Site Analysis and Planning

Lecture 8

Welcome to UGC lecture series, today's topic is Site Analysis and Planning. Subject code - AR 6512. Unit 3 - Site Analysis, Lecture - 08.

The overall presentation is divided into three major categories - first is introduction, then we move on to natural and different factors that affect the site planning which is the continuation from our last presentation. Then we look into vegetation, wildlife, soil and climate factors that affect the site planning aspect. Then we move on to land use and urban planning.

Climatic Factors -1

First, vegetation. A study of vegetation helps in locating large existing trees, which can be retained. These can be used for providing seating. The ecology of the area should also be examined to know what plants or shrubs would grown in that area. Vegetation is about the study of landscapes, different types of trees, what types of shrubs can be used in the present site conditions. We also need to have a thorough understanding about the existing trees which for example, if you have a huge site and there are a bunch of trees in the middle of the site, there might be a lot of chances for the designer to incorporate the trees within the design. Incase if they want to replace those trees, they need to understand what is the spread of the roots and how deep the roots are going inside in order to take it out and replace it effectively so that it can grow again within in the site but in a different location. The ecology of the overall site is also maintained. Understanding about all this comes under vegetation factor. Let's move on to wildlife - this is an important consideration when choosing sites for parks and recreation. Fishing and hunting are major recreational activities. For example, when you are designing a boat house or designing parks and recreational areas, you need to understand, you don't affect or remove the wildlife that is present in the place already. For example, if there is a huge chunk of land, if there is no human use, there might be a lot of smaller animals and birds that come to this type of place. Once the human activities begin happening, these birds and animals eventually start moving outside. You need to be sensitive to the ecosystem as well as the type of design you are going to propose, should go hand in hand so that the eco system does not affect it and the design vision or the design proposal is not getting affected. The selection of land suitable for such activities depends upon natural wildlife present in the area. Wildlife also adds form, colour and movement to the landscape. One might also want to be informed about the wildlife present in the area to preserve it and not disturb the animal's natural habitats due to the construction. If there are certain types of extinct birds that are coming to your site, you might not create something that is very noisy or something which will create a bad condition for these type of species and get rid of it completely. It has to go hand in hand, understanding about wildlife gives the designer or the architect make very sensitive designs with these type of factors. Next is soil, the different types of soil present are analyzed. Soil decides the stability of

land, foundation, suitability, excavation, erosion, drainage, and plant growth as the top soil is essential for good plant growth. We need to know what type of soil condition is present on top of the site not only to just understand the type of foundation but also to understand what type of plants and what type of shrubs can be grown in this type of soil. Soil has to be rich enough so that a good amount of landscape can be adopted. For example, in a case where you have a site where the topsoil is not so good, the topsoil can be removed and a good rich soil from some other site can be taken and fill the space in order to support the landscape. The bearing capacity of soil is an important factor to be considered while locating buildings. There is something called the bearing capacity of soil which determines where the building can be located so that it will be safe for construction.

Soil classification - Soil is usually classified into three types depends upon the amount of water content that is present in each of these categories. General soil type based on soil texture. the triangle indicates the relative proportions of three particle sizes - sand, silt and clay. Say for example, if you are considering sand, the particle sizes are much more bigger compared to silt which is even bigger compared to clay. Keywords for soil characteristics - soil texture, soil porosity, soil chemistry, soil moisture. You need to understand about texture, porosity, moisture content and chemistry in order to determine the type of soil as well as support vegetation and your construction.

Soil survey data and the importance of soil information. Related to building construction and basement. Usually this soil surveying is done in order to give a better understanding of your location of your buildings and your vegetations. Next is related to water supply and septic systems. Even with the information of soil survey, it can give you information to make an informed decision about water supply and septic systems. Say for example, if you are having water supply systems in sand that will absorb a lot of water content, it will take into it and rejuvenate the entire under water table which is very good for a hydrological cycle to happen continuously. Related to functions of land use planning. Related to vegetation and wildlife habitat. Where to get the information, department of underground resources, boring test and results analysis from agricultural department. We can get information about department of underground resources which usually have documented information about various types of soil that are present overall in the state. Also you can taking boring test and the results will show what type of analysis can be done and what type of things can be avoided. Also information can be gathered from agricultural department.

Climatic Factors -2

Climatic factors - next in line is the climatic factors which are a major and first factor to be considered in site planning. Across a piece of land, the elevation difference, character of

topography, vegetation cover, and water bodies influence the climate of that area. The Earth is a sphere and yet we have different climates at different axis, this happens due to the location of the sun, where the sun is received and how the Earth has been tilted as well as the type of contours that are present around each space and what type of reflection and absorption it creates to the site. Also, how many water bodies are present around, all this influences the climate of the place. On the other hand, precipitation and temperature are the major factors affecting vegetation. In cool and temperate climates, vegetation may be used to block winter winds. For example, if you are designing something in a much cooler place like a place like UK where we have strong gush of cold winds, you can actually use thick leafy trees in order to avoid or reduce the speed of the wind that may affect the people who are walking on open spaces or parks. All these climate factors depend upon the elevation and the altitude of where the place is located. It also depends upon wind patterns; global wind pattern and wind direction; surface of the Earth - surrounding surface of the Earth is contoured if it's going to absorb and reflect the solar radiation. Topography, Effects of Geography, where it is located and how far is it from the sun and how much tilted it is. Climate change over time, although these are all more constant factors, climate change over the time is a constantly varying factor which determines or contributes to the climate of a certain or particular space tremendously.

Climatic Factors - wind velocity, precipitation rate at which the amount of rainfall is being absorbed over a time period is called precipitation rate. Temperature - usually the annual temperature is considered to give a much more understanding of different seasons and what happens in each month in the project. Humidity is the percentage of water content that is present in the air. For example if you are designing something in a tropical climate, the relative humidity percentage is very high. You need to create huge openings, doors and windows in order to take out the humidity through the air movement. Where do you get this information, you can collect this information from the department of meteorology.

Man-made factors - Right now we have finished dealing with environmental factors and natural factors that may affect site planning aspect. Now, we are moving on to man-made factors that may affect the site planning. Different factors are existing land use which is on-site as well as off-site. How the land is being used on-site as well as off-site is something that is being created by human. These are some of the factors which will have direct influence on the site. Potential of change, say for example if there is a road main highways, it is being proposed closer to the site, there is a lot of possibility, a lot of space due to the extension of these roads can be taken from the site. This is potential of change. Colour symbol of land use, we need to understand what different colours mean. Say for example green colour is used to represent parks or recreational areas. Yellow colour is used for commercial areas. These are few colour codes that are generally used, we need to understand each colour code and what it represents. Facilities

or site amenity, from the position of your site where the facilities surrounded to it is located, for example we have a site, we have a bus station. we need to record how far the bus station is, the hospitals and school buildings, these are basic amenities and services which usually every person who is using the site might need in the future, we record all these details as well. How these main spots or main node points are connected to your site is recorded in Linkage and movement pattern and communication.

Circulation system - A circulation system depends on accessibility, potential of change, density : F.A.R. This determines how dense your project is going to be and zoning district. Which area you are going to zone gives you the information about F.A.R. For example, if you are building something very close to a conservation project, the height restriction is limited. You cannot opt for taller buildings in such type of zones. You need to understand the F.A.R and which zone are you going to design, also about setbacks, fire lane and other regulation; which give you information about how the whole fire vehicle can go around the building in order to stop the fire. These are some of the elements and some of the factors that have to be considered and also parking schedule which gives you information about a lot of public spaces in which we have one side of the road has been parked for alternate days and other side of the road is being parked for odd number of days. We need to know about these kinds of information as well in order to give guidance to the users to the site. FAR is one of the density control device, FAR is a term the zoning ordinance will use to quantify and limit the amount of square footage of building area as a function of the building site. Zoning setback and height limits - these minimums and maximums provide the basis for the maximum building envelope on the site. FAR is a density control element. It determines how dense your project can be developed. Zoning and setback give you ideas about what type of building typologies can be developed as well as the maximum and minimum heights these buildings can scale. For example, this dotted line is the site and this FAR is 2.0 which means you can build twice the amount of the site area. This is one proposal which occupies the entire site and this is built one on top of the other. You divide the site into two halves and then you stack everything up above. We create four floors which means the FAR is still 2.0 but we have half the plot as empty now. There is one more option in which we can divide the whole site into four parts and only one fourth of the whole plot is being used for construction and everything is being stacked one on top of the other which creates almosts 8 floors and we have almost three fourth of the entire plot empty. All these methods are right, even though we might not be able to choose, we can streamline depending upon the height restriction and zoning patterns that are being used on the site. This can give the architects or designers an idea on how to choose design.

Moving on to Aesthetic Factors, Visual qualities and relationship - landscape special character, pattern of the site, visual quality and character, natural features, urban features, visual value

characters. Usually aesthetic factors means views and vistas that is getting created from the site. When you are standing from what you have created on a building, what you can see is an aesthetic factor, this becomes very crucial because in your entire building, you'd like to see much more nicer or you'd like to project or showcase something is very appealing to the eyes, not something to do with sewage and drainage systems. Aesthetic factors that eventually become a part and parcel of architecture. Aesthetic Factors - vista, panoramic view, visual channel, framed view/filter view, point of interest. From each point what you can see is how views are created and vistas are formed. If you are creating a huge open area design, you might keep different viewpoints from each walk or path the user is going to take which will create much more interest for the user to use the space continuously. Also creating a point of interest. This is an urban planning in which they have created a church at the end which creates a point of interest. As we begin walking down the street, we see the church that will act as an attraction and pull us closer to it.

Natural Factors

Cultural Factors - Existing land use - ownership of adjacent property and off-site nuisance, these are some of the factors that are very sensitive to us usually. We need to have ownership of the adjacent property in order to make sure they won't disturb us during our future occupancy or future development. Also about offside nuisances, like how if there are any dump yards close to your site or if there is any noise producing area which is going to affect the end user who is going to use the space. We must also know about linkage, from the main or primary road, how the roads are connected from the mainroad to your site, that comes under linkage. Traffic and transit-vehicular and pedestrian circulation on or adjacent to the site. How the traffic is going to get regulate within the site and how the traffic is going to get taken out of the site comes at this point. We need to know about density and floor area ratio which become very crucial in order to know how much open space is to be provided and what is the maximum and minimum height a building can be built depending on which zone you are going to design for. It is the same. If you see, there are two different images which are two different sites. FAR is 1.0 which means coverage is 100 %. The same is being adopted in Dharavi, Mumbai, which uses coverage of almost 95% which uses just 5% of open ways are provided for walkways. Whereas, one more place which is located in Paris, has the same plot size, FAR = 1 but the coverage is just 11% which means the remaining 89% is open space. 89% is open space, only 11% is used for construction on ground. This is the final limit. As we can see, there are a lot of open places around the site. When you actually see these two climatic conditions side by side, you will understand that Mumbai has a much more hotter and humid climate while Paris is much more colder in which we need the sunlight to fall within. When you need the sunlight to fall within the plot, you need to space your buildings as far apart as possible for the rays to penetrate within whereas when you are already in a hot and humid climate, you may need to protect

yourself from any type of solar radiation that falls on this space. Dharavi, even though horizontally spread, the penetration of solar radiation is much more lower compared to what is being proposed in Paris. These two are actually working well in their own climatic regions.

Utilities take into account of sanitation, water, gas, electricity, storm water drainage. Existing buildings, Historical buildings, you must know all this information in order to make sure your site or proposal has all your services, utilities and we must know about surrounding buildings, historical buildings and if there are any height restrictions due to the presence of such historic buildings. This is a small example of an existing land use map in which we can see here, this is a river which has been running through the city, along the river a green space has been created - park and trails. There is a red space that stands for mixed use. Mixed use is a mix of different spaces either residential, commercial and industrial spaces. The residential areas are usually far away from the city so that we don't get affected by the noise or the crowd that usually is being attracted in the city. R-2 Residential is again residential units but also falls within the city. MFR is residential of multi-families which is here and then Mu is mixed use. Office and retail spaces are kept along main roads so that it's easy to commute as well as it gets public attention.

Existing Land Use - this implies a survey of the present status of the land-whether it is residential, commercial, industrial or recreational. The ownership of the adjacent site will also affect the land being surveyed. This implies the survey of the present status. What actually the site is, how the terrains are, what type of land is being used, in this we also need to know the immediate block that is also going to get surrounded by the site. Once you start building up, or when you begin surveying, there might a lot of problems that is created by the neighbourhood. Offsite nuisances - disturbances from outside and around the site have to be studied.

Visual nuisance elements - Power lines, water tower, certain industrial complexes, highways, advertisement boards, junkyards (waste dumps), etc, are some examples of eye-sore elements that have to be taken into account. It not only has to take in sound nuisance, but visual nuisance, the things which might be unpleasant for a user to look at. Say, drainage, sewer or a place where you dump your unused or waste products, these are spaces that are called visual nuisance, which affect the aesthetic factors of a building. Possible auditory nuisance - noise produced by heavy automobiles, trains, air traffic, etc, and the surrounding population has to be studied. You need to understand where your airports, railway lines or main national highways or state highways which are proposed, which is being designed in order to understand how much sound is going to produced from these areas. Olfactory nuisance - dumps, chemicals, other wastes in and around the site have to be taken care of. Safety Hazards - severe or sudden changes in landform, such as a steep cliff at the edge of a site has to be noted.

Site Analysis - you have studied what site analysis is in previous presentations, however, this is a small recap that explains 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. This is the same as we discussed in our earlier presentation. It is an inventory cum preparatory step for site planning, in order to do a good site planning, you need a good site analysis. Good and detailed site analysis, this goes hand in hand. The three processes which are involved in Site analysis are - Research phase, Analysis phase and Synthesis.

It primarily deals with basic data as it related to a specific site. The topic itself branches into the boundaries of architecture, landscape architecture, engineering, economics, and urban planning. It does not only stop with architecture, it also tries to understand different aspects such as urban planning, land use pattern, landscape architecture, engineering and economics.

Moving on to Transportation Planning - transportation planning is the field involved with the siting of transportation facilities (generally streets, highways sidewalks, bike lanes and public transport lines). Transportation planning historically has followed the rational planning model of defining goals and objectives, identifying problems, generating alternatives, evaluating alternatives and developing the plan. It is planning about transportation and how all your public transport is being connected, how your highways are being laid and how it is getting connected to each and every part of the entire city. Other models for planning include rational actor, satisfying, incremental planning, organizational process and political bargaining. We need to understand if there is a future expansion of the road, how much land are you going to take from these private plots i.e like a political bargain that has to be done in order to meet up with the future or expanding crowds. However, planners are increasingly expected to adopt a multidisciplinary approach, especially due to the rising importance of environmentalism. You need to not only cater to how many vehicles are going to be present on the road in the future but you also have to take into account the sustainability part, being sensitive to the overall environment also has to be considered even from transportation planning level. For example, the use of behavioral psychology to persuade drivers to abandon their automobiles and use public transport instead. In order to reduce the fuel consumption, we need to create a design in such a way that people will be more thrilled to use their public transportation system when compared to their own private vehicle. If we have a very good connection of public transportation system, people might prefer using public transport when compared to their own cars or two wheelers. The role of the transport plan, is shifting from technical analysis to promoting sustainability through integrated transport policies. Sustainability is also integrated within the transport policy. As you see in this image, it is just not a road but a road that has been divided into three to four segments, which has a cycle track, which promotes the usage of

cycle and there is also a lot of vegetation present. People who are going to walk along the lane, will have a shaded pathway throughout the stretch. For a short distance, people might not rely on their public transportation system or their private vehicles, this shady road or pathway provides a path to walk in comfort.

Urban planning - urban, city and town planning is the integration of the disciplines of land use planning and transport planning, to explore a very wide range of aspects of the built and social environments of urbanize municipalities and communities. Regional planning deals with a still larger environment, at a less detailed level. Based upon the origins of urban planning from the Roman (pre-dark ages) era, the current discipline revisits the synergy of the disciplines of urban planning, architecture and landscape architecture, varying upon from inter lectural strategic positioning. When you do planning for a much more larger scale, for hectares of land, that will be termed as 'urban planning'. Whereas, when you are doing a plan for an entire state or country, it is called regional planning but there is very less detailing given when you are doing planning at regional level. These are different characteristics or elements that go into actually making what the real world is. The customers or the end users who are going to connect to the street, this becomes a parcel of land and then it goes into how the terrain is being located, what the land usage is and all these factors together combine and is created as the real world or the city in which we live.

Learning outcomes - discussion on other natural factors such as; vegetation, wildlife, soil and climate factors. Other manmade factors, aesthetic factors, and cultural factors are discussed in detail. Land use planning and site analysis. Transportation planning and urban planning. Questions - How is vegetation and wildlife important for site analysis? What is F.A.R? Why is it significant? Explain in detail about aesthetic factors and cultural factors that determine the site analysis. What is urban planning? What is transport planning and state its significance. Thank you!