Guidelines for a GIS Plan for KFUPM Campus.

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Abstract:

In the wake of the information revolution there has been extensive use of computers for performing many diverse functions. Benefits of all information technologies are evident from their ability to support the basic operational activities of institutions. By providing support to the fundamental operations and functions of an institution, e.g. regulatory, utility management, human services, etc., benefit is derived from an automated system. This aspect is vital to accept GIS technology but one has to be aware also of the fundamental difficulties that are encountered when setting up such a system.

There is a dearth of precedents for GIS based campus maintenance systems. Therefore the process of implementing such a system has to be incremental and learning experience. The paper has in the process of determining the requirements for a campus maintenance system attempted to recognize pitfalls and identify guidelines for the establishment of a nomenclature system for the KFUPM university facilities.

1. Introduction:

The global revolution in information technology has expanded the use of computers and computer technology for decision-making and management support in almost all aspects of life. The use of computers to support decision-making and management is further reinforced by the current trend in research towards developing computer-based expert systems. One of the most popular computer-based systems used to support decision-making and management is Geographical Information Systems (GIS).

GIS systems are generally used to support the management of geographically referenced activities and facilities. The maintenance of large facilities is a daunting task, requiring enormous amounts of data management and co-ordination. This task of maintaining and upkeep of a large facility can become cumbersome, due to enormous paperwork and records. It requires a common platform for data registering and also analysis that has to be done from time to time.

Over the past few decades the computer has made geographic information about the world and its inhabitants much more useful to governments, businesses, and communities for making critical decisions. Geographic information systems (GIS) allow users to integrate, analyze, and manage information about locations. Improvements in software, increased storage capacity, and ever-decreasing hardware costs have put geographic information systems and associated technologies on desktops everywhere.

Government organizations of all kinds, from towns and cities to national agencies-routinely use GIS as a tool to coordinate disaster relief, manage land, and understand and solve environmental and social issues. Private companies use GIS for facilities management, resource location, and marketing. Many disciplines use GIS in different contexts for different purposes.

Computerized management of facilities and infrastructures from a database offers the managers and decision makers a variety of tools that can be adapted to specific needs. GIS can be used to perform general data maintenance, allowing staff to add, delete, and modify facilities data, and to post data from work order as-built drawings (Zaheer, 1996).

2. Objective:

This paper is an attempt to develop a set of guidelines that will use the capabilities of a GIS system, in maintaining a facility. The attempt will be to demonstrate the above objective in the context of the KFUPM campus. The methodology to be employed is to review literature to help in assessing the pitfalls in establishing a GIS system for facility management systems deployed in a university campus so as to arrive at the salient features for a campus-facility management system.

The contention is that a GIS system for the planning and maintenance is ideal for KFUPM campus as the spatial data can be linked to the attributes of various facilities such as buildings, utilities and infrastructure of the university. As this process of maintaining large amounts of data is cumbersome and can generate lots of ambiguities in the machinery and involve tons of paper work, an efficient computerized system capable of handling both graphical as well as attribute data can be an ideal solution for the campus.

The result of the study will be aimed at identifying the areas that can be a bone of contention for use of a GIS system for maintenance. Further an outline for a set of recommendations; initiatives and processes that need to be adapted for the implementation of a GIS based maintenance management system for KFUPM will be arrived at.

3. Methodology:

The approach to the study will be to familiarize with the nuances of a GIS system that can be adapted for the KFUPM campus. This will be followed up with understanding the development of the university, the maintenance mechanism of the university. An assessment of the needs of the system to be adopted by KFUPM will be done.

The advantages of using a GIS based maintenance system over the conventional methods can be learned from the instances of campuses that have implemented such a system. It is needed to understand the administrative machinery of the university, so that the proposed guidelines can be streamlined to the requirement and not vice-versa.

3. Study Area:

An excellent example for study can be the KFUPM university campus, which has an elaborate infrastructure network, facilities and equipment, which need regular maintenance and repair. Since GIS integrates data from different sources into a geographically referenced system and thereby expands data analysis capabilities and enhances the uses of available data, it can be used for the above-mentioned purpose.

The KFUPM campus is a medium sized educational university, with an enrolment of about 9,000 students and about 4,000 faculty and staff living on campus. The policy of this university is that day scholars or full time students are to reside on campus; this is aimed at promoting greater interaction and learning between the faculty and students (university bulletin). The physical development of campus started with the old administration building, later the north compound was added for housing the staff and some of the barracks belonging to ARAMCO were adapted for student housing.

The campus design was assigned to CRS, a Texas based firm in 1965 and the development has been guided by a series of master plans. The appended maps briefly illustrate the developments during various phases (appendix a). The design in a way has achieved its initial goals of developing a sense of a community & orientation for the users of the campus.

The present campus according to the master-plan consists of 3 major areas, the central academic ‘Jebel’ (teaching and associated facilities), the south campus (staff housing & recreation), and the north campus (E.L.C., Preparatory year program, undergraduate housing, the north compound & supporting-services for campus). An arterial road looping around the Jebel connects the 3 areas.

As the university grew more area was added and eventually the road which was bisecting the campus blocked according to the 1976 master-plan and a network of university's separate entrance way form the rebuilt highway to the north of the campus. The buildings on the academic Jebel were added in phases. Buildings 1,2 & 3 were in phase-1, 4 to15 in phases 2 and the latest being the buildings 16 - 21 built around late 1980's. In the 1990's the housing facilities on campus grew with demand, in similar phases, a variety of housing-types were built in addition to supporting facilities like recreation & shopping centers (refer to maps appended, (appendix a). At present the campus occupies a sprawling 640 hectares (1300acres) of area. The university’s maintenance department undertakes the maintenance of the KFUPM campus. (The administrative structure and the functional structure are appended appendix b and c1 & c2)

5. Review of Literature:

Generally geographic information systems are designed to manage spatial information and the attributes associated with the spatial information. The later half of the twenty-first century has seen the computer make geographic information much more useful to governments, businesses, and communities for making critical decisions. Geographic information systems (GIS) allow users to integrate, analyze, and manage information about locations. Improvements in software, increased storage capacity, and decreasing hardware costs have made geographic information systems and associated technologies widely available. Thus there have been innumerable uses to which GIS is being put to.

GIS is becoming an important planning, implementation management, operations management tool, and maintenance management tool, for the utility industries such as Telecom, Transportation, Energy and several urban utilities such as Water Supply, Waste Water and Health. (Jagadeesh K M and Milind Deshpande). The fastest growing amongst, GIS utility applications are electric and water supply, gas, telephone, transport network, Land use development/planning etc. Facility Management (FM) i.e. support, plan, update and display of civic facilities (sewer, water, electricity/telephone cables, hospitals, roads, parks, schools, recreation facilities, etc.), Land parcel boundaries, inventory of public/ Govt. owned property; transportation planning/vehicle routing etc. are also emerging as major applications (Atul Sahai, 1997).

This invariably points to the potential of the GIS system in the maintenance of facilities such as university campuses. Any Utility is the nerve center and basic infrastructure requirement. To facilitate management of a GIS system, the task of maintenance management system should be substantially flexible and the system must be based on geographical data, for easy tracking and attention. Executing a GIS with a defined system design basis can go a long way in successful utility management (Atul Sahai, 1997).

GIS facilitates not only the mapping of actual physical structure of any utility distribution system such as, where the lines run, where the connections are, and can be duplicated or modeled on the computer, as can other things, like streets, buildings, and land ownership boundaries, that have a bearing on the distribution system. This aspect of GIS capability is vital to any maintenance management system. There have been examples of modifications to GIS systems to perform facility planning for critical decision support (Alexandra Rebeiro, 2002).

This process of integration of all of these tasks, with a common database across the network of utilities needs to be coordinated and efficient. In a modern spatially integrated utility, such as a university campus all it's operating and facilities data is to be stored in a common database. Each operating department of the maintenance unit can have its own applications pulling information from the single, non-redundant database that has periodic updating. An example of an institutional setup is the City of Houston's Department of public works and Engineering (PW&E) developed a GIS-based Maintenance Management System for water distribution, sanitary sewer, and storm sewer facilities management (appendix: d).

6. Nuances of Campus Wide GIS: The Arizona State University Experience.

A study of the plans for a GIS based campus maintenance system being developed for the University of Arizona provides insight into the potentials of such a system and also the hurdles one would expect to encounter when establishing such a system. Foremost could be significant cost savings_associated with handling information, improved planning and management of physical resources. It can prevent Duplication of effort. Disparate data standards across different departments within the university campus usually result in inefficient data transfer. Standardization through a GIS system can result in timesaving and increased efficiencies, which produce quicker and better analyses.

Numerous benefits of such a system are more accessible information, higher quality of data, and adapting procedures for multiple analyses will lead to Improved administrative reporting and planning and will greatly enhance decisions made during the physical planning process. Communication can be enhanced due to the improved quality and accessibility of maps, information more efficiently stored electronically, which in turn allows easier distribution and accessibility of the information. Updating information will become easier, while less time will be spent searching files and going into the field to verify information.

There is no guarantee that any map on campus will provide accurate and current spatial information, when hard copy maps that are not updated are to be relied upon. A significant amount of information does not exist in any documented form - it is only known by key ground staff. A system is needed to allow this information to be recorded on maps and databases. There is usually no coordinated system for providing public oriented maps on-demand. Many departments on campus do not have map-making capabilities, however, they often need maps for various purposes (Department Of Campus And Facilities Planning, University Of Arizona, 1997).
GIS can be effectively used to establish relationships among map features and the characteristics of these features. For example, one can calculate the amount of a particular land use (one map feature) that falls within a given boundary (another

map feature). Thematic maps are often used in conjunction with the other GIS uses; however, they are particularly well suited for presenting complex information in an understandable format. Making complex information understandable is a primary purpose of any map geared toward the general public. (Department Of Campus And Facilities Planning, University Of Arizona, 1997).

An important area that calls for attention in a maintenance department is Records management. Records such as as-built drawings, parcel information, utility data, and facility use data may be effectively stored and retrieved using a GIS, and critical documents will receive effective protection from deterioration. Although a GIS can provide an overall framework for organizing data storage and retrieval, the actual data may be stored using a different technology.

7. Advantages and Impediments in Setting up a Campus-Wide System:

Some of the basic impediments to establishing a GIS based Maintenance Management System, keeping in view the maintenance management and the requirements of the KFUPM maintenance department are:

- **Software, Data, Standards and Common Base map:**

A basic standardization in terms of software; map accuracy, content, and presentation; and, the integration of applications is usually not available. There is usually an absence of a common base map that may be used by all departments. This insures that thematic layers of data that are developed for special purposes by one department will overlay properly with thematic layers created by other departments. An assessment of current situation can give insight into this aspect.

- **Digital Data and Metadata:**

A significant portion of the maps on campus, more often are not in digital form. In order for a GIS to operate, existing paper maps and other data need to be converted into digital form. A system that is based on sharing data across a network requires digital data. In order for data to be retrieved, there needs to be a system for looking up the availability of the data. This is done using metadata.

- **Accepting currently available Technology:**

Manual procedures have been used for many years. Usually, using new technology is resisted, training is inadequate, and usually a lack of interest. All Departments must be willing to share information and overlook “territory” concerns.

- **Staff and Training:**

Trained staff is very essential, both for individual departments and for a campus-wide coordination. The pace of system evolution and development is directly related to the number and quality of staff. Continuous training of staff is essential for both starting a system, as well as maintaining a system. This is particularly important in the wake of rapid advances in technology. A campus-wide system has both administrative and technical complexity. There must be adequate support at all administrative levels in order for a system to meet expectations in terms of budget, timeline, and service. There must be specialist support available, and understanding by managers that it is not a job that can be handled by technicians.

- **Precedent:**

As this technology is relatively new and most applications as is evident from the introduction, have been for infrastructure systems on the scale of whole cities or for natural resource mapping of an entire region. Thus expertise and models for this sort of system are hard to come by. The system needs to be rapidly under development in campus environments.

- **Campus-Wide Mandate for Coordination and Direction:**

Lack of overall coordination, will always lead to duplication of effort, incompatible standards, different software and hardware systems, different base maps and scales, etc. Lack of consistency of data and communication between each department will lead to isolated departments, working on their own. Such coordination and direction can only happen at a high level within the University administration. The foremost task in establishing a campus-wide GIS maintenance system is to deal with incompatible standards.

Work Orders and Complaint Taking:

With regards to taking complaints and answering calls, Work Orders, Inspections and Tests are to be explicitly linked to assets in the GIS. As the work is completed, work histories can be maintained as an attribute of the asset and the assets are maintained as an attribute of the work order. The database design should allow reports to be generated for criteria based on spatial and non-spatial attributes. (City of Houston, Azteca Systems,2000) article appended, appendix d.

8. Guidelines for Establishing a Standardized Nomenclature:

Following are some guidelines for establishing a standardized nomenclature to university facilities and property to identify all spatial elements that make up the KFUPM campus. Standards for common spatial elements such as building numbers should be uniform to make analysis of data easy. Common identifiers are to be enforced among databases (different units of the maintenance department).

All university departments should follow standards set, in order to label any "Facilities Spatial Information”. All systems are to be campus-wide, they are to be mapped to depict the entire campus and illustrate a theme. These maps are also known as thematic maps. Structures are elements within systems, Utilities and Equipment are further defined because of their complexity and hierarchy. Structure Identifier (ID) distinguishes natural and man-made boundaries, landscape elements, utility structures and equipment. Zones can be used to determine the facilities personnel and financial responsibility for the maintenance of the building. Examples of zone codes are G - Grounds and Landscape Areas, H - Health Services, I - Infrastructure, L – sports, O - Other, Not Maintained by maintenance department, S - Housing and Dining Services, U – Utilities, V - Vehicles and Small Equipment, Z - Structures other than Buildings. Such a system can be extended to all facilities on the campus. (Department Of Campus And Facilities Planning, University Of Arizona, 1997).

Utilities such as Communications, potable Water, raw-water, Gas, Electricity, Outdoor Lighting, Steam, Steam Tunnels, Storm Drain, Sewer should be mapped and appended to a database for information on Utility structure and pipe standards. Facilities include buildings, trailers, civil features, utility elements such as manholes and pipes, parking lots, monuments, recreation and grounds areas, trees, art, signs, etc. a uniform naming convention for FACILITY ID's is to be defined. For example Facilities are assigned <ROLL NUMBER>dash<STRUCTURE ID>, (001-00001 where the ROLL is three characters and lists all types of areas and facilities in chronological order, and the STRUCTURE ID is three characters (like the present 2 character building numbers prevalent in the KFUPM campus). All numbers should contain leading zeros to adhere to a common format. This is necessary for databases to link to spatial features in a Geographic Information System.

University defined systems include systems developed for running the University, these include Emergency Operations Centers, Critical Buildings, Roadway Responsibilities, Emergency Assembly Points, Service Vehicle Delivery Points, Service Vehicle Routes, Fire Access Routes to Buildings, Fire Hydrants, Parking Designations, Disabled Access to Buildings, Residence Housing Types, Elevator Locations, Bicycle/Disabled Access and Pedestrian Routes and Bus stops, open spaces, and pedestrian zones. Each of these systems is critical for University operations and is defined by the location of their elements. The mapping of these systems should be coordinated between Information and Technology department (GIS unit) and the maintenance department. (adapted from, Department Of Campus And Facilities Planning, University Of Arizona, 1997).

Different floors in a building have to be clearly indicated by codes such as 00 - Basement Level, 01 - First Floor Level, etc. Rooms may be identified by the same convention (example: 001-001-01-005, that is: roll-building-floor-room, thus 01 is the first floor and 005 is the room number). Civil Features including Landscape and Grounds Features, Landscape architecture elements such as Fountains, Signs and Outdoor Art, Parking Lots, Streets and Intersections must have unique IDs separate from Parking Lots or Roads because they represent different areas. The maintenance department should define their boundaries.

Since landscaping in this arid climate is very expensive trees have also to be mapped and their maintenance tracked so a separate numbering system has to be developed for Trees based on the Grid number in which they are present. Signs are another aspect of the maintenance section that is often neglected. ID's have to be

defined. They can be tracked by location and by type (example: ID, TYPE (Directional, Event, Temporary, Street, and Regulatory) and legal code for each type (since traffic signs have official codes for their design). Their location can be tracked by road segment codes.
Roads and streets can be identified with Roll ID and Structure ID with a proceeding alphabet to the Structure ID. For example: 001-R010, similarly shopping centers has a proceeding letter M to the Structure ID. For example: 01-M001.

Utility maps can be based on network topology. Networks consist of two elements: the node and the link. Nodes are synonymous with structures such as manholes, drop-inlets and pumps. Lines are synonymous with pipes. And each node and each link can be individually identified. More than one pipe can connect two nodes. To uniquely identify each pipe they can be given a number. The names 12-16-1 and 12-16-2 refer to two separate but parallel pipes. If there is only one pipe between structures, the pipe number is usually not included in the pipe name. Thus 13-99 can be a valid pipe name.

Utility equipments can be categorized like the following; Electric Controls, Mechanical-infrastructure, Vehicular Roadways, Smoke/Equip Fire Alarm, Structural Lighting, Water Instrument, Generator Pumps, Trees Sprinkler, Shrubs Ground Cover, Lawns Irrigation, Fire Extinguishing Tools Etc. each of them being assigned a unique identifier number.

8. Summary and conclusion:

An effective nomenclature system is the first step towards establishing a GIS based maintenance system. This is to be followed by selection of the type of package for the specific purpose based on the technical capabilities of each of them. As it is widely known the main cost of setting up a GIS system is data acquisition and data updating which has to be a continuous activity.

Another important aspect is the top down approach as has been discussed before. However the success of the program depends very much on the kind of cooperation that different units of the department and other departments extend, in terms of data sharing and setting common goals and objectives. Thus a successful GIS based maintenance system calls for both technical and non-technical cooperation with common goals and objectives.

Defining the expectations of a GIS is a critical factor in ensuring that future funding is continuous prior to achieving the operational capability of the originally designed program. Defining broad goals, capabilities, and application potentials without considering the department's commitment can be harmful.

Finally the success and effectiveness of the system will depend directly on individuals who will be responsible for the implementation of the programs. Since many non-technical factors that also influence the programs success, the leader will have to deal with the raised expectations, building consensus within the organization, manage the work loads and remain open to suggestions and social and political influences that will impact the implementation of the program. (Ken Schmidt, (1994).

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APPENDICES:

a. Figure1.1 to figure 1.6, university maps in different phases of spatial development. Source: CRS report and university publications.
b. The administrative structure of projects and maintenance department of KFUPM, source: The projects and maintenance department of KFUPM.
c. List of maintenance units and their activities, source: The projects and maintenance department of KFUPM.
d. Article: City of Houston, Azteca Systems, 2000,
   http://www.azteca.com/Houston.htm.

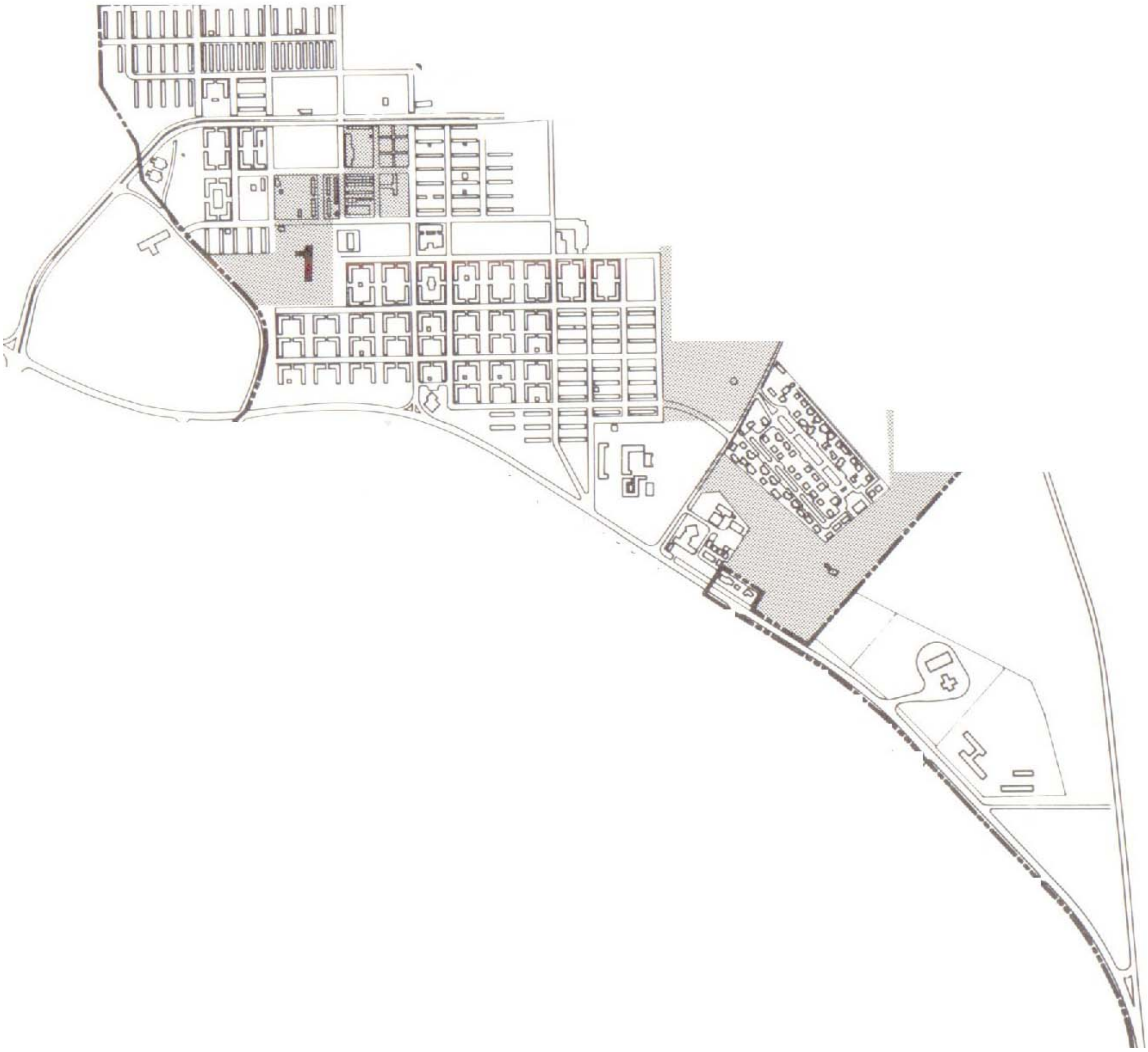


Fig 1.1: THE CAMPUS AT INCEPTION. Source: CRS report 1976.

Fig 1.2: THE CAMPUS IN THE EARLY 1970'S. Source: ms final project report by Mr. Nabil Al Jame, 1998, Impact of Saudi ARAMCO on the Development of the Eastern Province.

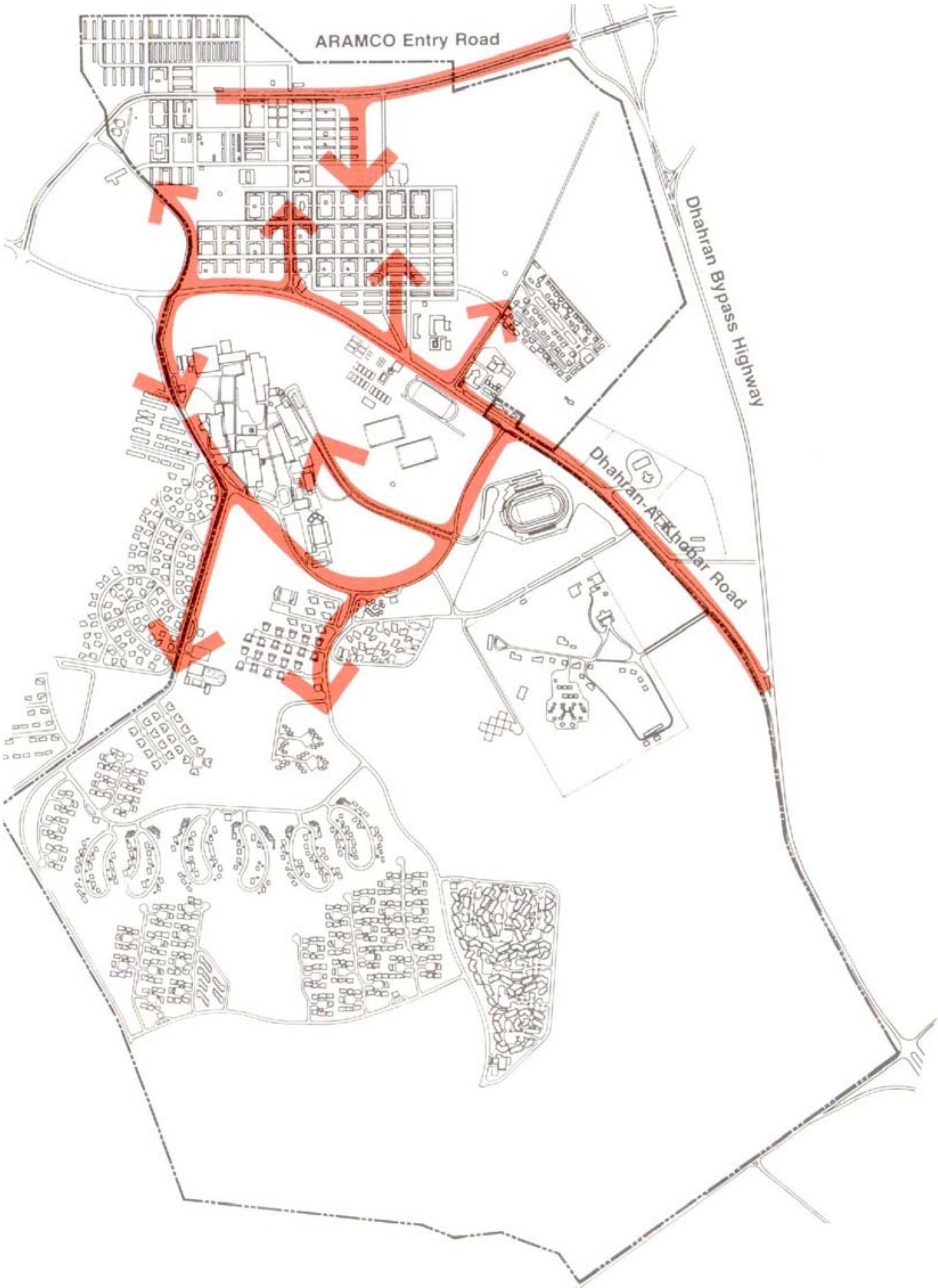


Fig 1.3: CAMPUS IN THE LATE1970'S Source: CRS report 1976.

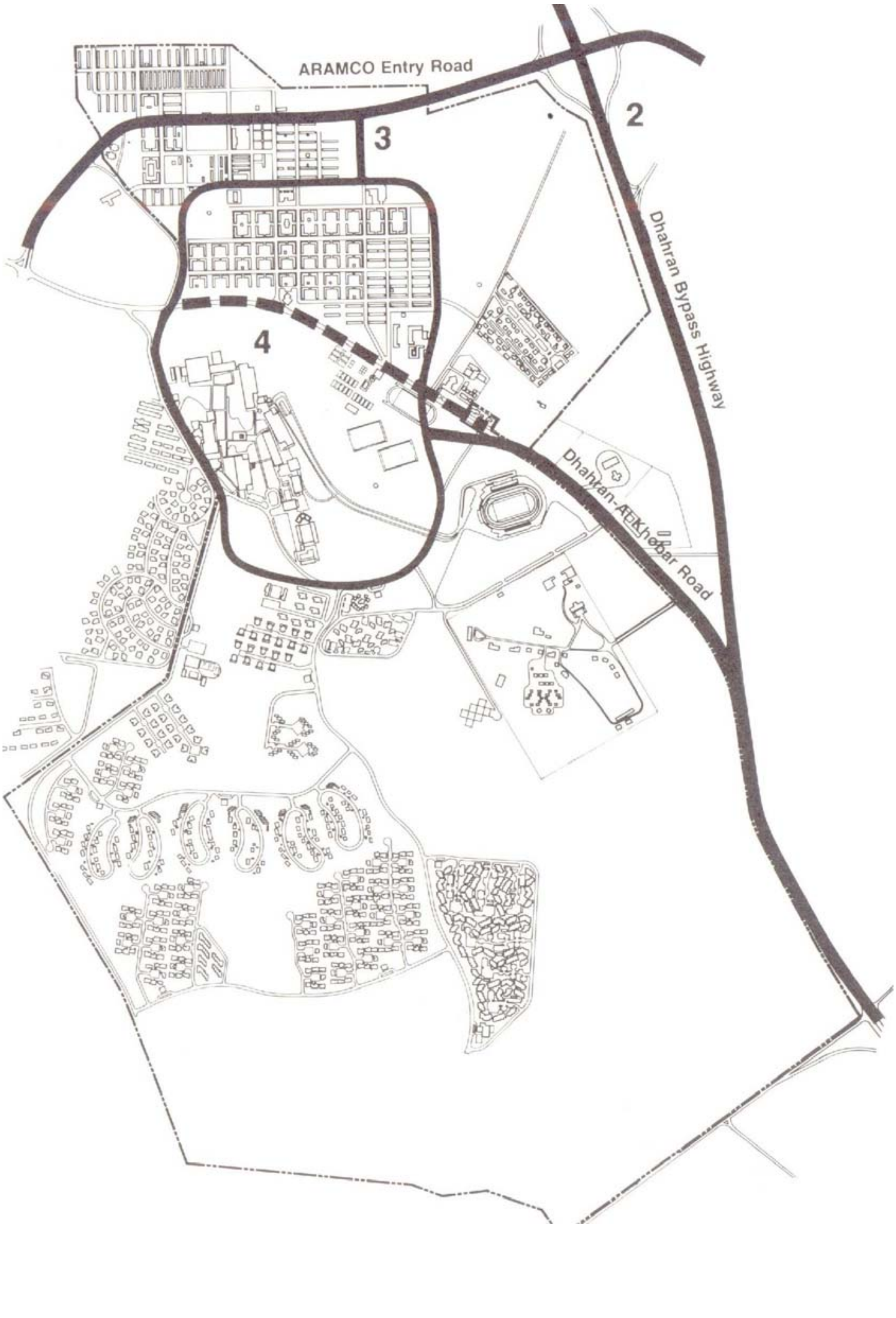


Fig 1.4: DEVELOPMENT OF ARTERIAL ROAD Source: CRS report 1976.

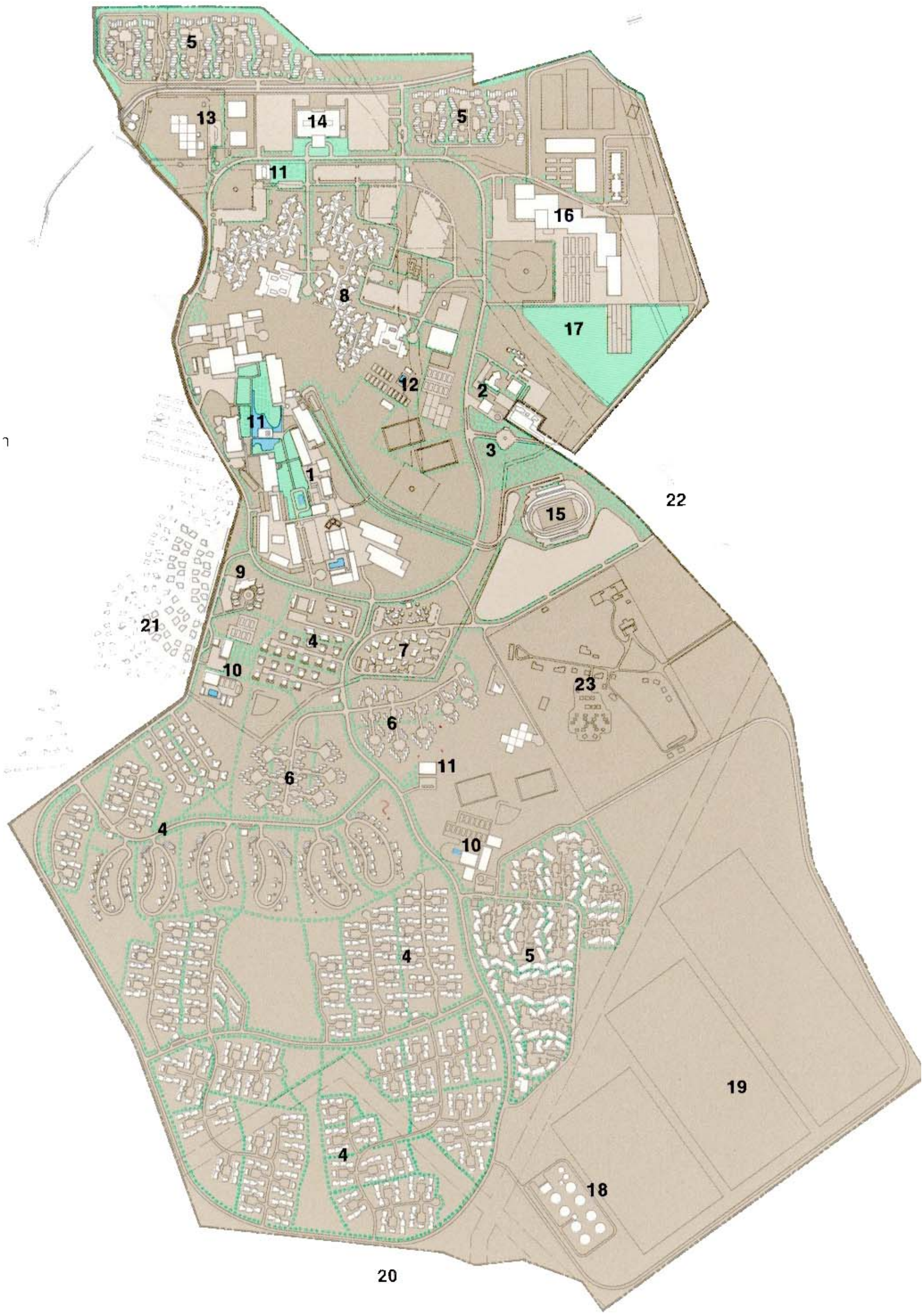


Fig 1.5: MASTER PLAN DEVELOPED IN 1976 BY CRS Source: CRS report 1976.

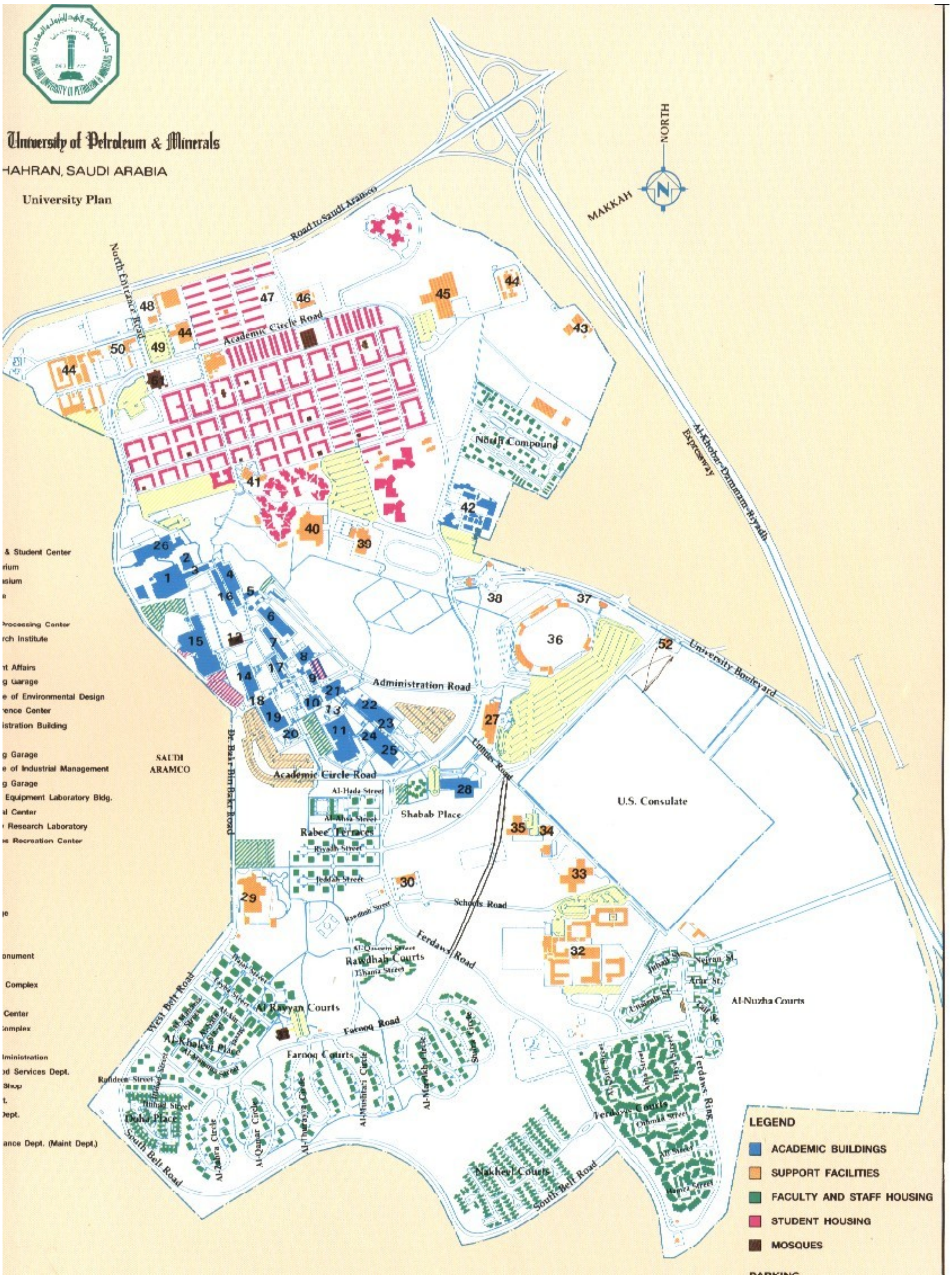


Fig 1.6: THE CAMPUS IN THE 1990'S Source: university publications.

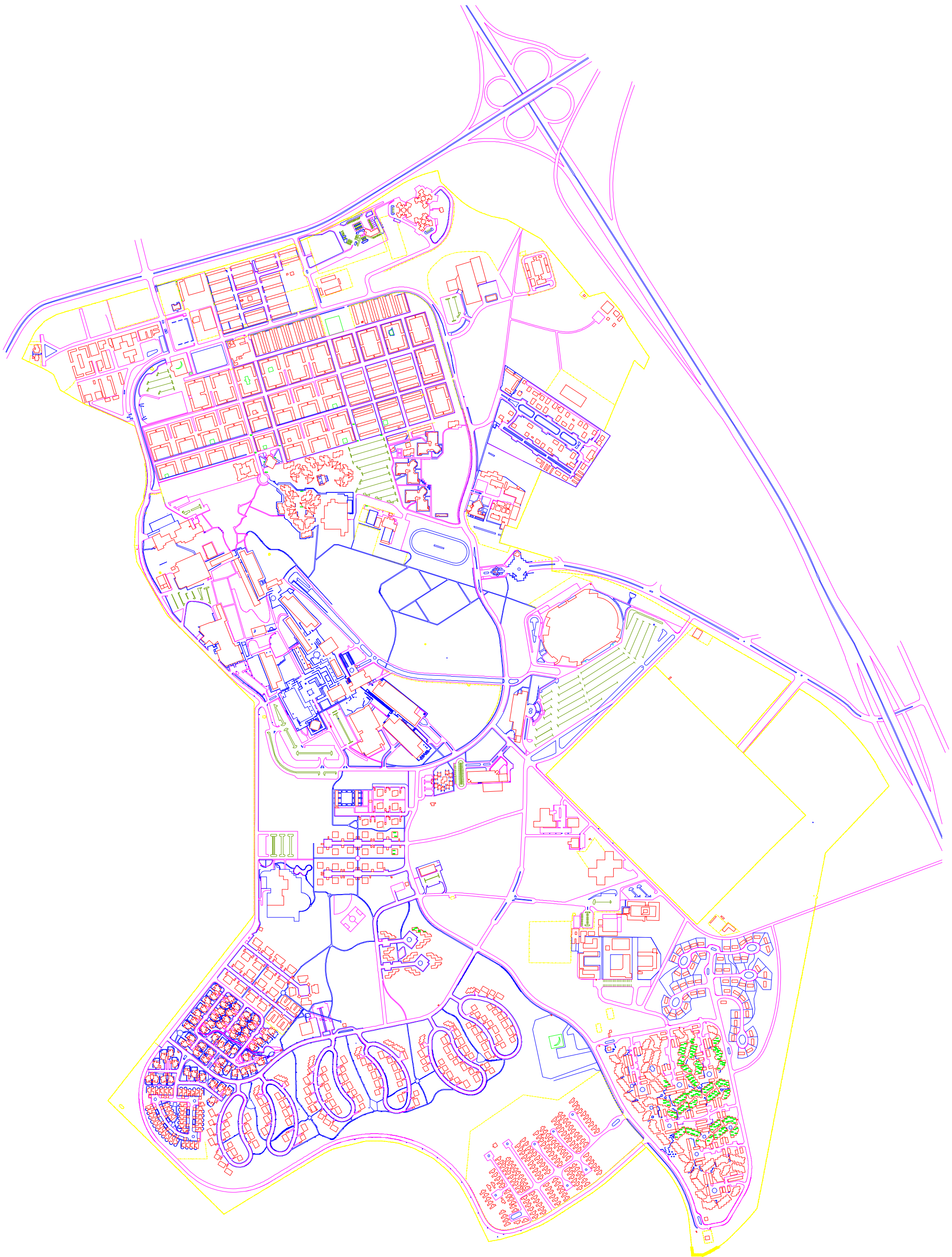


Fig 1.7: PRESENT CAMPUS PLAN Source: maintenance department.

Appendix b:

The projects and maintenance department of KFUPM: The Projects & Maintenance Department of the KFUPM is responsible for the development and maintenance of KFUPM. It undertakes the projects and executes them either through its own resources, or through sub-contractors. It caters for Telecommunications, Electrical, Mechanical, Civil and Architectural requirements of KFUPM.

The Project & Maintenance Department is responsible for:

The design of projects within the university.

Supervision of the execution of designed projects.

Operation and maintenance of facilities at the University

Prolong the lifetime of these facilities by adopting optimum operation and maintenance procedures and standards.

Respond timely to other related work requested by university departments.

Maintenance work is usually divided into four categories:

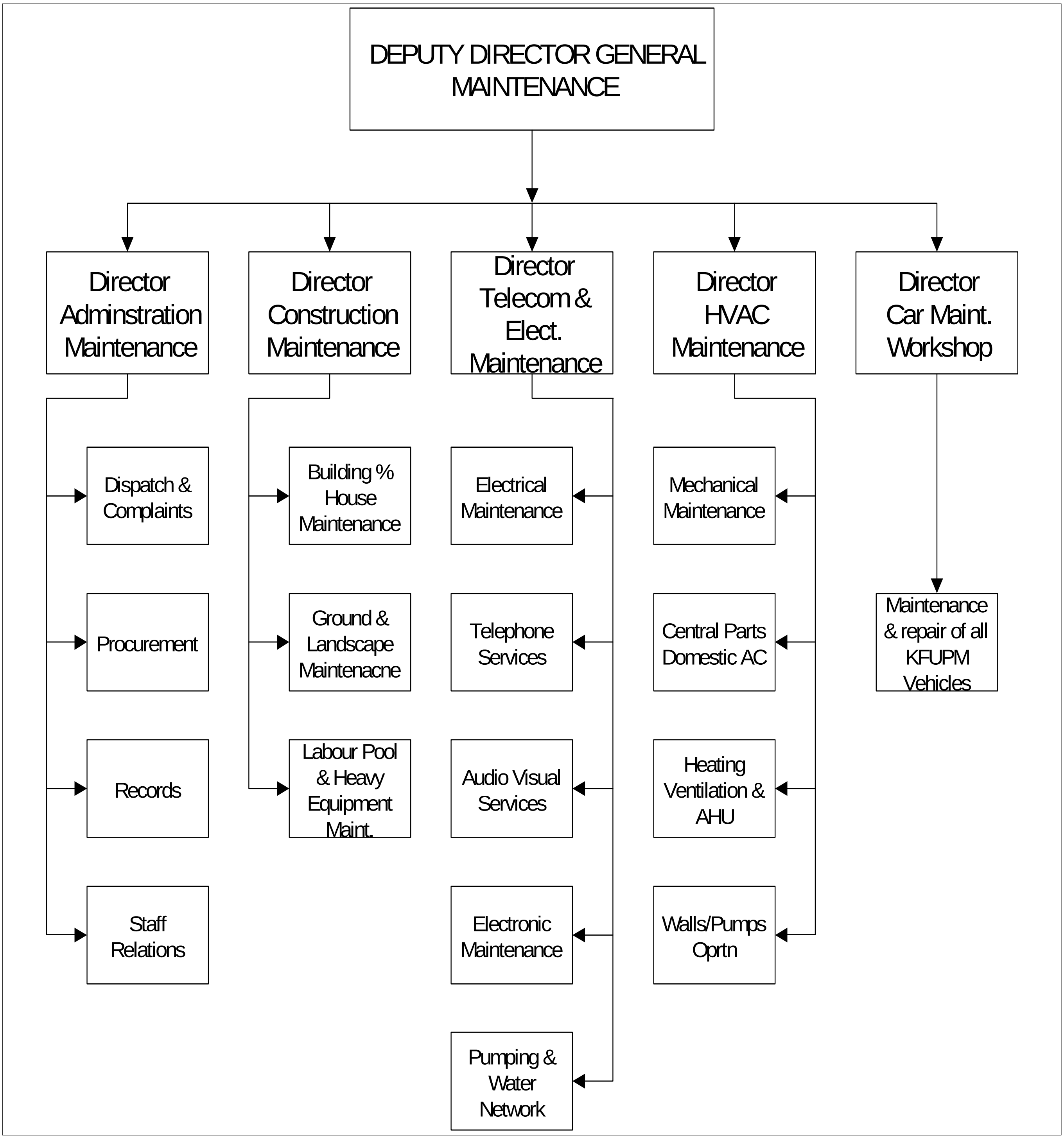
Corrective maintenance.

Routine preventive maintenance work.

Major overhauls and renovations.

Major work that requires shut down of facilities.

The administration of the department consists of, Director General, Deputy Director General, Director Studies & Design, Director Projects, Administrator Telecommunications Maintenance, Director Maintenance Housing, Director Electrical & HVAC and Director Administration Maintenance.



Appendix c1: Structure of the Maintenance Department.

Maintenance Units	Maintenance Activity
1. Building and Housing Maintenance	Houses, Buildings
2. Ground and Landscape maintenance.	Open grounds, landscaped areas
3. Electrical Maintenance	Main service network, Building systems, fittings
4. Telephone maintenance	Main service network, Building systems, Fittings
5.Pumping and Water Networks	Pump stations, Main service network, building networks, Internal and External fittings
6. Electronic maintenance.	Electronic equipment
7.Audio Visual Services	Audio visual equipment
8.Labour Pool and heavy Equipment Maintenance	Heavy equipment
9. Mechanical Maintenance	Heavy mechanical equipments
10. Heating, Ventilation and Air conditioning (HVAC)	HVAC systems
11. Walls/Pump Operations	Pumps

Appendix c2: List of maintenance units and their activities.

Appendix d:

City of Houston Azteca Systems, 2000, http://www.azteca.com/Houston.htm.

Beginning in the Spring of 1999, The City of Houston Department of Public Works and Engineering (PW&E) undertook a $3.6 million, two-year project to design and develop a GIS-based Maintenance Management System for water distribution, sanitary sewer, and storm sewer facilities management. ESRI was asked to be the prime contractor with Azteca Systems, Inc., Berger & Co., EMA Services, Inc., Digital Consulting Software Services, Inc., and ESOR Consulting Engineers as subcontractors. Today, the system is fully functional and demonstrates that the Cityworks GIS-based Maintenance Management approach can be successful for any size organization.

The system is built upon the established ArcInfo-based Geographic Information Management System (GIMS) that has been serving the mapping and information needs of several departments for several years. Cityworks integrated with the existing GIMS, “dramatically improves in many ways the manner in which the City conducts its business,” says Wayne Dessens, chief engineer, City of Houston. The system allows the City to better utilize and track its resources, resulting in reduced costs to taxpayers. At the same time, the system provides significantly better services. The system is built on the premise that customer calls, inventory data, current work activities, and historical information can be best integrated geographically, providing the best possible tool for improved customer service.

The core of the system features ESRI's Spatial Database Engine (SDE) technology with Oracle Enterprise Server as the DBMS. The main database server is a cluster of DEC AlphaServer 4100 computers serving upwards of 200 client connections. In addition, the system features the Cityworks ArcView GIS and MapObjects-based software suite to support call taking, service request investigation, work order generation, dispatching, physical inspection and test activities, and incorporates mobile computing to provide improved use of information and efficiency of operations throughout the department. Cityworks is installed on multiple Citrix Servers.

The City receives approximately 1,000 calls daily for sewer, water, and other public services problems. Call handling and request creation is managed through the City's Customer Response Center (CRC) using the Cityworks Call Center application. Each request generated by the CRC is automatically geocoded and located. The request is automatically assigned to a field investigator and dispatched via CDPD (cell modem) to the inspector's truck-mounted computer.

Field investigators have the ability to browse requests, download and upload while performing other work, full field mapping view capabilities, and the ability to notify repair crews of any additional work that might be needed. Radio transmissions are greatly reduced and are now needed less frequently. For most calls, investigators can receive call information, travel to the incident location, evaluate the problem, and close out the request without any radio traffic.

For services requests that require additional work, the flow of information and coordination are handled by the Central Operations Section (COS). Using the GIS, service requests are pre-assigned to a “quadrant.” COS staff are easily able to access detailed asset inventory data, network connectivity, current work activities and previous work histories, all from within the GIS environment. Additional work requests can be created including the linking of work orders to service request. Information from the field is sent back to COS by radio transmission. The data is entered into the system and available to all of the organization on a nearly real-time basis, including the Call Center for follow up and return calls.

Work Orders, Inspections and Tests are explicitly linked to assets in the GIS. As the work is completed, linked service requests and calls are closed. The work histories are maintained as an attribute of the asset and the assets are maintained as an attribute of the work order. The database design allows reports to be generated for criteria based on spatial and non-spatial attributes. A unique task flow manager manages workflow. Tasks are associated to a work order, are sequenced and can be associated to resource utilization.

The City of Houston PW&E proves Cityworks robust enough for mega-sized organizations like PW&E. However, most Cityworks organizations are not the size of Houston. Our users range in size from PW&E to Holland Water Board. With Cityworks you have the assurance that your system is scalable and appropriate for any size organization.