

Landscaping in Construction Projects

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Abstract: *An architect plans and designs a building to satisfy the requirements of the owner for making the building structure comfortable, convenient and economical also. An interior designer designs an interior space of a structure to give it right environment and mood. But it is the Landscape Architect's job to improve the environment of the site of the building. Landscaping is a specialized branch of study. The services of the Landscape Architect should be engaged right from the planning stage only. The Landscape Architect gives important suggestions to the Architect on how to exploit the potentialities of a site fully. A careful survey of the soil condition, climate, nature of the existing trees, proposed location of the building, slope of the site, surrounding details etc. helps to take a decision on the kind of grass, shrubs and trees to be planted on the site to enhance the effect of architecture and to impart the desired character to the building. The treatment given to the surrounding should make the environment cheerful and picturesque by providing lawns and plants at different levels. As such, with variation such as a building surrounded by ample space or a building having marginal distance and compound, each case becomes a challenge to the landscape designer.*

Keywords: Landscaping, Gardening principles, Pruning, Fertilizers

1. Introduction

In the world of concrete, people had forgotten the importance of presence of trees and greenery which plays an important role for human beings and without such natural resource, a daily living is quite monotonous and unhealthy. Pollution which has increased drastically also has caused many diseases due to polluted air. But nowadays the necessity of trees and plants has been understood by all and new trends of plantation have been developed. There are different varieties of plants and their specific study helps to reduce the pollution in the atmosphere. Landscaping means defining the space by integrating the structures such as constructed features, natural elements such as rocks, water, plants and garden accessories in an aesthetic manner for the use and enjoyment of man. The main purpose of landscaping is to produce pleasant appearance and to improve the quality of life by creating a healthy environment between man and nature. Landscaping is required in connection with highways, business and public buildings, hotels, municipal parks, traffic islands and individual house gardens to enhance the beauty of these structures. Mere plantation of trees does not beautify the land and the surroundings but the way they are arranged, known as landscape design which covers the specific study of plants with a view of aspect of beauty so that the elegance of the structure is enhanced. Landscape design can range from a large geographical region to a small house garden. [1]

1.1 Principles of Gardening

In order to layout a good garden, some fundamental principles to be followed are as under.

1. The garden should be reasonably laid out for the comfort and convenience of the owner.
2. The garden design should be a simple one and there should not be any complexity.
3. Variety in the garden gives a greatest pleasure. But attempting too much in a small space is not desirable.
4. The natural grade of the ground should be taken as a guide.
5. The ground should be so designed that the entire garden is not visible at a glance. Even in a small plot it should

not be possible to view the whole garden at a glance. It should be full of pleasant surprises with each turn of the path revealing fresh vistas or disclosing new interest.

6. Long and straight garden paths should be avoided. They are monotonous.
7. Judicious employment of more number of plants of different varieties should be one of the most important fundamental approaches.
8. Colour and contrast in the garden are very much desirable which are lasting enjoyment and most satisfying means of creating interest in the garden.

1.2 Garden Design

A garden may be defined as a place for growing plants, exhibiting various forms of plants life which are consciously directed for ornamental or practical use or both. Arrangement of trees, shrubs, climbers and various other plants together with the building walks, drives, artificial and natural features for the use of humanity is termed as Landscape Gardening. The subject of garden design is one of the parts of landscaping and it is so diverse and complicated that it is very difficult to represent all ideas of completeness on the paper. Garden design combines the aesthetic beauty, knowledge of growth and development of plants and at least the maintenance in different seasons. The garden design may be of two types:

- i) **Aesthetic Design:** It is purely attractive and pleasing in appearance.
- ii) **Economic Design:** It is meant to serve some practical and utilization purposes. The Landscape Architect in most cases should satisfy in its design both the purposes.

1.2.1 Types of Gardens

- i) **Formal Garden:** In formal garden we find symmetrical balance with sharply defined edges, straight lines of planting, manmade levels and retaining walls.
- ii) **Informal Garden:** These are asymmetrical gardens where planning is done in free flowing contours. Garden design involves attention to many considerations connected with the character and position of the site and its surroundings. Each particular site presents a problem to itself in relation to the soil, position, aspect and

environment and the designer must carefully consider these factors. In garden planning, proper growth and flowering of plants and the comfort and convenience of those who use the garden must always receive first attention. Gardens which are made haphazard are rarely successful, while over elaborating any feature destroys simplicity and breadth of effect. Hastening in planning a garden should always be avoided. Trained and skilled personnel should be engaged in the design and laying out of the gardens to furnish the desired character to the garden. [2]

1.3 Important Features of an Ideal Garden

- i) **Lawn:** Lawn is one of the essential and most important element in the garden design, attractive at all times and providing a pleasant surrounding for house, trees, shrubs and flowers. One of the greatest charms of a garden is a beautifully kept, clean shaven, verdant lawn. Grass is considered as the background to the designer on which the garden picture is built. It is always restful to the eyes. The lawn or portion of it should always be seen from the best parts of the house. The size of the lawn depends on the availability of the space whereas the shape should be such that it creates an attractive appearance. Once the lawn is established, it takes little efforts to keep it growing beautiful.
- ii) **Rosary:** Roses are grown in the garden with great love and sincerity in isolated beds or where the space permits, they may be grown together in a special garden which is known as rosary or rosarium. Establishing a rose garden involves design, choice of varieties, preparation of soil and planting.
- iii) **Wild Garden:** As there is an increasing popularity for informal design in gardening, laying out the wild gardens is also getting importance in the garden design. It is the desire of man to have direct communication with the nature, natural things and naturalizing home living without any touch of artificiality. Combinations of some plants are very attractive in wild garden. A wild garden will show its best when the plants have grown well and this type of garden should be attempted in large garden area. Designing a wild garden requires lot of thinking as well as imagination and careful selection of plants depending on the growth habit of the plants.
- iv) **Terrace Garden:** Terrace garden is increasingly becoming an essential feature of modern gardens. This is an area of paving between the garden and the house and it may be of various sizes and attractive shapes. In order to improve the look of the garden, terrace is constructed for the following main reasons:-
 - a. For cultivation of plants in pots and raised beds.
 - b. An outdoor area for sitting and dining
 - c. Dirt-free children's play area.
- v) Paving of terraces may be made by flag stone, native stone, brick, concrete, wood or gravel. It is important to select the right color and texture of paving material when planning a terrace. Plant material for this area should be chosen with great care.
- vi) **Container Garden:** Container garden is one of the most interesting and popular methods of gardening. It widens the scope of making gardens indoor as well as outdoor and adds all colors in the garden with least effort. Different shapes and sizes, attractive containers are used in this garden. Simple shape and suited color of the container is always desirable. For outdoor display large containers are better whereas small containers can be grouped for getting the bold effect.
- vii) **Steps for ground and gardens:** Steps are required to change the levels in the garden. They may be of brick, stone, concrete, wood, grass or a combination of two or three of these. They should be of comfortable height and construction should be safe, durable and easy to maintain. The design of steps must fit well in the overall landscape planning.
- viii) **Walks and paths:** Garden paths are used for recreative purposes. The boundaries of these walks and paths should be harmonious and there should be easy gradients and perfect paving. Walks are the skeleton framework of a garden and a means of circulating around the place to make the walks still more useful, seats and shelters may be provided at convenient positions. They should be arranged in proper working and should be approximately leveled and wherever a fall occurs, it should be connected by steps. Depending on the availability of material and design, walks may be made of bricks, gravel, stone, concrete, wood or grass. Much care is required while planning and designing paths and the walks. Paths of gravel or stepping stone through flower beds give an informal look. Stepping blocks, round paving blocks and angled squares also make the garden walk interesting. Stone, bricks and concrete are suitable for the important and much used paths in the garden. Delightful edging to garden paths may be made by planting lawn grass, but the careful maintenance of this should be taken, otherwise it will spoil look of the garden.
- ix) **Fences for utility and beauty:** Fences provide clearly defined boundary line, screening, security and allow the gardener to make the best use of the land. The immediate surrounding and architecture of the house is important in deciding on the design of the fence. Sometimes fences support climbers and shrubs which assures considerable privacy. Combination of stone walls and the common sheep wires looks extremely interesting. As a cheap fence round a cottage garden, there are few forms which look so well in carpenter made lattice from bamboo slits. Simplicity in design, charming and attractive appearance of fence is desirable. Hedge of different kinds and forms are also used for this purpose, this gives lasting pleasure.
- x) **Garden gates:** A gate with its attractive and simple design in garden welcomes the visitor and it is a point of interest. It should be ornamental as well as functional. Its design should be such that it should suit the architecture of the house, the fence or area surrounding them and should be at least one metre wide.
- xi) **Arches and pergolas:** Arches are generally provided in the garden to form a sort of screen or connecting link between one part of garden to the other. They may be of different shapes and sizes with variety of design. Its proper place is to support climbing plants.

Pergolas are very pretty features in a garden. A series of simple arches embowered with climbers are termed as pergola. A path shaded with pergola is as much a necessity against the heat of the sun as a welcome visual feature. This may be used to cover a path leading from one path of the garden to another. The materials for making the pergola are brick, stone, timber or bamboo poles. Arches and pergolas are to be erected in such a place of the garden that their design and existence harmonize with the entire planning of the garden. Climbers on the pergola should create interest at all seasons of the year.

- xii) **Garden walls:** The garden walls are usually constructed by using bricks, stones, flints and concrete blocks. They add beauty in the garden if designed properly. The architecture of the house and immediate surroundings of the place is also important in deciding on the architecture of the wall. It is usually desirable to have some planting on or near the wall which otherwise looks bare.
- xiii) **Garden furniture:** Good design in garden furniture is as necessary as the selection of furniture of the house itself. A wide range of attractive garden furniture is used in modern garden design. They make outdoor living attractive and comfortable. To add fun and pleasure in the garden, simple material and attractive designs are preferred.
- xiv) **Seat:** Comfortable seats are usually made of wood and fabric. Iron and stone seats are too hard and absorb temperature. Nylon, PVC and aluminum are largely used for making light and attractive furniture. Cast iron work for benches, tables and chairs look very charming in white color.
- xv) **Bridges:** When water is introduced into the garden particularly in the form of lake or canal, it may be necessary to bridge the bank at some point, either as a matter of convenience or for the sake of an attractive feature. A well designed bridge has not only an aesthetic value but it is very useful in viewing the water vista. Unnecessary decoration should be avoided.
- xvi) **Trees:** Tree is a woody plant with a spreading crown whose single trunk exceeds diameter of 15 cm attains a certain height. Generally height less than 4 m is known as shrub while height more than 4 m and upto 7 m may be called a small tree. All trees are capable of producing seeds under favorable environmental conditions. A tree may show the height and shape of a shrub in a climatic condition different from the natural habitat. Temperature, light, humidity, moisture and nutritional status of the soil are found to play important role on growth and flowering of plants. The soil should be moist but porous. Trees are very fascinating because of their graceful appearance and the abundance of bloom. They are grown for their economic importance and aesthetic value or both. Fruit trees are mainly planted in the garden for fruits. The cultivation of trees for their aesthetic or recreational value is known as arboriculture. Here the individual tree is important in contrast to the wood as a crop as in forestry. This also exercises beneficial influence on climate and rainfall, regulates the water flow and prevents soil erosion. A large number of trees in our country are resplendent in riotous colors

at the flowering time and are capable of transforming the landscape. Trees are the most permanent element in landscape. They restore a thorough knowledge of their ornamental properties, rate and mode of growth, their behavior in different soil situation and climate is essential. They should be planted carefully and thoughtfully for the benefit of height, shade, color and vertical emphasis. Avenues planted with trees are smaller because their restful and scenic views reduce the monotony of driving and provide shade, to the exhausted pedestrians. Avenue trees are beautiful and safety enchanting feature of modern roads. Reduces head light glare from the oncoming traffic and provides a more pleasant drive with less distraction from the surrounding. Such mediums are numerous in New Delhi and Chandigarh. Mostly indigenous shade and flowering trees are widely selected for landscaping these medians, where the traffic lanes are widely separated. Such landscape medians prevent the erosion of road berms and back slopes. We should aim at three objectives in planning and constructing of today's heavily travelled transportation arteries. Greater safety, reduced maintenance cost & general attractiveness, systematic tree planning and landscaping contribute strongly to these objectives. [3]

1.4 Some special features of landscaping

- i. **Waterfalls- indoor & outdoor:** Today waterfalls are found in gardens, corner of small hotels and public spot. Waterfalls are of various types. Rocks, shrubs and plants are so positioned so as to render the falls as natural as possible. When a waterfall is to be created on a floor other than the ground floor, a quite tough job as the digging on floor has to be carried out very carefully, so that the waterfall does not find the way to the flat below. Cascade type of waterfall provides a softer sound.
- ii. **Fountain:** Today, fountains are very common in the road junctions of large cities, gardens, national parks as it is a pleasing feature, attractive at all times. The fountain can be ranged from a large size series fountain to a small house garden fountain.
- iii. **Rock Garden:** This is a place where large sizes of boulders are arranged in a systematic manner so as to give it the natural effect. The choice of stone required depends upon the view to be achieved. The rocks are taken from river beds. [6]
- iv. **Roundabout:** These are the traffic island, circular in shape. There are many examples of such roundabouts in the Chanakyapuri area of Delhi. These have become very popular from the time of Asaid. Now the situation is that there are @ 45 roundabouts within the VIP area of Delhi. Maintenance of it is fairly inexpensive. Seeds are procured from the flowers already growing and are collected, store and classified according to variety and color for the next planting season. [4]

2. Maintenance

In course of gardening operations, one come across a few discouraging hurdles. The chief among them are ravages of pests, diseases and parasites. They can mark the appearance of an otherwise decorative plant, spoil the edible quality of

fruit and vegetables or disfigure the flowers. Some pests or diseases may kill a plant sooner or later. Identifying them early enough to take remedial and corrective action is an important aspect of landscape maintenance. Plant diseases are caused by fungi, bacteria and virus. These organisms enter into the cell structure of the host plant and cause various diseases. These may be identified by the characteristics symptoms. Only some of the diseases are carried by seeds. Pruning and destroying affected parts of plants or whole plants are often necessary in disease control. Selection of nursery plants free from pests and disease is also very crucial to prevent the spread of diseases. In the case of virus diseases, chemical control is almost impossible. Destruction of infected plants, control of insect vector and use of virus resistant plant materials are steps which should be taken. Fungicide is mainly applied as spray. Drenching in case of root infection and swabbing the affected area with a Fungicidal pest are also practiced. Seed treatment is an effective measure against certain seed borne diseases. [1] [5]

2.1 Pruning

Plants have many organs like root, shoot, leaf, flower and fruit. Well considered removal of any organ or part of any organ with a view to regulate shape, growth, flowering and fruiting is called pruning. Pruning is accomplished by making a clean cut with a knife secateurs or saw or by simpler operation as pinching, topping and tipping. Thinning of flowers and fruits accomplished by chemical plant growth regulators is also called as Pruning. In this sense since the aim here is to regulate growth and cropping. Pruning also helps in regulating the size and shape which will encourage latent buds to grow.

2.2 Maintenance of trees prone to accidents

Accidents caused by falling trees on their branches are many. Roots are damaged on account of infection by plant pathogens and insects. Stagnant water and severe drought can also cause death of roots. When damage to root is anticipated, correct the unfavorable conditions such as poor drainage or ill consequences of drought. It can be done by providing Earth mounds of about one metre height. These mounds can be circular, square or rectangular. While earthing up, use as many boulders as possible. The mound itself helps to retain moisture to some extent and also the anchorage is improved.

2.3 Fertilizers used

Manures and fertilizers are carriers of plant nutrients. Trees draw upon these nutrients mainly from the soil and assimilate them as a solution in water. That is one reason why adequate fertilizer's application goes hand with ample water supply.

2.4 Lawn

Apply in two split doses every year 1.0 kg of urea, 1.5 kg of super phosphate and 0.5 kg of marinate of potash for an area of 100 sq.m. Mix fertilizer with soil and broadcast over the lawn uniformly. In old lawns, spiking the surface with a crowbar at intervals of 30 cm and filling the holes with weed free tank silt will help to improve nutrient status as well as

roof aeration. Give an occasional foliar spray of solutions of diammonium phosphate at a rate of 5 g per liters of water.

2.5 Small Shrubs

To each shrub, apply in two split doses every year 100 g of urea, 150 g of super phosphate and 50 g of marinate of potash immediately after the monsoons.

2.6 Large Shrubs and Woody Climbers

Apply 220 g of urea, 300 g of super phosphate and 100 g of marinate of potash. In shrubby borders with mixed grouping of shrubs, calculate the total quantity of fertilizers required taking into consideration of the number and kind of shrubs present.

2.7 Landscape Trees

Generally, fully grown trees require no manuring. But in exceptional circumstances, this is done to improve conditions of trees and also encourage more flowing and fruiting. A well grown tree 10m x 10m spread will require upto 3 kg of urea, 7 kg of super phosphate and 3 kg of marinate of potash in a year.

2.8 Liquid Fertilizers

Plant grown in container or pot should not be given application of fertilizer. The fertilizer should be dissolved in water at weak concentration prior to application. For ordinary purpose a liquid fertilizer would be useful.

Table 1: Fertilizers used

<i>Name of fertilizer</i>	<i>As measured in teaspoon (in 20 liters of water)</i>
Diammonium phosphate	1
Potassium dihydrogen phosphate	1
Potassium Nitrate	1
Calcium Sulphate	½
Magnesium Sulphate	½
Ferrous Sulphate	½

Dissolve the fertilizer by stirring them in water for about an hour and pour into the plant containers unit a few drops drip through the drainage hole. Weekly application during the growing season would be sufficient to maintain the plant in good health. Another way to prepare a liquid nutrient is to ferment neemcake. 1 kg in 10 liters of water for about a fortnight. Filter the fermented liquid through hessian and dilute it with an equal volume of water. At the time of application of plant, add two teaspoonfuls each of super phosphate and wood ash to each bucket (15-20 liters) of neemcake extract.

3. Case Study

An educational institute namely Pune District Education Association's College of Engineering, Manjari, Pune is considered as a case study to see how landscaping features are planned and designed in and around the campus to enhance the beauty of the campus. The total land area is @ 5 acres with two spacious, elegant buildings to cater the requirements of built up space.



Figure 3.1: College of Engineering, Manjari, Pune



Figure 3.2: Main Entrance

A pleasant roundabout is provided at the main entrance to welcome all students, staff & visitors. It also serves as a traffic divider for separate entry & exit of the people. By the side of the main entrance gate, flower beds with appropriate plants and shrubs are provided to create a cool feeling while entering in the campus.



Figure 3.3: Approach Road

Continuous flower bed with variety of plants is provided along both sides of the approach road to provide the enchanting effect while entering into the campus.



Figure 3.4: Building Entrance

On either side of the Building entrance, separate lawn areas are covered with creepers along the semicircular area and small shrubs with bigger rock pieces are planned to have the natural look. Adequate space is kept reserved around the flag pole for flag hoisting programme during Independence Day and Republic Day.



Figure 3.5: Central Lawn

A large area covered with a lush green lawn in front of the main building is provided for having the feel of spaciousness when someone stands at the building entrance. This space can be utilized for multipurpose use pertaining to the college annual activities such as annual social gathering, sports events etc.



Figure 3.6: Rock Garden

To have a feeling of living with the nature, the rock pieces of suitable dimensions and arrangement are positioned in the garden area. Also other plant species are designed compatible with the rocks which provide an attractive appearance.



Figure 3.7: Flower beds around compound wall

Flower beds of sufficient width are provided along the compound wall to have a green boundary along the periphery of the campus. This also serves as a space for growing variety of plant species, different shrubs, and bigger trees.



Figure 3.8: Roundabout

A circular feature of 8 m diameter is planned at the junction of main building, workshop and cafeteria to create a pleasant feeling while moving to the cafeteria for the refreshment. It comprises special type of pebbles arranged in three different strips dividing the space into three parts.



Figure 3.9: Indoor Fountain with waterfall

A special landscaping feature in the form of fountain with cascade type of waterfall is constructed near the entrance lobby. It refreshes the surrounding environment during morning and evening time when it is fully operated. It provides very attractive, pleasant and aesthetic view during its working.

4. Future Trends

It is difficult and often unwise to predict future trends, but by looking back at progress in the recent past years and projecting forward several possible ways for advancement stand out. Changes in land use are inevitable. The rising demand for space for leisure particularly water recreation seems likely, with hygiene-oriented municipal parks giving a way to logically planned open space system throughout a town. Change in housing patterns to cater for population increase hence hard and more consciously designed-landscape setting will be demanded. This may eventually extended to creation of open spaces. Even to well plant sitting and recreation areas on decks, over buildings, car parks or other land uses. As in towns, so in country side, due to the public pressure, concrete, asphalt and wire fences will just not be seen only. In technology one can expect attempts to meet the desire for 'inside' landscaping more ideas to

prolong the planting season and another drop of inventions to enable horticulture maintenance to be done by amateurs and unskilled.

5. Conclusion

1. Landscaping is necessary for making the surrounding of building structures more pleasant, attractive and habitable.
2. Landscaping helps to improve the quality of life.
3. Landscaping enables to create a healthy environment between man and nature.
4. As per the case study, it is cleared that if adequate landscaping features are provided around the building structure, it enhances the beauty of the entire campus and makes the surrounding more pleasant, attractive.
5. Landscaping contributes for achieving the sustainable development.

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