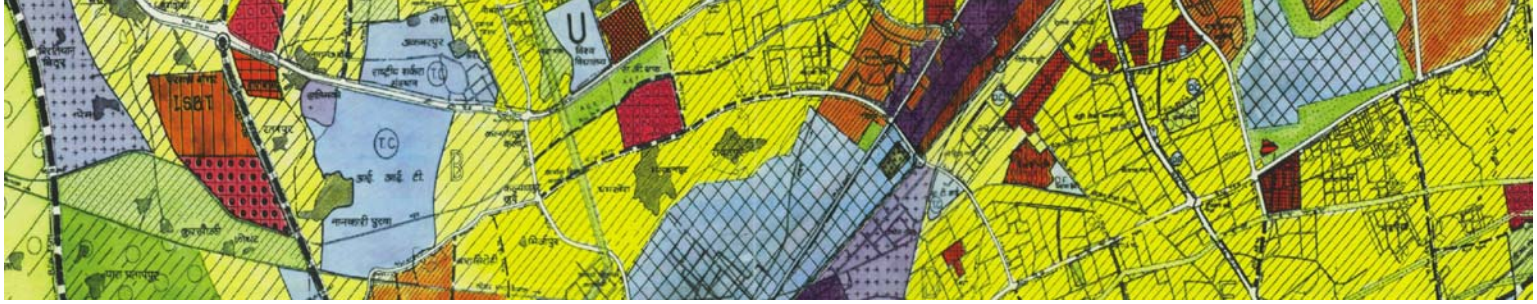
16th November, 2011

IIT KANPUR CAMPUS

MASTER PLAN - 2021

D.S. MESHRAM, Advisor, Town Planning



IITK, CAMPUS MASTER PLAN - 2021

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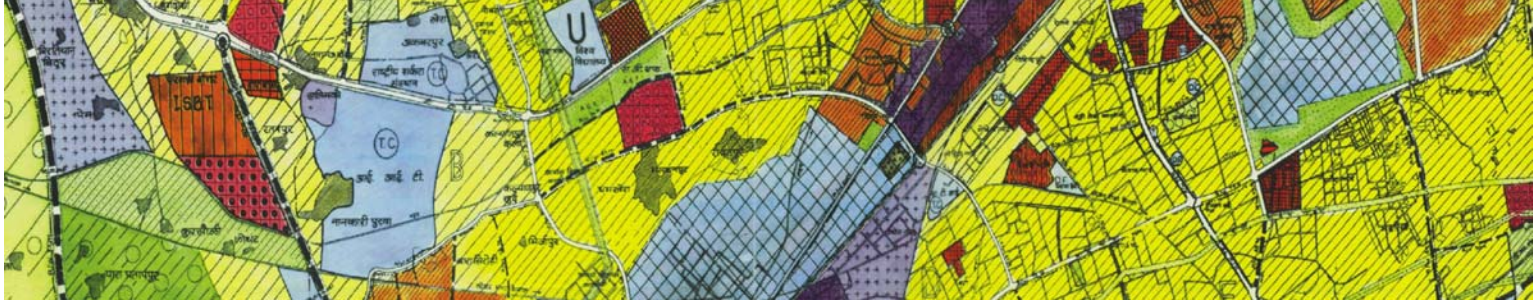


1.0 BACKGROUND

1.1 As per Terms of Reference, the scope of work includes - to advise on comprehensive planning for Master Plan of IITK Campus based on the input of various stakeholders of IITK community, and to:

(a) Study the existing planning of IITK Campus;

(b) Interaction with the various Groups of Institute Community members; and

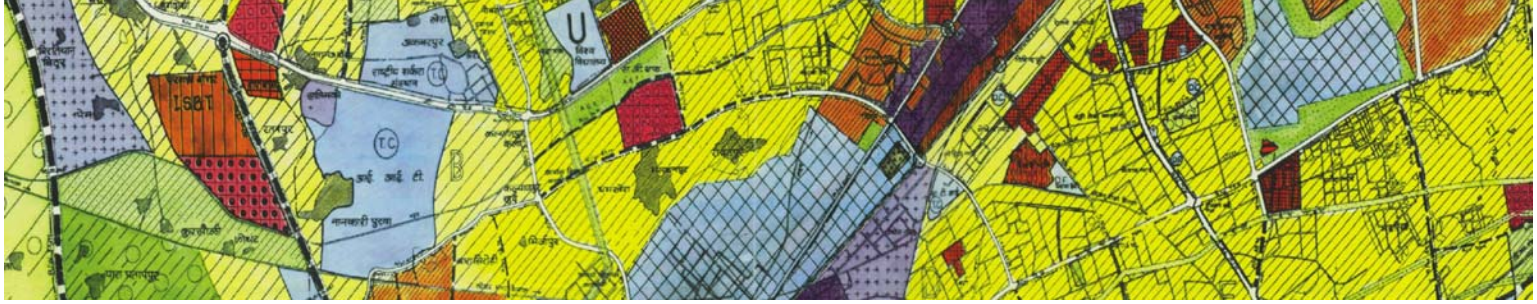
(c) Review the IITK Master Plan 2021 prepared by the Architect of the Institute, in the light of future requirements.

1.2 Accordingly, in the first instance, the whole Campus was recced along with Shri Rajeev Garg, Superintending Engineer, IWD, followed by the discussions with Prof. R.K. Thareja, and Prof. S.P. Mehrotra. During the discussions it was given to understand that the detail requirement of all the Departments are being worked out, and will be finalized shortly.

1.3 In conformity with the scope of work, the meetings / discussions were organized with the various Stakeholders like - (1) Institute Space Planning and Allocation Committee; (2) Institute Environmental Committee; and (3) Institute Advisory Committee. Detail surveys of existing buildings were carried out along with the officers of Institute Works Department. The Insception Report was prepared (20th January, 2011) and submitted to IITK, along with the questioner for collecting the data / information. Besides the discussions were also held with Architect of the Institute and also with Director, IITK. Accordingly, the Report has been prepared, which is primarily based on the information provided by IWD and information available in the IITK, MP 2021, prepared by Architect, which is substantiated by the field visits, physical surveys, points arrived at during discussions, etc.

2.0 IITK CAMPUS IN VOGUE

2.1 The Government of India with technical assistance from a consortium of leading American Institutions established IITK in 1959, which is one of the premier technological institutes of the country. It is located off GT Road at Kalyanpur on the outskirts of Kanpur with a site admeasuring 1,055 acres (426.9 ha.). The Campus was originally designed for a student strength of 2,400, the totally residential campus presently caters to a student strength of 4,500. Most of the physical development of the campus was completed by the early 70's. Little building activity happened till the late 90's, when an

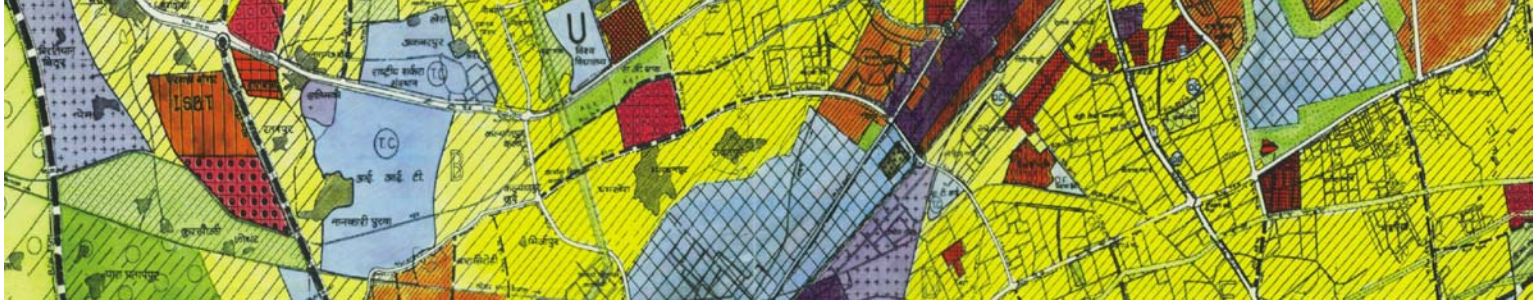


increase in the student intake spurred new development. Today IITK Campus is a dynamic campus of great diversity and scholarly distinction with a strong sense of history over the last 50 years.

Phase I: 1959 – 1996

2.2 To encourage meeting and interaction among students and faculty, all activities in IITK Campus are grouped around Lecture Halls, Library and Faculty Buildings and Laboratories, while other specialized services are organized and planned as decentralized activities and are connected by the walkway, which allows the students to walk at two levels of the buildings that are designed to receive a two level circulation. The structure is based on a module which consists of "lab" and "non-lab" and major work areas evolved as a compilation of unitized system with provision for services. Barring the Library and Lecture Halls, most of the work areas have been designed on a system where lab services can be tapped easily.

2.3 The campus is planned for a strength of 2400 students, 280

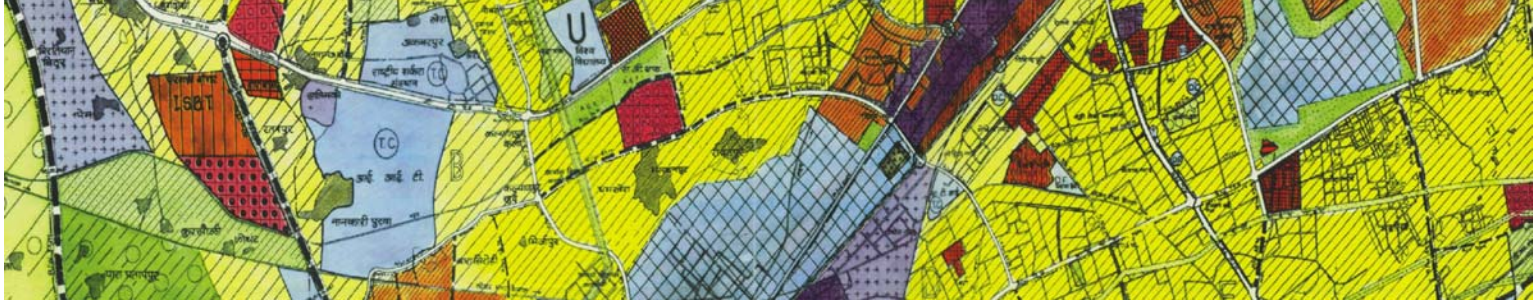


faculty and 500 staff with the possibility of eventually increasing the capacity. The Academic Complex, centrally located on the site, is a single entity, supported by an infra-structure, landscape and service systems. The arrangement provides spatial variety within an ordered unity. Pedestrian and vehicular traffic is segregated to keep the core of the Academic Complex free from traffic, noise and conflict. Places of interaction in corridors and courts are provided along the pedestrian movement system which is on more than one level. The trees have all matured in the last 50 years of the campus life, making the campus one of the greenest in the country.

2.4 The design of the initial Academic Core comprising Library, Faculty Block, Lecture Halls, Computer Centre and surrounding Labs has acquired a landmark status in the development of modern Indian architecture. The building forms are open with linking corridors and spaces penetrating through, uniquely providing shelter from the hot sun, yet allowing breeze. The residential areas adjoin the academic complex to provide a planned neighborhood unit with provision for such community needs as shops, primary school, hospital, post office, bank, etc. As per IITK, MP 2021 the total ground coverage is 3.7%, area under road is 8.8% and open space amount to 87.5%.

2.5 The original structure of the IIT campus was interwoven with the pedestrian / cycle movement network such that most facilities were within a 3-5 minute optimum walking distance of 10 minute. Furthermore, the academic core was entirely pedestrian with vehicular movement restricted to the periphery or in the form of cul-de-sacs. Over the passage of time, this underlying concept particularly in the Academic Core is getting diluted by the introduction of a number of internal roads.

2.6 Although the built environment of IITK has a sense of permanence and timelessness, it supports a living institution that must always grow keeping pace with new academic disciplines and changing student expectations. Even though the setting of IITK is unique, unlike other growing campuses across



the country which face pressures, the enough space has been left as open space to meet the future requirements of the Campus. With growth comes a need to address issues related to traffic, parking, and forms of infrastructure, as well as a heightened commitment to environmental sustainability, however, it is also important to avoid overcrowding so as to ensure the quality of living environment conducive to teaching and learning.

Phase II: 1996 – 2011

2.7 Although designed in the early 1960's to cater to a student strength of around 2400, today the student strength including postgraduates is around 4500 with 325 faculty and 750 supporting staff. To accommodate this growth, various additions have been made to the academic buildings, hostels and housing.

2.8 The Academic Core has experienced several completed and ongoing expansions. In fact, CSE, Lecture Halls, Samtel, SIDBI, BSBE, Alumni Centre, Pseudo Dynamic Lab, Nano Lab, JEE GATE, Helicopter Lab, CESE, New Core Labs, IME, CSE Expansion and Research Labs are part of the Phase II expansion. Almost all of these buildings characterized as energy efficient and sustainable. Especially BSBE (2003) and CESE (2008) which has been granted a five star TERI-GRIHA rating integrated various innovative features.

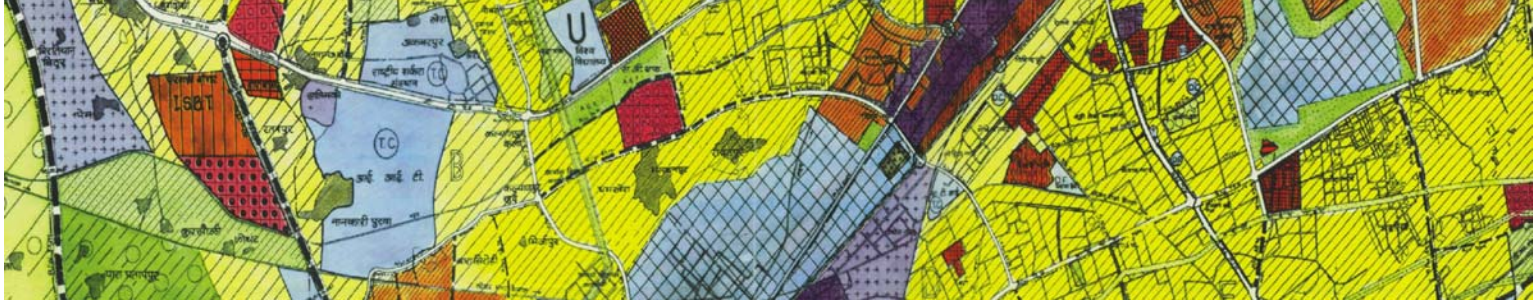
2.9 Similarly several Hostels – Halls of Residence VII to X and Girls Hall of residence, RA Hostels and SBRA have been added to the hostel infrastructure. Some Housing such as visiting faculty apartments and multistory faculty housing is also underway. As per IITK, MP 2021, the present ground coverage is 5.6%; area under circulation and network is 10.4% and open space amounts 84%.

2.10 The present structure of IITK is such that the academic area is located in the centre surrounded by residential area on three sides, with the staff and faculty housing located to the south, east and west and the hostels towards the south-west and west.

3.0 REVIEW OF IITK MASTER PLAN – 2021 (IITK, MP 2021)

Planning Philosophy

3.1 The intent of IITK, MP 2021, is to establish parameters that provide for the inevitable growth in a planned and orderly manner so as to maximize benefits and minimize impacts, ensuring that the next decade of development proceeds within a coherent framework and in orderly manner.



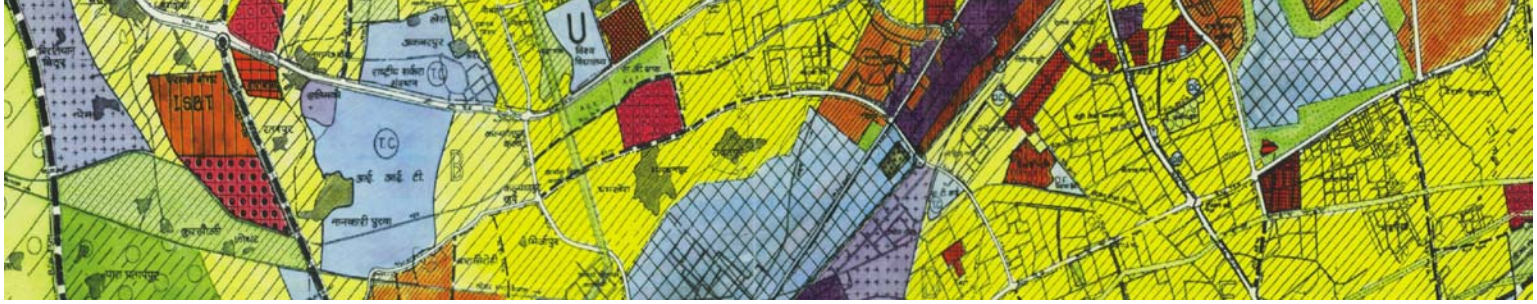
Accordingly, the IITK, MP 2021 envisage a campus of 2021 that will have more opportunities for inter-disciplinary collaboration; improved facilities for students, faculty, staff, and visitors; more sustainable uses of infrastructure; innovative architecture; and enhanced landscape, all well integrated to create a setting that is timeless in its beauty and capable of meeting the ever-evolving needs of a modern campus.

3.2 IITK, MP 2021 is a continuation of the initial plan which earmarked the principal land uses around a Central Academic Core flanked by Hostels and Housing on two sides and also laid out the primary road network for the initial and the future phases. The IITK, MP 2021 anticipates an expansion over the next ten years, and proposes to achieve this growth by applying the following strategies to steer the planning process.

- Integrate present and future needs and build into the existing fabric sensitively;
- Promote a pedestrian friendly campus;
- Maintain the green character of the campus;
- Maintain identify of campus neighbourhoods and promote sense of community; and
- Build in an environmentally responsible manner.

Integrate present and future needs into the existing fabric sensitively: To ensure this the Core of the Campus continues as the vibrant and active place for the important functions of the institution. The plan should reinforce and build upon the past experience in achieving an appropriate balance between preservation and the operation of a modern institution. The plan aims to preserve and accentuate IITK's unique qualities and landmark structures.

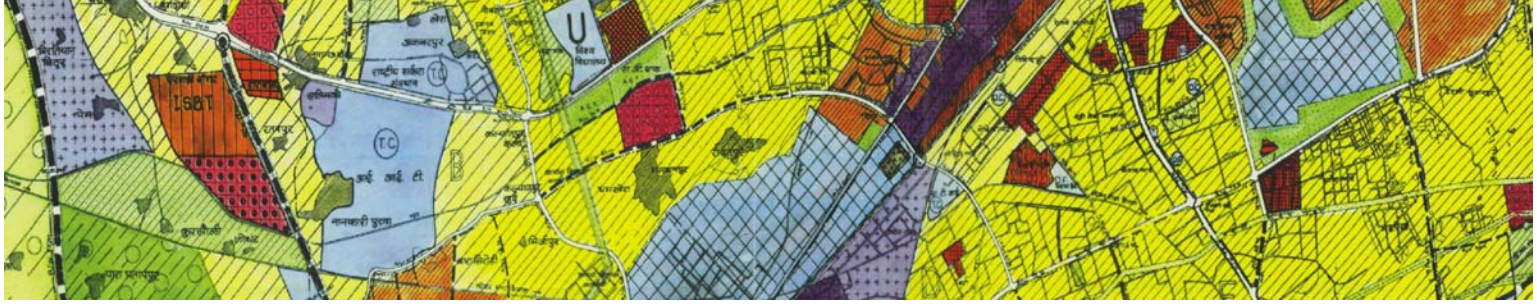
Promote a pedestrian friendly campus: To achieve this the concentration of growth has been envisaged within a walkable distance of the centre complements - IITK's unique academic cultural and educational philosophy, which is manifested in the original design of the campus. Continuing this



tradition means that even as IITK becomes larger in student strength, with more buildings, it must continue to feel small and intimate, with most academic buildings linked by pedestrian / cycle corridors. It should continue to be characterized by green, interactive open spaces where faculty and students can meet and work face-to-face.

Maintain the green character of the campus: In view of this it is proposed to conserve the park-like quality of the campus and reinforcing it is a key factor in planning for the future. Site planning should improve the natural ecology of the area. The plan recognizes that landscape form the connective tissue that unifies diverse buildings into a coherent whole and encourages the enjoyment of the outdoor environment as a part of campus life. Exposure to nature is essential for mental and spiritual wellbeing of the inhabitants. The potential of the existing open space asset is exploited to articulate a network which ensures access, amenity, linkage and environmental benefits to every part of the institute. The enhancement of the landscape of the core campus is a key component of the plan.

Maintain identity of campus neighourhoods and promote a sense of community: To achieve this aspect, the future growth should respect the existing



academic, student and staff residential neighbourhoods, maintaining their distinct identity while creating the sense of an integrated campus community. Sufficient cultural and recreational spaces need to be provided at key locations, which aid in overall personality development.

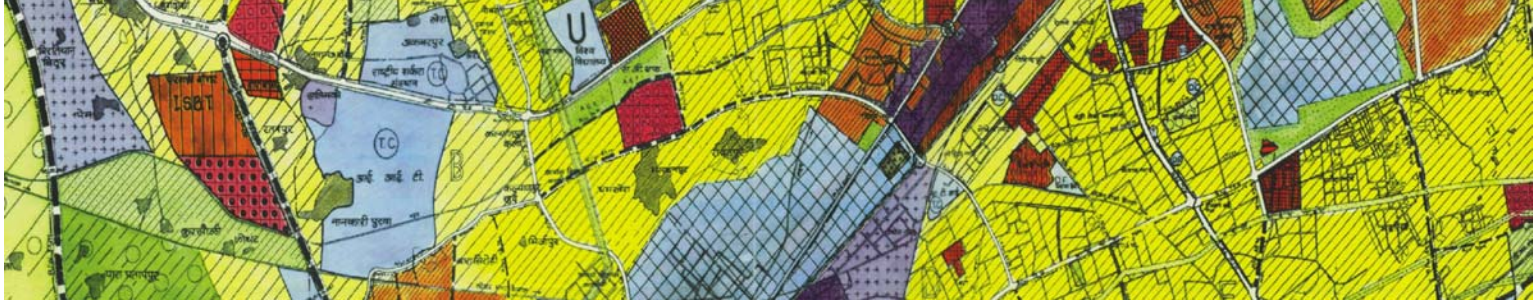
Build in an environmentally responsible manner: To achieve this, the efforts would continue to build upon the previous record in environmental sustainability. New development should be sensitive to the natural landscape, air and water quality, resource conservation, and energy efficiency in building design. Future growth must adopt 'green measures' in the physical infrastructure development.

Future Growth Options

3.3 Although IITK has more land area than many other similar campuses, considering the present growth and trends, it is now extremely important to conserve land and optimize land utilization. The future growth options may be addressed in the following manner:

- Identification of Greenfield sites for development;
- Re-densification of existing development which may result in vertical growth and needs to be introduced in phased manner starting with mid - rise (4-6 stories) before finally going high rise (8-10 stories);
- Redevelopment of older buildings which have either outlived their life / function or are not in good structural condition;
- Refurbishment / renovation of older buildings which have served five decades; and
- Infill of buildings within the skeletal structure of the academic core. This would further reinforce the framework of the existing movement spine connecting the various academic buildings, achieve better space utilization towards the original concept of 'ever diminishing corridors'.

3.4 The IITK, MP 2021 envisages the total strength of around 10,000 students by 2021. Taking into account a faculty student ratio of approximately 1:10 to 1:12, this would necessitate around 800 faculty, 1000 support staff and approximately 750 project staff. Since the campus is totally residential this would mean that in addition to the increase in the academic areas in the form of teaching, Lab and Office facilities, it also becomes necessary to proportionately increase housing and especially the hostels which would have to nearly double in capacity. Furthermore, a modern campus requires more



than just academic and residential buildings; it must provide its population with a variety of infrastructural and support facilities that enhance the quality of campus life and the efficient functioning of a large institution.

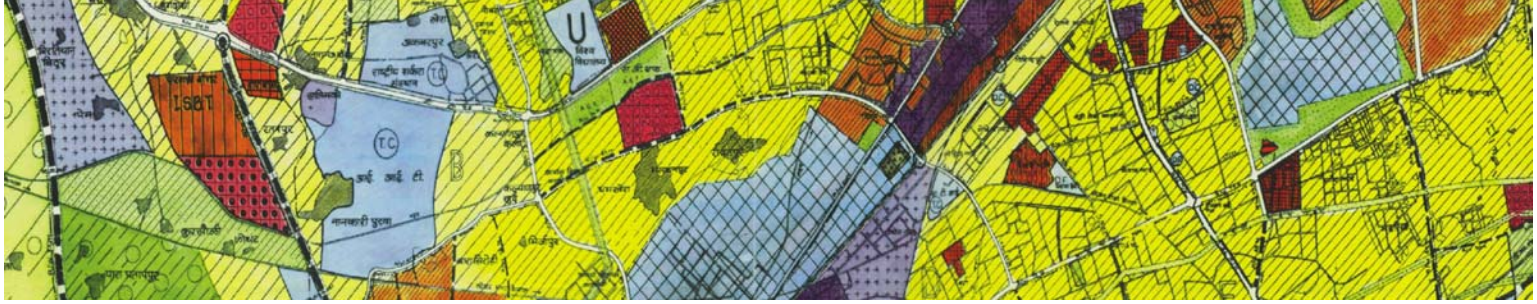
3.5 The periods of substantial growth need careful planning to ensure that the additions enhance the campus setting rather than detract from it, and that the impacts on the environment and the surrounding community are understood and addressed. Accordingly it is envisaged to provide the total open space to 77.6%; total circulation and network to 13.9%; and ground coverage to 8.5%.

3.6 **Academic Expansion**: The future academic core expansion is projected as being approximately 1,00,000 sq. mt. Respecting the existing road network and the open space structure, a number of academic plots primarily to the north and to the east of the academic core are proposed, to be followed by future academic development north of the airstrip road. In addition certain plots within the academic core need to be identified as infill development such as north of the Nuclear Lab and south of the Southern Labs or as redevelopment of existing facilities east of the northwest labs and subsequently the Core Labs. Extension of the covered corridors linking the various academic buildings to be continued.

3.7 It is proposed that the existing stores and services located to the west of the academic core be redeveloped as academic and new load centres for electrical and HVAC systems in close proximity to the enlarged core. The new development is proposed as 4 storey development at a reasonable distance from the inner heritage core comprising Library, Faculty Block, Lecture Hall Complex and Computer Centre so as not to disturb their spatial composition. Development north of the airstrip shall be limited to 2 to 3 floors because of height restrictions of the air funnel.

3.8 The sequence of open spaces within the original academic core such as the greens, library plaza, and arrival plaza is proposed to be retained and developed as landmark spaces reinforcing and complementing the built form. Similarly, the academic core expansion needs to respond to the existing vegetation. In keeping with the original concept, the academic core needs to be preserved as a primarily pedestrian friendly zone with parking limited to the periphery along the boundary wall.

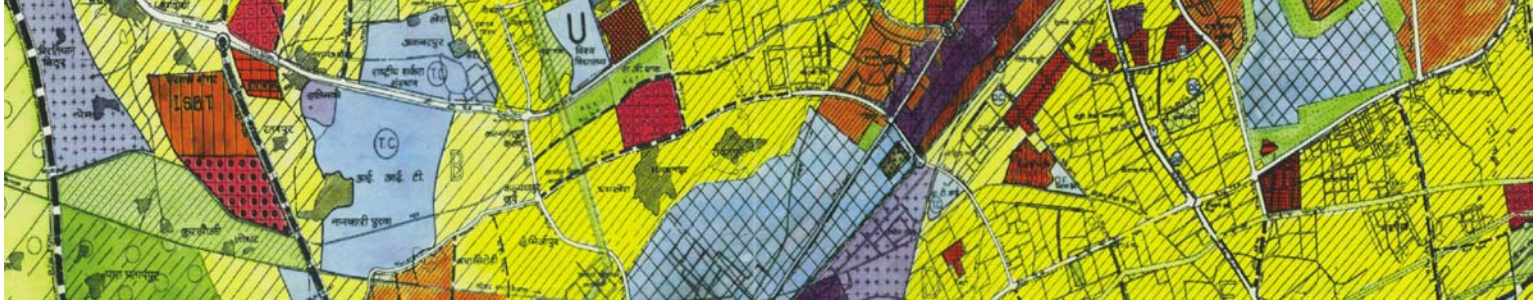
3.9 **Circulation and Network**: Presently the single entry from GT road is choked and has an undesirable urban sprawl around it. It is also used as a through access road by surrounding villages, creating nuisance and security



problems. The solution may be to create a peripheral road along the boundary to connect the existing villages thereby curtailing through traffic within the campus. Since an alternate route needs to be provided for the villages a new bypass road has been created along the airstrip road as a second exit on to GT Road. It is needed to explore the possibility of a grade separator underpass at this Railway crossing which may entail acquiring land on the opposite side. It may also be useful to introduce an alternate emergency exit on to Shivli road and Kanpur via Kalpi Road to avoid the traffic congestion on GT Road. The existing grid oriented NS / EW needs to be broadly respected in the new road network.

3.10 The present transportation network consists of a main spine from the entrance intersected by a major loop road around the academic core and facilities and supporting spurs and loops. In the academic core the concept lies in the separation of vehicular and pedestrian network with vehicular access and parking at the periphery keeping the centre a predominately pedestrian zone. This idea needs to be extended / reinforced in the future growth of the academic core. In order to maintain and further this concept adequately, shaded parking lots accommodating cars and cycles each discretely located on the periphery need to be provided. To cater to a large student population using cycles, introduction of a system of dedicated cycle-ways need to be integrated into the road cross section especially on the primary student movement from the hostels to the Academic Core. The recommendation also is to decentralize cycle parking at load centres like the Lecture Hall, Core-Labs, Computer Center and use stilted areas provided in each building for cycle parking. Revitalize the disused distributary as a dedicated bi-cycle tract, pedestrian path, jogging track interspersed with green spaces, informal meeting points, linking the halls of residences, needs to be explored.

3.11 As the campus is completely residential, the original campus was conceived as a walkable campus which essentially was bi-cycle friendly. The growth of the campus in the late 90's and after saw a change in the profile of teaching faculty and students marked by an increase in automobiles on the campus. The initial cycle and pedestrian friendly Academic Core started to be invaded by four wheelers. As a long term measure, considering the final extent of the campus exceeding a reasonable walking distance, creation of overlapping Battery Bus Routes from the housing and hostels to the Academic Core may be a possibility. By the final phase of growth, the institute would ideally have a shuttle system in place with the environmentally friendly gas run / battery



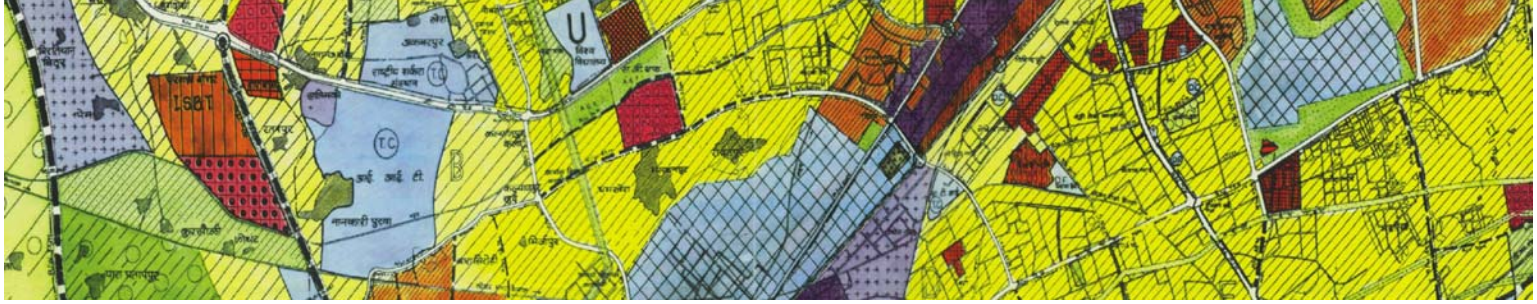
operated / solar shuttle service with convenient stops moving along the primary roads giving connectivity from the academic core to the faculty housing, student housing and any other campus destinations. A campus shuttle system will reduce the amount of local driving and its related demand for parking.

3.12 **Sustainability and Energy Efficiency**: Since its inception IITK has been a pioneer in promoting sustainable campus design which is environment friendly. IITK has in the phase - II of its campus expansion, taken this a step further and committed to promoting energy efficiency as its prime consideration in the future developments. In 2001, the institute appointed TERI (The Energy and Resources Institute) for energy modeling of its building: Bio Sciences and Bio-Engineering Department. The recommendations while quantifying the efficiency achieved, acted as a guideline towards technology to be adopted in the construction of the future buildings.

3.13 Subsequently in 2006-07 at the conceptualizing of Centre for Environmental Science and Engineering, the institute decided to register with TERI for the TERI-GRIHA rating (The Green Rating for Integrated Habitat Assessment). In 2008, the building was completed and the facility was awarded a 5 star rating for its energy efficiency and sustainable initiatives. Centre for Environmental Sciences and Engineering, is the first building in the country to receive this award. Being equipped with the intricacies of building green and having quantified the measurable advantages, all new developments, integrate green design principles to its advantage. Some of the features that are adopted include a gray water system used for horticulture and rain water harvesting and recharge pits thereby minimizing storm water runoff.

3.14 **Open Space:** A broad policy for the open spaces of the IITK Campus is proposed as part of the larger Master Plan, to complement and reinforce development objectives, and to fit the directions and strategy for the institute's future physical growth. Existing open space, both developed and undeveloped is broadly identified. An attempt is made to classify and designate particular spaces for specific functions based on the Institute's future physical growth. The open space policy as proposed in the plan comprises of:

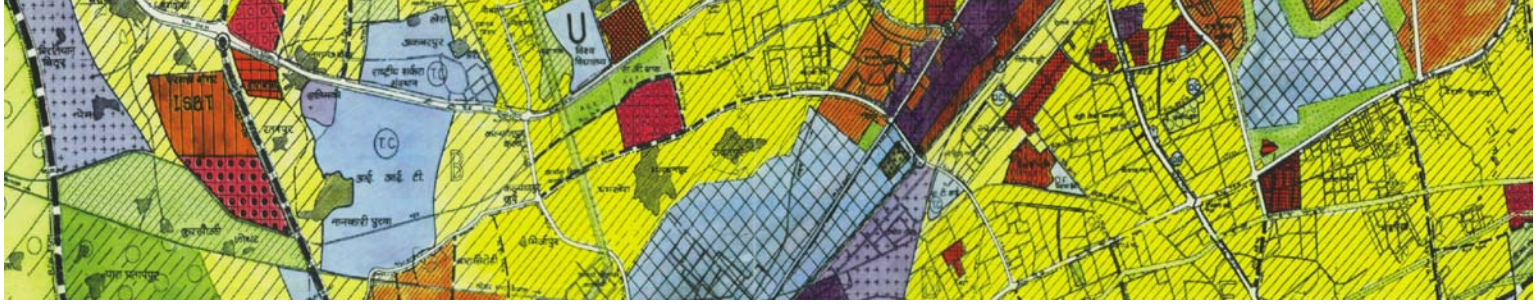
- Open space with ecological emphasis:
  - Existing forest spaces with distinctive vegetation cover of native and naturalized species, in the form of dense forest,



undisturbed water body or bird habitats, etc., to be protected and enhanced; and

- Spaces along the boundary which can be planted with dense forest type vegetation as buffer zones, and would thus become environmentally beneficial in the long run.

- Open space for linkage and community use:
  - Low maintenance spaces for community and recreational use in residential as well as in the vicinity of academic areas, to be developed and improved for linked landscape structure, using their existing features, e.g. tree-groves, sloping land, etc.; and
  - Closely associated with the above, small spaces for seating, children's recreation, to serve as retreat within or near residential and academic areas, but relatively open and not too densely planted, so as to ensure safe use by all age groups.
- Land-mark space:
  - Relatively high maintenance park- like spaces in the institutional / academic part of the campus which can be recognized as potential 'landmark' spaces especially those located strategically between residential areas and academic zones, and also at intersections.
- Sports fields and playgrounds:
  - Existing sports fields to be retained; and
  - Provision has been suggested for additional sports field space, in continuity to some of these, in the vicinity of the new sports gymkhana. Further space can be designated depending on requirements.
- Roads and road-side space:
  - This could form part of a separate, fairly extensive study to examine actual site conditions and possibilities.
- Academic open space:
  - Open space enclosed and defined by the existing academic buildings at the heart of the campus are central to the expression of its distinctive architectural character. A policy of



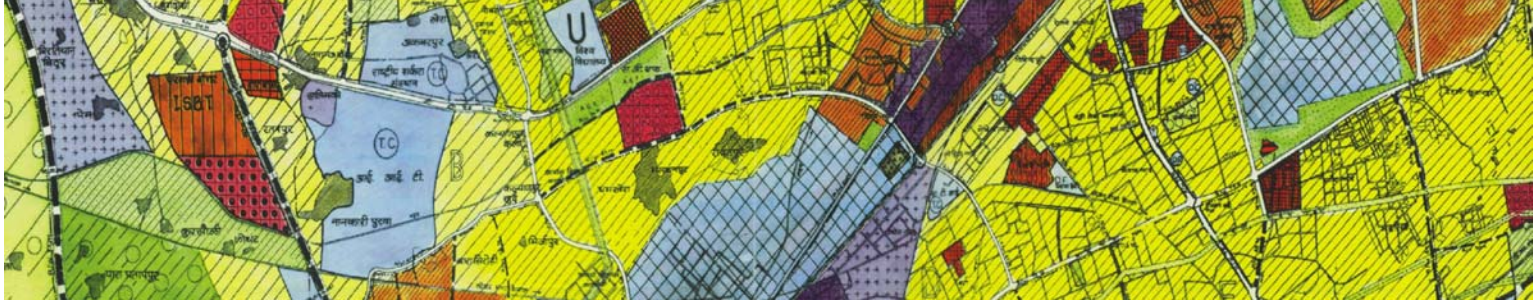
improvement, so that each space, in the form of a 'plaza', courtyard, quadrangle, grove or green has its own special identity, closely matched with the way it is likely to be used and in harmony with its built surroundings. A substantial reduction in the car-parking provision in this area would certainly help.

- This typology of well-defined, elegantly organized focal, or 'core' academic open spaces embodying identity and structure would be carried through into the new extensions of the academic zone, with strong linkages between existing and proposed space.

- Existing nursery space:
  - In the context of the development of the campus, it is not an exaggeration to perceive this as a kind of 'heritage' landscape. The Plan suggests its integration with the proposed open space system.

3.15 **Water Supply**: The campus had been provided with a centralized water distribution system laid on a grid - iron network. The supply is from ground water through a series of deep bore-wells which pump directly in the grid all the time. In addition the campus has been provided with 4 overhead water reservoirs located around the campus. There have been several modifications made to the system. A central system with proper water quality control is important for protection of public health, accordingly the IITK, MP 2021 recommends to:

- Conduct a detailed survey of all water resources like tube well, open wells and any other sources and prepare a master plan to optimize its utilization according to the water quality;
- Plan for a 24 hour water supply for domestic and drinking water usage;
- Check and redesign the water supply grid, upgrade, retrofit and clean the pipes as required and repair where required;
- Re-plan the distribution system by eliminating the direct pumping from tube wells and providing two or three central underground water reservoirs to enable control and monitor wastage;
- Install remote reading electronic bulk water meters at strategic locations which can record water consumption and detect leakages



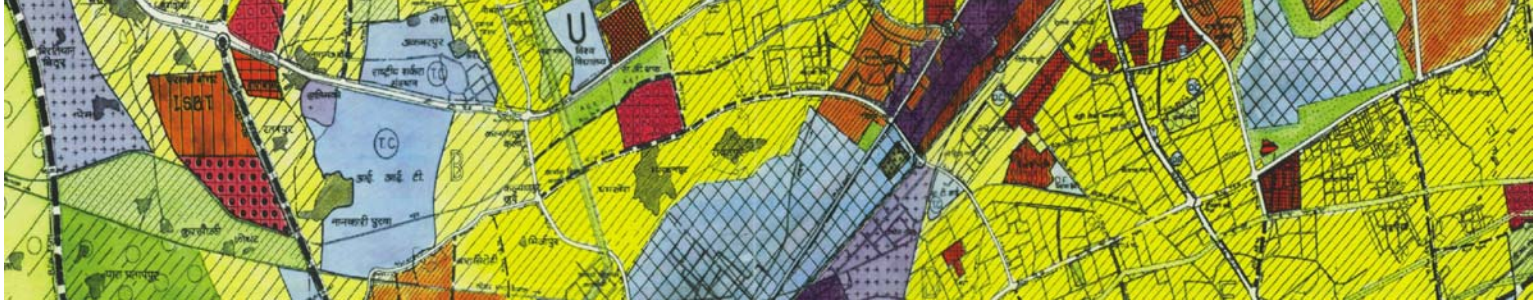
with hand held devices and results recorded on IITK's building automation system or a stand alone system; and

- Plan and upgrade the existing garden hydrant system to be connected with treated effluent from proposed STP ensuring that the recycled water is safe.

3.16 **Storm Water Drainage System**: An underground piped drainage system divided into six sections with an outfall into existing natural drains and water bodies. Only one area which is low lying is provided with a sump and pumping system. There are many outlets for the natural flow of rainwater but many of these have been silted, blocked or diverted, accordingly the IITK, MP 2021 recommends that:

- The entire system need to be physically examined, repaired and cleaned up to enable improved flow of rainwater;
- As the built up area has increased and is likely to increase further with additional buildings, roads and paved areas, gross run off will substantially increase, the runoff to the existing storm water drainage system and it's outfall. It may not be essential to remove and construct all old drains but select portions of overloaded drains may need to be redone and additional drain constructed; and
- There is a need to re-plan the existing storm water drainage system to be able to collect the maximum rainfall either in preplanned ponds and water bodies in low lying areas and to divert them to appropriate rainwater harvesting structures constructed as per Ground Water Board parameters.

3.17 **Sewerage System**: A centralized underground pipe sewerage system using glazed stoneware and RCC pipes with brick masonry manholes had been originally constructed. About 10 sewage lifting sumps with a dry well pumping station for locating horizontal pumps were provided. Reports indicate that due to inadequate maintenance, the sump wells are clogged with silt and sludge and have inadequate holding capacity as required by good engineering practice and no more serve the purpose for which they are meant. The system is run on a round the clock manual basis. IITK has provided alternate negative suction pumps on the surface to pump out the incoming sewage to the next portion of the line. The original sewage treatment was designed as a passive type oxidation pond, which had occupied a large space in the campus. A new modern STP will be more appropriate and will occupy much less space. Three captive packages sewage



treatment plants have been provided near the newer developments gradually phasing out the oxidation ponds and more are proposed. However, the IITK, MP 2021 recommends that:

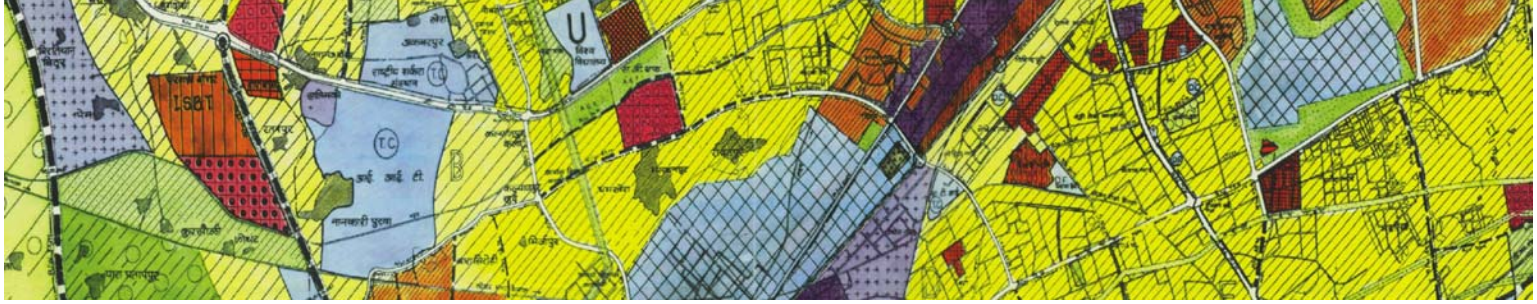
- The entire sewerage system needs to be physically surveyed. The collapsed or broken portions need to be identified, repaired and cleaned to enable improved efficiency;
- A maximum of 2 centralized sewage treatment facilities for a total projected population of + 22,500 persons is most ideal and appropriate instead of several independent package STP's;
- Reuse of STP effluent will require a separate water supply grid and it is possible to use the existing garden hydrant piping system already in place. The system can be upgraded and retrofitted so that it can be made available at points which require it; and
- Individual STP's require more maintenance, consume more power, and if in smaller quantities cannot be efficiently diverted to other areas for reuse.

3.18 **Solid Waste Management**: A new policy of collection, carriage and disposal of solid waste be adopted in consultation with experts and specialist manufacturer which should include:

- Collection of domestic organic waste from kitchen in separate containers and collected door to door on daily basis;
- Disposal of the waste be done by installing several semi centralized vermin-culture farms to produce manure, used in growing fruits, vegetables and flowers, etc. The waste water from the system if any may be discharged into the sewage system;
- Solid waste including cardboard, paper, glass and plastics be disposed through recycling contractors; and
- Electronic wastes have to be disposed off as per government policy.

3.19 **Electricity and Power**: The existing electrical system consists of power obtained at 33 KV and a receiving 33/11 KV 20 MVA sub station provided adjacent to the old SBRA Hostel. The distribution system at 11 KV rings 9 numbers sub-stations with varying transformer capacities to supply power to the academic and residential areas of the campus.

3.20 **Fire Suppression System**: Earlier the system was required for academic core which had buildings with high fire risk such as labs. However most of

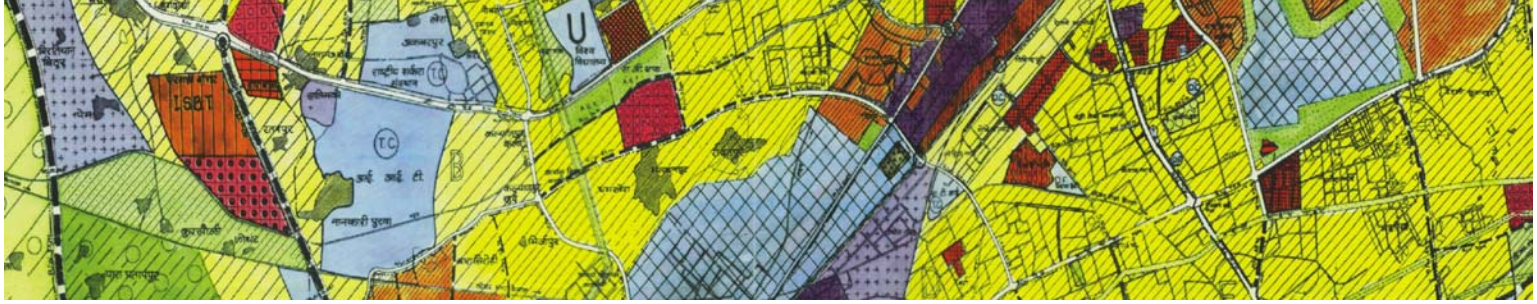


the development in the academic core is limited to G+2 floors with the exception of few buildings. Now, with new development in the academic core being mid-high rise (4-6 floors) as well as residential developments such as hostels and housing are also likely to be high rise, it is therefore proposed to protect the complex with a dedicated fire suppression system.

Planning Interventions

3.21 Taking into consideration all the above aspect, the IITK, MP 2021 Plan suggests following planning interventions:

- Identify potential sites for future development of academic residential and recreational needs;
- Identify iconic buildings that need to be preserved;
- Identify buildings that need to be refurbished to met the future requirements;
- Integrate new proposals with landmark buildings and spaces;
- Identity areas and buildings which are underutilized or in poor condition which need to be redensified;
- Prepare a comprehensive landscape plan for development and preservation of parks, greens and forests;
- Identify landmark open spaces and revitalize them as interactive meeting points;
- Restrict vehicular circulation within the academic core and encourage pedestrian friendly movement;
- Provide for meaningful socio-cultural, community facilities ensuring the quality of life for students traffic from adjoining villages;
- To provide universal accessibility and comprehensive signage throughout the campus;
- Provide for a secured campus by proposing a peripheral road along with boundary to minimize through traffic from adjoining villages;
- Propose future residential development as high-rise multi-dwelling units in place of detached / semidetached bungalows;
- Review and upgrade service infrastructure-sanitary, electrical and HVAC to meet the future demand; and



- Follow environmentally sustainable and `green practices' towards making development energy efficient.

IITK, MP 2021 - Proposals

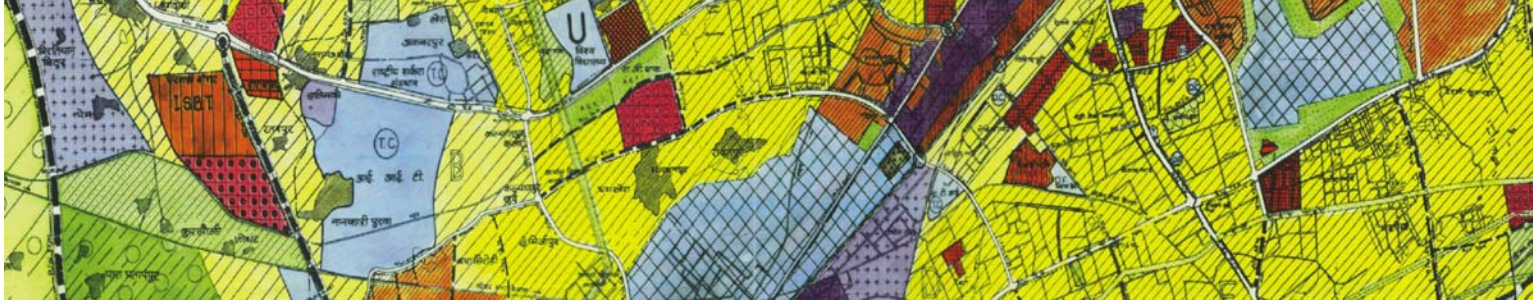
3.22 The IITK, MP 2021 does not propose specific solutions for a presently unforeseen future, but suggests a comprehensive and integrated framework that will allow the institute to make appropriate decisions, when the demand arises. It also identifies certain possibilities that could heighten the experience of the campus at various levels. Accordingly in the IITK, MP 2021, following proposals have been made.

Lecture Hall Expansion: Although the institute requires 1000 capacity Lecture Halls, it is recommended that halls larger than 500 capacity would not be a workable proposition considering visibility parameters. For the proposal of 4 Lecture Halls of 500 capacity, the location of a new multilevel Lecture Hall Complex is with the limitation on the available land area. Considerations for sitting the new lecture hall including close proximity to existing lecture hall complex, ease of movement of students and faculty and conservation of foot print. Alternate sites for locating the Lecture Halls include:

- Within the open space adjoining L8 and L9 and the Southern Labs;
- Across the road from L16 and L17 adjoining the Student Activity Centre;
- Within the northern expansion of the Academic Core; and
- Considering the merits / demerits, the recommendation is to site the lecture hall expansion across from L-16 and L-17. With the restriction of use of campus internal roads from adjoining villages, the present vehicular use of the road will be reduced in future. Connectivity across the street could be achieved on grade or by an underpass / overhead bridge. The lecture halls would be arranged on two levels above one another, thereby conserving the footprint.

Student Counseling Centre and Foreign Student Cell: Considerations for sitting the facility include discrete location, proximity to student zone and the Health Centre. Alternative locations include:

- North of the Health Centre;
- Open space north of the hockey field across the distributary;



- The Retrofitting of the present Student Activity Centre, which shall be available when SAC moves to its new location; and
- Considering the merits / demerits of the various options, the location near the hockey field is found most suitable as it is close to the hostels and the major student movement spine.

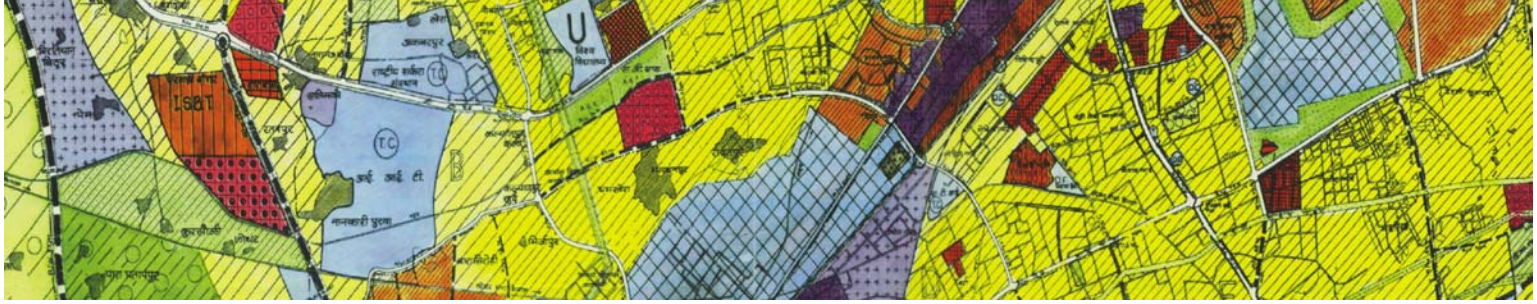
Redevelopment of Girls Hall of Residence - II: Presently the Girls Hall of Residences I and II cater to 350 and 135 students respectively. Considering issues of safety and security and the low efficiency of Hall - II, it is desirable to redevelop this plot by re-densification and in the process interlink the two Hostels by using the space available north of the Health Centre. This multistory hostel will cater to around 650 girls and be a combination of mid and high rise development.

Expansion for new Boys Halls of Residence: Approximately an increase of 4,000 students in the Halls of Residences is anticipated. The choices for this expansion include:

- Towards west of existing Halls;
- Redensifing the existing Halls I – V;
- Keeping the halls in close proximity to the academic core, the emotional attachment of the alumni to the earliest Halls and conserving the land to the west for growth in the future; and
- Expanding west of the present location, would be ideally suited, though the new Halls of Residence would be further away from the academic core. They would need to however be developed as a multistoried development in order to conserve land. Post 2021, the option of redeveloping the older Halls of Residence would be considered.

Additional Sports Fields with necessary facilities is proposed with the expansion. The present and future sports fields would be linked through the proposed bi-cycle / pedestrian path and jogging track along the distributary channel. This spine would also front onto a number of small and large open spaces, providing relief along the uniform width of the channel.

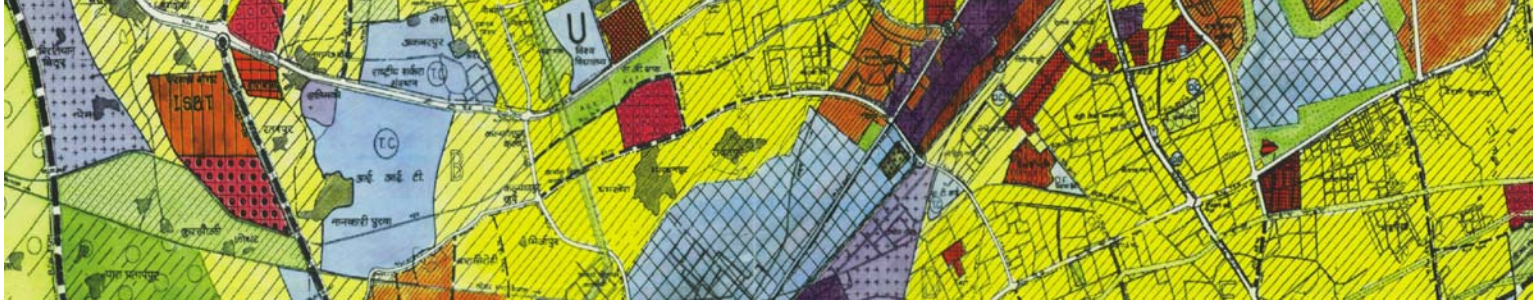
Academic Core Expansion: The future academic core expansion is projected as being approximately 1,00,000 sq.mt. Respecting the existing road network and the open space structure, a number of academic plots primarily to the north and to the east of the academic core are proposed, to



be followed by future academic development north of the airstrip road. In addition certain plots within the academic core need to be identified as infill development such as north of the Nuclear Lab and south of the Southern Labs or as redevelopment of existing facilities east of the northwest labs and subsequently the Core Labs. Extension of the covered corridors linking the various academic buildings to be continued. It is also proposed that the existing stores and services located to the west of the academic core be redeveloped as academic and new load centers for electrical and HVAC systems in close proximity to the enlarged core.

- The new development is proposed as 4 storey development at a reasonable distance from the inner heritage core comprising Library, Faculty Block, Lecture Hall Complex and Computer Centre so as not to disturb their spatial composition. Development, north of the airstrip shall be limited to 2 to 3 floors because of height restrictions of the air funnel.
- The sequence of open spaces within the original academic core such as the greens, library plaza, and arrival plaza is proposed to be retained and developed as landmark spaces reinforcing and complementing the built form. Similarly, the academic core expansion needs to respond to the existing vegetation, which is characterized by new open spaces. In keeping with the original concept, the academic core needs to be preserved as a primarily pedestrian friendly zone with parking limited to the periphery along the boundary wall.

New Housing Development: Broadly four sites are identified for locating new multifamily dwelling units. One opposite the swimming pool in close proximity to the proposal for multistory faculty housing. The second as infill pockets near the existing Type IV and V quarters located on the eastern edge of the campus. With the earlier detached / semi-detached dwelling units almost having outlived its life and being inefficient in terms of land utilization, it is recommended that these be redeveloped as high rise multifamily dwelling units with the stipulation that the ground coverage be limited to the existing foot print or a maximum of 25%. The duplex Type V cluster near the Director residence is proposed as a pilot project to be followed by similar housing projects. A fourth site to the northwest near the type I quarters shall cater to lower category residential staff including security barracks. All sites shall have their open space network earmarked.



Observations

3.23 As per IITK, MP 2021, in view of the 54% increase in student strength and new academic initiatives, IITK needs to cater to 10,000 students, 800 faculty, 1,000 staff and 750 project staff by the year 2021 in a phased manner. However, as per the Institute Space Planning and Allocation Committee, the student strength by 2021, would be of the magnitude of 7,000, thus the requirement has been curtailed by 3,000 students which will also reduce the faculty staff and service population strength as well. And accordingly the total proposals of IITK, MP 2021 needs to be re-visited and revised.

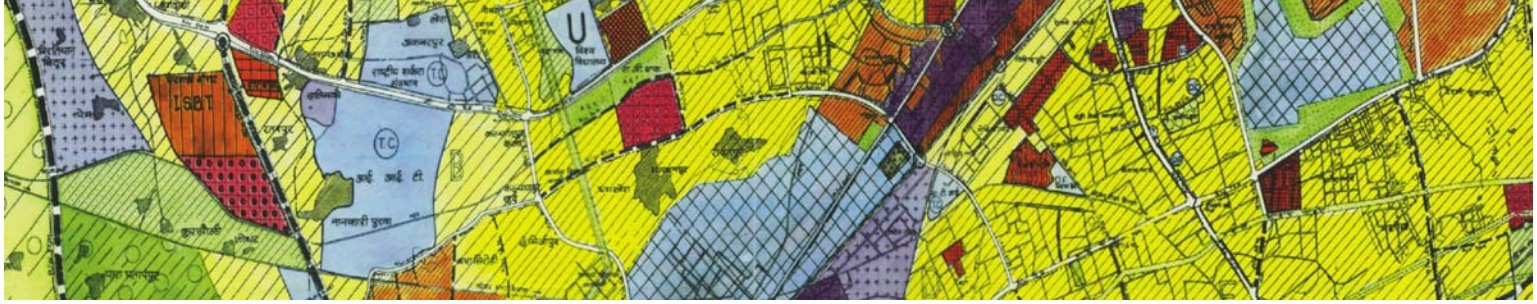
3.24 As per M/s Kanvinde Rai and Chowdhary; the IITK, MP 2021 does not propose specific solutions for a presently unforeseen future, but suggests a comprehensive and integrated framework that will allow the institute to make appropriate decisions, when the demand arises, however, it is felt that specific proposals needs to be identified to meet the requirements of IITK Campus by 2021.

3.25 In order to make the IITK Campus, stakeholders friendly, it would be advisable to have the intimate interaction with them, so as to ascertain, in which direction they want their Campus to be planned / designed. Accordingly, efforts have been made to know the feel of various stakeholders in the preceding sections of the Report.

4.0 INCEPTION REPORT

4.1 In the meeting of the Space Planning and Allocation Committee of IITK held on 11th January 2011, it was desired to prepare the "Inception Report" covering certain basic issues. Accordingly, the Inception Report was prepared and submitted to IITK, which clearly states that while preparing Master Plans for a new town / township; two basic steps under taken are: (a) to decide / project, the population for 20 – 25 years and (b) to calculate the requirement of the land to cater to this projected population. The preparation of Master Plan for new township is rather easy due to clean slate, however, for the existing town / township the population is projected by adopting various methods, including trends of last few decades. And accordingly, the requirement of land is calculated in the light of which the urbanizable limit / area (periphery / boundary of town / township) is extended.

4.2 The campus was designed; originally for 2400 students, 280 faculty and 500 staff i.e. total strength of 3180; on the land measuring 1055 acres,



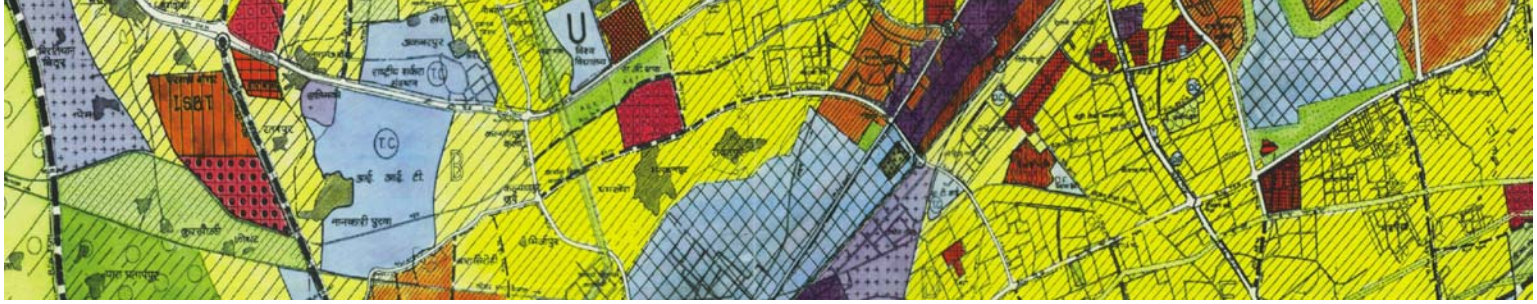
while the proposal as per IITK, MP 2021; prepared by M/s Kanvinde Rai Chowdhury, in 2009; appears to be for 10,000 students, 800 faculty and 1000 supporting staff, i.e. total strength of 11,800 (Table -1), that is to say many fold increase in the requirement; at the same time, the land mass remains the same i.e.; unlike Master Plan of the towns where urbanizable limits are always extended for catering to increased population, as stated above. Therefore, it would be essential that the population in terms of students, faculty, staff and service population is calculated / decided, on priority, by the IITK.

Table – 1, Phase-wise Total Strength of the Campus

Sr.	Strength	Phase – I (1959-1996)	Phase – II (1996-2011)	Phase – III (2011-2021)
1.	Students	2400	4500	10000
2.	Faculty	280	325	800
3.	Staff	500	750	1000
	Total	3180	5575	11800

4.3 As the IITK Campus is located within the limit of Kanpur City, the provision of Kanpur Master Plan – 2021, would be applicable and accordingly, while preparing the IITK, MP 2021, the norms and standards prescribed in the Kanpur Master Plan - 2001 and Building Bye Laws are required to be followed. It may also be underlined that, as the IITK Campus falls within the urbanizable limit of Kanpur Municipal Corporation (KMC), it would be possible for IITK to avail the benefits of the proximity of Kanpur Town in terms of services and facilities available like commercial, health, hospitals, fire fighting, etc; and also the basic infrastructure like water supply, sanitation, electricity and solid waste management, etc.

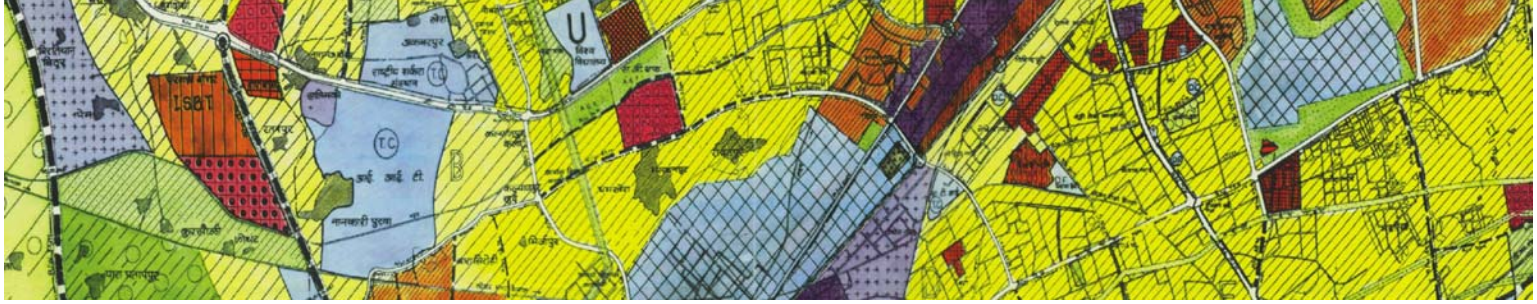
4.4 It would be pertinent to mention here that the aspect of Floor Area Ratio (FAR) as prescribed in Kanpur Master Plan – 2021 also needs to be taken into consideration / calculated. It would be helpful to ascertain whether the additional space requirements prepared by various Departments can be accommodated or not. In case it exceeds the FAR, then the space requirements prepared by various Departments would be required to slash down.



4.5 While planning the Campus it is most essential that minimum land is utilized for locating the footprints of the new buildings at the same time optimum benefits are achieved. However, as land is limited (426.9 ha) and requirement of space is increased to many folds, it may not be possible to carryout various activities on the foot prints of existing buildings. Therefore, for catering to many fold increase, open spaces need to be used for locating the new buildings. As far as planning of the buildings is concerned the architect needs to ensure that no trees are cut, unless it is very essential. However, wherever such trees are cut it needs to be ensured that new trees are planted as per the Environment Policy of Government of India.

4.6 To achieve the minimum utilization of land for building purpose, it would be more pertinent to opt for high rise buildings, so that land can be conserved for future generations in conformity with the principle of sustainable development. At the same it needs to be underlined that by opting for high rise buildings the horizontal distance is reduced but the vertical distance is increased, due to which provision of the lifts, etc., are required to be made, which consumes more energy and also generates heat which ultimately contributes to global warming . Therefore, it would be more advisable to identify the buildings / activities which can be selected for high rise development. Here it would be advisable to follow the caution that while resorting to high rise buildings the requirements of fire fighting are also taken into consideration i.e. availability of ladders and equipments with appropriate fire fighting agencies.

4.7 As stated earlier land is limited to 1055 acres, it needs to be used sparingly for meeting the additional requirement of various Departments, for locating foot prints of the new buildings on the ground. In addition it would, be prudent to identify the buildings which have the low density so that the density can be increased by accommodating appropriate / connected / inter-related activities. Re-densification and locating new buildings for increased requirement would not only generate additional traffic and increase the population but would also have imprints on the circulation pattern because adequate access will be required to be provided to the new buildings as well. In addition it would also generate additional demand for parking, for both slow and fast moving vehicles and would also reduce open / green spaces. While resorting to redensification it would be ensured that the buildings which have outlived their life / utility / function, make the room for other activities by demolition of such buildings. Here it may also be mentioned,



that building which can be repaired / renovated / refurbished should not be demolished but re-used for appropriate use.

4.8 For maintaining the desired level of quality of the Campus the most relevant aspect is provision of infrastructure. But it is not denying the fact that the public health engineering services provided in the Campus are over 50 years old, expressing ageing and deteriorating signs. In addition the ever increasing number of users is putting the pressure on the existing services which are already over strained and need, not only the extensive repair but also upgradation and updation. Accordingly, it needs to ensure that adequate provision of infrastructure like water supply, sanitation, drainage is made in addition to solid waste management, etc. As the area of the Campus is limited it would be desirable that the aspects of "water harvesting" and "zero run of" is addressed adequately. Besides, the total waste water be used / re-circulated for the purpose of gardening / greening and non-potable use of water.

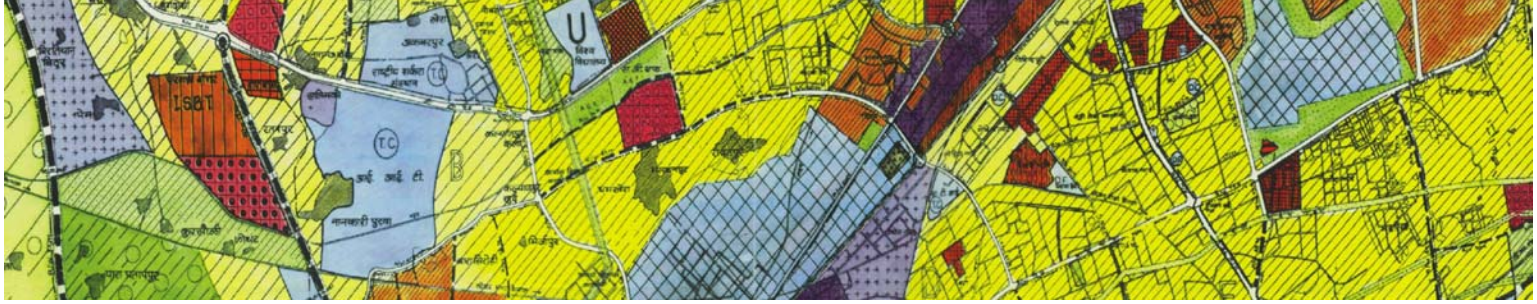
4.9 As per the IITK, MP 2021, it appears that the Zoning has been done for various activities like Academic Area, Residential Area, Hostel Area for both boys and girls; besides for green spaces. However, as the requirements of the IITK, has increased many folds, there is every possibility, that the new buildings / activities may not fall within the same zone as the space may not be available to accommodate the new buildings next to the concerned existing Departments. Therefore, various departments need to appreciate the fact that the new accommodation can not be provided in the vicinity of the existing departments and may be away in certain cases. However, efforts needs to be made by Architect to locate the new building as near / as close as possible, to the concerned existing department building.

- **Academic Area**:

  Presently the Academic Area is located in the centre of the Campus, surrounded by the residential buildings from all the three side. Thus, there is only possibility of extending the academic area on north side. This extension / expansion is possible only up to the existing Airstrip that too keeping certain distance from the Airstrip, for safety reasons.

- **Hostel Area**:

  As there is substantial increase in the number of students, to accommodate them it would be essential to opt for multistory construction on / near existing Hostel Buildings both for boys and



girls. In case it is not possible to locate new hostels buildings in the proximity of existing Hostels, then suitable and safe location needs to be identified.

- **Housing for Staff**:

  Presently majority of houses in the campus are on plotted development, but due to shortage of land and ever increasing demand for housing it would be appropriate to opt for multi-storied group housing.

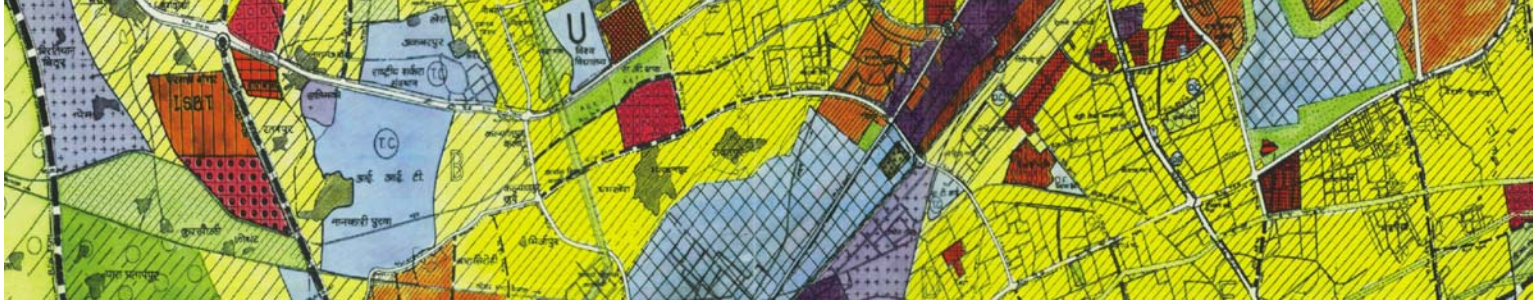
4.10 As the requirements of the IITK has increased to many folds, it is essential that the following major important issues are decided / resolved on priority:

- The final strength of students, faculty, staff and service population;
- Calculate floor area of all the existing buildings along with their ground coverage / foot prints so as to ascertain whether it is within permissible limit of the FAR as prescribed in the Kanpur Master Plan – 2021. It would also enable IITK to decide whether the space requirements projected by various Departments is possible to meet or there is a need to slash down the projected requirement of space by various Departments;
- Explore the possibility of utilizing the land at Shivli Road and area beyond Airstrip for appropriate use.

4.11 The small questionnaire was devised and enclosed for obtaining the views / opinion of all the Departments concerned with planning and development of IITK Campus and various stakeholders. It was given to understand, during the meetings of various stakeholders, that the questionnaire was uploaded on the website of IITK for obtaining the views of various stakeholders. The opinion / views received from IITK are given in **Annexure – 1**.

5.0 CONSULTATION WITH VARIOUS STAKEHOLDERS

5.1 As per ToR, the consultations were made with various stakeholders of IITK, comprising (1) Institute Advisory Committee, (2) Institute Environmental Advisory Committee, and (3) Institute Space Planning and Allocation Committee, in addition to various departments, however, it was interesting to note that majority of member have divergent views / opinion **(Annexure – 2)** on the future development of IITK campus, like vertical /



high rise development, while others opted for maintaining the low rise - tree studded character of the Campus. Which is quite understandable because each group has different perception regarding the open spaces, land scaping, nature; besides the committee they are representing. However, in the larger interest of the community and to meet the many fold increase in the space requirement, a balanced approach is required to be adopted.

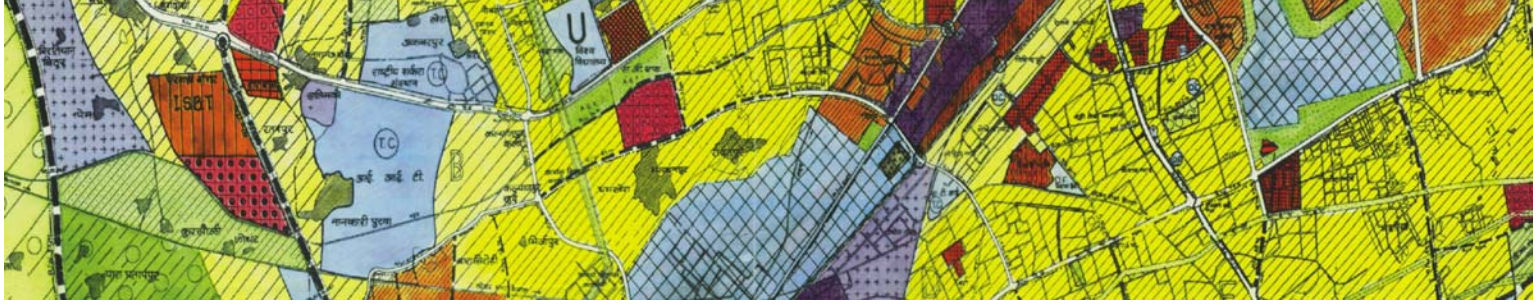
5.2 The views / opinion that emerged during the consultation with various committees are given below:

Institute Advisory Committee

- Chemistry, Physics and Maths have been distributed at various places / buildings and therefore needs to be grouped in once place, however, each Department would be autonomous / independent.
- School of Humanities and social sciences also needs to be located at appropriate locations, it can be even located in Science and Social Science and Management Block, but each discipline would be autonomous / independent.
- As the volume of books in the Library are increasing, the new additional liberally space should be located in the proximity of existing library block.
- Separate space be provided for organizing Seminars and Conferences.
- With the increase in number of students, and faculty, there will be increase in visitors / guests accordingly expansion of Visitors Hostel also needs to be considered.
- Counseling Service Centre should be close to Hostel and Health Centre.

Institute Environmental Advisory Committee

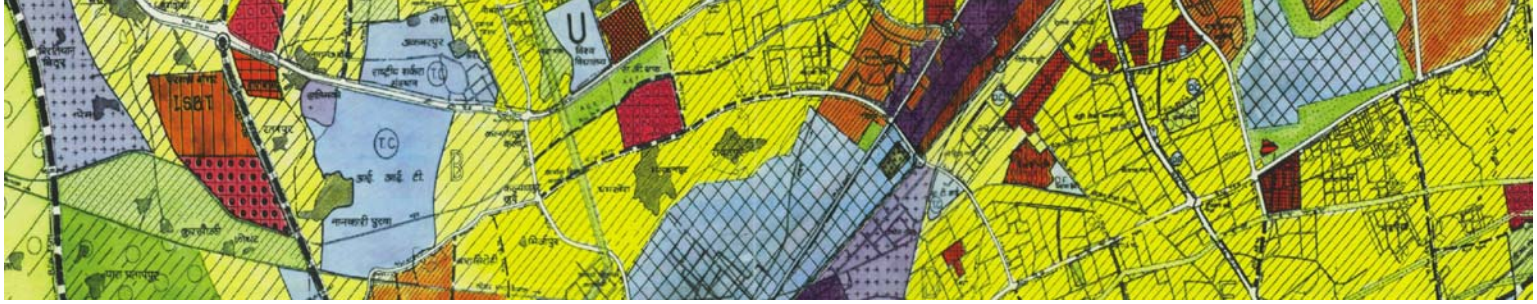
- The areas after the present development be declared as Eco Zone / 'No Touch Zone'.
- High Rise Construction be followed to avoid the location of buildings on the open spaces available.
- Statement of space given by Institute Space Planning and Allocation Committee is inflated / on higher side.



- Married Student Hostels be provided at appropriate locations on priority.
- Adequate accommodation for Research Staff should also be provided.
- ACMS / Tutorial Block can be opted for modifications / additions and alterations for providing for additional area for academic purpose.
- The buildings under future construction should have adequate strength to support additions of extra floors if required in latter stage.
- Water harvesting should be followed in the Campus.
- Open water body for collection of rain water / waste water be created.
- *Neelgai*, peacock, snakes, rabbits, etc., are the part of campus and their habitat should not be disturbed, as they are not creating any menace.

Institute Space Planning and Allocation Committee

- Efforts should be made to consume the less open space as far as possible for construction activities.
- Vertical growth of some buildings may be permitted but not at the cost of security / and over all character of the Campus which is low rise – tree studded.
- Water harvesting should be promoted.
- Buildings which have outlived its utility / life may be demolished to make room for new buildings.
- The building which are under utilized should be densified, similarly building occupying more ground coverage and giving less floor areas be considered on priority for densification may be through modifications / additions and alterations / demolition.
- Floor area as specified in the Master Plan Kanpur - 2021 be adhered to.
- Security and safety of the IITK community / Campus should be given top most priority and not to be compromised at any cost.



- The Committee was of the opinion to follow the balanced approach, as far as locating new building for meeting increased requirement of Campus on open spaces.

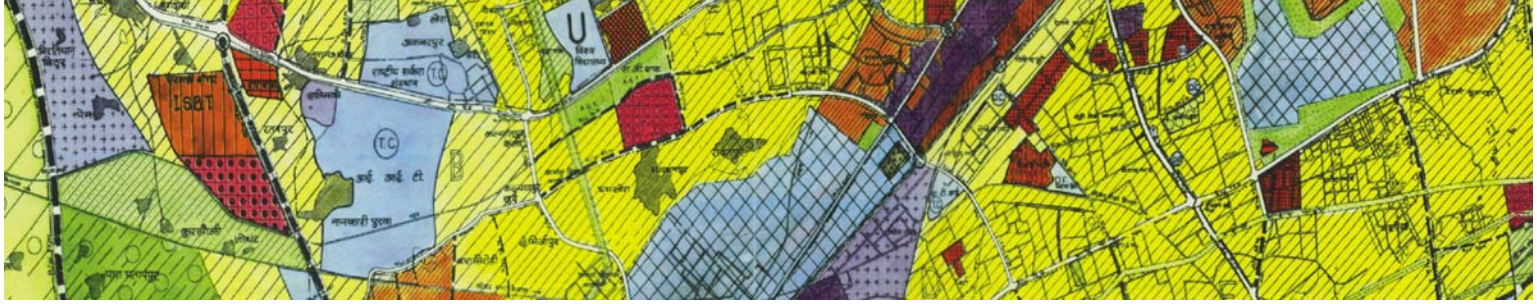
5.3 Thus, it is quite clear that the major concern of the various stakeholder is not to encroach much on open land and keep the open land free of built up space.

6.0 PHYSICAL SURVEY OF IITK CAMPUS

6.1 To ascertain the physical conditions of all the buildings in IITK Campus, the physical survey was conducted in collaboration with Institute Works Department, so as to ascertain the conditions of the buildings. Accordingly, the Area Statement is given in Table – 2 which shows the year of construction of various buildings along with foot print (ground coverage) and total floor area of all the buildings.

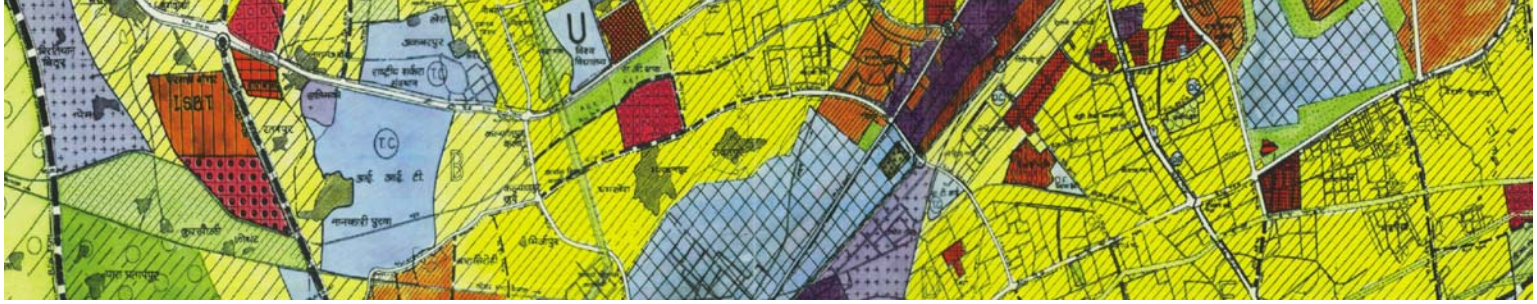
Table - 2: Area Statement showing Year of Construction, Ground Coverage and Floor Area of various building

S.No	Name of building	Year of Construction	Ground Coverage (in sq mt)	Floor Area (in sq mt)
Academic Buildings				
1.	Faculty Building	1966-67	2535.00	13700.00
2.	PK Kelkar Library	1963	2410.00	5000.00
3.	Computer Centre Building	1965	1825.00	3600.00
4.	Computer Science and Engineering	2001	1300.00	3200.00
5.	Workshop-I & II (N.West Lab)	1962-63	10393.00	10393.00
6.	Western Lab	1962-63	3600.00	8950.00
7.	Western Lab Extension	1967-68	1020.00	3060.00
8.	ACES Building	1966-68	1300.00	4145.00
9.	Science Block (Southern Lab)	1962-65	3500.00	7413.00
10.	Lecturer Hall Complex (Old) (L1-L7)	1966-67	3500.00	3829.00



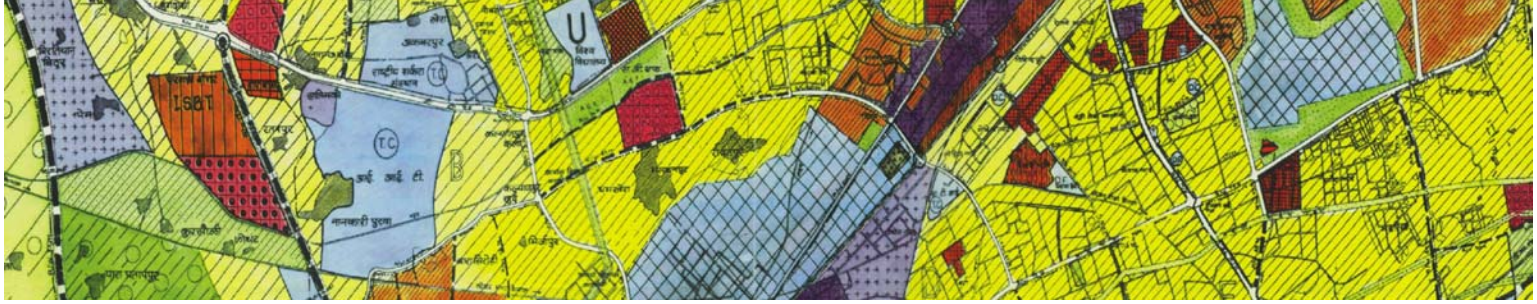
11.	New Lecture Hall Phase-I (L8-L15)	2001-2002	2177.00	2177.00
12.	New Lecture Hall Phase –II (L16-L17)	2006-2007	2376.00	2376.00
13.	Northern Lab (Mech. Engg.)	1967-1968	1372.00	4115.00

14.	Northern Lab-II (Chemical Engg.)	1968-1969	1700.00	4908.00
15.	Northern Lab Extension	1986	1804.00	1804.00
16.	Tutorial Complex	1989	620.00	1240.00
17.	New Core Lab Building	2009	3400.00	9940.00
18.	Pseudo Dynamic Lab Building	2010-11	550.00	550.00
19.	IME Department Building	2010	2000.00	5400.00
20.	SIDBI Innovation and Incubation Centre	2002-03	450.00	1153.00
21.	Nano Science Department	2005-2006	150.00	271.00
22.	SAMTEL Centre for Display Technology	2001-2001	600.00	1687.00
23.	J.E. / GATE Building	2008	965.00	2560.00
24.	Wind Tunnel (National Wind Tunnel Fac	1996	1965.00	3212.48
25.	Helicopter & Research Lab	2007-08	1080.00	2376.00
26.	Old Core Lab Building	1967	3021.00	6041.00
27.	CESE Department Building	2007	2000.00	3845.00
28.	Airstrip Aircraft Hanger Stores	1976-78	1691.00	1691.00
29.	ACMS Building	1974	1525.00	3050.00
30.	BSBE Building	2002-03	2400.00	5942.00
31.	Aero Space	1975	7565.00	7565.00

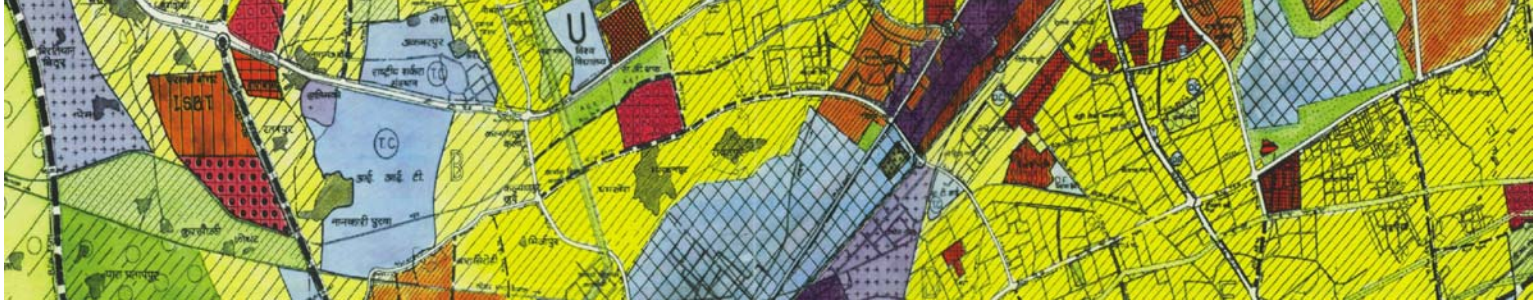


	Department Building and Lab			
32.	Workshop Extension Building	1970	1536.00	1716.00
33.	Nuclear Lab	1975	980.00	1650.00
Sub-total			**79695.00**	**144944.48**

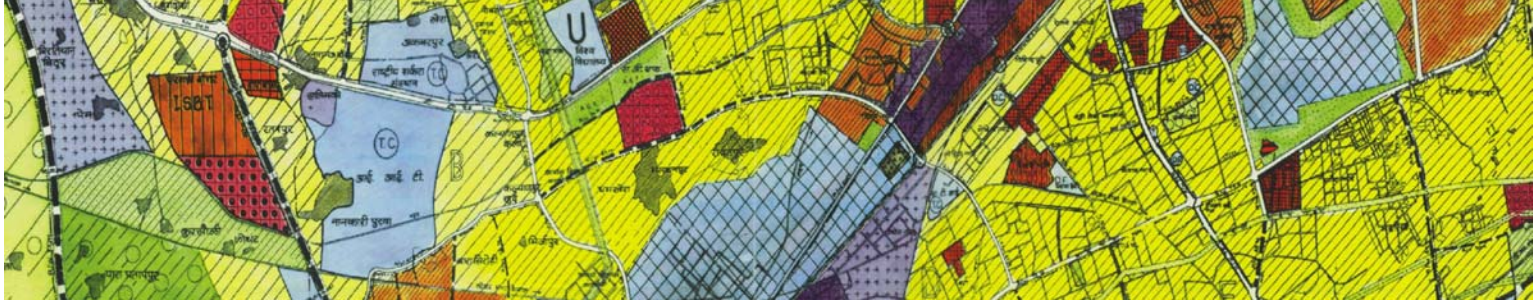
Hostels Building				
1.	Hall of Residence - I	1961-63 & 2001-02	7531.00	14193.00
2.	Hall of Residence – II	1962-64 & 1997-98	6895.00	12120.00
3.	Hall of Residence – III	1962-64 & 1998-99	6895.00	12120.00
4.	Hall of Residence – IV	1966-67 & 2001-02	6450.00	11510.00
5.	Hall of Residence – V	1966-68 & 2002-03	6450.00	11500.00
6.	Hall of Residence – VII	2002-03	6750.00	12450.00
7.	Hall of Residence – VIII	2003-04	6350.00	12850.00
8.	Hall of Residence – IX	2006-07	4750.00	11282.00
9.	Hall of Residence – X	2010-2011	5553.00	15610.00
10.	Girl Hostel No.1	2001-2003	4150.00	8204.00
11.	Girl Hostel No.2 (Old Hall - VI)	1971-73	2230.00	4000.00
12.	SBRA two storeyed	1976-80 & 1988-90	3911.00	7113.00
13.	New Multi Storeyed SBRA	2005-06 &2008-09	560.00	3878.00
14.	Old R.A.Hostel	1966	1302.00	2549.00
15.	New R.A.Hostel Phase-I	2003	1390.00	2750.00
16.	Multi Storeyed RA Hostel	In Progress	2221.00	13455.00
Sub-total			**73388.00**	**155584.00**



Students Activity and Sports				
1.	Students Activity Centre	2009 -2010	1568.00	2350.00
2.	Open Air Theatre	2009 -2010	1280.00	1280.00
3.	Outreach Building	2005 -2006	1150.00	1590.00
4.	Auditorium	1992	1810.00	2580.00
5.	Swimming Pool	1974	1608.00	1608.00
6.	Gymnasium Hall	1992-93	400.00	400.00
7.	Badminton Hall	-	476.00	476.00
8.	Sport Stadium	1980	417.00	417.00
9.	Sport Complex	2009	3850.00	4233.00
10.	Tennis Court	Renovated 2010	4987.00	4987.00
11.	Basket Ball Court	Renovated 2010	1504.00	1504.00
12.	Squash Court	2008	220.00	220.00
13.	Old SAC Building	1975	1806.00	2580.00
Sub-total			**21076.00**	**24225.00**
Residential Accommodation				
1	Director's Residence	1966	353.00	353.00
2	Type-V Quarter (40+20)	1963	13900.00	15360.00
3	Type-IV Quarter(175 No)	1964-1968	30975.00	30975.00
4	Type-III Quarter(170 No)	1962-1964	12450.00	21420.00
5	Type-II Quarter(189 Nos)	1963-1964	7560.00	15120.00
6	Type-I Quarter (192 No)	1963-1965	5760.00	11520.00
7	Type- I A Quarter (160+88)	1965-1968	4690.00	9380.00
8	Residences for Visiting Faculty – 12 Nos.	2003	780.00	1380.00
9	Multi Storied Flats – 48 Nos.	In Progress 2011	2060.00	12362.00
10	Type-III SQ Quarter	1967	702.00	1050.00



	– (40 Nos.)			
Sub-total			**79230.00**	**118920.00**
Utilities and Services				
1.	Visitors Hostel	1966-70 & 1976-80	1750.00	2774.00
2.	Pioneer Batch Extension (Visitors Hostel Extension)	1999	1200.00	1999.00
3.	Health Centre	1969	1986.00	1986.00
4.	IWD Central Office, Store and Water Supply	1988 & 2003	1909.00	1939.00
5.	Nursery	-	384.00	384.00
6.	Community Centre Type-I and II	1988-1989	780.00	780.00
7.	Shopping Centre Building	1963-64	2051.00	2051.00
8.	Shopping Type – I & II	1964-65	258.00	258.00
9.	State Bank of India	1963	334.00	334.00
10.	Post Office	1980	140.00	140.00
11.	Police Chauki	1978	150.00	150.00
12.	NCC Building	1980	586.00	586.00
13.	Security Office	1979	270.00	270.00
14.	SIS Office	1995	250.00	250.00
15.	Security Barrack Old	1982	200.00	200.00
16.	Security Barrack New	2002	445.00	816.00
17.	Generator House		476.00	476.00
18.	8 No. Sumpwell		160.00	160.00
19.	11 No. Deep Tubewell		242.00	242.00
20.	Substation No.1	1962	677.00	677.00
21.	Substation No.2		477.00	477.00
22.	Substation No.3		215.00	215.00
23.	Substation No.4		370.00	370.00
24.	Substation No.5		225.00	225.00



25.	Substation No.6		89.00	89.00
26.	Substation No.7		350.00	350.00
27.	Substation No.8		350.00	350.00
28.	33 KVA Substation		184.00	184.00
29.	Central Store	1966	2100.00	2100.00
30.	New Telephone Exchange	2006	145.00	145.00
31.	Railway Reservation	2002	129.00	129.00
32.	Kendriya Vidyalaya	1969	2210.00	3314.00
33.	Campus School, Opportunity School, Kishlaya School	1969	1205.00	1918.00
34.	Media Centre and TV Centre		380.00	380.00
35.	Telecom Office		40.00	40.00
36.	Security Post, at Hostel and Academic Area		280.00	280.00
Sub-total			**22997.00**	**27038.00**
Total			**2,76,386.00**	**4,70,711.48**

Source: Based on information provided by IWD and Surveys under taken on 26 – 28 March 2011.

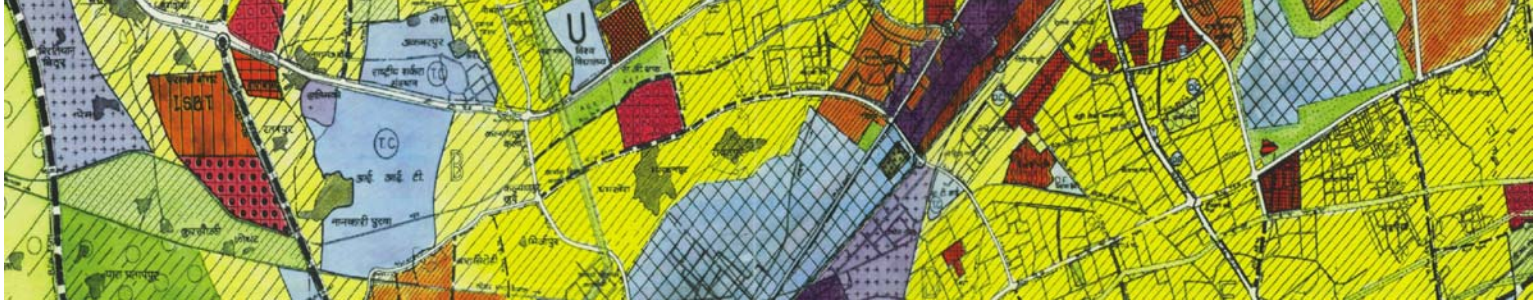
6.2 In addition to above it was observed during physical survey that following buildings are under construction:

- Hall No. – XI (Boys), with ground coverage of 5,553 sq. mt. and floor area of 15,610 sq. mt..
- New Girls Hostel (Phase – I), with ground coverage of 1,656 sq. mt. and floor area of 9,096 sq. mt..
- Rajeev Motwani Building, with ground coverage of 980 sq. mt. and floor area of 3,510 sq. mt..

6.3 Thus, it can be observed that the total floor area of IITK Campus is 4,70,711.48 + 28,216 = 4,98,927 sq. mt. and total Ground Coverage / Foot Print area is 2,76,386.00 + 8,189 = 2,84,575 sq. mt. i.e. 6.66% of the total area of the Campus (42,69,000 sq. mt.)

Table – 3: Area under Circulation and Network

Sr. No.	Description	Area in Sq. mt.
1.	Bituminous Roads	1,06,800.00



2.	Cement Concrete Roads	45,000.00
3.	Cement Concrete Paving and Foot Paths	11,200.00
4.	Jogging Tracks	1,650.00
5.	Cement Concrete Cycle Track	26,000.00
6.	Airstrip including Taxi Track and Parking	27,752.00
7.	Connected Brick Paths for entry to Residences	1,89,000.00
Total		**4,07,402.00**

6.4 As per the information provided by IWD the total area under circulation and network, is given in Table – 3.

6.5 Thus, the total area under circulation works out 9.54% of the total area of the Campus. Thus, area under footprint (6.66%) added, to this the total ground coverage would workout to 16.20% i.e. 83.80% would be open space.

7.0 IITK CAMPUS MASTER PLAN – 2021 (IITK, CMP 2021)

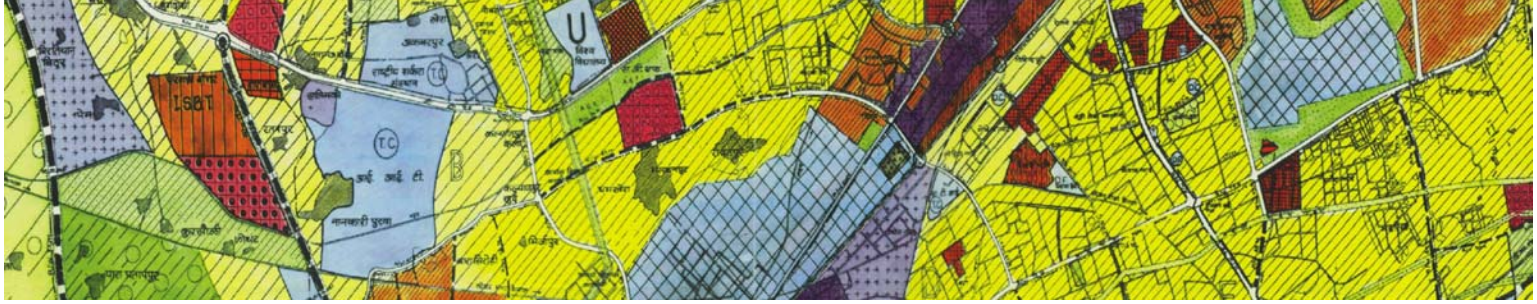
Space Requirement - 2021

7.1 The IITK, MP 2021 prepared by Institute Architect assumes the total student strength to 10,000; faculty – 800; staff 1000 and project staff – 750 while the Institute Space Planning and Allocation Committee has prepared the requirement of the space for the year 2021, keeping in view student and staff requirement (Letter no. DIR/IITK/2011/309 dated 15th March, 2011) as given below:-

- Strength of the Students – 7000;
- Strength of Faculty – 650;
- Strength of Staff – 900;
- Strength of Project Staff and service population – 2000;
- Floor Area of existing Buildings – 4,98,927 sq. mt.
- Foot Print Area (Ground Coverage) – 2,84,575 sq. mt.

7.2 On the basis of the 7000 strength of students the total requirement of the space for 2021 have been worked out by Institute Space Planning and Allocation Committee, and accordingly total additional space required, amounts to 2,17,406 sq. mt. as given below:

- Academic Buildings (useable carpet area 52,000 sq. mt.)



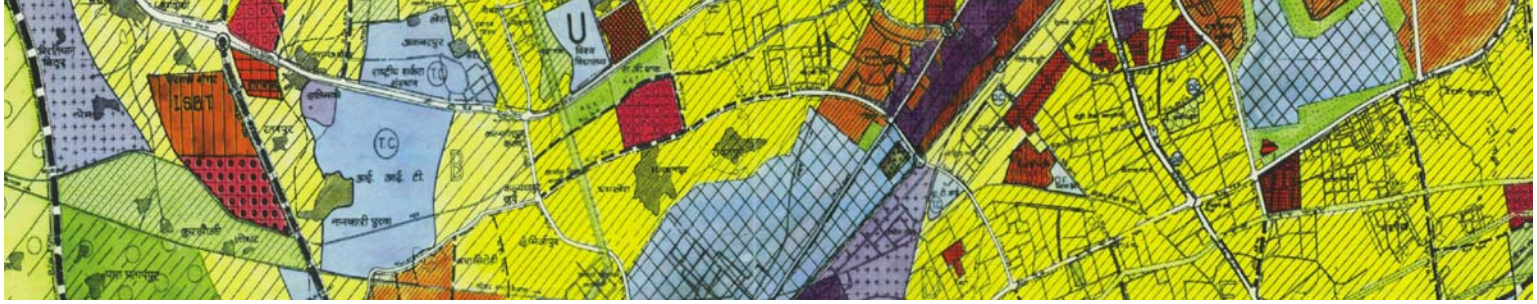
(To work out the plinth area of the future academic buildings, additional 50% area has to be added for corridors, walls, stair case and other utility services.) Hence the additional academic spaces required is 75,000 sq. mt.

- Research Complex 30,000 sq. mt.
- Library 21,506 sq. mt.
- Incubation and Innovation Centre 3,500 sq. mt.
- Administrative Building 3,000 sq. mt.
- JEE / Gate Offices 1,200 sq. mt.
- 100 Seater Guest House 5,000 sq. mt.
- Hostel Accommodation for students (considering 7,000 student capacity) 40,500 sq. mt.
- Residences for Staff and Faculty (considering 70 nos. additional type – III, 100 type – IV and 50 type-II houses) 37,700 sq. mt.

IITK, CMP 2021 - Proposals

7.3 The projected space requirement of Institute Space Planning and Allocation Committee and the views expressed by the various stakeholders IITK, CMP 2021 has been evolved. However, it would be pertinent to mention here that, the various stakeholders were having the different views and perceptions about the planning, design and open spaces, therefore, it would not be possible to accommodate the divergent views, however, the major thrust during the discussion was that IITK, CMP 2021, should not encroach much on the open space at the same time should provide built environment which is conducive to all the persons living on the Campus not only to the student community but for faculty and staff. Accordingly, proposals have been basically made to accommodate the space requirement of various activities by 2021, as projected by Institute Space Planning and Allocation Committee, on the ground coverage / foot prints of the existing buildings, as far as possible. However, it would be pertinent to mention that some additional activities require to be located on the open space are like Sport Complex, Swimming Pool, and Roads, etc; due to many fold increase in the intake capacity.

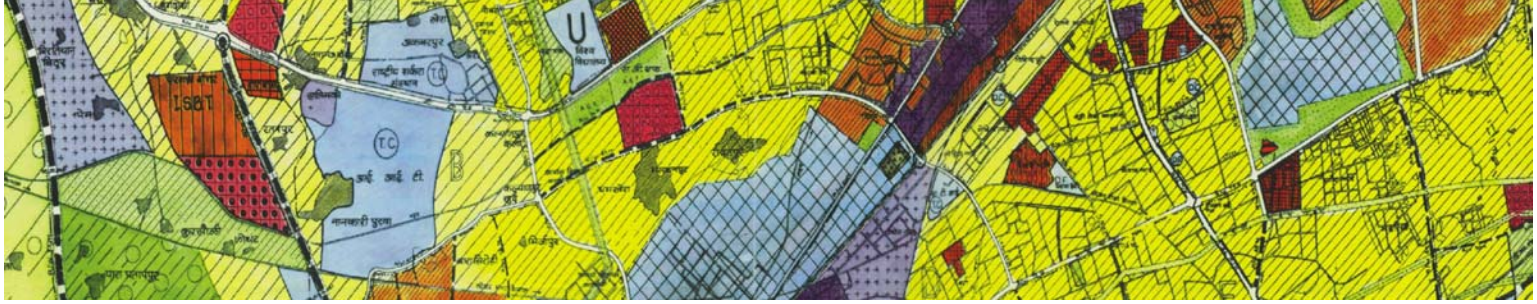
Academic Buildings



7.4 The total area required for Academic purpose is 1,34,206 sq. mt. out of which 75,000 sq. mt. is for academic buildings only. Taking example of new Core Laboratory building which have 3,400 sq. mt. ground coverage and floor area of 9,940 sq. mt. i.e. 9,940 ÷ 3,400 = the ratio of ground coverage and floor area works out to 3. The existing Aerospace Engineering Building which is single story having 4 blocks with ground coverage of 7,565 sq. mt. may be converted into a multistoried building upto height of 20 mt. as of same height Overhead Tank is existing in the line of Aerospace Block. Thus, in 20 mt. height (four storied building) would accommodate floor area of 7,565 x 4 = 30,260 sq. mt. (Shown as A)

7.5 The Workshops i.e. North East Building – 1 and North West Building – 2, both have the ground coverage of 10,393 sq. mt. And by additions and alterations upto 60% of the ground coverage i.e. (10,393 x 0.60) = 6,235.8 sq. mt. has only been proposed to be built upon into 5 storied building. Thus, the total floor area which can be made available would be 6,235.8 x 5 = 31,179 sq. mt. (shown as B). Thus, total floor space adjusted would be (30,260 + 31,179) = 61,439 sq. mt. and remaining (75,000 – 61,439) = 13,561 sq. mt. could be provided in new three storied building with ground coverage of **3,000 sq. mt.** and 4½ storied building (Shown as B1). Infact, the requirement calculated by the Institute Space Planning and Allocation Committee for Academic Building is only 52,000 sq. mt. And 50% area has been added for corridors / walls, etc; which is generally taken as 30%. Thus, 20% of 52,000 sq. mt. i.e. 10,400 sq.mt. would be surplus and can be used for meeting the remaining requirements of academic buildings. JEE / GATE / Office requiring 1,200 sq. mt. area can also be adjusted on this premises because it is nearer to existing JEE facilities.

7.6 Research Complex requires 30,000 sq. mt. floor area out of which 18,000 sq. mt. could be provided in four floors on foot print (ground coverage) of **4,500 sq. mt.** on the site Shown as C. The remaining floor area of (30,000 – 18,000) = 12,000 sq. mt. can be adjusted in old Core Laboratory building (shown as D), as the new Core Laboratory building has already been constructed with total floor area of 9,940 sq. mt. The old Core Laboratory building has ground coverage of 3,021 sq. mt. which could be renovated by way of modifications / additions / alterations / demolitions, in four floors; which will provide floor area of (3,021 x 4) = 12,084 sq. mt. (Old Core Laboratory building was constructed during 1967). Thus, total requirement of Research Complex would be totally achieved.



7.7 The requirement of floor area for Library has been projected to 21,500 sq. mt., while the existing area of the Library is 5,500 sq. mt., therefore, if the existing area is doubled i.e. 11,000 sq. mt. it should be sufficient, because with the latest technological innovations the existing library can be converted to e-library which would reduce the space for staking of hardcopies of books, etc; considerably. Thus, the additional Floor Area of 5,500 for Library can be accommodated on Old Student Activity Centre (with same ground coverage / foot print); since new Student Activity Centre has already been constructed (shown as E). In case some additional space is still required, the same can be accommodated by additions / alterations to the existing building or even by constructing one additional floor or by extending the footprints (G.C.) of the existing SAC building as and when required.

7.8 Incubation and innovation Centre requiring floor area of 3,500 sq. mt. can be accommodated in the space being provided in the existing Aerospace Engineering Department when additions / alterations are carried out (shown as A).

7.9 Administration Building requiring 3,000 sq. mt. floor area could be provided near Media Laboratory Corner by constructing new building with ground coverage of **1,000 sq. mt.** having three floors (shown as F).

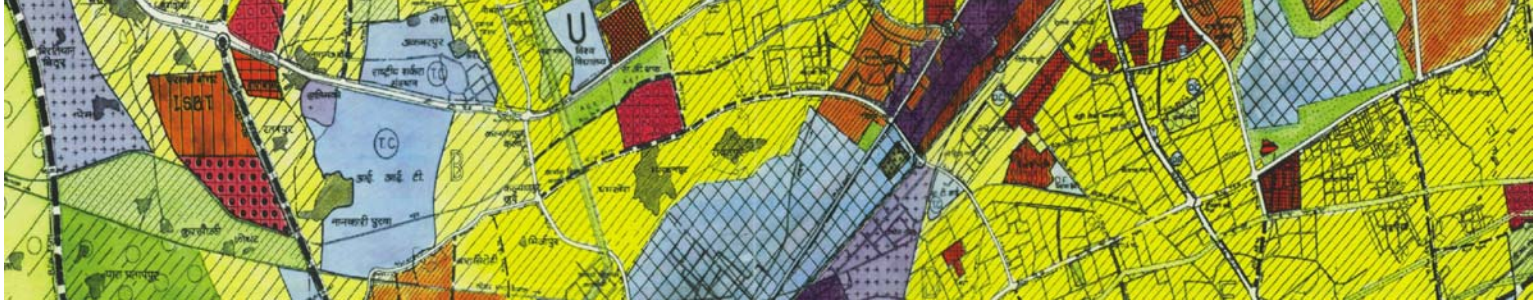
7.10 The additional requirement of 3, lecture halls one of 600 capacity and other two each of 400 capacity, which can be accommodated on 400 x 2 = 800 sq. mt. ground coverage and 600 students lecture hall on first floor. Thus, the foot prints / ground coverage would be only of **800 sq. mt.** (one sq. mt. each student) on the land, (shown as G). This location is in the vicinity of existing lecture hall complex.

7.11 The existing Tutorial Complex has 24 class rooms accommodating 40 students in each class room, which in the present day context are small rooms. It is, therefore, proposed that the wall in between two existing class rooms be demolished so that the size of class rooms can accommodate 80 students per class rooms i.e. total class rooms would be 12, which can accommodate 960 students.

7.12 Thus, the total area of open space being occupied is (3,000 + 4,500 + 1,000 + 800) = **9,300 sq. mt.**, only.

Hostel Accommodation

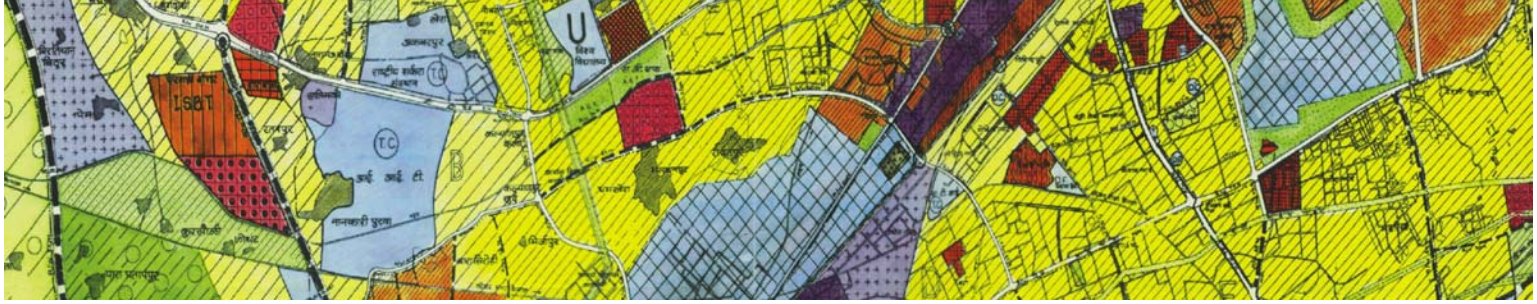
7.13 The projected requirement of IITK, by 2021 is to the tune of 40,500 sq. mt. for 7,000 students both girls and boys, which can be accommodated /



adjusted through additions / alterations / demolitions, without encroaching on the open space as given below; on priority as requirement arises:

- Hall No. - IV has the seating capacity of 486 students with ground coverage of 6,540 sq. mt. and floor area of 11,510 sq. mt., which was constructed in 1966-67 and needs to be renovated (shown as H).
- Hall No. – I has the seating capacity of 460 students with ground coverage of 7,531 sq. mt. and floor area of 14,193 sq. mt. and was constructed in 1961-63, which also needs to be renovated (shown as I).
- Hall No. – II has the seating capacity of 470 students with ground coverage of 6,895 sq. mt. and floor area of 12,120 sq. mt. and was constructed in 1962-64 (shown as J), would require renovation.
- Hall No. – III has the seating capacity of 470 students with ground coverage of 6,895 sq. mt. and floor area of 12,120 sq. mt. and was constructed in 1962-64 (shown as K)), would require renovation.
- Hall No. – V has the seating of 486 (378 + 108) students with ground coverage of 6,450 sq. mt. and floor area of 11,500 sq. mt. and was constructed in 1966-68 (shown as L)), would require renovation.
- Hall No. – VII, is the new Boys Hall constructed in 2002-03 with ground coverage of 6,750 sq. mt. and floor area 12,450 sq. mt. with capacity of 458 students (shown as M).
- Hall No. – VIII), is the newly constructed Boys Hall in 2003-04 with ground coverage of 6,350 sq. mt. and floor area of 12,850 sq. mt. with capacity of 489 (shown as N).
- Hall No. – IX, is the newly constructed Boys Hall in 2006-07 with ground coverage of 4,750 sq. mt. and floor area of 11,282 sq. mt., with capacity of 480 (shown as O).
- Hall No. – X, is also newly constructed Boys Hall in 2010-11 with ground coverage of 5,553 sq. mt. and floor area of 15,610 sq. mt. and capacity of 496 students (shown as P).
- Hall No. – XI, is under construction for boys with ground coverage of 5,553 sq. mt. and floor area of 15,610 sq. mt. with capacity of 496 students (shown as Q).

7.14 As per prevailing position the girls students intake is about 12%, accordingly, the total strength of the girls would be 840 which can be adjusted as given below:



- Hall No. – VI or GH – II has seating capacity of 136 girls students with ground coverage of 2,230 sq. mt. and floor area of 4,000 sq. mt. and was constructed in 1971-73. At present it is proposed to demolish the Hall No. VI and in place of this a multi-storied girls hostel is in progress. The present residential accommodation for 320 girls is under construction as part of the new girls hostel. Subsequently, 320 seats would be constructed on existing foot print (ground coverage) of GH – II, after its demolition. Therefore, the strength of this girls hostel would be 320 + 320 – 136 = 504 (shown as R).
- GH – I has already been constructed in 2001-2003 with ground coverage of 4,150 and floor area of 8,204 sq. mt. with capacity of 378 girls students (shown as S). With this total seating capacity of GH – I and GH – II would be (378 + 504) = 882.

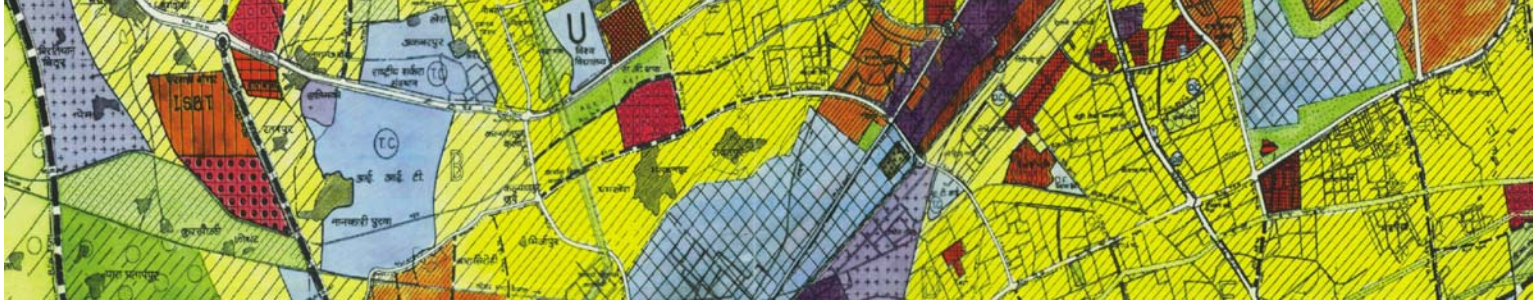
7.15 Thus, the total capacity works out to 4,791 (boys) + 882 (girls) = 5,673. Remaining (7,000 – 5,673) = 1,327 needs to be adjusted in Hall No. – I to Hall No. V which is proposed for additions / alterations / demolition or can be achieved by adding extra one floor on new Halls VII to XI, in consultation with Structural Engineer. It may also be noted that Institute Space Planning and Allocation Committee has also mentioned that no new hostel space would be required. However, as a abundance precaution to meet the future requirements of the Hostels, the area has been earmarked at AK, however the present Ramleela Ground be shifted to area earmarked as AM near Pradhan Gate, which will also reduce the disturbance during the Ramleela to Hotel blocks.

Residential Accommodation

7.16 At present there are 20 duplex Type – IV quarters (constructed in 1964 – 1968), on the same location with same ground coverage / footprint multi storied Type – IV of 25 blocks, with four stories could be constructed meeting the total requirement 100 quarters (shown as T).

7.17 At present Type – III quarters (constructed in 1962 – 1964) are located near the main gate. It is proposed to retain blocks abutting to the main road and remaining blocks can be modified / demolished and four storied 18 blocks can be constructed to meet the requirement of Type – III quarters numbering 70 (shown as U).

7.18 The requirement of 50 Type – II quarters could also be considered on the existing area of Type – II quarter (constructed in 1963 – 1964) with the same ground coverage / foot print. New construction should be started first,



as per priority, on open areas available on the same location. 13 four storied blocks could be constructed (shown as V).

7.19 Thus, it may be noted that the total Residential Accommodation can be accommodated without occupying / encroaching additional open space. All residential buildings should be constructed on the foot prints of existing buildings as multistoried construction for achieving the additional number of dwelling units, as per priority and requirement. Within the residential areas, the location for provision of the children parks have been identified and shown as AL.

Utilities and Services

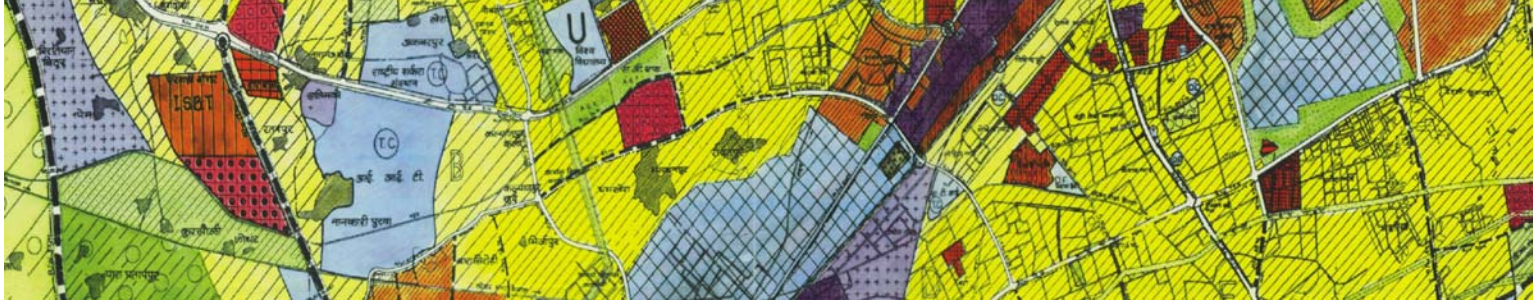
7.20 The requirement of additional floor area of 5,000 sq. mt. for Visitors Hostel could be adjusted on the land available near existing Visitors Hostel (shown as W), on the footprints of **1,250 sq. mt.** (4 stories). The construction of the new Visitors Hostel away from the existing one, may not be advisable, as it would be inconvenient to manage and provide services.

7.21 The existing Health Centre has an area of 1,986 sq. mt. on ground floor and was constructed in 1969, therefore as and when the space requirement increases, the additional space could be adjusted by additions / alterations / demolition of the existing building, however care should be taken to not increase the foot prints (Ground Coverage) of the existing building.

7.22 Need for Faculty Club was also noted by the ISPAC, accordingly two locations have been suggested. Location at AI is centrally located but is on the main road and during functions it will act as bottle neck for traffic. While location at AJ would be more suitable because it is away from the major traffic spine with ample space for parking and other open activities.

7.23 **Sewerage:** As recommended in para 3.17, a new modern STP will be more appropriate for the Campus, in addition the entire underground sewerage system needs to be upgraded. Re-use of STP effluent for gardening purpose be resorted to.

7.24 **Water Supply:** As recommended in para 3.15, efforts needs to be made to re-cycling the waste water in addition to the water harvesting and plugging of all leakages of the water pipes. 50% of the total requirements would be made available from Ganga Barrage for which underground storage tank (360 sq. mt.) needs to be provided (shown as X). Conservation of water can be approached by checking the consumption of water through meter, may be beyond certain limit and accordingly the charges should be collected. Rain



water harvesting should also be made mandatory, in conformity with the provisions of Kanpur Master Plan 2021, Section – 10 **(Annexure – 3)**.

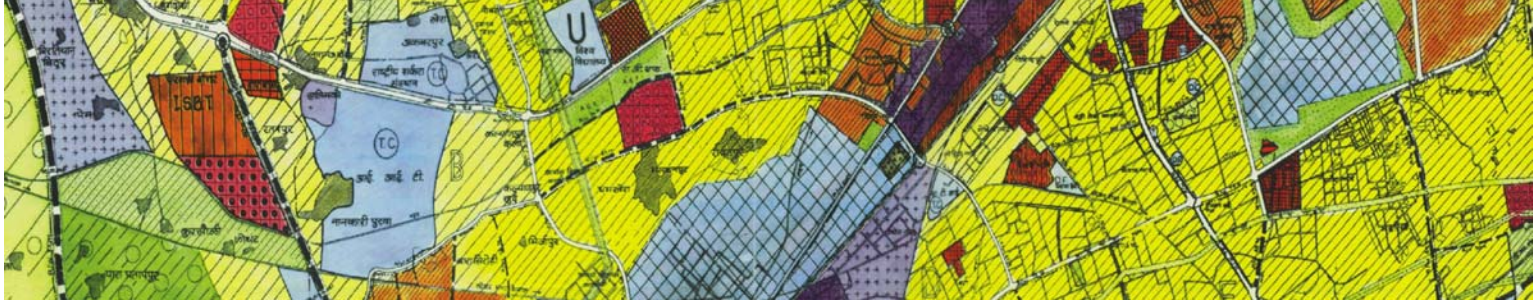
7.25 **Storm Water Drainage:** As suggested in para 3.16, the entire area drainage system need to be physically examined, repaired, and cleaned up to enable smooth flow of rain water, in addition it would be more appropriate to design the total area drainage system taking into consideration the proposed buildings. Institute is already doing the recycling of sewage water to be used for horticulture purpose.

7.26 **Solid Waste Management:** A new policy of collection, carriage and disposal of solid water needs to be addressed, taking into consideration not only the requirement of 2021 but beyond, specifically segregation of solid waste into degradable and non-degradable waste at the door to door collection point itself. As the Campus now falls within the urbanizable limit of Kanpur City, the concerned authorities / agencies may be approached for solid waste disposal. Green waste be converted to manure by way of composting or organic composting inside the Campus for this existing wormy compositing plant, could be augmented, if requried.

7.27 **Electricity and Power:** The anticipated power demand by 2021, has been estimated to 14 MVA for, Academic, Hostel and Residential purpose, therefore efforts needs to be made to meet this additional demand of power. It may, however, be noted that, all the buildings which are to be constructed should be designed on the principles of green buildings requiring less electricity / power. Beside the concerned Department of Uttar Pradesh State Electricity Board may also be approached to meet the short fall of power. In all Labs / Lecture Halls / Library the occupancy censors should be installed and use of solar power be promoted wherever feasible.

7.28 **Fire Suppression System:** Adequate measures are required to be taken in the laboratory and workshop buildings and other hazardous research labs by availing the services of experts. As some of the buildings are proposed to be multistoried, it would be advisable to contact the Local Body (Municipal Corporation of Kanpur) for availing their services, as the IITK Campus falls within the municipal limits.

7.29 **Other Facilities:** includes Nursery with 384 sq. mt; Community Centres with 780 sq. mt.; Shopping Centre with 2051 sq. mt.; Convenient Shopping I and II having area of 258 sq. mt.; Bank 334 sq. mt.; Post Office with 140 sq. mt.; Police Chawki with 150 sq. mt.; Security Office with 1536 sq. mt., etc. However, it may also be mentioned that, some of these facilities are available



near the main gate of the Campus itself, within municipal limit and can be availed of by the Campus Community.

7.30 The security barracks and office needs to be constructed (with ground coverage of **800 sq. mt.**) shown as Y.

7.31 The Counseling service centre should be located on the top of Health Centre or in old RA Hostel near Health Centre (shown as Z).

7.32 At present the space has been allotted to private taxi services for their office and parking for facilitating the availing of taxi services by the residents of IITK, however, it would be advisable that they are provided the space (**800 sq. mt.** ground coverage) on the GT Road near existing level crossing or at the junction proposed in para 7.36, so that they don't disturb the environment of the Campus (shown as AB alternative location at AN whichever is more suitable).

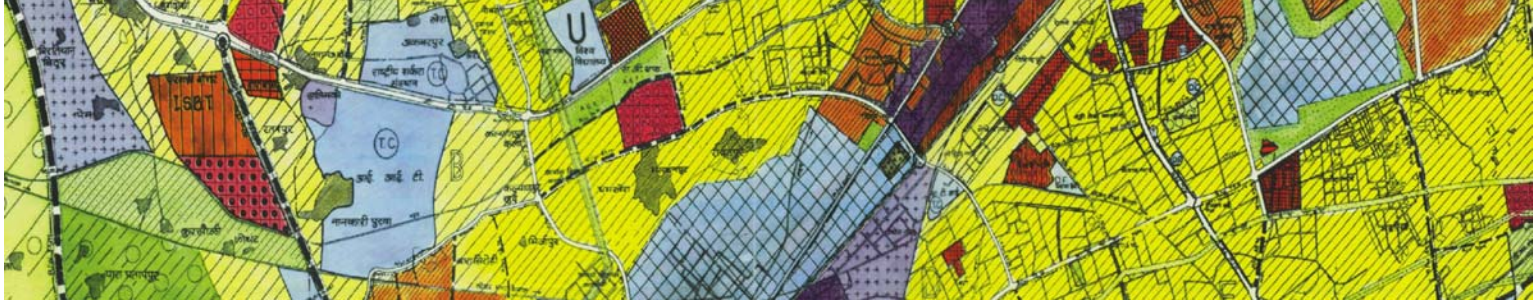
7.33 The convenient shops (**1,000 sq. mt.** ground coverage) may be located as shown at AC, to facilitate the provision of services to the students community in vicinity of their hostels.

7.34 The existing *Dhobi Ghat* needs to be modernized by adopting the latest technology so that the environment of the area can be improved (shown as AD).

Circulation and Network

7.35 The present circulation and network consists of a main spine from the entrance intersected by a major loop road around the Academic Core and facilities supporting spurs and loops are serving well and needs to be maintained. However, adequate provisions are required to be made for parking of bi-cycles and also of automobiles, in case it is not possible to restrict the automobiles in Academic Core. Introduction of dedicated cycle – tracks would be advantages specifically at road – cross sections. It may be mentioned that by 2021, the area under circulation and network would be 9.54% only.

7.36 In order to provide the security to the student, staff and residents of the Campus and discouraging the use of main spine off the Campus, it would be more advisable to provide additional entry and exists to the communities living outside the Campus, i.e. to the residents of Nankari Village which passes through the Campus disturbing, the security and safety of the property and people of the Campus. Accordingly, providing of a road inside the boundary of the Campus by connecting Chandel Gate to GT Road



through road in front of Airstrip may be considered. However, the railway authorities are required to be approached for getting approval of entry through the level crossing. This will facilitate the residents of Nankari Village to reach to GT Road without disturbing the environment of IITK. Similarly, a road inside the boundary of the Campus connecting Pradhan Gate to Sheoli Road may be considered, so that residents of Nankari village going towards Sheoli Road can be diverted / channelized through this road. This circulation of road would enable the security staff to maintain proper vigil on outsiders.

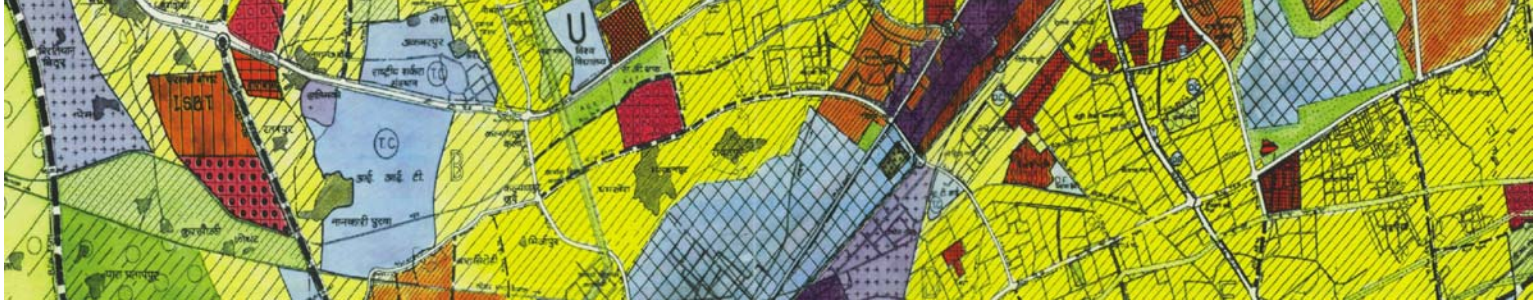
7.37 For the surveillance of Airstrip it would be advisable to provide a surrounding road so that proper security and vigil can be provided to the Airstrip.

Environmental Sustainability

7.38 Nowadays, there has been a growing concern in recreation, conservation, open space, beautification, pollution abatement and a myriad of other ways to improve the quality of environment. As the increase in density, depletes the limited land resource the task of providing a satisfying and stimulating built environment assumes importance but becomes difficult. Infact, trees and forests even though are not the essential ingredient of built environment enhances its beauty and offers comfort to the inhabitants. Open spaces comprising parks, gardens, avenue trees, water bodies and forests play a vital role, as they are serving to preserve and improve the overall environment of the Campus. Accordingly, in IITK, CMP 2021, efforts have been made to not disturb the existing ground coverage / foot print and to retain maximum open space on the Campus.

7.39 It is pertinent to mention here that, not only the open spaces but pollution, abatement if not more, is equally important. Initially the Campus was interwoven with the environment friendly green modes i.e. pedestrian and cycle network ensuring that most facilities are within walking distance. Specifically, Academic Core was entirely pedestrian with vehicular movement restricted to the periphery. But over the passage of time the Academic Core is getting intruded with two / four wheel automobiles. It is therefore, recommend that green modes be encouraged and red mode i.e. cars and automobiles be discouraged at least in the Academic Core. Restricting the red mode in the Academic Core would also check the noise pollution in the Academic Core.

7.40 The second collection and recharge tank is required to be properly designed and landscaped as part of a Leisure Park (shown as AE). This collection and recharge tank also takes discharge from the existing swimming pool. The



shallow Swimming Pool, with ground coverage of **5,000 sq. mt.** (shown as AF) can also be constructed as an indoor activity with provision of solar water heating arrangements near this tank as the number of users would be increased by 2021.

7.41 Similarly, water can be recycled and stored in the tank behind the Airstrip which can also be used for gardening purpose and this area can also be developed as Eco-Park (shown as AG). However, care needs to be taken to define the boundary for preserving the habitats of *Neelgai*.

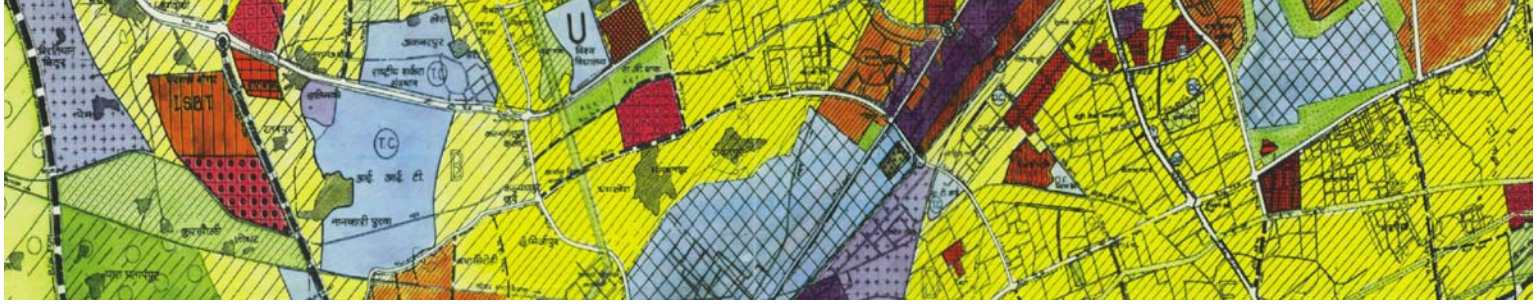
7.42 As the student's strength would be increasing many folds it would be advisable to provide space for future activities, accordingly space has been earmarked as open field (shown as AH).

7.43 The 'Green Belt' along the periphery of the Campus needs to be provided in a planned manner and not as a wild growth so that, environmental and ecology aspect is well taken care of. It would be in the larger interest of the IITK Campus community to ensure that this 'Green Belt' is not allowed to deplete.

7.44 The proposed location for various activities to meet the requirements of the ISPAC is shown in Table-4.

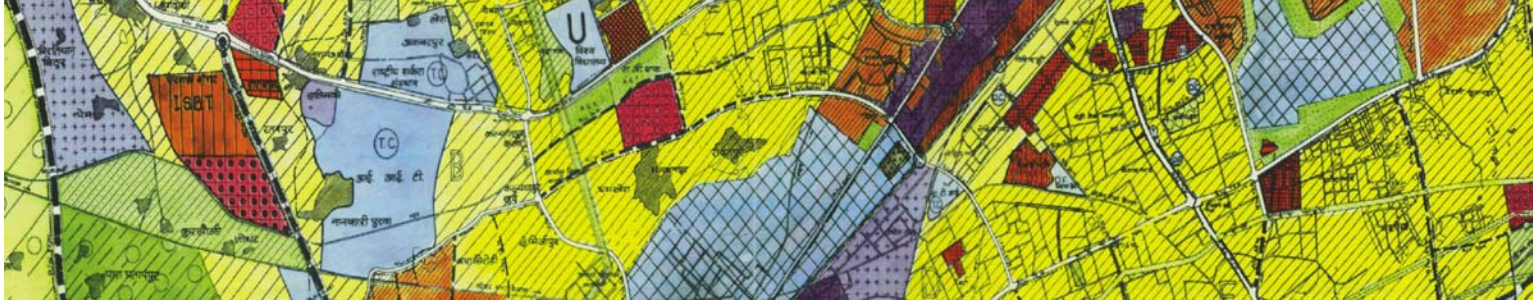
Table - 4: Location of Various Proposed Activities

Location	Activity
A	Academic Buildings + Incubation and Innovation Centre
B	Additions / Alterations in North-East and North-West Workshop Buildings, for Academic purpose
B1	New Three storied Building for Academic purpose
C	Research Complex
D	Research Complex on Old Core Lab
E	Additional Space for Library on existing SAC Building
F	Administration Building
G	Additional Lecture Halls
H	Hall No. IV to be renovated
I	Hall No. I to be renovated
J	Hall No. II to be renovated
K	Hall No. III to be renovated
L	Hall No. V to be renovated
M	Hall No. VII Newly Constructed Hostel for Boys
N	Hall No. VIII Newly Constructed Hostel for Boys
O	Hall No. IX Newly Constructed Hostel for Boys



P	Hall No. X Newly Constructed Hostel for Boys
Q	Hall No. XI Boys Hostel Under Construction
R	Hall No. VI or G.H. - II Multi-Storied Girls Hostel Under Construction
S	G.H - I Constructed already (2011 - 2003)
T	Site for Construction of Type IV Quarters
U	Site for Construction of Type III Quarters
V	Site for Construction of Type II Quarters
W	Extension of Visitor Hostels
X	Location of Underground Storage Tank
Y	Security Barracks
Z	Counseling Service Centre
AB	Site for Taxi Services
AC	Convenient Shop
AD	Dhobi Ghat to be improved
AE	Site for Second Collection and recharge Tank
AF	Shallow Swimming Pool (Inside)
AG	Site for Eco-Park
AH	Open Field
AI	Site for Faculty Club (Alt. - 1)
AJ	Site for Faculty Club (Alt. - 2)
AK	Site for future expansion of Hostel Blocks
AL	Children Parks
AM	Site earmarked for Ramleela Ground
AN	Alternative Space for Taxi Services
AO	Site for Solar Energy Research

7.45 With the aim to achieve the integration between academic area with Hostels (both for boys and girls) and for faculty and staff, efforts have been made not to disturb the original concept of the Master Plan. The Zoning in fact facilitates meeting and interaction not only among the students themselves but also with the faculty and staff. All activities rotates around Lecture Halls, Library, Faculty buildings and laboratories. While specialized services have been maintained as planned originally, as decentralized activities connected with walkways, which encourage the student to walk. Therefore, it is attempted to broadly respect the original zoning, besides circulation and network, and to ensures that the pedestrian-friendly environment of the campus, is maintained besides the efforts have also been made in IITK, CMP 2021 to keep the open area intact so as to maintain original character of the Campus, which is 'low rise – tree studded'.



7.46 It would be important to mention here that the total existing and proposed ground coverage would amount to (2,84,575 + 18,510) = 3,03,085 sq. mt. i.e. 7.09% of the total area of the campus. The remaining 92.91% would be open space. If area under circulation and network (9.54%) is included, the total covered area would increase to 16.63% i.e. to say that open area would be to the tune of 83.37% (Refer Table 5), which earlier was 83.80% i.e. total additional open space covered now would amount to 0.43% which by any standard is quite high (Refer Table 6)

Table – 5: Comparative Statement of Area under GC, Circulation and Open Spaces

Details	GC %	Circulation %	Open Spaces %
IITK, MP – 2021			
• Phase I (1959 – 1996)	3.7%+	8.8%	87.5%
• Phase II (1996 – 2011)	5.6%+	10.4%	84.0%
• Phase III (2011 – 2021)@	8.5%	13.09%	77.6%
IITK, CMP - 2021	7.09%	9.54%*	83.37%
	7.09%	10.47%#	82.51%

Note:

* Area Calculations are based on information provided at site (Table 2)

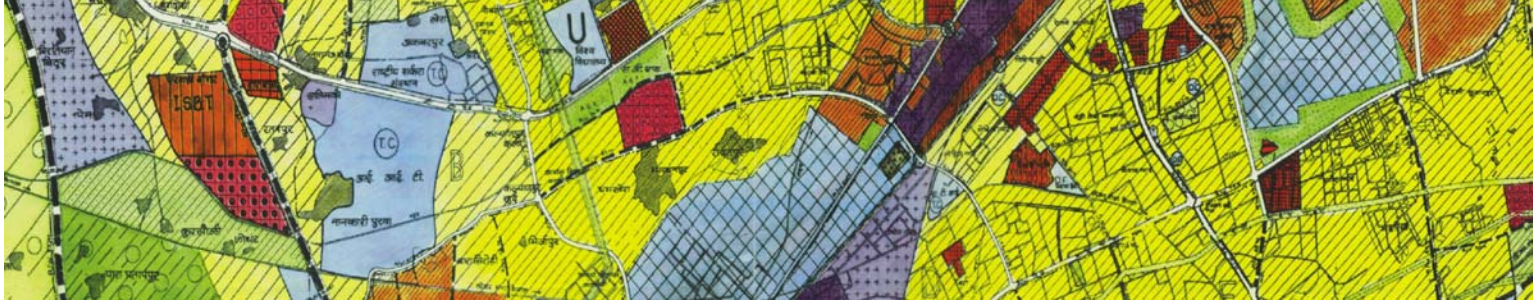
Even if area under circulation is taken as 10.4% still then area under open spaces works out to 82.51%.

+ Buildings under construction are not included

@ Prepared by Institute Architect

Table – 6: Additional Open Space Covered in the IITK, CMP – 2021.

Sl. No.	Description	Ground Coverage / Foot Print
1.	Academic Building (Shown as B1)	3,000 sq. mt.
2.	Research Complex (Shown as C)	4,500 sq. mt.
3.	Administration Building (Shown as F)	1,000 sq. mt.
4.	Additional Requirement of Lecture Halls (Shown as G)	800 sq. mt.
5.	New Visitors Hostel (Shown as W)	1,250 sq. mt.
6.	Security Barracks and Office (shown as Y)	800 sq. mt.
7.	Site for Taxi Services (Shown as AB)	800 sq. mt.
8.	Convenient Shops (Shown as AC)	1,000 sq. mt.
9.	Indoor Shallow Swimming Pool (Shown as AF)	5,000 sq. mt.
10.	Site for underground Water Storage Tank (Shown as X)	360 sq. mt.



	Total	**18,510 sq. mt.** **0.43% of total Area**

7.47 It would be pertinent to mention here that as per Building Bye-Laws of Kanpur Development Authority (2008), Section 3.5.1 the total permissible FAR is 2, with ground coverage of 35% (**Annexure – 4**). While the total ground coverage by 2021 would be 3,12,585 sq. mt. i.e. 7.32% and FAR achieved would be even less than one, leaving much scope for future expansion.

8.0 IITK CAMPUS BEYOND 2021

8.1 Taking into consideration the aspect of looking beyond the horizon year of 2021 the IITK, CMP – 2021 **(Annexure – 5)** provides ample opportunities to the expansion of the Campus beyond 2021, because, after 2021, the growth of IITK would not halt. However, each decision to locate a new building in the Campus requires to be taken judiciously because it not only impacts but restricts future options. Therefore, it would be more appropriate to consult Institute Architect M/s. Kanvinde Rai & Chowdhury. IITK is one of the greenest campuses in the country and it is important that this defining quality is passed on to the next generations.

8.2 The present character of the campus which is 'low rise-tree studded', makes IITK Campus distinct from other IIT Campuses in the country and provides a distinct identity in India and abroad. It would therefore, not be in the larger interest of the various stakeholders of IITK that the whole campus be converted into high rise buildings, rather it would be more appropriate that the future development opts for medium-rise development, in harmony with green open spaces which merges with the nature, so that the built living environment is provided to IITK community for imparting excellence in teaching and learning, IITK being the knowledge - township.

Annexure – 1

IITK, RESPONSE ON QUESTIONNAIRE OF INCEPTION REPORT

As the future requirements of the IIT, Kanpur Campus is likely to increase many folds while the area remains the same i.e. 426.9 ha, the views / opinions of the various stakeholders would be of great help in locating new buildings / activities. Accordingly the views on the following points may kindly be furnished:

1.0 ACADEMIC AREA

Q.1.1 Present Academic Area is located in the centre of the Campus surrounded by Residential Area from all the three sides. Should the land available between Academic Area and Airstrip on the north side be used for expansion for meeting the requirement of additional Academic Area.

Ans.1.1 Yes, In fact, an underlying principle in delineating areas could be the following:

(a) Northern area of the campus, including the zone upto the airstrip be used for normal academic and research activity. A zone beyond be the airstrip may be considered a natural extension of this zone, should that be required at present or in the future.

(b) The area across the Sheoli road and the southern tip of the campus be earmarked for research activities requiring (a) large areas of land, or, (b) isolation.

Q.1.2 If it is not possible to meet the total requirement of the future Academic Area, even on this piece of land, should the new buildings be located away from the existing Departments? (because it may not be possible to accommodate the future requirements of all the Departments on this piece of land).

Ans.1.2 In principle, Yes. The details of how or which of the departments or other research activities, will be relocated, will be worked out once more information about the possible development in terms of (developed) areas in the different segments become known.

Q.1.3 In case the FAR (Floor Area Ratio) exceeds than what is permissible in Kanpur Master Plan - 2021: then the projected future requirements of some Departments needs to be slashed down. (How much percentage of projected future space required can be reduced, would depend on FAR prescribed). Departments needs to be ready to meet this eventuality.

Ans.1.3 Yes, it will be done.

Q.1.4 Is there any requirement of expansion of Library with the increase in number of students and faculty?

Ans.1.4 Yes.

Q1.5 In case it is not possible to provide the area in the proximity of existing Library then can it be provided as Library Annex in the near by location.

Ans.1.5 Yes.

Q.1.6 If the expansion of western, southern and north Laboratory is not possible in continuation of existing buildings then can it be away or can it be in separate buildings. In this situation which option you will opt for.

Ans.1.6 Yes, if need be extension can be separate buildings.

Q.1.7 Should the core area be made totally pedestrian with no entry for automobiles.

Ans.1.7 In certain parking lot for motorized vehicles may be located at the designated location in the core area. However appropriate possibility be made for movement of emergency vehicles and movement of equipments.

2.0 HOSTEL ACCOMMODATION

Q.2.1 Can Hostel Blocks be expanded on west or south – west side.

Ans.2.1 Given the present capacity, it is felt that No new hostel space may be needed. However, the possibility of rebuilding existing old hostels (Halls of Residence I through 5) may be explored with increased capacities (increasing the number of floors, etc.)

Q.2.2 If sufficient space is not available can Boys Hostels be taken slightly away from the existing Hostel Building?

Ans.2.2 In principle, Yes. Please also see response to 2.1 above. It is felt that such a contingency may not arise. However, it may be desirable at this stage to clearly 'earmark' area for building such a hostel in the future, should there be a need.

Q.2.3 Can Hostel Blocks be multi-storied? (Availability of equipment with Fire Fighting Department needs to be ascertained to decide the maximum floors)

Ans.2.3 Yes.

3.0 RESIDENTIAL ACCOMMODATION

Q.3.1 Due to shortage of land can various types of residential housing for faculty and staff be constructed multi-storied.

Ans.3.1 Yes.

Q.3.2 Should a multi-storied block be dedicated to one single type of accommodation (i.e. may be only for Type – IV or Type – V; etc) or can various types be mixed. Which option you will opt for.

Ans.3.2 Type – IV and V may be mixed. All others to be separate blocks preferably at different locations.

Q.3.3 Can existing plotted development be demolished to make a room for duplex and multi-storied Group Housing. (Availability of equipment with Fire Fighting Department needs to be ascertained to decide the maximum floors)

Ans.3.3 In principle, yes. However, the exact locations for such 'redevelopment' will need to be identified, depending upon factors such as age of structure, present demand and integrity of the structure, etc.

Q.3.4 Can housing for certain Type of categories be taken to areas like Sheoli Road / beyond Airstrip.

Ans.3.4 No. It is not considered desirable from several points of view including accessibility and security.

4.0 GENERAL POINTS

Q.4.1 To accommodate many fold increase, new buildings are required to be located on the existing space, otherwise it is not possible to meet the increased requirement of various departments, residential areas, and hostels, etc.

Ans.4.1 In principle yes.

Q.4.2 To accommodate many fold increase of space whether it would be advisable to demolish certain buildings which have out lived its life / utility / function.

Ans.4.2 In principle yes.

Q.4.3 If yes the present occupiers of the buildings needs to be sifted in temporary accommodation or make shift accommodation for some time. Whether you will accept the situation.

Ans.4.3 Yes.

Q.4.4 Is it possible to make the core area fully pedestrian (by providing parking space for automobiles at some convenient location) and restrict the entry of fast moving vehicles.

Ans.4.4 Yes (also see 1.7).

Q.4.5 Is it possible to shift / locate certain activities to 40 acres of land at Sheoli Road and some land available beyond Airstrip. Which specific activity you would like to recommend to shift in both these places.

Ans.4.5 Solar power plant and other hazardous R & D activities may be located at Sheoli Road side. The airstrip side may be left as it is.

Q.4.6 Can some portion of area be reserved for habitat of white antelope "*Neel Gal*" to check their entry in other areas of the Campus.

Ans.4.6 All efforts should be made to preserve the flora and fauna of the area to the extent possible. It should be borne in mind that any threat to the residents or other activities of the Institute, on this account, should be kept to a minimum. It is further

considered desirable to clearly earmark 'GREEN' areas or WATER-BODIES that should NOT be used for any development activity in the future.

Q4.7 Should "Water Harvesting" and re-cycling of waste water be practiced in the Campus?

Ans.4.7 Yes.

Q.4.8 Whether it is possible to adopt the principle of " zero run off ".

Ans.4.8 Though desirable but may not be practical.

Q.4.9 Should the buildings which have not been fully used and having low density be used for higher density.

Ans.4.9 Yes.

Q.4.10 IIT, Kanpur Campus being "Knowledge City" is it possible to separate solid waste into degradable and non-degradable waste at door to door collection points.

Ans.4.10 Very desirable.

Q.4.11 Whether it would be advisable to provide convenient shops at walkable distance near to residential and hostel areas to avoid in convenience to residence of the Campus.

Ans.4.11 If possible, yes.

Annexure - 2

CONSULTATION WITH VARIOUS STAKEHOLDERS OF IITK

1. Institute Advisory Committee

List of members present in the Meeting.

(i)	Dr. A.K. Chaturvedi	-	Dean, Research and Development
(ii)	Dr. Manindra Aggarwal	-	Dean, Resource Planning and Generation
(iii)	Dr. Amlendu Chandra	-	Head, Computer Centre
(iv)	Dr. D. Bahuguna	-	Acting Head, Mathematic Department
(v)	Dr. Leelavati Krishnan	-	Head, Department of H.S.S.
(vi)	Dr. Ravi Shankar	-	Head, Physics Department
(vii)	Dr. A.R. Harish	-	Head, Counseling Services
(viii)	Dr. Kamal Kar	-	Head, M.S.P.
(ix)	Dr. S. Qureshi	-	Head, Electrical Engineering Department
(x)	Dr. V.D. Shrivastava	-	Librarian
(xi)	Dr. R.N. Mukherjee	-	Head, Chemistry Department

Prof. Sanjay G. Dhande, Director, IITK gave the introductory remarks and invited all the stakeholders present (Annexure – I) during the consultation to give their frank and considered opinion, which would go a long way in planning / designing the campus.

Initiating the discussions Shri D.S. Meshram brought to the notice of the members of the Committee members that initially the IITK campus was planned / designed for the student strength of 2400, which now increased to 4500 and by 2021 it is expected to rise to 7000, beside Faculty Members, Staff and service population, totaling to 10,500 i.e. more than three times increase of the initial strength, while land mass remains the same ie. 1055 acres (426.9 ha). In addition it was stated that by the passage of time the IITK campus has became the part of urbanizable limit of Kanpur City and therefore the provisions of Kanpur Master Plan 2021, would also be applicable. Besides the land admeasuring 121 acres has certain limitations like:

- Land at Sheoli Road (40 acres) is not appropriately located for the development i.e. is insfected by the H.T. lines;
- The land under Canal;
- Area beyond the Airstrip is also not properly located and has limitation for using it for academic, residential and other purposes; and
- Low lying Area at the main entrance gate.

Thus, the total usable area amounts to hardly 934 acres, on which 10,550 IITK community needs to be located by 2021. Therefore, to absorb this three times increase the alternative appears to be:

- Densification of existing buildings and land;
- Building which have out lived their life should make the room for new construction; and
- To construct new buildings on the vacant land to accommodate the increase in strength.

It was also stated that there are certain imperatives in the form of additional requirements like academic area or hostel accommodation (for both boys and girls) beside the residential accommodation (for both faculty and staff) which may not be possible to be planned in the vicinity / continuity of their existing buildings and would be slightly away. Accordingly, all the stakeholders, present, needs to give their considered opinion after taking into consideration all these imperatives and limitations.

After detailed discussions / deliberations on planning and development of IITK Campus following views / issues emerged:-

- Chemistry, Physics and Maths have been distributed at various places / buildings and therefore needs to be grouped in once place, however, each department would be autonomous / independent;
- School of Humanities and social sciences also needs to be located at appropriate locations, it can be even located in Science and Social Science and Management Block, but each discipline would be autonomous / independent;
- As the volume of books in the Library are increasing, the new additional library space should be located in the proximity of existing Library Block;
- Separate space be provided for organizing Seminars and Conferences;
- With the increase in number of students, and faculty, there will be increase in visitors / guests accordingly expansion of Visitors Hostel also needs to be considered; and
- Dr. Harish – location-wise, it should be close to Hostel, Counseling or Health Centre.

2. **Institute Environmental Advisory Committee and Environmental Group of Faculty Forum**

List of members present in the Meeting.

(i)	Dr. Amitabh Bandopadhyay	-	Chairman, EAC
(ii)	Shri Navpreet Singh	-	Member, EAC
(iii)	Shri R.R. Dohre	-	Member, EAC
(iv)	Shri Satish Kumar Singh	-	Member, EAC

(v) Shri Karthik (student Rep.) - Member, EAC

(vi) Dr. C.S. Upadhyay - Member, GFF

(vii) Dr. Sumit Das - Member, GFF

(viii) Dr. Ishan Sharma - Member, GFF

(ix) Dr. Anantha Subramaniyan - Member, GFF

(x) Dr. K.S. Venkatesh - Member, GFF

(xi) Dr. Ashish Garg - Member, GFF

After detailed deliberations / discussions following views / issues emerged.

- The areas after the present development be declared as Eco zone / 'No Touch Zone';
- High Rise Construction be followed to avoid the location of buildings on the open spaces available;
- Neelgai, peacock, snakes, rabbits, etc.; are the part of campus and their habitat should not be disturbed, as they are not creating any menace;
- Statement of space prepared by Institute Space Planning and Allocation Committee is inflated / on higher side;
- Married Student Hostels be provided at appropriate locations on priority;
- Adequate accommodation for Research Staff should also be provided;
- ACMS / Tutorial Block can be opted for modifications / additions and alterations for providing for additional area for academic purpose;
- The buildings under future construction should have adequate strength to support additions of extra floors if required in latter stage;
- Water harvesting should be followed in the Campus; and
- Open water body for collection of rain water / waste water be created.

3. **Institute Space Planning and Allocation Committee**

List of members present in the Meeting.

(i) Dr. S.P. Mehrotra - Prof. Department of M.M.E.

(ii) Dr. V.K. Jain - Prof. Department of Mech. Engg.

(iii) Dr. J.N. Murthy - Prof. Department of Chemistry

(iv) Dr. Sudhir Mishra - Prof. Department of Civil Engg.

The Committee has been briefed about the major issues emerged during discussions with Institute Advisory Committee and Institute Environmental

Advisory Committee. But Committee members were of the opinion that Institute Space Planning and Allocation Committee cannot take the decision or reducing space requirement and not to use any open space and declaring certain areas as 'no touch zone'. It was also highlighted that the questionnaire was put on the website of IITK but no such suggestions were received from any of the stakeholders. After detailed deliberations / discussions following issues / views emerged.

- Efforts should be made to consume the less open space as far as possible for construction activities;
- Vertical growth of some buildings may be permitted but not at the cost of security / and over all character of the Campus which is low rise;
- Water harvesting should be promoted;
- Buildings which have outlived its utility / life may be demolished to make room for new buildings;
- The building which are under utilized should be densified, similarly building occupying more ground coverage and giving less floor areas be considered on priority for densification may be through modifications / additions and alterations / demolition;
- FAR as specified in the Master Plan Kanpur - 2021 be adhered to;
- Security and safety of the IITK community / Campus should be given top most priority and not to be compromised at any cost; and
- The Committee was of the opinion to follow the balanced approach.

Thus, it can be observed that divergent views / opinions have been received from various stakeholders.

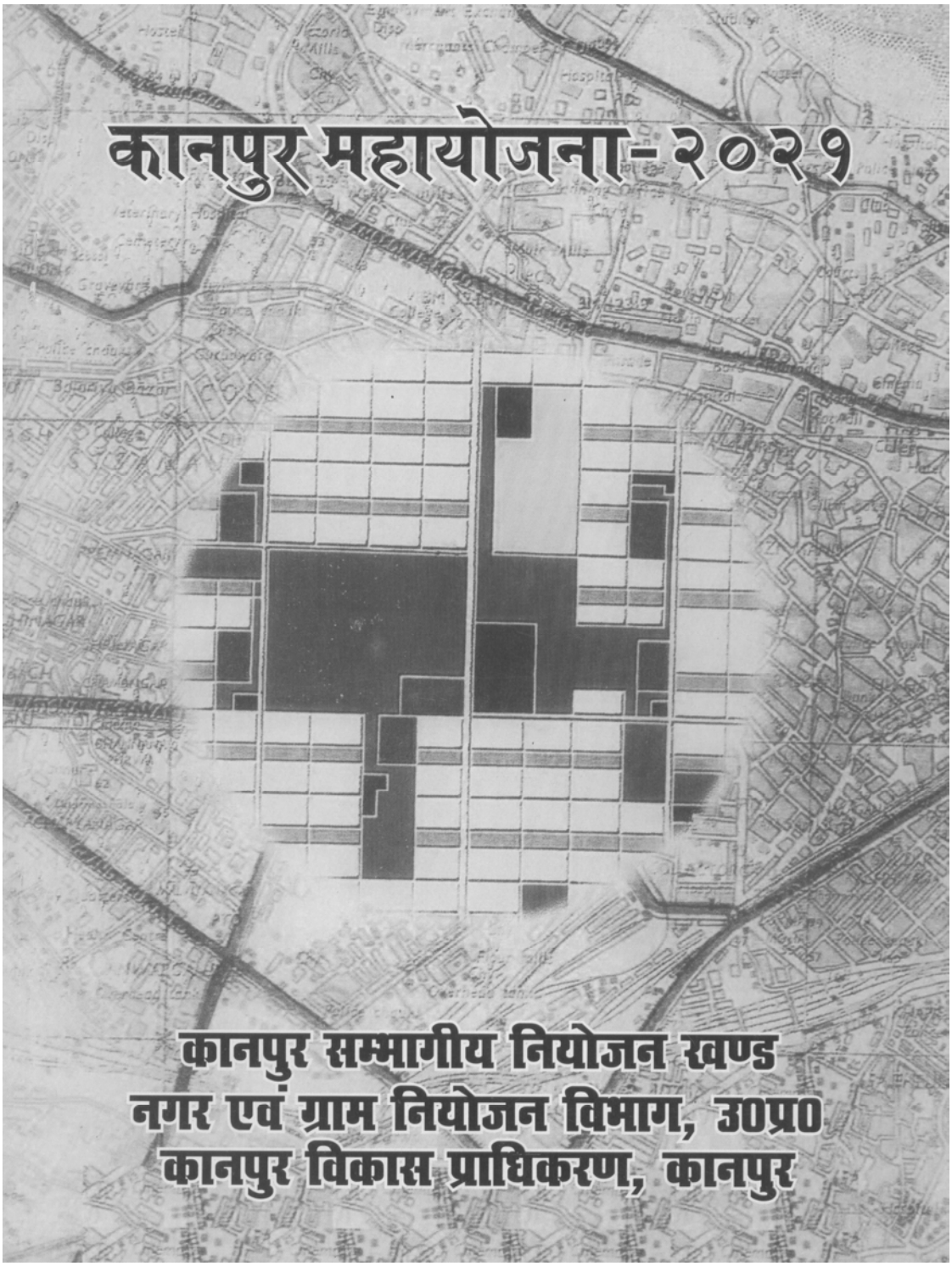
4. In addition following officers of the Town Planning Department of Government of Uttar Pradesh and Kanpur Development Authority were also contacted.

(i) Shri N.R. Verma, Chief Town Planner, Town Planning Department, Government of Uttar Pradesh.

(ii) Shri Mahaveer Singh, Chief Town Planner, Kanpur Development Authority, Kanpur, Uttar Pradesh.

(iii) Mrs. Vandana Tikoo, Associate Planner, Government of Uttar Pradesh, Kanpur.

Annexure – 3


कानपुर महायोजना-२०२१
कानपुर सम्भागीय नियोजन खण्ड
नगर एवं ग्राम नियोजन विभाग, उ0प्र0
कानपुर विकास प्राधिकरण, कानपुर

10.0 कानपुर महायोजना में वाटर हार्वेस्टिंग के अन्तर्गत योजनाओं का क्रियान्वयन :

शासनादेश के परिप्रेक्ष्य में वर्तमान समय में भूमिगत जलस्त्रोत के स्तर में प्रति वर्ष काफी तीव्रगति से गिरावट दृष्टिगोचर हो रही है। इस स्थिति को दृष्टिगत रखते हुए शासनादेश संख्या 1703ए/8–अ–1–20–विविध/98 (अ0ब0) दिनांक 12 अप्रैल, 2001 के अनुसार 20 एकड़ एवं अधिक क्षेत्रफल को विभिन्न योजनाओं के ले–आउट प्लान्स में पार्क एवं खुले क्षेत्रों के अन्तर्गत कुल योजना क्षेत्र के लगभग 5 प्रतिशत भूमि पर तालाब / जलाशय (वाटर वाडीज) बनाये जाये, जिससे ग्राउण्ड वाटर चार्ज हो सके। ऐसे जलाशय/तालाब का न्यूनतम क्षेत्रफल एक एकड़ होगा और उसकी गहराई 6 मीटर होगी। वाटर हार्वेस्टिंग हेतु दिये गये सुझावों को भवन / तलपट मानचित्र स्वीकृत करते समय प्रदान कराया जायेगा। उपरोक्त के अतिरिक्त यह भी सुझाव है कि कानपुर विकास क्षेत्र के अन्तर्गत स्थित पाण्डु नदी एवं गुजैनी नाला में वर्षा ऋतु के समय जल का बहाव बहुत अधिक रहता है। यह समस्त जल गंगा नदी में गिरकर बह जाता है। अतः यह सुझाव दिया जाता है कि पाण्डु नदी एवं गुजैनी नाला का विस्तृत सर्वेक्षण एवं तकनीकी परीक्षण कराकर जगह–जगह चैक डेम्स का निर्माण किया जाय, ताकि वर्षा ऋतु में जो जल नदी एवं नाला के प्रवाह के द्वारा गंगा नदी में चला जाता है उसे चैक डेम्स बनाकर रोका जा सके जिससे भूमिगत स्त्रोत प्राकृतिक रूप से प्रति वर्ष ऊपर उठेगा और वाटर हार्वेस्टिंग के अन्तर्गत उक्त योजना का कार्यान्वयन कराकर भूमि जल स्तर को ऊंचा उठाया जा सकेगा।

कानपुर विकास प्राधिकरण
भवन निर्माण एवं विकास उपविधि
2008

आवास एवं शहरी नियोजन विभाग

उत्तर प्रदेश शासन

नवम्बर, 2008

3.5 भू-आच्छादन एवं एफ.ए.आर.

3.5.1 **भू-आच्छादन एवं एफ.ए.आर. के मानक**

विभिन्न भू-उपयोगों हेतु भू-आच्छादन एवं एफ.ए.आर. के मानक निम्नवत् होंगे -

1.	**भूखण्डीय विकास (आवासीय प्लेटेड)**		
		भू-आच्छादन (प्रतिशत)	**एफ.ए.आर.**
	(क) निर्मित/विकसित क्षेत्र		
	• 100 वर्गमीटर तक	75	2.00
	• 101-300 वर्गमीटर तक	65	1.75
	• 301-500 वर्गमीटर तक	55	1.50
	• 501 से 2000 वर्गमीटर तक	45	1.25
	(ख) नए/अविकसित क्षेत्र		
	• 100 वर्गमीटर तक	65	2.00
	• 101-300 वर्गमीटर तक	60	1.75
	• 301-500 वर्गमीटर तक	55	1.50
	• 501 से 2000 वर्गमीटर तक	45	1.25
2.	**व्यवसायिक**		
	(क) निर्मित/विकसित क्षेत्र		
	(i) सुविधाजनक दुकानें	60	1.20
	(ii) नेबरहुड/सेक्टर शापिंग सेन्टर	40	1.20
	(iii) बाजार स्ट्रीट	40	1.20
	(iv) उपनगर केन्द्र/सब सेन्ट्रल बिजनेस डिस्ट्रिक्ट/डिस्ट्रिक्ट शापिंग सेन्टर	40	1.75
	(v) नगर केन्द्र (सेन्ट्रल बिजनेस डिस्ट्रिक्ट)	50 40 30	1.50 1.75 2.00
	(ख) नए/अविकसित क्षेत्र		
	(i) सुविधाजनक दुकानें	50	1.50
	(ii) नेबरहुड/सेक्टर शापिंग सेन्टर	40	1.75
	(iii) उपनगर केन्द्र/सब सेन्ट्रल बिजनेस डिस्ट्रिक्ट/डिस्ट्रिक्ट शापिंग सेन्टर	35	2.00
	(v) नगर केन्द्र (सेन्ट्रल बिजनेस डिस्ट्रिक्ट)	30	3.00

3.	**कार्यालय**		
	(क) निर्मित क्षेत्र	40	1.50
	(ख) विकसित क्षेत्र	30	2.00
	(ग) नये/अविकसित क्षेत्र		
	• राजकीय एवं अर्द्धराजकीय	35	2.00
	• प्रोफेशनल/व्यवसायिक कार्यालय	30	2.50
4.	**शैक्षिक**		
	(क) निर्मित/विकसित क्षेत्र		
	• प्राइमरी व नर्सरी स्कूल	35	0.80
	• हाईस्कूल/इण्टरमीडिएट/ उच्चतर संस्थाएं	30	1.00
	(ख) नए/अविकसित क्षेत्र		
	• नर्सरी स्कूल	40	0.80
	• प्राइमरी	35	1.00
	• हाईस्कूल/इण्टरमीडिएट	35	1.20
	• डिग्री कालेज	35	1.50
	• तकनीकी/प्रबन्धन संस्थान	35	2.00
5.	**सामुदायिक एवं संस्थागत सुविधाएं**		
	(क) निर्मित/विकसित क्षेत्र	35	1.50
	(ख) नए/अविकसित क्षेत्र		
	• सामुदायिक केन्द्र, बारातघर एवं धार्मिक भवन	40	1.50
	• अन्य संस्थागत	30	2.00
6.	**भण्डारण**		
	(क) निर्मित/विकसित क्षेत्र	35	0.80
	(ख) नए/अविकसित क्षेत्र		
	• गोदाम	40	1.20
	• भवन निर्माण सामग्री यार्ड	30	0.60