CONTENTS

Page

Preface

1 INTRODUCTION 1

2 SEPTIC TANK SYSTEMS AND THEIR EFFECTS ON GROUNDWATER QUALITY 2

2.1 The septic tank system 2
2.2 Septic tank system effects on groundwater quality 4
2.3 Recommended approach 6

3 LAND CAPABILITY ASSESSMENT 6

3.1 Absorption ability 7
3.2 Purification ability 10
3.3 Ease of excavation 12
3.4 Water pollution risk 13
3.5 Flood hazard 14
3.6 Land capability rating 15

4 DESIGN CRITERIA 16

4.1 The septic tank 16
4.1.1 Compartmentation of the septic tank 17
4.1.2 Geometry of the septic tank 17
4.1.3 Inlet and outlet arrangements 18
4.1.4 Materials 19
4.1.5 Access, inspection and ventilation 19
4.1.6 Location 19
4.1.7 Septic tank capacity 20
4.2 Fat and grease traps 24
4.3 The drainage field 25

Bibliography 33

LIST OF TABLES

Table No		Page
1	Septic tank effluent quality at three typical South African coastal facilities (a holiday home, caravan park and recreational complex)	5
2	Land characteristics used to assess qualities which affect effluent disposal capability	7
3	Assessment of land quality - Absorption ability	8
4	Drainage classes	10
5	Assessment of land quality - Soil purification ability	11
6	Assessment of land quality - Ease of trench excavation ratings	12
7	Assessment of land quality - Water pollution risk	14
8	Assessment of land quality - Flood hazard	15
9	Land capability rating table for on-site effluent disposal in the coastal zone	15
10	Estimated sewage/waste water flow for lower-income areas where water is obtained from standpipes	20
11	Sewage flow that could be expected from dwellings with full in-house water reticulation	21
12	Rate of sludge and scum accumulation for low-income areas	21
13	Rate of sludge and scum accumulation in litres per person for middle to high-income areas (multiple sanitary fittings)	22
14	Typical daily waste water flows from various non-residential establishments	24
15	Site criteria for domestic mound systems	29
16	Commonly used (USA) fill materials and their design infiltration rates	29
17	Trench widths in relation to site characteristics	30

LIST OF FIGURES

Figure No			Page
1		Schematic cross-section through a conventional septic tank soil disposal system for on-site disposal and treatment of domestic liquid waste	3
2		Comparison of permeability classes and hydraulic conductivities for various soil	8
3		Recommended septic tank design	18
4		Septic tank capacity related to size of dwelling	23
5		Typical grease traps	25
6		Detail of trench construction	26
7	(a)	Cross-section of a mound system for slowly permeable soil on a sloping site	27
	(b)	Cross-section of a mound system for a permeable soil with high groundwater or shallow creviced bed rock	28
8		Typical drainage pits	31
9		A typical example of a septic tank system design as specified by a south coast local authority	32