

TABLE OF CONTENT

COVER PAGE	i
APPROVAL	iii
DECLARATION	iv
ACKNOWLEDGEMENTS	vi
TABLE OF CONTENT	vii
LIST OF TABLES	ix
LIST OF FIGURES	xii
ABSTRACT	xviii
INTISARI	xix
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Problem formulation	4
1.3 Objectives of the project	4
1.4 Scope of the project	5
1.5 Benefit of the project	5
CHAPTER II PROJECT DESIGN OVERVIEW	6
2.1 Concept design	6
2.2 Design method	8
2.3 Software's conceptual model	9
2.3.1 Visual objects	9
2.3.2 Process model	15
2.3.3 Infiltration model	15
2.3.4 Routing model	16
2.4 Data availability	18
2.4.1 Sea water and coastal conditions	18
2.4.2 Existing rivers and canals	18
2.4.3 Rainfall data	21
2.4.4 Design rainfall	23
2.4.5 Flood discharge for main rivers	25
2.4.6 Hydraulic analysis for main rivers	27
2.4.7 Culverts and perimeter drainages	28

2.4.8	The macro road network	30
2.5	EPA Storm Water Management Model (SWMM) 5.2 simulation steps.....	31
CHAPTER III SUSTAINABLE STORMWATER MANAGEMENT		38
3.1	Drainage system planning	38
3.2	Drainage type	39
3.3	Drainage dimensioning	40
3.3.1	Design flood.....	40
3.3.2	Drainage's discharge design	41
3.3.3	Drainage calculation	45
3.3.4	Schematic drainage design.....	52
3.4	Low-impact development (LID) Model.....	60
3.4.1	Riverside hub	64
3.4.2	Detention hub.....	66
3.4.3	Garden gate hub	67
CHAPTER IV EVALUATION OF DRAINAGE PERFORMANCE		69
4.1	EPA SWMM 5.2 simulation scenarios	69
4.2	EPA SWMM 5.2 simulation results.....	70
4.2.1	Flow evaluation under design rainfall	71
4.2.2	Flow evaluation under LID model implementation.....	78
CHAPTER V COST ESTIMATE.....		92
5.1	Work breakdown structure (WBS).....	92
5.2	Price of basic materials, wages, and equipment.....	94
5.3	Work unit pricing analysis	94
5.4	Estimate work volume.....	95
5.5	Cost estimate	96
CHAPTER VI CONCLUSION AND RECOMMENDATIONS.....		100
6.1	Conclusion of the project	100
6.2	Recommendations for the future study	101
BIBLIOGRAPHY.....		103