1-12-1825

URBAN SOILS

Applications and Practices

PHILLIP J. CRAUL

Senior Lecturer in Landscape Architecture The Graduate School of Design Harvard University Cambridge, Massachusetts



CONTENTS

Pre	face	xii
1	Introduction	1
	The Need for Practical Urban Soil Applications, 1 The Interplay Among the Soil Scientist, Landscape Architect, and Other Professionals 7	
2	Site Soil Assessment and Interpretation Development	8
	Introduction, 8 Resource Data, 10 Sampling Design, 11 Soil Profile Evaluation, 13 Soil Testing and Analysis, 18 The Character and Soils of Restoration Sites, 21 The Soil Interpretation Process, 23	
3	Biophysical Analysis of Site	40
	Introduction, 40 The Site Heat Budget, 41 Heat Stress of Urban Trees, 66 Evapotranspiration, 69 Sun-Shade Relationships, 72 Calculation of Potential Evapotranspiration of a Site, 73 Dynamic Water Relations of Designed Soil, 77 The Use of Solar Rhythm in Landscape Design, 78	

	Evapotranspiration Examples, 82 Conclusions, 83	
4	Design and Construction of the Urban Sustainable Soil Profile	85
	Introduction, 85 The Soil Model 86 Designing Soil, 95 Sustainable Soil, 107 Construction and Installation of the Urban Soil Profile, 111 Xeriscape Design, 115	
5	Soil Specifications	118
	Introduction, 118 Writing Soil Specifications, 124 The Mineral Component, 126 The Structure Component, 134 The Organic Component, 140 The Biological Component, 150 Elements Applied to All Components of the Specifications, 151 The Concern for Sustainability in Soil Specifications, 152	
6	Rooftop Applications	153
	Introduction, 153 Loading and Space Constraints, 153 Lightening Amendments, 156 Tree Architecture, 161 The Effects of Wind on Trees, 162 Rooftop Irrigation, 171 The Design and Specification of Rooftop Soil, 171	
7	Drainage Techniques	173
	Introduction, 173 Principles of Drainage, 175 Elements of Drainage Design, 180 Surface Drainage Techniques, 182 Subsurface Drainage Techniques, 185 Drainage Restoration Systems, 193	
8	Irrigation Design	194
	Introduction, 194 Basic Concepts of Irrigation, 196	

	Active Irrigation, 202 Soil Design, 206 Determination of Application Rates, 207 Irrigation Frequency and Timing, 210 Passive Irrigation, 211	
9	Tree Planting Techniques	213
	Introduction, 213 Tree Planting Criteria, 215 Transplanting Techniques, 220 The Planting Situation Array, 227 Special Applications, 242 The Concept of <i>le Preverdissement</i> (Plant Today, Build Tomorrow), 243 Transplantation of Large Trees, 244 Assessment of the Tree Planting, 244	
10	Project Erosion and Sedimentation Control	250
	Introduction, 250 The Process of Erosion, 251 The Universal Soil Loss Equation, 253 Urban Area Erosion, 260 Urban Area Erosion and Sediment Control Planning. 261 An Erosion and Sediment Control Example. 272	
11	The Soil Design Decision Process	274
	Element 1: Open. 278 Element 2: Curb, 285 Element 3: Covered, 290 Element 4: Roof, 294 Conclusions, 295	
12	Case Studies	297
	Introduction, 297 Battery Park City South Cove, New York City, 298 Boston Commons Parade Garage, 299 J. Paul Getty Fine Arts Center, Los Angeles, 310 Allegheny Riverfront Park, Pittsburgh, 326 New School for Social Research Courtyard, New York City 334	

xii CONTENTS

Appendix: Standard Tests for Analyses of Designed Soil	
Glossary	341
References	348
Author Index	357
Subject Index	