

# VIABILITY OF UTILIZING URBAN CANAL SYSTEM FOR SOCIO-ECONOMIC ACTIVITIES IN THE CITY OF COLOMBO



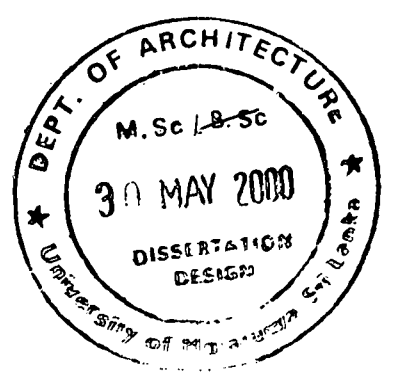
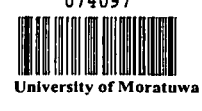
A Dissertation Presented to The Faculty of Architecture  
University of Moratuwa Sri Lanka,  
As a Part of The Final; Examination in  
M.Sc. (Architecture) and to the  
Royal Institute of British Architects for The  
RIBA Part -II Examination.

74097

ප්‍රකාශනය  
කොටුව විශ්ව විද්‍යාලය, ශ්‍රී ලංකාව  
කොටුව.

T.C. Bandaranayake  
Faculty of Architecture  
University of Moratuwa  
Sri Lanka  
May-2000

074097



72 "00"  
-----  
711.76

74097

TH

## ABSTRACT

---

Water is used as a utilitarian, recreational, landscape or experimental element in the urban context of Sri Lanka. Among the inland water bodies in Sri Lanka the canal system in Colombo is unique. It was meant for storm water drainage & inland transportation. Properly functioning canal system is an asset to the city structure. Even though the SLLRDC annually spend millions of rupees to maintain and keep the canal system in order, the canals continue to pollute and clog resulting environmental problems particularly floods. This has become a major problem in the city, which raises the necessity of improving and utilizing the canal system rather than keep it alone. On the other hand the people living in Colombo and its vicinity are looking for places for recreation.

The intention of this study is to investigate whether civic activities can be used on canals in order to enhance the quality of urban life, while safeguarding the urban canal network. Therefore the study mainly focuses on the viability of utilizing urban canal system for socio-economic activities, in the pretext of sustainable development.



University of Moratuwa, Sri Lanka  
Electronic Theses & Dissertations  
[www.lib.mrt.ac.lk](http://www.lib.mrt.ac.lk)

This study was initially carried out by close observation and investigation of the total canal network in Colombo and its vicinity. This lead to identify the potential area for developing socio-economic and civic activities along the canals. The demand for recreational activities in the city was found by using a structured questionnaire, with randomly selected residents in and around Colombo. Observations and informal interviews conducted at waterfronts recreational spots helped to identify the participation level of recreation under prevailing opportunities. Economic viability of utilizing urban canal system for such activities was analyzed by considering the proposition, and its capability to achieve the three overall goals of sustainable development. The study concludes that introducing socio-economic activities along the canal system is a feasible idea, when compared to the costs and benefits incurred to the society, the city environment and the economy as a whole.

## ACKNOWLEDGEMENT

---

My sincere gratitude goes to each and every person for their involvement to make this dissertation a reality.

Professor Nimal de Silva Head of the Department, Faculty of Architecture, Dr. Ranjith Dayaratne, A.C.T. Madura Premathilake, Dr. S. Manawadu lectures of the Department of Architecture, University of Moratuwa for the valuable comments, suggestions, advice and guidance given to me through the course of the study.

I wish to extend my gratitude to Dr. L.S.Ranjith Perera, Senior lecturer, Faculty of Architecture for the support and for his patience and precious time expended in this respect.

Mr.K.A.T.Nikapitiya the Chairman of SLLRDC, Mr. V.Gunaratne, Director (Canals & Maintenance Division), Mr.H.M.K.S.Jayawardene D.G.M. (Research & Design), Mr.Kongahawatta, Chief Engineer (Maintenance Office), Mr.G.W.G.Abeygunewardene Asst. Director (UDA Land Division), Mrs.S.Wijeratne, Chartered Architect (UDA-Landscape Division), and the staff of those authorities, who helped and interested taken, from the inception of this study.

Mr.Seneviratne, Ranga, Dilmini, Chamila & Saliya for providing the computer, with their busy schedules and many limitations. My cousins Asitha & Nishamini for furnishing me with a neat typed script. Jagath, Rasnayake & Neluka for taking Photographs, aunt T.M.Weerakoon, Sandaruwan, Bimba, & Sujeewa for providing the necessary information.

For Dulani akki, Lokku Appachchi (T.B.Bandaranayake), Malani Iokuamma, Padma Iokuamma, uncle Jayampathy & Geethani nandi, uncle Bandara, Asha, Manjula, Lakmali, Dharshi and aunt Perera for most unhesitant hand given in the completion of the essay into its present format.

My friend Chaminda for the sharing of joys and hardships on canal experience and for being a source of strength and encouragement in all endeavors.

My dearest Amma & Appachchi, my brother Anil & my sister Inoka for the immeasurable help, guidance and encouragement given me all the time to make this successful.



# CONTENTS

	Page
Abstract	ii
Acknowledgment	iii
List of illustration	vii
<b>Chapter One – Introduction</b>	<b>1</b>
1.1. Background to the study	
1.2. Issue/Problem area	3
1.3. Need of the study	3
1.4. Research objectives	4
1.5. Method of Study	4
1.6. Scope and limitations	5
<b>Chapter Two - Historical background of waterways and their relationship with the Man and his Built Environment</b>	<b>6</b>
2.1. Importance of water to the Man	7
2.1.1. Physical use of water	7
2.1.2. Socio – cultural importance of water	9
2.2. Water and its relationship with the built environment.	13
2.3. Water based cities in early Sri Lanka.	15
2.3.1. City of Kandy and its waterfront.	15
2.3.2. Waterways in the city of Colombo.	17
2.3.3. Utilization of waterways in various eras in Colombo.	24
<b>Chapter Three – Water front development trends in cities</b>	<b>31</b>
3.1. Water in the historical urban context.	32
3.2. Use of water in restructuring urban voids.	35
3.2.1. Case studies in Gothenburg	39
3.2.2. The sustainable development approach	43

3.3. Development trends of urban waterfronts	44
3.3.1. Waterfront as an open space	46
3.3.1.1. Water square or water piazza as waterfront.	46
3.3.1.2. The conception of water streets or water corridors.	47
3.4. The development of the urban built environment with Water corridors.	48
3.4.1. Canals in the city as urban waterfronts.	52
3.4.2. Canals in the city as waterfronts for civic activities and commercial functions	53

## **Chapter Four - Utilizing urban canal system for socio-economic activities in the city of Colombo.**

59

4.1. Canals in Colombo and their existing functions	60
4.1.1 The Greater Colombo flood control and Environment Improvement project	61
4.2. Canal network in Colombo and its future potential development	64
4.3. Functional viability of utilizing Colombo canals for socio – economic activities	65
4.3.1 Accommodating socio-economic activities along two close loops of canals in Colombo.	65
4.3.2. Accommodating socio-economic activities around <i>Kotte</i> Lake and marsh	73
4.3.3 Accommodating socio-economic activities along <i>Wellewatta</i> and <i>Kirulapone</i> canals.	77

## **Chapter Five – Social and Economic viability of utilizing Urban canal system for socio- economic activities in the city of Colombo**

85

5.1. Social Demand for recreational activities in the city of Colombo	86
5.1.1. Demand study	87
5.1.2. Home interview survey	87
5.1.3. On site survey	90

5.2. Demand from private sector investors for investing on activities based on urban canal system in Colombo	94
5.3 Costs and benefits of accommodating socio- economic activities along the urban canal system	94
5.3.1. Cost-effectiveness of accommodating socio- economic activities	95
5.3.2. Achieving economic goals	96
5.3.3. Achieving social goals.	98
5.3.4. Achieving environmental goals	99
5.3.5. Cost recovery project	100
5.4. Prevailing problems against utilizing urban canal system for socio- economic activities	103
5.4.1. Participatory approach to prevent garbage disposal into the canal network	104
<b>Conclusion</b>	108
<b>Bibliography</b>	114
<b>Appendix</b>	120



University of Moratuwa, Sri Lanka.  
Electronic Theses & Dissertations  
[www.lib.mrt.ac.lk](http://www.lib.mrt.ac.lk)

## LIST OF ILLUSTRATION

Fig.No.	Description	page
Fig 1.	The location of the first civilizations	08
Fig. 2a & 2b	Water the most primitive transportation system of goods and people	08
Fig. 3.	The Dutch fort at Jaffna - water acts as a defensive element	09
Fig.:4	Abundant water is the symbol of fertility	10
Fig.:5	Water as a spiritual element	10
Fig. 6.	Physical purification of water	11
Fig. 7	Entertaining in water	11
Fig .8	Entertaining with water	12
Fig.:9	Boating along rivers create more excitement and joy	12
Fig.10	People tend to spend long hours by seeing water	12
Fig.11	Entertaining near the water – in Thailand	12
Fig 12	Water as a landscaping element	13
Fig.13	Reflection of water added dignity and fantasy in Architecture	14
Fig 14	The historical context of the Kandy city	16
Fig.15	Kandy lake and the island	16
Fig 16	The swamp near the Colombo harbour latter drained to form the lake	17
Fig 17	The lock gate of St. Sebestian canal	18
Fig 18	The lake in its original state - entering the sea through modern Pettah.	19
Fig 19	The urban canal system in 1800	20
Fig 20	Canal system constructed by the Portuguese, Dutch and British	21
Fig 21.	The Old Dutch canal	22
Fig 22.	The lake and Fort of Colombo – 1909	23
Fig.23	Colombo Lake reclamation scheme.	24
Fig.24	Colombo Fort and Beira Lake at present	25
Fig.25	Colombo in 1656 – waterways mainly used for transportation and defense	26
Fig.26	Use of Horse carts and barges for transporting goods Drawbridge at Grandpass.	26
Fig.27 :	'Padda boat service' in inland waterways.	27
Fig.28	Colombo Harbour – a major trading centre.	28
Fig.29	Present use of canals at North of Colombo and Negambo	28

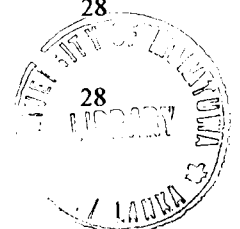


Fig.No.	Description	page
Fig.30	Lake as a wash tub during British period	29
Fig.31	Lake as a urban 'dumping ground'	29
Fig 32	Shanty dwellers captured the edge of the canals	33
Fig 33a:&b	Buildings responded to the water as a backyard	34
Fig.34	Roman port of Ostia, which served imperial Rome	34
Fig 35	Waterfront houses in Holland	34
Fig 36	Railway station provide a public space along the Grand Canal	35
Fig.37	The <i>Piazza San Marco</i> in Venice	35
Fig.38	Industrialized Waterfronts	36
Fig 39	A typical section of a rural setting.	36
Fig.40	Typical section of an urban setting	37
Fig.41	Man made structures captured almost all the natural environment	38
Fig 42	'A lost space' – abandoned canals in Britain	39
Fig 43	The original plan of Gothenburg	40
Fig 44:	The diagram shows the space in isolation. This has lost its identity and the relation with the city	40
Fig 45	Proposed infill development	40
Fig 46	An important waterfront node- Jarntorpei	41
Fig 47:	Proposed infill to restructure the space as series of urban rooms	41
Fig 48	Lost space at Stenpiren	42
Fig 49	The proposed infill-Senpiren	42
Fig 50	Arial sketch of proposed development.	42
Fig 51	Sustainable development model of Jacob & Sadler	43
Fig 52	Water edge as an outdoor eating space – St. Antonio, Texas	45
Fig 53	A water square – the Piazza San Marco in Venice	46
Fig 55	Section of a typical water street	
Fig 56	Water side commercial activities Riva degli Schioconi	47
Fig.57	A cross section of the land towards the water body.	47
Fig 58.	Waterside terrace-	48
Fig 59.	Boating along the Grand Canal	49
Fig 60:	Riverside settlements in Bangkok	50
Fig 62	Gothenburg, Sweden is formed and shaped by the urban fabric and its waterfront	





Fig.No.	Description	page
Fig 63	Grand canal in Venice-Built form and public activities generate a rich urban form	51
Fig 64:	Amstel River in Amsterdam	52
Fig 65	A towing path along the canal	55
Fig 66	Two different attitudes to the urban canal	55
Fig 67	Urban canals define a sense of enclosure	56
Fig 68	Edge defining and Detailing of buildings harmonize the waterfront environment	56
Fig 69	Projecting porches used as Barber saloons – Bangkok	57
Fig 70	Houses on stilts provide the space for boat shelter – Bangkok	58
Fig 71	Floating Market of Sanduk – Bangkok	59
Fig 72	Encroachments and Unauthorized constructions on Colombo canals	61
Fig 73	Upgraded low-income housing along <i>Dehiwala</i> canal	62
Fig 74	A dredge machine is using to the silted marsh	63
Fig 75	The map of Greater Colombo canal network	66
Fig 76	<i>Gothami</i> Road bridge canal at <i>Borella</i>	67
Fig 77	<i>Nawala – Koswatte</i> Open University bridge ( <i>Kirullapone</i> canal)	68
Fig 78	Lack of physical and visual connection between the city and canal ( <i>Mahawatte</i> canal)	68
Fig 79:	The River Seine, Paris – Principally the variety of spaces both at water level with adjoining quays and at bridge level	69
Fig 80:	The structured levels in the river space – Seine in Paris	70
Fig 81	Potential development at Royal Park Luxury Apartments <i>Rajagiriya</i> ( <i>Mahawatte</i> canal)	71
Fig 82	Potential development at Open University, <i>Nawala – Kirullapone</i> canal	72
Fig 83	A conceptual plan of waterfront redevelopment with public activities	73
Fig 84	A typical cross section of the valley highland – A cross profile of <i>Kotte</i> swamp/ Lake detention area	74
Fig 85	Potential development around <i>Kotte</i> Lake and Marsh	75
Fig 86	Proposed recreational activities around the lake	76
Fig 87	Havelock town bridge – <i>Wallewatte</i> canal	77
Fig 88	Galle road bridge– <i>Wellawatte</i> canal	78

<b>Fig.No.</b>	<b>Description</b>	<b>page</b>
Fig.89:	Proposed redevelopment along <i>Wellawatte / Kirullapone</i> canal	78
Fig 90	Huge business houses located along the canal – Amsterdam	79
Fig 91a:	Existing high-income residential belt along the <i>Wellawatte</i> canal	80
Fig 91b	Potential development Tree lined residential street in Amsterdam	80
Fig 92a	St Peters' Playground-looking back to the canal	81
Fig 92b:	Proposed public node stepped down to the canal	81
Fig 93	Towing path snaking along the canals with new activities	81
Fig 94	The proposed continuation of the Towing path near Bo Tree shrine	82
Fig 95	Low income housing crowded along <i>Kirulapone</i> canal	82
Fig.96	Change of canal environment in Bermingham	83
Fig 97	Proposed market place at <i>Wellawatte</i> canal	83
Fig.97a.	Identified canal development in the city of Colombo	83
Fig 98	Demanding recreational activities in urban life	89
Fig 99:	People enjoying in the evenings at Galleface Green.	91
Fig 100	A typical section of activities on Parliament grounds, <i>Kotte</i> .	92
Fig 101	Demand curve – recreational participation in the city of Colombo	93
Fig 102	Expected pleasing environment along Colombo canals	100
Fig.103:	he program to prevent garbage disposal into canals with community participation	107

## LIST OF TABLES

Table 4.1. Details of canals maintained by SLLRDC	66
Table 4.2: Some physical features of the three detention areas under study	74
Table 5.1: Demand for recreational activities in Colombo	88
Table 5.2: Demand for outdoor recreation in Colombo	88
Table 5.3: Goal achievement matrix – for economic goals	97
Table 5.4: Goal achievement matrix – for social goal	98
Table 5.5: Goal achievement matrix – for environmental goal	100
Table 5.6: Visitation figures for the month of March	101
Table 5.7: Analyzed cost recovery for Colombo canal network	103
Table 5.8: Area to be leased out for 500m canal length in Colombo	103