fees for initial Goal-Setting Workshop

### A.1.1 Fundamental Research for Workshop No. 1

- Site selection: Assess optional sites (if not already selected)
- Context: Identify base ecological conditions and perform preliminary analysis of the four key subsystems:
- Habitat
- Water
- Energy
- Materials
- Stakeholders: Identify key stakeholders—social and ecological
- Program: Develop initial functional programmatic requirements

### A.1.2 Principles and Measurement

Select rating system and performance measurement criteria

### A.1.3 Cost Analysis

Prepare integrative cost-bundling framework template

### A.1.4 Schedule and Fees

- Develop a scheduling template—a *Road Map*—for assigning tasks
- Prepare Agenda for Workshop No. 1

### Preparation of proposal A



-Proposal A: Selected key consultants or team members are asked to submit a fee only for participating in the initial goalsetting workshop and preparing the background research needed.

-Proposal B: With clearer understanding of scope and schedule, all team members can now sign more accurate fees to the tasks required for the remainder of the project.

Fundamental Research for workshop No. 1

- Site selection
- Stakeholders
- Programs
- Context (Habitat, Water, Energy, Materials)

### Site Selection Criteria

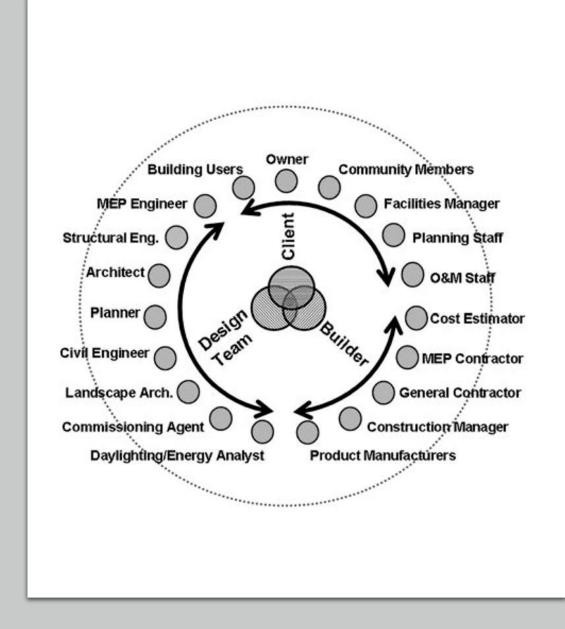
- Sensitive land protection: Avoid building on the following sites:
  - Prime farmland
  - Floodplains
  - Habitat for endangered and threatened species
  - Close proximity to wetlands and water body
- High-Priority site: Building on areas with development constraints and promote the health of the surrounding area:
  - Historic District
  - Priority Designation
  - Brown Field Remediation
- Building in dense areas with diverse uses
- Building close to public transportation/ bicycle network.





# Stakeholders

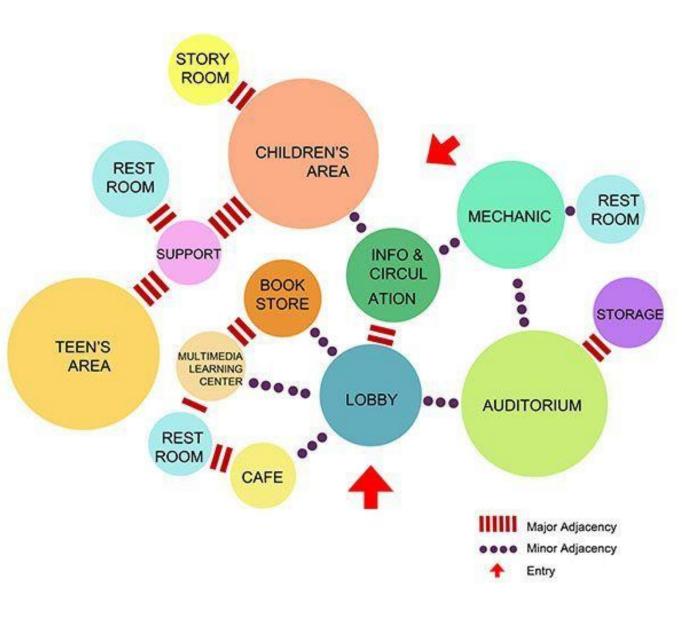
- Include everyone early- 70% of the decisions associated with environmental impacts are made during the first 10% of the design process
- Select the right team members based on expertise
- Recognize where additional expertise may be needed
- For advanced whole-systems approach additional expertise may include: a systems ecologist, geohydrologist, restoration biologist, community facilitator, social historian, etc.



### Program

Develop initial functional programming requirements (briefing package):

- Basic areas
- Functions
- Proximities
- Adjacencies



### Think about Joint Use of Facilities!

Think about ways to integrate the school with the community by sharing the building and its playing fields for non-school events and functions. **Option 1.** make building space open to general public

**Option 2.** Contract with specific organizations to share some building spaces

**Option 3.** Use shared spaces owned by other organizations



Sample Questions for writing your Reflections



با توجه به اینکه یکی دیگر از تکنیکهای موفقیت در مرحله کشف و شناخت طراحی یکپارچه پرسیدن سوالات به جاست، برای شناخت بهتر ماهیت پروژه طرح معماری این ترم چه سوالاتی می توانید مطرح کنید ؟



با توجه به اینکه یکی از قدمهای اولیه در طراحی یکپارچه شناخت ماهیت مکان است، ماهیت مکان پروژه طرح معماری خود را چگونه تعریف می کنید؟ آیا می توانید در یک کلمه این ماهیت را نامگذاری کنید؟ چه نیرو هایی می توانند در سیر تکاملی و یا تغییر این ماهیت در آینده تاثیرگذار باشند؟ فکر می کنید شناخت این ماهیت و نیروهای موثر برآن چه تاثیراتی می تواند احیانا در برنامه فیزیکی طرح، و شکل گیری طراحی شما داشته باشد؟