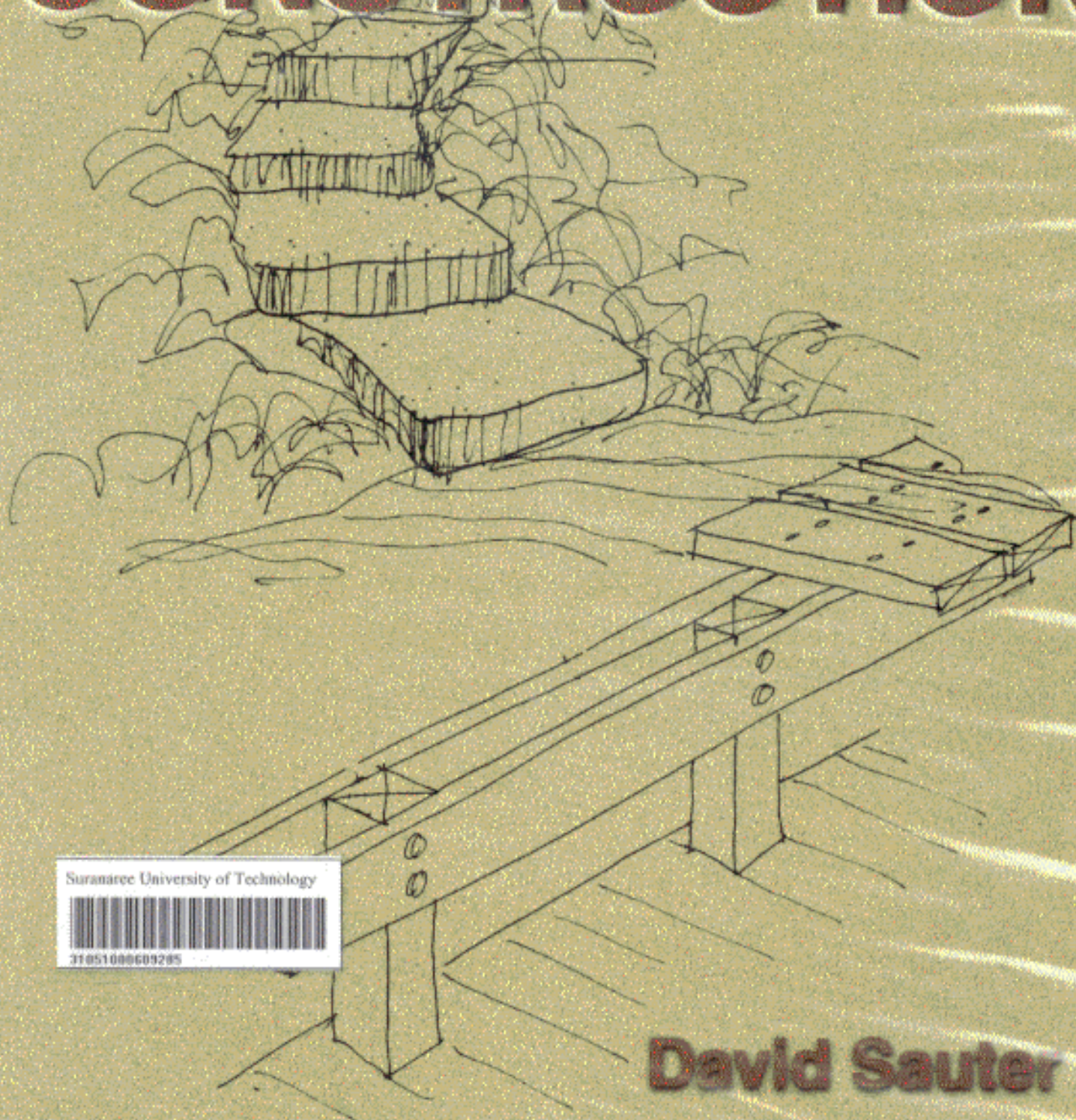


LANDSCAPE CONSTRUCTION



Suranaree University of Technology



31051000600205

David Sauter

Contents

Preface, xiii

About the Author, xv

Acknowledgments, xv

SECTION 1 **BEFORE CONSTRUCTION BEGINS** 1

Introduction, 1

CHAPTER 1 **The Landscape Construction Process** 2

Preconstruction Activities, 2 • Site Preparation, 2 • Rough Grading, Erosion Protection, and Site Drainage, 4 • Site Utilities and Irrigation Distribution Lines, 4 • Landscape Retaining Walls and Stairs, 5 • Landscape Paving, 5 • Site Structures and Wood Construction, 6 • Finish Grading and Completion of Irrigation Work, 6 • Fencing and Freestanding Walls, 6 • Site Amenities, 6 • Plant Material and Turf Areas, 7 • Cleanup, 7

CHAPTER 2 **Legal Requirements** 8

Contractor/Client Relationships, 8 • Building Codes, 11 • Ordinances and Deed Restrictions, 12 • Insurance, Bonding, and Licensure, 13 • Tort Issues, 14

CHAPTER 3 **Interpreting Construction Documents** 15

Reading Specifications, 15 • Reading Construction Drawings, 17 • Interpreting Landscape Construction Plans, 19

CHAPTER 4 **Safety in the Workplace** 28

Accident Prevention, 28 • Personal Injury Reduction, 29 • Working Around Utilities, 30 • Working Below Grade, 31 • Operating Power Equipment, 32 • Working with Chemicals, 32

CHAPTER 5 **Construction Math** 33

Calculating Averages, 33 • Item Count, 33 • Linear Measurements, 33 • Perimeter Calculations, 35 • Area Calculations, 36 • Volume Calculations, 37 • Weight Conversions, 38 • Specialty Calculations, 39 • Calculating Rip-Rap Quantities, 39 • Calculating Length of French Drains, 39 • Slope Calculations, 39 • Wall Material Calculations, 40 • Stair Calculations, 42 • Edge Restraint Calculations, 43 • Setting Bed and Base Course Calculations, 44 • Paving Material Calculations, 44 • Calculating Contraction Joint Spacing in Concrete, 44 • Wood Material Calculations, 45

CHAPTER 6	Project Pricing 46 Estimates and Bidding, 46 • Calculating Project Costs, 47 • Presentation Format for Project Prices, 49
CHAPTER 7	Basic Construction Techniques and Equipment Operation 51 Excavation, 51 • Staking and Fencing, 54 • Cutting and Joining Pipe, 54 • Cutting Paving and Wall Materials, 59 • Cutting, Drilling, Fastening, and Connecting Wood Materials, 62 • Joining, Splicing, and Fastening Materials, 66
CHAPTER 8	Construction Staking 70 Layout Equipment, 70 • Specialty Layout and Measurement Techniques, 71 • Location of Improvements, 75 • Establishing Elevations, 77 • Locating Plant Material, 81
	Section 1 Summary 82
<hr/>	
SECTION 2	SITE PREPARATION 85
<hr/>	
	Introduction, 85 • Productivity Suggestions, 85
CHAPTER 9	Preservation of Existing Site Elements 86 Site Access and Storage Areas, 86 • Construction Limits, 87 • Plant Material Protection, 87 • Structure Protection, 89 • Utility Protection, 90 • Perimeter Protection of Construction Sites, 90 • Protection of Environmentally Sensitive Areas, 91
CHAPTER 10	Removing Unwanted Site Elements 92 Plant Material Removal, 92 • Pavement Removal, 93 • Utility Abandonment and Removal, 94 • Burial and Abandonment of Unwanted Site Elements, 94 • Recycling and Waste Disposal, 94
	Section 2 Summary 96
<hr/>	
SECTION 3	GRADING, SITE DRAINAGE, AND EROSION PROTECTION 97
<hr/>	
	Introduction, 97 • Working With Soil, 97 • Productivity Suggestions, 98
CHAPTER 11	Site Grading 99 Steps to Grading a Site, 99
CHAPTER 12	Site Drainage 102 Surface Drainage, 103 • Subsurface Drainage, 105 • Temporary Storage of Storm Water, 109
CHAPTER 13	Erosion Control 111 Protecting the Site from Perimeter Erosion, 112 • Protecting the Site from Surface Erosion, 113 • Protecting the Site from Channel Erosion, 116
	Section 3 Summary 119
<hr/>	
SECTION 4	SITE UTILITIES 121
<hr/>	
	Introduction, 121
CHAPTER 14	DC Site Lighting and Related Electrical Work 122 Direct Current Electrical Systems, 122 • Alternating Current Electrical Systems, 126

CHAPTER 15 **Related Site Utility Work** **128**
Water Systems, 128 • Phone, TV, and Telecommunications Systems, 129 • Gas Systems, 129
• Placement of Conduits for Future Use, 129

Section 4 Summary **130**

SECTION 5 **LANDSCAPE RETAINING WALLS AND STAIRS** **131**

Introduction, 131 • Productivity Suggestions, 131

CHAPTER 16 **Materials and Installation Techniques for Retaining Walls** **133**
Selection of Wall Materials, 133 • Wall Layout, 135 • Excavation, 136 • Base Preparation, 136 • Drainage Behind Walls, 138 • Compaction Behind Walls, 139
• Wall Heights and Stabilization, 139 • Ending Walls, 143 • Preventing Excess Runoff Over the Top of a Wall, 143

CHAPTER 17 **Tie and Timber Retaining Walls** **144**
Planning the Project, 144 • Vertical Post or Tie/Timber Wall Construction, 144 • Stacked Tie/Timber Wall Construction, 145 • Staggered Tie/Timber Wall Construction, 147
• Constructing Stairs with Tie/Timber Walls, 150

CHAPTER 18 **Segmental Retaining Walls** **151**
Pinned and Lipped Segmental Wall Construction, 151 • Anchored Unit Wall Construction, 156
• Stair Construction with Segmental Walls, 156

CHAPTER 19 **Dry-Laid Stone Retaining Walls** **157**
Planning the Project, 157 • Dry-Laid Stone Wall Construction, 158 • Stair Construction with Dry-Laid Stone Walls, 160

CHAPTER 20 **Gabion Retaining Walls** **161**
Planning the Project, 161 • Gabion Wall Construction, 161 • Stair Construction with Gabion Walls, 163

CHAPTER 21 **Stairs** **164**
Planning the Project, 164 • Interlocking Stair Installation, 167 • Butt Stair Installation, 170
• Freestanding Stair Construction, 172

Section 5 Summary **175**

SECTION 6 **LANDSCAPE PAVING** **177**

Introduction, 177

CHAPTER 22 **Materials and Site Preparation for Paving** **178**
Selection of Paving Material, 178 • Access to Site and Delivery of Materials, 182 • Project Layout, 182 • Strip Sod, 182 • Matching Existing Concrete and Asphalt Slabs, 182
• Excavation, 183 • Geotextile Installation, 185 • Base Material Installation, 185
• Edge Restraints for Paved Surfaces, 186

CHAPTER 23 **Concrete Paving** **189**
Planning the Project, 189 • Jointing and Reinforcing, 191 • Form Construction for Slab Pours, 193 • Form Construction for Stair Pours, 196 • Preparation Before Pouring, 200 • Placement of Concrete, 201 • Surface Texturing and Finishing, 205 • Completing the Pour, 207

CHAPTER 24	Unit Pavers	209
	Planning the Project, 209 • Base Material, 210 • Edge Restraints for Paved Surfaces, 211 • Adhering Pavers to Steps, 211 • Placement of Setting Bed, 211 • Unit Paver Placement, 212 • Cutting and Finishing Edges, 214 • Seating and Finishing the Surface, 214 • Sealing Unit Paver Surfaces, 215 • Installation of Open Cellular Pavement, 216	
CHAPTER 25	Dry-Laid Stone Paving	217
	Planning the Project, 217 • Base Material, 218 • Placement of Setting Bed, 218 • Edge Restraint, 218 • Stone Placement, 218 • Cutting and Finishing Edges, 220 • Finishing the Surface, 220 • Setting Stepping Stones, 221	
CHAPTER 26	Mortared Paving	222
	Planning the Project, 222 • Preparation for Paving, 223 • Cutting Pavement Materials, 223 • Mixing and Placement of Mortar, 223 • Pavement Placement, 224 • Jointing and Finishing the Surface, 225	
CHAPTER 27	Granular Paving	227
	Planning the Project, 227 • Edge Restraint, 228 • Placement of Granular Wearing Course, 228 • Finishing and Compacting the Surface, 229	
	Section 6 Summary	230

SECTION 7 WOOD LANDSCAPE STRUCTURES 233

	Introduction, 233 • Types of Structures, 233 • Productivity Suggestions, 235	
CHAPTER 28	Materials for Exterior Carpentry	237
	Wood Products, 237 • Connectors, Fasteners, and Hardware, 241 • Exterior Finishes for Wood, 243 • Prefabricated Materials, 244 • Non-Wood Products, 244	
CHAPTER 29	Wood Decks and Platforms	245
	Site Preparation for Wood Structures, 245 • Foundations for Wood Landscape Structures, 246 • Substructure Construction, 250 • Deck Surfacing, 257 • Trimming, 258 • Applying Finishes, 258	
CHAPTER 30	Wood Stairs, Railings, Seating, and Skirting	259
	Foundations and Structural Supports, 259 • Stairs, 259 • Railings, 264 • Seating, 267 • Skirting, 271	
CHAPTER 31	Wood Overhead Structures	272
	Foundation and Structural Supports, 272 • Roof Beams/Ridge Plates, 274 • Roof Substructure, 275 • Roof Surfacing, 278	
	Section 7 Summary	287

SECTION 8 FENCES AND FREESTANDING WALLS 289

	Introduction, 289 • Preconstruction Considerations for Fencing and Freestanding Walls, 289 • Productivity Suggestions, 289	
--	--	--

CHAPTER 32	Fencing	291
	Materials for Fencing, 291 • Planning the Project, 293 • Wood Prefabricated Panel Fence Installation, 297 • Wood Rail Fence Installation, 299 • Wood-Surfaced Stringer Fencing, 301 • Chain Link Fencing, 303 • Decorative Metal Fencing, 308 • Vinyl Fencing, 309	
CHAPTER 33	Freestanding Walls	312
	Materials for Freestanding Walls, 312 • Planning the Project, 312 • Dry-Laid Fieldstone (Rubble) Walls, 314 • Masonry (Stone, Block, and Brick) Walls and Piers, 315	
	Section 8 Summary	321
<hr/>		
SECTION 9	SITE AMENITIES	323
	Introduction, 323 • Sources for Amenities, 323	
CHAPTER 34	Water Features and Bridges	325
	Type of Water Features and Bridges, 325 • Planning the Project, 326 • Site Preparation for Water Features, 328 • Installation of Flexible and Rigid Liners for Static Pools, 329 • Installation of Concrete Pools, 332 • Installation of Waterfalls and Cascades, 335 • Installation of Fountains, 339 • Installation of Bridges, 339	
CHAPTER 35	Site Furniture, Signage, and Prefabricated Playground Equipment	342
	Types of Site Amenities, 342 • Planning the Project, 343 • Anchoring Site Furniture, Signage, and Play Equipment, 344 • Installation of Site Furniture and Play Equipment, 346	
CHAPTER 36	Edgings, Planters, and Plant Protection Equipment	349
	Planning the Project, 349 • Installation of Landscape Edging, 349 • Installation of Planters, 356 • Installation of Tree Grates and Tree Guards, 357	
	Section 9 Summary	359
APPENDICES	Example Material and Workmanship Specification for Seeding Project	361
	Example Performance Specification for Seeding Project	362
	Measurement Conversions	363
	Glossary, 365	
	Bibliography, 371	
	Index, 373	