Site Analysis and Planning

Lecture 1

Welcome to UGC lecture series for B.Architecture. The topic is Site analysis and planning. Subject code - AR 6512. Unit 1 - Introduction, lecture 01.

Presentation Outline - the presentation is divided into three major categories. First, introduction and then we move on to Site planning and finally we close with site analysis. In the entire presentation we are going to see the importance and uses of site planning and how it goes along with Site analysis.

Site Planning

What is site planning? The art of arranging structures on land and shaping the spaces between them is called Site planning, this is according to Kevin Lynch. What he is trying to imply is, on a piece of land, the way in which you arrange your buildings and the space in between them to act accordingly with a good relationship with each other is called Site planning. It is also defined as Site planning is the organization of the total land area and the air space of the site for the best use by the people who will occupy it. It was said by Garrett Eckbo. According to them it means the relationship between the site and the building means it can be best used by the people who are going to use the space. It takes into account also the uses, who will finally occupy the site and who will be the end user of the space, this is called as site planning. What is site planning? Site planning is a creative process requiring the manipulation of many variables. It involves the location, the site where it is located, in which area is it located and all those details fall under the location part and it also takes into account; placement - where it is placed from the road. Say for example, from the main road how far is the site located; all this comes under the placement part. We will move on to the relationship of all site elements which means other services, utilities, how it is going to come into your site, utilities like gas, electricity, all this comes in relationship with the site.

What is a site? Site can be defined as the existing conditions of the land. A place where something is or will be located. A site is like an open piece of land in which construction is going to happen. Planning where to build and where not to build is understood in planning. A detailed proposal for doing or achieving something. It is the way in which you plan how your buildings and roads, and other service areas are going to be located within your site is called planning. The site is an empty plot in which designing is going to happen is called the site planning. Site is being categorized under plot and then there is site, land and region. The plot is like a smaller piece of land, when a few plots come together it is also called as site. The land is a parcel of sites and a cumulative piece of land in which lot of sites are located. Region is on a much more larger scale, in which a country or an entire state is taken into account. Definition of plot/site area - means the area of contiguous parcel of land enclosed by definite boundaries over which

the applicant has legal right for development (or) as a continuous portion of land held in own ownership. In square feet or square meter or grounds. Plot or site area is defined as a piece of land which is being surrounded by a definite boundary. A site is completely a finite piece of land in which you are going to make a proposal or build something. It is being held in single ownership, in some cases, it can even go to multiple ownership or partnership basis. It is usually expressed in square meters or square feet or grounds. Site - Segments of land with artificial boundaries and there is a human intention to assign a land for a specific purpose in square meter, grounds, acre or hectare.

Plot is usually a small parcel of land whereas site can be designed into a much bigger space in which it is also enclosed by artificial boundaries created in which you can create other buildings but it is usually expressed in acres or hectares when it goes into much bigger size. The place where a structure or a group of structures was, is or is to be located, a plot of land prepared for or underlying a structure or development i.e a land in which a building is going to happen, this is called a site.

Land - Solid part of Earth's surface. Large in areas - natural or man made intervention for certain economic activities. A land can be defined as a huge parcel of land in which humans are again going to develop something. It can be natural or even an artificial land can also be considered land. For example - Agricultural or forest land, measured in sq.kilometres. When you compare the scale between site, plot, land and then region, you can actually see how the scale has been increasing.

Region - defined as a part of the country. Space, place of more or less definitely marked boundaries or characteristics. A large usually continuous segment of a surface or space. A large, indefinite portion of Earth's surface. An area, division or district of administration. Also, a land surface with common geographical or topographical characteristics. This is a much broader sense of which a region is being covered. It can be an indefinite, continuous parcel of land, say for example - India is one region, that is how big a region can be defined. A specified district or territory, this is usually defined with territories that can be marked by various aspects like water, other countries along with it, that is called a territory or a district divided into two.

A unit of measurement - let's see what different units are used for measurements. Millimeter - A millimeter is a unit of length in the metric system, equal to 1000 of a meter, which is the current SI base unit of length. It can be written as 1 meter/1,000. As you can see in this diagram, 0 to this part is called 1 millimeter. 1 millimeter is the basic unit for any measurement that we take. In 1 meter we have 1000 millimeters.

Centimeter - A centimeter is a unit of length in the metric system, equal to 100 of a meter, which is the current SI base unit of length. It can be written as 1 metre/100. 10 mm together is called as 1 cm or in 1 m we have 100 cm, it is defined as 1 cm.

Feet - A feet is a unit of length in a number of different systems. There are 3 feets in a yard and 12 inches in a foot.

Furlong - A furlong is a measure of distance within imperial units and U.S. It is equal to 660 feet or 201.168 meters. There are eight furlongs in a mile.

Hectometer - A hectometer is somewhat uncommonly used unit of length in the metric system, equal to 100 meters, the current SI base unit of length. It can be written as 100 x 1 meter. It is usually used to measure the length of highways or roads. It is written as 100 x 1, hectometers.

Inches - An inch is the name of unit of length in a number of different systems. There are 36 inches in a yard and 12 inches in a foot. As we know, inches are commonly used in our context and in 1 feet we have 12 inches and 1 inch = 2.45 cm.

Kilometer - A kilometer is a unit of length in the metric system, equal to 1000 meters, the current SI base unit of length. It can be written as 1,000 x 1 meter. Usually kilometers is used to measure long distances or it is used in surveying, when surveying roads or national highways, kilometers are usually common terms. 1000 meters makes 1 kilometer.

Meter - A meter is a measure of length. It is the basic unit of length in the metric system and in the international system of units (SI). It is defined by the International Bureau of Weights and Measures as the distance travelled by light in absolute vacuum in 1/299, 792, 458 of a second. One meter is basic international system of units. For 1 meter we have 100 cm and when you make drawing for international clients, we should typically use meters which is accepted throughout the world. It consists of 1 m = 100 cm = 1000 mm.

Purpose of Site Planning

What is the purpose of Site planning? To learn and practice a logical method of fitting design programs and sites harmoniously. To understand interaction of following factors in design process. Natural factors, Socio-economic forces and Technological functions which means architecture and engineering. As we saw earlier, site planning is the process in which we are taking a parcel of land and we are creating a relationship between the building and the unbuilt space. This is called site planning. We need to understand natural factors which exist in landscape and what type of soil it has, all this falls under natural factors. We also need to

understand about socio-economic forces which is planning factors which is going to go into the site planning aspect. We also need to understand technological functions which is architecture and planning which is going to go into it as well.

To understand the site development process by observing natural and human factors affecting the form and appearance of the environment. To collect information and data concerning planning or design issues. To classify and analyze the data. To make recommendations for issues at hand. When you do a site planning, it gives a clear understanding of what has to be done and what cannot be done in a parcel of land. It gives an idea of what are the pros and cons of the site which can be addressed by the designer or architect very clearly and the best outcome can be made based on the site planning factors. To draw up guidelines for planning, architecture and landscape disciplines, when you start a project, you need to have certain guidelines or regulations which you need to follow to fulfil the final goal, which can be done through the site planning process.

Site Analysis

What is Site analysis? Site analysis is an inventory completed as a preparatory step to site planning, a form of urban planning which involves research, analysis and synthesis. Site analysis and site planning cannot be separated, these two aspects go hand in hand together. When you do site analysis, you look into aspects such as what is the sun path, what is the wind movement, shadows changed throughout the day; according to which you make decisions on where your structure is going to be located, according to various seasons how this site is going to get affected. All these aspects happen hand in hand. It primarily deals with basic data as it relates to the specific site. We take a specific site context and study about the surrounding aspects that is going to affect the site. The topic itself branches into the boundaries of architecture, landscape, engineering, real estate development, economics, and urban planning disciplines. This is not only concerned about what is going to happen within the site but also takes care of other aspects which are going to indirectly affect the site planning. Aspects such as - Landscape, engineering, real estate development, economics, and urban planning disciplines. Only when you know what are the services happening around the site, you can bring in the services to your site and the end users can enjoy those services. All these aspects are being analyzed under Site analysis. Site analysis is an element in site planning and design. As I said earlier, it cannot be separated, site analysis is also a part of site planning and design..

Site design process is divided into three phases - 1. Research Phase and then we move on to Analysis Phasis and finally, Synthesis phase. Above three phases are divided into the eight chronological steps in the design process. When you take a parcel of site, first you undergo

three main stages before you arrive at a final site plan or design; Research phase, Analysis phase and Synthesis phase.

Research Phase - The first step is defining the problem and its definition. This is usually taken care of by the architect. Research is the first step of defining the problem. What is the need for this project, what can be incorporated in the project to get maximum benefit. This is usually taken care of by the architect and the architect comes up with this whole proposal of what can be done, this comes under the research phase.

Next is the analysis phase, the next step involves integrating site and use functions. Once we decide upon what has to be built on the site, then we move on to the next step of involving how this can be tackled and what is going to happen. What is the best solution that can be bought to reduce or completely minimize the problems caused in the future. Numerous site elements related to site viz. Access, shape, surroundings, etc, are being studied and analyzed. It takes care of all the aspects like how the site is going to be accessed, what are the entry points, how the services are going to come and how the services are going to get out of the site and even the water lines, everything comes under services aspects, access and surroundings and all this falls under the analysis phase in which the architect usually analyzes each and every element sensitively to the site.

Next is Synthesis Phase. After analysis, a program is developed as a solution to the problem at hand. This phase deals with schematic design of a site plan. This is the phase in which, based on the gathered information from the previous two methods, we are going to conclude or come up with a scheme which is a very basic ideology for the site plan in which we are going to shape and zone the buildings where every space has to come and how the services are going to go in, all comes under synthesis phase. Chronology of steps after synthesis. We then break down to how it can be done. A guideline will be developed on which spaces come first, what gets developed later; all this falls under Synthesis phase. Developed designs and a detailed cost estimate. After we finalize with a design, what the proposal is going to be, then we prepare a detailed estimate in which the client is going to get an overall idea for the project, on how much it is going to cost. Preparation of construction documents for the plan. Then we prepare the approved plans that go through few methods after which the construction has to start. Bidding and contracting for the project. If the client has ideas for one or more architectures, he can actually go for bidding or contracting basis in which people can be called in to give their rates and the lowest rate gets the bid. Finally, the construction state. After the client chooses who is going to be their contractor and architect, then the project is given to them according to the estimate that was initially prepared and then the construction eventually starts happening. Occupation and management of the site. There must be a team that takes care of the building,

the overall run. Say if you are building a shopping complex , it usually has a dedicated team of building management services (BMS) which takes care of all the services and all the functions which makes the building work completely non-stop. Electricity, fuel, gas; everything, all this comes under the Building Management Services.

What are the goals of Site analysis? To achieve a successful design, site analysis is a must and should be done carefully. Only after you have done a site analysis, it gives you a clear picture of what your site is and what can be done. Site analysis becomes very vital. Site analysis involves taking an inventory of site elements and analyzing these factors relative to the clients needs and aims. We also need to keep in mind what the client needs and what the client's vision of the whole project is. The analysis phase, what the client needs, the end result has to go hand in hand. Gather relevant information about the properties of the site, from topography to climate to wind pattern and vegetation. Analyze these features and incorporate them into the design. Site analysis takes care of not only client needs but also take care of what the site can achieve, what is the climatic condition of the local area, what is the micro climate that is present in the site and other aspects such as sun path movement and wind movement and all this is taken care under site analysis.

If you take a look at this picture, this is the site, this is the sun path diagram and as you can see, there is a wind flow pattern that is shown here. Only because they did this analysis before they started the design, they were able to shape the building according to the sun path diagram so that the building does not receive a lot of solar radiation. As you can see on top of this building, there is a wind turbine that is kept and there is a stack effect which takes the lower wind that is coming into the building and then there is vegetation that is going to cool the air and the air is going to go up. All this is known only after one does site analysis. Only when you know site analysis, you'll know what is the direction in which the wind is going to come through. If you can use stack effect or natural cooling to cool your building or if you need solar radiation to heat up your facade, all this you'll know or understand only after you do site analysis.

Elements of Site analysis -

Location - The site should be related to existing roads and landmarks. Time & distances from major nodes should be recorded. There is no point in developing a huge commercial space which is not even connected to the main road. You need to take care of the importance of location. If it is going to be a commercial space, how far is it from the main road, can people access it. Even if it is a residential plot, how can people commute to their daily work place and needs, all this comes under location. We need to take care of the distance between the main road to the site. It is an overall empty plot in which the digging of the pit happens and then

after you construct, this whole project is conceived. This is the secondary road and this is the primary road. There are inner roads which are going to get connected to the primary road. This is how detailed you need to connect axis and location.

Neighbourhood Context - Zoning of the neighbourhood is important and information could be found with municipal authorities. Numerous issues viz. architectural patterns, street lighting, condition of existing buildings must be observed. This would also include the immediate surroundings of the site. The reaction of the surrounding buildings towards the site and the people moving around should be analyzed. This can give you information about privacy aspects for the client and also for the people who are going to use public roads and surfaces.

Subsurface features, this includes analysis of the following - Geology, Geological history of the area, bedrock type and depth, etc. We need to understand the type of rock settlements underground, which also gives us the idea of the type of foundation that can be done, how strong the soil is and what is the depth of foundation we need to go with. Analysis of the soil and rocks is also very essential. Hydrology - underground water table, aquifers, springs, etc. In hydrology we study about underground water levels, in which we decide how the big a motor has to be for your mortar tank systems, etc. Soil Genesis - Erosion susceptibility, moisture, bearing capacity, etc, is studied in soil genesis.

Natural surface features - most of this information will be derived from the topographic features on the site. A contour map of this magnitude can be drawn. Trees, ground cover, ground texture and soil conditions can be directly observed. Study of vegetation should be done in relation to type, size, location, shade pattern, aesthetics, ecology, etc. Slope study must entail gradient, landforms, elevations, drainage patterns, etc. These are few natural surface element features that have to be taken care while designing such as topography, where your vegetation is located and what type of vegetation is there. This can reduce your cost of construction eventually. Other man-made features, buildings, walls, fences, patios, plazas, bus stops, shelters, etc, shall be carefully recorded on maps. Before starting, we need to create a map in which the neighbouring manmade features have to be noted and recorded which can give you a better design area.

Size and Zoning - Land use of site, adjacent use, zoning restrictions, easement, etc. Site boundaries can be located by either verifying the dimensions physically or through map records of land development controls such as MOS, height restrictions, ground coverage, FAR parking requirements could be obtained from development plans. Zoning classifications from a zoning map to be procured from the city planning department. You need to take care of the type of

zoning and land use, your plot falls under and you also need to take care of parking and other services.

Circulation - Study of important nodes and linkages. The uses of streets, roads, alleys, sidewalks and plazas are important. Utilities - includes power, sewage network, gas network and water supply. Availability and proximity to sources are to be examined. These circulations and utilities take care of other services and how your site is connected to the main road and how other services such as gas and water are going to come to your side, all this falls under utilities and circulation.

Sensory - Aerial photography, sketching, visual surveys and other methods of direct observation to be employed. Sensory elements such as noise, odours, smoke and pollutant areas must be detected and recorded. We also need to take care of where the noise and smell is going to come under. For instance if you are going to design a school building, it has to be placed in location where there is less noise, all this becomes important depending on the type of design you are going to adopt.

Human and cultural - Census data to be used for social factors such as population, population density, literacy, sex ratio, occupation pattern, ethnicity, cultural typology, etc.

Climate - Information on precipitation, annual rain/snow, humidity, wind direction, solar intensity and orientation, average mix and minimum temperature can be obtained through the local weather service. Rainfall, humidity and temperature over months must be recorded. Annual sun path data throughout an entire year to be noted importantly. We need to take care of different aspects of climate to have a better understanding of how climate happens throughout the year.

Aesthetic Factors Visual Analysis - Scenic views, flora and fauna, rock formations, water bodies, green cover valleys, rivers and mountains, etc, add to the value of the site. Any such features if available shall need call for designing preferential locations. If you have a beautiful view present around the site, you can take advantage of it and you can create viewpoints in such a way it is being overlooked. These are vital informations that have to be analyzed before starting a design.

Let's summarize what we have learnt from the whole presentation as a learning outcome. First we got introduced to site planning, then we saw definitions about site, plot, land and then region. Then we moved on to various units of measurements, purpose of site planning, introduction to site analysis along with its process and elements. Questions - Define site

planning and its process? What are the various phases in site planning? What is the difference between site and plot? Define site analysis and the process. What are the different elements that have to be considered for site analysis? Thank you !