

1. Introduction

1.1. Background

The developments of Urban Lands in Sri Lanka are carried out by both private sector institutions and public agencies. Some of them are as follows,

- Urban Development Authority (UDA)
- Colombo Municipal Council (CMC)
- Sri Lanka Land Reclamation & Development Corporation (SLLR & DC)
- Sri Lanka Railway Department
- National Housing Development Authority (NHDA)
- Sri Lanka Port Authority
- Urban Local Authorities (ULAs)
- Board of Investment (BOI)
- Ceylinco Group of Companies
- ASP Group of Companies etc.

Urban Development Authority is the main planning organization, which identifies the lands to be developed and then declares these lands under its law. UDA encourages public and private land developers to carry out development of their properties and its activities complying with the rules and regulations enforced under the UDA Law.

In this task, the UDA simultaneously serves as the authority for both planning and building regulations. The ULAs acting under the direction and guidance of UDA enforce the planning and building regulations specified by the UDA Law.

The Urban lands are frequently subjected to misuse, mismanagement, and to political interferences. The development and maintenance of a systematic land records and information are important public functions. Maintaining a good land information system is a prime requirement for quick decision-making in the nature of urban development. Therefore implementation of a proper land

information system is an essential factor for sustainable development policies. Use of a systematically organized Land Clearance System (LCS) supports the land management by giving exact information about the land for its physical developments. Land information management is an integral part of urban development and urban management. Actions, which are required to improve the land information system, may depend on the city context. Hence, it is important to develop a land clearance system in order to deliver an effective service which will encourage the developers / Investors.

UDA and ULAs, from the time they receive an application for a Preliminary Planning Clearance of a land, spend more time period for its complete processing. Through this time consumption, the developers/investors initially waste their opportunity cost and get frustrated at the first stage itself. As a result, the general public (Tax Payers) living in the City limits loses the implementations of valuable projects through which huge benefits could be obtained for their welfare. A computer based land clearance system, therefore, is highly required to be introduced to avoid the shortcomings.

The UDA also has identified the need to introduce a successful system to reduce the unnecessary time waste in its planning works. At present various methods are being experimented for introduction of electronic data management systems for planning approval, preliminary planning clearance, subdivision approval etc. UDA expects the information systems and information technology to be used in their planning work in order to increase overall efficiency of their services. A proper system when introduced will benefit the following categories.

- Property developers
- Investors / Private, Public
- Other interested groups, NGOs
- Private citizens
- Government Agencies
- Policy Makers
- In addition the General Public (Tax Payers)

This study analyses the existing processing system that is being adopted by UDA for issuing clearances for land developments. Following have been identified as reasons, which affect the efficiency and effectiveness in the present system.

- The entire process is conducted manually
- Significant time period taken for processing the application
- A Field visit must be carried out to identify the location
- Spends significant time to assess the cadastre data of land parcels
- Spend more time to assess the suitability of the proposal with regulations that is being enforced.
- If a proposed development cannot be considered, the existing system does not provide any alternatives.

Therefore it may be necessary to maintain separate databases for cadastre information and regulations that ensures easy accessibility. The scope of information required for proposed system has to be designed in order to fulfill all above shortcomings.

1.2. The Present Status

Land Clearance System is a complex process that deals with allocation of lands and determining its usage for sustainable development. If a person wishes to develop a land for commercial or any other business purpose, he is required to get a Preliminary Planning Clearance from the respective Local Authority (LA) or the UDA. The LA is being guided by the UDA Law and the Development Plan, which has been prepared for the respective area. The development plan, zoning plan and regulations are prepared and approved by the Urban Development Authority (UDA) Act No. 41 of 1978 and its Amendments.

The City of Colombo Development Plan was gazetted in 1986, which was amended and gazetted under Urban Development Authority law No. 1090/13 dated 29th July 1999 (Appendix H). In the amended development plan the minimum – maximum plot sizes, and building heights were revised in order to manage the city development. It is a mandate for the LA to adopt, implement and monitor the gazetted development plan.

The Municipal Council of Colombo covers an area of 3729 Ha. with a population of more than 700 thousand in the year 2001. The CMC by issuing clearances for development activities and development permits, maintain a sustainable development within the city limits. The zoning plan is an instrument to the Local Authority, for guiding and controlling permissible developments. The zoning plan is normally produced on cadastral-based property maps showing legal boundaries of each zone. The property maps that were originally produced by the Survey Department on a scale of 1 inch: 1 chain (one chain is 66 ft) there are more than 400 such sheets to cover the entire Colombo Municipal Council Area.

An application for Preliminary Planning Clearance may be submitted with a pending development concept, proposed by an individual or an organization to the authority in order to find its suitability. A preliminary planning clearance is granted to the applicant and thereafter a set of detailed plans should be submitted by the applicant for final approval of the development. The preliminary planning clearance is not a permit given to the developer to commence any development activities. The existing system adopted by UDA for processing of an application for preliminary planning clearance is explained in Figure 1-1.

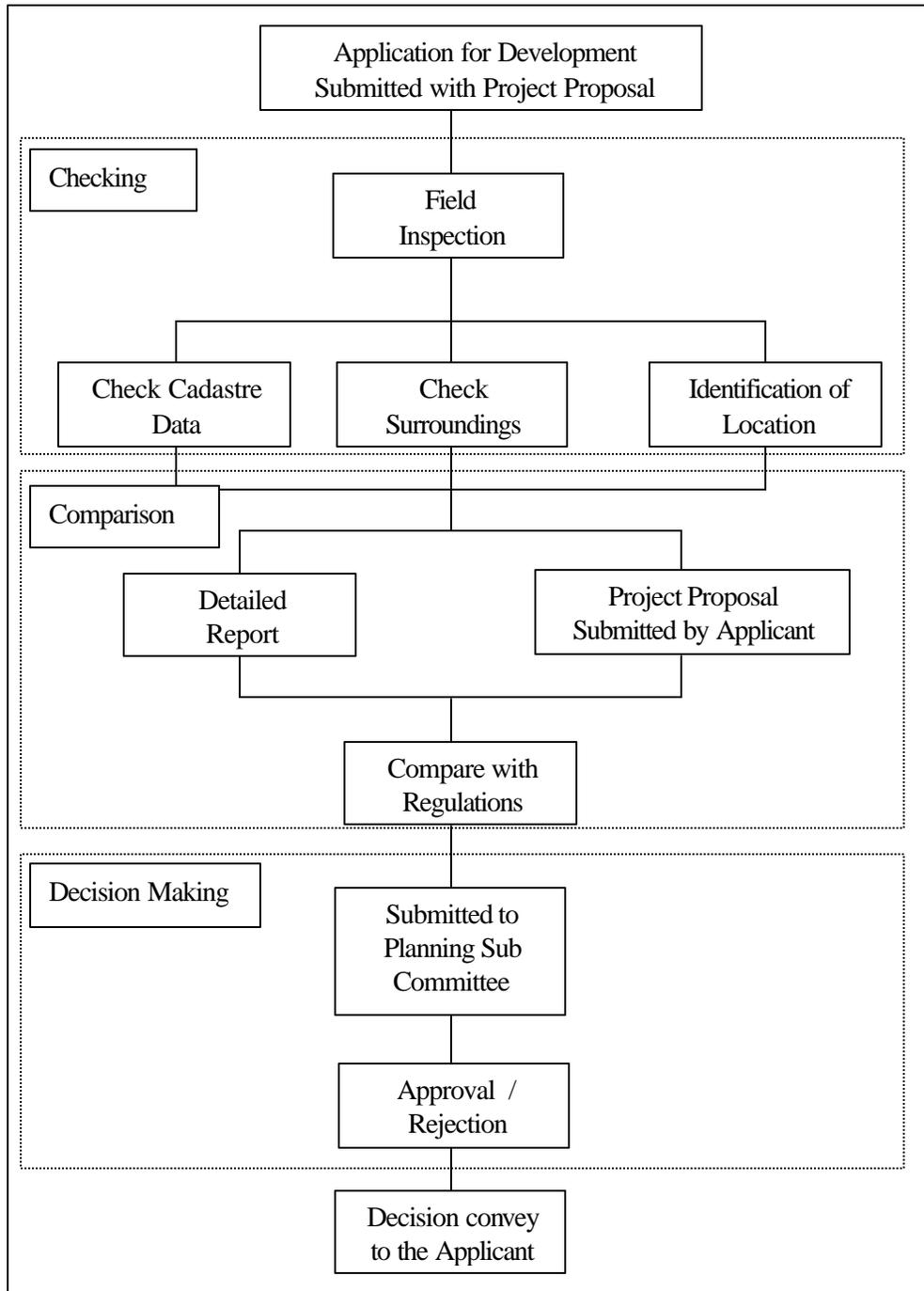


Figure 1-1 Existing Preliminary Planning Clearance System

1.3. Status Improvement

In the present system, cadastre data related to the land parcels are not at all developed. The study identifies that this status be improved first, and an electronic database should be introduced on this. Since GIS is a powerful tool, it can be actively used to develop the database. The GIS based electronic databases provide the facility of easy access to various data.

The needs to improve the status of the system

1. The system has to be consisted with various data so that to any form of related data can easily be accessed.
2. Almost all the steps in the process of an application are manually being operated at present and it takes a significant time (almost 45 days) to reach a decision (Figure 1-4). This operation can be brought down (less than 5 days) by introducing the proposed system. The database should consist of accurate spatial and non-spatial data and they should be updated in the system that ensures the accurate decision- making. The efficiency is automatically increased of the processing system when the above all are fulfilled.
3. The present usage of hard paper maps of land parcels may be converted into digital form so that the availability of data in digital form would ensure quick processing in related applications.
4. The system improvement needs to provide facilities of data extraction and integration while maintaining the data security.

1.4. Merit of GIS

GIS technology is currently being used in the developed world in various fields. It allows analyzing and related modeling of spatial data in the subject of development applications.

GIS is,

- The tool to resource management;
- The tool to resource allocation;
- The tool for decision-making;
- Used with parameters such as time and cost, for the optional analysis;
- Extensively used for research purposes;

Once the traditional form of data (Graphical & Textual data) are converted into digital form the GIS can help geographically analyze the spatial data in many ways such as map overlaying, querying, and modeling etc. GIS also can handle a large quantity of data in a single database.

GIS has become an integrating information technology tool which is being used by many Organizations and Departments. Community development specialists, public work experts, surveyors, urban planners, engineers, politicians and people of many other disciplines use this to find their own management for planning solutions in the respective fields.

1.5. Objective of the Project

This work targets to development of a case study application for land clearance process using GIS. In this effort the specific objectives are;

- a. To study the prevailing land clearance processes in UDA
- b. Design an information system for land clearance process considering appropriate changes.

In order to fulfill these objectives, the Colombo Municipal Ward area is selected for the development of Geographical Land Information System (GeoLIS).

1.6. Study Area

The study area is in the capital city of Sri Lanka. Sri Lanka is situated in the Indian Ocean and very close to the India. It is located within Northern latitude $5^{\circ} 55'$ and $9^{\circ} 50'$ and Eastern longitudes $79^{\circ} 42'$ and $81^{\circ} 52'$. The Island is separated from India by the 35 km wide Palk straight. Sri Lanka has a land area of 65,610 sq. km. Out of the 9 provinces in Sri Lanka the Western province is treated as the most important province the both capital administrative and commercial cities; Sri Jayewardenepura Kotte and Colombo respectively are located in this province. The city of Colombo has become the most complex urban center of the Western region. The Colombo Municipal Council (CMC) administrative area extends over 3729 Ha. and within this, a population of 642,020 has been reported in 2001(Figure 1-3). The City consists of 47 Municipal Wards and at present the city has a gross density of 193 persons per Ha.

The existing land use patterns of the Colombo municipal area was observed through field visits. The availability of updated cadastre maps and cadastre data at the CMC, such as the plot Coverage, Floor Area Ratio, and number of Buildings per Hectares within Colombo municipality were studied. Based on this information, Thimbirigasyaya Ward (ward No 40) was selected as the most suitable area for the case study (Figure 1-2). Thimbirigasyaya Ward has a land extent of 161 Hectares and it is located in the southern part of the city with a population of 13,793 with a density of 87 Ha.

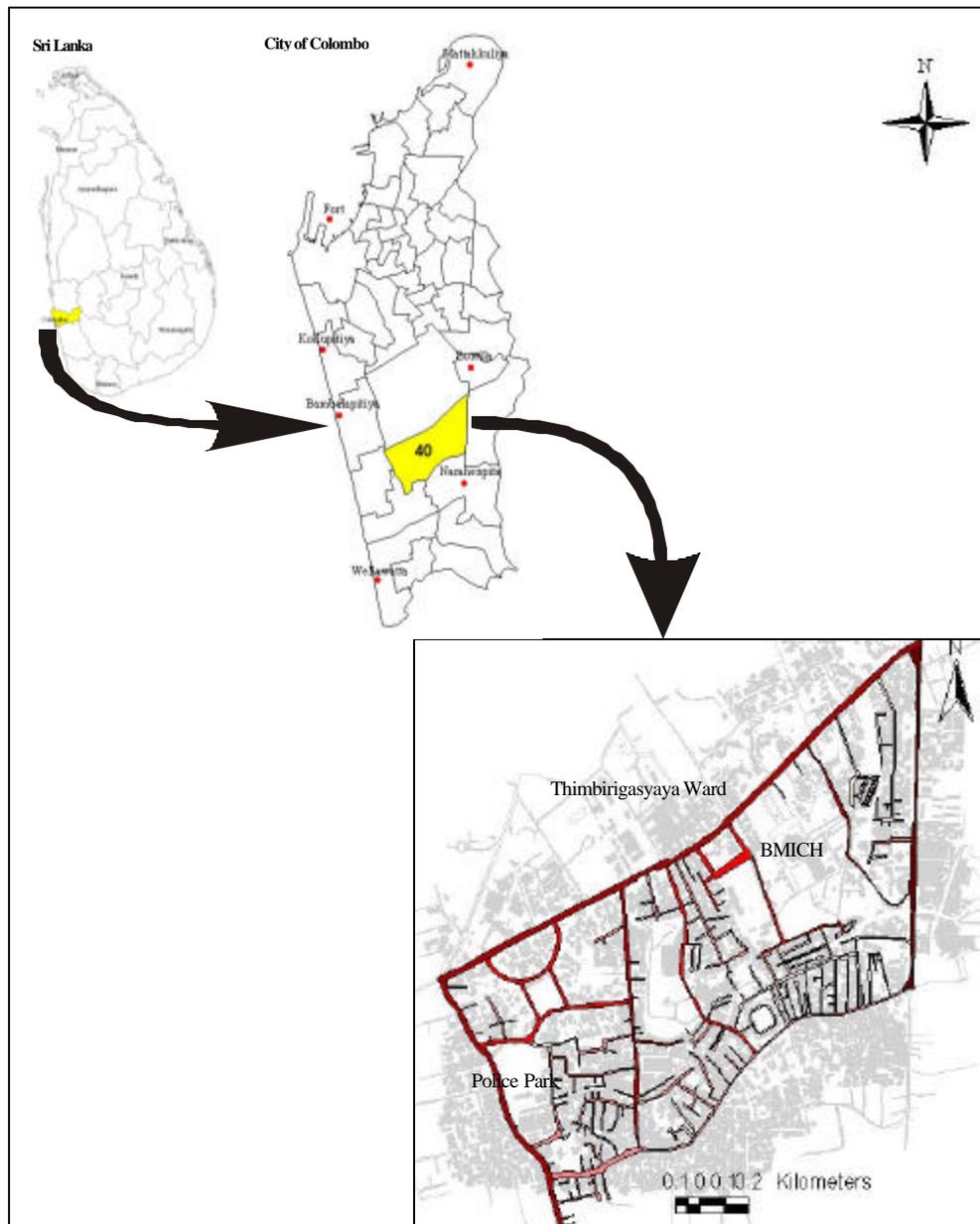


Figure 1-2 Location of Study Area

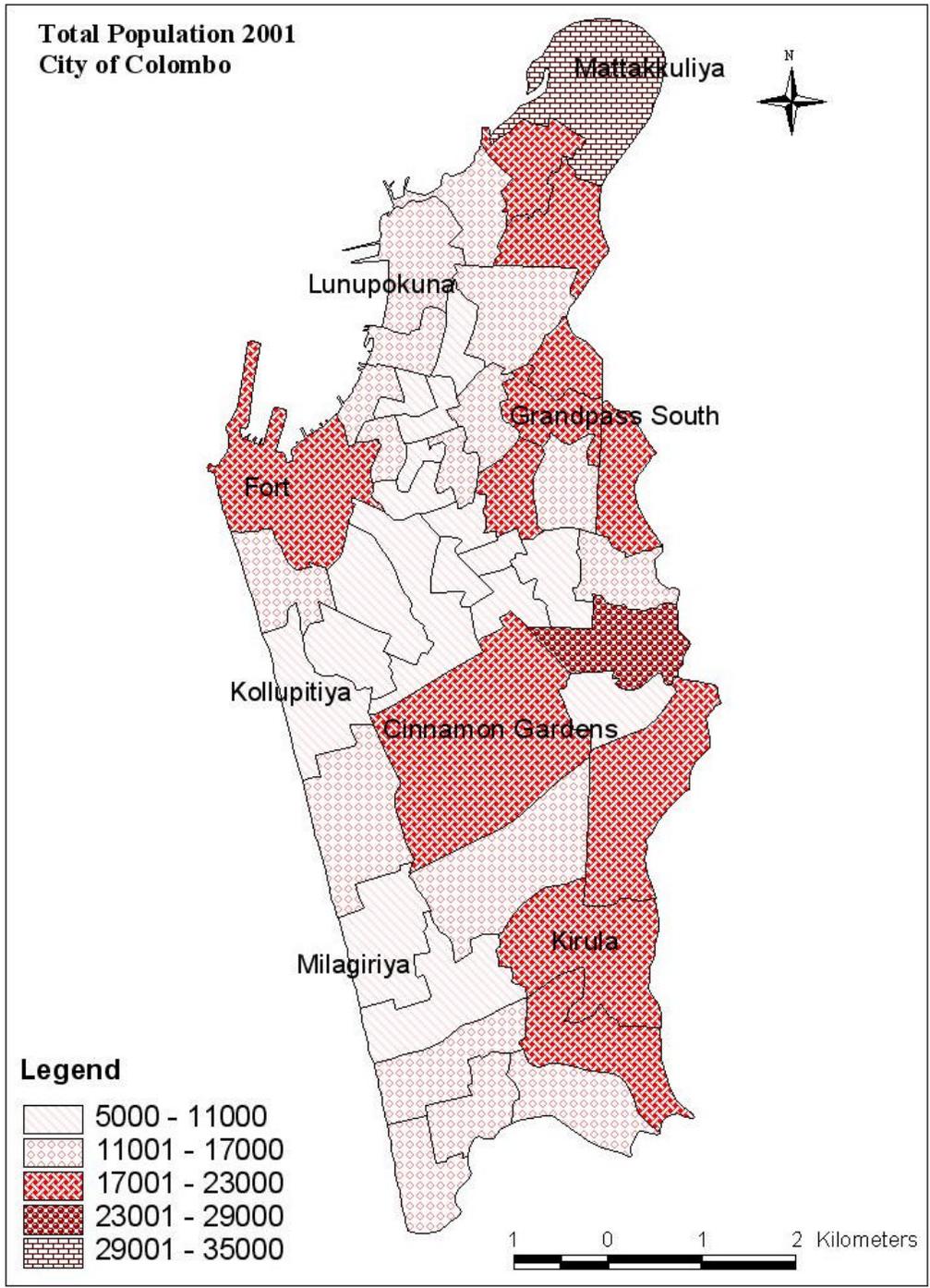


Figure 1-3 Population Distribution of Colombo City

Source: GIS Division, UDA

1.7. Existing Planning Approval Process

The basic components that are needed to be followed in the existing preliminary planning clearance process to arrive a decision, illustrate in step I of Figure 1-4 given below. Once the preliminary planning clearance is obtained for the proposal, it will be the step II in which the applicant forward a detailed plan requesting approval to commence the physical work. Then a permit is issued by the authority outlining some guidelines, conveying regulations that are being imposed. A certificate of conformity is necessary to be obtained by the developer form the authority concern before the building been occupied.

Obtaining a preliminary planning clearance is an important activity for a project proposal but as seen in step I of Figure 1-4 & Table 1-1 the present system of processing the application is very complicated and time consuming. Therefore the study was mainly pointed to find a simplified system incorporated with the latest technology.

Table 1-1 Preliminary Planning Functions and Responsible persons involved in Clearance Process

No	Source	Document	Recipient	Action/Function	Days
1	Applicant	Application for Clearance	Subject Clerk	Payment of Fees and registration	0.5
2	Subject Clerk	Payment Voucher Form	Applicant	Pay to finance division	
3	Applicant	Paid	Finance Division	Pay to Cashier	0.5
4	Finance Division	Copy of Voucher Form	Subject Clerk	Mark Payment	01
5	Subject Clerk	File with Application	Director	Forward to Deputy Director	
6	Director	File	Subject Clerk	Mark File Movement	01
7	Subject Clerk	File	Deputy Director	File send to Deputy Director	
8	Deputy Director	File	Subject Clerk	Mark File Movement	01
9	Subject Clerk	File	Planning Officer	Forward to Planning Officer	
10	Planning Officer	Inform required Documents	Subject Clerk	Inform to the Applicant	05
11	Planning Officer	File with Field Report	Deputy Director	Go through the Field report	03
12	Deputy Director	File	Subject Clerk	Recommend Planning Committee	01
13	Subject Clerk	File	Planning Committee	Mark File Movement	01
14	Planning Committee	File	Subject Clerk	Committee Decision	05
15	Subject Clerk	File with Decision	Director	Recommendation for Letter preparation	01
16	Director	File	Subject Clerk	Letter Preparation	02
17	Subject Clerk	File with Draft Letter	Typist	Letter Typing	01
18	Typist	File	Subject Clerk	Draft Letter	02
19	Subject Clerk	File with Draft Print	Planning Officer	Letter Correction	01
20	Planning Officer	File	Subject Clerk	Draft Letter with Correction	02
21	Subject Clerk	File	Typist	Correct for Typing Mistakes	01
22	Typist	File with Final Print	Subject Clerk	Mark File Movement	02
23	Subject Clerk	File with Final Letter	Director	For Signature	01
24	Director	File with Signed Letter	Subject Clerk	Mark Movement	02
25	Subject Clerk	Signed Letter	Thapol Clerk	To Post	01
26	Thapol Clerk	Letter	Applicant	Received Letter	05
Total Time Period for Issuing Preliminary Planning Clearance					40