CAMPUS ON THE SABARMATI IIT GANDHINAGAR





LANDSCAPE AND OPEN SPACE DESIGN

LANDSCAPE AND OPEN SPACE DESIGN

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NOTE:

For this publication, the drawings and graphic material were prepared by MSYK Design and presented to IIT Gandhinagar at various stages during campus development, primarily in a report entitled Landscape and Open Space Design. It is hoped that this publication will be of interest to design professionals as well as others, and will also serve as a useful educational tool for students and young professionals.

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FOREWORD

Once created, universities may last not just decades, but centuries. Hence, it is a rare privilege for any academic to participate in the process of creating a new university. Establishment of the Indian Institute of Technology Gandhinagar (IITGN) has enabled all of us associated with the Institute to innovate in creating curricula, in organising governance, and in nurturing a unique culture and ethos of the Institute. The philosophy of education has been to push traditional boundaries with an emphasis on a multi-disciplinary approach and crosscutting thematic areas.

Just as the Institute endeavours to think out of the box for its academic programmes and governance, it has also been doing so for development of its 399 acre campus on the banks of the Sabarmati River. It is our firm belief that the physical environment makes a huge contribution to shape the processes of learning and knowledge creation. The campus has been conceptualized keeping in mind the long-term objectives as well as the present needs and immediate future. The guiding principles of the campus development have been

- An ambience that attracts visitors and conveys to them that they are on a university campus unlike any they have visited before
- Functional convenience for the academic community for mutual interaction, learning and research
- Low energy and resource consumption, as well as minimal upkeep and low maintenance costs

The engagement of a large number of professionals and academics in brainstorming sessions and in executing the design and construction has enabled us to introduce numerous innovations in the development of the campus. The campus development work was split into master planning and architectural design. The Masterplan development was completed by a consortium of architects. The comprehensive architectural design was developed by architectural firms selected through an architectural design competition. Separate architectural firms were selected to design the student hostels, the faculty and staff housing, and the academic buildings. A landscape architect and member of the master planning team oversaw the landscape design for the overall elements and spaces of the new campus. In addition, this landscape architect also peer-reviewed the landscap- ing developed as part of the hostels, faculty and staff housing, and academic buildings. This publication is one in a series that explains the complex decision making, design and construction process for the new campus.

ABOUT THIS PUBLICATION : This publication showcases the landscape design for the open spaces of the entire campus. The landscape design was an essential part of the Masterplan, integrating the buildings and features of the campus together and establishing a planned system of open spaces and vegetation that responds to the existing landscape qualities of the site. This included identifying uses such as orchards for areas that may not be developed for another ten or fifteen years. Landscape is often a neglected element in large projects, but at IITGN a conscious decision was made to use the landscape as a central unifying element. The landscape architect who developed this plan (the late Prof Mohammad Shaheer) was involved with the development of the IITGN campus in several ways. He was a member of the Masterplan team, but he was also engaged to prepare a separate plan for the landscape design of the open spaces. He also served as peer reviewer for the landscape design of the student hostels, the faculty and staff housing, and the academic buildings. This ensured that there was a cohesive design across all the spaces of the new campus.

Sudhir K Jain Director and Professor Indian Institute of Technology Gandhinagar

EXECUTIVE SUMMARY

Landscape Masterplan

A master planning consortium to guide overall campus development was selected in 2012. A prominent landscape architect, the late Prof Mohammad Shaheer of MSYK Design, was a member of this team, but also developed a separate plan for landscape design of the open spaces. He also peerreviewed the landscape designs in the three distinct areas of development—the student hostels, the academic buildings and the faculty and staff housing. His involvement in the campus Masterplan, the design of the open spaces and the review of the specific building areas ensured a unifying vision for the landscape structure of the site as a whole. The landscape Masterplan did not prescribe details for individual buildings on the site, but rather provided an overall landscape structure for the open spaces of the campus.

Landscape Structure

The landscape Masterplan envisaged a range of open spaces arranged as a visually interesting and varied network to facilitate comfortable and unhindered movement of people on foot. The landscape structure is held together by three prominent open spaces:

- The River Promenade, designed as a broad landscaped walkway.
- The Ravines, an extensive area where the existing natural identity of the landscape can be protected and enhanced. The scenic drive aligned along one side of the main valley of the ravines is the main entrance driveway of the campus and is a major landscape feature.
- A Central Vista, in the shape of a landscape mall, envisaged as the prime open space of the campus extends from the Entrance Court at the northern end to the hostels and staff residences at the southern end.

An Entrance Experience

The Arrival Court has been designed as a visually interesting feature, drawing visitors into the uniqueness of the campus.

Open Space System

A series of landscape spaces has been used to provide definition to the campus site. These include:

• The academic spine, largely architectural in its definition, consists of courts and connecting arcades between academic buildings.

- Green connectors are a network of secondary open spaces that provide connections from residential areas and hostels to academic areas and to the Central Vista.
- Sports fields, planned at the very heart of the campus, are a centerpiece to the landscape structure, easily seen and accessible from all parts of the campus.

Landscape Infrastructure

A series of features have been incorporated in the campus landscape design that provides definition to the campus. These include:

- The main gate complex designed as a landmark.
- Boundary wall as a distinctive and recognizable feature, besides fullfilling functional needs of security and privacy.
- Jal Mandaps, pavilions marking the presence of underground water storage tanks.
- Nurseries, to be established in the future for the propagation of large quantities of various types of plants, required to fulfil the horticultural requirements of the campus.
- Tree plantation: A wide variety of trees are used in the landscape, within the Central Vista, in the avenues, along roads and paths, in the ravines and along the boundary.

ACKNOWLEDGEMENTS

IITGN would like to acknowledge the significant contribution of the late Prof Mohammad Shaheer of MSYK Design in designing the landscape plan for the entire campus, as well as providing peer review for the landscape plans for the specific building areas. Even though the landscape may take years to mature, it is immediately apparent that there is a unifying vision for the campus. The plantings, including trees, provide life to the landscape. Prof Shaheer's vision and exemplary leadership are gratefully acknowledged.

IITGN would also like to acknowledge all the stakeholders in the development of the IITGN campus: architects, landscape architects, structural designers and consultants, IITGN engineers, faculty and other staff, Central Public Works Department (CPWD) engineers, contractors, and the construction workers. The project would not have been possible without the effort and dedication of all these people.

This project would also not have been possible without the financial support provided by the Government of India.



Prof Mohammad Shaheer

Soon after the conclusion of the Masterplan design of the IITGN campus, on November 28, 2015, Professor Mohammad Shaheer passed away peacefully in his sleep. What follows is IITGN Director Professor Sudhir K Jain's eulogy, written as a Facebook post the day after Prof Shaheer's death.



Professor Mohammad Shaheer is no more...he went 'home' peacefully in his sleep yesterday morning. He was the country's top landscape architect, and made huge contributions to the design of IIT Gandhinagar's Palaj campus.

I heard his name for the first time when he designed "Park-67" at IIT Kanpur, where I used to take walks in the evenings. I first met him when he (together with Dr Vinod Gupta) presented before the IITGN evaluation committee a concept Masterplan for the Palaj campus... we immediately recognized that (a) it was a beautiful concept, unlike any that we had seen over two days of presentations by others (it was the last presentation), and (b) this concept had a lot of inputs from Prof Shaheer (even though he was not a partner of GCDC; the firm he was representing). We awarded the work to GCDC with a condition that Prof Shaheer MUST remain part of the design team throughout. Over the next several months, we greatly enjoyed working with him on the Masterplan, and realized that in him we not only had a very creative architect but also a very wise person.

When time came for the design of the buildings and facilities, we decided to retain Prof Shaheer and his firm for the landscaping work. He had some reservations when I called him on the phone, and I assured him... "Professor Shaheer, we are going to build the best academic campus in the country (and possibly the world) and we need you...we will not let a single tree be planted if you do not approve of it.... please let us know what conditions will enable us to avail of your services and we will try to meet those conditions".

He not only undertook landscape work for the campus, but also carried out the peer review of all landscaping work done in hostel, housing, and academic parcels. He was a stern and tough teacher, as I saw him guide the young landscape architects of other firms but very understanding and very humane. His presence in our large team of architects and professionals has been extremely reassuring to us in general and to me personally...we knew that he would point out if we were making mistakes somewhere.

Prof Shaheer....your creativity and wisdom have left a huge imprint on the IITGN campus...please be assured that we will not let you down... that you will smile from your 'home above' at the great campus that has started to emerge....your hard work in design of a beautiful boundary wall (we hope to start this soon) and on the 2000 capacity amphitheater will be masterpieces ...that generations of students, faculty and staff will be grateful to you.

It is a huge loss to us...to IITGN...to me...I will miss you, Professor Shaheer...Rest in peace.....

Facebook post by Prof Sudhir K Jain, Director on November 29, 2015.

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Introduction

Addressing the need for additional campuses in the Indian Institutes of Technology system, the Government of India has established a number of completely new campuses. This includes the Indian Institute of Technology Gandhinagar (IITGN), which became part of the system in the 2008-09 academic year. The Institute was initially housed on the premises of Vishwakarma Government Engineering College in Chandkheda, Ahmedabad, Gujarat. In August 2012, the Government of Gujarat provided a piece of land on the banks of the Sabarmati River at Palaj village, Gandhinagar District, measuring about 161 hectares (399 acres) for the IITGN permanent campus.



Bird's eye view of campus, shot from a drone, showing housing in background and hostels in right center and Academic complex in foreground. The open space in between will soon be sports complex and central arcade.

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Landscape Masterplan

The landscape structure is held together by the following three important spaces:

- The River Promenade along the western boundary of the site is one of the main conceptual anchors of the open space system. Designed as a broad landscaped walkway for movement along the riverfront of the Academic Complex, it is also the focus of informal leisure activities of students and faculty.
- The Ravines are the subject of land rehabilitation, storm water management and soil conservation through erosion control and new planting. They are the second major anchor of the landscape structure, an extensive area where the existing "natural" identity of the landscape can be protected and enhanced, in contrast to other necessarily more formal spaces of the campus.
- A Central Vista in the shape of a landscape mall is the third major element of the landscape structure and is envisaged as the prime open space on campus. It is conceived as a broad sweep of open space.

Designers of the campus Masterplan strove to make this an exemplary project for sustainable development. The IITGN campus Masterplan subsequently was awarded a 5-star GRIHA rating in the large development category in 2016 and was the first in the country to win such a rating.







The concept establishes a broad landscape structure for the proposed campus, a planned system of open spaces and vegetation that is responsive to specific landscape qualities of the site. There is an emphasis on preserving natural lakes and drainage patterns to the extent possible. By isolating the development from the river, the plan also ensures minimum impact on the river and its ecosystem.



Illustrated here are some of the physiographic and other environmental and visual aspects that guided the process of site analysis from which the landscape Masterplan emerged.



ELEVATION MAP

The ravines represent a degraded landscape that can become an asset through rehabilitation. Through erosion control and encouraging the growth of native species, the ravines can be utilized as a picturesque landscape feature whilst at the same time serving useful environmental functions.



The central part of the site is characterised by ravine lands. These are susceptible to back-flow from the river during floods, and also erosion from the passage of large volumes of water during monsoons.



Two seasonal ponds situated in slightly low lying areas amidst the former agricultural fields have been retained and integrated with the stormwater management system.



The riverside location offers panoramic views across the Sabarmati and suggests the possibility of a linear landscape edge, as indicated in the Masterplan.



The landscape structure is based on a connected system of open spaces of various kinds.



River Promenade under development



Landscape Spaces

The landscape structure as shown in the drawing on the next page comprises a range of open spaces arranged as a visually interesting and varied network to facilitate comfortable and unhindered movement of people on foot. Tree-shaded pedestrian footpaths follow the alignment of this open space system, connecting academic, residential and recreational areas not only to each other, but also to the riverfront and the ravine landscape under development. Lawns and expanses of grass have been avoided as they are "expensive" ecologically requiring large quantities of water to maintain.

As many of the trees planted for shade will take a few years to grow, the campus has a challenge to provide shade cover in the interim. Some transportation between housing and academic area is thus being provided on an interim basis.

The landscape spaces are largely barrier-free. In the academic, hostel and housing areas the entire hardscaped area has minimal or no barriers.



Gardens



Landscape Structure



A Central Vista

A Central Vista in the shape of a landscape mall is an important major space of the landscape structure, and is envisaged as the prime open space of the campus, as illustrated in the drawing on the next page.

It is a broad sweep of open space, about 50 m wide, to be lined with two or three rows of large shady trees on either side, extending from the Entrance Court at the nothern end, through the sports complex (where it is defined by an arcade under the stands), to the student hostels and staff residences at the extreme southern end.

This landscape axis is aligned to integrate, at either end, the two large seasonal ponds within its design. The Masterplan suggests that this would be a good location for community and shopping facilities of the Institute because of its central location and its potential as a centre of social activity and casual interaction between faculty and students.



One of the seating areas in the Central Vista



Plan & concept of Central Vista



6

The River Promenade

Between Academic Complex area and adjacent to the boundary wall along river edge.

The promenade along the river edge connects the Academic Complex with the river. The connection with the river is expressed with a raised path along the buildings and a pedestrian path along the site edge. Sitting areas, light poles and trees planted at wide intervals enhance this visual connection.

The boundary is in the form of a ha - ha to take advantage of the view to the river. The land outside the site is also developed (8.0 m) and is 1.25 m below the boundary edge. The land slopes to -1.25 m in a grass slope of 1:2 with a flat area and a hedge defining the boundary edge.

The boundary edge along the river is the subject of land rehabilitation and soil conservation and is stabilized through erosion control measures and plantings.





River Promenade plan

Seating





A Scenic Entrance Driveway Through The Ravines

The Ravines are the subject of land rehabilitation, stormwater management and soil conservation through erosion control and new planting. They are the second major anchor of the landscape structure, an extensive area where the existing "natural" identity of the landscape is protected and enhanced, in contrast to other necessarily more formal spaces of the campus.



Section



Scenic Drive through the Ravines

Originally the landscaping work in the ravines called for stone pitching to hold the hillsides (see stone walls in lower left of the photo). However when campus planners were introduced to geosynthetics they realised that this might be a better option for hillside stabilisation while keeping the slopes green. They began using geosynthetic fabrics with a toe wall of gabion on the ravine slopes. These fabrics are made from polymers and have the advantage of being both permeable and flexible by growing grass on top with their roots gripping the soil below. The geosynthetic fabric on the ravine embankment is visible in the center of the photo. In addition, check dams have been built at a few key locations. These small dams provide a minimal stone wall at the lowest and narrowest point in a ravine to hold back soil and moisture that is washed through the ravine during the monsoons.



Scenic Drive: Alignment



Design of earth grading to align the Scenic Drive through the ravines



Simulated View



An Entrance Experience

The entrance experience for the visitors includes passing through the landmark gate, driving the Scenic Drive through the differing topography of the Ravines, passing through the Entrance Garden Amphitheatre and arriving at the conference court adjoining the Arrival Court, through a gateway defined by the administration and conference buildings.

Elevation

PARKING BEHIND SCREEN WALL

SIGNAGE

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAI

PEDESTRIAN





Entrance Plaza

Entrance Plaza




Amphitheatre



Entrance Garden, Gateway to the Arrival Court



Aerial View of Entrance Garden Amphitheatre

The Arrival Court at the end of the Scenic Drive will greet visitors to the campus. From the court the eye is drawn down the Central Vista.



Plan of Scenic Drive, Entrance Garden Amphitheatre

Seasonal pond at Arrival Court

125-

The Arrival Court

The Arrival Court illustrated here is located on the northern end of the landscape axis aligned to integrate, at either end, the two large seasonal ponds and to follow the campus buildings presently built.

The proposed design provides access to the present academic and administration buildings.



- 1. Approach road from Scenic Drive is extended to Central Vista
- 2. Mounds 1.8 M high
- 3. Entrance drop-off (9 Squares) connects to Academic Areas
- 4. Feature wall in line and continuation of existing screen wall
- 5. Arrival Court with place for art/sculpture as a marker for the axis, centre line of the Central Vista
- 6. Existing seasonal pond retained in natural form
- 7. Parking
- Flowering shrubs in an orchard like planting in areas designated for future buildings gives a finished look to the landscape at Arrival Court

Pedestrian and cycle friendly campus





Views of Central Vista and Arrival Court, including details of Arrival Court colonnade

Plantings and seating areas along Central Vista

SCHOOL ST.

THEF.

Address

- CALLEN &

*Sale Decommences

The Entrance Garden Amphitheatre

The amphitheatre has been designed for multiple purposes. It is a spot for performances, events, street plays, and student cultural events, but it has also been designed as a garden. There are trees within the amphitheatre itself, as well as grass strips between each row of seats, making the space appropriate for morning walks and contemplation. The Arrival Court also has garden seating leading up to the amphitheatre.



11

The Connecting Greens

Between the Central Vista and adjacent faculty housing, student hostels and sports area











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- 640

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Existing trees will be protected and given importance by specially designed sitting places in gardens around them

Trees in the green connecting spaces





Mangifera indica

Holoptelea integrifolia



Pongamia pinnata



Manilkara hexandra

Existing trees protected where possible

2

Gates

iy

The Main Gate complex has been designed as a landmark when seen from the highway.

It extends over a length of 50 m and is set from the main road by 20 m to provide for visitors parking and waiting spaces.



GATE 1 Main Entrance from Highway

Plan



View 1



View 2



A boundary has to fulfil the need for security and privacy as well as present a suitably impressive facade, especially on the highway side. At the same time, it must not appear ostentatious or wasteful. The design has developed from these requirements so that it is distinctive, instantly recognisable and a major landmark on this length of the highway.

The main design considerations have been

- 1. It is not a solid wall. Solid panels and piers are balanced with the length of mild steel (MS) grill so that there is sufficient transparency, but also a certain amount of visual screening.
- 2. It is to be constructed with reinforced concrete pillars and beams together with brick masonry. The basic module is a set of twin concrete piers 11.5 metres apart with exposed brick masonry cladding.
- 3. In between these piers is a 0.6 m high solid wall of brick masonry finished in washed aggregate grit, grey in colour.



Boundary Wall under construction



grit, or MS grill.

and to create a visual rhythm.

finished in white-coloured washed aggregate of grills and solid panels have been proposed of the wall. These panels can be used for to avoid monotony (since the wall is very long) artistic displays, social messages and also by the community or local school for cultural or educational communication.



Rendering of typical Panel Boundary Wall



Jal Mandaps

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Strategies for water harvesting and conservation are integral to the Masterplan. An important feature of the water conservation system is the collection of rooftop rainwater into pipes that feed into several underground water tanks located throughout the campus. The capacity of the tanks range from 628 to 1413 cubic metres.



Campus on the Sabarmati

The pavilions illustrated here are inspired by the concept of associating architectural features with water conservation structures, e.g. stepwells regionally known as *vavs, baolis* and *kunds*. In the present case the landscape architect has called these features *Jal Mandaps* and designed them as an integral part of the water tank to mark its presence and also serve as a means of access. The associated landscape has been designed to encourage its use as a gathering space and a landmark in the landscape.



Key Plan



Key plan showing locations of all 6 Jal Mandaps



14.1. Jal Mandap 1



Section X1



Plan at +1500





Jal Mandap 2 at night

14.2. Jal Mandap 2



Nursery

15

It was initially thought by IITGN planners that the development of campus horticulture would require the establishment of a nursery for the propagation of large quantities of various kinds of plants, with a particular focus on native species. The nursery would fulfil requirements of afforestation, horticulture and ornamental plants for the complete site and also provide a base for the management and maintenance of the site landscape as it developed over time. However, the reality of maintaining such a nursery proved problematic. Further, the incentive to maintain the nursery was not very strong since there are several forest department nurseries and private nurseries in the vicinity from where most saplings are easily available. At this point of time there is no functioning nursery on site. However, IITGN will keep these plans and reevaluate the need for such a nursery in subsequent phases of campus development. There has however been a strong community-led effort on developing and maintaining an organic farm on campus.



Proposed nursery on site



Organic vegetable farm on campus







BIG KOPIN

75 Neem trees were saved from cutting and transplanted along the boundary.



Emphasis has been placed on using native species of trees and plants in the campus landscaping. For land that has been earmarked for future construction, the plantings are primarily fruit trees and vegetation that will not present a challenge to cut later.

16.1. List of Trees

GREEN CONNECTOR	RAVINE LAND	BOUNDARY
Ailanthus excelsa	Acacia catchu	Acacia auriculiformis
Albizzia lebbeck	Acacia leucophoea	Acacia catechu
Butea monosperma	Acacia nilotica	Albizzia lebbeck
Dalbergia sissoo	Acacia planifrons	Anogeissus sericea
Holoptelea integrifolia	Acacia senegal	Azadirachta indica
Madhuca indica	Acacia tomentosa	Bombax ceiba
Mangifera indica	Acacia tortilis	Cassia siamea
Manikara hexandra	Ailanthus excelsa	Casuarina equisetifolia
	Albizzia lebbeck	Dalbergia sissoo
CIRCULATION NETWORK, ROADS AND PATHS	Azadirachta indica	Mangifera indica
Alstonia scholaris	Butea monosprema	Moringa oleifera
Azadirachta indica	Capparis deciduas	Peltophorum pterocarpum
Bahunia spp	Pitecolomium dulce	Polyathia longfolia
Cassia renigera	Salvodora oleoides	Pongamia pinnata
Cassia siamea	Tecomella undulate	Tecomelia undulata
Delonix regia	Zizphus mauritania	Teminalia celeppe
Ficus infectoria	Terminalia catappa	
Mitagyna parviflora		
Peltophorum pterocarpum		
Terminalia catappa		



Landscaping Plan

Mangifera indica

Terminalia catappa

Cassia fistula





Alstonia scholaris

Syzygium cumini

Azadirachta indica

Concept Landscape Detail (Trees)

for Central Vista, west green connector and riverfront promenade



Concept Landscape Detail (Trees)

for east green connector

Cassia siamea Ficus infectoria Azadirachta indica Mangifera indica Delonix regia Manikara hexandra Alstonia scholaris Bauhinia spp. Cassia fistula Madhuca indica Butea monosperma Holoptelea integrifolia

16.3. Trees in Central Vista





Tamarindus indica



Ficus benghalensis





Syzyigium cumini





Ficus infectoria



Azadirachta indica





Ficus amplissima

16.4. Trees in Avenues





Delonix regia





Alstonia scholaris





Cassia renigera

Bauhinia spps.









Terminalia catappa





Peltophorum ferrugineum



Mitragyna parviflora

16.5. Trees in Ravines























Capparis decidua (kerdo)

Zizphus mauritania (bordi)

Acacia nilotica

Acacia leucophloea (harmo)

rmo) Prosopis (

16.6. Trees in Ravines, along boundary









Acacia auriculiformis





Acacia catechu





Bombax ceiba







Moringa oleifera





Casuarina-equisetifolia




Landscape and Open Spaces of Academic Complex, Housing and Hostels

The Academic Complex, Faculty & Staff Housing and Student Hostels in Phase 1a were designed by three different architectural firms as mentioned below. Prof Mohammad Shaheer remained involved in peer-reviewing and contributing to the landscape design of these three areas in Phase 1a. The following subsections give a glimpse of the landscape and open areas within these areas.

17.1 Academic Complex

The Academic complex has been designed by Mitimitra Consultants Pvt Ltd, and is designed around a Central Spine with a series of courts. The open spaces were designed in a manner so as to give a meandering and exploratory character and promote interactions. The landscape subconsultant for the Academic complex was M/s Swati Sahasrabudhe, Pune.







17.2 Faculty and Staff Housing

The faculty and staff housing has been designed by M/s Vastu Shilpa Consultants (VSC). Inspired from the traditional "Pols" architecture in Ahmedabad, the housing is designed as a closely packed cluster of buildings with green pockets of various scales connected by a central pedestrian spine. The landscape subconsultants for faculty and staff housing were M/s IORA Studio.





17.3 Student Hostels

The student hostels were designed by M/s HCP Design Planning and Management Pvt. Ltd. In Phase 1a, 6 hostel blocks are designed as a single hostel community centered around a vibrant hostel street.







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This publication is one in a series describing the development of IIT Gandhinagar's campus on the bank of the Sabarmati River in Gandhinagar. Campus development provided numerous opportunities for innovation and the series is meant to document these.

This document describes the landscape design for the entire campus, an essential part of the Masterplan that integrated the buildings and features of the campus together. The document describes the three prominent open spaces that hold the landscape structure together, along with the entrance experience, the landscape spaces that provide definition to the campus, and the landscape infrastructure.





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