CITY OF PEORIA ENGINEERING STANDARDS MANUAL

TABLE OF CONTENTS

1. Introduction 1
1.1 Purpose and Intent 1
1.2 Legal Authority 1
1.2.1 City Code and Ordinances 1
1.2.2 Applicability 1
1.2.3 Severability 2
1.3 Project Classification 2
1.3.1 Public Works 2
1.3.2 Private Development 2
1.4 References 2
1.4.1 City General Plan 2
1.4.2 Specific Area Plans 2
1.4.3 Zoning Ordinance 2
1.4.4 Subdivision Regulations 3
1.4.5 Planned Area Developments (PAD) 3
1.4.6 Permit Applications and Process Guides 3
1.4.7 Community Services Master Plan 3
1.4.8 Other References 3
1.5 Definitions 4
1.6 Abbreviations 12
1.7 Waiver 17
2. Land Division 18
2.1 Purpose 18
2.2 Applicability 18
2.3 General Information 18
2.3.1 Pre-Application Conference 18
2.4 Minor Land Division 19
2.4.1 Minor Land Division Process 19
2.4.2 Submittal Checklist 19
2.5 Subdivision Design and Submittal Standards for Preliminary and Final Plats 19
2.5.1 Preliminary Plat Application and Submittal 19
2.5.2 Final Plat Submittal Requirements 19
2.5.3 Final Plat Format 20
2.5.4 Identification Data Required 20
2.5.5 Survey Data Required 20
2.5.6 Dedication and Acknowledgment 21

2.5.7 Required Certifications 26
2.5.8 Required Notes 26
2.5.9 Final Approval 27
2.6 Condominium Plats 28
2.6.1 Modification or Change to a Condominium Plat 28
2.6.2 Guidelines for Review Process 28
2.6.3 Condominium Plat Submittal Requirements 29
2.7 Hillside Development Subdivisions 29
2.8 Changes to a Recorded Land Division 30
2.9 Amended Plats or "Re-Plats" 30
2.10 Administrative Changes to a Recorded Plat (Affidavit of Correction) 30
2.11 Maintenance Improvement District (MID) 31
2.11.1 Purpose and General Information 31
2.11.2 Formation of a MID 32
2.11.3 MID Checklist 36
2.12 Street Light Improvement District (SLID) 36
2.12.1 Purpose and General Information 36
2.12.2 Formation of a SLID 37
2.12.3 SLID Checklist 39
3. Improvement Plan Requirements 40
3.1 General Infrastructure Considerations & Requirements 40
3.1.1 Order of Precedence 40
3.1.2 Site Development 40
3.1.3 Street Improvement 40
3.1.4 Storm Drain 42
3.1.5 Stormwater Management 42
3.1.6 Water Extension 43
3.1.7 Sewer (Wastewater) Extension 43
3.1.8 Refuse and Recycle Enclosure 43
3.1.9 Repayment and Reimbursement 44
3.2 Infrastructure Planning Requirements 45
3.2.1 Conformance with City Infrastructure Requirements 45
3.2.2 Subdivision Requirements 45
3.2.3 Street Requirements 45
3.2.4 Lot Planning and Design 47
3.2.5 Easement Planning 48
3.2.6 Street and Utility Improvement Requirements 48

3.3 Infrastructure Plan Requirements 49
3.3.1 Engineered Plans 50
3.3.2 General Plan Requirements 50
3.3.3 Cover Sheet Requirements 52
3.3.4 General Notes Sheet Requirements 54
3.3.5 Detail Sheet Requirements 54
3.3.6 Plan Sheet Requirements 55
3.3.7 Plan/Profile Sheet Requirements 55
3.3.8 Presentation of Design Information 55
3.3.9 Plan Revisions 58
3.4 Construction and Improvement Plan Submittal Process 58
3.4.1 CAD Drawings 58
3.4.2 Digital Submittal and Review 59
3.4.3 Utility Company Approvals 59
3.4.4 Submittal Checklist 60
3.5 Assurance of Construction 61
3.5.1 Assurance Process 61
3.5.2 Types of Assurances 62
3.6 Right-of-Way Management – Permit Requirements 62
3.6.1 General Right-of-Way Encroachment Permit 63
3.6.2 Emergency Encroachment Permit 63
3.6.3 Annual Maintenance Encroachment Permit 63
3.6.4 Grading at Owner's Risk Permit 64
3.6.5 Haul/Encroachment Permit 65
3.6.6 Over Dimensional Load Permit 65
3.6.7 Permit Procedures 66
3.6.8 Utility Company Permit Process 67
3.6.9 Permit Fees 68
3.6.10 Permit Durations 69
3.6.11 Permit Suspension, Revocation and Enforcement 70
3.6.12 General Insurance Requirements 70
3.7 Right-of-Way Management – Construction Work Activity 70
3.7.1 Traffic Control Plan (TCP) 70
3.7.2 Water Ramp 72
3.7.3 Pavement Cut 73
3.7.4 Street Boring 73
3.7.5 Potholing (Vacuum Excavation) 74

3.7.6 Work Hours in The Public Rights-Of Way 75
3.7.7 Construction Hours 76
3.7.8 Use of Off-Duty Officer 76
3.7.9 Construction Sign 76
3.7.10 Striping and Marking Facility 77
3.7.11 Utility Conflict Review 77
3.7.12 Private Water Companies 78
3.7.13 Abandonment of Facilities in The City's Right-of-Way 78
3.7.14 Inspection 80
3.8 GIS Requirements 80
3.9 As-Built and Record Drawings 80
3.9.1 As-Built Plans 80
3.9.2 Record Drawings 82
3.10 Acceptance of Improvements 82
3.10.1 Final Letter of Acceptance 82
3.10.2 Warranty 83
3.11 Right-Of-Way and Easements 83
3.11.1 General Land Office Easements 83
3.11.2 Dedication and Abandonment by Separate Instrument 84
3.12 General Notes 85
3.12.1 General Information 86
3.12.2 General Notes 87
3.12.3 Grading & Drainage 90
3.12.4 Paving 92
3.12.5 Signing & Striping 93
3.12.6 Street Lighting 95
3.12.7 Traffic Signal 96
3.12.8 Water 101
3.12.9 Wastewater 104
3.12.10 Reclaimed Water 107
3.12.11 Landscape & Irrigation 109
3.12.12 Bridges 111
4. Grading and Drainage 115
4.1 General Information 115
4.2 City Code, Standards and Master Plan 115
4.3 Federal, State and County Regulations 115
4.4 Drainage Facility Components 116

4.5 Hydrology 117
4.5.1 Methodology 117
4.5.2 Rational Method 118
4.5.3 HEC-1 118
4.5.4 Basis of Design 118
4.5.5 Compliance with Master Plans and Studies 119
4.5.6 Compliance with other Regulating Authorities 119
4.6 Hydraulics 119
4.6.1 General Policies 119
4.6.2 Design Criteria 119
4.7 Storm Water Storage Facilities Design 120
4.7.1 General Policies 120
4.7.2 Design Criteria 120
4.7.3 Storage Facilities Grading 122
4.7.4 Underground Storm Water Storage 128
4.8 Street Drainage Requirements 130
4.8.1 General Policies 130
4.8.2 Design Criteria 130
4.8.3 Valley Gutters 131
4.9 Storm Drain Requirements 131
4.9.1 General Policies 131
4.9.2 Design Criteria 131
4.9.3 Storm Drain Pipe 132
4.9.4 Bedding and Backfill Requirements 132
4.9.5 Manholes and Junction Structures 132
4.9.6 Catch Basins 133
4.10 Channels 133
4.10.1 General Policies for Natural Channels 133
4.10.2 General Policies for Man-Made Channels 134
4.10.3 Channel Design Criteria 134
4.11 Storm Water Quality 134
4.11.1 Construction General Permits 135
4.11.2 City Approval 135
4.11.3 Post-Construction Stormwater Management in New Development and Redevelopment BMP Summary 135
4.11.4 Operational Requirements 137
4.11.5 Section 404 Permits 137

4.11.6 Section 401 Certification 137
4.11.7 Compliance Requirements 137
4.12 Floodplain Management 138
4.12.1 General Policies 138
4.13 Easements and Permits 138
4.13.1 Easement Dedication 138
4.13.2 Maintaining Drainage Easement 139
4.13.3 At-Risk Grading Permits 139
4.13.4 Stockpile Permit 139
4.14 Drainage Reports 140
4.14.1 Conditions Requiring a Report or Data Submittal 140
4.14.2 Types of Reports 140
4.14.3 Standards 141
4.14.4 Report Content and Format 142
4.14.5 Hydrology 144
4.14.6 Floodplain Analyses and Results 145
4.14.7 Hydraulic Improvements and Hydraulic Structures (Drainage Report Only) 147
4.14.8 Storm Water Storage Facilities 148
4.14.9 Drainage Maintenance Manual 149
4.14.10 Summary and Conclusions 150
4.14.11 References 150
4.14.12 Appendices 150
4.14.13 Exhibits and Maps 150
4.14.14 Drainage Statement 150
4.14.15 Quality of Submittals 151
5. Transportation Planning 152
5.1 General Information 152
5.2 City Code, Standards and Master Plan 152
5.3 Functional Classification 152
5.3.1 Freeway 153
5.3.2 Parkway 153
5.3.3 Major Arterial 154
5.3.4 Minor Arterial 154
5.3.5 Major Collector 155
5.3.6 Minor Collector 156
5.3.7 Local 157

5.3.8 Rural 157
5.4 Right-of-Way Requirements 157
5.5 Street Layout and Planning 157
5.5.1 Intersections 159
5.6 Traffic Impact Analysis 160
5.7 Access Management 160
5.7.1 Driveway Spacing and Location 160
5.7.2 Median Openings 161
5.8 Public Transit Facilities 161
5.9 Public Pedestrian Facilities 161
5.9.1 Design Guidelines 161
5.9.2 Sidewalks and Pedestrian Ways 162
5.10 Bikeways 162
5.10.1 Components of Bikeway Systems 162
5.10.2 Planning Bikeway Systems 163
6. Transportation Infrastructure Design 164
6.1 General Information 164
6.1.1 Applicability 164
6.2 City Code, Standards and Master Plan 165
6.3 Federal, State and County Regulations 165
6.4 Street Classifications 166
6.4.1 Major Arterial 166
6.4.2 Minor Arterial 167
6.4.3 Collectors 168
6.4.4 Local 168
6.4.5 Alley/Emergency Access 170
6.5 Right-of-Way Requirements 171
6.6 Roadway Design Standards and Guidelines 171
6.6.1 Typical Sections 171
6.6.2 Design Speed 171
6.6.3 Horizontal Curves 172
6.6.4 Superelevation 173
6.6.5 Pavement Transitions/Tapers 174
6.6.6 Vertical Alignment 174
6.6.7 Cross-Section and Slope 176
6.6.8 Unpaved Streets 177
6.6.9 Side Slopes 177

6.6.10 Clear Zones 177
6.6.11 Concrete Curbs 177
6.6.12 Pavement Edge Treatments 178
6.6.13 Curb Return and Ramps 178
6.6.14 Valley Gutters 180
6.6.15 Medians 180
6.6.16 Sidewalk 180
6.6.17 Intersections 181
6.6.18 Cul-de-sacs 181
6.6.19 On-Street Parking 182
6.6.20 "Half Street" Minimum Requirements 182
6.6.21 Traffic Control Devices 183
6.6.22 Street Names and Signs 183
6.6.23 Mailboxes 184
6.6.24 Retaining Wall Design Guidelines 184
6.6.25 Safety Railings 184
6.7 Driveway Design 184
6.8 Signing and Striping Design 184
6.9 Bikeways 185
6.9.1 On-Street Bike Lanes 185
6.9.2 Multi-Use Paths 185
6.10 Traffic Signal and ITS Design 186
6.11 Bridge and Guardrail Guidelines 186
6.11.1 References 187
6.11.2 Structure Name 187
6.11.3 Utilities on Structures 188
6.11.4 Structural Design Guidelines 188
6.11.5 Structural Aesthetics 189
6.11.6 Guardrail Design Guidelines 193
6.12 Technical Design Reports 193
7. Street Lights 196
7.1 Purpose and Intent 196
7.2 Applicability 196
7.3 General Information 196
7.4 Street Lighting Warranty Agreement 196
7.5 Street Light Design Guidelines 196
7.6 Intersection Lighting 201

7.7 LED Luminaire Requirements 201
7.8 Photocontrol Requirements 204
7.9 Street Light Plan Checklist 205
8. Water Infrastructure Design 206
8.1 General Information 206
8.2 City Code, Standards and Master Plan 206
8.2.1 System Requirements 206
8.3 Federal, State and County Regulations 210
8.4 Private Water Companies 210
8.5 Agreements 210
8.6 Requirements to Connect 210
8.7 Design Reports 211
8.7.1 Preliminary Basis of Design Reports 212
8.7.2 Final Basis of Design Reports 213
8.8 Water Infrastructure 216
8.8.1 City Wells 216
8.8.2 Reservoirs 216
8.8.3 Booster Pump Stations 217
8.8.4 Waterlines 217
8.9 Transmission and Distribution Design Standards and Guidelines 218
8.9.1 Location 218
8.9.2 Rights-of-Way/Easements 218
8.9.3 Cover and Separation 219
8.9.4 Pipe Materials 220
8.9.5 Bedding and Backfill 220
8.9.6 Wash Crossings 220
8.9.7 Valves 221
8.9.8 Tapping Sleeves 222
8.9.9 Water Services and Meters 222
8.9.10 Backflow Prevention 223
8.9.11 Air Release Valves 225
8.9.12 Thrust Restraint 225
8.9.13 Tracer Wire 225
8.9.14 Removal/Abandonment 225
8.9.15 Dead End Waterlines 226
8.9.16 Design Flow & Head Loss 226
8.10 Fire Protection 226

8.10.1 Fire Hydrants 226
8.10.2 Fire Flow Test 228
8.11 Water Resources and Conservation 228
8.12 Consultant Deliverables 228
8.13 Construction and Acceptance 229
8.13.1 Water Infrastructure Construction 229
8.13.2 Water Infrastructure Acceptance 231
9. Wastewater Infrastructure Design 232
9.1 General Information 232
9.2 City Code, Standards and Master Plan 232
9.2.1 System Requirements 232
9.3 Federal, State and County Regulations 233
9.4 Agreements 234
9.5 Requirements to Connect 234
9.6 Design Reports 234
9.6.1 Preliminary Basis of Design Reports 235
9.6.2 Final Basis of Design Reports 236
9.7 Wastewater Infrastructure 239
9.7.1 Lift Stations 239
9.7.1 Wastewater Lines 239
9.8 Wastewater Line Design Standards and Guidelines 240
9.8.1 Location 240
9.8.2 Rights-of-Way/Easements 240
9.8.3 Cover and Depth 241
9.8.4 Pipe Material 242
9.8.5 Bedding and Backfill 242
9.8.6 Wash Crossings 242
9.8.7 Slopes and Design Flows 243
9.8.8 Manholes 243
9.8.9 Sewer Taps 245
9.8.10 Force Mains 246
9.8.11 Odor Control 246
9.9 Pretreatment 246
9.9.1 Commercial Developments – Interceptor Requirements 246
9.10 Consultant Deliverables 246
9.11 Construction and Acceptance 247
9.11.1 Wastewater Infrastructure Construction 247

9.11.2 Wastewater Infrastructure Acceptance 249
10. Reclaimed Water Infrastructure Design 250
10.1 General Information 250
10.2 City Code, Standards and Master Plan 250
10.3 Federal, State and County Regulations 250
10.4 Requirements to Connect 250
10.5 Reclaimed Water Infrastructure 251
10.6 Design Standards and Guidelines 252
10.6.1 Location 252
10.6.2 Rights-of-Way/Easements 252
10.6.3 Cover and Depth 253
10.6.4 Pipe Material 254
10.6.5 Valves 254
10.6.6 Reclaimed Water Services and Reclaimed Water Meters 255
10.6.7 Backflow Prevention 256
10.6.8 Air Release Valves 257
10.6.9 Thrust Restraints 257
10.6.10 Bedding and Backfill 257
10.6.11 Wash Crossings 258
10.7 Consultant Deliverables 258
10.8 Construction and Acceptance 259
10.8.1 Reclaimed Water Infrastructure Construction 259
10.8.2 Reclaimed Water Infrastructure Acceptance 260
11. Landscape and Landscape Irrigation 261
11.1 City Code and Standards 261
11.2 Landscaped Medians and Right-of-Way 261
11.3 Landscape Guidelines 261
11.3.1 Maintenance Responsibility 261
11.3.2 Median Widths 261
11.3.3 Placement of Trees and Shrubs 262
11.3.4 Quantity and Sizes 263
11.3.5 Grading 263
11.3.6 Decomposed Granite 263
11.3.7 Boulders 263
11.3.8 Plant Selection and Hydroseeding 263
11.4 Irrigation Guidelines 263
11.4.1 General Irrigation Design Criteria 263

11.4.2 Controllers ... 264
11.4.3 Power Source ... 264
11.4.4 Water Source ... 264
11.4.5 Remote Control Electric Valves ... 264
11.4.6 Backflow Prevention ... 264
11.5 Sight Distance ... 264
11.6 Alterations and As-Builts ... 265
11.7 Landscape and Landscape Irrigation Inspections ... 265
11.8 Parks ... 266
11.9 Trails ... 266
11.9.1 General Information ... 266
11.9.2 Trail Design ... 267
11.9.3 Trail Locations ... 269
11.9.4 Backcountry Trails ... 271
11.9.5 Primary and Secondary Trails ... 272
11.9.6 Tread Construction ... 274
11.9.7 Vegetation Clearance ... 277
11.9.8 Surface Water Control ... 278
11.9.9 Special Structures ... 282
11.9.10 Road Crossings ... 290
11.9.11 Trail Access Facilities ... 291
11.9.12 Trail Signs and Markers ... 292
12. Public Utilities – Non-City Utilities ... 293
12.1 Purpose ... 293
12.2 City Code and Ordinances ... 293
12.2.1 Telecommunications ... 293
12.2.2 Cable ... 293
12.2.3 Pavement Cuts ... 293
12.2.4 Work Hours ... 294
12.2.5 Stormwater Management ... 295
12.3 Applicability ... 296
12.4 General Information ... 296
12.4.1 Placement in Right-Of-Way & Easements ... 297
12.4.2 Availability of Non-City Utilities ... 297
12.4.3 Coordination Required ... 297
12.4.4 Conflict Review ... 297
12.4.5 Undergrounding ... 297

12.4.6 Permit Required 297
12.5 Types of Permit 298
12.5.1 Utility Permit 298
12.5.2 Pothole Permit 299
12.5.3 Annual Emergency Permit 299
12.5.4 Annual Maintenance Permit 300
12.5.5 Traffic Control Plan 300
12.6 Permit Application Plan Submittal and Approval 300
12.6.1 Minimum Standards 300
12.6.2 Telecommunications Cable Installation (Copper or Fiber Optic) 301
12.6.3 Wireless Telecommunication Equipment 302
12.6.4 Flood Irrigation Facilities 302
12.6.5 Private Water Companies 303
12.6.6 Engineered Plans 303
12.6.7 Plan Review 306
12.6.8 Permit Fees 307
12.6.9 Permit Extensions 307
12.7 Construction and Inspection 308
12.7.1 Inspections 308
12.7.2 Pre-Construction Meeting/City Requirements 308
12.7.3 Construction Schedule 309
12.7.4 Notification of Construction 309
12.7.5 Construction Signs 309
12.7.6 Use of Construction Water 309
12.7.7 Trench Backfill and Pavement Replacement Requirements 310
12.7.8 Traffic Control/Barricading Requirements 311
12.7.9 Working in Privately Owned Streets 311
12.7.10 Record Drawings 311
12.7.11 Final Inspection/Walk Through 311
12.8 General Notes for Utility Construction 311
12.9 Utility Coordination Processes 313
12.9.1 Utility Coordination Process - CIP 314
12.9.2 Utility Coordination Process - Private 315
13. Survey and Benchmarks 316
13.1 General Information 316
13.1.1 Definitions 316
13.2 City Codes and Standards 317

13.3 Federal, State and County Regulations 317
13.4 Survey Standards 317
13.4.1 Boundary Surveys 317
13.4.2 ALTA Surveys 317
13.4.3 Horizontal Datum 317
13.4.4 Vertical Datum 317
13.4.5 Ground Coordinate Systems 317
13.5 Horizontal and Vertical Control System 318
13.5.1 Horizontal Control 318
13.5.2 Vertical Control 318
13.5.3 Temporary Benchmarks 318
13.6 Public Improvement Projects 318
13.7 Land Development Projects/Right-of-Way Permits 318
13.8 Monument Perpetuation Process for Public and Private Development Projects 318
13.8.1 Prior to Commencement of Construction 320
13.8.2 Results of Survey 320

LIST OF TABLES

Table 1 - 1 Abbreviations 12
Table 3 - 1 Construction Work Hours 76
Table 6 - 2 Technical Design Requirments – Major Arterial 166
Table 6 - 3 Technical Design Requirments – Minor Arterial 167
Table 6 - 4 Technical Design Requirments – Collectors 168
Table 6 - 5 Technical Design Requirments – Local 168
Table 6 - 6 Technical Design Requirments – Local (Cul-De-Sac) 169
Table 6 - 7 Technical Design Requirments – Alley 170
Table 6 - 8 Technical Design Requirments – Emergency Access 170
Table 6 - 9 Minimum Design Speeds For Roadways By Classification 172
Table 6 - 10 Minimum Curb Return Radii 179
Table 6 - 11 Appearance Standards 190
Table 7 - 1 Illumination Requirements 198
Table 7 - 2 Streetlight Spacing And Height Requirements 198
Table 8 - 1 Historical Total Per-Capita Water Use (IWUMP-2015) 207
Table 8 - 2 Water System Performance Criteria (IWUMP -2015) 207
Table 8 - 3 Total Per-Capita Water Use (IWUMP -2015) 209
Table 8 - 4 Required Fire Flow And Fire Reserve Storage (IWUMP) 209
Table 8 - 5 Waterline Functional Classifications 217
Table 8 - 6 Waterline Locations 218
Table 8 - 7 Pipe Materials 220
Table 8 - 8 Maximum Valve Spacing 221
Table 8 - 9 Hydrant Types And Allowable Materials 227
Table 8 - 10 Required Flow To Flush Waterlines 230
Table 9 - 1 Adjusted Unit Wastewater Loads By Land Use Type (IWUMP -2015) 233
Table 9 - 2 Wastewater Line Functional Classifications 239
Table 9 - 3 Wastewater Line Locations 240
Table 9 - 4 Wastewater Pipe Materials 242
Table 9 - 5 Sewer Taps 245
Table 9 - 6 Test Duration (Seconds) 248
Table 10 - 1 Reclaimed Waterline Functional Classifications 251
Table 10 - 2 Reclaimed Waterline Locations 252
Table 10 - 3 Reclaimed Pipe Materials 254
Table 10 - 4 Maximum Valve Spacing 254

LIST OF FIGURES

Figure 5 - 1 Parkway Street Section 153
Figure 5 - 2 Major Arterial Street Section 154
Figure 5 - 3 Minor Arterial Street Section 154
Figure 5 - 4 Major Collector Street Section 155
Figure 5 - 5 Major Collector With On Street Parking Street Section 155
Figure 5 - 6 Minor Collector Street Section 156
Figure 5 - 7 Minor Collector With Left Turn Lane Street Section 156
Figure 5 - 8 Minor Collector With On Street Parking Street Section 156
Figure 5 - 9 Local Street Section 157
Figure 11 - 1 Arterial/Collector Roadway Clearance 262
Figure 11 - 2 Local Roadway Clearance 262
Figure 11 - 3 Cross Slopes 275
Figure 11 - 4 Typical Trail Profile 275
Figure 11 - 5 Typical Trail Cross Sections 277
Figure 11 - 6 Vegetation Clearance 278
Figure 11 - 7 Grade Dips 279
Figure 11 - 8 Rock Waterbar 280
Figure 11 - 9 Rock Culvert 281
Figure 11 - 10 Pipe Culvert 282
Figure 11 - 11 Rock Retaining Walls 283
Figure 11 - 12 Riprap 284
Figure 11 - 13 Desert Wash Crossing 285
Figure 11 - 14 Switchback And Climbing Turn Concepts 286
Figure 11 - 15 Switchback Turn 288
Figure 11 - 16 Climbing Turn 289
Figure 11 - 17 Rock Steps 289
Figure 11 - 18 Trail Access Facility Concept 292

1. INTRODUCTION

1.1 Purpose and Intent

The purpose of the Engineering Standards Manual is to provide standards, specifications and guidelines that complement and support the Peoria Subdivision Ordinance. This document will provide both general information and specific design standards to the design professionals who are preparing development construction documents that include or involve the installation or construction of public infrastructure for the City of Peoria.

The intent of these Standards is expressly to promote public safety and health while, at the same time, assure reasonable economy for affordable development. The intent of these Standards is to present clear and concise direction regarding technical requirements, policies, and processes to facilitate consistent uniform design during the plan preparation phase. However, the information presented is not intended to supersede sound engineering judgment. Accordingly, creative, innovative or cost-reducing use of materials, system design, or construction practices may be accepted by City plan review personnel upon finding that public welfare is duly protected.

1.2 Legal Authority

1.2.1 City Code and Ordinances

The purpose of the Engineering Standards is to satisfy the requirements of ARS Section 9-463.01, which grants authority to and directs Arizona municipalities to regulate the subdivision of all lands. This Manual is adopted as a guidance document and has been carefully crafted to clearly outline methods, procedures and requirements for the use of property owners and subdividers in subdividing land within the City of Peoria.

This Manual is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law except as provided in this Manual. Where any provision of this Manual imposes restrictions different from those imposed by any other provision of law, the provision that is more restrictive or imposes higher standards upon the development and use of land shall control.

1.2.2 Applicability

The Engineering Standards are applicable to projects constructing public and private infrastructure (i.e., public water, sewer, storm drain utilities owned, operated or maintained by the City of Peoria; public streets and facilities; public retention basins & drainage facilities; public street lighting & signalization; or private facilities installed by a Public Utility or Franchisee, etc.) within dedicated public right-of-way or easements.

These standards also apply to drainage, retention and solid waste management requirements for private facilities.

QUICK LINKS

Development Services Website

General Plan

Specific Area Plans

Zoning Ordinance

Subdivision Regulations

Community Services Master Plan

Amended City Building and Fire Codes

Capital Improvement Program

Request for Waiver

1.2.3 Severability

If any part of these Standards as approved by the City Engineer shall be found invalid, all other parts shall remain in effect.

The City Engineer may incorporate minor changes to these Standards as they become necessary. Major, substantive changes shall include an opportunity for public review and comments.

1.3 Project Classification

1.3.1 Public Works

Public Works Projects or Capital Improvement Projects (CIP) are projects that are installed as part of a Capital Improvement Plan. CIP projects are typically City funded projects, usually inside the public right-of-way, that are managed by City staff and designed by private engineering consultants. Ultimately, design services and construction of a CIP project are awarded by the City.

1.3.2 Private Development

Private Development or Development Services (DS) projects are projects with construction improvements that are to be installed as part of a new land development. Requirements are outlined in this Manual as well as the City codes. Refer to the Development Services website for specific information regarding the Development Services processes. The website includes the applications, permits and checklists outlining each step in the process.

1.4 References

All references herein shall be to the editions or versions of documents in effect at the time a complete application for the required Permit is accepted by the City unless a Developer is otherwise vested by applicable law. When a publication is specified, it refers to the most recent date of issue, including interim publications, unless a specific date or year of issue is provided.

1.4.1 City General Plan

The City of Peoria General Plan was developed to provide the community with a vision to guide growth and development. The developer/engineer shall review the document to assure their proposed construction improvement accommodates the requirements outlined in the General Plan.

1.4.2 Specific Area Plans

The City has a number of Specific Area Plans. These documents further define the City's planning policies, objectives and goals for specific areas within the City. The Specific Area Plans build on the overall goals presented in the City's General Plan. The developer/engineer shall review any applicable Specific Area Plan to assure their proposed construction improvement accommodates the requirements outlined.

1.4.3 Zoning Ordinance

The intent of the Zoning Ordinance is to secure adequate light and air, to prevent the overcrowding of land and undue concentration of population, to secure safety from fire, panic and other dangers, to lessen or avoid congestion in the streets, to facilitate the adequate provision of transportation, water, sewerage, schools,

parks and other public facilities, and otherwise to promote the health, safety, morals, convenience and general welfare of the citizens of Peoria. The developer/engineer shall review any applicable requirements to assure their proposed construction improvement accommodates the requirements outlined in the Zoning Ordinance.

1.4.4 Subdivision Regulations

Refer to Chapter 24 of the City Code for the Subdivision Regulations. See Quick Links.

1.4.5 Planned Area Developments (PAD)

Planned Area Developments are intended to provide an alternative zoning district to the conventional zoning and development approaches and processes in the City. The PAD may include any development having one or more principal uses or structures on a single parcel of ground or contiguous parcels. The PAD shall consist of a compatible selection of uses and groupings of buildings, parking areas, circulation and open spaces, and shall be designed as an integrated unit, in such manner as to constitute a safe, efficient, and convenient urban area development.

1.4.6 Permit Applications and Process Guides

The Permit Applications and Process Guides are a series of documents which are to be utilized through the planning process. The developer/engineer shall utilize these documents for guidance on submittal requirements and ensure that adequate information is provided for reviews.

1.4.7 Community Services Master Plan

The City of Peoria Community Services Master Plan was developed to provide Implementation Strategies for Parks, Recreation, Open Space, Trails, Sports Facilities, Public Art and Libraries. The developer/engineer shall review the document to assure their proposed construction improvement accommodates the requirements outlined in the Master Plan. Refer to the City website for the Community Services Master Plan.

1.4.8 Other References

Except where these Standards provide otherwise, the design detail, construction workmanship, and materials shall comply with the editions or versions of the following publications, as amended by the City of Peoria.

- Maricopa Association of Governments (MAG) Uniform Standards Specifications and Details, Latest Edition. These will be referred to as the "MAG Standard Specifications and Details"
- Arizona Department of Transportation (ADOT), Standard Specifications for Road, Bridge, and Highway Construction. These will be referred to as the "ADOT Standard Specifications"
- Arizona Department of Transportation (ADOT), Roadway Design Standards and Guidelines, latest edition; Roadway Design Standards
- Arizona Department of Transportation (ADOT), Construction Manual, latest edition
- United States Environmental Protection Agency (EPA), Cross Connection Control Manual
- United States Federal Highway Administration (FHWA)

- Manual on Uniform Traffic Control Devices (MUTCD), as adopted and supplemented by the State of Arizona.
- Americans with Disabilities Act (ADA) and rules adopted there under
- Latest adopted and amended building and fire codes.

1.5 Definitions

All words in the Engineering Standards Manual shall be first defined as provided herein and, if not defined herein, shall be defined as in the Peoria Zoning Ordinance, Subdivision Regulations or according to the customary dictionary definition. Words used in the present tense include the future tense; words used in singular include plural, and words used in plural include the singular; the word "shall" is always mandatory; the word "person" includes a firm, association, organization, partnership, trust, corporation, company, and/or an individual.

Abandonment by Plat: The procedure whereby the owner of land may abandon temporary or permanent easements, by identifying those easements on a subdivision plat. Such easements are abandoned, removing any City interest therein, upon approval of the plat by City Council and recording of the plat in the Office of the County Recorder. A "street", as defined in Chapter 23 of the Peoria City Code, or easement for roadway purposes accepted by the City of Peoria for dedication can be abandoned by plat only if processing of the plat complies with the requirements of Chapter 23 of the Peoria City Code.

Alley: A public service way used to provide secondary vehicular access to properties otherwise abutting upon a street.

Approved Lending Institution: Any person or company currently approved by the Federal Housing Administration to act as a mortgagee, qualified to transact business in the State of Arizona and having a business office within the Phoenix metropolitan area and any other lending institution approved by City of Peoria.

Area of Special Flood Hazard: Land within a flood plain that is subject to inundation by the Base Flood. (see Flood Plain Ordinance Chapter 20, Peoria City Code)

Base Flood: The flood having a one-percent chance of being equaled or exceeded in any given year i.e., the 100-year flood as defined by the Federal Emergency Management Agency (FEMA). (see Flood Plain Ordinance Chapter 20, Peoria City Code)

Block: A parcel of land or group of lots entirely surrounded by public or private streets, cemeteries, streams, railroads, open space, parks, or combination thereof.

Building: Any structure having a roof and used or built for the shelter or enclosure of persons, animals, chattel or property of any kind, including, but not limited to, tents, awnings, carports, ramadas, mobile homes or vehicles situated on private property and used for purposes of a building.

a) Principal building means a building, or where the context so indicates, a group of buildings, within which is conducted the principal use of the lot on which the building is situated.

QUICK LINKS
Development Services Website
General Plan
Specific Area Plans
Zoning Ordinance
Subdivision Regulations
Community Services Master Plan
Amended City Building and Fire Codes
Capital Improvement Program
Request for Waiver

b) Accessory building means a subordinate building on the same lot with a principal building or use, the use of which is customarily accessory and incidental to the main use of the principal building or use. When attached to the principal building, such accessory building shall be considered as part of the principal building for purposes of setback and yard regulations.

Building Setback: The minimum horizontal distance between a lot line and nearest point of a Building, structure or use, as the context indicates, located on a lot. Also see Chapter 21 of the Peoria City Code.

Building Site: That portion of the lot or parcel upon which a building and appurtenances are to be placed or are already existing, including adequate areas for parking, sewage disposal, clearance, proper drainage, the safest and most convenient means of access and which conform to the requirements of the provisions in applicable Chapters of the Peoria City Code.

Certificate of Correction or Change: Procedure for amending recorded plats that are administrative and does not change any real property description.

Certificate of Occupancy Hold: Procedure for using the Certificate of Occupancy of a Building as a guarantee for installation of required off-site improvements, on-site improvements or dedications.

City: City of Peoria, Arizona, a municipal corporation.

City Engineer: The person identified as the chief engineer for the City, or a designee duly appointed to act in his/her stead. Also see Director of Engineering.

Code: The municipal code and ordinances adopted by the City Council of the City of Peoria.

Conditional Approval: An affirmative action by the Engineering Director indicating that approval will be forthcoming upon satisfaction of certain specified stipulations.

Conservation: Retention or acquisition of land for the purposes of preservation and public use.

Conservation Easement: A right granted to a governmental body over privately-owned land, to prohibit development of property, including roads and utilities, and to use the land for public open space purposes.

Context Plan: The principal document showing the relationship of the project site to adjacent setting as specified in the City of Peoria Design Review Manual.

Council: The City Council of the City of Peoria.

Cul-de-sac: A short local street having one end permanently terminated in a vehicular turnaround.

Cut: The land surface that is shaped through the removal of soil, rock or other materials.

Department: An organizational subdivision of the City of Peoria directly responsible for review and approval of applications or submittals associated with this Chapter.

Development: Utilization of land. Development shall include any man-made changes to improve or alter real estate, including but not limited to establishment of uses, buildings or other structures, mining, dredging, filling, grading, paving, or excavations.

Design Review: Required review of architectural, engineering and landscape features of specific kinds of Development and utilizing the City of Peoria Design Review Manual. See Design Review Ordinance, Chapter 20 of the Peoria City Code.

Design Review Appeals Board (DRAB): A board appointed by the Council to hear appeals of recommendations, stipulations or conditions proposed for a project or Subdivision, based on the City of Peoria Design Review Manual. See Design Review Ordinance, Chapter 20 of the Peoria City Code.

Director of Engineering: As outlined in Chapter 23 of the City Code, the Director of Engineering is appointed by the City Manager and shall hold the additional offices of Superintendent of Streets and shall be designated and have all the duties and powers of the City Engineer as set forth in state law and under the Peoria City Charter and this Code. The Director of Engineering or their designee can act upon these duties as designated by the Director of Engineering. The terms City Engineer, Engineering Director and Director of Engineering all refer to this definition.

Easement: A right granted to a governmental body, public, or persons over privately-owned land for specific uses and purposes as so designated.

Easement, Drainage: An area designated and used for conveyance, retention or detention of runoff in which nothing can be placed, which will impede, divert or cause runoff to have an adverse effect on adjoining property.

Easement, Public Utility: An easement for the installation of facilities underground or overhead, furnished for the use of the public; including electricity, gas, communication, water, storm drainage, sewage, sidewalks, landscaping, traffic signals, street lights, flood control, etc. Owned and operated by any person, firm, corporation, municipal department, board duly authorized by State or municipal regulations. Utility or utilities as used herein may also refer to such persons, firms, corporations, departments, or boards.

Easement, Non-Vehicular Access: An easement prohibiting vehicular access from a street, or between inappropriate uses.

Engineering Department: May also be referred to as the Development and Engineering Department, Planning and Community Department or any other reference that has been used to represent the Engineering Department in past, present or future publications.

Engineering Plans: Plans, profiles, cross-sections, and other required details for the construction of public and private improvements, prepared by an Arizona registered engineer of appropriate discipline in compliance with standards of design and construction approved by Council as required in the City of Peoria Engineering Standards Manual.

Engineering Standards: Policies and procedures developed and approved by the Engineering Director, that provide the detail development standards of the City of Peoria.

Exception: Any parcel of land which is within or adjacent to the boundaries of the subdivision, which is not owned by the subdivider and not part of the platted area.

Fill: Placement of natural materials such as soil, rock or other materials by equipment or other manmade device or tactic on the ground surface.

Final Approval: Council approval of the Final Plat as evidenced by certification on the Plat by the City Engineer, Mayor, and City Clerk of the City. Final approval constitutes authorization to record a Plat.

Finish Grade: The final grade or elevation of the ground surface after grading is completed.

First Flush: The City of Peoria defines first flush as 1 inch of rainfall.

Flood Plain: An area, designated by FEMA or other City floodplain management agency, which typically adjoins the channel of a water course, or areas where drainage is or may be restricted by natural or man-made structures which may have been covered partially or wholly by floodwater from a Base Flood (see Flood Plain Ordinance Chapter 20, Peoria City Code).

Freeway: A major highway that provides for the expeditious movement of large volumes of through traffic and has full access control via interchanges only. All roadways classified as Freeways are under the jurisdiction of the Arizona Department of Transportation.

General Plan: A document, or parts thereof, containing comprehensive plans for future development, growth and improvement of the City and for the general location and coordination of streets and highways, schools and recreation areas, public building sites, specific neighborhood elements and other physical development, which shall have been duly adopted by the Council and approved by City voters pursuant to A.R.S. 9-461.

Grading: Any cut or placement of fill material, or combination thereof on a ground surface. Grading may include the conditions resulting from any cut, excavation or fill, any alteration of the natural drainage pattern or the removal or rearrangement of surface soil.

Hillside Development Area: All land, in all zoning districts, which has a natural terrain with a slope of ten percent or greater, computed in accordance with the method set forth in the Zoning Ordinance, Chapter 21 of the Peoria City Code.

Irrigation Facilities: Includes canals, laterals, ditches, conduits, gates, pumps and allied equipment necessary for the supply, delivery, and drainage of irrigation water and the construction, operation, and maintenance of such.

Legal Access: Access provided to real property connecting the property to the public street system. Access may include a public or private street or access easement as approved by the City Engineer.

Local Street: A roadway that is intended to provide access to abutting properties, tends to accommodate lower traffic volumes at lower speeds, serves short trips, and provides connection to collector streets.

Lot: A piece, tract, or parcel of land separated from other pieces or parcels by description, as in a subdivision or on a record survey map, or by metes and bounds, for purposes of sale, lease, or separate use and abutting or having legal access to a public street.

- Corner lot: A lot abutting on two or more intersecting streets where the interior angle of intersection does not exceed 135- degrees. A corner lot shall be considered to be in that block in which the lot fronts.
- Interior lot: A lot having but only one side abutting on a street.
- Key lot: An interior lot, one side of which abuts the rear lot (line) of a corner lot, or is separated there from, by an alley.
- Panhandled Lot: A lot which does not directly abut a public or private street except through a driveway "handle" that connects the lot and the street.
- Through Lot (Double Frontage Lot): A lot abutting on two more or less parallel streets.

Lot Width: The distance between side lot lines measured at the minimum front setback line on a parallel line to the street or street chord for a lot abutting on the outside of a street curve, or the distance measured between lot lines measured at the rear of the dwelling for lots abutting the inside of a street curve. Lot width is measured 30-feet behind the minimum front setback line for lots with no buildings Also see Chapter 21 of the Peoria City Code.

Major Arterial: A roadway that is of regional importance and is intended to serve high volumes of traffic traveling relatively long distances. A major arterial is primarily intended to serve through traffic. Service to abutting land is limited and access is controlled. Opposing traffic flows are often separated by a raised medium. Major arterials typically have up to three lanes in each direction.

Major Collector: A roadway that provides for traffic movement between arterials and local streets and carries moderate traffic volumes over moderate distances (less than 3 miles). Provides direct access to abutting land and has some access control through spacing and location of driveways and intersections. Opposing traffic flows are

generally separated by a continuous left turn lane. Major collectors normally have two lanes in each direction.

Map of Dedication: A form of plat that dedicates right-of-way, and/or easements.

Marginal Access Street or Frontage Road: A minor street parallel and adjacent to an arterial route, which provides access to abutting property and intercepts local streets and controls, access to an arterial route.

Master Plan: A plan for the development of a larger or complicated land area, the platting of which is expected in progressive stages, not necessarily by a single owner or developer. A Master Plan may be designed by the subdivider or by the Engineering Department. It shall be subject to Engineering Department approval and may be in the form of a Specific Area Plan or Planned Community District in accordance with State Law and City Ordinances.

Minor Arterial: A roadway that is similar in function to major arterials, but it is operated under lower traffic volumes, serves trips of shorter distances, and provides a higher degree of property access than major arterials. Opposing traffic flows are often separated by a raised medium. Minor arterials typically have two lanes in each direction.

Minor Collector: A roadway that is similar in function to a major collector but carries lower traffic volumes at lower speeds over shorter distances (less than 3 miles), and has a higher degree of property access. Minor collectors normally have one lane in each direction.

Minor Land Division: The division of one parcel of land, into three or less parcels.

Minor Subdivision: Any subdivision of property that meets the standards for a "Major Subdivision" (as defined in the Subdivision Regulations) except that the property contains 10 or fewer Lots on five or less acres. See Chapter 24 of the Peoria City Code

Natural Terrain: The existing grade of the land at the time of application submittal unless the original grade has been altered by other than natural events and engineering proof of the original grade such as original topographic maps or aerial photos with topography shown and certified as to date by a recognized competent official or other evidence of similar validity acceptable to the City Engineer.

Parkway: A major arterial that serves high volumes of traffic traveling relatively long distances and is managed to reduce conflict between through traffic and traffic entering, leaving and crossing the facility. By limiting access to intersections and interchanges, Parkways regulate and control the spacing and design of driveways, medians, median openings, traffic signals and intersections to improve safe and efficient through traffic flow. Parkways typically have up to three lanes in each direction.

Pedestrian Way: A public walk dedicated entirely through a block from street to street and/or providing access to a school, park, recreation area, or shopping center.

Plat: A map of a subdivision.

- Preliminary Plat: A preliminary map, including supporting data, describing a proposed subdivision development, prepared in accordance with applicable City of Peoria Codes and Ordinances.
- Final Plat: The final map of all or part of a subdivision shown on an approved preliminary plat, prepared by a registered Arizona land surveyor in accordance with applicable City of Peoria Codes and Ordinances, and formally approved by the City.
- Recorded Plat: A final plat bearing all of the certificates of approval required in applicable City of Peoria Codes and Ordinances and duly recorded in the Maricopa County Recorder's office.
- Amended Plat.: A final plat that changes a portion of a previously recorded plat.

Preliminary Plat Approval: Approval of the Preliminary Plat authorizing the Subdivider to proceed with final engineering plans and Final Plat preparation.

Private Access Way: Any private street or private way of access to one or more lots, which is owned and maintained by an individual or group of individuals and has been improved in accordance with City standards for private access ways and plans approved by the Development and Engineering Department. A private access way is intended to apply where its use is logically consistent with a desire for neighborhood identification and control of access, and where special design concepts may be involved, such as within planned area developments, mobile home developments, and hillside areas.

Public Improvement Standards: A set of regulations (City of Peoria Engineering Standards) setting forth the details, specifications, and instructions to be followed in the planning, design and construction of certain public improvements in the City of Peoria, formulated by the Public Works Director and the County Health Department.

Request for Waiver: A request submitted on a form supplied by the City by the design engineer/developer for waiver from specified standards found in this Manual.

Rural Street: A rural street is the same functional classification as local street; however, just in a rural setting instead of an urban or suburban setting.

Slope: The vertical rise in feet measured over a horizontal distance of 100-feet, expressed as a percentage, measured generally at right angles to contour lines but which shall not extend across significant changes in grade. A portion of the 100-foot line shall extend across property lines if necessary to obtain the 100-foot measurement at a property line so long as not more than 50-feet shall so extend.

Street: Any thoroughfare, avenue, boulevard, road, lane, parkway, place, viaduct, easement for access, or other way that is an existing state, county, or municipal roadway; or a street or way shown in a plat heretofore approved pursuant to law or approved by official action; or a street or way in a plat duly filed and recorded in the County Recorder's office. A street includes the land between the right-of-way lines

whether improved or unimproved and may comprise pavement, shoulders, curbs, gutters, sidewalks, parking areas, landscaping, and above and below ground utilities.

Street Classification System: A part of the Circulation Element of the Peoria General Plan (GP) that provides a system for identification of the hierarchy of major streets and highways, including the location and alignment of existing and proposed thoroughfares. The system is the City's guide for right-of-way and dedication requirements for individual streets.

Structure: Any constructed or erected material or combination of materials the use of which requires location on the ground or attachment to something located on the ground, including inter-alia buildings, stadiums, radio towers, sheds, storage bins, and fences. Also see Chapter 21 of the Peoria City Code.

Subdivider: The individual, firm, corporation, partnership, association, syndication, trust, or other legal entity that files the application and initiates proceedings for the subdivision of land in accordance with the provisions of applicable City of Peoria Codes and Ordinances. The subdivider need not be the owner of the property as defined within the referenced documents.

Subdivision: The division of property for a particular purpose.

Subdivision Committee: A committee of City professional staff persons appointed by the City Engineer, Public Works Director and Community Development Director to review and recommend plat applications. See Chapter 24 of the Peoria City Code.).

Supplemental Standard Details: The City of Peoria Supplement to MAG Uniform Standard Details have been prepared and approved by the City Engineer, as a supplement to the latest adopted Edition of the Uniform Standard Details for Public Works Construction (MAG Standards) as sponsored and distributed by the Maricopa Association of Governments.

Tract: (1) A parcel of land or area of land appropriate for subdivision, or (2) a parcel of land included within a subdivision for a specified purpose other than that proposed for the lots in the subdivision.

Usable Lot Area: That portion of a lot usable for or adaptable to normal uses of residential property, excluding any areas which may be covered by water, excessively steep, or included in certain types of easements.

Utilities: Underground or overhead facilities used for provision of public electricity, gas, communications, water, drainage, sewage disposal, or flood control, owned and operated by any person, firm, corporation, municipal department, or board, duly authorized by state or municipal regulations. Utility or utilities as used herein may also refer to such persons, firms, corporations, departments, or boards involved in supplying these services.

1.6 Abbreviations

TABLE 1 - 1 ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AASHTO LRFD	American Association of State Highway and Transportation Officials Load and Resistance Factor Design
ABC	Aggregate Base Course
ABSMS	Arizona Boundary Survey Minimum Standards
AC	Asphaltic Concrete
ac	Acre
ACDC	Arizona Canal Diversion Channel
ACI	American Concrete Institute
ACP	Asbestos cement pipe
ADA	Americans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADMP	Area Drainage Master Plans
ADMS	Area Drainage Master Studies
ADOSH	Arizona Division of Occupational Safety and Health
ADOT	Arizona Department of Transportation
ADOT BDG	Illuminated Street Name Sign
ADWR	Arizona Department of Water Resources
ALTA	American Land Title Association
ANSI	American National Standards Institute
AOC	Certificate of Approval of Construction
APLS	Arizona Professional Land Surveyors
APS	Arizona Public Service
ARS	Arizona Revised Statutes
ASTM	American Society for Testing and Materials
ATC	Approval to Construct
ATSSA	American Traffic Safety Services Association
AUCC	Arizona Utility Coordinating Committee
AWG	American Wire Gauge
AWM	Appliance Wiring Material
AWS	American Welding Society
AWWA	American Water Works Association
AZPDES	Arizona Pollutant Discharge Elimination System
BLM	Bureau of Land Management
BMPs	Best Management Practices
BOD	Basis of Design
BUG	Backlight, Uplight and Glare
C	Celsius
C of O	Certificate of Occupancy

CAD	Computer-aided Design (and Drafting)
CC&Rs	Covenants, Conditions and Restrictions
CCT	Correlated Color Temperature
CCTV	Closed-circuit Television
CD	Compact Disk
cfs	Cubic Feet per Second
CGP	Construction General Permit
CIP	Capital Improvement Project
CLOMR	Conditional Letter of Map Revision
CLSM	Controlled Low Strength Material
COBS OR CORS	continuously operating broadcast/reference
COE	Army Corps of Engineers
CRI	Color Rendering Index
CVN	Charpy V-Notch
CWA	Clean Water Act
d	Depth
DC	Direct Current
DR	Pipe stiffness
DRAB	Design Review Appeals Board
DRB	Development Review Board
DVD	Digital Video Disc
EGL	Energy Grade Line
EMI	Electromagnetic Interference
EPA	United States Environmental Protection Agency
FC	Functional Classification
FCC	Federal Communications Commission
FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Act
FFEs or FFFs	Finished Floor Elevations
FHWA	United States Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLOA	Final Letter of Acceptance
fps	Feet per Second
FRP	Fiber-Reinforced Polymer
ft	Foot
G & D	Grading and Drainage
GDACS	Geodetic Densification and Control Survey
GIS	Geographic Information System
GLO	Government Land Office
GP	General Plan
gpad	Gallons per Acre per Day
gpcd	Gallons per Capita Daily
gpm	Gallons per Minute

GPS	Global Positioning System
HEC-1	Hydrologic Engineering Center
HEC-HMS	Hydrologic Modeling System
HEC-RAS	River Analysis System
HGL	Hydraulic grade line
HOA	Homeowners Association
HPS	High Pressure Sodium
HWE	High Water Elevation
Hz	Hertz
ID	Inside diameter
IDDE	Illicit Discharge Detection and Elimination
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFC	International Finance Corporation
IMSA	International Municipal Signal Association
in	Inch
ISNS	Internally Lighted Street Name Signs
IWUMP	Integrated Water Utilities Master Plan
IWUMP-2015	Integrated Water Utilities Master Plan 2015 Edition
K	Kelvin
kA	kilo-amps
kVA	kilo-volt-ampere
LED	Light-emitting diode
LF	Linear Foot
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOS	Level of Service
LTL	Left Turn Lane
mA	milliamps
MAG	Maricopa Association of Governments
MAX	Maximum
MCDOT	Maricopa County Department of Transportation
MCESD	Maricopa County Environmental Services Department
MCMs	Minimum Control Measures
MCR	Maricopa County Recorder's
MD	Maximum Day
MEP	Maximum Extent Practicable
mgd	Millions of Gallons per Day
MID	Maintenance Improvement District
mil	One-thousandth of an inch
MOC	Municipal Operations Center
MOD	Map of Dedication

MS4s	Municipal Separate Storm Sewer Systems
MUTCD	Manual on Uniform Traffic Control Devices
NAD83	North American 1983 Datum
NASSCO	National Association of Sewer Service Companies
NAVD88	North American Vertical Datum of 1988
NCHRP	National Cooperative Highway Research Program
NESHAP	National Emission Standard for Hazardous Pollutants
NGS	National Geodetic Survey
NICET	National Institute for Certification in Engineering Technology
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intention
NOT	Notice of Termination
NPDES	Nation Pollution Discharge Elimination System
NSF	National Sanitation Foundation
NSPS	National Society of Professional Surveyors
NVAE	Non-Vehicular Access Easement
O.D.	Outside dimension
OSHA	Occupational Safety and Health Administration
P & Z	Planning and Zoning
P.C.s	Point of Curvature
P.I.s	Point of Intersection
P.T.s	Point of Tangency
PAD	Planned Area Developments
PC	Point of Curve
PCC	Portland Cement Concrete
PDF	Portable Document Format
PE	Professional Engineer
PI	Plasticity Index
PM	Project Manager
PSI	Pounds per Square Inch
PT	Point of Tangent
PUE	Public Utility Easements
PUFE	public utilities and facilities easements
PVC	Polyvinyl chloride
PVC AWWA	Polyvinyl chloride American Water Works Association
PVC SDR	Polyvinyl chloride Standard Dimension Ratio
PW	Public Works
QUV	Q (Q-Lab) Ultraviolet
Ret. Walls	Retaining Walls
RFI	Request for Information
RGRCP	Rubber Gasket Reinforced Concrete Pipe
RLS	Registered Land Surveyor
ROW	Right-of-Way

RP	Reduced Pressure
RTN	Real Time Network
RW	Right-of-Way
SCH-40 PVC	Schedule 40 Polyvinyl chloride
SD	Structural Detail
SF	Square Foot
SFHA	Special Flood Hazard Area
SH-No	Shrub Number
SLID	Street Light Improvement District
SMFO	Single-Mode Fiber Optic
SMT	Surface Mount Technology
SOP	Standard Operating Procedure
SRP	Salt River Project
SSA	State Standard Attachment
SWG	Southwest Gas
SWMPs	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SY	Square Yard
TCP	Traffic Control Plan
THO	Total handover
TIA	Traffic Impact Analysis
TOC	Table of Contents
TRB	Transportation Research Board
TR-No	Tree Number
TS	Terminal Socket
TV	Television
UL	Underwriters Laboratories
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
V	Volt
VCP	Vitrified Clay Pipe
VMB	Variable Message Board
VNAE	Vehicular Non-Access Easement
W	Watt
WB-50	Wheelbase 50
WCMP	Watercourse Master Plans
WRF	Water Reclamation Facility
WWTP	Wastewater Treatment Plant

Additional abbreviations are included in the latest Maricopa Associations of Governments Uniform Standard Specifications and Details for Public Works Construction.

1.7 Waiver

Technical provisions of this Engineering Standards Manual may be waived or modified through a Request for Waiver as provided in Chapter 24of the Peoria City Code. The City may approve an application for Request for Waiver upon recommendation from the City Engineer or his/her designee. All known deviations must be approved prior to approval of the Engineering Plans for construction. Refer to the Quick Links for the Request for Waiver.

QUICK LINKS

Development Services Website

General Plan

Specific Area Plans

Zoning Ordinance

Subdivision Regulations

Community Services Master Plan

Amended City Building and Fire Codes

Capital Improvement Program

Request for Waiver

2. LAND DIVISION

This Chapter describes the City's processes for all types of land divisions: minor land divisions, final plats, condominium plats, and replats. The developer of each land division is expected to construct the public improvements necessary to serve the lots created by the land division, and to assure construction of the public improvements.

2.1 Purpose

All minor land divisions, final plats, condominium plats, and replats are processed, reviewed and approved through the steps described in this Manual. The main purpose of these platting processes is to provide for the land division and associated dedications necessary for orderly development.

2.2 Applicability

This Chapter identifies processes and minimum criteria for platting purposes per the Subdivision Regulations, Chapter 24 of the City Code.

2.3 General Information

The owner is responsible for planning, constructing and financing all public improvements associated with land divisions (dividing, assembling and platting property) and land development. Standard public improvements such as streets, sidewalks, streetlights, water, sewer and drainage facilities may be required for a land division. Additional public improvements, such as trails, irrigation, parking, recreation areas and amenities are expected where the land division warrants the enhanced level of services. These public improvements must be completed and accepted before the City will issue a certificate of occupancy.

Improvement plans, as prepared by a Professional Engineer registered in the state of Arizona, shall be subject to City approval prior to recordation of the final plat. Final plat may not be recorded until it and the improvement plans have been approved nor until an approved covenant to construct and assurance have been secured.

2.3.1 Pre-Application Conference

All land divisions and land development within the City of Peoria shall require a pre-application conference. The pre-application conference between City staff and the applicant to discuss a proposed development application typically lasts 30 to 60 minutes. Staff will usually contact the applicant to schedule the pre-application conference within one week of receipt of the pre-application request. In general, the pre-application conference is scheduled within two to three weeks of the receipt of the pre-application request.

Information exchanged at the pre-application conference allows City staff and the applicant to come to a more complete understanding of the size, scope and feasibility of the proposal. Based on the discussion at the conference, the proposal will be processed in one of three ways:

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

1. Determine if the application may be processed administratively or require a public meeting/hearing to obtain a decision on the application once submitted.
2. Provide the applicant with the appropriate development application checklist(s) and any related information; or
3. Require additional information to be submitted, and a subsequent preapplication conference to be conducted for further review.

2.4 Minor Land Division

The Minor Land Division map process is an administrative process with map approval granted by the Engineering Department staff. The review/approval process is generally intended to ensure that the proposed division or future division of land will result in lots which meet minimum area and width requirements of the Zoning Ordinance, produce legally recognized land division (into less than four parcels), and that the required right-of-way dedications are made. A land division of four or more parcels requires the preparation of a plat map. All rights-of-way and/or easement dedications shall be in accordance with this Manual. The preparation, submittal, review and approval of all Minor Land Divisions located inside the limits of the City of Peoria shall proceed through the following progressive stages and by following the Minor Land Division Process. Additional information can be obtained from the Peoria Comprehensive Master Plan, Zoning Ordinance and other policies and standards (*Including State Subdivision Statute).*

2.4.1 Minor Land Division Process

Refer to Quick Links for the Minor Land Division Process Guide.

2.4.2 Submittal Checklist

Refer to Quick Links for the Minor Land Division Submittal Checklist and requirements.

2.5 Subdivision Design and Submittal Standards for Preliminary and Final Plats

2.5.1 Preliminary Plat Application and Submittal

Refer to Quick Links for the Preliminary Plat Process Guide.

2.5.2 Final Plat Submittal Requirements

The following items must be submitted to the Engineering Department in order to accommodate a timely review of the Final Plat/Map of Dedication:

- Submittal Application Form.
- Final Plat/Map of Dedication Review Fee.
- Application Contact Form.
- Ownership Verification Form.
- An 8 ½” × 11” copy of the legal description of the Final Plat/Map of Dedication boundary lines.
- A copy of the computed closure for the subdivision boundary and individual lots properly stamped and signed showing registration number.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

- Approved copy of the Preliminary Plat or Site Plan
- Copy of the Approved Preliminary Plat or Site Plan conditions/comments.
- The Final Plat/Map of Dedication shall be prepared according to the Maricopa County Recorder "Map Recordation Criteria".
- 10 folded copies of the Final Plat/Map of Dedication, 24" x 36".
- 1 half size copy of the final plat/map of dedication, 11"x17"
- Phase I Environmental Site Assessment (as required).
- Copy of current Title Report (within 30-days).
- Copy of current ALTA Survey (within six-months).
- 404 Certification Form
- 100-year Assured Water Supply (in the case of private water company service areas)

2.5.3 Final Plat Format

The format for the Final Plat shall adhere to the following:

- Copies of the recorded plat shall be reproduced in the form of blue line or black line prints on a white background.
- The plat shall be 24"x36" and drawn to an accurate scale having not more than 100-feet to an inch.
- The plat shall be prepared and sealed by a land surveyor registered to practice in the State of Arizona.
- All necessary rights-of-way and easements (public water, public sewer etc.) shall be dedicated on a Final Plat or MOD. Deviations from this policy are required in writing from the Engineering Department.

2.5.4 Identification Data Required

Information on the Final Plat shall include the following:

- The name and location of the subdivision and its location by section, township, range, and county.
- The name, address and registration number of seal of the registered land surveyor preparing the plat.
- A scale, north arrow, and date of plat preparation.
- Metes and bounds legal description of the outlining boundary of the final plat.
- Flood Zone information including the FIRM panel.

2.5.5 Survey Data Required

The following survey data shall be required:

- Boundaries of the land to be subdivided shall be fully balanced and closed, showing all bearings and distances, determined by an accurate survey in the field. All dimensions shall be expressed in feet and decimals of feet.
- Location and description of cardinal points to which all dimensions, angles, bearings, and similar data on the plat shall be referenced; each of two corners of the subdivision traverse shall be tied by bearing and distance to two separate section corners or quarter-section corners.
- All existing adjacent plats shall be referenced to the location of monument corners.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

- Location of all physical encroachments upon the boundaries of the land shall be identified.
- A sealed copy of a computer printout or all material involved in a hand calculated boundary traverse survey of the tract shall be included with the plat submittal.
- Descriptive Data Required
- The name, right-of-way lines, courses, length, and width of all proposed and existing public streets, alleys, and utility easements radii, points of tangency, and central angles of all curvilinear streets and alleys, radii of all rounded street line intersections shall be included on the map.
- All drainageways shall be shown on the plat. The right-of-way of all major drainageways, flood plains, floodways, probable maximum flood boundaries, etc., as approved by the City of Peoria Engineering Department, shall be shown as dedicated.
- All existing and proposed easements, with recording numbers
- All unobstructed view easements shall be shown at all intersections on all Final Plats.
- The location and dimensions of all residential lots shall be shown on the map. Proposed subdivisions for single family dwellings shall provide a table identifying the lot area in square feet for each lot.
- All residential lots shall be individually numbered by consecutive numbers throughout the plat. "Tracts," or “common areas,” shall be so designated, lettered, or named and clearly dimensioned.
- The location, dimensions, bearings, radii, arcs, and central angles of all sites to be dedicated to the public shall be shown on the map with the use clearly indicated.
- The location of all adjoining subdivisions with date, book, and page number of recordation noted, or if unrecorded, so marked and noted on the map. City and County boundary lines.

2.5.6 Dedication and Acknowledgment

The following information is required for dedication and acknowledgement:

- A statement of dedication of all streets, alleys, drainageways, pedestrian ways, and other tracts and/or easements for public use by the person holding title of record, by persons holding title as venders under land contract and by spouses of said parties shall be required as part of the Final Plat submittal. Mortgaged land to be dedicated shall require the signature of the mortgagee. Dedication shall include a verbal legal description including the section, township, and range in which the tract is located.

- Example Dedication language:

  Owner’s name, as Owner, does hereby publish this “Name of Plat, Re-Plat, etc.” Over a portion of section, township, range of the Gila and Salt River base and meridian, Maricopa County, Arizona, as shown and platted hereon and hereby publishes this plat as, and for, the plat of said “name of Plat, Re-Plat, etc.” and hereby declares that said plat

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

sets forth the location and gives the dimensions of the lots, tracts, easements, and streets constituting same, and that each lot, tract and street shall be known by the number, letter or name given to each respectively on said plat and hereby dictates to the City of Peoria for use, as such, the streets as shown on said plat and included in the above described premises. Easements are dedicated for the purposes shown.

- In the case of replats, provide a statement in the dedication:
  All notations and dedications stated on or within the recorded plat of "Insert plat/replat name" (M.C.R. Book xxx, Page xx) shall remain in full force and effect with the recordation of this re-plat.

- For Right-of-way dedication, add verbiage to the dedication statement:
  (Owner name), as owner, hereby dedicate to the City the (street name) rights-of-way as shown hereon, for the use as (A) public streets, and (B) any and all public sewer, water, gas, electric and any other utility services. Landscaping within the (street name) rights-of-way shall be maintained by the Home Owners Association. (Owner name), hereby warrants to the City the title to said right of way as shown hereon, against the claims of all persons whomsoever.

- Provide a statement:
  Public Utility Easements (PUE) are dedicated to the City of Peoria for use as such. The maintenance of landscaping within the right-of-way shall be the responsibility of the fronting property owner.

  Private streets contained in the plat shall have the right reserved to public utilities to install and maintain facilities within the street boundaries. Private streets shall be dedicated as tracts.

- A provision shall be included in the Dedication Statement for private streets/access which reads:

  "Tract(s) (insert tract letter(s)) are hereby dedicated to and owned by the Homeowners Association (HOA) for the purpose of private streets/access. The homeowner's association is responsible for maintenance of the private streets/access. A public utilities easement, public water easement, public sewer easement, ingress and egress for refuse collection, emergency and service type access are hereby dedicated over Tract (insert tract letter).

  The Master Developer, as Owner, hereby declares that effective as of the date of the recordation of this Plat, the Property within (subdivision name) shall be held, sold, conveyed, encumbered, hypothecated, leased, used, occupied, and improved subject to the following restriction: The private streets depicted on this Plat shall be

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

private and shall not be dedicated to public use until such time as all Owners (i.e. 100%) of the Lots within this Plat vote to approve such streets being dedicated to public use and such dedication is accepted by the City. If the dedication of such streets to public use is approved by 100% of such Owners and accepted by the City, the City will require (as a condition to its acceptance of such dedication), that such streets shall be upgraded to the then-current City Standards, at no expense to the City (i.e. such upgrading shall be at the expense of such Owners and/or a Homeowners Association that includes such Owners. This restriction may be amended only upon the written consent of the City and all Owners (i.e. 100%) of the Lots within this Plat.

(Name) do hereby grant to the City of Peoria, Arizona, an Arizona municipal corporation, in Maricopa County, Arizona, its successors, and assigns, a permanent, perpetual and exclusive utilities easement for the following purposes, namely: The right to access and enter upon, over, across, and under the surface, for access, construction, maintenance, operation and replacement of utilities over, under, and across Tract(s) (tract letters) and easements as reflected on the Plat situated in the County of Maricopa, State of Arizona.

To have and to hold the said easement unto the City of Peoria, and unto its successors and assigns forever, together with the right (at the City of Peoria's discretion) to allow other utilities to utilize such easement, ingress and egress to permit the construction, operation, maintenance, and replacement of utilities subject to notes 1, 2, 3 and 4.

And the Grantor hereby covenants that it is lawfully seized and possessed on this aforementioned tract or parcel of land; that it has a good and lawful right to sell and convey it; and that they will warrant the title and quiet possession thereto against the lawful claim of all persons.

Notes:

1. The said easement to include the right to cut back and trim such portion of the branches and tops of the trees now growing or that may hereafter grow upon the above described premises, as may extend over said easement, so as to prevent the same from interfering with the efficient maintenance and operation of said utility lines.
2. The City of Peoria shall not be responsible for replacing any landscaping or any improvement placed in the easement by Grantor or its successors or assigns, except as noted herein.
3. The City of Peoria will make reasonable efforts to promptly restore asphalt concrete pavement surfaces.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

4. Grantor, its successors or assigns at its sole cost, shall be responsible for promptly replacing any landscaping or improvement(s) placed in the easement by Grantor or its successors or assigns.
5. In the event the right, privilege and easement herein granted shall be abandoned and permanently cease to be used for the purposes herein granted all rights herein granted shall cease and revert to the grantors, their heirs or assigns.

- Landscaped areas within the boundaries of private streets to be maintained by a Homeowners Association and tracts in common ownership or owned and maintained by a Homeowners Association shall be contained within an easement. The easement(s) are required as part of the formation of the Maintenance Improvement District (MID). As such, the dedication statement shall include a provision that reads: "The City of Peoria is hereby given an easement for maintenance of landscaping, retention and drainage facilities on Tract(s) (insert tract letters). This easement may be exercised by the City of Peoria at such time that the HOA fails to exist and provide the required maintenance and operation of the landscaping, retention and drainage facilities. As long as the HOA is in existence, it will be responsible for providing all maintenance of landscaping, retention and drainage facilities, regardless of the dedication of the easement.

- Drainage facilities (i.e. above and below ground retention) are required to be within a drainage easement. These facilities are to be maintained by the property owner and/or association. As such, the dedication statement shall include a provision that reads:

  The owner does hereby grant to the City of Peoria, as easement for maintenance of on-site retention basins(s), pipe storage system(s), or any drainage facility(ies) within this development as reflected on the approved grading and drainage plan. This easement may be exercised by the City of Peoria only at such time that the property/center owner or association responsible for the maintenance of such facilities fails to provide the required maintenance and operation and the City has determined that lack of such maintenance and operation constitutes a nuisance or impacts public health and safety. As long as the property/center owner or association is in existence, it will be responsible for providing all required maintenance of such facilities regardless of the dedication of the easement.

- Temporary easements, landscaped easements and/or utility easements to be abandoned shall be shown on the plat and labeled "Abandoned Hereon." A roadway right-of-way or easement may be placed on the plat for abandonment in accordance with state law and City approval. Verbiage for abandonment shall be included in the dedication statement.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

- A provision shall be included in the dedication statement for dedication of water and sewer easements which reads:

  (Name) do hereby grant to the City of Peoria, an Arizona municipal corporation, in Maricopa County, Arizona, its successors, and assigns, a permanent and perpetual easement for the following purposes, namely: The right to enter upon for construction, maintenance, operation and replacement of a water and/or sewer line over, under, and across Tract(s) situated in the County of Maricopa, State of Arizona.

  To have and to hold the said easement unto City of Peoria, a municipal corporation of Maricopa County, Arizona and unto its successors and assigns forever, together with the right of ingress and egress to permit the construction, operation, maintenance, and replacement of public water /sewer line. Subject to notes 1, 2, 3 and 4.

  And the Grantor hereby covenants that it is lawfully seized and possessed on this aforementioned tract or parcel of land; that it has a good and lawful right to sell and convey it; and that they will warrant the title and quiet possession thereto against the lawful claim of all persons.

  Notes:

  1. The said easement to include the right to cut back and trim such portion of the branches and tops of the trees now growing or that may hereafter grow upon the above described premises, as may extend over said easement, so as to prevent the same from interfering with the efficient maintenance and operation of said water lines.
  2. The City of Peoria shall not be responsible for replacing any landscaping or any improvement placed in the easement by Grantor or its successors or assigns, except as noted herein.
  3. The City of Peoria will make reasonable efforts to promptly restore asphalt concrete pavement surfaces.
  4. Grantor, its successors or assigns at its sole cost, shall be responsible for promptly replacing any landscaping or improvement(s) placed in the easement by Grantor or its successors or assigns.
  5. In the event the right, privilege and easement herein granted shall be abandoned and permanently cease to be used for the purposes herein granted all rights herein granted shall cease and revert to the grantors, their heirs or assigns.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

2.5.7 Required Certifications

The registered land surveyor who prepared the Final Plat map shall provide certification on the Final Plat map that the plat is correct and accurate, and that the monuments described in it have been either set or located as described. All maps shall contain the seal of a registered land surveyor, as per Arizona Revised Statutes (ARS).

2.5.8 Required Notes

The following notes, 1 through 8, shall be placed on each Final Plat.

Notes 7 and 8 shall be included on each Final Plat. If the subdivision is not located within the City of Peoria Water and Sewer Service Area, the notes shall be amended.

Senate Bill 1062 became effective July 13, 1995 and was passed to protect military airports from encroachment of urban development. Provisions of Senate Bill 1062 require public disclosure for residential resale, new subdivision and bulk property sales. As such any subdivision located within the vicinity of a military airport shall include note 9.

Note 10 is required if the subdivision is located in the vicinity of a City of Peoria Designated Truck Route. The specific streets designated as a truck route shall be listed.

Note 11 is required if the subdivision is located within the vicinity of a rock quarry or a gravel operation.

1. The subdivision is subject to a Maintenance Improvement District (MID) _____ and Street Light Improvement District (SLID) _____, as required.
2. No construction of any kind shall be constructed or placed within the utility easements, except utilities, wood, wire, or removable section type fencing, and/or paving, nor any planting except grass. It shall be further understood that the City of Peoria shall not be required to, replace any obstruction or planting that must be removed during the course of maintenance, construction or reconstruction.
3. All new and existing utility, electrical facilities less than 69 KVA, cable T.V., telecommunications fiber optics, cellular, gas, etc. shall be installed underground as part of the street improvements and be located outside of dedicated water/sewer/drainage easments.
4. Maintenance of surface and underground drainage facilities within all tracts, easements and rights-of-way shall be the responsibility of the Homeowners Association.
5. All lot corners shall be monumented with ½" rebar and capped or tagged bearing the registration number of the surveyor responsible for their placement.
6. Signs, fences, walls, utility boxes, structures, shrubs, hedges or other plants, but excluding trees over 30-inches in height shall not be permitted within view easements or the sight distance triangles. No limbs, leaves, needles or other foliage above 30-inches in height or below 84-inches are permitted.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

Trees are to be planted so as not to obstruct 20% of the visibility when combined with other obstructions.

7. This subdivision is located within the City of Peoria Water Service Area and has been designated as having a 100-year assured water supply. In cases of private water companies, the note shall read: This subdivision is located within the (insert private company name) Water Service Area and has been designated as having a 100-year assured water supply. (Insert Certification # and date of approval by Arizona Department of Water Resources).
8. This subdivision is located within the City of Peoria Sewer Service Area.
9. This subdivision is located within the vicinity of a military airport.
10. This subdivision is located in the vicinity of a designated truck route. (Insert the name of the street(s)) is/are designated as a Truck Route by the City of Peoria.
11. This subdivision is located in the vicinity of a Rock Quarry (Gravel Operation).
12. No structure of any kind be constructed or any vegetation be planted, nor be allowed to grow within the drainage easement or tract, which would impede the flow of water over, under, or through the easement or tract.
13. An association, including all property owners in the development, will be formed and have the responsibility for maintaining all common areas to be noted as "Tracts" or easements (including landscaped areas and drainage facilities) in accordance with approved plans.
14. Hillside lots will require individual hillside development review by the City's Planning and Community Development Department prior to the issuance of a building permit.
15. A signature blocked is required:

    APPROVAL
    Approved by the Mayor and City Council of the City of Peoria, Arizona, on the _____ day of _____ 2018.
    By: ____ Date: _____
    Mayor
    Attest: _____ Date: _____
    City Clerk
    Approved By: _____ Date: _____
    For City Engineer

2.5.9 Final Approval

At final approval, submit:

- A signed and notarized 4 mil Mylar, which must contain original signatures in black ink
- 8 1/2 X 11 reduced size copy of the final plat
- 8 1/2 X 11 exhibit of an enlarged vicinity map
- CD containing Autocad drawing of the project which can be opened in Autodesk Map 2010 or earlier
- Payment for all recording and courier fees

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

- After the above items are submitted, the Final Plat will be scheduled for City Council. Upon Council approval, the plat will have 60 days in which to be recorded. If it is not recorded within 60 days, it will need to go back to Council for reapproval. Prior to recordation, all required assurances must be posted. Once all the necessary fees have been paid, assurances posted, and Council approval, the plat will be signed by the City Engineer, Mayor, and Clerk and sent to the recorder's office for recordation.

Any seal, detail, note or other item required for inclusion on the final plat shall be clearly legible. Failure to provide legible details on a final plat shall be considered an incomplete submittal.

2.6 Condominium Plats

Condominium plats must conform to all City codes and ordinances, Development Review Board and City staff stipulations and Arizona State Department of Real Estate requirements. The applicant is responsible for obtaining and fulfilling all requirements whether or not they are referenced or stated in this Manual. Condominium plats create a system of individual fee ownership suites/units in a multi-suite/multi- unit structure, combined with joint ownership of common areas of the structure and land. Condominiums plats must conform to all City and state codes and requirements.

2.6.1 Modification or Change to a Condominium Plat

A condominium plat may also be used to:

- Convert an existing structure (apartment building, commercial center, etc.) to a condominium or
- Amend an existing condominium

Both a conversion of an existing structure to a condominium and a change to an existing condominium, are subject to City staff review to determine conformance with current requirements for all public improvements, such as parking, drainage, utilities, emergency vehicle access, etc. City staff may determine that additional Development review is required.

2.6.2 Guidelines for Review Process

City staff to review the following before Council approval:

1. Compare the proposed changes to any previously approved plan and analyze current compliance with the approved plan.
2. Review the submission to determine the extent of any exterior changes to the structure.
3. Review the existing access and parking requirements with those that are proposed.
4. Review the existing drainage facilities and requirements with those that are proposed.
5. Review the existing emergency and service vehicle access requirements with those that are proposed.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

6. Review the existing intersection and sight distance for vehicles requirements and those that are proposed.

2.6.3 Condominium Plat Submittal Requirements

The requirements for a Condominium Plat are the same as the requirements for a final plat. Additionally:

1. Condominium plat with new construction must be submitted for review at the same time as the engineering and architectural construction documents are submitted for final plans review.
2. Existing condominium plat with no structure or aesthetic changes may be submitted directly to the Engineering Department by a plan review application.
3. Identify each individual unit by number and all tracts for common areas by letter. Provide bearings, distances, dimensions and curve data necessary for the complete description of each individual unit or tract. Any area not occupied by an individual unit is common area.
4. Ensure all suite and unit numbers conform to MAG standards: commercial, 3-digit suite numbers; residential, 4-digit unit numbers. Example for commercial: 1st floor 101, 2nd floor 201, 3rd floor 301.
5. Verify that each building, suite and unit has a unique identifier, such as Building 1, Unit 1001, or Building A, Suite 101.
6. The floor elevations for each unit to the City's vertical control data. Tie horizontal unit boundaries to the project's property lines by bearing and distance.
7. Include the following note on all condominium conversion plats: The suites, units and buildings of this condominium conversion have not been reviewed by the City for compliance with current building code standards.
8. If a common area is used as a public utility easement, exclude from said easement the areas that will be used for swimming pools, saunas or other permanent structures (other than individual units). Blanket easements are generally unacceptable because they overlap areas which permit construction that may conflict with the easement.
9. Include a dedication block, a ratification block and acknowledgement
10. Condominium plats will not be recorded prior to improvement plan approval

2.7 Hillside Development Subdivisions

Hillside Development Areas contain slopes in excess of 10% and special requirements for development in these areas are found in the City's Hillside Development Ordinance. Preliminary plat applications may require additional information for development located in these sensitive areas. Where possible and appropriate, the combining of submittals and maps may be acceptable on less complex lots and site conditions. The maximum number of lots allowed in a Hillside Development Area shall be as provided in Chapter 21 of the Peoria City Code.

Please contact the Planning and Community Department for more information regarding Hillside Development Areas and submittal requirements and processes.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

2.8 Changes to a Recorded Land Division

An owner/developer may want to make changes to an approved, recorded land division. Different kinds of changes require different kinds of procedures. The nature and complexity of the change will dictate which procedure applies and is generally related to the number, size, location, zoning, recordation and history of the affected lots. The general parameters of each kind of change are set forth below. However, each change is unique in its effects, so the general rules may not apply in every case. Changes to recorded plats are subject to the City's approval. The City staff will meet with the applicant to review the extent and effect of the changes and advise the applicant which procedure is appropriate to make the changes.

The change may be subject to revisions in applicable ordinances, codes, plans, regulations and policies enacted since the original plat was recorded.

2.9 Amended Plats or "Re-Plats"

A replat must be in substantial conformance with the approved preliminary plat and all applicable City Codes and Ordinances. The applicant is responsible to obtain and fulfill any and all City Codes and Ordinance requirements whether or not they are referenced or stated in this Manual. The replat is subject to City Council approval and must be recorded in Maricopa County Recorder's Office. Submittal requirements for a replat are the same as for a final plat. Once a property has been previously platted, all subsequent changes must be through a replat.

2.10 Administrative Changes to a Recorded Plat (Affidavit of Correction)

Minor corrections of errors may be accomplished without re-recording the subdivision plat through the Affidavit of Correction administrative process. Allowable corrections under this process are engineering errors and name changes, typographical errors, misspellings, etc. Administration changes to the recorded plat must be reviewed by the Engineering Department, prior to recording.

1. Engineering Error Classification
   - The proposed change is an obvious engineering error and not a design error; and
   - The correction does not change or relocate any parcel or easement boundary or line or change the legal description or the land area included in the subdivision.

2. Procedure
   - The subdivider shall file an application for Affidavit of Correction with all necessary back-up information.
   - The application shall contain a form with the following information:
     i. The corrections and/or changes requested
     ii. The date that the plat was recorded
     iii. The docket and/or page number of the plat that is to be modified
     iv. Written consent to the correction or change by the current owners of record of all of the property affected by the correction or change (as shown by a title report furnished by the owner and prepared

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

within thirty days prior to the filing of the Certificate of Correction or change)

v. Signature line for approval by the Engineering Director

- The City Engineer shall review and approve the application as appropriate. The subdivider shall have the Certificate recorded in the Office of the Maricopa County Recorder with copies of the recorded Certificate forwarded to the Office of the City Clerk and the City Engineer.

2.11 Maintenance Improvement District (MID)

Each subdivision is subject to the formation of a Maintenance Improvement District for the maintenance of the landscape, irrigation system and drainage facilities located within the rights-of-way, tracts and easements dedicated as part of the Final Plat. The developer is required to submit all information required to form the maintenance improvement prior to recordation of the Final Plat.

2.11.1 Purpose and General Information

The purpose of this section is to inform and assist the developers in their formation of the Maintenance Improvement District pursuant to Arizona Revised Statutes § 48-574 (MID). It is the City's intent that the MID act as a dormant tax assessment mechanism to generate funds necessary to maintain parkway landscaping and improvements, which will only be triggered in the event of failure of the applicable homeowners' association (HOA) to maintain those facilities.

Under provisions of this Manual and the City Code, all developers are responsible to include the appropriate notes on the Final Plat which will cover the following:

1. Giving the City an easement for maintenance of landscaping, drainage and retention areas on tract(s), easements and rights-of-way.
2. Easement may be exercised by the City of Peoria at any such time when the homeowners association fails to exist and provide the required maintenance and operation of the landscaping, drainage and retention areas
3. As long as the homeowner's association is in existence, it is responsible for providing all maintenance of landscaping, drainage and retention areas regardless of the dedication of the easement
4. Note which states that the subdivision is subject to a Maintenance Improvement District.

The developer is responsible to completely landscape the development projects according to the approved plans, prior to issuance of a Final Letter of Acceptance (FLOA). In addition to providing landscape in tracts, easements, drainage areas and basins, the developer shall also provide landscape along arterial and collector streets in which lots back onto the streets and in other locations as provided in the zoning stipulations, or engineering requirements. The developers may also provide paths, trails, and other amenities in the common open space areas (collectively, the improvements are referred to herein as the "Streetscape Improvements").

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

The City of Peoria's Design Review Manual and this Manual will assist in the development and review of the landscape projects for conformance to established policies and approved preliminary plats.

Pursuant to the provisions of Arizona Revised Statutes § 48-574, the Mayor and City Council (the "Council") are empowered to form a MID for maintenance, repair, upgrade, and improvements of pedestrian malls, off-street parking facilities, parking lots and parkways (the "Allowed Uses"). The Council has determined that the Streetscape Improvements along arterial and collector streets are Allowed Uses; accordingly, all residential subdivisions approved after November 1, 2013 are subject to the formation of a MID and a resolution ordering the improvements.

The Homeowners Association will continue to be responsible to maintain the Streetscape Improvements within its development, including landscape, irrigation, hardscape, and drainage improvements within the public rights-of-way, easements, and tracts. The additional MID tax assessment charge to property owners will be $0.00 while the HOA maintains the Streetscape Improvements. Charges will be assessed only at such time as the HOA fails to maintain the Streetscape Improvements and the City assumes maintenance responsibility.

2.11.2 Formation of a MID

To form a MID, the property owner(s), developer, shall submit to the Development and Engineering Department/Site Development Division all documents and exhibits mentioned in the Document section, to establish the district

Step 1: Documentation:

As mentioned above, each residential subdivision is subject to a MID. Prior to recordation of the subdivision Final Plat the developer is responsible to have the following documentation submitted to the City.

1. Each owner/developer shall fully execute a MID petition/waiver. The petition/waiver must be executed in black ink only (this does not apply to electronic submittals in which electronic signatures are required), include the MID number, acreage of the subdivision, subdivision name, print or type the name of the owner/developer, provide the company name, company address, day of witness of execution of the petition and then sign the document.
2. The Development and Engineering Department will provide a MID number. The MID number must be placed on the MID diagram.
3. Each owner/developer shall provide one copy of the metes and bounds legal description of the MID boundary with ½" top, bottom, and side margins and using font size – Aerial 12. This format is suitable for recording. The legal description shall be prepared and sealed by a professional engineer or surveyor registered in the State of Arizona. The legal description shall be accompanied with back-up material showing it closes.
4. Each owner/developer shall provide a MID diagram prepared and sealed by a professional engineer, or surveyor registered in the State of Arizona.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

The diagram shall be 24" x 36". The MID diagram shall contain the following information:

- All lettering, numbers, and the drawing must be clear and distinct and of sufficient size to enable the City to have useable records when drawings are microfilmed.
- Prepare the drawing of the proposed MID boundary so that the direction of the north will be toward the top of the sheet. (The top of the sheet will have the 36-inch dimension). All notations should be oriented to read with north pointed up. A north arrow shall be provided in a pertinent manner with a bar scale indicating the scale of the MID boundary drawing.
- Insert the statement provided below at the top of the page:
- "Assessment Diagram"
- "Maintenance Improvement District No. (Insert MID#)"
- Insert City Emblem
- Insert Subdivision Name
- Following the subdivision name, state the quarter section(s) within which the proposed MID boundary is located, for example: "A portion of the southeast quarter of section 22, township 4 north, range 1 east of the Gila River meridian, County of Maricopa, State of Arizona, more particularly described as follows." This statement should be followed by a complete legal description.
- A certification must be provided that states the following:

  CERTIFICATION

  I, _____, Development and Engineering Department Director of the City of Peoria, Arizona hereby certify that this is the assessment diagram of the City of Peoria Maintenance Improvement District No. (Insert Number) for (Insert Subdivision Name) was approved by the Mayor and Council of the City of Peoria, and that a quorum was present. Assessment Diagram Submitted this (Insert date) day of (Insert Month), 20_____.
  By: _____ District Engineer

- A note must be provided that states the following:

  NOTE:
  This improvement district is for the express purpose of providing the maintenance and operation of the landscaping adjacent to and along the public roadways and parkways within the district and drainage and retention facility within such proposed district. Specific authorization is included in the Arizona State Statutes, Title 48, Chapter 4, Article 2, Section 574, as amended.

- Each MID boundary shall have two survey ties to existing monuments. These ties must be shown, together with the

QUICK LINKS
Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

bearings and distances, curve lengths, central angles, radii, etc. for all MID boundary lines. All corners must be identified.

- Each MID boundary shall be taken to the centerline of all adjacent roadways.
- If a median exists on a roadway the MID boundary may have to be adjusted in order to clarify the responsible party for maintenance of the entire median.
- Identify all lots by number and all tracts by letter. Show all lots, tracts and street rights-of-way to be within and perimeter the district. Provide all bearings, dimensions and curve data of the MID boundary.
- Include the vicinity map on the Assessment Diagram.

5. The owner/developer shall provide one 8 ½" x 11" copy of the MID diagram with ½" top, bottom, and side margins suitable for recording.
6. The owner/developer is responsible to provide a table on the diagram listing the rights-of-way, easements, lots, parcels, and tracts of the areas (sub-totals and totals in square footage & acreage) to be included in the MID.
7. The owner/developer shall provide a ½ size copy of the landscape plans, if and in the form requested.
8. The dedication statement of the Final Plat shall include the following paragraph:

   The City is hereby given an easement for maintenance of landscaping, drainage and retention areas on tract(s) (insert number or letter of each tract). This easement may be exercised by the City of Peoria at any such time when the homeowners association fails to exist and provide the required maintenance and operation of the landscaping, drainage and retention areas. As long as the homeowner's association is in existence, it is responsible for providing all maintenance of landscaping, drainage and retention areas regardless of the dedication of the easement.

9. Each Final Plat shall include a note, which states that the subdivision is subject to a Maintenance Improvement District.

Step 2: Establishment Process

1. Once the owner(s), developer, submits the documents listed above, the Development and Engineering Department/Site Division will:
   - Assign MID #
   - Prepare Council Communication
   - Prepare a Resolution of Intention to create an Improvement District to maintain landscaping
   - Prepare Resolution of Intention ordering the improvements to maintain landscaping and creating an improvement district

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

- Submit council communication and resolution to Council for action

2. Once Council has approved the formation of the MID:
    - City Clerk's Office shall record the resolution in the office of the Maricopa County Recorder's Office in such a way as to give notice of formation of the district to the property owner(s) within the district (developer).
    - The Development and Engineering Department will notify the Arizona State Department of Revenue by letter and provide copies of resolutions
    - The Development and Engineering Department will notify the Maricopa County Assessor's Office by letter and provide copies of resolutions
    - Provide copies of the letters to the Budget and Management Department and the Planning and Community Department
    - A $0.00 tax levy will be assessed on each individual property included in the Maintenance Improvement District Assessment boundary.
    - All statutes providing for the levy and collection of general county taxes, including the collection of delinquent taxes and sale of property for nonpayment of taxes, shall be applicable to the district taxes provided for under ARS 48-574 and 575.
    - The Posting Notice shall be advertised in the City's Official newspaper.
    - The developer shall pay the application fee and all other related fees.

Step 3: HOA Failure and implementation of a Tax Assessment

1. The HOA will notify the City in writing of its termination, provide a copy of the ratified termination agreement and request the City to assume the responsibilities of the MID
2. The City will notify the owners within the boundary of the subdivision in writing of its intention to assume responsibilities of the MID.
3. The Planning and Community Development Department will prepare a spreadsheet of all ROW, easements, tracts and areas to be maintained by the City, including square footage of each area and the maintenance costs.
4. The Planning and Community Development Department will coordinate with the Budget and Management Department to determine the final estimated maintenance costs and forward the annual statements and estimates of the expenses of the district to the Arizona State Department of Revenue and the Office of the Arizona State Assessor's Office which provides for a levy and collection of ad valorem taxes upon the assessed value of all the real and personal property in the district.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

5. The City will notify the owners of the assessment and provide the owners a copy of the estimated maintenance costs, frequency of maintenance and planned facility upgrades.

2.11.3 MID Checklist

Refer to the City's website for the City's and Developer's MID checklists.

2.12 Street Light Improvement District (SLID)

Each subdivision is subject to the formation of the Street Light Improvement District for operation and maintenance of the streetlights. The only subdivisions excepted from the formation of a SLID are those dedicating private streets. The Homeowners Association for any subdivision with private streets is responsible to pay all installation, electrical and operation costs associated with the streetlights. See the SLID Policy for more detailed information regarding the formation of a street light improvement district.

2.12.1 Purpose and General Information

The beginning of a street light district occurs when a majority of property owners make a request to the City. This request must be in the form of a petition signed by a majority of those property owners.

A map delineating the district's limits is prepared for review and approval of the City Engineer. This map shows where lights are to be located within the subdivision. Next, the map is forwarded to the Salt River Project for purposes of creating a cost estimate. This estimate includes construction and estimated monthly and annual energy charges.

City staff then prepares a resolution of intention to order the improvement. The resolution consists of the district map and charges to be assessed. Once the resolution is approved by the City Council a 30-day protest period ensues. Any protest regarding the district must be raised before Council prior to any further action on the district.

Following the protest period, a resolution ordering the work is prepared by City staff and formally approved by the City Council. A certified copy of the resolution is sent to SRP along with a check for the amount of the street light installation.

SRP then schedules the work and performs the installation. When completed, the City accepts the improvement and begins receiving the monthly energy billings for payment.

State law allows for the assessment of costs associated with the installation and on-going energy costs of streetlights. The assessment is collected by the County in the form of a tax based upon the assessed value of the real and personal property in the district area.

The City pays for the installation of the streetlights and the energy costs for the first year. Costs associated with a street light district are assessed against the property owners and paid back over a period of years.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

Once these up-front costs are recovered by the City, property owners are annually assessed for the SRP electricity rates, sales tax and fuel adjustment fee, if applicable.

The average cost per year of SLID differs depending on the number of street lights, actual construction costs, annual energy charges and the district's total valuation.

2.12.2 Formation of a SLID

Step 1: Authorization

Arizona Revised Statutes, Title 48, Chapter 6, Article 1 sets forth the procedures for establishing a Light Improvement District. A.R.S. § 48-960 sets forth that an improvement district may be formed for the sole purpose of purchasing electricity for the lighting of the public streets and parks of the improvement district as follows.

Step 2: Petition

A petition addressed to the Board of Supervisors requesting the establishment of a street light improvement district may be filed with the Clerk of the Board of Supervisors if signed by a majority of persons owning real property or by the owners of 51 percent or more of the real property owners. The Petition shall set forth:

- The name of the proposed improvement district
- The necessity for the proposed district
- That the public convenience, necessity or welfare will be promoted by the establishment of the district and that the property to be included in such district WILL BE benefited
- The boundaries of the proposed district.
- A general outline of the proposed improvement.
- Such other matters as are required by this article.

Step 3: Bond

A bond is set by the Clerk at the time of filing, to cover all expenses in the formation of the district. If the district is formed the expenses shall be paid by the district after a certified copy of costs is presented to the Board by the Clerk. If the district is not formed, the Board taxes costs against the signers of the Petition and collect costs on bond of Petitioners.

Step 4: Verification

Each copy of the petition shall be verified by one of the petitioners and shall be accompanied by a plat or sketch indicating the approximate area and boundaries of the district.

Step 5: Hearing Date

Upon receipt of the petition for the establishment of a Street Light Improvement District, the Board of Supervisors shall set a date for a hearing not later than forty (40) days after presentation of the petition. After setting a date for a hearing and not less than fourteen (14) days, prior to the

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

hearing, the Board shall send by First Class Mail, to the home of each absentee property owner, (one who has resided outside the proposed district for more than six (6) months of the last preceding calendar year) within the proposed district, notification that a petition for the establishment of a Street Light Improvement District has been filed with the Clerk. The validity of the establishment of the district is not affected if any absentee owner does not receive notification before the hearing. To be eligible for such notification, the absentee owner must give the Clerk a current address.

Step 6: Notice

The Board must publish the "Notice of Hearing" and statement of boundaries of the proposed district, twice in a newspaper of general circulation in the county within which the proposed district is located, one week apart and the first publication shall not be less than ten days prior to the hearing. The notice shall also be mailed by first class mail to owners of real property in the proposed district at least twenty (20) days prior to the hearing. The most recent property tax assessment roll shall be used for names and addresses. If the Board can prove that all real property owners, who did not sign the Petition received notice by registered mail or personal service ten (10) days before the hearing, it does not have to do the publication of "Notice of Hearing". Street Light Improvement Districts are formed the same way as other county improvement districts, as spelled out in A.R.S. § 48-902 and 903,; except that if the Petition presented is signed by all the property owners in the proposed district, the Board, after verifying that, may hold a hearing as set forth in A.R.S. § 48-906 without the publication required by A.R.S. § 48-905.

Step 7: Hearing on Petition

At the hearing, the Board will decide if:

- The petition is signed by the requisite number of owners of real property in the proposed district
- If the establishment of the district is in the interest of public convenience, necessity or welfare,
- Determines the type of lighting to install
- Considers the rate to be paid for purchasing electricity for the proposed district.

The Board may delete property described in the Petition if it decides it would not be benefited or add property the it feels would be benefited

.

Step 8: Provisions

Improvement districts for street or public park lighting formed under the provisions of A.R.S. § 48-960 and 961 shall be exempt from the provisions of § 48-912 through 917.

Step 9: Board of Directors

Established in this manner are governed by the Board of Supervisors sitting as the board of directors.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

Step 10: Recording of Order

Although the law does not require that the Order of Establishment of the district be recorded, in order to assure that this action becomes a part of the permanent record of the history of the district, and in order to assure that the impact of this action on taxes, assessments, voting, and the like is taken care of, it is critical that the instrument is recorded. The Board will take responsibility for seeing that the instrument is recorded and will be responsible for sending a copy of the recorded instrument to the Department of Revenue, The United States Department of Justice, the County Assessor, Treasurer, and Elections Department.

2.12.3 SLID Checklist

Refer to the City's website for the City's and Developer's SLID checklists.

QUICK LINKS

Preliminary Plat Process Guide

Minor Land Division Submittal Checklist and Process Guide

Final Plat Submittal Checklist and Process Guide

MID Checklist

SLID Checklist

3. IMPROVEMENT PLAN REQUIREMENTS

3.1 General Infrastructure Considerations & Requirements

3.1.1 Order of Precedence

It is not intended by these guidelines to repeal, abrogate, annul, or in any way impair or interfere with existing provisions of other laws or ordinances except those specifically repealed with private agreement, restrictive covenants running with the land to which the City is a party. Where these guidelines impose a greater restriction on land, buildings, or structures than is imposed or required by such existing provision law, contract, ordinance, or deed, the provisions of these guidelines shall prevail.

The following sections outline the City's infrastructure requirements associated with the development process. They are by nature general in scope. Reference should be made to the appropriate Chapters within the balance of this Manual for specific details.

3.1.2 Site Development

It is the City's policy that all development within the City shall be designed and constructed in such a manner as to provide a safe and pleasant environment for the citizens of Peoria. To that end, the appropriate standards have been established for site development to include: public and/or private access for general and special uses, public and private water and sewage systems, on-site and off-site drainage, undergrounding of utilities, sanitation, landscaping, storm water retention/detention, safety, convenience, lighting and public utilities as may be required. The structures themselves are to be constructed in accordance with the Zoning, Subdivision, Floodplain Management, Building Regulations, Streets and Sidewalk, Traffic, Streetlight, Water and Sewage Disposal, Landscape Codes and Ordinances, and these guidelines, as appropriate.

3.1.3 Street Improvement

All developments within the City shall provide an interior street system adequate to ensure that all parcels and/or facilities within the development shall have access to the public street system. Further, they shall provide access into the development for public service and/or emergency operations. Such facilities, whether public or private streets, shall be of such width and structural strength as to provide safe and unrestricted access. Street Improvements include and are defined as per Chapters 5 and 6.

In single-family developments it is the intent of the City of Peoria that the street system be designed in conformance with the classifications outlined in Chapter 5. There shall be minimal direct access to the collectors, and extremely limited access to major and minor arterial streets.

When the development occurs adjacent to a street, it is the City's policy that it shall be the responsibility of the developer to install improvements along the development's frontage to the ultimate grade and alignment for the street. This may include removal and replacement of the existing street surface to the centerline if that structure is inadequate to meet the current design standards.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

A. Hillside Streets

The purpose of these standards is to minimize hillside disturbance and encourage preservation of the natural character and aesthetic value of the desert within the hillside area by allowing the flexibility necessary to produce unique, environmentally sensitive projects.

All City design standards may not be applicable to the hillside areas. However, all streets and driveways shall meet fire access and turnaround requirements.

B. Unpaved Streets

When unpaved streets are encountered to provide access to and/or adjacent to any development, provisions for paving or dust control per Ordinance 23-75 shall apply. Maricopa County has been designated by the U.S. Environmental Protection Agency as being a Non-Attainment Area for Air Quality. Ordinance 23-75 has been adopted which addresses the City's compliance with the federal regulation. All streets and driveways shall meet fire access and turnaround requirements.

C. Private Streets

Private streets shall not be permitted unless specifically approved by the City Council.

Private streets shall not be maintained by City forces. Private streets shall be designed and constructed to City standards for public streets and shall include an easement for utility and public safety access at least equal to the City standard right-of-way for local, residential streets.

All streets and driveways shall meet fire access and turnaround requirements. Where site conditions necessitate unique design solutions or the developer requests such unique design solutions, modifications may be approved by the City Engineer or their designee.

Where private streets are approved, statements shall be contained on the plat and in both the deed restrictions and the HOA by-laws that those streets are declared private subject to an easement authorizing use by emergency and public service vehicles and remain the permanent responsibility of the HOA. In addition, the developer will be responsible for providing signage stating that the streets are privately maintained and shall provide guard, gates, or other means of denying access to the general public.

D. Conversion of Private Streets to Public Streets

As stated above, City Council approval is required to create any new private streets. Many private streets were created prior to the adoption of the City's requirement that private streets shall be designed and constructed to City standards and the HOA's often inquire about the possibility of the City of Peoria accepting dedication of the private streets. As such, a procedure for the City of Peoria to consider applications for the acceptance of private streets was developed, Administrative Procedure 1-11.A.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

E. Conversion of Public Streets to Private Streets

In addition, the HOA's often inquire about the possibility of converting public streets to private streets. As such, a procedure for the City of Peoria to consider applications for the acceptance of private streets was developed, Administrative Procedure 1-11.B.

3.1.4 Storm Drain

It is the City's requirement that all developments shall provide sufficient retention so as to minimize the adverse impact of that development on its downstream neighbors. To that end, all development shall provide sufficient on-site retention to contain, at the least, the runoff generated by 100-year, 2-hour storm falling on that property. Such retention facilities shall be separate and distinct parcels within the development and shall be planned for accordingly.

Further, it is required that all developments shall provide adequate drainage facilities so as to convey runoff generated both on and off the project, around or through the project in such a manner as to insure that the structures will be free from flooding and that there is reasonable access for emergency and public service vehicles. The developer shall install storm drains, channels and/or other physical improvements necessary to achieve this result.

3.1.5 Stormwater Management

The Stormwater Management Program has been prepared by the City of Peoria (City) to satisfy the requirements of the Clean Water Act (CWA) in accordance with the Arizona Department of Environmental Quality's (ADEQ) Arizona Pollutant Discharge Elimination System (AZPDES) General Permit Number AZG2016-002 (Permit).

AZPDES permit (AZG2016-002) is established by ADEQ pursuant to the CWA (section 402(p)(3)(iii)) to ensure that pollutant discharges from small municipal separate storm sewer systems (MS4s) are reduced to the maximum extent practicable (MEP), protect water quality, and satisfy the appropriate water quality requirements of the CWA. ADEQ's 2002 AZPDES general permit required small MS4s to develop and implement stormwater management programs (SWMPs) designed to control pollutants to the MEP and protect water quality. This general permit builds on the requirements of the previous general permit.

The Stormwater Management Plan (SWMP) has been developed by the City of Peoria and the Notice of Intention (NOI) was submitted, in order to fulfill the requirements for compliance with the 2016 AZPDES Small MS4 General Permit, which became effective on September 30th, 2016. This SWMP addresses the six Minimum Control Measures (MCMs) established by the EPA:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination (IDDE) Program
4. Construction Activity Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

6. Pollution Prevention and Good Housekeeping for Municipal Operations

The BMPs associated with each of the six MCMs will be identified in this SWMP for the City of Peoria. Each BMP includes a description and measurable goals to assess the effectiveness and level of implementation. An implementation "start date" is provided for each of the BMPs, as well as the names of the City staff responsible for implementing them in their respective department.

The intent of the SWMP is to reduce the discharge of pollutants from the municipal separate storm sewer system (MS4) to the "maximum extent practicable" (MEP). The City of Peoria will be responsible for the administration and implementation of this SWMP and will remain in a regulatory role at construction sites within the City.

In order to evaluate the effectiveness of the SWMP the City will conduct an annual review of the identified best management practices and report any updates in the annual report. The annual report will provide an update on the progress towards meeting the measurable goals including a BMP inventory and an implementation schedule.

3.1.6 Water Extension

It is the City's requirement that all development within the City shall have an adequate and secure source of potable water. Therefore, unless specifically excepted, all developments within the City shall be serviced by the City's potable water system or private Water Company system. Further, the developer shall extend said system to and through the development as necessary to ensure adequate supply to the development. The developer shall extend the water distribution system to the extremities of the project so as to ensure that more distant potential users shall have reasonable access to the City's water system.

Water to meet fire flow needs, shall be provided to all developments per the Fire Department requirements. This provision shall apply to all development within the City regardless of the water purveyor, and location within the City.

3.1.7 Sewer (Wastewater) Extension

It is the City's requirement that, unless specifically excepted, all development shall provide for the discharge of domestic and other approved liquid waste into the municipal sewerage system. All developers shall be required to extend to and through their project a sewage collection system of a size sufficient to dispose of these wastes to the public system. The developer shall extend the main trunk and/or collector lines to the upstream extremities of the project so as to provide reasonable access for potential upstream users to the City system.

3.1.8 Refuse and Recycle Enclosure

It is the City's requirement that all development within the City shall be designed and constructed to accommodate safe and sanitary refuse and recycle collection that compliments the site aesthetics. To accomplish this all developments shall be in compliance with City of Peoria Standard Details.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.1.9 Repayment and Reimbursement

The City has a repayment and reimbursement mechanism for public improvements, which may exist and may be imposed, by agreement, on benefiting properties. The authorization for the public improvement repayments in the Peoria City Code, Chapter 23. Construction of the special public improvements as determined by the construction contract price or the actual costs, such construction to include, but shall not be limited to construction and installation of water pipes and lines, sanitary irrigation and storm sewer lines and systems, asphaltic and concrete paving, curb, gutter and sidewalks, streetlights, traffic signals and public landscaping. Application shall be provided by specific written request submitted to the Engineering Director.

If approved by the Engineering Director and prior to permits being issued for construction of special public improvements, for which repayment is being requested, the following requirements shall be met:

1. A diagram shall be submitted and approved by the Engineering Director or their designee describing all property which will be benefited by any special public improvements to be installed.
    - The diagram is required to have ½" margins at the top, bottom and sides suitable for recording.
    - The diagram shall be prepared by a registered professional engineer in the State of Arizona.
    - The diagram shall identify all construction, inspection, testing and permit fees, engineering and design fees and administrative costs.
    - The diagram shall identify the per acre or front footage costs assigned to each lot and/or parcel.
    - The diagram shall contain a signature block for the Engineering Director and the developer.

2. The owner/developer shall provide a copy of the approved construction plans.
3. The project shall be bid in accordance with the provisions pertaining to Public Works projects contained in Title 34, Arizona Revised Statutes. Bids shall be opened by the City on a pre-determined date agreeable to the owner and the City. The City and the owner reserve the right to reject any and all bids. Construction costs shall be determined prior to the commencement of construction and shall be approved by the City. In the event that the agreed upon construction costs increase, the repayment agreement may be amended upon approval of the additional construction costs by the City.
4. The City shall perform the inspection during construction and shall charge the owner/developer for the inspection of the special public improvements. The costs of such inspections may be included in any repayment agreement.
5. The repayment diagram will be recorded by the City of Peoria with the Maricopa County Recorder's Office. All costs associated with the recording of the repayment diagram must be paid by the owner/developer.
6. The owner/developer shall provide the City with a current list of owners impacted by the specific repayment zone. The City will notify in writing all

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

owners of the property located within the repayment boundary prior to recording of the document.

7. An annual charge will be assessed by the City for administration of each repayment agreement. The annual charge shall be calculated on actual construction costs incurred by the City for the administration of the agreement.
8. The repayment obligation under Chapter 23 of the City Code shall terminate 10 years or when the total amount provided for by Chapter 23 is repaid, whichever is sooner.
9. At such time as the total amount of the repayment zone is repaid the City will record a project close-out letter. This letter will be prepared by the City Attorney.

3.2 Infrastructure Planning Requirements

3.2.1 Conformance with City Infrastructure Requirements

Subdivisions and street and engineering design shall conform to the goals, objectives and provisions as stated in adopted City policy. City policies are found in the Peoria General Plan, the Peoria Zoning Ordinance, the City of Peoria Design Review Manual, City of Peoria Engineering Standards Manual, and other ordinances and regulations of the City, and to the Arizona Revised Statutes.

Subdivision design is dependent on the character of the subdivision, topography and other physical and density factors. In general, urban density of three or more lots per gross acre must have urban street and utility improvements. "Urban improvements" is interpreted to mean paved streets with curbs and gutters, sidewalks, landscaping, local storm drainage system, underground utilities, streetlights, public sanitary sewage systems and public water systems.

3.2.2 Subdivision Requirements

A. Public Sites

A subdivision containing all or any part of the site of a park, school, flood control facility, or other public area as identified in the City's General Plan, shall provide for dedication of such site(s) to the public or reserved for acquisition by the public for the period of time specified under state law.

B. Lands Subject to Flooding

Land that is subject to periodic flooding, land that cannot be properly drained or other land which, in the opinion of the Engineering Director is unsuitable for the proposed use shall not be subdivided. The Engineering Director may approve subdivision of such land upon receipt of evidence from the Maricopa County Flood Control District that the construction of specific improvements can be expected to render the land suitable. Construction upon such land thereafter shall be prohibited until the specified improvements have been planned and construction guaranteed.

3.2.3 Street Requirements

A. Conformance with Street Classification System

Any part of a street alignment or design in a subdivision shall conform to the latest adopted version of the Circulation Plan and Street Classification Map.

B. Continuation of Streets

The street layout shall provide for the continuation or discontinuation of streets in furtherance of City policy with respect to neighborhood traffic circulation design. Street continuation design is subject to review and approval by the Engineering Department.

C. Conformance with Neighborhood Plans and Specific Plans

The street layout plan for a subdivision shall include the application of circulation elements of neighborhood plans or specific plans of which the area to be subdivided is a part.

D. Connection with Future Streets

The Subdivision Committee may designate certain street alignments to be extended to the tract boundary to provide future connection with adjoining unplatted lands.

E. Through Traffic Mitigation

Public and private local streets shall be designed to encourage local traffic and discourage through traffic by incorporating design strategies included in the City of Peoria Design Review Manual or as approved by the Engineering Director.

F. Frontage Roads

Where a proposed subdivision abuts or contains an existing or proposed arterial route, the Subdivision Committee may require frontage roads or reverse frontage with non-access easements along the arterial route, or such other treatment as may be justified for protection of residential properties from the nuisance and hazard of high volume traffic, and to preserve the traffic function of the arterial route.

G. Sound Study Required

A sound study shall be required where a proposed subdivision abuts a parkway, arterial or abuts and/or contains an existing or proposed truck route. Specifications and scope of the study shall be prepared in accordance with Arizona Department of Transportation, Noise Abatement Policy. The study shall analyze 2040 noise levels along the adjacent roadways.

Any subsequent sound wall recommendations shall be designed and included on the engineering drawings and installed. The minimum standard height shall be 8-feet; however, the actual height shall be determined by the results of the sound study. The measurement of the wall height shall be from the top of curb of the parkway or arterial.

H. Traffic Study Required

A traffic study shall be required where a proposed subdivision abuts an existing or proposed arterial street or for any proposed development that is anticipated to generate 100 or more trips per day. The traffic study shall be prepared in accordance with the latest version of the City of Peoria Traffic Impact Analysis (TIA) Criteria.

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

I. Street Design for Subdivisions Located Adjacent to Impediments

Where a subdivision abuts or contains the right-of-way of a railroad, a limited access highway, an irrigation canal or other physical impediment, or abuts a commercial or industrial land use, the Subdivision Committee may recommend location of a street approximately parallel to and on each side of such right-of-way at a distance suitable for appropriate use of the intervening land. Such distance shall be determined with due regard for approach grades, drainage, bridges, or future grade separations.

J. Street Design in Relation to Topography

Streets shall be so arranged in relation to existing topography as to produce desirable lots of maximum utility, streets of reasonable gradient and facilitation of efficient drainage patterns.

K. Alleys

Alleys may be included but shall not be required in residential, commercial, or industrial subdivisions, except that alleys shall be required in all subdivisions where:

1. The subdivision abuts an existing, partially dedicated alley(s).
2. Extension of an alley(s) from an adjoining subdivision is required to complete the established circulation pattern.

L. Streets Connecting Adjoining Neighborhoods

Local streets shall be extended to provide access between adjoining neighborhoods at appropriate intervals. Half streets at subdivision boundaries shall be discouraged except where necessary for continuation of existing patterns. Platted half-streets abutting the tract to be subdivided and furnishing the sole access to residential lots shall be platted within the tract.

3.2.4 Lot Planning and Design

A. Lot and Block Dimensions

Lot width, depth, area and building setbacks shall comply with the minimum requirements of the Peoria Zoning Ordinance and shall be appropriate for the location and character of the proposed development, and for the type and extent of street and utility improvements being installed.

B. Relationship of Lots to Streets

1. Side lot lines shall be substantially at right angles or radial to street lines.
2. Every lot shall abut upon a public street or private street or access way designed and appropriate for providing vehicular access.
3. Single-family residential lots extending through the block and having frontage on two parallel streets shall not be permitted except where the second street is designated as a collector or arterial street. The rear lot line of through lots shall be buffered as provided in Chapter 24 of the Peoria City Code.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

3.2.5 Easement Planning

Easements within the City shall adhere to the following:

- Where alleys are provided, four-foot aerial overhead easements on each side of alley shall be provided by dedication.
- Guy and anchor easements shall be one-foot wide on each side of a lot line and approximately 35-feet in length measured from the rear lot line.
- An eight-foot Public Utility Easement (PUE) shall be dedicated along both sides of all streets, including arterial streets, adjacent to the right-of-way or private street/access way.
- The Lake Pleasant Parkway Corridor Land Use Plan requires the dedication of a scenic corridor buffer along the right-of-way line of 15-feet within the Urban Section, 30-feet in the Suburban Section, and 50-feet in the Rural Section. Refer to the Lake Pleasant Parkway Corridor Land Use Plan for further details.
- For lots facing on curvilinear streets, utility easements may consist of a series of straight lines with points of deflection not less than 120-feet apart. Points of deflection should always occur at the junction of side and rear lot lines on the side of the exterior angle. Curvilinear designs for easements and alleys may be provided and shall be designed with a minimum radius for the easement or alley of not less than 800-feet.
- A public drainage easement shall be required for streams, basins, lakes, golf courses, significant surface drainage courses or other watercourses that abut or cross the tract and accept drainage from public areas. Dedication of an easement with sufficient width to permit widening, deepening, relocating, or protecting the watercourse shall be required. The minimum dimension of the width of a public drainage easement is 50-feet.
- Land within a public street or drainage easement or land within a utility easement for major power transmission lines or pipelines shall not be considered a part of the minimum required lot area. This shall not be construed as applicable to land involved in utility easements for distribution or service purposes.
- Lots arranged with the rear property line adjacent to major streets, railroads, canals, or non-residential districts shall have, the rear one foot of which shall be recorded as a vehicular non-access easement.
- Tracts with park or open space use designations shall contain a one-foot Vehicular Non Access Easement (VNAE) along the borders of the tract. The VNAE shall be written so as to allow access only to maintenance vehicles.
- Trees shall not be located within water, sewer or public utility easements

3.2.6 Street and Utility Improvement Requirements

It is the purpose of this section to establish in outline the minimum acceptable standards for improvement of public streets and utilities; to define the responsibility of the subdivider in the planning, construction, and financing of public improvements; and to establish procedures for review and approval of engineering plans.

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

A. Subdivider's Responsibility of the Required Improvements

1. All improvements required in streets, alleys, or easements that are required as a condition to plat approval shall be the responsibility of the subdivider; provided, however, that he may be allowed to meet the requirement by participation in an improvement district approved by the Engineering Director.
2. The subdivider shall repair damages to any existing improvements adjacent to the proposed development caused by the project.

B. Improvements on Abutting Streets:

1. Where all properties abutting an existing public street within any given block are not under the control of the subdivider, and the street abutting such properties is not fully improved in accordance with the City standards, the subdivider shall construct the required improvements and obtain a "scallop street" or pay back agreement with the City for the improvements.
2. The subdivision shall have as its primary access, a paved public road between its boundary and an existing, public, paved road that has been constructed to City standards.

3.3 Infrastructure Plan Requirements

This section describes the City's requirements pertaining to the preparation of improvement plans, which are to be submitted to the City for approval. These requirements apply to plans prepared for the following purposes:

- Street Construction (Public or Private)
- Grading of Land (Public or Private)
- Storm Drain System
- Drainage Management Facility Construction (AZPDES Requirements)
- Water System Construction
- Wastewater System Construction
- Street Lighting
- Striping and Signage
- Traffic Signal
- Site development other than building plans (i.e., driveways, deceleration lanes, etc.)
- Landscaping and/or Irrigation System Installation
- Any construction in Public Rights-of-way and Easements not listed above

This section also includes related work such as the use of GIS Data, preparation of Record Drawings, deliverable format and the general process for plan submittal review to the City.

Engineering Plans for all public and private projects shall be prepared and submitted through the City of Peoria Development Services Department. The anticipated order of events is: submittal of Engineering Plans; acceptance and approval of Engineering Plans as complete; submittal of permit application(s); submittal of associated

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

documents such as financial guarantees and certificate of insurance; and issuance of permit(s)/approval to work. Projects may be constructed in phases provided that all public and private infrastructure needed to serve the phase being accepted has met the conditions of these Standards. At a minimum, the Engineering Plans shall meet the requirements in this Section.

3.3.1 Engineered Plans

The subdivider shall prepare a complete set of engineering drawings for construction of streets, public water and sanitary sewer facilities, drainage, and for construction of all other required improvements.

Preliminary plans shall be prepared in conjunction with the Preliminary Plat submittal and final draft plans submitted with the Final Plat submittal.

The plans shall be prepared by a civil engineer registered in the state of Arizona and reviewed for approval by the Engineering Director.

All engineering plans shall be approved by the City Engineer prior to approval of the Final Plat by the City Council. A certification approving engineering plans signed by the Engineering Director shall be filed with the City Clerk.

Engineering plans for drainage facilities in areas of special flood hazard, or which alter areas of special flood hazard shall be approved by the Engineering Director for general conformance to the National Flood Insurance Program and related regulations.

3.3.2 General Plan Requirements

A. Plan Quality

Plans shall be of a quality to allow for electronic capture.

B. Master Utility Plan

A master utility plan at 1” = 100 ft. shall be submitted with the final construction plans for each individual development project.

C. Plan Size

All improvement plans submitted to the City for approval must be on 24” x 36” sheets. Larger plan sheets create handling and storage problems and may produce unsatisfactory records when they are scanned.

D. Drawing Scale

The scale chosen for drawings on plans submitted to the City must be such that existing features, proposed construction, and any other information to be provided will be depicted in a clear, uncluttered, understandable manner. Water system, wastewater system and street paving improvements shall be drawn at a horizontal scale of 1 in = 20 ft. and a vertical scale of 1 in = 2 ft., unless the Engineering Director approves the use of another set of scales for a particular project. Plans for other purposes (grading, landscaping, land surveys, streetlights, etc.) may require the use of larger or smaller scales.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

E. Materials

Improvement plans submitted to the City for review shall be bond copies, but all improvements plans submitted for receipt of City signatures shall be copies of the approved drawings.

F. Boundary Lines

All property, right-of-way and easement lines are to be shown on the drawings and the ownership of the property is to be indicted.

G. Monument lines and Monuments

Township and range lines, section lines, and mid- sections lines must be clearly identified. If a roadway centerline does not coincide with, for example, a section line, each line must be shown. Where necessary, paving plans must indicate the need to set, replace or adjust monuments at street intersections, points of curvature and points of tangency. It should be noted that a registered land surveyor must set, replace or adjust the monuments. All documentation related to the setting, replacement or adjusting of the monuments must be submitted to the City.

H. Legends

Every set of plans shall have a legend, which describes each symbol used on the drawing.

I. North Arrows and Scales

Each plan sheet shall have a north arrow and a bar scale indicating the scale(s) to which the proposed improvements have been drawn. The drawing shall be oriented such that the North arrow points to the top or the right side of the sheet, unless required by another plan standard (e.g. stationing for sanitary and storm sewers).

J. Elevations and Benchmarks

All elevations shown on improvement plans shall be based on City of Peoria datum. Benchmark identification, location and elevation shall be shown so that construction can be tied into the benchmark on which plans are based.

K. Depicting Elevations

When contour lines are needed, they should be used to depict both existing and proposed conditions. High and low points should be identified with spot elevations. The contour interval chosen for particular plan should be small enough to ensure that pre- and post- construction ground slopes and configurations are clearly shown.

L. Dimensions

Dimensions must be provided to show the size and location of the facilities to be constructed and of the existing features, which will affect the construction or will be affected by it.

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

M. Clarity

Plans must be prepared so there is clear differentiation between new and existing facilities.

3.3.3 Cover Sheet Requirements

The description of the requirements for a particular improvement can be so simple that only one sheet is required, or the scope of work may be so large or complex that many sheets are required. When several sheets are required to describe the scope of work, a cover sheet is needed for the plan set. The following subparagraphs describe the requirements of a cover sheet. A single sheet plan shall have the same kind of information as that described in the following subparagraphs, but the replacement of the information on the sheet may differ from that required for a cover sheet. The project review staff will be flexible regarding the need for and the preparation of a cover sheet as long as the improvements to be provided are presented in a clear, uncluttered, understandable manner, along with the information described below.

A. Title

Provide a title, which describes the content of the plan set and the name of the development, for example: "Water System Plans for Alta Loma Subdivision". The title shall be printed in large letters and placed in the upper middle of the sheet. Orient the sheet so that the 36-inch edges are along the top and bottom of the sheet.

B. City Name

Immediately below the Title, the words "Peoria, Arizona" shall be printed in letters somewhat smaller than those used for the title.

C. Vicinity Map

Provide a small vicinity map showing the location of the improvements with respect to the nearest arterial and major collector streets. This map does not need to be drawn to a particular scale, but it shall be oriented so that north is at the top of the map.

D. Key Map

A key map showing the project's location within a section and a graphic sheet index (this may be shown on a detail sheet instead of the cover sheet).

E. Names and Addresses

At the bottom of the sheet, place the names, addresses and telephone numbers of both the owners of the development and the engineering, architectural, or survey firm, which prepared the improvements plans.

F. Approval Blocks

The block for the City approval signatures shall be placed on the lower right side of the sheet. See below for an example of the City's approval signature blocks and re-approval signature block. Since re-approvals of the plans may be needed, space shall be provided adjacent to the approval signature block for a

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

re-approval signature block. The re-approval block shall not be placed on the sheet until a re- approval is needed.

Released for Permitting:
This set of plans has been reviewed for compliance with City requirements prior to issuance of construction permits. The City neither accepts nor assumes any liability for errors or omissions. This compliance approval shall not prevent the City Engineer from requiring correction of errors or omissions in plans found to be in violation of any law or ordinance.

Review	Reviewer	Date	Review	Reviewer	Date
Paving			Traffic		
G & D			Fire		
Ret. Walls					
Water					
Sewer					

City Engineer Date _____

G. The Professional's Seal

The Civil Engineer's, Landscape Architect's or Land Surveyor's seal shall be stamped in the lower right portion of the sheet. Plans for improvements to water and wastewater systems and for paving and grading and drainage shall have a registered civil engineer's seal; plans for landscaping in the public right-of-way shall have a landscape architect's seal; and plans depicting land measurements, identifying boundaries, etc., shall have a land surveyor's seal. The engineer, architect or surveyor shall place his/her signature on the stamped seal along with the date of his/her signature.

H. As-Built Drawings of Completed Work in the Right-of-Way

As-built drawings indicating any changes to the approved plans of the constructed or revised facilities permitted in the right-of-way or on-site shall be provided to the City of Peoria Engineering Department within 30 days of completion of the project and shall be maintained by the permittee in accordance with State Statutes. The preferred format for the as-builts is digital format in AutoCAD format. The digital as-builts must conform to the Maricopa Association of Governments Computer Aided Drafting (CAD) standards.

I. "As-Built" Drawing Certificate

When the construction of improvements that will become the City's property has been completed, the City requires the developer to provide a set of drawings that accurately reflect the nature, locations and dimensions of those improvements. The civil engineer who makes the measurements to verify or correct the information shown on the plans must provide an "as-built" drawing certification statement on the plans. The certification statement (unsigned) shall be placed on the cover sheet prior to the time the plans are submitted for approval. The certification statement shall be placed on the lower half of the cover sheet near the approval block.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

J. Information on the Right Edge of the Sheet

Along the right edge of the cover sheet, provide the following information:

- The title of the plan
- The engineer's, architect's, or surveyor's name, fax and telephone number for contact by the City staff
- The City of Peoria Review number

This information along the right edge of the cover sheet will expedite handling by the City staff since plans won't have to be unrolled to find this information.

K. Other Information on the Cover Sheet

Some information, in addition to that described above, such as the names of the utility system owners, plan sheet index, or Maricopa County Environmental Services Department approvals may also be placed on the cover sheet. However, the construction notes (or general notes) and construction detail drawings shall be placed on a second or third sheet rather than attempting to include all of this information on the cover sheet.

L. "Arizona 811" Note

Provide the note: "Call the Arizona 811, Blue Stake Center (602) 263-1100, 48 hours before you dig for location of all underground utilities."

M. Estimate of Quantities

A thorough and completely itemized quantity list is required which includes the following, but not limited to:

- Cut and fill
- S.Y. of paving
- L.F. of curb and gutter
- S.F. sidewalk
- L.F. waterline, number of hydrants and valves
- Number of hydrant markers
- Number of services
- L.F. wastewater line, number of manholes, number of services

3.3.4 General Notes Sheet Requirements

Certain general notes are required with each set of improvement plans, depending upon the kind of improvements depicted on the plans. The required notes are presented in the **Section 3.10**. Please keep in mind that these notes shall be on every set of improvement plans, regardless of the type of improvements depicted on the plans.

3.3.5 Detail Sheet Requirements

A separate detail sheet shall be provided at the discretion of the consultant or when required by the City.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

Following information is required:

1. A typical cross section shall be shown for each street included on the street construction plans. The information required on a typical section is:

    - Dimensions and slopes
    - Street center line, right-of-way, and public utility easement
    - City of Peoria Details
    - Pavement structural design per MAG Standard Details and Specifications
    - Trim and match to existing street
    - Existing and proposed utilities
    - Landscape areas, wall locations

2. Special construction details as required shall be provided. Typically included are:

    - Modification or relocation detail for existing irrigation facilities
    - Special construction where utility conflicts exist
    - Other determined by the consultant or the City

3.3.6 Plan Sheet Requirements

Plan view sheets are allowed only for the following:

- Grading and drainage plans.
- On-site commercial water and sewer plans.
- Street light layout plans

3.3.7 Plan/Profile Sheet Requirements

Plan and profile sheets are required for each of the following plans:

- All parkway, arterial, collector and residential streets
- Water line plans for construction within the right-of-way
- All sewer line plans
- All storm drain plans for main lines and connector pipes

3.3.8 Presentation of Design Information

A separate plan set shall be prepared for each type of improvement, or a plan set may be prepared combining improvements (such as water and sewer). Off-site Improvements shall be submitted under separate cover, unless approved in writing by the Engineering Director or their designee.

A. <u>Water, Wastewater and Reclaimed Plans</u>

There are certain requirements in addition to those listed in this Chapter, which apply to the preparation of water, wastewater and reclaimed waterplans. The additional requirements are listed in Chapters 8 and 9 of this Manual.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

B. Paving Improvements

There are certain requirements in addition to those listed in this Chapter, which apply to the preparation of paving improvement plans. The additional requirements are listed in Chapter 6 of this Manual.

Street improvements shall be shown in both plan and profile views. The plans must show sufficient information to clearly indicate the scope of work. In cases involving significant amounts of grading, contour lines will be required on the plan views.

C. Striping and Signage and Traffic Signal

There are certain requirements in addition to those listed in this Chapter, which apply to the preparation of striping and signage and traffic signal plans. The additional requirements are listed in Chapter 6 of this Manual.

D. Grading and Drainage Improvements

There are certain requirements in addition to those listed in this Chapter, which apply to the preparation of the Grading and Drainage plans and Drainage Report. The additional requirements are listed in Chapter 4 of this Manual.

E. Landscape and Irrigation

The following requirements apply to plans for the installation of plants, landscaping materials and irrigation systems.

1. Plant Material List:
   - Key symbols for plants
   - Botanical and common plant means
   - Quantities of each plant type
   - Plant sizes
   - Planting details and instructions

   All landscape and irrigation plans shall be submitted to the Planning and Community Development Department for review, approval, permitting, inspection and final acceptance.

2. Landscaping in Drainage Ways
   Any landscaping proposed for a channel or for a drainage management facility shall be shown on the grading and drainage plans where the designs for the drainage facilities are shown. The engineer's analysis of the capacity and capability of the drainage facilities must take the proposed landscaping into consideration.

3. Retention of Trees
   Any requirement for the retention of trees or other plant material in a drainage way must be shown on the grading and drainage plans where the designs for the drainage facilities are shown. The type and diameter of each tree must be indicated.

4. Notes Concerning Existing Plants

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

Notes are required which describe the size and type of existing plants and which indicate whether the plants are to remain, to be removed, or to be transplanted.

F. Portrayal of Features in Project Area

Existing features and conditions surrounding the area where construction and/or grading is proposed shall be shown on the plans with sufficient detail and data to ensure drainage problems, or any other problem, will not be created by the construction work or will not exist when the work is completed. Normally, this requirement can be met by showing the features and conditions within 200 feet of the proposed work, but it is the engineer's responsibility to provide sufficient information to show that problems will not be created, regardless of how far from the edge of the proposed construction or grading features and conditions must be shown to achieve this goal.

G. Relocation of Facilities

If a plan calls for the relocation of a structure or facility in order to allow for construction of the desired improvements, the location to which the structure or facility is to be moved shall be shown on the plan. If a structure or facility is to be removed or taken away from the job site, a note shall state this clearly. The agency responsible for a relocation shall be indicated by a note.

H. Sight-Distance Requirements

The following requirement identified on City of Peoria Details PE-090 and PE-091, which pertain to sight distance requirements that must be observed in the preparation of plans for the construction of any structure, wall or fence and for the installation of trees, shrubs, and materials that could block a driver's vision of hazards.

I. Areas Adjacent to Curved Streets

Do not propose any structures, walls, fences, signs, berms, etc. or any landscaping or planting in the area between the curb on the inside of a street curve and the line of sight which will be higher than 18-inches above the adjacent curb. This restriction applies regardless of whether the land within the area is public right-of-way or private property.

J. Maintenance Responsibility

Notes must be provided on the final plat, landscape and grading and drainage plans which indicate who will be responsible for the maintenance of the landscaped areas.

K. Sprinkler Systems

All plants shall be watered by automatic sprinkler systems. Detailed plans of the systems must be provided. Drip systems may be used.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

3.3.9 Plan Revisions

If an approved set of plans must be revised, the following items must be provided:

- Cover letter addressing the revised items and reasons for revisions.
- Re-approval signature line added to the original cover sheet.
- Engineer's seal for the revisions added to the original cover sheet.
- All changes on the plan set must have clouds and deltas to indicate revisions.

After the revised plan set has been approved, and re-signed by the Engineering Director or their designee, a new permit must be pulled for the revised plans, and additional permit sets must be provided to the Engineering Department.

Approved plans shall be used as the permit set. Any changes to the plans that occur after the signed plans shall be submitted for review and approval prior to permitting.

3.4 Construction and Improvement Plan Submittal Process

As a part of the approval process for permitting as-builts and record drawings, electronic file submittals are required. Electronic base files of the civil plans that have been created or saved in AutoCAD 2010 or earlier format are required. All submittals are required to provide AutoCAD drawings. Images of the plan sheets for the project shall be submitted in PDF image format in separate PDFs for each permit plan set. These files will need to be submitted with the AutoCAD drawing at the approval (permitting) as-built and record drawing submittal.

Once an approved submittal has been obtained, the City of Peoria will import line work from the electronic submittal into the City's Geographical Information System (GIS) and electronic filing system.

The following requirements shall be met during the electronic submittal of civil plans:

3.4.1 CAD Drawings

1. CAD Drawings site/civil base models supplied to the City of Peoria will be created in relation to its geographic location. Use the Arizona State Plane Coordinate System, FIPSZONE 0202, North American Datum 1983, Units: International Feet (0.3048 Meters). This is the coordinate system recognized by the City of Peoria for all GIS applications.
2. A single base drawing is requested. If the drawing size is too large, line work can be divided into more drawings). Generally, the base drawing should include the Topography, Survey/Property line work, Site line work (curb, sidewalk, and walls), Utilities (storm, sanitary, and water), etc.
3. All CAD line work is to be created in model space. Text can remain in the drawings for user reference, but is not required.
4. All AutoCAD line work and symbols shall be separated onto known layers. The Engineer should follow the City of Peoria Layer Naming Convention or provide a layer list to the City.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

5. All CAD drawings (model space) will be referenced to at least two accepted geodetic control points identifiable via the Peoria Geodetic Network – these points may be part of the existing Peoria Bench Mark control project, Maricopa County Geodetic Densification and Control Survey (GDACS) control network (published through MCDOT), or any monument survey control system approved by the City of Peoria Engineering Department.
6. All external references shall be bound and inserted in the base drawing. Purge all empty layers, unused blocks, line types, dimension styles, plot styles, text styles, shapes, etc. from the base drawing.
7. The use of standard AutoCAD fonts and shapes is required. Non-standard fonts and shapes must be transmitted with the drawings in the original file format as separate fonts subdirectory.

The City of Peoria may modify CAD drawings to adapt projection into the ArcGIS environment. These adjustments will not impact the integrity of the survey but are for application of drawing information into the GIS environment.

The City of Peoria reserves the right to refuse CAD Drawings and Images that are not in conformance with the Submittal Requirements as outlined above.

3.4.2 Digital Submittal and Review

The City allows Digital Plan Review for several plan types.

1. Portable Document Format (.pdf) is the standard electronic file format for submittal and reviewing plans and supporting documentation.
2. Digital Signature Acceptance per the Board of Technical Registration, RA-30-304.G. Use of Seals: An electronic signature, as an option to a permanently legible signature, in accordance with A.R.S. Title 41 and Title 44, is acceptable for all professional documents. The registrant will provide adequate security regarding the use of the seal and signature. The codes and rules of the Board of Technical Registration at www.btr.state.az.us.

3.4.3 Utility Company Approvals

A full set of improvement plans, including Landscape Plans, Grading Plans, Paving Plans, Water Plans, and Sewer Plans together with the "No Conflict Form" shall be submitted to each of the following utility companies in parallel with the First Submittal:

- Salt River Project (SRP)
- SRP Land Department
- Salt River Valley Water User's Association
- CenturyLink
- Cable Television Companies
- Arizona Public Service (APS) (if project is located in APS service area)
- Southwest Gas and/or El Paso Natural Gas (if gas service is required)
- Other utilities in the project area

The design engineer will be responsible to provide the City of Peoria an executed copy of a conflict letter from each specific utility company.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

3.4.4 Submittal Checklist

A complete set of civil engineering construction plans (water, sewer, storm drain, grading and drainage, paving, etc) for each development (residential, commercial, and industrial) must be submitted to the Engineering Department for review and approval. Improvement plans shall comply with the requirements of Chapter 3. Deficiencies will be noted and the submittal will be returned to the applicant. Incomplete submittals will not be accepted.

The first submittal shall include the following:

- Completed checklist (completed submittal application, contact, ownership verification, 404, etc.). If ownership changes during the approval or construction process, a change in Ownership Verification Form will need to be completed and submitted.
- Payment of review fees.
- One copy of the site plan approved by Planning and Community Development Department and any P & Z stipulations.
- Ten full (24x36) size copies and 1 half size (11x17) of the Final Plat for distribution to City departments. The Final Plat shall match the approved Preliminary Plat. If any changes have been made, the changes shall be noted on a memorandum attached to each copy of the Final Plat.
- Four sets of Civil Improvement plans to include – 2 full size (24x36) and 2 half size (11x17)
- Four sets of Signing and Striping plans to include – 2 full size (24x36) and 2 half size (11x17), 2 copies of the Final Drainage Report.
- Two copies of the Water Analysis Report, One copy of the Sewer Analysis report, and original Maricopa County Environmental Services Department (MCESD) documents, along with an 8 ½ x 11 vicinity map.
- Two copies of the Traffic Impact Analysis (if not previously approved).
- Two copies of the Soils Report.
- Two copies of the Landscape/Irrigation plans (if required).
- Three copies of the Retaining Wall Plans and Structural Calculations (if applicable) – two (24” x 36”) and one (11” x 17”).

Second and subsequent submittals shall include:

- Final Plat redline comments from first review.
- Revised Final Plat – two (24” x 36”).
- Civil drawing redline comments from first review.
- A comprehensive list of changes made, that are not a direct result of City comments. If requested, the reason for the change shall be provided.
- Three sets of the revised civil drawings – two (24” x 36”) and one (11” x 17”).
- Fire Department redline comments from first review.
- Drainage Report redline comments from first review.
- Two copies of the revised Drainage Report.
- Four sets of the Street Light Layout Plans prepared by a professional Electrical Engineer.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

- Street Light Improvement District documents (See SLID Policy, if applicable).
- Maintenance Improvement District documents (See MID Policy).
- Local Street Signing Plans (as applicable) for Local Streets (Public and/or Private) – two (24" x 36") and one (11" x 17").

  NOTE: `If the time elapsed between submittals exceeds nine months, a re-review of the plans may be necessary. The Engineering Department will determine if the plan review status provided during the previous review will be void and if additional Engineering review fees will be assessed.

The latest version of the Submittal Checklists can be found on City of Peoria Engineering Services website. This Checklist may be periodically updated by the City of Peoria.

3.5 Assurance of Construction

Assurance of construction is required for all improvements. An assurance of construction is a financial security that guarantees completion of designated public improvements according to approved plans and is a precondition for recordation of a final plat. The owner/developer is responsible for providing the assurance of construction to the City.

If the owner/developer defaults on constructing improvements, the City may choose, among other options, to construct, maintain or remove the improvements in whole or in part; bring action to the developer's obligations; or otherwise mitigate the developer's failure to complete the public improvements.

3.5.1 Assurance Process

Prior to obtaining an Engineering Construction Permit for any developemnet project, the owner/developer must submit a fully executed copy of the Agreement to Install Improvements. There are two types:

Agreement to Install Improvements, INSTALL-A
This agreement must be accompanied by some form of assurance. The acceptable form of assurances are: Performance Bond from a Surety Bonding Company authorized to do business in the State of Arizona, Letter of Credit, cash, cashiers check, negotiable bonds, or an escrow account. The cost of the assurances shall be in the amount equal to 100% of the contract cost or 110% of the engineer's estimate or an amount determined by the Engineering Director or their designee.

Agreement to Install Improvements, INSTALL-B
This is an alternate form of assurance that may be available to the owner/developer. With this form of assurance, the owner/developer gives the City the right to withhold Certificates of Occupancy in the development until all improvements have been constructed and accepted. A letter must be provided by the owner/developer stating they have done work within the Phoenix Metropolitan area for a minimum of 3 years, a list of successfully completed projects, and a list of City employee contact names and numbers.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.5.2 Types of Assurances

The types of assurances acceptable to the City are outlined below. The owner/developer must use the appropriate City forms when providing assurance of construction.

A. Corporate Surety Bond

The corporate surety bond involves an agreement between the developer and a bond company to guarantee to the City that improvements will be made by the developer as planned and within a specified time frame. The surety must be a corporation authorized to transact surety business in the State of Arizona. The surety must have an AM Best rating of at least A+ VII or be on the latest US Treasury Department Listing of Approved Sureties. The bond must be prepared on the City's template and must be equal to 100% of a contract price or 110% of a sealed engineer's estimate.

B. Cash Deposits

The City does not have a cash deposit agreement. The amount must be equal to 100% of a contract price or 110% of a sealed engineer's estimate.

C. Letter of Credit

The letter of credit must be prepared on the City's template and must be equal to 100% of a contract price or 110% of a sealed engineer's estimate.

D. Escrow Agreement

The escrow agreement must be prepared on the City's template and must be equal to 100% of a contract price or 110% of a sealed engineer's estimate.

3.6 Right-of-Way Management – Permit Requirements

This section outlines the requirements for securing an Engineering Construction Permit for encroaching into the City of Peoria's public rights-of-way and public easements. It is the responsibility of the permit applicant to obtain and fulfill any and all other requirements found in the City of Peoria Ordinances and City Code whether or not they are referenced or stated in this Manual.

The City of Peoria administers the plan review, permitting and construction processes in accordance with the following documents:

- City of Peoria Standard Details.
- Maricopa Association of Governments (MAG) Uniform Specifications.
- City of Peoria Engineering Standards Manual.
- Arizona Utility Coordinating Committee (AUCC) Public Improvement Project Guide.
- City of Phoenix Barricade Manual and the Manual on Uniform Traffic Control Devices.

Permits are necessary to assure that all work in the right-of-way is completed in the proper location with adequate spacing; built with acceptable materials and in accordance with current specifications; installed in a safe and expeditious manner;

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

that final completion is assured and acceptable; that all infrastructure is protected; that unnecessary traffic delays or congestion to the traveling public is limited; that all landscaping is restored; and that liability issues are properly addressed.

Engineered construction drawings (plans) must be submitted for review. The objective is to make optimal utilization of the space available in the public rights-of-way and public utility easements; to assure compliance with all City of Peoria ordinances, policies and standards; to assure coordination with other right-of-way users, agencies, and City of Peoria project activities; and to reduce risk and/or inconvenience to the traveling public.

Permits are reviewed in scope by the City of Peoria Engineering Department and these permits do not relieve a permittee from any of the stated standards in the Permit Requirement section above, and/or any federal, state, City or industry accepted practice. It is the permittee's responsibility to ensure compliance with all of the above stated requirements. Permittee plans that have been reviewed by the City do not relieve a permittee of this requirement unless the deviation from these standards is clearly specified on the plans and permit, and the permittee has received an additional approval granted in writing by the City of Peoria, in addition to the standard City permit approval. This additional approval does not waive any other stated requirements on the plans or stipulations to the plans.

3.6.1 General Right-of-Way Encroachment Permit

A permit is required for any encroachment in, on above, over, under, or through the City's public rights-of-way or public easements.

3.6.2 Emergency Encroachment Permit

For emergency repairs involving loss of service, the permittee shall call the Engineering Department Inspection Division at (623) 773-8434 to state the type of emergency, the location, the number of lanes closed, a contact name, estimated time to complete repairs, and a cell phone number. A TCP shall be faxed to the Engineering Inspection Division (623) 773-5371 within 24-hours. Note: the installation of new service is not an emergency. The appropriate construction signage shall be posted by the permittee.

3.6.3 Annual Maintenance Encroachment Permit

A permittee who owns an improvement in the City's public rights-of-way may apply for an annual maintenance encroachment permit (Blanket Permit). The annual encroachment permit must be renewed every year. Permitted activities include entering manholes, cabinets, or other above/below ground improvements but do not include any pavement cutting.

Permit fees and other construction costs are collected upon issuance of each individual permit in accordance with the Peoria City Code except as superseded by a franchise or license agreement. On joint trench projects, the surcharge fee will be apportioned to the participating agencies.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.6.4 Grading at Owner's Risk Permit

The Engineering Department will issue a "Grading at Owner's Risk" permit which is effective for 60 calendar days provided that the developer/owner/contractor agree to complete the items listed below. No other permits such a water, sewer, concrete, dry utilities or paving will be issued until such time as all civil construction drawings are approved by the Engineering Department, the Grading and Drainage Permit is obtained, all fees identified by the plan approval letter have been paid to the City, all documents; SLID, MID, Street Light Warranty Agreement, Agreement to Install, etc., have been executed by the developer and accepted by the City, the City of Peoria business license is obtained and proof of insurance is submitted to the City.

Application shall be completed by the applicant. The application shall contain the following information:

- Identify and describe work to be covered by the permit.
- Indicate intended use for which the site is being prepared.
- Permit application is to be signed by the authorizing agent.
- City must complete first review of Grading and Drainage plans for the proposed development and find that the plans are substantially acceptable.
- City must approve the SWPPP for the proposed development.
- Developer must provide to the Engineering Department three copies of the red lined Grading and Drainage Plans and approved SWPPP. The red lined plans will alert the Engineering Inspector that the project has not been approved, but has been reviewed at least one time and also make them aware of the possible changes.
- Contractor shall provide to the Engineering Department a copy of the Dust Control Permit per Maricopa County Rule 310.
- Developer/Engineer/Contractor must provide to the Engineering Department copies of the cut/fill quantities.
- Contractor shall obtain a "Grading at Owner's Risk" permit at a cost of 150% of the actual grading and drainage permit cost up front, which has a one time "life" of 60 calendar days. The 150% fee will be applied to towards the actual grading and drainage permit.
- Developer/Contractor must provide the following information when applying for a "Grading at Owner's Risk" permit:
- A haul route permit must be obtained if 100-cubic yards of material or more will be brought onto or exported from the site.
- Letter of Authorization from property owner in which material is being removed or hauled onto.
- Contractor shall provide to the Engineering Department a list of 24-hour emergency telephone numbers.
- The Developer/Contractor must provide a letter to the City guaranteeing the repair of any street or other improvements that may be damaged during the hauling of the material.

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

- The Contractor must provide the necessary Traffic Control Plan and Traffic Control devices including Off-duty Police Officers in accordance with City of Peoria, MUTCD and Phoenix Barricade Manual standards.

3.6.5 Haul/Encroachment Permit

In accordance with Chapter 20 of the Peoria City Code a haul route permit is required for each site in order to move 100-cubic yards, or more of material off-site or bring material on site. To obtain a haul route permit, an applicant shall submit in writing on a form provided by Development and Engineering Department, an application and a diagram showing the specified route. The application shall contain the following:

- Identify and describe the work covered by the permit.
- Describe the land on which the proposed work is to be done by lot, block, tract, or similar description that will identify readily and definitely locate the proposed work and give name and address of property owner.
- Indicate the intended use for which the site is being prepared.
- Give proposed location of deposit area and name and address of person who will receive excavated material and evidence that he/she is willing to receive material (if offsite).
- Be accompanied by plans, specifications and a soil and drainage report and a SWPPP, if requested.
- When the proposed Haul Route impacts another jurisdiction, the Engineering Department requires approval in writing from the affected jurisdiction. The written approval(s) shall be submitted with the Haul Permit application.
- State the estimated quantities of earthwork involved.
- Be signed by the permittee, or his agent, who may require submitting evidence to indicate such authority.
- Locate all retaining walls (and state height) planned in the project.
- Provide typical cross sections of retaining and privacy walls at all locations where a change in grade occurs along the perimeter of the entire site.
- Obtain all applicable Maricopa County Air Quality Control permits and submit/incorporate it as part of the overall grading permit.
- Give such other information as reasonably may be required by the Public Works Director or his designee, i.e. proper insurance information, 24-hour emergency telephone numbers, traffic control plan, provide off-duty police officers.
- Payment of the application fee currently established by the Peoria City Code.

3.6.6 Over Dimensional Load Permit

Under Chapter 14of the Peoria City Code, the Chief of Police or his/her designee, upon written application and with good cause being shown, may issue an oversized or overweight permit, authorizing the applicant to operate or move a vehicle, or a combination of vehicles, of a size, weight, or load exceeding the maximum set forth in Arizona Revised Statutes, Sections 28-1008, 28-1009 and

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

28- 1009.01, the provisions which are adopted by reference as though fully contained in the Peoria City Code.

The Chief of Police or his designee may establish seasonal or other time limitations on such permits which the vehicles described may be operated on the streets indicated, or otherwise limit and prescribe conditions of operation of the vehicles when necessary, to ensure against undue damage on the road infrastructure and/or surfaces, and may require other security as he deems necessary to compensate for any damage to a roadway or road structure. The person for whom the permit is issued is liable for any damage caused by his/her actions, and for the actions of parties carrying out the work covered under the permit.

A fee shall be issued for each permit. The fee shall be assessed in the amount provided in Chapter 2 of the Peoria City Code for each 30-day period.

A 30-day permit may be issued for the movement of over dimensional and/or overweight loads as long as any load to be carried within the 30-day period does not exceed the specifications listed on the permit.

A single trip permit may be issued under the same premise as is a 30-day permit, but is valid for only three days from the date of issuance. A fee for this permit shall also be assessed in accordance with Chapter 2 of the Peoria City Code.

Applications for Over Dimensional or Over Sized Load permits along with a map showing the proposed route must be submitted to the Police Department not less than five working days prior to the time that work, described on the permit, is to commence.

At the discretion of the Chief of Police or his designee, a permit holder may be required to have escorts and/or direction and control by permit holder and shall utilize vehicle markings that are visible from a minimum distance of 200-feet in daylight.

Loads with widths wider than 25-feet and/or heights greater than 15-feet will require review of the Public Works Director, or their designee, before a permit can be issued.

The Chief of Police, Engineering Director, or their designees, may suspend permits for reasons of public safety concerns and/or negligence.

3.6.7 Permit Procedures

The appropriate Engineering Construction Permit for development related construction shall be obtained from the City of Peoria Engineering Department counter, located on the first floor of the Development Community Services Building, 9875 N. 85th Avenue. Permits for off-site construction are issued following plan approval by the Engineering Department.

Prior to obtaining an Engineering Construction Permit for any development project the owner/developer shall provide the following information:

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

- Proof of a recorded Final Plat or approved Site Plan.
- Required assurances in place.
- Developer responsible to pay all development related fees.
- Three sets of approved construction plans - one full size (24x36) and two half size (11x17).
- Project schedule.
- All contractors, subcontractors, and developers must provide a Certificate of Insurance naming the City of Peoria as "Certificate Holder and Additionally Insured", including Liability, Auto, and Worker's Compensation.
- A copy of the signed construction contract showing quantities. The permit fee for water, sewer, trenching, conduit, gas or other pipelines, drywells, curb, gutter, sidewalks, driveways, flood irrigation, landscape, landscape irrigation, well abandonment and utility lines, is 3.5% of the contract price plus an administration fee, for each permit.
- A copy of the signed grading and drainage construction contract showing total cubic yards (cut and fill). The fee calculation is based on the total cubic yards. A special permit fee will be charged for custom homes.
- All contractors, subcontractors, and developers must obtain a license to operate in the City of Peoria.
- Each development is subject to certain fees as identified below. Such fees must be paid prior to the issuance of an Engineering Construction Permit.

Although all appropriate Engineering Construction Permits may be issued simultaneously subject to the provisions listed above, the City of Peoria will not allow construction of above ground street improvements (curb, gutter, sidewalk, paving, etc.) until the water and sewer lines, trench bedding and backfill have been installed, tested, videoed, inspected and accepted by the City of Peoria and the Substantial Letter of Completion has been issued. Upon the issuance of the Substantial Letter of Completion the City will allow the construction of the curb, gutter, sidewalk and paving construction to commence.

3.6.8 Utility Company Permit Process

Prior to the issuance of an Engineering Construction Permit for any Utility Company the specific utility company shall submit a permit application together with four sets of plans.

Upon receiving the appropriate drawings, details and notes, etc., the City of Peoria will log the request into the City's automated permit system and route the documents to the appropriate departments for technical review. The review includes, but is not limited to, checking for compliance with construction standards, approving alignments, verifying that work is in the public rights-of-way or easements, determining if other work is occurring at the same time or at the same site, verifying that all joint trench opportunities have been incorporated to the design, checking for conflicts, reviewing traffic impacts, and verifying that all City requirements have been met and been incorporated into the plans. In addition, the City will check to see if the utility company has obtained a Franchise

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

If the utility company does not have a Franchise Agreement with the City, up to five Revocable permits may be issued by the City. The utility company will be required to obtain a Franchise Agreement if more than five Revocable permits are requested.

Upon completion of the review, the permit request will either be issued to the applicant or denied and returned to the applicant for further modifications. Permits are issued for 90 working days. Special conditions or stipulations may have been added to the permit by the City after submission by the applicant. It is important that these conditions be carefully reviewed by the applicant for compliance upon issuance by the City of Peoria. If additions or corrections are required to the plans, the applicant will be notified and asked to make the corrections and resubmit to the City.

For more information on the construction of non-City utilities see **Chapter 12**of this Manual.

Fees for all permits will be charged as set forth by City Code. Permittees must demonstrate proof of insurance as required by City Code.

3.6.9 Permit Fees

Fees are payable at the time permits are issued and are based upon construction quantities. The Engineer/Contractor/Developer is responsible to provide quantities through the submittal of a copy of the construction contract or a certified engineer's estimate. Water, sewer, paving, concrete and dry utility permits are based on 3.5% of the contract amount or certified engineer's estimate.

The sequence of permits and construction is at the discretion of the developer with the following exceptions:

- The storm drain system must be installed and accepted by the City prior to commencement of the concrete and paving phase.
- The water system must be pressure tested and pass the bac-t test prior to commencement of the concrete and paving phase.
- The sewer system must be pressure tested, lamped, mandreled and videoed prior to commencement of the concrete and paving phase.
- The dry utilities must be installed prior to commencement of the concrete and paving phase.
- Bedding and backfill compaction test results must be submitted, review and accepted by the City prior to commencement of the concrete and paving phase.

In addition, all fees identified on the plan approval letter must be paid in full prior to the issuance of any Engineering Construction Permit. The developer is responsible to contact all other City Departments to obtain a listing of any applicable fees. Refer to the following information and the City's Fee Schedule for all fees.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

1. The project may be located within the boundaries of a water and/or sewer buy-in fee zone. The owner/developer will be notified during the review process of the specific zone and the associated charge per acre or per lineal footage.

2. The project may be located within the boundaries of an improvement district. The owner/developer will be notified during the review process and must determine whether an assessment modification will be required. If an assessment modification is required, the owner/developer is responsible to reimburse the City for the Assessment Modification fee and the proposal fee from the Improvement District Engineer.

3. The City will fog seal the streets for each new development approximately 1-year following the final acceptance. The owner/developer will be charged a fee for the total square yardage of asphalt. The asphalt quantity listed on the cover sheet will be used to calculate the total fog seal fee.

4. Application fees per lot for the formation of Streetlight Improvement Districts (SLID) and the per lot fee for the formation of the Maintenance Improvement Districts (MID).

5. Provide payment of the per lot addressing fee.

6. Provide payment per sheet for first, second and third plan review and each review thereafter.

7. The Owner/Developer is responsible to pay all applicable City Expansion fees.

8. The Owner/Developer is responsible to pay all street cut surcharge fees.

9. Any right-of-way or easement dedication fees.

3.6.10 Permit Durations

The Engineering Construction Permit for any development project will be valid from the date of issuance for an approved timeframe of nine months. The permit shall be activated by contacting the Engineering Automated Inspection Request line at (623) 773-8445.

The permit request by the utility companies shall state the anticipated length of construction in calendar days and/or weeks and state the anticipated start date for construction. The City may require additional construction scheduling information on a case by case basis. The permit will be valid from the date of issuance for an approved timeframe of 90-days.

The permit shall be activated by calling the Engineering Automated Inspection Request line at (623) 773-8445 a minimum of 48-hours prior to start of construction and obtaining approval of a barricade plan (if needed) prior to

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

commencing work. Failure to expeditiously complete the current project within the permitted timeframe may result in denial of future permits until the currently permitted project(s) is completed to the City's satisfaction.

3.6.11 Permit Suspension, Revocation and Enforcement

The City may take enforcement action to protect the public interest in the right-of-way, including:

- Issuing a stop-work order, and
- Suspending or revoking a permit.

The City may take enforcement action under several conditions, including the following:

- If the permit holder's insurance lapses or expires
- If any false statement or misrepresentation was made in the application or improvement plans on which the permit was based.
- If an emergency or other circumstance significantly interferes with the public uses of the right-of-way.

3.6.12 General Insurance Requirements

Prior to permit issuance, permittee must identify and list all agents, contractors and all tiers of subcontractors who will perform work for permittee under subject permit. All such agents, contractors and subcontractors must comply with all of the above provisions, including but not limited to, providing a Certificate of Insurance to the City of Peoria containing all of the insurance requirements set forth in this section. If permittee engages any other agents, contractors or any tier of subcontractor not initially scheduled, prior to work commencing, permittee must notify the City of Peoria of such agent, contractor or subcontractor and such agent, contractor and subcontractor shall submit the appropriate Certificate of Insurance in compliance with this section.

No applicant shall be entitled to an Engineering Construction Permit unless they have filed and maintain on file with the City a current Certificate of Insurance certifying that the permittee carries public liability and property damage insurance issued by an insurance carrier authorized to do business in the State of Arizona, insuring the applicant and the City and its agents, against loss by reason of injuries, to, or death of persons, or damages to property arising out of or related to work performed by the applicant, its agents or employees while performing work under the permit. Such insurance shall be primary and provide coverage for liability assumed by the applicant under this agreement and shall be provided by the permittee in the amounts established by the City.

3.7 Right-of-Way Management – Construction Work Activity

3.7.1 Traffic Control Plan (TCP)

The purpose of the TCP is to proactively plan for, coordinate, and minimize the impacts of encroachment and construction in the right-of-way to the traveling public, i.e,

- divert multi-lane traffic at signalized intersections

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

- divert traffic across the yellow center line
- divert traffic from a paved surface
- require roads to be closed

A TCP shall be submitted by the permittee prior to (with permittee plans) or submitted with the permit application for all proposed work in or on arterial or collector streets.

The TCP will be reviewed and approved by the Engineering Department prior to commencement of construction. The plan shall indicate the construction duration and schedule and the hours of operation for the project. The plan shall show the proposed work location area in detail and describe the traffic routing, traffic control devices, signage and construction traffic routing proposed. Additional information and stipulations may be required by the Engineering Department on a case by case basis. This requirement is in addition to the submission of a TCP prior to the start of construction.

1. A TCP shall be submitted to the City of Peoria Engineering Department a minimum of 72- hours (three working days) prior to any proposed partial or complete street or alley closure. TCP submittal forms and traffic control plans shall be submitted to the Traffic Control Mail Box via email at tcp@peoriaaz.gov. For questions, please contact (623) 773-7878. The Engineering Department will review all TCP's prior to TCP approval and commencement of work by the permittee. Work shall not commence on the portion of the project requiring street barricading until approval has been obtained in writing from the Engineering Department.

2. Work in/on residential streets typically does not need a separate TCP, unless requested by the Engineering Department. All signs, barricades and other necessary traffic control devices shall be placed in accordance with the Manual on Uniform Traffic Control Devices.

3. Design and implementation of the TCP shall be performed by a well-trained and knowledgeable individual assigned the responsibility for traffic control devices at work sites. This individual must be ATSSA (American Traffic Safety Services Association) certified.

4. The TCP shall include the identification and location of all barricades and signs, the hours of operation for the project, the construction duration and schedule, location of Variable Message Signs or arrow boards, bus stop signs, advisory signs for relocation of bus stops, detour plans, relocated traffic control signs and the project identification signs. Construction project signage shall be posted by the permittee.

5. A copy of the approved TCP shall be available at the job site at all times for the duration of the project.

It is unlawful for any person or entity to install on any street or sidewalk on any City street a traffic control device, barricade or any other item interfering with the movement of vehicular or pedestrian traffic without first having obtained an individual permit or approved construction plans and approved TCP issued by the Engineering Director or their designee.

The Engineering Director or their designee may remove summarily without notice from any street or sidewalk any traffic control device, barricade or other item interfering with the movement of vehicular or pedestrian traffic that has been placed in such a location without an individual permit or approved construction plans.

1. Any item summarily removed may be removed and notice provided to the owner by first class mail or telephone.

2. The owner of such traffic control device, barricade or other item interfering with the movement of vehicular or pedestrian traffic shall be charged a storage fee. In the event of a conviction for violation of this section, the Court shall impose all current due and pending storage charges as restitution to the City.

3. Violation of this section shall be subject to a fine for an individual and for an enterprise. The Court may order the revocation of any right-of-way, construction or barricade permit, TCP or direct that the approval of the construction plans be revoked.

4. Traffic lanes shall normally be 12-feet in width and have safe operating speed of 25-miles per hour. When traffic control plans call for an asphalt or oil paved detour, the contractor shall provide and maintain it in a safe drivable condition. When traffic is diverted from the pavement, the contractor shall provide a suitable graded surface with proper dust control.

5. Except under emergency conditions, streets shall not be closed for construction activity unless prior approval is obtained from the Public Works Director or their designee.

3.7.2 Water Ramp

When the water supply source for the construction project is located on the opposite side of the street, the City does not allow the placement of the supply hose and ramp across arterial or collector streets.

The contractor/developer may submit an application to the Engineering Director or their designee for permission to place the hose and ramp across any local street. The application shall include the manufacturer's specifications, materials used, dimensions of the ramp, proposed location of the ramp and proposed barricading and signage.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.7.3 Pavement Cut

As outlined in Chapter 23 of the Peoria City Code, if the City finds and determines that pavement cuts cause early deterioration of newly paved, resurfaced or sealed public streets less than 36- months old, the permittee will be assessed street cut surcharge fees.

3.7.4 Street Boring

The City developed this Policy for street utility crossings using boring methods. This Policy provides a reliable procedure to conduct the street crossing, minimize the likelihood of inadvertent damage to existing facilities within the street, minimizes the disruptions to the motoring public and reduces the future maintenance required on the street by eliminating the pavement cut (open trench).

Whenever possible, utility companies must install their facilities within the public right-of-way or easements and outside of existing pavement surfaces. The City understands that, at some time, the utility must cross a street to provide service on the opposite side. Crossing the existing street must be bored or punched unless permission is given to open cut has been given in writing by the Engineering Director or their designee on a case by case basis. The burden of proof will lie with the permittee to show that boring is not a feasible requirement.

A. <u>Permit Requirements:</u>

The following information must be included on the plans:

- Utility owner and contractor name.
- Site layout plan, project schedule and company experience record.
- Location of entry and exit points, access pit locations, and equipment and pipe layout areas.
- Proposed drill path alignment (both horizontal and vertical) to include the lowest point of the roadway cross-section.
- The location and clearances for all existing utility crossings, structures, etc. must be located vertically and horizontally.
- Designs with pavement boring shall include a boring profile to ensure proper separation is maintained from City of Peoria Utilities and other existing utilities. Profiles of existing City of Peoria facilities and other utilities that cannot be verified by as-built records shall be potholed.
- The City recognizes that supplying this information too far in advance may not be accurate when the contractor begins the drilling operation. Therefore, this information can be submitted to the City's Inspector no later than 48 hours before the contractor begins the drilling operation.

B. <u>Street Bore Requirements:</u>

- Utility companies shall comply with ARS 40-360.22(d) when locating underground facilities prior to construction.
- Potholes in residential streets may be temporarily repaired (compacted soil and cold patch asphalt) when the bore will commence within 30 days of the pothole excavation. Should the temporary repair fail, the permittee

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

shall make pavement restoration within24-hours of notification from, and at the direction of the City Inspector. Potholes in arterial streets must be permanently repaired immediately following pothole excavation.

- The contractor shall prepare an emergency response plan in the event of a utility strike. The plan shall be submitted and on file with the City of Peoria prior to the issuance of any permits by the City.
- The contract shall restore all landscape materials and irrigation systems damaged during the project.

C. <u>Backfill and Pavement Restoration Requirements:</u>

- Backfilling of the bore pits and trenches shall be ½ sack ABC slurry.
- Pavement replacement as specified by pavement design engineer construction documents, 4-inches, or existing asphalt concrete thickness; whichever is greater.
- The patch shall be permanently placed per MAG specification and City standards. The City of Peoria Engineering Inspectors shall approve the asphalt mix design.

3.7.5 Potholing (Vacuum Excavation)

The City of Peoria does not consider potholing to be an option. Rather, it is viewed as an essential phase of underground construction for all types of excavation. This practice describes potholing activities that will occur immediately proceeding or in conjunction with construction activities. Potholing can also be utilized during the planning and design phases of the project. The requirements for potholing are as follows:

- A permit is required for all utility location work within the City right-of-way.
- The potholing method must be specified on the permit application.
- A Traffic Control Plan (TCP) shall be submitted to the Engineering Department and approved for each pothole location.
- The permit and the TCP must be approved and permitted before any work can begin.
- The contractor is responsible to obtain a hydrant meter and backflow preventer before using water from a City fire hydrant.
- As with all excavations, call for utility locates through the Arizona Bluestake is required.
- The City requires the contractor to comply with the requirements for coring, vacuum excavation, backfilling and reinstatement of asphalt core into asphalt pavement as specified in Section 355, Utility Potholes-Keyhole Method, of the MAG Specifications.
- Excavation requires coring a circular hole through asphalt pavement using drilling/coring equipment and removal of the intact asphalt pavement core. The vertical alignment of the coring operation shall be perpendicular to the horizon and cutting shall be extended the full depth of the existing pavement section.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

- Pavement cores shall not be greater than 24 inches in diameter, shall not be spaced closer than 3 feet between cores (edge to edge), shall not contain a joint or any pavement cracks greater than 1/8-inch wide, and shall only be obtained from pavements where the asphalt concrete section is at least 4 inches thick.
- Contractor shall place a temporary mark (paint or chalk) on the pavement core and adjacent pavement prior to cutting to ensure that the pavement core when replaced will have the same orientation as found in the original pavement.
- Pavement cores shall be either removed from the work site or stored in a safe and secure on-site location. The cores shall be made readily available for reinstatement into the pavement.
- Soil shall be removed by air/vacuum extraction methods to expose utilities. The zone of soil removal shall remain essentially within a vertical plane extending below the edges of the core hole.
- The Contractor shall dispose of all excess materials.
- Utilities exposed by potholing must be protected throughout the project duration; as necessary, place temporary support or shoring to support so that exposed utilities do not shift or sag when the soil that was supporting and protecting them is removed; and/or place a barrier that protects exposed utilities from heavy and sharp items that could fall into the excavation.
- Once the utility is exposed, record the horizontal and vertical position and the depth below surface. These dimensions must be included in the as-built drawing package for the area being excavated. Methods include tying the measure to a survey benchmark or permanent above-grade feature using GPS, using potholing traditional survey coordinates, or measuring the distance to permanent landmarks.
- Once the underground utility is located, the pothole should be managed in the same manner as any other open excavation: place barricades, traffic plates, or other measures until backfill and restoration is carried out.
- Backfilling shall be ½ sack ABC slurry.
- The contractor shall reinstate the pavement core within 24 hours of cutting the pavement. Holes left open longer than 24 hours after cutting shall be covered with an approved steel road plate.
- The pavement surface shall be restored to its original condition by setting the reinstated pavement core flush with and in its original orientation.
- Bonding agent meeting the requirements of MAG Section 708 shall be used for pavement core reinstatement. Excess bonding material shall be removed from the restored pavement surface. A "patched" appearance shall be avoided in surface restoration wherever possible.

3.7.6 Work Hours in The Public Rights-Of Way

No interference with traffic flow on arterial streets shall be permitted during the hours of 6:00 a.m. to 8:30 a.m. or from 4:00 p.m. to 7:00 p.m., unless prior authorization is obtained in writing by the City of Peoria Traffic Engineer or their

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

designee. Specific work hours may be stipulated by the City on the project's barricade plan.

During off peak traffic hours, the minimum number of lanes shall be two lanes (one in each direction) on streets with four lanes or less and four lanes on streets with five or more lanes.

Night work must have prior authorization from the City. In addition, certain areas of the City may have seasonal or special event restrictions for construction work as designated by the City on a case by case basis.

3.7.7 Construction Hours

The City of Peoria Code establishes construction work hours as follows:

TABLE 3 - 1 CONSTRUCTION WORK HOURS

Construction Type	April 2 – September 29	September 30 – April 1
Concrete Work	5:00 a.m. to 7:00 p.m.	6:00 a.m. to 7:00 p.m.
Construction other than concrete (Residential Zones or within 500 ft. of Residential Zones)	6:00 a.m. to 7:00 p.m.	7:00 a.m. to 7 :00p.m.
Construction Work other than concrete (Commercial and Industrial Zones or more than 500 ft. of Residential Zone)	5:00 a.m. to 7:00 p.m.	5:00 a.m. to 7:00 p.m.

3.7.8 Use of Off-Duty Officer

The permittee shall provide a uniformed off-duty officer to assist with traffic control when the construction zone extends within 300 feet of a signalized intersection or whenever traffic in any one direction is restricted. An off-duty officer may be required at other times if construction conditions dictate or by direction of the Engineering Director or their designee.

3.7.9 Construction Sign

The permittee shall post information signs on construction vehicles and at the work site identifying the name of the utility authorizing the work. The purpose of the sign is to identify the permittee authorizing the work and the contractor performing the work. The sign information shall include a phone number where a person can call and receive information about the job and leave a message. The permittee must respond to all phone messages within 24-hours. In addition, all permittees must return regular traffic control signs back to their original place and replace any signs damaged during construction. General signage requirements are listed below. Specific project signs may be required on a case by case basis.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

A. Arterial Streets

Projects on arterial streets, as identified by the City of Peoria Street Classification Map, that are either; a) greater than one mile in length or b) have a construction timeframe of 30 calendar days or longer, must utilize the following signage:

1. Variable Message Board (VMB) or Portable Arrow Panel type signs at each end of the project that indicate the following:

    - Location of construction, including cross street names.
    - Direction of travel restricted.
    - Dates and duration of construction.
    - Alternate route suggested.

2. Stationary Signs at end of the project that indicate the following:

    - Names of authorizing company and permittee.
    - Phone number for job information and to leave a message.
    - Estimated start and completion dates for the project.
    - Project description.

3. Variable Message Board (VMB) signs shall be placed 5 working days before commencement of construction or as otherwise directed by the City.

B. Collector Streets

All projects on streets not classified as arterial streets must post the following information:

- Names of authorizing company and permittee.
- Phone number for job information and to leave a message.
- Estimated start and completion dates for project.
- Project description.

3.7.10 Striping and Marking Facility

All striping and markings removed during construction by the permittee shall be replaced by the permittee. The City of Peoria Public Works Field Operations Division shall approve all obliteration, layout of markings to be replaced and type of material used to replace the striping and marking.

3.7.11 Utility Conflict Review

The developer or a designated representative of the design team is required to contact the Blue Stake Center, other jurisdictions, and any City and non-City utilities or service providers within the project limits to determine the locations of their facilities within the areas affected by the project. Information about the Arizona Blue Stake one call locating identification center can be in Quick Links.

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.7.12 Private Water Companies

There are a number of private water companies with service areas within the Peoria City limits. The private water companies include: EPCOR Water, Sunrise Water Company, and Rose Valley Water Company.

For those land development projects that will be provided water utility service from a private water company, the City of Peoria will require:

- Improvement plans submitted for review, that contains the water system design along with construction notes. The design must comply with the City of Peoria Infrastructure Guidelines.
- A copy of the approval from the private water company to install their water mains & facilities within City of Peoria's rights of way and public utility easements.
- A private water company utility easement for the subject water mains and facilities.
- Upon plan approval by the City of Peoria, a separate Right-Of-Way Permit will be required to install these facilities.

3.7.13 Abandonment of Facilities in The City's Right-of-Way

The purpose of this section is to outline the procedure the City of Peoria will follow to determine if utility facility removal is required or if alternatives may be used. The Engineering Director shall ensure that all provisions of this section are followed.

Utility facilities include any publicly or privately-owned assets including pipelines, conduits, wet and dry utilities of any kind, structures, and related features placed or located in the City right-of-way (ROW).

The City will review proposals to abandon utility facilities within its right-of-way on a case-by- case basis. The Engineering Director, or his/her designee, will determine if utility facility removal is required or if abandonment in the ROW will be allowed. All work in the ROW must meet City requirements as stated in this Manual.

Utility facilities may be considered for abandonment in the ROW when one or more of the following conditions apply:

- The City plans to transfer ownership of the right-of-way to another party and the receiving party allows abandonment of utility facilities within its right-of-way;
- Removal of the utility facility would involve cutting a pavement structure less than 2 years old;
- Removal of the utility facility would disrupt traffic or create a threat to public safety;
- The Utility submits justification to the City that the cost of the removal would exceed the public benefit;
- The abandoned utility facility would not create conflict for future improvements;

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

- Removal of the utility facility can be accomplished by the Utility at a later date during future project construction/reconstruction;
- City determines that it may remove the abandoned utility facility in the future without cost increase to current or future projects;

Requests to abandon a utility facility shall be made as part of the City's permit process as discussed in this Manual. A request to abandon the utility facility with appropriate justification shall be attached to the Utility's permit application. The Utility owner shall adhere to the following procedures:

- The Utility owner shall maintain installation records for all utility facilities that are approved for abandonment. The Utility shall make these records available to the City at the time of request for abandonment. When the City provides copies of plans for City projects, the Utility shall respond to the City identifying conflicts with their abandoned facilities and provide Blue Stake services according to Arizona Blue Stake law, (Title 40-360.22.L.) If the abandoned utility facility must be removed to accommodate a City project, the City will notify the Utility owner.
- The Utility owner shall remove all appurtenances to all utility facilities approved to be abandoned. This includes above ground, below ground and surface features such as valve boxes, service lines, backflow devices, air valves, fire hydrants and all related connecting piping.
- The Utility owner shall purge, cap or plug the ends of all utility facilities and conduct whatever procedures are necessary to safely abandon the utility facility. In general, this will include filling all empty pipes, structures and related features with approved concrete grout.
- The Utility owner shall be responsible for all of the costs associated with the maintenance, removal, or relocation of its abandoned utility facility within the City's right- of-way.
- In the event of a conflict between a City project and an abandoned utility facility, the Utility owner shall remove or pay for removal of the utility facility provided that the Utility owner did not have prior rights.
- Conflict is defined as and caused by the following:
    - A grade change resulting in less separation from the proposed work than is acceptable;
    - The proximity of the abandoned utility facility interferes with the constructability or construction method;
    - The utility facility impacts construction efficiency, project schedules or phasing;
    - The location, type or size of the utility facility interferes with construction and/or operation of City's projects and results in an increase in the City's cost of work;
- If the Utility owner later decides to remove the abandoned utility facility, the Utility owner shall follow the City's permit requirements outlined above.
- Should the Utility owner request to include utility facility removal as part of a City construction project, such request shall be made with sufficient

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

time to allow for incorporation of the removal into the design of the City project. Utility owner shall reimburse the City for all costs associated with such removal and disposal of the utility facilities.

- If an unmarked or unanticipated abandoned utility facility is discovered in City ROW the Utility owner will be responsible for removing it according to the applicable policies herein.
- Appeals may be made to the Engineering Director.

3.7.14 Inspection

All above ground and underground facilities and equipment placed in the public rights-of-way and all construction work done in the rights-of-way shall be subject to periodic and final inspection by the City of Peoria for compliance with all permit requirements, as well as applicable City, state and federal laws. Permittee must notify the City of Peoria Engineering Department Inspection Division at (623) 773-8445 at least 48-hours prior to beginning permitted construction work in the right-of-way. Requests for City inspections must be made 24-hours in advance of required inspections.

3.8 GIS Requirements

The City is using GIS technology for capturing, managing, analyzing, and displaying all forms of geographically referenced data and information. GIS data submitted to the City shall comply with the Arizona Spatial Data Accuracy and Geo-Referencing Standards available from the Arizona Professional Land Surveyors (APLS).

3.9 As-Built and Record Drawings

3.9.1 As-Built Plans

The following additional requirements apply to As-Built Plan Submittal.

A. <u>As-Built Review Process</u>

A set of blue-line plans must be submitted with “as-built” redline markings to the Engineering Inspector for review. These markings must represent actual as constructed conditions. Once the redline as-builts are approved and accepted by the Engineering Inspection Supervisor the final as-builts can be prepared and submitted.

B. <u>As-Built Plans</u>

One set of As-Built plans will be provided as a hard copy, printed and bound in 24”x36” size. As-Built plans shall be signed and sealed by a Registered Professional Engineer or Registered Land Surveyor as applicable, prior to producing the hard copies. In addition, the original signatures of the approval block shall be intact.

C. <u>Test Results, Certifications, Registrations and Reports</u>

The following is a summary of documents that will be required as part of the as-built submittal. Refer to the appropriate Chapter for more information.

- Materials Testing required for all types of construction.

- Compaction, Density Test Results for Bedding, Backfill, Sub-grade, Base Materials and Pavements.
- Pressure and Leakage Testing.
- Disinfection Testing.
- Drilling Logs, Registration and Certification.
- Closed Circuit Television (CCTV) DVD for the sanitary sewer system.
- Coating System Test results.
- Percolation Test Results for drywells and basins.
- Certified Pad or Finished Floor Elevations.
- Certification of Provision of Required Retention Volume.
- Signal Phase Timing Charts.
- Well Abandonment Registration of Certification.
- Acknowledgement of Completion to Satisfaction of other Jurisdiction or Agency requirements.
- Final Drainage Report
- Operation, Service and Maintenance Manuals.
- Warranties.
- Pavement Evaluation Report.
- Survey Monument Replacement

D. As-Built Certification

The following As-Built Certification statement must be added to the plans and executed:

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE "AS-BUILT" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

_____ _____ _____

Registered Land Surveyor Registration No. Date

CONTRACTOR:

_____

PERMIT NO.

_____

APPROVAL DATE:

_____

BY CITY INSPECTOR:

_____

***NOTICE*:**

THE CITY OF PEORIA ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE "AS- BUILT" INFORMATION PROVIDED AS PUBLIC RECORD.

3.9.2 Record Drawings

Record Drawings are only required on facility or utility facility projects. Record Drawings will be used by the City of Peoria or their designees for facility maintenance and/or future project modifications. Typically, projects requiring Record Drawings will be City of Peoria Capital Improvement projects or City of Peoria Operational projects. However, if a developer is required to construct a facility or utility facility with a development project, then record drawings are required by the City.

The term "Record Drawing" shall mean that drawing prepared for submission to the City of Peoria by the Registrant. A "Record Drawing" is prepared in CAD and contains the Registrant's corrections to the drawings based on as-built constructed conditions (RFI clarifications, field sketches, and scope additions/deletions) in addition to the construction markings provided by the Contractor. Record Drawings represent the combined knowledge of Designer and Contractor as the accurate representation of the constructed facility for the benefit of the City of Peoria and shall be prepared by the Design Firm of Record.

A. Record Drawing Certification

The following Record Drawing Certification statement must be added to the plans and executed:

RECORD DRAWING CERTIFICATION

I HEREBY CERTIFY THAT THESE RECORD DRAWINGS WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

_____	_____	_____
Registered Professional Engineer	Registration No.	Date

3.10 Acceptance of Improvements

3.10.1 Final Letter of Acceptance

The Final Letter of Acceptance (FLOA) will be granted when the entire project is completed. To obtain the FLOA, the following items must be approved:

1. All work shown on the approved plans completed and installed.
2. AC or Concrete Mix design approval.
3. Compaction reports approved.
4. All concrete work (curb, sidewalk) is accepted, or if cracked, replaced if a hazard (tripping, etc.).
5. Brass Caps for Horizontal Control and Bench Marks for Vertical Control (new and existing) installed and survey roles establishing the x, y, and z data approved. All new or re-set monumentation that is not associated with a plat or MOD that has an RLS responsible for checking the brass caps accuracy in relation to two separate section, quarter section, or other acceptable cadastral ties must be checked for accuracy by an RLS,

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

submitted to the City for review then upon City acceptance the RLS shall record said replacement or set.

6. Completed maintenance and streetlight improvement district documents received and approved.
7. "As-built" drawings, certified by a registered land surveyor or professional civil engineer registered in the State of Arizona for:

    - Grading and Drainage including certificates of pad elevations or finished floor elevations, drywell rim elevations, retention/detention basin elevations and flood zone determinations.
    - Sanitary sewer system, including dimension between manholes, actual location of services and length of services installed, rim and flowline elevations and type of pipe, etc. Must have AOC in hand prior to acceptance.
    - Water system, including valve locations, depth of water line, type of pipe, actual location of services, actual location of vertical alignment(s), dimension to hydrant locations, dimensions to tees and crosses. Must have AOC in hand prior to acceptance.
    - Paving, curb, gutter and sidewalk, including locations and widths of driveways, elevations, streetlight locations. Tops of curbs are to have a stamped S at sewer tap crossings per MAG Standard Detail 440-4.
    - Storm Drain, including type of pipe, dimension of pipe to monument line, location of catch basins, inlets and NPDES markers, manhole rim and flowline elevations, dimensions to vertical or horizontal realignments.
    - Bank stabilization, if any included in as-builts.
    - Traffic signal/striping and signage.
    - Flood irrigation (public and private).
    - Copies of drywell drilling logs and ADEQ certification/registration.
    - Copies of drywell percolation tests.
    - Provide CAD drawings, compatible with City software of the water, sewer, storm drain system base maps with as-built locations of the mains.

8. All fees must be paid.
9. All streetlight installation costs have been paid.

3.10.2 Warranty

The FLOA will constitute the beginning of the 1-year warranty

3.11 Right-Of-Way and Easements

3.11.1 General Land Office Easements

The Government Land Office (GLO) roadway easements were created by the Federal Small Tract Act (1938) to assure legal access for future street planning by prohibiting the building of any structures across these easements. The City has

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

viewed these patent roadway and utility easements as assured access at least until a local circulation plan is established. As GLO lots come in for development (such as minor subdivisions, subdivisions, or requesting building permits) staff requires City rights-of-way dedications per City circulation plans. Any patent easement in excess of the current circulation plan requirements (including trails) and roadway standards that are not required to insure access to any other lot, may be requested to be abandoned. GLO roadway easements go through the same process as the public roadway abandonment; only the public rights are abandoned in a Resolution approved by City Council. The City's abandonment of a GLO easement does not include any determination of private rights; similar to other private easement rights, those are matters between property owners.

3.11.2 Dedication and Abandonment by Separate Instrument

Rights-of-way and/or easements, which are not included on recorded Final Plats or Maps of Dedication, shall be dedicated by a separate instrument with written approval from the Engineering Department. Abandonments shall be accomplished by a separate instrument. All other right-of-way/easements shall be dedicated or abandoned as part of the recordation of a Final Plat or Map of Dedication. The items listed below shall be provided by the City and the developer, respectively. Please call (623) 773-7600 for current fee information.

A. Commercial Development – Dedication

City responsibility:

1. Engineering Department shall provide the appropriate Dedication form.
2. The City Attorney's Office will review all documents.
3. The Engineering Department will prepare the Council Communication and Resolutions necessary for Council approval.

Developer responsibility:

1. Provide a fully executed Ownership Verification Form
2. Provide a fully executed Application Contact Form
3. Provide a Warranty Deed. Quit-Claim Deeds are not acceptable.
4. Provide a current copy of the Title Report. The Title Report shall be dated within 30 days of the submittal to the Engineering Department
5. Provide an 8 ½" x 11" copy of the Legal Description with ½" margins at the top, bottom and sides suitable for recording. The legal description shall be sealed by a registered land surveyor or engineer.
6. Provide an 8 1/2" x 11" Exhibit with ½" margins at the top, bottom and sides suitable for recording. The exhibit shall be sealed by a registered land surveyor or engineer.
7. Provide a copy of the Phase 1 Environmental Site Assessment.
8. Provide a check made payable to the City of Peoria to cover the cost of processing the application.

B. Residential Development – Dedication

City responsibility:

1. The Engineering Department shall provide the appropriate Dedication form.
2. The City Attorney's Office will review all documents.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

3. The Engineering Department shall prepare the Council Communication and Resolutions necessary for Council approval.

Developer responsibility:

1. Provide a fully executed Ownership Verification Form.
2. Provide a fully executed Application Contact Form.
3. Provide a current copy of the Title Report. The Title Report must be dated within 30 days of the submittal to the Engineering Department.
4. Provide an 8 ½ " x 11" copy of the Legal Description with ½" margins at the top, bottom and sides suitable for recording.
5. Provide an 8 ½" x 11" Exhibit with ½" margins at the top, bottom, and sides suitable for recording.
6. Provide a Warranty Deed. Quit Claim Deeds are not acceptable.
7. Provide a fully executed copy of the Check List of Environmental Considerations for Right-of-Way Dedication.
8. Provide a check made payable to the City of Peoria to cover the cost of processing the application.

C. <u>Commercial, Residential Development - Abandonment</u>

City responsibility:

1. The Engineering Department shall prepare the Council Communication, Ordinance or Resolution necessary for council approval.
2. The City Attorney's shall review all documents prior to Council approval.

Developer responsibility:

1. Provide a fully executed Ownership Verification Form.
2. Provide a fully executed Contact Form.
3. Provide a current copy of the Title report. The title report must be dated within 30 days of the submittal to the Engineering Department.
4. Provide an 8 ½" x 11" Legal Description with ½" margins at the top, bottom and sides suitable for recording. The Legal Description shall be sealed by a registered land surveyor or engineer.
5. Provide an 8 ½" x 11" Exhibit with ½" margins at the top, bottom and sides. The exhibit shall be sealed by a registered land surveyor or engineer.
6. Copies of No Conflict Letters from each of the utility companies stating that they agree with the proposed abandonment.
7. Provide a check made payable to the City of Peoria to cover the cost of processing the abandonment.

3.12 General Notes

The following general information and general notes must be placed on the detail sheet of each set of construction plans. The Design Engineer is responsible to include these notes accurately, without modification, on the plans.

The latest version of the City's General Notes can be found on the City of Peoria Engineering Services website. These Notes may be periodically updated by the City. At the time of the publication of these Standards they were as follows:

QUICK LINKS

General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

3.12.1 General Information

1. No person, Corporation, Contractor, or utility shall work within the right-of-way, road, street, or easements granted for public use or alleys without securing an Engineering Construction Permit from the Engineering Department.
2. Engineering Construction Permits are required for grading, drainage, erosion control, flood control structures, hauling material in excess of 100 cubic yards, oiling, graveling or any surfacing of any street, alley, water system, sewer system, storm drain system, trenching, gas or any other types of pipe lines, drywells, paving, curb, gutter, sidewalks, driveways (concrete), flood irrigation, landscape/irrigation, traffic signals, striping and signage, bank stabilization and channelization, street lights, well abandonment, utility lines such as electric, telephones, television, communications and other franchised facilities.

3. The City Code Sec. 13-91. (2) establishes construction work hours as follows:

Construction Type		April 2-September 29	September 30-April 1
A	Concrete Work	5:00 AM – 7:00 PM	5:00 AM – 7:00 PM
B	Other Construction (within 500 ft of residential area)	5:00 AM – 7:00 PM	5:00 AM – 7:00 PM
C	Construction Work (more than 500 ft of residential area)	5:00 AM – 7:00 PM	5:00 AM – 7:00 PM

4. The City Code also establishes work hours in the public right-of-way as follows:

   No interference with traffic flow on arterial streets shall be permitted during the hours of 6:00 a.m. to 8:30 a.m. or from 4:00 p.m. to 7:00 p.m. unless prior authorization is obtained in writing by the City of Peoria Traffic Engineer or their designee.

5. Prior to issuance of Engineering Construction Permits, the Contractor/Developer must provide the City of Peoria with the specific information and payment of fees as listed in Chapter 2 of the City Code. Any person, Corporation, Contractor, or utility company working in the right-of-way, road, street, or easements granted for public use or alleys without securing a permit is subject to a fine in accordance with Chapter 23 of the City Code.

6. The Contractor shall submit a traffic control plan per the Phoenix Traffic Barricade Manual. Barricades must be continually maintained throughout the duration of the project (refer to Chapter 23 of the City Code). If any part of the traffic control plan falls within 300' of a signalized intersection, an off-duty officer will be required for traffic control. A Traffic Control Plan (TCP) shall be submitted to the Engineering Department and accepted a minimum of three

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

working days; 72-hours prior to construction. An accepted TCP will be stamped and a copy returned to the Contractor. A copy of the accepted plan must remain on the job site at all times.

7. Refer to the "General Information-Final Acceptance of Projects Checklist" for a list of the required close out items. Any questions should be directed to the Engineering Inspector.

3.12.2 General Notes

1. All construction shall conform to the latest edition of the Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Details for Public Works Construction. The latest edition of the City of Peoria Engineering Standards Manual, the City of Peoria Supplement to Maricopa Association of Governments Uniform Standards Details and City of Phoenix Standard Details will continue to apply where such details were not adopted or included by MAG. Alternate details and specifications may be submitted for review and acceptance by the Engineering Department. If accepted, alternate details will be shown as part of the approved plans/detail sheets.

2. This set of plans has been reviewed for compliance with City requirements prior to issuance of Engineering Construction Permits. However, such review shall not prevent the Engineering Director from requiring correction of errors or omissions in plans found to be in violation of any law or ordinance.

3. Approval by the Engineering Director or their designee means for general layout in right-of-way only. This approval of construction plans is valid for a period of nine months. Engineering Construction Permits shall be obtained within this period or the plans shall be resubmitted for approval. Work shall also be continuously pursued in order to maintain a valid plan approval and permit. Approval is only for work within the jurisdiction of the City of Peoria.

4. The Engineering Director or their designee does not warrant any quantities shown on these plans.

5. Engineering Construction Permits for any work within the right-of-way and easements, and any grading and drainage, whether on-site or off-site, is required prior to commencing work. The building permit shall not be construed in any way as permission to commence work covered by an Engineering Construction Permit. It shall be the responsibility of the Contractor/Developer to understand the work covered by various permits.

6. The Engineering Department, Inspection Division, shall be notified 24-hours prior to any construction work by telephone at (623) 773-8445. Any work concealed without inspection shall be subject to removal and replacement at the Contractor's/Developer's expense.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

7. An approved set of plans must be available on the job site at all times. The Contractor's/Developer's representative (capable of communicating with the City's representatives) shall be on the job at all times the work is being pursued.

8. The Contractor/Developer is responsible to provide emergency telephone numbers to the City of Peoria at time of issuance of Engineering Construction Permits and have personnel available 24-hours a day to respond to emergencies. If the City is required to respond and make emergency repairs on behalf of the Contractor/Developer, the Contractor/Developer is responsible to reimburse the City for all costs incurred.

9. It shall be the responsibility of the permittee to arrange for the relocation and relocation costs of all utilities and submit a utility relocation schedule prior to the issuance of an Engineering Construction Permit.

10. All underground tanks require a permit from the Fire Department prior to removal.

11. The procedures and methods used to sample, test materials, and report test results will be determined by the Engineering Department. For all phases of construction, the type, scheduling, frequency and location of all materials testing and sampling shall be determined by the Engineering Department. All test results shall be reported directly (in writing) to the Engineering Department. For each phase of construction, test results (in writing) must be received from the testing laboratory, prior to start of the next phase of construction.

12. The Contractor/Developer must give a location for wasting excess excavation and a letter from the owner giving permission for dumping prior to starting on-site construction

13. It is the Contractor/Developer's sole responsibility to verify the presence and location of all existing overhead and/or underground utilities that may interfere with this construction, whether or not said utilities are shown on the construction plans for this project and to adequately protect and maintain any such utilities.

14. The Engineering Department does not assume any liability for errors of line and/or grade on any staking which has been disturbed in any way, nor does the Design Engineer assume any liability for errors of line and/or grade on any staking that has been in place for a period of 24-hours or more without the commencement of the construction for which it was set.

15. The Contractor/Developer shall contact Blue Stake (602) 263-1100 prior to construction. It is the responsibility of the Contractor to maintain current Blue Stake markings throughout construction.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

16. The Contractor/Developer shall obtain a fire hydrant meter for construction from the Management Services Department, Customer Services. Contact Customer Service at (623) 773-7160 to schedule the relocation of hydrant meters. Contractors shall not relocate hydrant meters themselves.

17. All Contractors/Developers are responsible to construct stabilized construction entrances in order to reduce or eliminate the tracking of sediment onto public rights-of-ways or streets. Gravel track-out pads shall meet current Maricopa County standards.

18. All drainage protective devices such as swales, interception ditches, pipes protective berms, concrete channels or other measures designed to protect improvements, whether existing or proposed, from runoff or damage from storm water, must be constructed prior to the construction of any improvements.

19. Traffic control shall conform to the City of Phoenix Traffic Barricade Manual, MUTCD, and the City of Peoria Infrastructure Development Design Guidelines.

20. Any and all obstructions within the rights-of-way and easements shall be removed before any construction is commenced.

21. All Contractors/Developers are responsible to obtain a National Pollution Discharge Elimination System (NPDES) Permit in accordance with Federal and State Regulations, including Notice of Intent (NOI), Notice of Termination, and Storm Water Pollution Prevention Plan (SWPPP). A copy of the NOI and SWPPP shall be available on the job site at all times. All SWPPP plans must include the N.O.I. tracking number administered by Arizona Department of Environmental Quality (ADEQ) on the bottom right hand corner of the sheet.

22. All contractors/developers are responsible to obtain the necessary 401 and 404 permits. A copy of the permit shall be submitted to the City prior to approval of the Grading and Drainage plans.

23. Contractor/Developer shall obtain any and all permits as required by other agencies which have jurisdiction at the Contractor/Developer's expense. The Contractor/Developer shall meet the requirements of these permits as set forth therein.

24. The Contractor/Developer is solely responsible for all job site safety, including but not limited to meeting all requirements of OSHA and ADOSH. The City of Peoria Engineering Inspector is not authorized to advise or direct the Contractor/Developer regarding matters of job site safety. Should the Contractor/Developer act on such advice or direction, it is at the risk of the Contractor/Developer.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

25. Per the Maricopa County Air Pollution Control Rules and Regulations on Earth Moving Equipment Permits, no person shall cause or permit the use of any power of mechanical equipment for commercial purposes to clear, excavate or level land, including but not limited to blasting, demolition, road and street construction, swimming pool excavating, trenching, vegetation removal, or engage in any other earth moving activities without first obtaining a permit from the Maricopa County Environmental Services Department. The property owner, lessee, developer, or prime contractor will be responsible for acquiring the permit.

    If the above referenced development has work that needs to be done in the Maricopa County rights-of- way, please obtain all permits from the Maricopa County Department of Transportation. The Engineering Construction Permits issued by the City of Peoria do not cover the Maricopa County rights- of-way.

3.12.3 Grading & Drainage

1. The Grading and Drainage plans must be approved by the Engineering Director or their designee. The Engineering Inspections Office shall be notified at (623) 773-8445, 48-hours before any on-site construction begins.

2. separate permit is required prior to any on-site grading, including custom homes.

3. Grading and Drainage Plan approval includes:

    a. Construction of all surface improvements shown on the approved grading and drainage plan, including but not limited to, retention areas and/or other drainage facilities, drainage patterns, channels, walls, curbing, asphalt pavement, bank protection and channelization, and building floor elevations.

    b. Contractor shall provide minimum slope to the bottom in all retention basins at elevations as shown on the plans. Retention basin side slopes shall not exceed 3:1 (under special circumstances – refer to Section 4.7.3 of the Engineering Standards Manual), as confirmed through the geotechnical report, on private property and 6:1 adjacent to public right-of-way unless noted otherwise on plans.

4. All drainage protective devices such as swales, interceptor ditches, pipes, protective berms, concrete channels or other measures designed to protect homes or other improvements whether existing or proposed, from runoff or damage from storm water, must be constructed prior to the construction of any improvements.

5. Drywells must be drilled a minimum of 10-feet into permeable porous strata and percolation tests will be required. The Engineering Inspector must be

present before backfill or wall pipes are placed within any drywell. Percolation tests must be conducted by an independent laboratory and results provided to the Engineering Department. All drywells must be registered with ADEQ. Copies of drilling logs and ADEQ registration information must be provided to the City.

6. All finish floor elevations shown are a minimum of 14-inches above the point of outfall, or one foot above the 100-year base flood elevation as shown on the approved plan.

7. A FEMA Elevation Certificate for all new and substantially improved construction in the floodplain shall be submitted to the Engineering Department prior to final acceptance of the project.

8. Soils compaction test results must be submitted to the Engineering Department for all building pads that have one-foot or more of fill material indicated.

9. Staking pad and/or finish floor elevations is the responsibility of the developer and his engineer. No minimum finish floor elevation will be raised or lowered without approval of the Engineering Director or their designee. In noncritical areas, developer's engineer shall submit certification of constructed building pad elevations prior to request for final inspection. In critical drainage areas or in the 100-year floodplain, substitute building floor elevation in above note, or FEMA Elevation Certificate.

10. The Contractor is responsible for locating and confirming depth of all existing utility lines within proposed retention and drainage facility areas. If the drainage facilities cannot be constructed per plan as a result of conflict with underground utilities, the Contractor should contact the Engineering Director or their designee and the Design Engineer and request modification of the drainage facility design.

11. All bank protection and channelization must be completed prior to final acceptance of the project.

12. A separate haul permit shall be required whenever hauling in excess of 100 cubic yards of material in or out of a site. A haul route must be submitted and approved by the Engineering Department. Additional requirements as set forth by the Engineering Department shall be met.

13. The developer is responsible to obtain a Nation Pollution Discharge Elimination System (NPDES) permit in accordance with Federal and State Regulations, including Notice of Intent (NOI), Notice of Termination (NOT), and Storm Water Pollution Prevention Plan (SWPPP). A copy of the NOI and SWPPP shall be available on the job site at all times. All SWPPP must include

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

the NOI tracking number assigned by Arizona Department of Environmental Quality (ADEQ).

14. Once an existing shoulder is disturbed by the grading operation or any other phase of construction, the shoulder shall be barricaded. Such barricading shall remain in place until final acceptance of the project.

3.12.4 Paving

1. Exact point of pavement matching, termination and/or overlay, if necessary, shall be determined in the field by the Engineering Inspections Division.

2. All frames, covers, valve boxes and manholes shall be adjusted to finished grade upon completion of paving or related construction. The concrete collar shall be adjusted level with existing bituminous pavement. Adjustment of existing Type "A" or Type "B" water valve boxes in right-of-way shall be considered incidental.

3. All Contractors/Developers shall comply with the City of Peoria Detail PE-211 for Trench Plating.

4. Paving shall not start until all appropriate testing has been completed and accepted (pressure testing of utilities, density testing, videoing of sewer line, etc.). Service stubs to all platted lots shall be extended, and all conflicting utility construction completed prior to start of paving.

5. Trees and shrubbery in the right-of-way, which conflict with the improvements proposed herein, are not to be removed or relocated without prior approval of the City of Peoria. The permittee shall be responsible for obtaining the necessary authorization to remove and/or relocate said trees or shrubbery.

6. In all areas where new construction of curb, gutter, sidewalks, and driveways is required, and the engineer determines the existing grade to consist of soils with swelling characteristics, the moisture content shall be brought as close as possible to optimum required for compaction by the addition of water, blending of dry suitable material or by drying of existing material. The material shall then be compacted to a relative density of 75 percent minimum to 85 percent maximum with 80 percent as ideal.

7. Construction loads: During construction operations, heavy equipment may cross existing or proposed pipe. In this case, an earth fill should be constructed to at least three -feet above pipe. The fill must be sufficient to prevent the lateral displacement of the pipe.

8. Unless otherwise specified, the City of Peoria requires that the asphaltic concrete mix design meet the current mix design specified in the City of Peoria Engineering Standards Manual.

9. All street improvements for custom homes must be completed in accordance with the City of Peoria policy on unpaved roads. All private access must be constructed with an acceptable dust palliative.

10. All Contractors/developers are responsible to construct stabilized construction entrances in order to reduce or eliminate the tracking of sediment onto public rights-of-ways or streets. Gravel track-out pads shall meet current Maricopa County standards. The contractor/developer shall immediately remove any sediment tracked onto public rights-of-ways or streets.

11. If any existing barricades, traffic signs or street name signs need to be removed during construction, notify the City of Peoria Public Works Streets Division at (623) 773-7432. A minimum of 48-hours notice is needed for removals. If signs and barricades belong to another agency, it is the responsibility of the contractor/developer to notify them.

12. No water supply hose or ramps shall be placed across or in the arterial or collector streets. Approval in writing from the Engineering Director or their designee is required for placement of the supply hose or ramps in local street streets. Applications shall include submittals of the manufacturer's specifications, materials used, dimensions of the ramp, proposed location, proposed barricading and signage.

13. All new curb shall be imprinted with the words "PRIVATE STREET – NO CITY MAINTENANCE" in 2-inch high letters at every curb return and at every entrance into a new private property subdivision.

3.12.5 Signing & Striping

Signing and striping installations shall be in accordance with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) adopted by the Arizona Department of Transportation (ADOT) and the City of Peoria Standard Details PE-011 through PE-018.

Signing and striping layout shall be approved by the Engineering Inspector prior to any installation. The contractor shall notify the City of Peoria's Engineering Inspection Division, 623-773-8445, at least 48-hours in advance of any signing or striping installation. Signing or striping installations completed prior to contacting the City's Engineering Inspection Division shall be removed and/or modified if it is not deemed adequate by the Engineering Inspector.

A. <u>Striping</u>

1. All road surfaces shall be prepared per manufacturer's instruction or to the satisfaction of the Engineering Inspector prior to application of pavement markings. At a minimum surfaces shall have debris removed, be cleaned and dried prior to application.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

2. All pavement markings shall be installed in accordance with City of Peoria Standards, City of Peoria Details PE-011-1 through PE-018, and the manufacturer's recommendations.
   - Longitudinal line markings shall be installed using water-based paint applied at a minimum of .15 Mil thickness.
   - Short-line markings, including crosswalks, stop bars, chevrons, and crosshatch markings shall be installed using alkyd thermoplastic material applied at a minimum .90 Mil thickness or 3M Stamark Pavement Marking Tape.
   - Word symbol and other legend markings shall be installed in 3M Stamark Pavement Marking Tape.

3. The obliteration of prior or conflicting thermoplastic striping shall be accomplished by water blasting with vacuum recovery or other methods approved by the Engineering Inspector. A type II micro seal treatment approved by the Engineering Inspector shall be applied in a minimum three-foot wide, continuous application to the portions of the affected asphalt following obliteration.

   The type II micro seal treatment can be applied directly over water-based paint without paint obliteration. All type II micro seal treatment shall be approved by the Engineering Inspector.

B. <u>Signing</u>

1. All sign blanks shall be .080 gauge aluminum, unless otherwise noted and all signs shall be ASTM Type IV high intensity sheeting, unless otherwise noted, per City of Peoria Detail PE-032.

2. All signs shall be installed per City of Peoria Standard Detail PE-032 and the contractor shall contact Blue Stake before digging. Care shall be taken to ensure unobstructed views for all signs installed.

3. Signs installed on street light poles shall be installed per PE-032-2, using a minimum ½" wide stainless steel banding (C20499) with a minimum thickness of .030, a banding buckle (C25499) and a (D02189) banding bracket. Street name signs shall be installed using banding listed above except replacing the banding bracket with a (KC250) cantilever bracket, round bracket (922SF), and a cross bracket (990SF); 6" signs shall have 6" wide brackets and 9" signs shall have 12" wide brackets.

4. Parking restriction signs shall be set at an angle of not less than 30 degrees or more than 45 degrees with the line of traffic flow in order to be visible to approaching traffic, per guidance in Section 2B of the MUTCD.

5. All signs shall be provided and installed by the developer per the approved permitted plans.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

6. The contractor shall return all traffic signal equipment and signs that are removed to the City of Peoria Municipal Operations Center (MOC), 8850 N. 79th Avenue. Contact the Streets Administrations Office at 623-773-7456 to set up a drop-off time.

7. The sign types and sizes included in the Peoria Sign Reference Guide provide additional guidance and clarification to the MUTCD, as it is applied in the City of Peoria.

8. Unless otherwise noted, all dimensions are to the face of curb and the center of the stripe. In the case of a double stripe, dimension is to the center of the double stripe.

9. The Engineering Inspector may require the contractor to make any adjustments deemed necessary to address conditions not included in the approved permitted plans.

3.12.6 Street Lighting

1. The contractor shall comply with State Statutes, City Code and Standards, MAG Standards and manufacturer's recommendations.
2. The electrical contractor shall comply with all licensing requirements set forth by the State Registrar of Contractors office to perform work relating to street light installation in the City right-of-way.
3. Contractor shall obtain an general right-of-way encroachment permit prior to construction.
4. Light poles shall be installed plumb, be adjusted to provide proper alignment to the roadway being lighted and be properly grounded when the installation is completed. The contractor shall furnish and install a placard with identification number on each light pole. Street light pole identification and specifications will be provided by the City of Peoria.
5. Luminaires:
    a. Luminaires shall be installed level and include a lamp and photocell.
    b. Contractor shall assure that the luminaries shall be free of dust, dirt or anything that would impair the output of the light before he/she leaves the site.
    c. Luminaires furnished with multi-tap ballasts shall be rewired or reconnected to match the voltage supplied by the electric utility company.
6. For embedment, the following requirements shall apply:
    a. A ground rod shall be installed in pull box in undisturbed soil and a lead in solid copper bare bond wire (#8) shall be installed in 1 inch liquid-tight flexible steel conduit with PVC jacket for pole grounding.
    b. Surplus excavation shall be disposed of by the contractor.
7. Wiring and Conduit requirements are:
    a. Wiring shall be installed per Utility Standards.

b. Conduit shall be installed at the depth specified on the plans. Conduit shall be one-inch Liquid-Tight Flexible Steel Conduit with PVC jacket. Conduit must be UL rated and suitable for underground use.

8. Connections and Grounding:
   a. Connections shall be per City Detail.
   b. Each pole shall have an 8 feet ⅝ inches copper clad ground rod driven beneath pull box. A #8 bare copper lead from the ground rod in pull box to landing lug in street light pole hand hole.
9. Excavation for pull boxes and material specifications shall be per the electric utility company standards.
10. Trench shall be installed per the Utility Company Standards. The use of a common Electric Utility Company trench is permitted. It is the contractor's responsibility to contact the Utility Company for coordination of the trenching and the installation of conduit.
11. It is the contractor's responsibility to restore all property, landscaping, paving and driveways that are disturbed during street light construction to their original condition in conformance with MAG Specification Section 107.9.
12. The developer shall be responsible for furnishing all personnel and equipment to successfully perform the following test:
    a. Prior to acceptance, the developer shall energize and operate the entire roadway lighting system, 48 hours for 2 consecutive days without interruption or failure. If a lamp or ballast should fail, it shall be immediately replaced.
13. For all arterial roadways, the street lighting system will need to include fiber optic traffic signal interconnect conduits and pull boxes.
14. The contractor shall guarantee all work for a period of 1-year from the date of final acceptance by the City, against imperfect workmanship, failure, malfunction of materials and/or equipment due to faulty or imperfect workmanship. This guarantee is to be in writing to the City at the time of issuing final acceptance. Work found to be defective within the warranty period shall be replaced without cost to the City.

3.12.7 Traffic Signal

General Notes

1. All material, equipment and installation shall conform to:
   a. The latest edition of ADOT's traffic signals and lighting standard drawings.
   b. The Manual on Uniform Traffic Control Devices (MUTCD). Latest edition adopted by ADOT.
   c. The City Phoenix Barricade Manual.
   d. The City of Peoria Traffic Signal Special Provisions and Standard Details.
   e. The City of Peoria bid documentation and these plans.

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

2. The contractor shall contact all Utilities and Blue Stake 48-hours before starting any construction. It is the responsibility of the contractor to contact all involved agencies and field verify exact locations of all utilities. Prior to construction, the contractor shall pothole and verify the location of existing utilities. If discrepancies exist the contractor shall notify the Engineer immediately.

3. Prior to construction, the contractor shall verify all foundation and pole locations. Contractor shall pot hole and perform site visit to determine any potential overhead or underground conflicts, and coordinate with the City of Peoria Project Manager and the Design Consultant prior to ordering equipment.

4. The contractor shall contact Arizona Public Service (APS) at (602) 371-7546, or Salt River Project (SRP) at (602) 236-4830 for electric service installation requirements.

5. The contractor shall replace in like and kind, per MAG Standard existing landscaping and/or irrigation system disturbed by construction of this project. The contractor shall coordinate this work with the Landscape Maintenance Supervisor, City of Peoria Community Services Department at (623)773-7137.

6. All signal equipment shall be in place and operational prior to removing existing stop signs. Stop signs shall be removed shortly after activation as approved by the City of Peoria Engineering Inspector.

7. The contractor shall provide traffic control during construction per the MUTCD and the City of Phoenix Barricade Manual. A police officer to be provided by the contractor any time the construction occurs within 300' of a signalized intersection, or as determined by the City of Peoria Engineering Inspector/Engineer.

8. The contractor shall notify the City of Peoria's Traffic Engineering Inspector at (623) 773-7536, and the City of Peoria's Engineering Inspection Supervisor at (623) 773-8439 at least 48-hours in advance of any construction.

9. The contractor shall obtain all permits from the City of Peoria and other applicable agencies prior to construction.

10. The contractor shall comply with all provisions for traffic control, barricading, signing and striping as per the City of Phoenix Barricade Manual and the Manual on Uniform Traffic Control Devices (MUTCD) latest edition adopted by the Arizona Department of Transportation.

11. The quantities and site conditions on these plans are for informational purposes only and are subject to error and omissions. Contractors shall satisfy

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

themselves as to the actual quantities and site conditions prior to bidding the work for construction covered by these plans.

12. The contractor shall return all removed/unused traffic signal equipment to the City of Peoria Municipal Operations Center, 8850 N. 79th Avenue. For additional information, please contact the Traffic Maintenance Supervisor at (623) 773-7432.

13. Electrical service address_____

Equipment Notes

1. Prior to construction, the contractor shall verify all foundation and pole locations. Contractor shall pot hole and perform site visit to determine any potential overhead or underground conflicts and coordinate with the City of Peoria Project Manager and the Design Consultant prior to ordering equipment.

2. All traffic signal equipment will be new with full warranty, used or refurbished equipment will not be permitted.

3. Red, Yellow, Green vehicle indications and inline filled in man/hand pedestrian indications shall be Dialight L.E.D. indications.

4. The contractor shall provide and install an extended riser on all F Heads, Type XI that are located where the mast arm attaches to the signal pole to accommodate for future Q Head installation.

5. All new 12-inch signal heads hall have five-inch metal louvered back plates.

6. All signal heads shall be McCain or Eagle/Siemens.

7. The contractor shall provide and install single channel 711 optical detectors (Opticom) with all appropriate mounting hardware, interface cables, optical cables, and any other equipment required for a fully functioning pre-emption system. Contractor shall provide and install A 754 CARD (opticom) in cabinet.

8. The contractor is responsible for providing and installing video detection equipment. The video detection camera (see project special provisions for model and type) to be mounted on mast arm. Install all necessary equipment including all wiring, cameras, mounting hardware and any controller interface equipment necessary for a fully functioning and operational video detection system. All equipment shall be pre-approved by the City of Peoria Traffic Engineering Division prior to installation.

9. Luminaries are to be 250W, 240V with multi-tap transformer, Type III GE Cobra cutoff with 52,000-hour lamps.

10. The pedestrian push buttons shall conform to ADOT Standard Drawings TS11-1 except that the push button shall be a minimum of two-inch in diameter. The push button shall be raised from the face of the push button housing. The force required to activate the control shall be no greater than five lbs. of force. Push buttons must meet ADA requirements and be mounted at ADA required height. The contractor is responsible for installing the R10-4B pedestrian push button signs.

11. Contractor is responsible for installation of the illuminated street name signs. The signs are to be flag mounted on the signal pole. Confer with the City of Peoria mounting instructions. The contractor shall consult with the City of Peoria Signal Maintenance Division at (623) 773-7477, for design approval of the signs prior to ordering of signs.

12. The contractors shall provide a six-foot coiled control cord in the police panel of the controller cabinet.

13. The contractor shall install a Cabinet "Courtesy pad". This shall consist of a four-inch PCC pad in front of the cabinet (door side). Pad shall be set a minimum of two-inches below the cabinet foundation elevation. Slope pad away from cabinet. See ADOT Standard Drawing TS 2-1 for pad details. In addition, the contractor shall provide a four-inch thick concrete walkway between the sidewalk and the PCC pad.

14. All equipment shall be approved by the City of Peoria through the electrical/equipment submittal process prior to the ordering of the equipment.

Detail Notes (When Applicable)

1. All interconnect conduit is to be installed per City of Peoria Standard Detail PE-033.

2. All mid run interconnect pull boxes to be installed per City of Peoria Standard Detail PE-034.

3. All communication vaults to be installed per City of Peoria Standard Detail PE-036.

4. All signs and sign posts shall be installed per City of Peoria Standard Details PE-031 and PE-032.

Construction Notes

1. The Contractor shall provide new IMSA conductors. No splicing of conductors in conduit run will be allowed. Pull new conductors into conduit as specified in the conductor schedule. All splices shall be scotch coat sealed and all conductors shall be labeled per the City of Peoria color code and wiring detail. All IMSA conductors shall be installed without splicing from the signal head to

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

the pull boxes. TS blocks shall be not used as a connection point between the pull box and the vehicle or pedestrian indications.

2. All pull boxes shall be left in a clean condition. Free dirt and debris upon completion of work.

3. Drilling height for signal faces shall be per ADOT Standard Drawing T.S. 4-21. Type XI mounts shall be used for all vehicle signal indications attached to vertical poles. The contractor shall confer with the City of Peoria Inspector for side-mount drilling locations. The contractor shall provide and install an extended riser on all Type XI mounts for all F Heads that are located where the mast arm attaches to the signal pole to accommodate for future Q Head installation. Type "V" and or Type "VII" mounts shall be used for the pedestrian indications.

4. All signal heads will be bagged/covered with a material that does not allow light penetration when not in full operation.

5. The top of new pole foundations shall be installed 4" below adjacent sidewalk elevation and finished in with apron. Leveling nuts will be blocked/formed out during concrete apron installation and grouted back in to provide for future access. Grout to be installed level with the base of the pole.

6. Prior to turn on, the contractor is responsible for the positioning, leveling and aligning of the individual signal heads, so they are completely visible to the approaching driver that the signal is intended to control.

7. The contractor shall contact Arizona Public Service (APS) or Salt River Project (SRP) for the electrical service. The contractor is responsible for installing all electrical service conductors, unless otherwise directed by APS.

8. Video cable to run continuous from cabinet to respective camera without splices. The contractor shall contact the City of Peoria Traffic Engineering Inspector at (623) 773-7536 to coordinate the mounting and installation of the video detection devices.

9. The contractor shall have an authorized representative present from the traffic signal controller and video detection system manufacturer at the time the traffic signal is activated for set up and configuration of the cabinet\controller and video detection.

10. The contractor shall coordinate with the City of Peoria's Traffic Engineering Inspector at (623) 773-7536; three working days prior to signal activation for pre-turn on inspection (refer to special provisions). Installation of ALL equipment wiring and alignment of heads shall be done prior to pre-turn on inspection. It is the City of Peoria's policy that new signal activation shall not

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

occur on a Monday or Friday. The contractor shall coordinate the activation of any new signal, so that it occurs on a Tuesday, Wednesday, or Thursday.

11. The contractor shall provide and install "Traffic Control Change" signs with flags 500 feet prior to the intersection for all affected approaches for 30-days. Contractor is responsible for the removal and return signs to the City of Peoria Public Works Department at 8850 N. 79th Avenue.

12. All signing and striping that pertains to the operation of the traffic signal shall be installed immediately prior to the activation of the signal. The contractor shall contact the City of Peoria Engineering Inspector at (623) 773-7536, three working days prior to installation for approval of layout and sign locations.

13. All ADA facilities shall be in place prior to the activation of the traffic signal.

3.12.8 Water

1. A City of Peoria Engineering Construction Permit is required. Other permits, as required, shall be secured from the appropriate agency; i.e. County permits for County Right-of-Way.

2. Acceptable Water Line Materials are per City of Peoria Standard Detail PE-101. Contractor shall not deviate from the materials specified by the Design Engineer on the contract documents without written approval from the Design Engineer and the Water Services Department.

3. Water line and grade stakes shall be set by a qualified Arizona Registered Land Surveyor and/or their representative prior to the construction of sewer lines. The qualified Arizona Registered Land Surveyor and/or their representative shall verify that the grades conform to the approved construction plans, and provide cut sheets to the Contractor and Engineering Inspector. After installation and prior to the Engineering Department acceptance, the Engineer of Record shall certify that water line installation conforms to the approved construction plans.

4. Trench excavation, backfilling and compaction shall conform to MAG Standard Specification Section 601 except as modified herein.

5. Bedding and backfill for water lines shall conform to the requirements of the City of Peoria Standard Detail PE-401, Bedding and Backfill.

6. Backfill shall be Type I as defined in Section 601.4.3 of the MAG Standard Specifications.

7. The minimum cover from finish grade to top of pipe for all waterlines which are less than 12-inches in diameter located in major streets shall be as specified by the Design Engineer, but no less than 48- inches unless approved in writing by the Public Works Director or their designee.

8. The minimum cover from finish grade to top of pipe for all waterlines which are 12-inches in diameter or larger, located in major streets shall be as specified by the Design Engineer, but no less than 60- inches unless approved in writing by the Public Works Director or their designee.

9. The minimum cover from finish grade to top of pipe for all waterlines in other locations shall be as specified by the Design Engineer, but no less than 36-inches for lines less than 12-inches in diameter and 48-inches for lines 12-inches and larger in diameter. Any proposed changes to this requirement must be approved in writing by the Engineering Director or their designee.

10. All stub-outs shall have a 2-inch brass ball corp. stop as a blow-off, left in place with a 2-inch riser, per MAG Standard Detail 390 "A," and shall be accessible to use.

11. Fire Hydrants shall conform to City of Peoria Standard Details PE-360-1 or PE-360-2, as applicable. The fire hydrant manufacturer shall be per City of Peoria Standard Detail PE-101.

12. All valves 16-inches and smaller shall be per MAG 630 with resilient seat AWWA approved gate valves and shall open by turning counter-clockwise.

13. Valves shall not be located in sidewalks, gutters, curb, or valley gutters.

14. All valve boxes shall conform to MAG Standard Detail 391-1, Type A and City of Peoria Standard Detail PE-270.

15. Contractors shall not operate valves on the existing City system.

16. To request a water system shut down a “Water System Shut Down Request” form must be submitted. This form shall be submitted ten days in advance of any requests to shut down any lines in the City of Peoria’s potable water distribution system. The form is to be submitted through the Engineering Inspector assigned to the project, which will in turn coordinate with necessary Utility staff. Failure to complete this form may result in delays to construction activities.

17. Water lines shall be installed in such a manner to minimize dips or high points. All water lines shall be parallel to the street centerlines or property lines, or as close as possible, unless the design documents indicate otherwise. All horizontal deflections in water lines shall comply with the pipe manufacturer’s recommendations for deflection at joints.

18. All joints restraints shall be inspected prior to backfill. For thrust restraints, reinforcing steel and form work shall be inspected prior to placing concrete

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

for thrust blocks. Thrust restraint shall conform to MAG Standard Specification 610.4 and MAG Standard Details 301,340, 380 and 381.

19. Water services 2-inches and smaller in diameter shall conform to the City of Peoria Standard Detail PE-363. The minimum size service connection shall be 1-inch.

20. Water service lines shall not be located under driveways, concrete aprons, scuppers, catch basins, or the like.

21. Water Lines shall not be located within Retention/Detention basin areas.

22. All water valves located outside paved areas shall have a concrete collar, and Utility Marker per City of Peoria Standard Detail PE-101.

23. All water lines require the installation of metallic locating tape, which shall be installed in accordance with MAG Spec. 616.4 with the following exceptions: the tape shall be solid blue in color, printed with the words "CAUTION POTABLE WATER LINE BELOW", and installed directly above the ABC course, approximately 1-foot above the top of the pipe.

24. All pavement replacement shall conform to MAG Standard Detail 200 with a "T-Top" - modified with a one-half (1/2) sack Portland Cement ABC slurry, which conforms to MAG Standard Specification 728, (modified for one-half sack Portland cement), for trench backfill from one-foot above the top of pipe to the existing pavement subgrade. Pavement replacement thickness shall be: as specified by the Design Engineer on the contract documents, four-inches, or the existing asphalt pavement thickness; whichever is greater.

25. Pressure testing shall not be conducted until after the Contractor has pretested 100% of the lines. Inspection testing must be called for 24-hours in advance. Water lines must pass pressure testing after Dry Utilities are installed and prior to any concrete work, street work, or final acceptance of the sewer.

26. All mains shall be chlorinated in conformance with the City of Peoria Engineering Standards Manual.

27. The contractor shall not connect to any existing public water lines without prior approval of the Engineering Inspector.

28. The following MAG Uniform Standard Details are specifically NOT approved.

No. 345-2	4-inch, 6-inch Water Meter
No. 360	Fire Hydrant Installation
No. 389	Curb Stop with Valve Box & Cover
No. 391-1	Valve Box Installation and Grade Adjustment, Types "B" & "C"

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

29. The Contractor is responsible to notify the Engineer of Record before the water line or fittings are backfilled so "as-built" measurements may be taken. Any changes to the approved plans must be authorized by the Engineer of Record and the Engineering Director or their designee before the change is made in the field.

30. A Certificate of Approval of Construction (AOC) issued by the Maricopa County Environmental Services Department, is required prior to final project acceptance. A copy shall be provided to the City Engineering Inspector. NOTE: It should be noted that the Engineer of Record or designee shall be present during testing procedures so that the requirements of the AOC can be completed in full.

3.12.9 Wastewater

1. A City of Peoria Engineering Construction Permit is required for all sewer line construction. Other permits, as required, shall be secured from the appropriate agency, i.e. County permits for County right- of-way.

2. Acceptable Sewer Line Materials are per City of Peoria Standard Detail PE-101. Contractor shall not deviate from the materials specified by the Design Engineer on the contract documents without written approval from the Design Engineer and the Engineering Department.

3. Sewer line and grade stakes shall be set by a qualified Arizona Registered Land Surveyor and/or their representative prior to the construction of sewer lines. The qualified Arizona Registered Land Surveyor and/or their representative shall verify that the grades conform to the approved construction plans, and provide cut sheets to the Contractor and Engineering Inspector. After installation and prior to the Engineering Department acceptance, the Engineer of Record shall certify that sewer installation conforms to the approved construction plans.

4. The Contractor shall uncover all existing sewer lines to be connected and verify invert elevations before any other construction.

5. All utility installations in conflict with these plans shall be removed or relocated at the Contractor/Developer's expense. Any utility removals or relocations must be approved by the governing municipality and utility purveyor.

6. Trench excavation, backfilling and compaction shall conform to MAG Standard Specification Section 601 except as modified herein.

7. Bedding and backfill for sewer lines shall conform to the requirements of the City of Peoria Standard Detail PE-401, Bedding and Backfill.

8. Backfill shall be Type I as defined in Section 601 of the MAG Standard Specifications.

9. Service line connections to the sewer main shall have a "Y" fitting. Saddles are not acceptable.

10. Sewer service lines shall not be located under driveways, concrete aprons, scuppers, catch basins, or similar structures.

11. Sewer Lines shall not be located within Retention/Detention basin areas.

12. All sewer lines require the installation of metallic locating tape, which shall be installed in accordance with MAG Spec. 616.4 with the following exceptions: the tape shall be solid green in color, printed with the words “CAUTION SANITARY SEWER LINE BELOW”, and installed directly above the ABC course, approximately one-foot above the top of the pipe.

13. New sewer taps shall be per MAG Standard Detail 440-1. See the Materials List, City of Peoria Standard Detail PE-101, for allowable materials. Tap location shall be supplemented by a curb stamp per MAG Standard Detail 440-4 (stamped S on top of curb).

14. All sewer manhole connections shall be installed with a gasket, joint sealer, or water stop between the base and riser section.

15. All manholes and components shall be constructed of Class A Concrete in conformance with MAG Standard Specification Section 725.

16. Workmanship on manhole bottoms will be closely inspected for uniformity and smoothness of channel. The preferred method for construction of manhole invert channels is to place pipe in manhole bottom and remove top of pipe after manhole is constructed. Failure to provide smooth, uniform channels shall be cause for rejection, removal and re-construction.

17. Manholes which: exceed 10-feet in depth, are 5-feet in diameter, are located in an arterial road, or as indicated per the plans shall have an approved manhole liner per City of Peoria Standard Detail PE-101.

18. Manholes in paved and non-paved areas shall be adjusted to the finish grade upon the completion of pavement work.

19. All manholes located outside paved areas shall have a locking cover, a concrete collar, and Utility Marker per City of Peoria Standard Detail PE-101.

20. Installation of manhole steps is not permitted.

21. Adjusting rings in manholes should be a minimum of 12-inches and a maximum of 24-inches per MAG Standard Detail 420-2.

22. Contractor shall mandrel, air pressure test, and provide a closed circuit television (CCTV) inspection in accordance with NASSCO Pipeline Assessment Certification Program. The CCTV inspection should be provided in digital (DVD) format utilizing a measuring device ahead of the camera to identify deflections in the line. The measuring device shall be able to measure water depth from 0 to 2 inches in ¼ inch increments. Contractor shall perform tests after Dry Utilities are installed and prior to any concrete work, street work, or final acceptance of the sewer.

23. Sewer lines shall remain "plugged" at the point(s) of connection to existing lines (outfalls) until all phases of the project have been accepted by the Engineering Director or their designee.

24. No flow shall be released into the City sanitary sewer until after all tests have been passed and approved by the Engineering Inspector.

25. The following MAG Uniform Standard Details are specifically NOT allowed:

No. 425	24-inch aluminum manhole frame and cover
No. 428	Manhole steps - "Cast Iron"
No. 440	Sewer building connection - Type "B" No. 441 Sewer clean out - sewer tap with C.O.

26. All pavement replacement shall conform to MAG Standard Detail 200 with a "T-Top" - modified with a one-half (1/2) sack Portland Cement ABC slurry, which conforms to MAG Standard Specification 728, (modified for one-half sack Portland cement), for trench backfill from one-foot above the top of pipe to the existing pavement subgrade. Pavement replacement thickness shall be: as specified by the Design Engineer on the contract documents, 4-inches, or the existing asphalt pavement thickness; whichever is greater.

27. The Contractor is responsible to notify the Engineer of Record before the sewer line is backfilled so "as- built" measurements may be taken. Any changes to the approved plans must be authorized by the Engineer of Record and the Engineering Director or their designee before the change is made in the field.

28. A Certificate of Approval of Construction (AOC) issued by the Maricopa County Environmental Services Department, is required prior to final project acceptance. A copy shall be provided to the City Engineering Inspector. NOTE: It should be noted that the Engineer of Record or designee shall be present during testing procedures so that the requirements of the AOC can be completed in full.

3.12.10 Reclaimed Water

1. A City of Peoria Engineering Construction Permit is required. Other permits, as required, shall be secured from the appropriate agency; i.e. County permits for County Right-of-Way.

2. Acceptable reclaimed and non potable waterline materials are per City of Peoria Standard Detail PE-101. Contractor shall not deviate from the materials specified by the Design Engineer on the contract documents without written approval from the Design Engineer and the Water Services Department.

3. Waterline and grade stakes shall be set by a qualified Arizona Registered Land Surveyor and/or their representative prior to construction. The qualified Arizona Registered Land Surveyor and/or their representative shall verify that the grades conform to the approved construction plans, and provide cut sheets to the Contractor and Engineering Inspector. After installation and prior to the Engineering Department acceptance, the Engineer of Record shall certify that the installation conforms to the approved construction plans.

4. Trench excavation, backfilling and compaction shall conform to MAG Standard Specification Section 601 except as modified herein.

5. Bedding and backfill for reclaimed and non potable water lines shall conform to the requirements of the City of Peoria Standard Detail PE-401, Bedding and Backfill.

6. Backfill shall be Type I as defined in Section 601.4.3 of the MAG Standard Specifications.

7. The minimum cover from finish grade to top of pipe for all reclaimed and non potable waterlines which are less than 12-inches in diameter located in major streets shall be as specified by the Design Engineer, but no less than 48-inches unless approved in writing by the Public Works Director.

8. The minimum cover from finish grade to top of pipe for reclaimed and non potable waterlines which are 12-inches in diameter or larger, located in major streets shall be as specified by the Design Engineer, but no less than 60-inches, unless approved in writing by the Public Works Director or their designee.

9. The minimum cover from finish grade to top of pipe for all reclaimed and non potable waterlines in other locations shall be as specified by the Design Engineer, but no less than 36-inches (for lines less than 12-inches in diameter), and no less than 48-inches (for 12-inch diameter and larger lines), unless approved in writing by the Engineering Director or their designee.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

10. All stub-outs shall have a 2-inch brass ball corp. stop as a blow-off, left in place with a 2-inch riser, per MAG Standard Detail 390 "A," and shall be accessible to use.

11. All valves 16-inches and smaller shall be per MAG 630 with resilient seat AWWA approved gate valves and shall open by turning counter-clockwise.

12. Valves shall not be located in sidewalks, gutters, curb, or valley gutters.

13. All valve boxes shall conform to MAG Standard Detail 391-1, Type A and City of Peoria Standard Detail PE-270. All reclaimed water valve boxes shall utilize square covers with the words “Reclaimed Water” imprinted on them. Covers shall be painted ‘reclaimed water’ purple utilizing an acceptable paint listed in City of Peoria Standard Detail PE-101.

14. Contractors shall not operate valves on the existing City system.

15. To request a water system shut down a “Water System Shut Down Request” form must be submitted. This form shall be submitted ten days in advance of any requests to shut down any lines in the City of Peoria’s distribution system. The form is to be submitted through the Engineering Inspector assigned to the project, who will in turn coordinate with necessary Utility staff. Failure to complete this form may result in delays to construction activities.

16. The term ‘reclaimed water purple’ refers to the standard reclaimed water color (Pantone 512).

17. New reclaimed waterlines must maintain minimum separation (both vertical and horizontal) from potable waterlines and sewer mains per MAG Standard Detail 404 except as modified: When it comes to separation from sewer mains, reclaimed and non potable waterlines shall use the same requirements as potable waterlines. When it comes to separation from potable waterlines, reclaimed and non potable waterlines shall use the same requirements as sewer mains.

18. All reclaimed and non potable waterlines require the installation of metallic locating tape, which shall be installed in accordance with MAG Spec. 616.4. The required color for reclaimed water pipelines is reclaimed water purple. The color to be used for non potable pipelines varies and will be determined by the City’s Water Services Department on a case by case basis.

19. Standard chlorination procedures for potable waterlines do not apply to reclaimed water. Prior to being put into service, new reclaimed waterlines should be pressure tested per MAG 610-1. The line should also be flushed to remove any construction debris.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

20. No fire hydrants will be permitted on the reclaimed water system unless approved by the City Engineer.

21. The contractor shall not connect to any existing public reclaimed waterline without prior approval of the Engineering Inspector.

22. Cross connection testing shall be required prior to the delivery of reclaimed water.

23. All above ground reclaimed water infrastructure shall be reclaimed water purple in color.

24. All new landscape and turf irrigation infrastructure (above and below ground) shall be reclaimed water purple in color.

25. Reclaimed water systems on private property must complete the requirements in the City's 'Reclaimed Water Checklist' before delivery of reclaimed water can occur.

3.12.11 Landscape & Irrigation

1. All landscape and irrigation installed within the public right-of-way or other City maintained areas shall be installed per the approved plans. All landscaping approved as a part of the site plan process shall be installed per the approved plans. Any deviations to the approved plans require City approval.

2. Permits are required for electrical connections, including electric meter installation, backflow preventers, and work within the City right-of-way or City dedicated property. The Contractor is responsible for obtaining these permits prior to the commencement of any work.

3. All landscape projects requiring City maintenance or within the City right-of-way shall be inspected for the following:

    a. Plant locations: these locations shall be staked in the field with identification as to trees or shrubs; or holes for the plant materials may be dug with identification of plant type. Use of this method does not relieve the Contractor of any plant relocations made by the City.

    b. Irrigation installation: Inspections shall be made at the point the irrigation system is installed. Inspections of the pipe depth, automatic valve installation and emitter/spray installations will be made.

    c. Substantial Completion: An inspection at completion of the landscape and irrigation installation will be made. Any deficiencies in the installation will be noted and corrected by the Contractor during the maintenance period.

d. Final Acceptance: A final inspection is required prior to City acceptance of the landscape and irrigation improvements.

The above inspections require a minimum of 48-hours prior notification to the City. Call the City of Peoria Planning and Community Development Department at (623) 773-7662 and leave a message including the subdivision, location and type of inspection to arrange for these inspections.

4. Separate inspections are required for the backflow preventer and electrical connections. Please schedule inspections online at devservices.peoriaaz.gov a minimum of 24-hours prior

5. Landscape and irrigation, which is installed on private property in conjunction with a City approved site plan, will be inspected by the Planning and Community Development Department for conformance to the approved site plan prior to issuance of a Certificate of Occupancy (C of O).

6. The landscape and irrigation for this project will be maintained by the Homeowners Association per the approved plans.

7. All City maintained projects require a 90-day maintenance period to begin at the date of substantial completion as determined by the City.

8. Right-of way and City maintained areas require separate water meter connections. Right-of-way areas designated for maintenance by the adjacent property owners for commercial, industrial and multi-family developments shall have the right-of-way irrigation isolated or separated from the on-site irrigation system.

9. The Contractor shall be responsible for installation, cost and required permit fees for the water meter(s) designated to serve the irrigation system.

10. All plantings at maturity shall maintain a minimum 6'-0" clearance around all fire hydrants and fire suppression devices.

11. Plantings shall not interfere with any traffic control signs and shall maintain a maximum height of 2'-6" within any sight distance triangles.

12. Installation of the landscape and irrigation system including addition of ground plant materials shall not impede the flow of designed drainage facilities nor decrease the design volume of any detention/retention basins.

13. The Contractor is responsible for the location and protection of all underground utilities during the landscape and irrigation installation.

QUICK LINKS
General Notes

Submittal Checklist

Development Fee Schedule (2018)

Arizona 811(Blue Stake)

14. All trees shall maintain a minimum of 6'-0" clearance from any City water or sewer line. All plantings shall maintain a sufficient distance to any sanitary and storm sewer manholes to allow access by maintenance vehicles.

15. A swale a minimum of 6" in depth shall be provided in all landscape areas within the City right-of-way per City detail to promote water harvesting.

16. All planting areas (except turf areas) to be maintained by the City shall be treated with a pre-emergent herbicide by a licensed applicator prior to and after the placement of the decomposed granite, river rock etc. Application documentation will be required prior to acceptance of the landscaping by the City.

17. As-built drawings of the landscape and irrigation system are required prior to acceptance by the City and for projects within the City right-of-way or City owned property. The as-built drawings shall show the locations of all plantings and the dimensions to fixed points of all irrigation equipment, piping etc.

3.12.12 Bridges

1. Construction Specification – Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 2008.

2. Design Specification - AASHTO Standard Specifications for Highway Bridges, 17th Edition 2002. AASHTO LRFD Bridge Design Specifications, 4th Edition with latest Revisions.

3. Loading Class - HS25-44 HL-93.

4. Inventory and operating ratings for HS25-44 are in accordance with AASHTO Manual for condition evaluation of bridges, Edition of 1994 and the 1995, 1996, 1998 and 2000 interims, in accordance with the load factor method. For HL-93 are in accordance with AASHTO Manual for condition evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges, Edition of 2003 with 2005 interim revisions. In accordance with the LRFD Method.

   Inventory Rating HS - XX.XX
   Operating Rating HS - XX.XX

5. Seismic Performance Category A (ACC = X.XXG).

6. All concrete shall be Class “S” unless noted otherwise.

7. Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

8. All bends and hooks shall meet the requirements of AASHTO Article 8.23. All bend dimensions for reinforcing steel shall be out-to-out of bars. All

placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

9. All reinforcing steel shall have two-inch clear cover unless noted otherwise.

10. Barriers shall be constructed after spans have taken dead load deflection. Barriers shall not be slip formed.

11. Chamfer all exposed corners ¾-inch unless noted otherwise.

12. Dimensions shall not be scaled from drawings.

13. Standards list:

    ADOT Bridge Group Structure Detail (SD) drawings and B-Standard drawings.

14. Contractor shall submit Haul Route Permit Application to the City of Peoria Capital Improvements Engineer as required for all excessive vehicle size, weight, and load per the following:

    Arizona revised Statutes Title 28, Transportation; Chapter 3, Traffic and Vehicle Regulation; Article 18, Vehicle Size, Weight, and Load.

    City of Peoria City Code Chapter 14, Motor Vehicles and Traffic; Permits for the movement of over-dimensional loads.

15. Bridge and Culvert Design are in accordance with the City of Peoria Engineering Standards Manual, current revision; Chapter 10, Design and Submittal Standards for Bridge and Structure Plans.

Additional Notes for Concrete Bridges

1. Dead Load – dead load allowance of 25 pounds per square foot for wearing surface.

2. The bridge design has an assumed dead load of 16 pounds per square foot for the stay-in-place deck forms and additional concrete needed for deck option.

3. Composite Design – dead load carried by girders only. Girders are designed with transformed section properties.

4. Stresses:

Superstructure Except Barriers	f'c = 4500 PSI
Deck	f'c = 1400 PSI
Barriers	f'c = 4000 PSI
Abutments and Piers	f'c = 3500 PSI
Drilled Shafts	f'c = 3500 PSI
Grade 60 Transverse Deck Reinf	fs = 20000 PSI

All other grade 60 Reinf Steel fs = 24000 PSI
Prestressing Steel f's =270000 PSI (1/2-inch Diameter 7-wire Low Relaxation Strand)

5. The cost of stay-in-place forms is incidental to the cost of deck concrete. Approximate deck concrete quantities are based on the removal forms option. No payment will be made for any additional concrete necessary for the stay-in-place metal deck forming system.

Additional Notes for Steel Bridges

1. Dead Load – dead load allowance of 25-pounds per square foot for wearing surface.

2. The bridge design has an assumed dead load of 16-pounds per square foot for the stay-in-place deck forms and additional concrete needed for deck option.

3. Composite Design – dead load carried by girders only. Girders are designed with transformed section properties.

4. Welding Code:

   All welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5-02 Bridge Welding Code

5. Steel CVN Impact Test Note:

   Main Span Truss Components including top chords, bottom chords verticals, diagonals, lateral braces, gusset and connection plates shall meet the longitudinal Charpy V-Notch Impact values, specified in Section 604-2.01 of ADOT Standard Specifications.

6. Stresses:
   Steel A36 f's = 20000 PSI
   Structural Steel Grade 50W f's = 27000 PSI

7. Structural steel shall be weathering Class ASTM A709 Grade 50W.

8. All bolts shall conform to ASTM Specification A325. All bolts, nuts and washers shall be Type IIIcorrosion resistant weathering Steel Grade.

9. All bolted connections shall be Type X (Thread excluded from shear plane).

10. The cost of stay-in-place forms is incidental to the cost of deck concrete. Approximate deck concrete quantities are based on the removal forms option. No payment will be made for any additional concrete necessary for the stay-in-place metal deck forming system.

Additional Notes for Masonry Walls

1. Construction shall conform to ACI 530.1, specifications for Masonry Structures.

2. Stresses:

Concrete	f'c = 3500 PSI
Masonry	f'm = 1500 PSI
Grade 60 Reinforcing Steel	fs = 24000 PSI

3. Materials:
   Masonry: f'm = 1500 PSI, ASTM C90, medium or normal weight, running bond, slump block unless noted otherwise.
   Mortar: ASTM C270, Type S, cube strength 1800 PSI, ASTM C91.
   Grout: ASTM C476, Type: Coarse, cube strength 2000 PSI.
   Reinforcing Steel: ASTM A615, Grade 60.
   Joint Reinforcing: 9 gauge ladder or truss type, standard weight, fy=33,000 PSI, wire: ASTM A82.

Additional Notes for Retaining Walls

Stresses:

Concrete	f'c = 3500 PSI
Grade 60 Reinforcing Steel	fs = 24000 PSI

Additional Notes for Box Culverts

Stresses:

Concrete	f'c = 3500 PSI
Grade 60 Reinforcing Steel	fs = 24000 PSI

QUICK LINKS
General Notes
Submittal Checklist
Development Fee Schedule (2018)
Arizona 811(Blue Stake)

4. GRADING AND DRAINAGE

4.1 General Information

This Chapter provides guidance for complying with specific federal, state, county, and City regulations applicable to floodplain management, water quality, and stormwater management. It presents guidance for preparing drainage reports and grading and drainage plans using the design standards and methodologies adopted by the City of Peoria, the Flood Control District of Maricopa County, the Arizona Department of Water Resources, and the Federal Emergency Management Agency. The design standards and methodologies from Flood Control District of Maricopa County are from the Drainage Design Manuals for Maricopa County which include Volume I Hydrology, Volume II Hydraulics and Volume III Erosion, as well as the Maricopa County Drainage Policies and Standards Manual. The City of Peoria Engineering Standards Manual prevails in any conflict between the County Manuals and the Engineering Standards Manual. Engineers should discuss any conflict with the appropriate City staff for resolution before submitting reports and plans for review.

In case of conflict between these provisions and those of the Code, the more restrictive shall govern.

4.2 City Code, Standards and Master Plan

New land development activities may result in potentially higher storm water drainage, more frequent flooding and increased pollutants. The City of Peoria has developed standards to alleviate or reduce these potential results. The engineer should be aware of and become familiar with the various drainage standards that pertain to land development within the City.

All development and infrastructure must comply with the City Codes.

4.3 Federal, State and County Regulations

Federal Authorities

Federal Emergency Management Agency (FEMA)
US Environmental Protection Agency (EPA)
The U.S. Army Corps of Engineers (USACE)
The U.S. Department of Agriculture (USDA) Natural Resources Conservation Services
Federal Agencies

State Authorities

AZ Department of Water Resources (ADWR)
AZ Department of Environmental Quality (ADEQ)

Local Authorities

Flood Control District of Maricopa County (FCDMC)
City of Peoria

Applicants are responsible for coordinating with other interested parties, including utilities, federal and state agencies. Other agency permits may be necessary before

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

applying for City permits. Applicants should consider the timeframes for obtaining those other permits

4.4 Drainage Facility Components

A. Storm Water Storage Facilities

Storm water storage facilities are defined as any apparatus, device, manmade construction or method for temporarily storing, suspending storm water runoff and releases by means of basins, channels, swales, wetlands, ponds, lakes, vaults, cisterns or any other means approved by the Engineering Director. This portion of the system is intended to retain, detain, store or suspend sufficient volumes of runoff to minimize the adverse impact of new developments upon downstream areas. All developments must provide storm water storage facilities, which consist of one or both of the following as provided below:

1. "On-Site" facilities, for private property to be maintained by the property owner or owner's association are required for any or all of the following types of developments.

    - Apartment complexes
    - Townhomes, Condos, Patio Homes and/or locations where a Homeowners Association will maintain the common area and drainage facilities.
    - Large lot Single Family parcels, where the lot is at least one-half acre or larger. (this is an option in lieu of "off-site or public facilities").
    - "Hillside lots", as defined by the subdivision regulations, require an individual drainage review regardless of the lot size or the means of storm water storage.
    - Industrial Developments including Subdivisions (this is an option in lieu of "off-site or public facilities").
    - Commercial Developments including Commercial Subdivisions.
    - Any lot being developed, permanently or temporarily, for any purpose, including materials or commodity storage, parking, open space, structures of any kind or temporary use consistent with the Zoning Code.

2. "Off-Site" facilities, for projects in a separate tract dedicated, as "Public Drainage Easements", to the City and to be maintained by an association of owners, are required of the following types of development:

    - Single-Family lots (regardless of acreage) that are part of a subdivision.
    - Planned Area Developments (PAD) or other large master planned developments.

3. Storm water storage facilities shall be protected from further development by a recorded drainage easement and must be fully improved with landscaping, irrigation systems, lighting and such other aesthetic improvements as may be required by the City. Any basin, which is accepted by the City for maintenance, shall be deemed public property and shall be dedicated to the City in fee

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

simple title. If the City does not accept a basin for maintenance, the developer shall be responsible for establishing some satisfactory means to maintain the area.

B. Conveyance Systems

Conveyance systems are storm drains, channels, washes, rivers and storm water storage facilities designed to provide regional storm drainage protection in accordance with approved Master Drainage Studies and Drainage Master Plans. Conveyance systems shall carry off-site drainage around and/or through the development, and/or the discharge of on-site storm water generated by the development, in accordance with the requirements herein. Streets shall not be considered as a facility for conveyance of off-site flows other than those impacting the development from upstream street rights-of-way.

C. Direct Discharge.

A development that has direct and immediate access to a natural watercourse or manmade regional drainage facility which can receive discharges without adversely affecting other properties or interests within the watercourse can request approval for direct discharge from the City.

Requests for direct discharge shall be submitted in writing. Approvals for direct discharge can be considered with the following conditions met:

- Acknowledgement by FCDMC of discharge
- Approval of a "Request for Waiver" from the onsite retention requirement of the 100-year, 2-hour volume.
- Provide minimum onsite first flush retention volume for development
- Provide appropriate sediment control in conformance with the NPDES and the City's requirements.
- Comply with Army Corps of Engineers Section 404 Certification, FEMA and the Environmental Protection Agency; Clean Water Act; 401

4.5 Hydrology

This section provides an overview of hydrologic methods and procedures acceptable for use in the City of Peoria

4.5.1 Methodology

There are two methods to determine peak discharge:

1. The Rational Method (generally used for watersheds less than 160 acres that are regularly shaped and uniformly contoured). The methodology is provided in the FCDMC Hydrology Manual.
2. A rainfall runoff model using the USACE's HEC 1 Flood Hydrograph Package (generally used for watersheds that are larger than 160 acres, irregular in shape and contour, or if routing of flows is necessary

Watersheds are subject to change. Grading and drainage plans shall consider all watershed conditions that would result in the greatest peak discharge rate to size drainage facilities and determine lowest floor elevations.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.5.2 Rational Method

A. Rainfall Data

The rainfall values to be used for development in the City of Peoria are contained within the latest Drainage Design Manual for Maricopa County, Arizona Volume 1 Version 4 Hydrology. These values were derived from the rainfall depth-duration frequency statistics for Arizona from NOAA Atlas 14, Precipitation-Frequency Atlas of the United States, Volume 8 Version 2.

B. Time of Concentration

The Time of Concentration (Tc) may be determined by a wide variety of commonly accepted calculation procedures. While no method is specifically preferred or disallowed, any method used shall be appropriate to the watershed being analyzed and compatible with the rainfall loss and hydrograph methods selected. Whichever method is used, it shall be fully documented in the drainage report. Different methods can be used for post-development conditions for on-site developed sub-basins. If the calculated Tc is less than 5 minutes, the rainfall intensity for 5-minute duration shall be used (i.e., the minimum Tc is 5 minutes).

C. Runoff Coefficients

Runoff coefficient shall be based on the development land use classification. A composite/weighted runoff coefficient may be allowed with City approval. See Maricopa County Drainage Policies and Standards Manual for runoff coefficients ("C" values).

4.5.3 HEC-1

HEC-1 methodology shall be per FCDMC Hydrology Manual. Submittals shall contain the following:

- A printout of the input data.
- A schematic (routing) diagram of the stream network.
- The runoff summary output table, including drainage basin name, area, 2, 10, and 100- year flow values.
- Electronic input file(s) on CD or DVD.
- Supporting documentation and source material for parameter selection.
- A narrative detailing the impact of adjustments to the modeling parameters made to address warnings and error messages.

HEC 1 modeling may be used for storage basin design, routing and analysis. Use modified Puls level pool routing option in HEC-1 for hydrograph routing through storage basins and lakes. For permanent lakes, assume no available storage below the normal water surface elevation.

4.5.4 Basis of Design

The basis of design shall be in accordance with the grading, drainage and flood control policies of the City of Peoria, the Flood Control District of Maricopa County and the Department of Homeland Security, Federal Emergency Management Agency (FEMA). The "Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology", as prepared and published by the Flood Control District of Maricopa County shall determine the minimum standards of design for grading, drainage and flood control, or unless otherwise specified herein. As determined

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

by the Engineering Director, a project may be required to use appropriate standards developed by the Arizona Department of Water Resources: "Delineation of Riverine Floodplains and Floodways in Arizona", State Standard Attachment (SSA) 2-96; etc., as made available to the regulatory and design community. In addition, standards shall also adhere to the requirements for FEMA Regulated Floodplain, Special Flood Hazard Areas.

4.5.5 Compliance with Master Plans and Studies

The hydrology shall be in accordance with any approved Area Drainage Master Studies (ADMS), Area Drainage Master Plans (ADMP) Watercourse Master Plans (WCMP) and other Studies, which involve the Agua Fria, New River, Skunk Creek, ACDC or other washes or watercourses as may be relevant.

4.5.6 Compliance with other Regulating Authorities

The Developer/Engineer shall comply with the Federal Emergency Management Agency (FEMA), U.S. Environmental Protection Agency (EPA) and Army Corps of Engineers (COE) requirements encountered in the pursuit of the hydrology. CLOMR, LOMR, COE 404 and EPA 401 applications and/or permits may be required by these other agencies. The City shall be apprised of agency notifications, applications, reports, and resulting agency decisions by reference and correspondence copy inclusion in the appendix of the project report.

4.6 Hydraulics

4.6.1 General Policies

The basis of design shall be the "Drainage Design Manual, Volume II, Hydraulics", as prepared and published by the Flood Control District of Maricopa County. The Design Engineer is responsible for evaluating the specific design conditions to determine the appropriate design criteria in evaluating the hydraulic design and anticipated operation and maintenance conditions.

4.6.2 Design Criteria

1. Storm drainage pipes and open channels shall be designed using "Manning's Formula".
2. Values of the "n" for "non-typical" materials shall be noted and justified in the report.
3. The Step Backwater Method utilizing HEC-2 or HEC-RAS is the preferred method for hydraulic calculations on open channels.
4. Street capacities shall be computed for each street section and slope.
5. Inlet capacity shall be computed for each inlet of the system. Design aids in accordance with the "Drainage Design Manual, for Maricopa County, Volume II, Hydraulics".
6. Topography contours and/or grades up to a 500-foot perimeter of the development at a minimum. The Design Engineer shall be responsible to determine whether certain topography and/or drainage features outside of this perimeter, which may affect the hydraulics, shall be considered. These provisions shall be required for review of the Preliminary Drainage Report, when offsite flows are diverted or routed around or through the development.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.7 Storm Water Storage Facilities Design

4.7.1 General Policies

1. The design engineer shall determine and present calculations on each storm water storage facility required for their project. The storm water storage volume for the 100-year, 2 and 6-hour event, actually achieved shall be provided. Basin volumes, which exceed the contribution from the sub-area(s) it serves, will not be considered as “volume provided”.
2. All storm water storage facilities are required to provide sufficient volume to retain 100 percent of the 100-year, 2-hour storm for the sub-basin that it serves. The routing of storm drainage for the development shall be through the storm water storage facilities, designated drainage tracts and /or storm drainage systems.
3. Detention style storm water storage facilities shall be designed for the volumes and discharge rates as defined by the Flood Control District of Maricopa County for purposes other than a storm water storage retention function. Design of the facilities shall meet the criteria of the appropriate recommended procedure level defined by the ADWR “State Standard for Stormwater Detention/Retention,” SSA8-99 (or current version).
4. A drainage easement shall be recorded over the tract or parcel containing each storm water storage facility within the project for both "public" and "private" facilities. The drainage easement shall include a 20-foot access easement from a paved surface. For Publicly maintained basins, channels and other drainage facilities, the 20-foot access easement shall connect to a public street.
5. Developments are required to retain the 100-year, 2-hour storm volume for the gross development area, which includes adjacent half street right-of-way areas. If adjacent half street is existing and/or interception of the volume is not practical or feasible, compensatory volume for the area may be provided within onsite basins.
6. Storm Water Storage facilities shall not be located within public rights-of-way or public utility easements.

4.7.2 Design Criteria

A. Basis of Design

All storm water storage facilities shall be sized to retain 100% of the 100-year, 2-hour storm volume for the gross area of the development, including the total adjacent right(s)-of-way. For the purpose of determining the volume required the project shall be considered to extend to the centerline of all existing and future streets on the exterior boundaries and to include all interior streets and other rights-of-way within the project.

B. Design Data

The following data shall be provided for each storm water storage facility:

1. Volume Required
   The volume required in cubic feet shall be computed using the methods of the "Drainage Design Manual for Maricopa County, Arizona, Volume II Hydraulics" published and sponsored by the Flood Control District of

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

Maricopa County. With few exceptions, the City's developments should be considered urban with respect to percentage of impervious cover.

2. Volume Provided
   The volume provided shall be submitted in a table noting the stage-capacity relationships.

3. The High-Water Elevation (HWE) shall be denoted on the plans for each basin or ponding area. This is not to be considered the water surface elevation of the basin's storm water storage depth for the period storm event. The HWE shall be designed to prevent damage of public improvements and minimize damage of site improvements, such as paving, structures, utilities, walls, landscape, signs and light standards.

4. Ponding Depth (D), the basin depth shall be measured from the lowest point to the elevation of the basin overflow.

5. Freeboard
   There shall be a 1-foot (12-inch) freeboard from the basin overflow water surface elevation to the lowest adjacent building elevation and/or equal to the gutter of the upstream streets. The freeboard for all project building floor elevations shall be a minimum of 14-inches above the project outfall water surface elevation. The project site outfall elevations must be considered to be lower than an individual on-site basin overflow elevation or the effective depth of the basin is measured to the outfall elevation.

6. The Outfall elevation and each basin Overflow elevation shall be shown on the plans.

C. Interception of Flows

Storm Water Storage Facilities shall be located such that they can intercept the flows from the entire site. If the basin is located other than at the lowest point of the project, the Design Engineer shall denote on the master drainage map the actual or effective drainage area. If portions of the project cannot drain to the primary basin, additional basins shall be added to retain/detain runoff from these areas. The Engineering Director may make exceptions on a case by case basis.

The sub-drainage areas for each basin shall be denoted on the plans and the calculations for each sub-basin storm water storage required shall be provided. Overflow from any sub-basin may be safely routed to another sub-basin, to ultimately be contained in the compilation of storm water storage provided. Routing of storm water volumes shall be contained within designated drainage tracts, easements or storm drain systems. The storm water storage provided shall contain 100% of the 100-year, 2-hour storm event, as actually routed through the development. Over sizing (having a capacity greater than the possible capture volume) of intermediate basins will not be considered for the provision of storm water storage required beyond the volume of the contributing area.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

Storm Water Storage facilities located within a drainageway, channelway, or floodway are prohibited.

4.7.3 Storage Facilities Grading

A. Depths

The overall depth shall not exceed 3-feet without authorization of the City. If granted, the side slopes shall be flattened per this Section. At the City's option, the basin may be fenced to allow steeper side slopes or greater depths.

In no case shall the water storage depth exceed 1.0 foot without a positive means (not relying on evaporation) of disposing of accumulated runoff. Soils Investigation Reports and testing in accordance with this Section must demonstrate that the facility is able to drain the first 1.0 foot of storage in accordance with the City's requirements, otherwise a positive means of disposing accumulated runoff in accordance with these provisions, will be required.

B. Slopes, Side and Bottom

The bottom of all basins shall be sloped towards the discharge points. The minimum bottom slope shall be 0.1%.

Side Slopes:

- Side slopes adjacent to public rights-of-way, or when there is pedestrian type access to that portion of the basin, shall have a side slope of 6:1 or flatter. There shall be at least 2-feet of level ground between the back of the sidewalk and the beginning of the side slope grading.
- When a basin is adjacent to walls, fences, and hedges, etc. (i.e., no or limited pedestrian type access in that area) the side slopes may have slopes up to 4:1 if adjacent to public right-of-way or easement and 3:1 if adjacent to private property. There shall be at least two feet of level ground adjacent from any wall or vertical obstruction to the top of the side slope grading.
- Greater water depths will require flatter side slopes and approval of the City. The following depth/side slope criteria shall be used:

Depth	Side Slope
< 4	4:1
4-6	6:1
6-9	10:1
> 9	14:1

- Retaining walls (i.e., vertical slopes) may be used in areas adjacent to permanent walls, fences, etc., with specific written request to the Engineering Director and written acknowledgment by the City. The horizontal separation of a retaining wall from a building, wall or fence shall be at least equal to the height of the retaining wall but in no case less than 4-feet. There shall be at least 2-feet of level ground adjacent to any building, wall, fence or vertical obstruction to the top of the side slope grading between the retaining wall and such building, wall, fence or vertical obstruction. The grade of the balance of the slope between such

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

retaining wall and a building, wall, fence or vertical obstruction shall not exceed 4:1.

- Concrete or grouted rip rap slope erosion protection and splash pad, a minimum of 9- inches in thickness, shall be provided when street runoff is collected and conveyed to the basin(s) via a storm drain, scupper, weir or spillway. The width of the slope protection shall be at least the width of the scupper or weir, but have a minimum width of 10-feet. The slope protection shall be channelized to contain the calculated flows and shall terminate at a level concrete splash pad or grouted rip rap within the basin, a minimum of 10-feet beyond the termination of the spillway and 5- feet beyond each side of the spillway. The City may reduce these criteria when flow quantities and velocities may warrant.

C. Basin Access:

The following access provisions shall apply to water storage basin and drainage channel construction. Access shall be provided for each storm water storage facility. Provide a driveway entrance, 10-feet of level ground, and a 10:1 ramp, 10-feet (min.) in width. The basin access shall be a minimum of 2-inches compacted decomposed granite over 6-inches of compacted ABC. The ramp shall be concrete, 9-inch in thickness with a surface that provides appropriate traction.

D. Grading and Landscaping

Storm water storage facilities shall be landscaped in accordance to Article 14-34 of the Peoria Zoning Ordinance and **Chapter 11** of this Manual. Basins maintained by the City shall incorporate the use of drought tolerant plant material with the ground surfaces being covered with decomposed granite, river rock or other type of decorative rock. Basins may incorporate the use of other planting including turf. Turf areas shall be kept to a minimum and will be reviewed with respect to promote water conservation. The maximum side slope for turf areas shall be 6:1. The use of turf shall be in compliance with the percent of site area criteria for allowable turf area. The perimeter of basins and channels shall incorporate a means of preventing erosion caused by uncontrolled drainage reaching and damaging side slopes. To prevent rills, head-cutting and other adverse erosion a berm, swale or combination of these features shall be incorporated to guide accumulated side flows safely into the basin or channel thru spillways, hard surfaces or armored faces of the side slopes.

E. Storm Water Storage in Parking Lots

Storm water storage in parking lots of multi-family developments is not allowed. All storm water storage of such developments shall be in landscaped areas.

Storm Water Storage runoff in parking lots of industrial/commercial developments is allowed subject to the following guidelines:

- No more than 25% of the volume required may be retained/detained in parking lots. The balance shall be provided in landscaped areas. The tributary areas to each "basin" shall be noted on the master drainage map.
- Parking spaces shall provide one dry access with no point of the space to exceed 0.67 feet deep, nor 0.25 feet at the midpoint. If paved areas of the

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

parking lot are designed to store water at a depth greater than 0.67 feet, the developer shall post conspicuous warning signs in these areas advising that flooding may occur and vehicles may be subject to inundation.

- A continuous vehicle access lane shall be provided throughout the development, and it shall be free of ponded water from the storm water storage areas. This access lane should typically coincide with a fire lane and be of a 20-foot minimum width.
- ADA accessible parking and loading spaces shall be free from ponding.

F. Outfall

- Each project shall be designed such that the "ultimate" outfall for all drainage is a public street, storm drain, drainage channel or natural watercourse. The outfall shall be accessible without draining over private property.
- When the prescribed method of storm water management is a detention scheme, the engineer must insure that the "post development flow" does not exceed flow that would result had no development taken place.
- All project site finished floors must be a minimum of fourteen inches (14-inches) above the outfall water surface elevation.
- If such an outfall does not exist, the project must provide conveyance to an outfall.
- Upon written request, off-project flows, which historically flowed through the project, may be routed through the storm water storage facilities. The applicant receive written acknowledgment of approval by the City.
- Runoff volumes in excess of those required to be retained/detained (currently the 100-year, 2-hour storm) may be routed through the outfall, although they must be routed via the storm water storage facilities.

G. Location/Conflicts with Existing Utilities

- Storm water storage facilities shall not encroach into existing easements for private utilities without written approval of the encroachment from all utilities that have interest in the easement.
- Storm water storage facilities shall not encroach into public rights-of-way or into public easements. If necessary, the developer shall relocate conflicting utilities into a new dedicated easement.
- The top of the storm water storage facilities (i.e., freeboard elevation) shall be at least four horizontal feet from any building.
- Storm water storage facilities shall not be located within 20-feet of an active septic system or within 100-feet of active water well or within any landfill, known or otherwise.
- A minimum 4-foot of cover (from the bottom of the basin to the top of the pipe) shall be maintained over water, private sewer and storm drain lines. Additional protection may be required for water lines in conflict with a basin, specifically concrete encasements per MAG Standard Detail 404. Public Utilities are to avoid locations within the area of basin facilities.
- Manholes adjacent to storm water storage facilities shall be provided a level area a minimum of 12-feet in diameter from the center of the manhole, and a 12-foot, level vehicular maintenance access way to the manhole from a public vehicular easement or right-of-way. The access

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

way shall be structured and surfaced to be capable of support for maintenance vehicles. The manhole shall be watertight and have a water tight manhole lid.

H. Disposal/Discharge

All storm water storage facilities shall have a positive method of disposing of retained or detained runoff waters. 100% of the 100-year, 2-hour storm being retained/detained shall be disposed of within 36-hours. Public streets are not considered to be an acceptable outlet for disposal of retained or detained runoff. However, streets are considered an acceptable outlet for basin overflow or project outfall.

Acceptable methods of disposal of accumulated storm water runoff are:

- A bleed-off discharge to an existing storm drain or drainage channel of sufficient capacity to convey the anticipated flows from the tributary drainage area after the storm subsides.
- The maximum bleed-off discharge rate shall be 1 cfs. This rate can be achieved by the addition of a 6-inch diameter hole in a plate mounted on the discharge structure. Use a 15-inch minimum diameter discharge pipe within the public right-of-way or public easement. Use a 12-inch minimum diameter discharge pipe for other locations.
- Drywells (percolation wells) are considered an acceptable method of disposing of the retained runoff when there is no other reasonably accessible discharge method, subject to the following:
    - i. Bleed-off meeting conditions cannot be met.
    - ii. Drywells shall penetrate a minimum or 10-feet into permeable soil, defined as mostly cobbles and gravel with no material passing a no. 40 sieve.
    - iii. An actual well test shall be performed, and the resultant design disposal rate shall not exceed 50% of the rate determined by the test, in order to compensate for deterioration of percolation rates over time. Only one test will be required if all Drywells in the area have similar soil boring logs. Copies of any percolation tests must be submitted to the City.
    - iv. Percolation tests shall conform to ASTM D3385-94 or D5093-90.
    - v. The minimum number of wells per storm water storage facility shall be computed, and noted in the drainage report.
    - vi. Drywell drilling log(s) and a copy of the completed Arizona Department of Environmental Quality Drywell registration(s) will be required before project can be accepted.
    - vii. All Drywells are to be equipped with a secured grate to prevent unauthorized removal.

- Runoff generated from washing vehicles and equipment shall conform to "Arizona Department of Environmental Quality – NOI

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

supplement for Type 3.03 General Aquifer Protection Permit for Vehicles and Equipment Washes" (A.A.C R18-9-D303).

- Drywells that drain areas at motor fuel dispensing facilities where motor fuels are stored or loaded, shall conform to "Arizona Department of Environmental Quality – NOI supplement for type 2.04 General Permit. Protection Permit for Vehicles and Equipment Washes" (A.A.C R18-9-D303) and Arizona Administrative Code R18-9-C301. In addition, the design of the system shall be fully automated (human intervention not required) and shall not depend on a power source.
- Drywells that drain areas where hazardous substances are used, stored, loaded or treated, shall conform to "Arizona Department of Environmental Quality – NOI supplement for Type 2.01 General Permit and Arizona Administrative Code R18- 9-C301. In addition, the design of the system shall be fully automated (human intervention not required) and shall not depend on a power source.

I. Nuisance Water

Each basin, particularly those used as a park or play area, shall be graded such that there are one or more "sump" areas wherein runoff from the more "frequent" storms and nuisance runoff may be retained/detained without flooding the balance of the basin. Positive methods of disposal shall be provided for each sump in accordance with these provisions.

J. Obstructions

Obstructions to drainage are fences, walls, berms, swales, retaining walls, patios, pools, decks, sheds, pens, corrals, water troughs, canals or any other construction that alters, redirects, impedes or suspends drainage from its natural course.

Obstructions can occur in landscaping which includes mounding, raised beds, edging, furrowing, gardens, water harvesting, planter boxes or any other landscape method or construction that alters, redirects, impedes or suspends drainage from its natural course.

Obstructions require special engineering considerations to assure that drainage is not altered, redirected, impeded nor suspended from its natural course.

A drainage analysis will be required to determine the necessary number of drainage openings required in the drainage obstruction. This analysis will be dependent upon the location, size and operation and maintenance constraints of drainage openings working as a system for the drainage.

Consideration shall be given to the structural integrity of the drainage obstruction and its ability to withstand the hydrostatic forces, velocities, accumulation of debris, contamination and other forces of drainage, including anchoring and foundations for the obstruction. The ability for the obstruction to breakaway or breach, in a means that does not alter drainage, may be considered when designing any drainage obstruction. Such breakaway or breach mechanism shall not result in the drainage obstruction causing damage: by becoming a projectile,

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

creating a wave, becoming buoyant, contaminating the flow or becoming debris in the flow and creating a further hazard.

A statement or report regarding the proper maintenance for the obstruction, its drainage openings and any attached devices shall be required. An engineering analysis and site plan determining the following criteria related to drainage obstructions shall be provided:

For Drainage Openings the following criteria should be addressed.

- Number of drainage openings.
- Location of drainage openings.
- Base of drainage obstruction - No greater than 6-inches above the upstream side of the drainage obstruction.
- Spacing along drainage obstruction - No more than 8 foot horizontal spacing
- Size of draining openings - Individually and in the aggregate.
- Maintenance of drainage openings - Provide a means to address the maintenance to prevent clogging, deterioration, damage, or loss of drainage opening efficiency. Repairs shall be recommended and made promptly.
- Access prevention for drainage openings - Assure that any screening, access or rodent barriers operate with a breakaway or swing away mechanism that is automatic and is not reliant upon Manual operation.

For Drainage Obstructions the following criteria should be addressed.

- Resistance to flow, impoundment, saturation, debris and contamination. The composition of materials used which become the drainage obstruction shall be made of materials that can resist and withstand hydrostatic forces, velocity, debris, saturation and contamination without reducing the integrity of the drainage obstruction in order to prevent catastrophic failure.
- Anchoring. A means of fixing, tethering, attaching with proper foundations to prevent drainage obstructions from dislodging, becoming buoyant, becoming debris in the flow, redirecting, impeding or suspending of flow, contaminating of flow and causing damage to property, homes, structures or other drainage obstructions is required.
- Breakaway features. Drainage Obstructions may incorporate breakaway mechanisms that allow unimpeded drainage during a flow event. These features must operate automatically and not require human operation or intervention to be activated. Breakaway features shall not alter the drainage pattern. A means of preventing the Breakaway features from becoming a further hazard shall be incorporated and be in accordance with the Anchoring provisions herein.
- Maintenance of Drainage Obstructions. Provide a plan to address maintenance of drainage obstructions to prevent deterioration, damage, or loss of drainage obstruction integrity. Repairs shall be recommended and made promptly.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.7.4 Underground Storm Water Storage

Underground storm water storage involves constructing underground tanks, pipes, or vaults that accept storm water runoff by means of inlets and storm drain pipes. Underground or concealed storm water storage facilities may be considered on a case by case basis. The City approves underground storage only after rigorous analysis of storage system location, specifications, access, operation and maintenance, liability, and signage. Installation of approved underground facilities shall conform to City of Peoria Standard Detail PE-402.

A. Projects Qualifying for Underground Storm Water Storage

Projects located within an industrial, commercial, or multifamily development may be approved for underground storm water storage.

The project must have a viable property maintenance organization or other maintenance mechanism to assume the continued maintenance, repair, and the potential replacement of the underground storm water storage system and to protect the public. The property maintenance organization or other mechanism shall be approved by the City of Peoria on a case by case basis based on an assessment of the long-term ability of the property maintenance organization or other mechanism to maintain, repair and potentially replace the system in conjunction with the review of development review and preliminary plat submittals for the project.

B. General Criteria for Underground Storm Water Storage System Design

Underground storm water storage systems must demonstrate protection of public health, safety, and welfare and related policies.

Storage systems must not be located under structures, parking garages, or significant landscaping such as trees or sizable cactus that would preclude access to or replacement of the facilities.

The owner must dedicate a public drainage easement to the City which meets the standards for all drainage easements.

Design must address:

- Water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.
- Vector control within storage system.
- Redundancy in case of storage system failure, with particular attention to the possibility of structure or street flooding, sediment accumulation, or storm events that are greater than the 100-year, 2-hour event.
- Initial suspended sediment load removal.
- At least a 75-year life of entire system, including the lining and coating of the underground storage tank.

C. Specific Criteria for Underground Storm Water Storage System Design

- Outfall-underground storage systems must have some sort of outfall, such as gravity drains or pumps.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

- Pipes-underground storage system pipes must have a smooth interior floor.
- Installation-excavation, bedding, and backfill procedures and materials shall conform to **Section 4.9.4**.
- Access-a minimum of two access points must be provided for each underground storage system unless waived in advance by storm water staff to enable inspections and access for removal of accumulated sediment and debris. Access must be in accordance with MAG standards and be placed to maximize the ability to maintain the underground system.

D. Criteria for Operations, Maintenance, and Liability

Operations and maintenance generally—owner must provide:

- Maintenance staff with expertise in operating, inspecting, and maintaining an underground storm water storage system;
- An Operations and Maintenance Manual on site for the system that includes a schedule for inspections and maintenance, provisions for emergency operations due to power failure, pump failure, and clogged outlet structures; and a log of the inspections and required maintenance services.

Inspections and maintenance required-in addition to maintenance required, owner shall:

- Inspect system after each storm event of 0.6 inch or more, and semiannually, preferably before summer and winter rains.
- Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of storm water.
- Inspect all other elements of the drainage system (pipes, geotextiles, and stone) and repair/replace elements as needed for the storage system to operate at peak efficiency.

Signage:

- Before receiving a certificate of occupancy, the owner must install signs at each end of the underground storage tank that read “Notice Underground Storm Water Storage Tank.”
- The size, color, and locations of signs are subject to City staff approval.

Ownership Responsibility Statement:

- The owner shall provide and sign a statement of responsibility for the system stating and acknowledging the owner is responsible for the maintenance, repair, and potential replacement of the system.
- Prior to final plan approval, the owner must provide a signed and notarized document to this effect, in a form satisfactory to the City Attorney.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.8 Street Drainage Requirements

4.8.1 General Policies

Streets may carry water from adjacent property and from local areas but should not be used as major water carriers in lieu of natural washes or man-made channels. The design criteria in this section imply that water may flow deeper than a normal vertical curb height, for a short distance over sidewalk or other back-of-curb areas, but the flow is always confined to the right-of-way or drainage easements. Engineers should provide catch basins, scuppers, or similar facilities, together with necessary channels, at appropriate locations (particularly street sag areas) to remove water flowing in the streets to comply with the design criteria in this section

4.8.2 Design Criteria

1. The basis of design for local streets shall be designed to carry the 10-year storm being contained within the pavement section with a maximum depth of 6-inches.
2. Streets shall be designed to carry the following minimum flows:
    - Major and minor arterial streets to carry a 10-year flow between the curbs and maintain a 12-foot dry lane in each direction; and carry the 100-year flow within the right-of-way with a maximum depth of 6-inches over the crown of the street, for emergency vehicles and evacuation purposes. (Determine the current City Code concerning emergency access.)
    - Collectors and local streets shall be designed to carry 10-year flows between the curbs and the 100-year flow within the right-of-way. The grading plans must substantiate the flow containment capability.
    - Underground storm drains are required when the above street capacity or maximum depth is exceeded. Open Channels may only be used as the supplemental drainage conveyance with specific written request to the Engineering Director and written acknowledgment by the City.
    - Streets shall have a crowned section with a maximum cross-slope of 3% for drainage. Exceptions may be submitted with specific written request to the Engineering Director and written acknowledgment by the City.

3. Streets and street rights-of-way shall not be used for channels. Channels must be located outside of the right-of-way. Drainage incidental to the adjacent street may be located in the right-of-way.
4. The street right-of-way shall be designed to limit storm water conveyance to carry a maximum 100 cfs. Storm Drains are required per **Section 4.9** when that capacity is exceeded.
5. In general, dip crossings of open channels shall be avoided. Such designs are subject to special review.
6. Where access to a new development requires crossing of a channel or wash, a minimum of one access point accessible during a 100-year storm must be provided. Additional 100-year accesses may be required by the City.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

A. **Commercial/Multifamily Access Drive Aisles**

1. Inverted crown sections are not allowed for drive aisles within commercial/multifamily developments.
2. Valley gutters are not allowed to run parallel within the drive aisles for commercial/multifamily developments. Valley gutters may cross the drive aisle as necessary to convey flows.

4.8.3 Valley Gutters

Valley gutters are permitted on local streets to transport runoff when a storm drain system is not required. Valley gutters are generally not acceptable on collector or arterial streets. In unusual cases, valley gutters may be necessary to convey runoff across a collector street. In such situations, the valley gutter shall be a minimum of 8 feet wide to lessen the impact on traffic.

4.9 Storm Drain Requirements

4.9.1 General Policies

All developments within the City shall provide such storm drainage facilities as are necessary to ensure that all improvements, structures and properties, both within the subject development and those located upstream and downstream of the development, shall be protected from the adverse impact of storm water due to the proposed development.

4.9.2 Design Criteria

1. Underground storm drains shall be provided whenever the capacity of the pavement section or maximum depth is exceeded by the design storm event. Additionally, storm drains are required when the flow in the right-of-way exceeds 100 cfs.
2. Pipes shall be sized using "Manning's Formula". Values of Manning's "n" shall be from appropriate technical literature and shall be referenced.
3. Velocities shall range from 3-feet per second to 9-feet per second in order to prevent sedimentation and abrasion damage.
4. The minimum pipe size shall be 15-inch ID, storm drain pipe within the right-of-way or easement or any facility maintained by the City. Where debris may be expected, follow the FCDMC requirements for clogging.
5. A minimum of 2-feet of cover is required over all storm drain pipes. Calculations shall be provided for special conditions.
6. Private culverts should be sized to manage the 100-year runoff, but should not be less than 15 inches in diameter when possible. Culverts that do not have 100-year peak flow capacity must be designed to adequately convey the balance of runoff by channel or other means to the appropriate watercourse.
7. For storm drains with submerged outlets an acceptable means for dewatering or evacuating the underground storm drain facilities is required. This can be accomplished with drywells or a bleed-off into subsequently connected, positively draining, outfall facility.
8. Bubble-up devices are not permitted, even in a temporary condition.
9. Manholes or junction structures are required at all horizontal and vertical changes in culvert alignment, pipe junctions, and changes in pipe

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

diameter. When the pipe changes direction more than 30 degrees there shall be manhole installed with a drop, between match points, of at least 0.1 feet. In no case shall the deflection angle be greater than 90 degrees.

10. The hydraulic grade line (HGL) for the design storm may be above the pipe, provided that it remains at least one foot below the ground elevation at all manholes, catch basins, inlets, etc., the pipe shall be designed to operate with the calculated head pressure provided the HGL does not compromise the operation of the storm drain system. The HGL shall be provided on the profile portion of the storm drain plan and profile.
11. Tracer Wire (#6 coated copper wire) shall be installed per MAG Specification 616.4.1. Termination shall be per Peoria Details PE- 551.

4.9.3 Storm Drain Pipe

Storm drain pipe construction in Peoria shall be Class IV or V Rubber Gasket Reinforced Concrete Pipe (RGRCP) per the MAG Standard Specifications 735 and 765.

4.9.4 Bedding and Backfill Requirements

Pipe and culverts installed in City of Peoria easements and rights-of-way shall be bedded from bottom of excavation to one foot above the pipe with granular bedding material in accordance with the requirements of Section 601.4.6 of MAG Uniform Standard Specifications, or the manufacturers' recommendations, whichever is more restrictive. Bedding compaction densities shall be per MAG Specification Table 601-2. The initial 4" bedding under the pipe is required for pipe having an inside diameter of 12" or larger, and in all cases where rock larger than 1.5" is encountered in the trench bottom, the requirements of MAG Standard Specification 601.2.5 shall apply. Specially designed and alternate bedding will be approved on a case by case basis.

Minimum trench backfill requirements shall be per MAG Specification 601.4, with compaction densities per MAG Specification Table 601-2. Backfill requirements provided by the Engineer shall apply, when such provisions are more restrictive than MAG Specification.

Within the existing pavement section of public streets, the backfill shall be ½ sack Controlled Low Strength Material (CLSM) per MAG Specification 728. Anyone using Controlled Low Strength Material (CLSM) for backfilling a trench shall protect all water service lines with sand shading to prohibit contact with metallic water line fittings, metallic joint restraint, valves and valve bonnets, copper and bronze fittings.

4.9.5 Manholes and Junction Structures

Manholes shall be per MAG Standard Details 520, 521, 522 and/or 523.

Junction Boxes and Headwalls are considered Concrete Structures - Concrete Structures shall be per MAG Specifications Part 500. Concrete shall be per MAG Specifications 525. Steel Reinforcement shall be per MAG Standard Specifications 727. Waterproofing shall be in accordance with **Section 6.11.4** of this Manual.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

A. Locations

Manholes, catch basins and/or junction boxes are required at all the following:

- Junctions of two or more pipes at the following locations:
  - More than two intersecting pipes
  - Changes in pipe material
  - Changes in pipe sizes
  - Joining of incompatible pipe products of the same nominal dimension.
  - Spacing exceeding requirements per below.
- Changes in grade
- Changes in alignment
- Changes in pipe sizes
- PC's and PT's, when permitted

B. Spacing

The maximum spacing for manholes, catch basins or junction structures along a storm drain main line shall be:

- 400-feet on lines 15-inch to 36-inch diameter
- 550-feet on lines over 36-inch in diameter

4.9.6 Catch Basins

Catch basins are to be curb opening inlets. Curb opening catch basins shall be constructed per City of Phoenix Detail P-1569.

Drywells, area drains and non-curbed catch basins with grates, within vehicular traffic areas, shall provide a heavy-duty H-20 bicycle safe grate.

In addition, construction of all catch basins, scuppers, spillways, inlets and outlets shall include installation of inlet markers per City of Peoria Standard Details PE-559-1 thru 3.

Catch basins and drywells can be used as junction structures provide they meet and achieve the hydraulic requirements of **Section 4.8**, and that the pipe sizes do not exceed the recommendations of the inlet or catch basin standards. Connections to drywells must also meet environmental requirements conforming to the NPDES.

4.10 Channels

Channels consist of facilities that collect, store, suspend, convey and discharge accumulated runoff by means respectively described as follows.

4.10.1 General Policies for Natural Channels

Natural channels are described as rivers, washes, arroyos, lakes, wetlands, or other naturally occurring watercourse, with the capacity to accept drainage discharges generated by the development of land. Except as specifically approved by the Engineering Director, it is the City's preference that existing drainage channels be left in an undisturbed and natural state. When this is the case, a drainage easement or right-of-way shall be dedicated over, at a minimum, the

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

100-year floodway zone of the natural drainage way. Design shall be in accordance with the Drainage Design Manual for Maricopa County, Arizona Department of Water Resources; Delineation of Riverine Floodplains and Floodways in Arizona, State Standard Attachment SSA 2-96; the State Standard for Detention/Retention, SSA8- 99; and the Watercourse Bank Stabilization, SSA 7-98; or the current version of the aforementioned. The developer is required to coordinate compliance with any requirements of the Army Corps of Engineers Section 404 Certification. The developer is required to coordinate all revisions to the FEMA flood insurance rate maps resulting from construction of bank protection.

4.10.2 General Policies for Man-Made Channels

Man-made channels shall be of a "natural" appearance and consider safety of the public. Grass lining will be allowed, with side slopes 6:1 or flatter, with specific City approval only. Full channel lining will be considered only on a case by case basis.

4.10.3 Channel Design Criteria

A. Maximum Velocities/Erosion Protection:

In general, the maximum velocity shall not exceed the scouring velocity of the soil (with natural cover). When the scour velocity is exceeded, additional erosion protection shall be provided. Bank/channel protection may consist of one or more of the following: Concrete or gunite lining, reinforced with 4-inch x 4-inch WWF-12GA.

B. Materials

1. Natural stone grouted riprap 4-inch to 12-inch diameter stones - leave a minimum 1/4 diameter exposed.
2. Natural Stone loose riprap 4-inch to 12-inch diameter stone.
3. Gabion Baskets/Gabion Mattresses.
4. Soil Cement.

Design shall be in accordance with the Drainage Design Manual for Maricopa County, Arizona Department of Water Resources; Delineation of Riverine Floodplains and Floodways in Arizona, State Standard Attachment SSA 2-96; the State Standard for Detention/Retention, SSA8-99; and the Watercourse Bank Stabilization, SSA 7-98; or the current version of the aforementioned. The developer is required to coordinate compliance with any requirements of the Army Corps of Engineers Section 404 Certification. The developer is required to coordinate all revisions to the FEMA flood insurance rate maps resulting from construction of bank protection.

C. Freeboard

Drainage channels shall be designed with a minimum of 1-foot of freeboard or with its top of bank to be above the calculated Energy Grade Line (EGL) of the channel, whichever is greater.

4.11 Storm Water Quality

A Storm Water Pollution Prevention Plan shall be required of all development/construction projects unless determined to be non-applicable by the Engineering Director. Each development shall comply, as a minimum, with NPDES

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

notification to the EPA and implementation of SWPPP control measures, as defined and required by the "Best Management Practices" of the Drainage Design Manual for Maricopa County.

4.11.1 Construction General Permits

1. ADEQ administers the Construction General Permit under the CWA. The City requires evidence that the development will comply with the ADEQ Construction General Permit, when applicable, before issuing development permits.
2. Storm water runoff from construction sites can include pollutants such as phosphorous, nitrogen, pesticides, petroleum derivatives, construction chemicals, solid wastes and sediment that adversely affect water quality. Compliance with the Construction General Permit will help prevent these pollutants from entering washes, lakes, other surface drain system.

4.11.2 City Approval

1. The operator of a construction site is responsible for applying for appropriate permits from ADEQ. The operator may be the owner, developer, general contractor or individual contractor responsible for operational control. When this responsibility is shared, all operators must apply for ADEQ approval. ADEQ will require a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP).
2. After ADEQ approval, the operator must include one 24"x36" and two 11"x17" of the approved NOI and SWPPP with improvement plan submittal to the City.

4.11.3 Post-Construction Stormwater Management in New Development and Redevelopment BMP Summary

Stormwater discharges from new development and redevelopment sites have the potential to degrade water quality, from soil disturbance associated with construction, or from an increase in impervious surface cover. Stormwater control measures addressing post-construction discharges incorporate several different approaches to maintain and/or improve water quality.

To remove pollutants from stormwater runoff, structures are installed to filter, slow, and treat drainage using various processes. These stormwater structures are called Best Management Practices, commonly referred to as BMPs. They are designed to reduce flooding, remove pollutants and decrease the amount of runoff from stormwater that ultimately flows to our washes and rivers. Ensuring that these facilities function correctly requires long-term maintenance and inspections.

The City has existing processes in place for development projects and capital improvement projects to assure site stabilization has occurred at the end of the construction period. As part of the acceptance or punch list inspection phase of the project any outstanding stabilization measures are noted for the contractor. The sites are also re-inspected one year after acceptance as part of a warranty inspection at which time any remaining control measures such as silt fencing that has not been removed is done so at that time.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

Post-Construction Stormwater Management Program includes three distinct components:

A. Documentation

Inspections are a necessary and important part of the Post-Construction Stormwater Management Program. The inspection forms will provide the necessary documentation to demonstrate when and what was inspected and notification to responsible party.

B. Inspections

1. All post-construction Stormwater Management is required to be maintained by the entity responsible for its operations and maintenance.
2. The property owners are responsible for inspection and maintenance of privately owned stormwater facilities to ensure proper operation and maintenance of the facilities.
3. The Public Works Department – Stormwater Maintenance inspects 20% of the privately owned stormwater facilities per year.
4. Following the inspection, the Public Works Department notifies the private owner of non-compliance.
5. The Public Works Department conducts a follow-up inspection to ensure compliance.
6. If corrective actions have not been implemented the inspector will document in Hansen and begin the enforcement process per City Code.

C. Maintenance

The effectiveness of post-construction stormwater control BMPs depends upon regular inspections and maintenance of all aspects of the facility. There are typically two types of BMP maintenance, referred to as routine maintenance and corrective maintenance. Corrective maintenance consists of repairs performed to correct a deficient part of the BMP facility as identified in the inspection. Maintenance action returns the BMP component to the original design conditions for proper function.

Post-construction BMPs are required to be maintained by the entity responsible for its operations and maintenance. Responsibility is determined by language included on the Dedication Statement found on the Final Plat and is typically documented through an operation and maintenance section included in the Final Grading and Drainage Report. The operation and maintenance requirements follow the property regardless of property owner changes.

Inspections of post-construction BMPs that discharge to the MS4 and are required to be maintained by an entity other than the City (such as an HOA or commercial property owner) will be performed by the City (Public Works-Stormwater Maintenance) on a rotating schedule (20% per year) and also be complaint driven through the citizen portal.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.11.4 Operational Requirements

The operators must keep a copy of the SWPPP on site. In addition to ADEQ enforcement, the City may enforce storm water management requirements, through inspections, responding to complaints and other means.

Once construction is completed, as defined in the Construction General Permit, the operators must send a Notice of Termination (NOT) to ADEQ and the City.

4.11.5 Section 404 Permits

The City requires developments to comply with Section 404 of the CWA.

A. <u>Activities Regulated Under Section 404</u>

1. The USACE and EPA jointly administer Section 404 of the CWA. The CWA regulates the discharge of dredged or fill material into washes, rivers, streams, lakes, certain man-made canals and other waters of the United States, including wetlands.
2. Examples of activities that might be regulated under this program include:
    - Stream crossings;
    - Dam construction and flow regulation;
    - Water diversion for canals, irrigation systems and stock tanks;
    - Streambed modification and stabilization; and
    - Building subdivisions, master planned communities, nonresidential structures, highways and airports.
3. Projects with minimal environmental impact require nationwide permits with a streamlined process. Projects with potentially significant impacts may require individual permits with public notice.
4. Projects cannot jeopardize the continued existence of a threatened or endangered species or its critical habitat. Consult with the USACE or the US Fish and Wildlife Service for guidance concerning threatened and endangered species in the City.

4.11.6 Section 401 Certification

Before the USACE can issue a Section 404 permit, Section 401 of the CWA requires ADEQ to certify (possibly with additional conditions) that the draft permit complies with effluent limits, state water quality standards, and appropriate requirements of state law. No discharge of dredged or fill material is permitted if:

- A practicable alternative exists that is less damaging to the aquatic environment, or
- The nation's waters would be significantly degraded.

ADEQ may grant, deny or waive water quality certification for both individual and nationwide Section 404 permits.

4.11.7 Compliance Requirements

The City will not issue any development permit without appropriate USACE action. An applicant must complete the City Section 404 Certification Form to assure that a project complies with Section 404 of the CWA and submit the form with improvement plans.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.12 Floodplain Management

4.12.1 General Policies

The City of Peoria manages its floodplains through Chapter 20 of the City Code. Applicability of this section and additional clarification can be found through this section and Maricopa County Flood Control District (FCD) standards.

Proposed development project that contain areas within a Special Flood Hazard Area (SFHA) designation per the current Flood Insurance Rate Map (FIRM) that would like to recommend modification of the SFHA are required to submit appropriate supporting documentation to meet the standards set forth by the Federal Emergency Management Agency (FEMA) to apply for and obtain a Letter of Map Change (LOMC). Guidance for this submittal is available on the FEMA website. The applicant is responsible for preparing and submitting all required applications and supporting documentation to the City of Peoria for review of compliance and completeness per applicable Arizona Department of Water Resources (ADWR) State Standards and FEMA guidelines. Once the application packet has been reviewed and associated comments addressed, the applicant is responsible for submittal to FEMA. All associated Local and Federal review fees are the responsibility of the applicant.

Conditional Letters of Map Revision (CLOMR's) are required for any proposed encroachment into a regulated floodplain.

Letters of Map Revision (LOMR's) are required prior to issuing of permits for any grading, structure or any development proposed to encroach into a regulated floodplain

Once acceptance through the FEMA application process has occurred, Conditional Letter of Map Revision (CLOMR), the applicant will be allowed to proceed with grading activities per the approved grading plans. There will be no vertical (building) permits approved until the Letter of Map Revision (LOMR) has been received by the City.

4.13 Easements and Permits

4.13.1 Easement Dedication

A drainage easement shall be dedicated to the City for all storm water storage facilities. Drainage easement dedications shall encompass all physical structures and sufficient area to access and maintain the facilities, including the setbacks for storage facilities.

A. <u>Ownership and Maintenance Requirements.</u>

As part of the initial layout design, the designer must consider and accommodate the future need of vehicular access for maintenance purposes. Preliminary design should minimize long-term maintenance requirements. It is essential that maintenance be considered during the planning, design and construction of drainage facilities. Maintenance is provided so that the facility is maximized. Common maintenance problems associated with drainage

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

facilities includes growth of undesirable vegetation, debris accumulation, sedimentation, erosion, scour, soil piping, soil settlement, structural damage and failing to plan for maintenance access. Culverts and bridges are to be designed to avoid impacts to existing sediment transport conditions.

Culverts and bridge within the City are generally within the public right-of-way for the road. Additional easement or right-of-way, beyond the normal street width may be required to facilitate the construction, operation and/or maintenance of the structure. Design plans for the structure shall include the proposed easement and/or right-of-way limits. Maintenance issues and access shall be considered in the structure design, and appropriate measures should be included to facilitate proper maintenance (i.e. access road if necessary, etc.).

Ramped, vehicular access for maintenance is required at the upstream and downstream ends of all culverts that are not accessible from the roadway. The maintenance access route shall be within public right-of-way or a City approved easement.

A City-owned property, right-of-way, or privately-owned drainage tract or easement shall be provided for the area inundated by backwater from the culverts for the peak 100-year event. The 100-year floodplain limits shall be delineated and shown on the subdivision Final Plat or Map of Dedication.

All storm drains and channels shall be constructed in public rights-of-way or dedicated Public Drainage Easements. The minimum width of the right-of-way or easement shall be adequate to allow a minimum continuous 12-foot wide maintenance road, but in no case, shall the easement be less than 20-feet wide.

If the drainage easement is not contiguous to right-of-way, a minimum 10-foot access easement, to maintain the drainage facility with mechanical equipment, shall also be dedicated, regardless of who maintains the drainage facility. Access easement shall provide a minimum internal turning radius of 25 feet and changes in alignment of the easement.

4.13.2 Maintaining Drainage Easement

Unless otherwise indicated on the document dedicating the drainage easement or in a recorded agreement, the property owner is responsible for maintaining the drainage easement.

4.13.3 At-Risk Grading Permits

Refer to the City of Peoria's "Grading at Owner's Risk" Permit Application.

4.13.4 Stockpile Permit

Refer to the City of Peoria's Stockpile Permit Requirements.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

4.14 Drainage Reports

The purpose of this section is to present criteria for submittals of drainage reports, hydrology reports, and drainage statements to the City of Peoria, including the necessary information that should be included as part of such submittals. The main purpose for preparing and submitting any of these studies is to adequately determine the finished floor elevations (FFEs or FFs) of proposed improvements. In addition to this purpose, a hydrology study should specifically identify existing runoff patterns and floodplain areas, identify existing flood hazards, and determine the effect of proposed construction upon existing flows and water-surface elevations. In addition, drainage reports should specify storm water storage requirements, as well as identify required drainage improvements and structures.

Before preparing a drainage report, hydrology report, or drainage statement, the consulting engineer is strongly encouraged, to discuss the proposed drainage design with the Review Engineer, or his designated representative, and obtain specific hydrologic, hydraulic, and design requirements for developing the subject parcel. Additional planning information can also be obtained as a result of this meeting, including City drainage policies found in documents with limited distribution, such as the Area Comprehensive Plan, Basin-Management Plans, Neighborhood Plans, and Specific Plans.

The City does not guarantee the reliability of specific hydrologic methods, techniques and/or parameter values. The engineer is expected to validate the reasonableness of the estimated values and design the plan to keep the development and the City relatively safe from flooding.

4.14.1 Conditions Requiring a Report or Data Submittal

The review and approval of drainage reports, hydrology reports, and drainage statements by staff are typically in response to reports and statements submitted in order to satisfy one of the following: (1) a requirement of rezoning; (2) a specific requirement for approval of a subdivision plat or a development plan; (3) approval of a disclosure statement prepared in conjunction with a condominium conversion; (4) the request for a floodplain, building, or grading permit for a parcel located within either a regulatory floodplain, an erosion/building-setback zone, or an identified flood hazard area; or (5) application for a Letter of Map Amendment (LOMA) or a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (FEMA).

The complexities of drainage reports, hydrology reports, and drainage statements depend upon many factors, such as development size, severity of existing drainage problems, extent of drainage improvements needed to satisfy Floodplain Regulations and development standards, and the need to provide storm water storage facilities. A brief description of the amount of drainage information that will be required for various development settings is provided below.

4.14.2 Types of Reports

A. <u>Drainage Report</u>

A drainage report is a report that is required for any site greater than one acre in size or for any site subject to storm water storage requirements. The drainage report shall contain all elements of a hydrology report, as well as

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

descriptive data of the appropriate components for the required storm water storage facility design. In addition, a drainage report shall be required for any site where extensive structural improvements for mitigating drainage impacts are required.

B. Hydrology Report

A hydrology report is a report required for developments which are not subject to storm water storage requirements, nor which require extensive structural improvements for handling drainage; but which are impacted by flows from significant watercourses and/or affected by 100-year flows of 500 cfs, or more. The objective of a hydrology report is to establish finished-floor elevations, which assure that all structures are free from flooding during a regulatory flood. Additional objectives of a hydrology report are to establish the size and configuration of flow-through wall openings and other minor drainage features; and, if required by the Engineering Director, to develop a grading plan which demonstrates adequate site drainage with no resulting impact to upstream or downstream properties.

C. Drainage Statement

A drainage statement is a brief description of drainage conditions applicable for a site which is not affected by 100-year flows of 500 cfs, or more, and is neither subject to storm water storage requirements nor impacted by flows from a significant watercourse. The objective is to demonstrate adequate site drainage retention according to the methods established by the Drainage Design Manual for Maricopa County, and to establish finished-floor elevations, which assure that all structures are free from flooding during a 100-year flood.

4.14.3 Standards

All drainage reports and plans should be prepared in conformance to the requirements in this Chapter. Hydrology calculations may be performed using Drainage Design Management System for Windows (available at no cost through the FCDMC), HEC-1, HEC-HMS or the Rational Method. Hydraulic calculations may be performed using HEC-RAS. However, the City encourages sound, innovative design and the use of new techniques where special conditions or needs exist. With prior City staff approval, alternate methods, models and procedures may be used with appropriate supporting documentation.

Development shall not increase peak discharge rates above the historic peak discharge rates for any storm events.
Proposed grading shall be at least 0.5% to allow for positive drainage. At a minimum, drainage reports should meet the following standards:

- Reflect local, state, and federal requirements.
- Use the best and most current data available.
- Provide a clear narrative of the methods used, parameters selected in the analysis and conclusions drawn.
- Be technically and legally defensible.
- Be well-organized and concise.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

- Demonstrate proposed development design will be safe from inundation up to and including the 100-year storm.
- Demonstrate proposed development design will not adversely impact existing and adjacent properties.

4.14.4 Report Content and Format

A. Drainage Reports and Hydrology Reports

Whenever a drainage report or a hydrology report is required, its presentation and format should be as brief and as succinct as possible. Unless otherwise noted herein, they should contain the following engineering information, at a minimum, presented in approximately the specified format indicated below:

1. Cover Sheet:
   - Submittal number (i.e., first submittal, second submittal, first addendum, etc.).
   - Name and address of the parcel, project, or development for which the report is being submitted; the Proposed Zoning of the development (i.e. R1-36); the Planning Case Number (e.g.: PR01-00, et. al.); the approximate location of the project site relative to Township, Range, and Section; and the Floodplain FIRM Map Panel Number.
   - Name, address, and telephone number of the client for whom the report was prepared.
   - Name, address and telephone number of the engineering firm responsible for the report.
   - Submittal date.
   - Seal and signature of the Arizona Registered Professional Civil Engineer responsible for preparation of the report.
   - Table of Contents. All report pages shall be numbered sequentially, including any appendices.

2. Introduction
   - When writing the report introduction, very briefly describe the general location of the parcel relative to nearby streets, drainageways, and washes.
   - Submit a site-location map, at a minimum scale of three inches equal to one mile, which shows the geographical relationship of the project to nearby properties, streets, and watercourses.
   - Provide a legal description of the specific parcel or parcels in question (if the description is lengthy, the information may be placed in an Appendix).
   - Briefly describe the type, and approximate size, of the project to be constructed. It must be clear to the reviewer, for storm water storage considerations, whether or not the parcel (or parcels) being developed is greater than, or less than, one standard acre (i.e., 43,560 square feet) in size. Any lot subdivided from a parcel greater than or equal to one standard acre in size on or after August 26, 1998 (Ord. No. 98-95) is subject to stormwater (storage) requirements,

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

regardless of lot size. A drainage report will be required under such conditions.

- In order for the reviewer to understand whether or not additional information will be forthcoming, identify those drainageways and roadways for which improvement plans will be prepared.

B. Purpose and Objectives for a Drainage Report or Hydrology Report

1. Give the purpose for submitting the report (i.e., Tentative Plat/ Development Plan approval, Building Permit application, Floodplain Use Permit application, condition of rezoning, etc.).
2. Briefly enumerate the report objectives.

C. Known Development Requirements

1. Repeat, for the benefit of the reviewer, those drainage and land-use policies given in the Area Comprehensive Plan, Basin Management Plans, Neighborhood Plans, or Specific Plans that apply to the project site, or its immediate vicinity. Specify how these policies have been satisfactorily addressed during the design of the development. (NOTE: For many projects, this information may not be required. Consult the Engineering Director's office.)
2. As may be appropriate, list any rezoning requirements that relate to drainage and grading, and describe how these specific requirements have been satisfied.
3. Summarize the preliminary requirements given by the Engineering Director's staff during any Pre-Submittal Conference. Include a dated copy of the Pre-Submittal Conference Summary, if required, as prepared by the Developer or the Consulting Engineer.

D. Previous Studies

Identify all known drainage studies for the subject parcel, and for adjacent parcels that share drainageways and/or storm runoff. Mention previous submittals of the subject report, if any; and reference earlier staff correspondence, as appropriate.

E. Long-term Maintenance Responsibility

Specify the name, address, and telephone number of the person(s), firm(s), agency or agencies responsible for the ownership, operation, scheduled and unscheduled maintenance, and liability of drainage improvements (i.e., roads, parking areas, washes, drainage ways, storm water storage facilities, common areas, etc.) described in the drainage report. List other documents where these responsibilities are documented (i.e., CC&R's, Final Plats, Development Plans, etc.).

F. Required Permits

Submit a comprehensive list of permits which either have been or will shortly be obtained from those governmental agencies when approval is required by Federal or State Law, including, but not necessarily limited to: a US Army Corps of Engineers administered Section 404 (of the Clean Water Act) Permit; a Section 401 Certification; an EPA National Pollution Discharge Elimination System (NPDES) Permit; etc. Provide document copies of the appropriate

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

permits/applications for permits, correspondence to and from the regulatory agencies regarding the need for such permits, and assurance to the City that the Owner/Developer is in compliance with all necessary permit procedures from all such regulatory agencies. Note that, according to current Floodplain Regulations, it is the City's responsibility to make sure that the owner/developer obtains all necessary permits prior to granting final approval of the project construction.

4.14.5 Hydrology

A. Offsite Drainage

In order to help staff locate the development relative to future drainage improvements, give the name of the Major or Minor Wash, or the Regional Watercourse into which the project site drains.

Describe the size, location, and hydrologic characteristics of upstream and adjoining watersheds that may potentially affect the site.

Provide either a topographic map at a scale of one inch equal to 200-feet, or larger, or (preferably) a photo-topo which shows:

- The parcel boundaries, major streets, drainageways, and nearby storm-drain systems (if they are considered in the analyses);
- Boundaries of the offsite watersheds affecting the site;
- Principal points of drainage concentration; and,
- Flowlines and grade breaks used to compute basin lengths and average watercourse slopes.

Note that U.S. Geological Survey 7.5-minute or 15-minute Topographic Quadrangle Maps, as well as City of Drainage Base Maps, are generally not acceptable for delineating offsite and onsite watershed boundaries, but may be used to show large drainage basins, if the actual basin boundaries are determined from larger-scale maps. The larger-scale maps should also be included within the report.

Identify and describe both the existing natural and/or man-made impacts and the proposed major developments to be located within the contributing watershed, which may impact the subject development, relative to flooding and erosion or sedimentation.

Identify and describe, as appropriate, the effects that nearby impending City/County drainageway and/or roadway-improvement projects may have on site drainage or site design. Also, specify the time frame within which these improvements are planned.

Submit Hydrologic Data Sheets for each significant onsite point of drainage concentration. If they are different, calculations are to be presented for both predevelopment and post-development conditions. If there are many sheets, put them in an Appendix, and summarize the watershed characteristics and flood peaks in a table placed, within the text of the report. Indicate, as

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At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

appropriate, whether the floodpeak estimates are for existing or future watershed conditions, or both.

B. Onsite Drainage

Describe the size, location, and hydrologic characteristics of the onsite watersheds.

Unless an alternative size has been approved by the Engineering Director's staff, show onsite drainage conditions on topo maps having a minimum scale 1" to 40' with one-foot contour intervals, as stipulated in Chapter 10 of this Guideline. A Grading Plan, Tentative Plat, or Site Plan may be modified for this purpose. Show on this map:

- Watershed boundaries;
- All points of drainage concentration, and;
- Flowlines and grade breaks used to compute basin lengths and average watercourse slopes.

Submit Hydrologic Data Sheets for each point of drainage concentration. Calculations are to be presented for both pre-development and post-development conditions. If there are numerous sheets that are difficult to organize comprehensively, place them in an Appendix, and summarize the watershed characteristics and flood peaks in a table exhibited within the text of the report. Indicate whether the flood-peak estimates are for existing or future watershed conditions, or both.

4.14.6 Floodplain Analyses and Results

It is intended that the particular section of a drainage report or a hydrology report that addresses Floodplain Analyses be reserved for describing the existing and future floodplains affecting the proposed development. Either normal-depth computations or backwater computations should be used to describe the existing (pre-development) and the future (postdevelopment) flow depths, widths, and velocities. The format of this Chapter will vary, depending upon the, complexity of the prevalent drainage patterns. Therefore, the consulting engineer may exercise his or her own judgment in writing this portion of the report. However, the analyses and results must be clearly presented and organized; the calculations and design elements should be clearly cross-referenced to other appropriate sections of the report. The following list contains the major technical items that must be included, or considered:

1. Describe the hydraulic analyses used to evaluate floodplains and floodways located in, and adjacent to, the proposed development. This description shall include a brief discussion of the theory and/or the numerical/computer model(s) used for the study, the source of input data, and any simplifying assumptions made.
2. Describe the results of the hydraulic analyses in terms of site design.
3. The following items should be shown by appropriate symbols and labels on the Site Plan, Custom Lot Developments, Minor Land Divisions, Preliminary and Final Plat, or Development Plan, if located on or within at least 200-feet of the subject development:

- All 100-year floodplain limits and areas of sheet flooding resulting from 100-year flood peaks of 100 cfs or greater shall be clearly shown and labeled and shall also include spot water-surface elevations.
- Those areas subject to flooding from flows less than 100 cfs shall also be identified and labeled with flow arrows.
- Each significant concentration point, along with its 100-year peak discharge and contributing drainage area, shall be labeled.
- (d) All applicable floodplain and floodway limits and erosion/building setback lines shall be shown in a surveyable manner on the Final Plat. All boundaries of Federal Emergency Management Agency, (FEMA) Special Flood Hazard Areas shall be indicated and labeled with the applicable Flood Zone designation on all Site Plans, Custom Lot Developments, Minor Land Divisions, Final Plats and Preliminary Plats.
- Any Regulatory Flood Plain or Special Flood Hazard Areas shall be clearly indicated labeled as "Regulatory Flood Plain".
- All floodways shall be labeled in one of the following ways: 'To be left natural," "To be channelized," "Public (or Private) Flowage Easement," "Public (or Private) Drainage Easement," or "Public (or Private) Right-Of-Way". Prior approval from the Engineering Director shall be required for the dedication of any Public Easement or Right-of-Way.
- 100-year floodplain limits, which are entirely contained within a street section or constructed drainageway, shall be labeled as such on the plan/plat, or a general note shall be included on the plan/plat that states the same.

4. The Hydraulic Calculation Sheets used in conjunction with the delineation of offsite and onsite flood plains, as well as those used for evaluating flow depths, velocities and flow durations, should be presented in a clearly understandable manner. Note that if computer input/output is submitted it must be well documented and described.
5. All hydraulic cross sections are to be clearly identified on a map of suitable scale so that they may be easily cross-referenced to the Hydraulic Calculation Sheets used by the consulting engineer. The cross sections are to be plotted to scale, and accompanied by pertinent hydraulic information, such as the ground profile, design discharge and return period, computed water-surface elevation and depth of flow, channel and overbank velocities, effective and ineffective flow areas, Manning's roughness coefficients, wetted perimeter, energy slope and/or ground slope, Froude number, and critical depth.
6. The calculations used to assess the hydraulic effects that existing and future structures may have upon the floodplain and floodway should be presented and be clearly described. Encroachment analyses shall be provided whenever significant development is planned within FEMA-recognized floodplains/floodways, major washes, or other washes or floodplains, as designated or determined by the Engineering Director.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

7. The floodplain analyses presented in the report being submitted should be compared with those presented in previous reports for the same geographical area. Special emphasis should be given to comparing the current results with those given in Flood Insurance Studies and Flood Insurance Rate Maps, Basin-Management Studies, and studies accompanying drainage or roadway improvement plans. Unless a FEMA Letter of Map Revision (LOMR) is to be requested, the floodplain delineation shall coincide with the FIRM limits.
8. For developments proposing changes to an established Special Flood Hazard Area (SFHA), including SFHAs determined per the ADWR State Standard 2-96, a FEMA Conditional Letter of Map Revision is required to demonstrate the proposed impact upon the floodplain, complete with plans to address the proposed impact upon the floodplain. Development Plan approvals will be suspended until acknowledgement by FEMA is received by Peoria's Floodplain Administrator,
9. FEMA Elevation Certificates are required for any structures, lots or developments proposed to be impacted by the Special Flood Hazard Area.

4.14.7 Hydraulic Improvements and Hydraulic Structures (Drainage Report Only)

It is intended that the particular Chapter of a drainage report which addresses Hydraulic Improvements and Hydraulic Structures be reserved for describing the design of any drainage improvements which are needed in order to satisfy either the wishes of the owner/developer or governmental regulations and standards, whether Local, State, or Federal.

The format of this Chapter of the drainage report will vary, depending upon the complexity of the prevalent drainage patterns. Therefore, the consulting engineer may exercise his or her own judgment in writing this portion of the report, subject to specific requirements imposed by the City Floodplain Engineer

The following list contains the major technical items that shall be included, or considered:

1. Provide a general description of the proposed drainage design for the entire project. Indicate which portions will be constructed in phases, in conjunction with other major structures.
2. Describe and present Hydraulic Calculation Sheets for each of the hydraulic systems used to collect offsite flow. Examples of these kinds of systems include collector channels, existing drainageways, and flow-through openings in perimeter screen walls. Demonstrate that the collector systems to be employed do not unnecessarily obstruct offsite flows. Encroachment analyses shall be provided, as needed.
3. Describe and present detailed and easily understandable Hydraulic Calculation Sheets for each of the stormwater conveyance systems to be constructed as part of the overall project. These systems include, but are not necessarily limited to, lined and unlined channels, drainage swales, streets and alleys, storm drains, and roadway culverts.
4. If any of the proposed drainage structures and roadways are to be dedicated to the City for ownership and operation/maintenance, Improvement Plans, prepared to City Standards, must be submitted for

QUICK LINKS
At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

approval prior to the issuance of a Grading Permit or a Building Permit. When applicable, place a note on the Final Plat, Development Plan, Site Plan, and Grading Plan that indicate the conditions of dedication.

5. If computer input/output data are submitted in conjunction with hydraulic computation sheets, they must be well documented and explained.
6. Describe and present Hydraulic Calculation Sheets for each of the hydraulic systems used to return the flow to either its natural or existing location and magnitude along the downstream property line.
7. If flows are to be concentrated or ponded on the upstream or downstream side of the subject property, either a recorded drainage easement or written permission must be obtained from the appropriate property owner(s) prior to issuance of Grading Permits or Building Permits. When this condition applies, place a note on the Development Plan, Final Plat, Site Plan, and Grading Plan, as appropriate, which indicates the same. If drainage improvements are proposed for offsite areas, written approval from the offsite property owner(s) will be required.

4.14.8 Storm Water Storage Facilities

1. Storm water storage Location and Description.
   - Provide calculations needed to demonstrate that storm water storage can be provided in accordance with criteria given in the Maricopa Standards (i.e., the "Drainage Design Manual for Maricopa County" Vol. II). Provide calculations for the required volume of storm water storage for the 100-year, 2- hour storm per the FCD Standards.
   - Give a general description of the proposed storm water storage scheme for the entire project. Indicate which basins and appurtenant drainage structures will be constructed in proposed phases.
   - Submit a detailed site plan which clearly shows the dimensions and locations of all proposed storm water storage systems, including:
     - The locations, sizes, and types of inflow and outflow structures to be employed. Include dimensions and elevations of critical portions of those structures
     - The location and size of access and maintenance access ramps and roadways
     - Boundaries of Common Areas and Private Drainage Easements which cover the basin, inlet and outlet structures, inflow and outflow drainage channels, and maintenance routes
     - Clearly marked dimensions of all building and/or erosion setback zones (i.e., additional space provided for structural safety considerations). Show the dimensions or distances between building structures and any proposed basins or drainage ways
     - Maximum water-surface elevations, and the limits of ponding
     - Identified locations and types of all security barriers to be installed around the basins, as appropriate

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

- Provide details and discussions of how the proposed storm water storage scheme will comply with landscaping and grading guidelines required by the City's Development Standards.

2. Retention Basin Design per **Section 4.7** of this Chapter.
3. Detention Basin Design Report Requirements Additional to **Section 4.7**.

    - Provide and describe Reservoir-Routing Calculation Sheets for each basin for the 2-year, 10-year, and 100-year design floods, at a minimum. The Reservoir-Routing Calculation Sheets shall, at a minimum, consist of a working-table for each basin, and a routing-table for each flow event. Note that the City may reserve final approval of basin design until its acceptance of the project's drainage control grading.
    - Provide and describe any other Hydraulic Calculation Sheets prepared while evaluating stage-storage and stage-discharge relationships, or any other pertinent data used in the basin analysis and design.
    - Submit plotted inflow and outflow hydrographs (preferably superimposed). Include any lag-time calculations.

4.14.9 Drainage Maintenance Manual

1. A detailed Drainage way and Storm Water Storage Facility Maintenance Checklist and Schedule shall be provided by an Arizona Registered Professional Civil Engineer, which will be followed by anyone performing scheduled and unscheduled maintenance on behalf of the owner(s).
2. Each of the privately-owned drainage structures and storm water storage facilities to be regularly inspected shall be identified.
3. The identification shall reference specific portions of construction documents of the approved final design. Note the minimum frequency of inspection and indicate the expected range of acceptable performance (i.e., sedimentation levels, scour hole dimensions, etc.).
4. If private drainageways or other water conveyance structures are proposed, but storm water storage facilities are not, a maintenance checklist and schedule shall still be prepared as part of the drainage report. In these cases, the engineer may exercise his or her own judgment as to the location within the report where he or she wishes to place the discussion of maintenance.
5. As part of the checklist, state that the annual inspection report shall contain the following summaries:
    - A statement saying that either no maintenance work is needed at 'that time, or a list of repairs and work to be done to correct deficiencies, to avoid potential problems, and/or to restore the aesthetics. Also state that this work shall be followed by a Letter of Certification from an Arizona Registered Professional Civil Engineer verifying that the recommended work has been satisfactorily completed. The Engineer shall notify the Engineering Director, in writing, should safety-related maintenance not be completed within a reasonable period of time.
    - A statement either indicating that watershed conditions have not changed since the previous inspection report or stating that

QUICK LINKS
At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

specific changes have occurred which alter or eliminate some of the design features thereby affecting the level of service of the drainage and storm water storage systems. In addition, the Engineering Director is to be immediately notified, in writing, if watershed conditions have changed to the extent that drainage and storm water storage systems no longer satisfy the requirements of the County Floodplain Regulations.

- SWPPP for post construction maintenance

4.14.10 Summary and Conclusions

1. Provide a brief summary of the important analyses and conclusions presented in the report.
2. Certify that the proposed drainage plan, once properly constructed, will adhere to applicable Local, State, and Federal Floodplain Regulations.
3. Certify finish floor elevations within the development will be safe from inundation during a 100-year storm event.
4. Certify proposed design will not adversely impact historic drainage conditions and adjacent properties.

4.14.11 References

Alphabetically list all of the sources of information and design procedures used in developing the drainage analysis and design.

4.14.12 Appendices

Place Hydrologic, Hydraulic, and Reservoir-Routing Calculation Sheets, and other relevant documents, in one or more referenced appendices. Number the pages.

4.14.13 Exhibits and Maps

Exhibit and Maps should be included with the report to clearly show the drainage considerations.

4.14.14 Drainage Statement

A drainage statement may be submitted in lieu of a drainage report or hydrology report. Because site conditions vary considerably within the area, each drainage statement may be different in content and format. The Arizona Registered Professional Civil Engineer preparing the report may exercise his or her own judgment in presenting the technical information for review. In all cases, the drainage statement must be clearly written, sealed, and signed by the Engineer; and may contain the following information concerning the proposed project:

- A brief description of the type and size of the proposed development, including a legal description of the parcel or parcels being developed;
- A brief description of the amount of runoff expected on, or near, the site;
- A 200-scale aerial photo-topo, or other acceptable map, showing the subject parcel, the contributing drainage areas and their principal points of drainage concentration, and any other pertinent information related to the site design;
- Hydrologic Calculation Sheets concentration for each principal point of drainage;

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

- The appropriate Hydraulic Calculation Sheets used in designing the proposed method of drainage disposal;
- A 40-scale Site Plan, for review and approval;
- Where significant changes to hydraulic structures, storm water storage facilities, grades, FFEs, or other development conditions occur on the grading plan submitted for the purpose of a grading permit, a drainage-report addendum, justifying the proposed changes, must be included with the plan.

4.14.15 Quality of Submittals

The Arizona Registered Professional Civil Engineer shall be held solely responsible for the correctness and adequacy of all data, drawings, calculations, and reports submitted to the City of Peoria for review and approval. In addition, the Engineer shall comply with all Local, State, and Federal Floodplain Regulations in the design of the development.

City will review the technical submittals for completeness and general compliance with all applicable Floodplain Regulations and Drainage Standards. Approval by the City does not necessarily imply that the design is appropriate, or that the development is in strict compliance with all applicable regulations and standards. Review and approval of drainage submittals shall not create liability on the part of the City or its employees for any flood damages that may result from reliance upon any administrative decision made by the City or its employees.

QUICK LINKS

At Risk Grading Permit

Stockpile Permit Requirements

FCDMC Drainage Design Manual - Hydrology

FCDMC Drainage Design Manual - Hydraulics

FCDMC Drainage Design Manual - Erosion Control

Maricopa County Drainage Policies and Standards

5. TRANSPORTATION PLANNING

5.1 General Information

This Chapter is intended to give the references and guidelines for layout of transportation and transit facilities within the City of Peoria. The designer shall utilize the information in this Chapter in conjunction with the other Chapters in this Manual.

5.2 City Code, Standards and Master Plan

The City of Peoria has the following related transportation planning documents available:

- City of Peoria General Plan
- City of Peoria Traffic Impact Analysis Criteria
- City of Peoria Access Management Guidelines
- City of Peoria Multi-Modal Transportation Plan
- City of Peoria Community Services Master Plan

The City of Peoria has adopted the General Plan which addresses the City's long-range plans for local and regional transportation requirements. City of Peoria General Plan and a current traffic impact study shall be used to determine the specific roadway requirements.

All street improvements shall be in accordance with the adopted City General Plan and satisfy all required development fees.

5.3 Functional Classification

Functional classification is the process by which roads are grouped into classes or systems according to the level of service they will provide. The basic functional systems used in these classification systems are arterials, collectors, and locals. Using national classification terminology, these systems are sub-classified based on the trips served, the areas served, and the operational characteristics of the streets or highways. Typical cross sections are discussed in this Chapter.

The desired Level of Service (LOS) designations for each roadway section shall be used in the traffic analysis to support roadway function classifications, sizing of interim roads and determining the number of intersection auxiliary lanes that are required.

A summary description of Level of Service is given:

A - free flow, with low volumes and high speeds.
B - reasonably free flow, speeds beginning to be restricted by traffic conditions.
C - stable flow zone, most drivers restricted in freedom to select their own speed.
D - approaching unstable flow, drivers have little freedom to maneuver.
F- unstable flow, may be short stoppages.

These following categories comprise the hierarchy of functional classification of roadways in Peoria and related directly to the different types and lengths of

QUICK LINKS
Traffic Impact Analysis
Access Management Guidelines
General Plan
*Circulation Element
Multi-Modal Transportation Plan
Community Services Master Plan
Valley Metro Bus Stop Guidelines
MAG Transit
Bus Stop Design Standards
Bicycle Development Plan
Transit Implementation Plan

generated trips as well as access needs. Travel demand determines these characteristics. Refer to the Circulation Map within the City of Peoria General Plan and **Figures 5-1 through 5-9**.

5.3.1 Freeway

Freeway is a major highway that provides for the expeditious movement of large volumes of through traffic and has full access control via interchanges only. All roadways classified as Freeways are under the jurisdiction of the Arizona Department of Transportation.

5.3.2 Parkway

A Parkway is a major arterial that serves high volumes of traffic traveling relatively long distances and is managed to reduce conflict between through traffic and traffic entering, leaving and crossing the facility. By limiting access to intersections and interchanges, Parkways regulate and control the spacing and design of driveways, medians, median openings, traffic signals and intersections to improve safe and efficient through traffic flow. Parkways typically have up to three lanes in each direction.

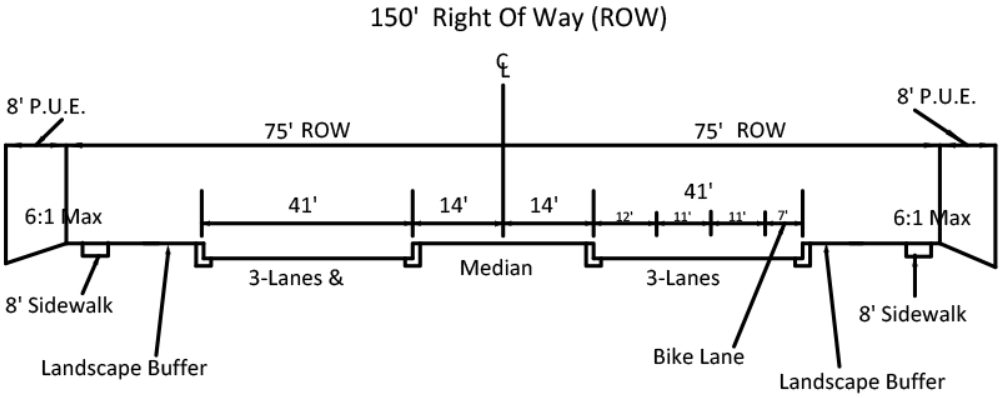


FIGURE 5 - 1 PARKWAY STREET SECTION

5.3.3 Major Arterial

Major Arterial is a roadway that is of regional importance and is intended to serve high volumes of traffic traveling relatively long distances. A major arterial is primarily intended primarily to serve through traffic, service to abutting land is limited and access is controlled. Opposing traffic flows are often separated by a raised medium. Major arterials typically have up to three lanes in each direction.

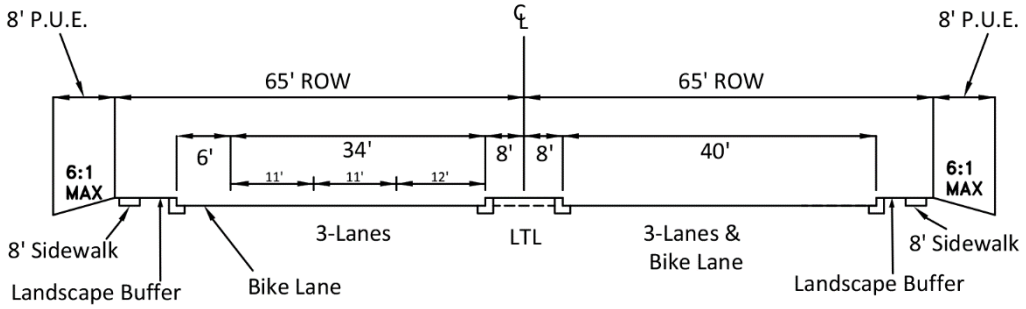


FIGURE 5 - 2 MAJOR ARTERIAL STREET SECTION

5.3.4 Minor Arterial

Minor Arterial is a roadway that is similar in function to major arterials, but it is operated under lower traffic volumes, serves trips of shorter distances, and provides a higher degree of property access than major arterials. Opposing traffic flows are often separated by a raised medium. Minor arterials typically have two lanes in each direction.

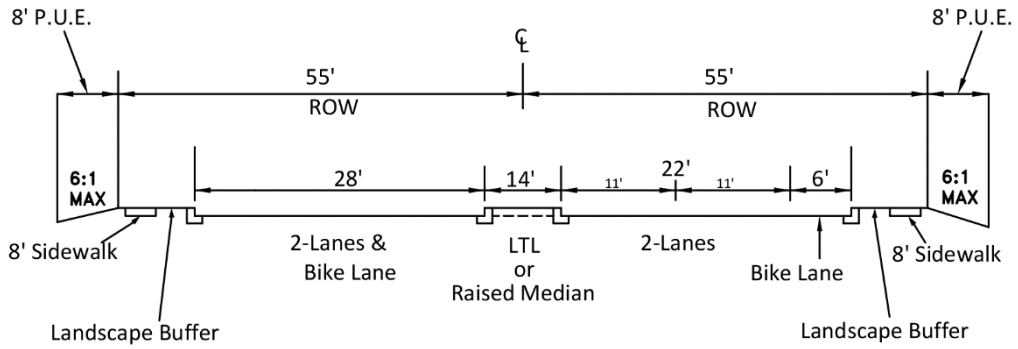


FIGURE 5 - 3 MINOR ARTERIAL STREET SECTION

QUICK LINKS

Traffic Impact Analysis

Access Management Guidelines

General Plan
*Circulation Element

Multi-Modal Transportation Plan

Community Services Master Plan

Valley Metro Bus Stop Guidelines

MAG Transit

Bus Stop Design Standards

Bicycle Development Plan

Transit Implementation Plan

5.3.5 Major Collector

Major Collector is a roadway that provides for traffic movement between arterials and local streets and carries moderate traffic volumes over moderate distances (less than 3 miles). Provides direct access to abutting land and has some access control through spacing and location of driveways and intersections. Opposing traffic flows are generally separated by continuous left turn lanes. Major collectors normally have two lanes in each direction.

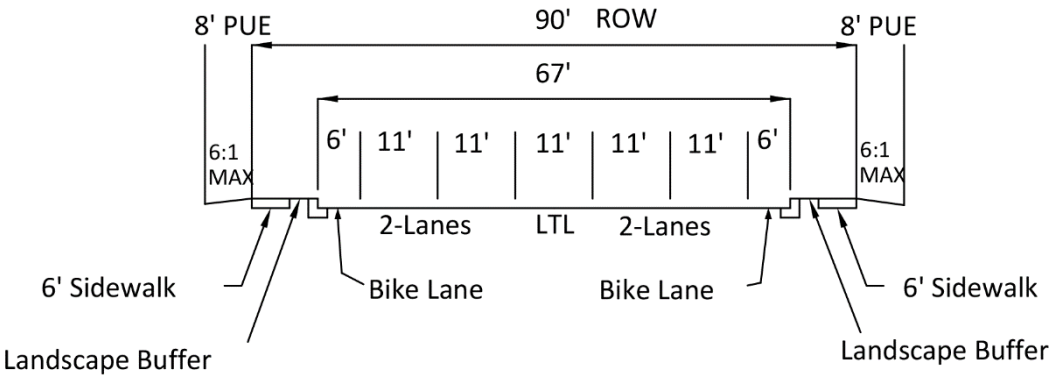


FIGURE 5 - 4 MAJOR COLLECTOR STREET SECTION

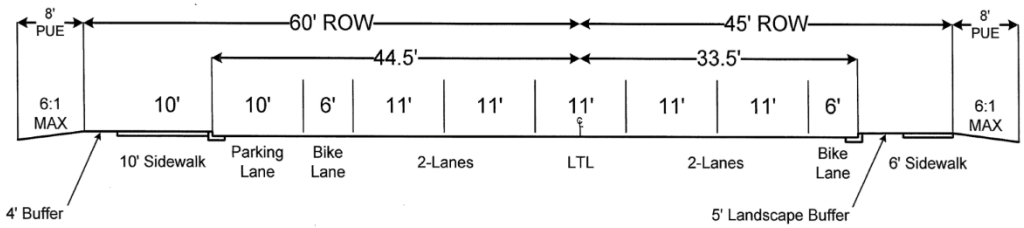


FIGURE 5 - 5 MAJOR COLLECTOR WITH ON STREET PARKING STREET SECTION

QUICK LINKS

Traffic Impact Analysis

Access Management Guidelines

General Plan
*Circulation Element

Multi-Modal Transportation Plan

Community Services Master Plan

Valley Metro Bus Stop Guidelines

MAG Transit

Bus Stop Design Standards

Bicycle Development Plan

Transit Implementation Plan

5.3.6 Minor Collector

Minor Collector is a roadway that is similar in function to a major collector but carries lower traffic volumes at lower speeds over shorter distances (less than 3 miles) and has a higher degree of property access. Minor collectors normally have one lane in each direction.

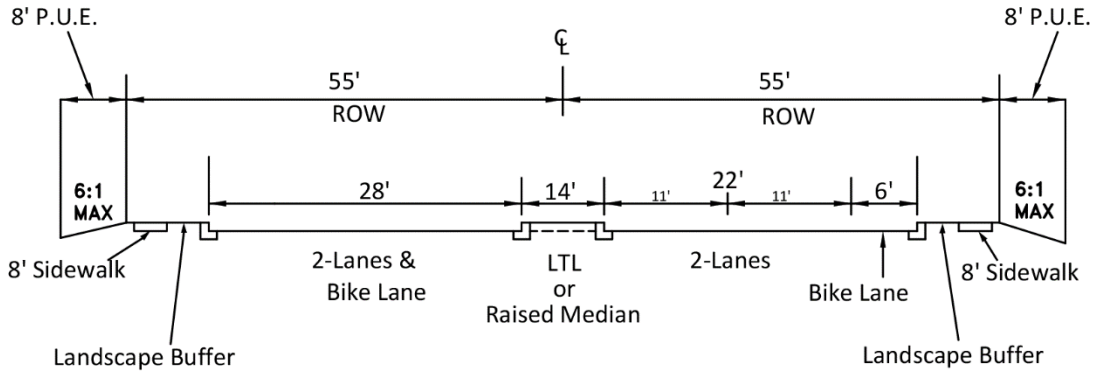


FIGURE 5 - 6 MINOR COLLECTOR STREET SECTION

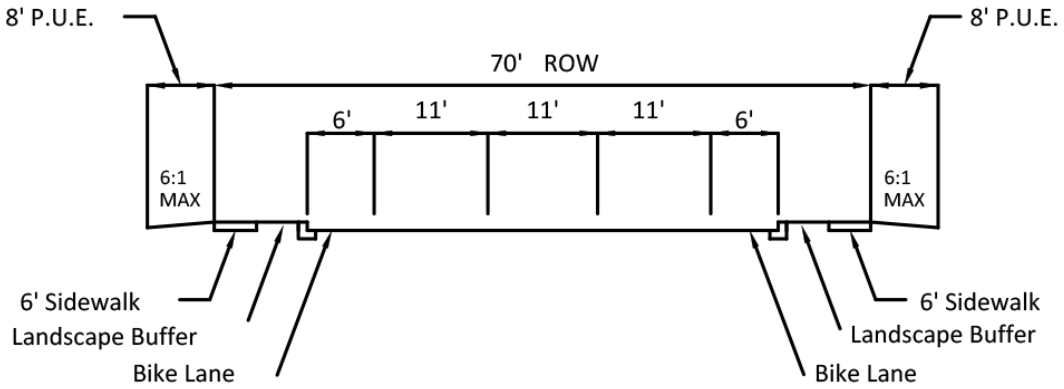


FIGURE 5 - 7 MINOR COLLECTOR WITH LEFT TURN LANE STREET SECTION

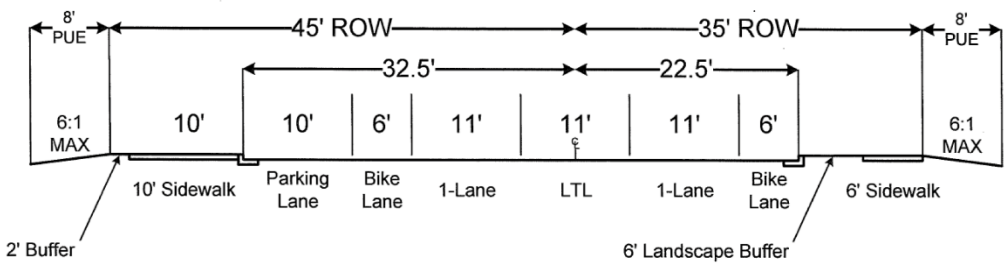


FIGURE 5 - 8 MINOR COLLECTOR WITH ON STREET PARKING STREET SECTION

5.3.7 Local

Local is a roadway that is intended to provide access to abutting properties, tends to accommodate lower traffic volumes at lower speeds, serves short trips, and provides connection to collector streets.

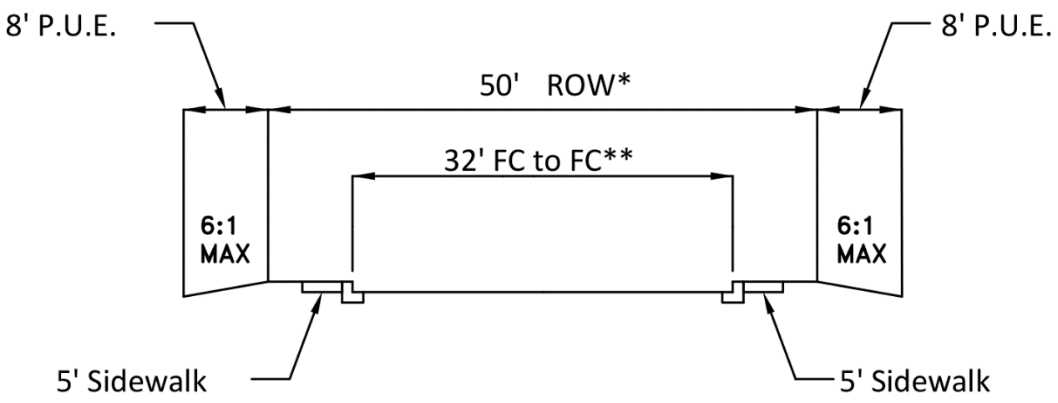


FIGURE 5 - 9 LOCAL STREET SECTION

5.3.8 Rural

A rural street is the same functional classification as local street; however, it is located in a rural setting instead of an urban or suburban setting. Any non-standard rural street will require approval from the City.

5.4 Right-of-Way Requirements

Right-of-way requirements in **Figures 5-1 through 5-9** are based on the space needed for the street when it is constructed to meet ultimate development requirements. The right-of-way must also provide space for utilities, cut or fill slopes, sidewalks, bicycle paths, trails, traffic control devices and information signs, fire hydrants, landscaping, transit facilities, and other public facilities that must be located adjacent to street pavements.

5.5 Street Layout and Planning

The City street system has two bases. The primary basis is a grid layout intending to provide public access to all legitimate land parcels. The second, less predominant basis, is the conformance to topographic features and constraints in concert with land division boundaries intending to provide public access to legitimate land parcels, which are typically larger. Access within the larger parcels may be provided via private access with specific written request submitted to the Engineering Director and written acknowledgment of approval by the City. Streets, lots, tracts, and easement planning and layout shall be in accordance with the Subdivision Regulations, Zoning Stipulations and Approved Site Plan.

A. Street Classification Map

Whenever the development embraces any part of a street designed in the adopted Streets Classification Map, such street shall be platted in conformity therewith.

B. Neighborhood Street Plan

Whenever the tract is located within the area for which a Neighborhood Street Plan has been approved by the Engineering Director, the street arrangement shall substantially conform to that approved plan.

C. Continuation

Street layouts shall provide for the continuation of existing collector streets in adjacent areas, and such other streets as the Engineering Director may designate.

D. Future Street Extensions

Certain proposed streets, as designated by the Engineering Director or an approved Neighborhood Street Plan shall be extended to the development boundary to provide future connection with adjoining unplatted lands. In general, these extensions should not be farther apart than the maximum permitted length of a block, as specified herein.

E. Local Street Arrangement

Local streets shall be so arranged as to discourage their use by traffic originating outside the immediate neighborhood. Local streets shall be discontinuous and generally should be interrupted with jogs and offsets. Refer to City of Peoria Standard Detail PE-270. Four-way intersections of local streets should be avoided.

F. Marginal Access and Reverse Frontage Streets

Lots intended for single-family residential use shall not front or have access from arterial streets. When a proposed development abuts or contains an existing or proposed arterial street, the arrangement of interior streets and lots shall prohibit marginal access streets and minimize reverse frontage streets, and shall provide non-access easements along the arterial street reverse frontage of each lot, or such other treatment as may be justified for protection of properties from the nuisance and hazard of high volume traffic and for preservation of the traffic function of the arterial street.

G. Access Provisions for Development Boundary Constraint

When a residential subdivision abuts the right-of-way of a railroad or limited access highway or abuts a commercial or industrial land use, the Engineering Director may require location of a street approximately parallel to such right-of-way or use at a distance suitable for appropriate use of intervening land, such distance being determined with due regard for approach grades, drainage, embankments, bridges, and future grade separations.

H. Non-Vehicular Access

Access to the parkway, arterial and major collector streets shall be restricted by use of a one-foot, Non-Vehicular Access Easement (NVAE) at locations other than street intersections and legal driveways.

QUICK LINKS

Traffic Impact Analysis

Access Management Guidelines

General Plan
*Circulation Element

Multi-Modal Transportation Plan

Community Services Master Plan

Valley Metro Bus Stop Guidelines

MAG Transit

Bus Stop Design Standards

Bicycle Development Plan

Transit Implementation Plan

I. **Topography**

Streets shall be arranged in relation to topography as to produce desirable lots of maximum utility and streets of reasonable gradient, safe ingress-egress and to facilitate adequate surface drainage.

5.5.1 Intersections

Interior streets shall not intersect major arterial or minor arterial streets at other than the 1/4 or 1/2-mile points of an arterial, except with specific written request submitted to the Engineering Director and acknowledgment of approval by the City. Widening of a collector street, right-of-way and pavement section, at the intersection with the parkway, arterial or another collector street may be necessary.

Although all intersections share certain common elements, they are not subject to generalized treatment. To minimize conflicts and provide for anticipated traffic movements each intersection must be evaluated with regard to its individual characteristics and designed based on the following factors:

- Traffic factors such as capacities, turning movements, vehicle size and operating characteristics, vehicle speed, pedestrian and bicycle movements, transit operations, and accident history.
- Physical factors such as topography, existing conditions, channelization requirements, and available sight distance.
- Human Factors such as driving habits, reaction to surprises, decision and reaction time, and natural paths of movement.

Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided.

A. **Angle of Intersection**

A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of intersecting vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (4 degrees with approval of the Engineering Director) on parkways, expressways, arterial streets and major collector streets; and by a maximum of 4 degrees (15 degrees with special approval of the Engineering Director) on minor and local collector streets and local streets.

1. Right Angle Intersection:
   If the street intersection legs meet at an angle of 88 to 90 degrees, the sight distances shown in Figure 6-1 are to be used with City of Peoria Detail PE-090 to calculate the sight triangle. The intersection sight distance shown on Figure 6-1 for all street classifications, except local industrial was determined assuming passenger car traffic. If high volumes of truck traffic are anticipated on other than local Industrial Street, the procedures in the AASHTO publication, A Policy on Geometric Design of

QUICK LINKS
Traffic Impact Analysis
Access Management Guidelines
General Plan
*Circulation Element
Multi-Modal Transportation Plan
Community Services Master Plan
Valley Metro Bus Stop Guidelines
MAG Transit
Bus Stop Design Standards
Bicycle Development Plan
Transit Implementation Plan

Highway and Streets should be consulted to determine the necessary sight distances.

2. Skewed Intersections:
   For skewed intersections where the intersection angles are less than 88 degrees, sight distances must be calculated in accordance with the procedures described in Chapter 9 of the AASHTO publication A Policy on Geometric Design of Highways and Streets.

3. Intersections within or near a curve:
   Distances 'A' and 'B' shown in City of Peoria Standard Detail PE-090 shall follow the street alignment when the intersection is within or near a horizontal curve.

B. Turning Lanes

A separate turning lane permits separation of conflicting traffic movements and removes turning vehicles for the intersection area. Right turn lanes shall be provided on streets classified as Major Arterial or higher, at all street intersections and at driveways where warranted. For left turn lanes at signalized intersections, dual turn lanes should be considered when the turn volume exceeds 200 vehicles per hour, the opposing through volume exceeds 1,000 vehicles per hour, or the delay to left turning vehicles exceeds 45 seconds. Abrupt reduction of alignment and sight distance standards should be avoided. The length of these lanes depends on several factors and must be determined on a case-by-case basis and approved by the Engineering Director.

5.6 Traffic Impact Analysis

A TIA is intended to identify existing traffic volumes and conditions, development traffic volumes and conditions and their combined impacts on the existing and future roadway system. Refer to the Traffic Impact Analysis document in the Quick Links tab.

5.7 Access Management

Access management attempts to balance the need to provide good mobility for through traffic with the requirements for reasonable access to adjacent land uses. Refer to the Access Management Guidelines document in the Quick Links tab.

5.7.1 Driveway Spacing and Location

Driveway Spacing and Location shall be in accordance with City of Peoria Standard Detail PE-251-3 and the Access Management Guidelines. The minimum throat length of all accesses/driveways shall be 100-feet. For commercial driveways that potentially could be signalized, the minimum throat length shall be 150 feet. Longer throat lengths may be required based on the requirements of the TIA. The throat length shall be clear of parking and intersecting drive aisles.

Planned commercial sites that consist of two or more parcels shall have internal connectivity that is clear of obstacles to minimize the impact to the adjacent public streets. New commercial sites shall coordinate and provide access to existing adjacent commercial centers whenever possible. Exceptions must be

QUICK LINKS
Traffic Impact Analysis
Access Management Guidelines
General Plan
*Circulation Element
Multi-Modal Transportation Plan
Community Services Master Plan
Valley Metro Bus Stop Guidelines
MAG Transit
Bus Stop Design Standards
Bicycle Development Plan
Transit Implementation Plan

submitted to the Engineering Director with an accompanied traffic study for review and approval.

5.7.2 Median Openings

Raised medians are required on parkways and designated arterial and collector streets to separate traffic flows, channelize left turns, and reduce conflicts. Median openings are limited according to the street classification. If a street has a raised median, it is not possible to provide an opening in the median for every street intersection or driveway. Full median openings should not occur at intervals less than ¼-mile on parkways and major arterial streets. Partial median openings, which allow only left turns off the major street, are acceptable at 1/8-mile spacing. On minor arterials, full access median openings should not occur at intervals less than 1/8-mile. In some cases where reasonable alternate access is not available, median openings may be provided at closer intervals with the approval of the City Traffic Engineer. Refer to the City of Peoria's Access Management Guidelines for additional spacing requirements of median openings.

5.8 Public Transit Facilities

This section documents guidelines for Peoria's public works projects and for developers working on projects that impact the fixed route transit system. The following facilities must be delineated on any site plan or preliminary plat submitted to the City:

- Bus bays
- Bus stops
- Bus Shelter sites
- Major transfer centers
- Park-and-ride lots
- ADA route to adjacent subdivision or business

Developers needing to construct transit facilities should contact the Transit Department through their Site Development Representative. City staff must approve the design and location of the above facilities during the project review process. Developers shall provide the necessary right-of-way or easements for future transit facilities adjacent to their project.

5.9 Public Pedestrian Facilities

This section provides resources for pedestrian facility planning and design. It provides guidance for pedestrian connections, safety, and information on accessibility, including curb ramps.

5.9.1 Design Guidelines

These guidelines apply to typical situations encountered during project development. Unique situations will require flexibility in design solutions. In some situations, the current standard may not be achievable due to geometric, environmental, right-of-way or other constraints. In those situations, flexible solutions will be determined by the project designers using appropriate professional judgment. In these circumstances, variances from the guidelines

QUICK LINKS
Traffic Impact Analysis
Access Management Guidelines
General Plan *Circulation Element
Multi-Modal Transportation Plan
Community Services Master Plan
Valley Metro Bus Stop Guidelines
MAG Transit
Bus Stop Design Standards
Bicycle Development Plan
Transit Implementation Plan

outlined in this section may be acceptable. However, a facility should not typically be built to less than the guidelines described in this section unless approved by the Engineering Director or their designee in conjunction with the Planning and Community Development Director or their designee.

5.9.2 Sidewalks and Pedestrian Ways

The connection between on-site and public sidewalks should provide convenient access. Safe pedestrian travel ways must be defined by walkways visually and functionally separate from the path of vehicles.

Sidewalks should provide a travel space to accommodate pedestrians moving in both directions, including pedestrians using assistive devices. Sidewalk widths shall be as shown in **Figures 5-1 through 5-9.** Additional width may be required in areas with a higher level of pedestrian traffic per the direction of the Site Development Representative.

Sidewalks should be located per **Figures 5-1 through 5-9** and separated from adjacent roadways with vertical and/or horizontal separation. Vertical separation can be curbs, bollards, or parking. Horizontal separation can be an on-street bike lane or a non-paved area (preferably landscaped). Detached sidewalks should be used along roadways without meandering. A meandering sidewalk should only be used in instances where topography or site conditions require deviation from a straight configuration.

Separations that include landscaping to shade pedestrians that also provide softening of the environment are encouraged. On roadways with transit routes, the sidewalk should be brought closer to the roadway at transit stop locations to allow boarding and deboarding at transit stops. Bollards can be used as a vertical element to separate pedestrians from traffic. Refer to AASHTO Roadside Design Guide for placement.

Pedestrian ways shall be constructed to connect sidewalks with public and private facilities not located in the public street right-of-way. Public pedestrian ways shall be within a tract or easement for such purposes. The minimum width shall be 5-feet or a width consistent with adjacent trails or paths and may be used for additional purposes as approved by the City. If additional uses are approved, the minimum required width may be increased depending specific use.

5.10 Bikeways

This section provides planning related design criteria for bicycle and multiuse paths within the City.

5.10.1 Components of Bikeway Systems

A. <u>Bike Lanes</u>

Bike lanes are integral sections of a roadway that are marked for exclusive bicycle use and are always one-way with the flow of traffic.

QUICK LINKS
Traffic Impact Analysis
Access Management Guidelines
General Plan
*Circulation Element
Multi-Modal Transportation Plan
Community Services Master Plan
Valley Metro Bus Stop Guidelines
MAG Transit
Bus Stop Design Standards
Bicycle Development Plan
Transit Implementation Plan

B. Bike Routes

Bike routes may include shared streets, bike lanes or shared-use or multiuse paths, in any combination. Routes may be designated by signing or by placement on a map.

C. Grade-Separated Crossings

Crossings are underpasses or overpasses that serve to isolate motorized and nonmotorized traffic from each other at points of intersections.

D. Multi-Use Paths

These paved pathways set aside for the exclusive use of non-motorized travel and are typically separate from the road infrastructure.

E. Soft-Surface Trails

Soft-Surface Trails are unpaved and designed to accommodate equestrians, pedestrians and bicyclists. Refer to Chapter 11 for trail information.

F. Shared Streets

Shared streets are all streets that do not have bike lanes where bicycles and motor vehicles share the same roadway. This includes all public streets except those specifically posted to prohibit bicycles.

5.10.2 Planning Bikeway Systems

A. Locations

Providing equal grids for both on- and off-street types of bikeways is encouraged, as it will accommodate the widest possible range of users, purposes and trip destinations.

B. Facility Selection: On-Street

Bike lanes are the most desirable facility for any street with a classification of minor collector or higher. For these streets with higher volumes of traffic, the classification of a street will determine its cross-section. Parkways, major arterials, minor arterials, major collectors and minor collectors have standard cross-sections that include bicycle lanes. Bike lanes would, therefore, be included on these streets whenever they are built or reconstructed.

For streets that provide a connection for local or regional multi-use paths or bikeway systems, but where a full cross-section with bicycle lanes cannot be accommodated, the following measures should be considered, in order of desirability:

- Edge line stripe with route signs
- Edge line stripe with no signs
- Route signs with no edge stripe

C. Facility Selection: Multi-Use Paths

The objective for multi-use paths is to provide both transportation and recreation links between residential areas, schools, businesses, parks, places of employment and other areas of significant community activity. Multi-use paths will typically experience the highest use levels. User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes. Multi-use paths shall follow the guidelines in the Community Services Master Plan.

6. TRANSPORTATION INFRASTRUCTURE DESIGN

6.1 General Information

The purpose of this Chapter is to standardize roadway design elements where necessary for consistency and to ensure, as far as is practical, that minimum requirements are met for safety, welfare, convenience, pleasant appearance, environmental sensitivity, and economical maintenance.

The standards outlined in this Manual cannot apply to all situations. They are intended to guide and assist the professional engineer's competent work but not to substitute for it. Professional engineers are expected to bring the best of their skills and abilities to each project so that it is designed accurately.

Further, these standards are not intended to unreasonably limit any innovative or creative effort that might result in higher quality or increased cost savings for the public. Any proposed departure from these standards will be judged based on whether such a variance will yield a compensating or comparable result that is fully adequate for road users and residents.

Any deviations from the standards found in this Chapter must be approved through the waiver process as detailed in **Section 1.8**. All design elements which do not meet these design standards require an approved design exception.

6.1.1 Applicability

These standards in this Chapter shall govern all construction and reconstruction of transportation facilities in City right-of-way. They shall also apply to all transportation facilities proposed to be built in right-of-way that is intended to be dedicated to City of Peoria and accepted into the City road system for maintenance, unless written approval is otherwise obtained from the City.

Before the City accepts a road for maintenance, it shall meet the standards outlined in this Chapter. Permitted work shall also conform to the requirements of the current City Ordinances governing permitted work. If noncompliant conditions are found after plan approval, improvements shall be made as necessary to bring the transportation facilities up to these standards prior to acceptance for maintenance. These standards shall be used by private parties, consulting engineers, public utilities, agencies, and City staff.

For the purpose of this Chapter, the following definitions for Maintenance/ Rehabilitation, Roadway Betterment, and Construction/Reconstruction shall be used:

1. Maintenance/Rehabilitation is defined as any work that does not change the geometrics of the road. Such work will include any surface treatment of the same kind of surface (i.e., addition of gravel to gravel/dirt roads; crack sealing, chip sealing; slurry seal; micro-surfacing; surface recycling, cold mix or hot mix recycling, road mixes or overlays less than or equal to 2½ inches to paved roads; and incidental drainage improvements).

QUICK LINKS

General Plan
*Circulation Element

Access Management Guidelines

Request for Waiver

AASHTO Policy on Geometric Design

AASHTO Roadside Design Guide

MUTCD

Phoenix Traffic Barricade Manual

US Postal Service Engineering Standards

Community Services Master Plan

Traffic Impact Analysis Criteria

2. Roadway Betterment is defined as a low-cost investment in transportation improvements, typically maintenance activities or safety improvements projects that may include pavement widening, resurfacing, grading, guardrail, or bridge repair activities that raise the traffic service level of a road or improves its safety or operating efficiency.
3. Roadway Construction and Reconstruction is defined as any work that changes the geometrics or surface type of the roadway. Such work will include roadway widening, penetration and chip seal on existing gravel/dirt surfaces, overlays greater than 2½ inches, and major drainage improvements.

6.2 City Code, Standards and Master Plan

The criteria for development of street infrastructure in the City of Peoria shall be in conformance with:

- The most current edition of the City of Peoria's General Plan Circulation Element and the Multi-Modal Transportation Master Plan. Refer to the Quick links for above referenced documents.
- Various City codes, including, but not limited to Chapters 21 and 23 of the City of Peoria Municipal Code apply to the development of the municipal roadway system and contain information regarding the development in association with land development.

6.3 Federal, State and County Regulations

Project design and construction, unless otherwise indicated, shall be in accordance with the latest edition and the most current revision of the following publications:

- Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction as distributed by the Maricopa Association of Governments (MAG).
- Maricopa County Department of Transportation Supplement to the Maricopa Association of Governments Uniform Standard Specifications and Details.
- Maricopa County Resolutions for Work in Dedicated Maricopa County Right-of-Way.
- Manual on Uniform Traffic Control Devices for Streets and Highways as distributed by the U.S. Department of Transportation, Federal Highway Administration, as amended and approved by the Arizona Department of Transportation.
- A Policy on Geometric Design of Highways and Streets as distributed by the American Association of State Highway and Transportation Officials (AASHTO).
- Roadside Design Guide as distributed by the American Association of State Highway and Transportation Officials (AASHTO).
- Highway Capacity Manual and the current Highway Capacity Software, as distributed by the Transportation Research Board.
- Roundabouts: An Informational Guide, Second Edition, Transportation Research Board (TRB), National Cooperative Highway Research Program (NCHRP) Report 672, research sponsored by AASHTO in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

- Materials Preliminary Engineering and Design Manual, Third Edition, March 1989, with current revisions, as distributed by the Arizona Department of Transportation.
- AASHTO LRFD Bridge Design Specifications as published by the American Association of State Highway and Transportation Officials
- Manual for Condition Evaluation of Bridges as distributed by American Association of State Highway and Transportation Officials (AASHTO).
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals as published by American Association of State Highway and Transportation Officials (AASHTO).
- Information Guide for Roadway Lighting as distributed by the American Association of State Highway and Transportation Officials (AASHTO).
- Guide for the Development of Bicycle Facilities, as distributed by AASHTO.

6.4 Street Classifications

The street classifications are based on street development policies and are determined by location, intended use and/or other factors. See the Peoria Street Classification Map, definitions in Chapter 5 and these guidelines for additional information. If the classification is not identified, the Design Engineer must submit a classification for approval.

The following sections outline the technical design requirements by street classification.

6.4.1 Major Arterial

TABLE 6 - 2 TECHNICAL DESIGN REQUIRMENTS – MAJOR ARTERIAL

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	130’ – Full ROW for Arterial to Arterial Intersections shall be 150’ for a distance of 500’ as measured from the center line intersection
Minimum Width (Face of Curb to Face of Curb)	See **Figure 5-2**
Curb (refer to MAG Standard Detail)	Vertical Curb & Gutter
Sidewalk (refer to MAG Standard Detail)	8’ Wide Detached
Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 12”; Asphaltic Concrete – 5”
Longitudinal Slope	0.4% Min – 6% Max – 600’ maximum length
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	Required when grade change exceeds 1.5%, see **Section 6.6.6**
Horizontal Curves	Required when Tangent centerlines deflect more than 5°. Minimum Radius – 1200’ no superelevation; and 1050’ 2% superelevation based on 50 mph speed

	limit. Minimum tangent centerline between reverse curves 150’
Tapers	Length = Speed Limit x difference of the two widths. Pavement Structure – Removed existing taper and match to full width and structural. When required, a new taper = 3” AC over 8” base and reconstructed with future improvements.

6.4.2 Minor Arterial

TABLE 6 - 3 TECHNICAL DESIGN REQUIRMENTS – MINOR ARTERIAL

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	110’ – Full ROW for Arterial to Arterial Intersections shall be 150’ for a distance of 500’ as measured from the center line intersection
Minimum Width (Face of Curb to Face of Curb)	See **Figure 5-3**
Curb (refer to MAG Standard Detail)	Vertical Curb & Gutter
Sidewalk (refer to MAG Standard Detail)	8’ Wide Detached
Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 12”; Asphaltic Concrete – 5”
Longitudinal Slope	0.4% Min – 6% Max – 600’ maximum length
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	Required when grade change exceeds 1.5%, see **Section 6.6.6**
Horizontal Curves	Required when Tangent centerlines deflect more than 5˚. Minimum Radius – 1200’ no superelevation; and 1050’ 2% superelevation based on 50 mph speed limit. Minimum tangent centerline between reverse curves 150’
Tapers	Length = Speed Limit x difference of the two widths. Pavement Structure – Removed existing taper and match to full width and structural. When required, a new taper = 3” AC over 8” base and reconstructed with future improvements.

6.4.3 Collectors

TABLE 6 - 4 TECHNICAL DESIGN REQUIRMENTS – COLLECTORS

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	60’ to 80’
Minimum Width (Face of Curb to Face of Curb)	See corresponding figure above
Curb (refer to MAG Standard Detail)	Vertical Curb & Gutter
Sidewalk (refer to MAG Standard Detail)	6’ Wide Detached where ROW permits. 5’ Wide Attached to curb/gutter for residential collector.
Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 8”; Asphaltic Concrete – 4”
Longitudinal Slope	0.4% Min – 9% Max – 600’ maximum length
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	Required when grade change exceeds 1.5%, see **Section 6.6.6**
Horizontal Curves	Required when Tangent centerlines deflect more than 5°. Minimum Radius – 670’ no superelevation; and 600’ 2% superelevation based on 40 mph speed limit. Minimum tangent centerline between reverse curves 100’
Tapers	Length = (Speed Limit)^2 x Width/60. Pavement Structure – Removed existing taper and match to full width and structural. When required, a new taper = 3” AC over 8” base and reconstructed with future improvements.

6.4.4 Local

TABLE 6 - 5 TECHNICAL DESIGN REQUIRMENTS – LOCAL

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	50’
Minimum Width (Face of Curb to Face of Curb)	26’
Curb (refer to MAG Standard Detail)	Single-Family Residential – Roll Curb & Gutter (unless curb is required for drainage) All Others, including Multi-Family – Vertical Curb & Gutter
Sidewalk (refer to MAG Standard Detail)	5’ Wide

Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 6” Min; Asphaltic Concrete – 3” Min
Longitudinal Slope	0.4% Min – 9% Max. 12% allowed with hillside and City Engineer Approval
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	Required when grade change exceeds 1.5%, see **Section 6.6.6**
Horizontal Curves	Required when Tangent centerlines deflect more than 5˚.
Tapers	Length = (Speed Limit)^2 x Width/60. Pavement Structure – Removed existing taper and match to full width and structural. When required, a new taper = 3” AC over 8” base and reconstructed with future improvements.

TABLE 6 - 6 TECHNICAL DESIGN REQUIRMENTS – LOCAL (CUL-DE-SAC)

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	50’ Throat; 50’ Radius The maximum length from the intersecting street center lines to the radius point shall be 400’
Minimum Width (Face of Curb to Face of Curb)	45’ Radius to face of curb
Curb (refer to MAG Standard Detail)	Single-Family Residential – Roll Curb & Gutter (unless curb is required for drainage) All Others, including Multi-Family – Vertical Curb & Gutter
Sidewalk (refer to MAG Standard Detail)	5’ Wide
Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 6” Min; Asphaltic Concrete – 3” Min
Longitudinal Slope	0.4% Min – 9% Max. 12% allowed with hillside and City Engineer Approval
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	Required when grade change exceeds 1.5%, see **Section 6.6.6**
Horizontal Curves	Required when Tangent centerlines deflect more than 5˚.
Tapers	Length = (Speed Limit)^2 x Width/60. Pavement Structure – Removed existing taper and match to full width and structural. When required, a new taper = 3” AC over 8” base and reconstructed with future improvements.

6.4.5 Alley/Emergency Access

TABLE 6 - 7 TECHNICAL DESIGN REQUIRMENTS – ALLEY

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	Varies. Entrances to public streets shall be reconstructed per MAG Standard Detail modified to 9" thick Class "A" Concrete per MAG specifications
Minimum Width (Face of Curb to Face of Curb)	Full width of alley up to 24'
Curb (refer to MAG Standard Detail)	N/A
Sidewalk (refer to MAG Standard Detail)	N/A
Minimum Pavement Structure (refer to MAG Specification)	Base Depth – 6" Min; Asphaltic Concrete – 3" Min
Longitudinal Slope	0.4%
Cross Slope (Straight Crown)	2% Min – 3% Max
Vertical Curve	N/A
Horizontal Curves	N/A
Tapers	N/A

TABLE 6 - 8 TECHNICAL DESIGN REQUIRMENTS – EMERGENCY ACCESS

ITEM	CRITERIA
Minimum Right-of-Way (ROW) Public/Private	20'
Minimum Width (Face of Curb to Face of Curb)	20'
Curb (refer to MAG Standard Detail)	N/A
Sidewalk (refer to MAG Standard Detail)	N/A
Minimum Pavement Structure	All-weather surface for Max Load 75000 pounds
Longitudinal Slope	10%
Cross Slope (Straight Crown)	5%
Vertical Curve	Crest Curve 10%; Sag Curve 10%
Horizontal Curves	WB-50 (Inside 19.8'; Outside 45')
Tapers	N/A

6.5 Right-of-Way Requirements

Right-of-way widths will be as required per Chapter 5. No reductions in right-of-way will be allowed without the approval of the City. Additional right-of-way in excess of the standard widths may be required in special circumstances such as when:

a. Cut or fill slopes cannot be confined within the standard width
b. Minimum sight distance lines on horizontal curves are not within the standards
c. Minimum sight distances at intersections are not within the standards
d. Auxiliary lanes are to be provided

6.6 Roadway Design Standards and Guidelines

Tables 6-1 through 6-8 list most of the design standards data necessary for the design of streets within the City of Peoria. Subsequent paragraphs herein discuss this data and provide other standards that could not be included in **Tables 6-1 through 6-8**.

6.6.1 Typical Sections

Refer to **Figure 5-1 through 5-9** for the typical cross sections.

Consult the standard sections for standard lane widths and other relevant geometry. All dimensions are in feet and measured to center of lane lines. No modifications to the typical sections will be allowed unless approved by the City.

6.6.2 Design Speed

The design of geometric features such as horizontal and vertical curves will depend upon the design speed selected for the street. The choice of the design speed is primarily determined by the street classification. The design speed is the maximum recommended speed at which reasonable safe operation of a vehicle can be maintained over a specific section of a road when conditions are so favorable that the design features of the road govern. Design speeds for the various classifications of roads are found in **Table 6-9**. The use of design speeds other than those shown must be approved by the City Traffic Engineer. Posted speed limit for a street is generally the design speed less 10 miles per hour, unless otherwise determined by the City Traffic Engineer. Local roads designed using the minimum design speed may have a posted speed equal to the design speed.

TABLE 6 - 9 MINIMUM DESIGN SPEEDS FOR ROADWAYS BY CLASSIFICATION

Classification	Design Speed (mph)
Parkway	50-55
Major Arterial	50-55
Minor Arterial	50-55
Major Collector	30-40
Minor Collector	30-40
Local	35 Desirable 25 Minimum

6.6.3 Horizontal Curves

Horizontal alignments should provide for safe and continuous operation of motor vehicles at a uniform design speed for substantial lengths of street. A horizontal curve is required when the angle of change in horizontal alignment is equal to or greater than five degrees. The nature of the surrounding development and topography, and the street classification will establish the factors that determine the radius of curve.

A. Minimum Radii of Curvature

The minimum radius of curvature will be determined by the design speed or by the stopping sight distance.

- Minimum Radii Based on Design Speed:
  Tables 6-1 through 6-8 contains the minimum radius of curvature for each street classification with and without superelevation of 0.02 ft/ft whenever possible, the radii used in design should be larger. If stopping sight distance conditions require a larger radius than that shown in **Tables 6-1 through 6-8**, then that larger radius becomes the minimum radius for the curve.
- Consideration of Stopping Sight Distance:
  When walls, buildings, bridge piers, cut slopes, vegetation, or other obstructions are near the roadway on the inside of a curve, they can block a driver's view of the road ahead. If they are too close, the driver will not have sufficient distance along the curved roadway to stop when a hazardous condition comes into view. For design, the drivers eye is 3.5-feet above the center of the inside lane (the driving lane closest to the inside of the curve) and that the hazardous condition is an object 0.5 feet high in the center of the inside lane.

The clear distance "M" is measured from the center of the inside lane to the view obstruction.

B. Reduced Design Speed on Curves

The reduction of a street design speed on a curve should be avoided. However, where physical restrictions prohibit increasing the radius of the curve or the clear distance, "M", the design speed for the curved section may be reduced. In such circumstances, signing in accordance with the MUTCD is required. The difference between the design speed for the roadway approaching the curve and the design speed for the curve shall not be greater than 10 miles per hour. The design speed for a curved roadway section must not be reduced if the reduction would occur at the end of a long tangent or at any location where high approach speeds may be expected.

C. Compound Curves

Compound curves should be avoided. However, if site conditions make the use of a compound curve unavoidable, the minimum lengths for tangents between two curves curving in the same direction are listed in **Tables 6-1 through 6-4**. The shorter radius shall be at least two-thirds the length of the long radius when the shorter radius is 1,000 feet or less. Compound curves are not permitted when design speeds require the shorter radius to be greater than 1,000 feet.

6.6.4 Superelevation

Superelevation is discouraged on horizontal curves in the urbanized area of the City. Superelevation of 0.02 ft/ft may be used, with approval of the Engineering Director, when the standard radius cannot be provided due to circumstances beyond the control of the Design Engineer and the general alignment cannot be changed due to physical topographical constraints.

Superelevation greater than 0.02 ft/ft may not be used except when approved by the Engineering Director. In no case shall a superelevation exceed 0.06 ft/ft.

Whenever superelevation is allowed on a divided street, a storm drainage system to collect the runoff along the median curb shall be provided. In no case shall nuisance water from the higher traveled way be allowed to cross the lower traveled way.

A. Transition for Superelevation

The length of superelevation transition shall be based on the superelevation rate and the width of rotation. The axis of rotation shall generally be about the pavement centerline. The transition lengths for a superelevation of 0.02 ft/ft are provided in **Tables 6-1 through 6-4** for other superelevation rates; refer to the AASHTO publication, A Policy on Geometric Design of Highways and Streets.

With respect to the beginning or ending of a horizontal curve, one-third of the transition should be on the curve, and two-thirds of the transition should be on the tangent pavement section.

6.6.5 Pavement Transitions/Tapers

When development causes the widening of a portion of the pavement of an existing road, pavement transitions are required at each end of the widened portion. Design of the various features of the transition between pavements of different widths should be consistent with the design standards of the superior facility. The transitions should be made on a tangent section whenever possible. Locations with horizontal and vertical sight distance restrictions should be avoided. Whenever feasible, the entire transition should be visible to the driver of a vehicle approaching the narrower section. Intersections at grade within the transition area should be avoided. Refer to **Tables 6-1 through 6-8** for transition equations.

6.6.6 Vertical Alignment

A vertical curve is required when grade changes are equal to or greater than 1.5%. All sections of a street's vertical alignment must meet passing and stopping sight distance requirements for the design speed established for the street. For further details, see the AASHTO Publication, A Policy on Geometric Design of Highways and Streets.

A. Longitudinal Street Grades

Tables 6-1 through 6-8 contain minimum and maximum street grades for each street classification. Any grades outside of these ranges may not be used without approval by the Engineering Director or his/her designee.

B. Vertical Curves

Properly designed vertical curves should provide adequate sight distance, safety, and effective drainage.

A parabolic vertical curve is to be used. **Tables 6-1 through 6-8** provides all necessary mathematical relations for computing a vertical curve, either crests or sags.

C. Sight Distance Requirements

Sight distance is the continuous length of street ahead visible to the driver. For vertical alignment design, two sight distances are considered: passing sight distance and stopping sight distance. Stopping sight distance is the minimum sight distance to be provided at all points on multi-lane streets and on two-lane streets when passing sight distance is not economically obtainable. Stopping sight distance shall also be provided in the vicinity of intersections.

1. Stopping Sight Distance

   The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, 3.5-feet above the pavement surface, to an object 2-feet high on the roadway, or currently accepted AASHTO standards.

2. Passing Sight Distance
   Passing sight distance is the minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely, without interfering with the speed of an oncoming vehicle traveling at the design speed should it come into view after the overtaking maneuver is started. The sight distance available for passing at any one place is the distance at which a driver whose eyes are 3.5-feet above the roadway surface can see the top of an object 3.5-feet high on the road, or currently accepted AASHTO standards.

D. Minimum Vertical Curve Lengths

Minimum vertical curve lengths are determined by sight distance requirements for a given design speed. Minimum crest vertical curve lengths are determined by either the stopping sight distance or the passing sight distance, whichever provides the greatest curve length.

The minimum crest vertical curve lengths must only meet stopping sight distance requirements on streets with two or more through travel lanes per direction.

1. Two-Lane Streets
   Passing sight distance requirements should be met on streets with one through travel lane per direction. When crest curve construction in accordance with passing sight distance requirements would result in the creation of drainage problems or excessive cuts or fills, the curve length may be reduced with the installation of appropriate traffic control measures.

2. Minimum Crest Vertical Curve Length Determined by Stopping Sight Distance
   Refer to AASHTO Policy on Geometric Design for equations used to determine the minimum crest vertical curve lengths based upon stopping sight distance requirements.

3. Minimum Crest Vertical Curve Length Determined by Passing Sight Distance
   Refer to AASHTO Policy on Geometric Design for equations used to determine the minimum crest vertical curve lengths based upon passing sight distance requirements.

4. Sag Vertical Curve Lengths
   Minimum sag vertical curve lengths are determined by either the stopping sight distance or comfort factors. The longer of the two possible minimum curve lengths will be used.

5. Minimum Sag Vertical Curve Length Determined by Stopping Sight Distance

Refer to AASHTO Policy on Geometric Design for equations used to determine the minimum sag vertical curve lengths based upon stopping sight distance requirements.

6. Minimum Sag Vertical Curve Length Determined by Comfort Factors
   Refer to AASHTO Policy on Geometric Design for equations used to determine the minimum sag vertical curve lengths based upon comfort factors.

E. Combined Horizontal and Vertical Curves

When horizontal and vertical curves are combined, the horizontal curve shall lead and follow the vertical curve. For additional information on this topic, refer to the AASHTO publication, A Policy on Geometric Design of Highways and Streets.

6.6.7 Cross-Section and Slope

Undivided streets should have a normal crown that is a two-way cross-slope with the cross-section high point on the street centerline. Divided streets should have cross-slope on each pavement section. The high point of each slope on each pavement section shall occur on the edge of the pavement nearest to the median. Unusual conditions may cause cross-slope requirements to vary, but normally the desirable cross-slope is two (2) percent, with a maximum cross-slope of three (3) percent. Any deviation from the desirable cross-slope is subject to review by the Engineering Department.

While dip sections are discouraged, where storm drainage runoff flows must cross the street, dip sections are needed. The pavement through the dip section should have a one-way slope (no crown), curbing and medians must not be raised, and cut-off walls shall be installed in accordance with MAG Standard Details and **Section 6.6.12**. Transitions back to normal street cross-slopes will be needed at both ends of the dip section.

Inverted crown cross-sections will not be allowed for any project. This applies to public streets, private streets, private driveways, and access aisles for commercial or multi- family developments.

The use of graded shoulders require approval by the City. Graded shoulders except rural local roads should slope 0.05 foot per foot (20:1) downward from the adjacent pavement edge. For rural local roads the graded shoulders should slope 0.10 foot per foot (10:1) away from the adjacent pavement.

The paved portions of the shoulders shall be constructed as an integral part of the travel lanes and have the same cross slope and structural section as the traveled lanes. The remaining unpaved portion of the shoulder is to comply with the graded shoulder requirements.

6.6.8 Unpaved Streets

When unpaved streets are encountered which may provide access to and/or are adjacent to any development, provisions for paving or dust control per Ordinance 98-20 shall apply. Maricopa County has been designated by the U.S. Environmental Protection Agency (EPA) as being a Non- Attainment Area for Air Quality. Ordinance 98-20 has been adopted which addresses the City's compliance with the federal regulation. The City is mandated to not permit any new unpaved streets and to eliminate any current unpaved streets within the City, whether public or private.

6.6.9 Side Slopes

Side slopes should be designed for functional effectiveness, ease of maintenance, and pleasing appearance. For areas greater than 10- feet back of curb, slopes of 4:1 or flatter shall be provided. Steeper slopes may be approved in areas more than 30-feet back of curb when soils are not highly susceptible to erosion, or when a cut is not more than 4- feet. Consult the AASHTO publication, Roadside Design Guide for further details.

The top of all cut slopes shall be rounded where the material is other than solid rock. A layer of earth overlaying a rock cut also shall be rounded. The top and bottoms of all fill slopes for, or adjacent to a traveled way, sidewalk, or bicycle path shall also be rounded.

6.6.10 Clear Zones

Consult the AASHTO publication, Roadside Design Guide for clear zone requirements.

6.6.11 Concrete Curbs

The concrete for curbs shall be Class 'A' concrete, per MAG Standard Specification 725.

A. <u>Vertical Curbs</u>

Vertical curbs deter vehicle operators from driving onto areas not intended for vehicular use and helps to contain longitudinal street drainage. Vertical curbs shall only be used where the posted speed of the road is 45 mph or less. Vertical curbs are required for all streets except local residential streets. Vertical curbs may be used where roll curbs are specified if drainage considerations make such use desirable. Vertical curbs with gutters are to be constructed in accordance with MAG Standard Detail 220-1, Type 'A'. Vertical curb and gutter shall match the adjacent pavement slope to the gutter cross section direction. The curb height shown on the Standard Detail is six-inches, but where fire lane or public maintenance vehicle access to abutting property must be provided over the curb, use mountable curb, per MAG Standard Detail 220-2, Type E.

B. <u>Roll Curb</u>

Roll curb and roll curb and gutter is preferred for local residential streets except where vertical curb is required and is to be constructed in accordance with MAG Standard Detail 220.

C. Ribbon Curb

Ribbon curb may be used in lieu of roll curb for local residential streets. When ribbon curb is used, drainage runoff from the road shall not drain with the road but shall be directed to roadside ditches. Ribbon curbs shall be constructed in accordance with MAG Standard Detail 220, Type B.

6.6.12 Pavement Edge Treatments

A. Safety Edge

A safety edge shall be installed at the edge of asphalt pavement for all uncurbed roadways having a design speed of 40 mph or greater. The safety edge shall be installed at the edge of the asphalt pavement regardless of the distance between the pavement edge and the closest travel lane. When a roadway that requires a safety edge is overlaid, the overlay operation shall install a safety edge if none exists or overlay an existing safety edge to produce a finished surface that complies with safety edge requirements.

B. Asphalt Thickened Edge

An asphalt thickened edge shall be installed on all uncurbed roadways where a safety edge is not installed. Install an asphalt thickened edge:

- Along the edge of roadways having a design speed of less than 40 mph
- At the termination of asphalt roadway pavement (requires MAG Detail 201, Type D)
- Edge of pavement behind guardrail

C. Cutoff Walls

In locations where dip sections are permitted to allow drainage flows to cross roadways, cut-off walls conforming to MAG Standard Detail 552 shall be installed. Cut-off walls shall be at least three-feet deep and have a top that is flush with the pavement surface. The exposed portion of the cut-off wall shall have the appearance of ribbon curb, with the same width as the street's regular curb and gutter. The cut-off walls shall extend across the flow path in the dip section to protect the pavement structure during runoff flows from a 100-year storm event. Transitions will be needed between the regular curbs and the cut-off walls at each end of the dip section.

6.6.13 Curb Return and Ramps

Vertical curb shall be used through the curb return from PC to PT regardless of whether the tangent curb sections are vertical or roll curb. All curb returns shall be provided with sidewalk from PC to PT of the same width as that provided for the sidewalk behind the tangent curb sections. If no sidewalk is provided behind the tangent curb sections, the curb return sidewalk shall be at least five-feet wide.

The curb height within the curb return shall match the height of the adjacent connecting curb. Transitioning from different heights of curb may occur at curb ramps. Transitioning from different types of curb shall be done in curb transitions. The curb transition shall not extend into the curb return.

Offsets for curb return radius points may be necessary to achieve throat widening required to accommodate the design vehicle turning path. An offset curb return may use a taper or large radius curve to transition to the standard curb location.

All urban street intersections and designated mid-block crossings shall be constructed with concrete vertical curb and curb ramps. Directional ramps shall be constructed to accommodate every marked or unmarked crossing at each intersection including t-intersections. When a new street segment is constructed intersecting an existing street, all marked or unmarked crossings shall be accommodated with curb ramps conforming to current ADA standards. One or more intersection crossings and the associated ramps may be deleted at the discretion of the City Traffic Engineer.

Ramps shall be constructed using an appropriate detail from the Peoria Standard Detail PE 241 series or other details approved by the City Traffic Engineer.

The minimum radii for curb returns at street intersections shall be in accordance with **Table 6-10**.

TABLE 6 - 10 MINIMUM CURB RETURN RADII

Street Classification	Major Arterial	Minor Arterial	Collector	Local
Parkway	35’	35’	35’	N/A
Major Arterial	35’	35’	30’	20’
Minor Arterial	35’	35’	30’	20’
Collector	30’	30’	30’	20’
Local	20’	20’	20’	20’

A. Truncated Domes

Truncated domes are required at all ramps crossing public or private streets, as well as busy commercial driveways and railroad tracks. Truncated domes shall be specified as StrongGo TekWay domes, terracotta in color, or equal meeting current ADA standards approved by the City Traffic Engineer.

Truncated domes shall be installed perpendicular to the direction of pedestrian travel and have a minimum width of 24 inches measured perpendicular to the edge of the roadway or rail crossing.

Truncated domes shall be installed on walkways at roadway crossings whenever the walking surface is not separated from the roadway by curbs, railings or other approved elements. Truncated domes installed on curb ramps shall extend the full width of the ramp depression. The truncated domes shall be located so that the edge nearest the curb line is 6 inches minimum and 8 inches maximum back from the face of curb.

Truncated domes for pedestrian at-grade rail crossings not located within a street or highway shall be located on each side of the rail crossing so that the edge nearest the rail crossing is 6 inches minimum and 8 inches maximum from the vehicle dynamic envelope. The edge of the truncated domes nearest

the rail crossing shall be 6.0 feet minimum and 15.0 feet maximum from the centerline of the nearest rail. Where pedestrian gates are provided, truncated domes shall be placed on the side of the gate opposite the rail. Truncated domes shall extend the full width of the pedestrian walkway.

6.6.14 Valley Gutters

Concrete valley gutters per MAG Standard Detail 240, shall be constructed at all intersections where the drainage pattern requires them. Concrete for valley gutters shall comply with MAG Standard Specification 725 for Class 'A' concrete. Valley gutters are not allowed to cross major arterial and minor arterial streets. Valley gutters are not allowed where storm drain facilities are existing. Valley gutters crossing collector or residential street intersections with major arterial or minor arterial streets shall be six-feet wide, minimum. Valley gutters not at intersections shall be six-feet wide, minimum. Asphalt valley gutters are not allowed on public streets.

Valley gutters may only be used across minor and local collector streets, and local residential streets. Exceptions must be approved by the Engineering Director.

6.6.15 Medians

The width of a median is measured from back of median curb to back of median curb. If a median has no curb, the width is measured between the centers of the continuous painted median stripes. Median widths are typically determined by the width of the center lane as dictated by the section detail but should not be constructed with a width of less three feet, unless approved by the City Traffic Engineer. See **Figures 5-1 through 5-9** for median widths of each street class. The cross-slope in the median opening shall be limited to 0.02 ft/ft. Median openings shall not be permitted on curves with superelevation exceeding 0.02 ft/ft.

A paved median should be constructed of a durable, low maintenance material, such as Portland cement concrete, concrete pavers, or other materials approved by the City Traffic Engineer. The surface should be crowned and have the same cross- slope as the street pavement.

Unpaved and Landscaped Medians are greater than five-feet in width. Features present in the median, i.e., landscaping, or other types of median features shall not restrict sight distances per the City of Peoria Standard Details PE-090 and PE-091. Mature vegetation size and maintenance should be considered when designing landscaping in median areas. At no time should landscaping impede on sight distance triangles.

6.6.16 Sidewalk

Placement of sidewalks and pedestrian ways shall promote and enhance pedestrian safety and the visual quality of the roadway by creating a boulevard landscaped area between the street, fence, wall, railing and the detached sidewalk. Sidewalks and pedestrian ways shall be constructed to a width, line and grade in accordance with ADA requirements and as approved by the City. Construction shall conform to the MAG Standard Detail 230.

Sidewalks are required along both sides of the pavement section on all public streets. Refer to **Figures 5-1 through 5-9** for sidewalk width requirements. Sidewalks abutting any public or private elementary school, high school, or park shall be a minimum of 10-feet in width.

6.6.17 Intersections

A. Profile

A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.

B. Traffic Safety Triangles

Traffic Safety Triangles should be used as a means to limit the height of structures, vegetation, and other improvements on corner properties immediately adjacent to intersections. Safety triangles are not to be used as a substitute for intersection sight distance. Safety triangles provide additional visibility around corners for all intersection approaches and should be applied to the design of perimeter walls and landscape roadway surface. City of Peoria Standard Detail PE-091 depicts the method used to determine the safety triangle location.

C. Intersection Sight Distance

In order to provide the opportunity for vehicles at an intersection to safely cross or make left or right turns onto a through street, adequate sight distance must be provided. Sight lines are to be drawn on roadway and landscaping plans to represent the areas that must be free of all objects and topography in excess of 24-inch above the roadway surface. City of Peoria Standard Detail PE-090 depicts the technique used to determine driver's eye locations; a line is then drawn to connect these two points. Continuous unobstructed line of sight must be provided along this line and throughout the approach to the intersection, providing an unobstructed sight triangle to the side street driver. Vegetation placed within the sight triangle shall be of a low variety that remains below 24-inch when mature. Trees can be considered within the triangle as long as the canopy is above 7-feet and if it is a single trunk variety.

Both horizontal and vertical sight distance for new intersections and driveways must be verified by the design engineer.

D. Intersections with an Unpaved Leg

If an intersection has a leg that is unpaved, the paving to be placed in the intersection shall extend to the end of the normal curb return location on the unpaved leg at a minimum.

6.6.18 Cul-de-sacs

Dead End Streets shall be prohibited except in locations approved by the Engineering Director for future street connection to adjacent unplatted lands.

QUICK LINKS

General Plan
*Circulation Element

Access Management Guidelines

Request for Waiver

AASHTO Policy on Geometric Design

AASHTO Roadside Design Guide

MUTCD

Phoenix Traffic Barricade Manual

US Postal Service Engineering Standards

Community Services Master Plan

Traffic Impact Analysis Criteria

A. **Maximum Lengths for Blocks and Cul-de-sacs**

- Maximum length of blocks, measured along the centerline of the street, and between intersecting street center lines, shall not exceed 1500-feet; except that in development with lot areas averaging one-half acre or larger or where extreme topographic conditions warrant, this maximum may be exceeded by up to 500-feet. Blocks shall be as long as reasonably possible under the circumstances within the above maximums in order to achieve depth and possible street economy and to reduce the expense and safety hazard arising from excessive street intersections.

- The maximum length of cul-de-sac streets shall not exceed 400-feet, measured from the intersection of right-of-way lines to the extreme depth of the turning circle along the cul- de-sac street center line, unless specifically approved by the City Traffic Engineer. An exception may be made where topography constrains the number of adjacent lots served and shall not be made merely because the tract has restrictive boundary dimensions. In such cases, provision should be made for extension of the street pattern to the adjoining unplatted parcel and a temporary turnaround installed, or to alter the street pattern to eliminate the constraint. Refer to **Table 6-6** and City of Peoria Standard Detail PE-110.

6.6.19 On-Street Parking

Parking is prohibited on parkway and arterial streets. Where not restricted on collector and local streets, parking shall be parallel to the flow of traffic unless a designated parking area is provided with marked angled or perpendicular parking stalls.

6.6.20 "Half Street" Minimum Requirements

In cases where no adjacent street improvements exist, a developer is, at a minimum, responsible for installing half of the full street improvements. The minimum paving width for residential "half streets" shall be 25-feet, to permit two-way traffic. The width of the street shall be in accordance with the typical section for the street classification. Minimum pavement widths for other types of streets shall be established on a case-by-case basis. In most cases, the developer shall be required to install all required improvements of the half street and a thickened edge on the unfinished side, within the required right-of-way for the half street. If these minimum improvements will require additional right-of-way, it will be the developer's responsibility to obtain the required right-of-way. The developer is responsible to install interconnect conduit per City Standards adjacent to their site. If the development installs a traffic signal as part of their project, interconnect communications is required at the new/modified signal. This will include conduit per City Standards, 96-strand SMFO to the new control cabinet, and connection to another signal with communications up to ¼ mile. Fiber splicing and a possible node cabinet will be required. Additionally, the City may require improvements in excess of the minimum required half-street, if it is deemed necessary to support the proposed development and surrounding areas.

6.6.21 Traffic Control Devices

Traffic control, sign, barricades and pavement markings shall be in accordance with the Federal Manual on Uniform Traffic Control Devices (MUTCD) as revised. Street and lane closure shall be in accordance with the Phoenix Traffic Barricade Manual and the MUTCD as revised. When any existing traffic control signs, barricades, guardrails, traffic signal facilities and equipment is called to be removed or replaced care shall be taken to salvage such facilities and equipment and deliver to the Maintenance Operations Center (MOC), Public Services Yard at 8850 N 79th Avenue.

All new developments and roadway projects shall provide the required traffic control signs, street name signs, sign posts and pavement markings on all streets and intersections. The Developer is responsible to furnish and install the signs, posts and markings. Final Certificate of Completion and Construction bonds will not be released and streets will not be opened to the public until all signs and markings have been installed.

A. Barricades

All new developments shall provide a typical end of road marker at all dead ends and incomplete streets. The end of road markers shall be nine red reflectors each with a minimum dimension of three-inches mounted symmetrically on an 18-diamond back panel. Five or more markers shall be used at the end of the roadway. The minimum height of the marker shall be four feet. If an existing barricade is removed it shall be salvaged and delivered by the contractor to the MOC, Public Services Yard at 8850 North 79th Avenue. Barricades installed by phased construction may be relocated within the same development if the condition of the barricades is restored. Barricades shall be set one-foot inside the subdivision being developed. The pavement should stop short of the barricade.

B. Street and Lane Closure

A Traffic Control Plan Submittal Form along with a Traffic Control Plan shall be submitted to the City at least 48-hours in advance of any lane or street closure. This submittal must be approved by the City prior to any closure for work to be undertaken within the street right-of-way. All construction zone signing shall be installed and maintained per the Phoenix Barricade Manual and the MUTCD at the developer's expense. This submittal shall be faxed to the Engineering Inspector Supervisor at (623) 773-5370.

6.6.22 Street Names and Signs

Wherever a plan indicates a public or private street, the street name shall be shown. Street names shall be consistent with the natural alignment and extension of existing streets and the "MAG Address and Street Assignment Policy". New street names shall not duplicate in whole or in part, or be confusing with existing street names. The City reserves the right to modify street names to conform to City standards at the technical review stage. Aisles or drives shall not be named or numbered. The site shall receive a single address based on the public street on which it fronts. Lots, homes, units and spaces, within the project will be assigned sub-addresses by the City staff for mail or delivery, emergency or other service needs.

Street name signs shall be located at all street intersections. The subdivider/developer shall be responsible for submitting the necessary plans to the Engineering Department for review and approval. The contractor shall ensure the landscape area behind the curb/sidewalk is level and prepared prior to installation of the sign posts. The subdivider/developer shall be responsible for the fabrication and installation of all signs, in accordance with the City standards.

For public streets, street name signs shall be a black on white, or white on brown. For private streets, the street name signs may be black on white, or white on brown, with a 1-inch color band of the same color as the lettering. All street name signs shall be retro-reflective. Private street name signs are considered non-standard and shall be maintained by the Homeowner's Association. Refer to City of Peoria Standard Details PE-030, PE-031 and PE-032.

6.6.23 Mailboxes

Mailbox facilities shall be in accordance with the U.S. Postal Service standards and requirements and as approved by the City. Mailboxes shall not be located within 3-feet of a fire hydrant. A streetlight shall be located such that the clustered mailbox locations are illuminated in the same manner as the street.

6.6.24 Retaining Wall Design Guidelines

Recommended types of retaining walls include reinforced concrete and structural masonry. Refer to City of Peoria Standard Details PE-121-1, PE-121-2 and PE-121-3.

6.6.25 Safety Railings

Safety railings are required on or adjacent to vertical faces such as retaining walls, culvert headwalls, bridge wing-walls, etc. where the vertical drop is 30-inches or more. In areas of pedestrian activity, a safety railing may be required where the vertical drop is 12-inches or more. The safety railing shall be constructed per the City of Peoria Standard Detail PE-119.

6.7 Driveway Design

Driveway spacing and location shall be per the requirements in Chapter 5. Driveway design shall be per City of Peoria Standard Detail PE-251-3.

6.8 Signing and Striping Design

Signs and sign posts shall conform to the latest adopted version of the MUTCD and City of Peoria Standards and be installed per City of Peoria Standard Detail PE-032.

Striping installation shall conform to the latest adopted version of the MUTCD and City of Peoria Standards and be installed per City of Peoria Standard Details PE-011 through PE-018.

Signing and Striping plans shall be submitted to the Engineering Department and approved through the plan review process. All new and existing signs shall be shown on the plans. It is the Design Engineers' responsibility to design the Signing and

Striping Plan to meet standards as described by the latest adopted version of the MUTCD.

6.9 Bikeways

Except where these standards provide otherwise, testing, report preparation, design, design details, workmanship, and materials shall be in accordance with the current editions of the following publications:

- Guide for the Development of Bicycle Facilities, The American Association of State Highway and Transportation Officials, ("AASHTO").
- Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation, as amended and approved by the Arizona Department of Transportation.
- City of Peoria Community Services Master Plan

6.9.1 On-Street Bike Lanes

1. Bike lanes shall always be one-way facilities that carry traffic in the same direction as the adjacent motor vehicle lane. Two-way bicycle lanes on one side of the roadway are unacceptable.
2. Bike lanes on one-way streets shall be placed on the right edge of the road, except in areas where placement on the left will significantly reduce conflict.
3. In areas with on-street parking, bicycle lanes shall always be placed between the parking lane and the through traffic lane. The Design Engineer shall confirm the bicycle lane width and need for buffers with the City prior to design.
4. Pavement surfaces shall be designed free from irregularities and the edges of the pavement shall be uniform in width.
5. When a new roadway is designed, all drainage grates and utility covers should be kept out of the bicyclists' expected path.
6. Drainage grates and utility covers shall be adjusted flush with the pavement surface on all new construction and reconstruction.
7. On new construction where bicyclists will be permitted, curb inlets rather than drainage grates should be used wherever possible. Bicycle safe drainage grates shall be used on all roadways.
8. In instances where bicycle lanes cross railroad tracks, it may be necessary to design and install additional safety measures. The Design Engineer shall confirm the requirements with the City prior to starting design.
9. Signing of bike route shall be in accordance with the Manual on Uniform Traffic Control Devices.

6.9.2 Multi-Use Paths

The Design Engineer shall utilize the guidelines in the Community Services Master Plan and references at the start of this section for the design of multi-use paths.

6.10 Traffic Signal and ITS Design

Signal modifications that are a result of street widening or recommended in the Traffic Impact Analysis (TIA) related to the development are the responsibility of the Developer. Signal conduit with pull boxes shall be provided at all major arterial, minor arterial and collector street intersections as shown in City of Peoria Standard Details PE-033 through PE-035. Traffic signal specifications and details shall be designed in accordance with the Arizona Department of Transportation, Traffic Signals and Lighting Specification and Standard Drawings.

Traffic signal poles and hardware shall conform to the Arizona Department of Transportation standards and shall be approved through the Electrical Equipment Submittal Process.

Traffic signal cabinets and controller/electronic equipment shall be selected from the City of Peoria approved traffic signal cabinets and controller/electronic equipment list. Traffic signal cabinets and controller/electronic equipment shall be approved through the Electrical Equipment Submittal process.

Internally Lighted Street Name Signs (ISNS)/Metros shall conform to the City of Peoria Standards. The design of the ISNS shall be approved through the Electrical Equipment Submittal process. The installation of the ISNS shall be coordinated with the Traffic Operations Supervisor.

6.11 Bridge and Guardrail Guidelines

This section contains general background information and definitions for preparing bridge, culverts and structure plans for submittal to the City of Peoria for Capital Division Projects and Land Development Projects. All bridges shall be designed per the ADOT Bridge Design Guidelines except as modified in this section.

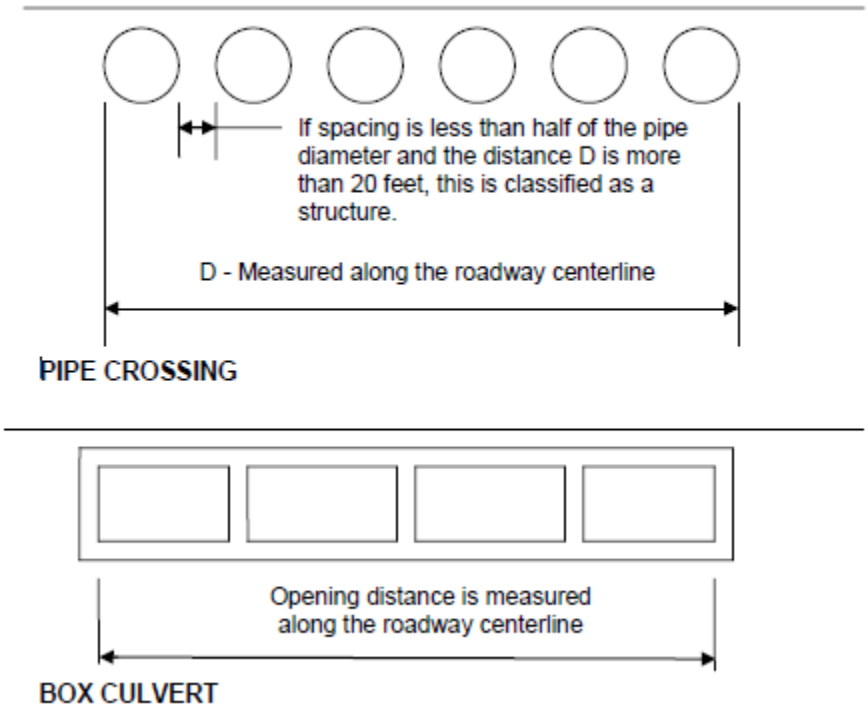
A. <u>Bridge Definition (AASHTO)</u>

A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20-feet between under copings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

Refer to ADOT BDG Section 1 for Terms and Descriptions. Refer to **Figure 6-1** below for further explanation on buried structures.

QUICK LINKS
General Plan
*Circulation Element
Access Management Guidelines
Request for Waiver
AASHTO Policy on Geometric Design
AASHTO Roadside Design Guide
MUTCD
Phoenix Traffic Barricade Manual
US Postal Service Engineering Standards
Community Services Master Plan
Traffic Impact Analysis Criteria

FIGURE 6 - 1 CULVERT CROSSINGS



6.11.1 References

AASHTO and ADOT has the following related bridge planning documents that shall be utilized within the City:

- AASHTO Guide Specification for Structural Design of Sound Barriers, 1st Edition with 2002 Interim Revisions. (AASHTO Sound Barrier)
- AASHTO Guide Specifications for Design of Pedestrian Bridges, 1st Edition, 1997. (AASHTO Pedestrian)
- AASHTO Guide Specifications for Design of FRP Pedestrian Bridges, Latest edition. (AASHTO FRP Pedestrian)
- AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002. (No longer updated). (AASHTO 17th Ed)
- AASHTO LRFD Bridge Design Specifications, Latest edition. (AASHTO LRFD)
- Arizona Department of Transportation Bridge Group Bridge Design Guidelines. (ADOT BDG)

6.11.2 Structure Name

City structures utilize a naming convention in which the approximate street address of the structure is used to locate it within the City. The structure name is defined by the street address of the roadway, street or object being carried as well as the type of crossing or structure. This convention provides for numerous crossings of the same type located along the same street.

An example of two pipe crossings along Union Hills Drive might be:

- 8958 West Union Hills Dr. - Pipe Crossing
- 9300 West Union Hills Dr. - Pipe Crossing

6.11.3 Utilities on Structures

1. During the preliminary phase of the design process the Engineering Department shall be contacted in order to determine the needs for future City water and wastewater lines, traffic interconnect, and the size and number of conduits needed to accommodate existing and future City facilities.

2. The placement of utility lines for flammable or hazardous materials on bridge structures is not permitted unless specifically approved by the Engineering Department. Attachment and placement shall be subject to review and approval by the Engineering Department.

3. Utility hangers shall be of the manufactured "roller-type" style and require approval by the Engineering Department.

4. Conduits - The size and number of conduits is subject to change pending Engineering Department review. All new bridges shall at a minimum include the following types of conduits:

    - 1 – 2 inch diameter conduit for bridge lighting.
    - 4 – 1 ¼-inch diameter conduits carried under the structure for signal interconnect.
    - Conduit placement as requested by utility companies to accommodate existing and future facilities.
    - Additional conduits for future use to be determined by the City.

6.11.4 Structural Design Guidelines

This section outlines the typical design requirements and standards to be addressed on structure plans submitted to the City for a permit.

A. <u>Typical Requirements of Structures within the City of Peoria</u>

1. All structures should be designed with ease of maintenance in mind. For example, deck joints shall be minimized. Integral substructure elements are preferred where practical. Bearings and deck joints shall be specifically designed and manufactured for use on bridge structures; i.e. subject to cyclic traffic loading, thermal movements and outdoor exposure. Drainage features shall be designed to prevent erosion damage around the abutments and approach slabs.

2. Structures shall be designed for a minimum 75-year life. For example, structures shall be designed with self-protection measures such as sloped surfaces to prevent water from ponding and penetrating.

3. All structures shall be designed to meet current City aesthetics requirements, see **Section 6.11.5**.

4. All roadway structures shall be designed for a future raised median on designated arterial streets.

5. Utility conduits and lighting shall be required for both vehicular and pedestrian traffic on all structures.

6. Structure Number
   - In conjunction with the City's Structures Maintenance and Management Program each structure is assigned an identification number by the ADOT Bridge Management Section. In the case of twin or parallel structures individual numbers are assigned if there is an open median.

   - The assigned structure number of all new structures shall be permanently fastened or embedded on the inside face of the concrete railing near the abutment or on the abutment in a readily visible location. The structure number shall be placed 6-inch from the top or an edge of the concrete railing, end block, or abutment surface. Location and details to be approved by the Engineering Department. (See Peoria Standard Details for marker and marker placement locations).

7. All buried concrete structures shall be waterproofed using Sinak S-102 waterproofing sealer. Prior to placing the asphalt overlay or rubberized asphalt, the existing or new bridge shall be sealed with a high molecular weight methacrylate resin system or Sinak S-102 waterproofing sealer. Type of sealer shall be stated on the bridge plans and/or special provisions and approved by the Engineer of Record during the shop drawing review process.

6.11.5 Structural Aesthetics

Structures addressed in this section include the following: bridges, retaining walls, traffic railings, safety and pedestrian rails, lighting and fencing. The design of visible parts of the structures plays an important role in the aesthetic experience of both drivers and pedestrians.

A minimum of two percent of the total structure cost shall be used towards aesthetic treatment to the structure upon review and approval by City Engineering Staff.

The City has adopted the following 10 guidelines:

1. <u>Appearance Standards</u>

Design in accordance with the highest applicable appearance standard level (Refer to **Table 6-11**).

QUICK LINKS

General Plan
*Circulation Element

Access Management Guidelines

Request for Waiver

AASHTO Policy on Geometric Design

AASHTO Roadside Design Guide

MUTCD

Phoenix Traffic Barricade Manual

US Postal Service Engineering Standards

Community Services Master Plan

Traffic Impact Analysis Criteria

High Standards

- Aesthetic enhancements shall be complimentary to the surrounding area.
- Aesthetic enhancements to different structures along the same corridor or within the same region shall have a common theme and a complimentary color palette.
- Landscaping should be an integral feature of the aesthetic enhancements. Indigenous vegetation is preferred in park areas.
- Consider incorporating public spaces and/or amenities in urban locations.

Moderate Standards

- Aesthetic enhancements shall be complimentary to the surrounding community and adjacent developments.
- Landscaping should be an integral feature of the aesthetic enhancement
- Cost of bridge aesthetic enhancements need not exceed ten percent of the total bridge structure cost.

3. Minimal Standards

- Cost of bridge aesthetic enhancements need not exceed five percent of the total bridge structure cost.

TABLE 6 - 11 APPEARANCE STANDARDS

Category	High Standards	Moderate Standards	Minimal Standards
Roadway Classification	Parkway	Major Arterial Minor Arterial Major Collector	Minor Collector Local Street
Land Use	Parkland and Conservation Areas	Commercial Mixed Use High Density	Industrial Residential Low Density
Region	Old Town Lake Pleasant Regional Park	Central Peoria Revitalization Area	

2. <u>Aesthetic Integration</u>

Integrate roadway structures with one another, with the adjacent landscape, and with the characteristics of the local area or community in which they are placed.

- Incorporate local materials, color, landscaping or symbols to make the roadway more responsive to the local community.
- Consider integrating lighting with adjacent terrain and vegetation.
- Bridges and retaining walls should retain the existing vegetation and adjacent earthworks.

- Design roadway structures as an integrated system – reduce the number of elements where possible. Combine wall and safety handrail design. Combine light standard and wall design. Standard Details should be avoided, except for required safety features.

3. Fill-reducing Structures

Locate fill-reducing structures such as bridges or walls where aesthetic impacts of large cut/fill areas are unacceptable.

- Install bridges rather than culverts when economics allow to maintain an open channel space or to reduce the undesirable appearance of large earthwork.

4. Structure Proportion

Consider the proportion of the structure in relation to the size of the space it is situated in.

- Avoid structures that would appear too large. (For example, use twin structures rather than one large single structure.)

5. Structural Form

All structures shall be of bold, simple form.

- Overall shape should be simple.
- Should give appearance of strength and solid form.
- Avoid the use of angular, triangular or pointed forms – only when the intent is to attract the attention of the driver. These structures will appear "hard".
- Curvilinear or rounded structures will appear "soft" – this is more desirable.

6. Colors

Select the color of the finish to meet the aesthetic objectives of the structure and the corridor.

- Create a color scheme for a route in its entirety.
- Blend structures into the background landscape.
- Alternatively, contrast structural landmarks with background landscapes.
- Color additives to concrete are preferred over painted concrete.

7. Textures and Finish

Provide a textured finish to visible structures to avoid large blank faces.

- Provide textured surfaces or finishes to large flat surfaces in the view of motorists and pedestrians.
- Finish should respond to materials and texture type of local landscape or theme.

- Be cognizant of the visual "slimming" or "thickening" effects some textures may have on structure proportions.
- Use City logos or symbols.

8. Coordination and Compatibility

Design structures to be of unified visual character within a local area or route.

- Design unity is gained from repetitive use of materials, textures and color.
- Design all custom elements with the same idea of unity.
- Choose a dominant form and repeat through structure.
- Use subordinate elements as design accents.

9. Accent Elements

Include accent elements in the design of significant structures.

- Use accents to contrast the components of a structure to draw the eye of pedestrians.
- Avoid too many accents. This may lead to confusion or may be a distraction to drivers.
- Examples include: entrance pillars at bridges, handrail elements, caps on retaining walls.

10. Structure Types and Elements

Design in accordance with the guidelines for each type of structure.

Bridges

- Traffic railings on a bridge should give a visual clue that the driver is on a bridge and should be designed accordingly.

- Handrails and traffic railings will be the most visual vertical elements for those on the bridge.
- Separated structures should be designed similar.
- Bridges crossing roadways and other public spaces require aesthetic features and/or treatment on exposed substructure elements, the sides of the superstructure, and sometimes the underside of the superstructure.
- Lighting – consider low glare, up-lighting that is integrated with the structure. f. Design accent features at entrance points and midpoints.
- Slope paving and landscaping should compliment the overall bridge appearance. h. Consider constructability, maintenance, and cost of aesthetic features.

Retaining walls

- Integrate walls with adjacent structure(s).
- Custom design walls to suit the adjacent land, features and vegetation.
- The location of the wall shall not detract from the visual aesthetics of the roadway. Walls should not dominate the field of vision of a driver.

- Provide surface offsets to hide potential future structure movements and settlements.

Traffic railings

- Shall meet minimum safety requirements.
- Consider custom features.

Hand rails

- Consider shapes that are pleasing to touch.
- Should be an Integral design with each structure – do not use standard detail for all structures (They can appear as though they were an add-on or after-thought – railings should be integral with the structure).

Fencing

- Avoid the use of chain link fence. Do not use a standard.

Light Poles

- Custom shapes should be used. Do not use a standard.

Landscaping

- Landscaping shall consist of low maintenance, low water use, non-invasive plants.

6.11.6 Guardrail Design Guidelines

Guardrail design shall be determined using procedures contained in AASHTO's "Roadside Design Guide." Canal access points adjacent to bridges shall be realigned to enable proper protection of the bridge approaches.

6.12 Technical Design Reports

Developers are responsible for submitting a Design Study Report to validate the design shown on the construction plans. The Design Study Report is a compilation of the following as applicable to the development. The Design Study Report should not be excessively long or complex. Rather it is to briefly describe the basis of the design and the assumptions made and explain "special" solutions to problems encountered as detailed below. All reports must be sealed by an Arizona registered engineer. The following sections shall be contained in the report:

A. Soils Investigation Report

A "Soils Investigation Report" shall be submitted with new street construction plans indicating "R" value, sieve analysis, and plasticity index of the sub-grade.

B. Drainage/Hydrology Report

A "Drainage Report" shall be submitted with new street construction plans and/or the grading plans. This report shall be prepared per Chapter 4 herein.

C. Pavement Evaluation and Design Report

A "Pavement Evaluation and Design Report" shall be submitted with new street construction plans. When the design is proposed to match existing pavement, the

report shall evaluate if the existing pavement condition and structure meet current structural requirements. The design engineer is responsible to provide the Soils Investigation Report, Traffic Impact Study and Pavement Core sampling which are required to determine the condition and structure and for investigating and evaluating the existing pavement structure.

If the existing pavement does not meet the structural requirements, it must be removed and new pavement constructed to the monument line.

Existing pavement to remain may be matched by trimming a minimum of 1-foot for a longitudinal match or 2-feet for a perpendicular match. Exact point of matching and sawcut shall be determined in the field by the City.

If an existing pavement section is less than 5 years old, and it can be demonstrated by a comprehensive pavement analysis that it meets or exceeds the current guidelines for an appropriate pavement structure, the subdivider/developer may request a waiver from removing the existing pavement to monument line and new pavement constructed. The Engineering Department will consider the application, review the pavement analysis and grant or deny the application.

Such pavement analysis shall include the following at minimum:

- Identify the average thickness of the existing AC.
- Identify the base course thickness, density, gradation, PI
- Identify the density of native subgrade
- Identify the extraction and viscosity of the existing AC

The location and number of test locations required shall be recommended by a geotechnical engineer, reviewed, and confirmed by the Engineering Department.

The pavement design method shall be approved by the City of Peoria Engineering Department. Soils tests required to perform the design are not provided by the City. The flowing tests are the minimum required for pavement design purposes:

- Samples shall be taken to a minimum of 18-inches below proposed grade elevation. Depths up to three-feet on arterial streets may be required in certain instances.
- One test per 800 lineal feet with at least one test per proposed street. Additional tests may be required in certain instances.
- Each sample shall have a sieve analysis per AASHTO T27 with results reported as percent passing #200 sieve, plus a plasticity index per AASHTO T90.
- Test results shall be forwarded to the City of Peoria Engineering Department.

Subgrade, Base Course and Surface Course:

- The report also is intended to provide the design of the new pavement subgrade, base course and surface course for compliance with these

guidelines. The components shall be in accordance with MAG Specifications. The design shall recommend the minimum structure composition and thicknesses.

Pavement Mix Design:

- A pavement mix design for concrete, asphaltic concrete and admixtures to base and subgrade components of the pavement structure in accordance with MAG Specification Parts 300 and 700, are required for review and approval by the City.

D. Supplemental Sketches, Details, Calculations, and Design Rational

Provide any support sketches, details, calculations and design rational used and pertaining to the design of required improvements.

E. Traffic Impact Analysis (TIA)

A "Traffic Impact Analysis" in accordance with Traffic Impact Analysis Criteria shall be submitted with new street improvement plans. Refer to Quick Links for the Traffic Impact Analysis Criteria.

F. Visibility/Sight Line Study

A "Visibility/Sight Line Study" to verify and preserve the visibility and/or sight line in accordance with AASHTO Guidelines, City of Peoria Standard Details PE-090 and PE-091 and generally accepted engineering practices, shall be submitted with new street improvement plans. Sight lines and dimension and shall be provided on the paving plans. Easements or tracts shall be dedicated on the plat or by separate instrument, to provide the perpetual sight line clearances.

QUICK LINKS

General Plan
*Circulation Element

Access Management Guidelines

Request for Waiver

AASHTO Policy on Geometric Design

AASHTO Roadside Design Guide

MUTCD

Phoenix Traffic Barricade Manual

US Postal Service Engineering Standards

Community Services Master Plan

Traffic Impact Analysis Criteria

7. STREET LIGHTS

7.1 Purpose and Intent

This Chapter present's the City's policy for the planning and installation of street lighting and identifies requirements for preparing construction plans and documents to submit for City review and approval.

The purpose of this document is to inform and assist the developers in their planning and installation of street lighting in the public right-of-way or easements. The developer shall perform installations per the standards and specifications provided herein.

7.2 Applicability

Under the provisions of the City of Peoria City Code, developers of residential, apartments, condominiums, commercial/industrial projects, etc., are responsible for all design and installation costs of street lighting on streets peripheral to their projects.

7.3 General Information

For public streets, street light installation and electricity for street lighting in new developments will be provided by the Street Light Improvement District (SLID) process. Refer to Chapter 2 for information on Streetlight Improvement Districts. Streetlight installation and electricity for street lighting in new developments containing private streets will be provided by agreement between the developer and the serving utility. Plans for street lights on private streets or streets not located within a SLID shall comply with the standards provided in this Chapter and the utility company standards.

7.4 Street Lighting Warranty Agreement

Refer to the Quick Links for the City of Peoria's Street Lighting Warranty Agreement.

7.5 Street Light Design Guidelines

The City of Peoria is serviced by two electric companies; Arizona Public Service (APS) and Salt River Project (SRP). The developer should be aware that different standards and specifications exist in each service area. The City of Peoria owns the streetlights located within the APS and SRP service areas.

Street light plans shall be prepared and sealed by a licensed electrical engineer registered in the State of Arizona. The street light design shall include the numbering of the street light poles as directed by the City. The contractor shall furnish and install a number on each light pole.

1. Arterial and collector streets open to traffic in the City of Peoria are to be lighted.

QUICK LINKS

General Plan

Street Lighting Warranty Agreement

2. In developed areas in the City of Peoria, intersection street lighting shall be provided. In new subdivisions all street lighting shall be installed concurrently with other off-site improvements.

3. Developments located north of Deer Valley Road may request reduced level of street lighting on local and collector streets. The developer must submit a request for approval to the Engineering Director for a reduced level of street lighting. Street lighting on arterial streets shall meet City standards

4. In accordance with the City Code, developers are required to underground the overhead electrical facilities less than 69 KVA and any other utilities located on the same poles concurrently with the construction of other off-site improvements at no cost to the City.

5. For developments with adjacent electrical facilities greater than 69 KVA, street lights and traffic signals shall be mounted on the same pole when practical. Under built power distribution lines less than 69KVA shall be buried underground unless a waiver is granted by the City Engineer or their designee.

6. In new construction, street light poles shall be located 1 foot behind the back of the sidewalk or 4 feet behind the curb if the sidewalk is located away from the curb.

7. Underground street light circuits: responsibility for underground street light circuits is fixed in relation to the following conditions:

    - In existing subdivisions where all utilities are presently placed underground, the developer will install street light circuits underground when streetlights are installed.
    - In new subdivisions under development within the City of Peoria where all utilities are to be provided underground by the developer.
    - In existing subdivisions where utilities exist overhead, and the property owners' initiate the placing of overhead utilities underground, the property owners would be responsible for placing the street light circuits within that subdivision underground.
    - Along arterial streets, underground street light circuits shall be installed underground. If utility poles exist but cannot be used for new lighting, and the majority of subdivisions adjacent to the arterial street segment have underground utilities, new streetlight circuits should be placed underground.

8. Street lighting designs, including the location of poles are to be approved by the City of Peoria Engineering Department.

9. All new subdivisions, new roadways, and in-fill projects on existing roadways shall use LED luminaires as specified in this Section unless otherwise

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

approved by the City Engineer. LED luminaires shall conform to this section and City specifications.

10. Illumination design shall follow the recommendation of the American National Standard Practice for Roadway Lighting, Illuminating Engineering Society of North America, IES RP-8 unless approved for low level lighting. The Luminance criteria, with light loss factor calculated as lumen depreciation factor based on 50,000-hour lumen maintenance at 40 C from TM-21 report data times luminaire dirt depreciation factor of 0.9, shall be used to determine the compliance with the IES RP-8 and City street lighting design guidelines. LED fixtures are the standard for all installations.

11. Spacing of street lights shall be based on light level requirements, type of luminaire and illumination level requirements listed in **Table 7-1**, below.

TABLE 7 - 1 ILLUMINATION REQUIREMENTS

Street Type	Luminaire	ANSI/IES Type	Minimum Avg. fc	Mounting Heights
Parkway				
Major Arterial	30,000 lumen (250 watt) HPS	III	0.7	40’
Minor Arterial	30,000 lumen (250 watt) HPS	III	0.7	40’
Minor/Major Collector	16,000 lumen (150 watt) HPS (Note 2)	II	0.4	32’
Local	9,500 lumen (100 watt) HPS	II	0.3	32’

12. Average spacing of streetlights and fixture height requirements are listed in **Table 7-2**.

TABLE 7 - 2 STREETLIGHT SPACING AND HEIGHT REQUIREMENTS

Street Classification	Average* Spacing	Pole Height	Mast Arm	Fixture Height
Parkway				
Arterial Street (No Medians)	200’	32’	12’x8/	40’
Arterial Street (Medians)	195’ (Installed in Medians)	40’	None	40’
Major/Minor Collector Road	270‘	32’	None	32’
Local Road	325’	32’	None	32’

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

** Average Street light spacing is a recommendation. The minimum photometrics must be verified by a registered electrical engineer through a sealed photometric lighting analysis.*

13. In all new developments, the developer shall be responsible for the installation of new street lights at no cost to the City. Street light design and pole locations are to be reviewed by the City of Peoria Engineering Department. Street lights shall be installed by the developer concurrently with other off-site improvements at no cost to the City.

14. All street lights installed within the APS service area shall be installed by the developer/contractor or APS. Installation and type of equipment shall meet APS standards. Any street lights installed by contractors other than APS will be inspected and approved by APS. Once approved by APS the City will be notified and accept the street lights.

15. If contractors other than APS install the street lights, the developer will be required to submit to the City four (4) original fully executed copies of the Streetlight Warranty Agreement. The four (4) copies will be distributed as follows:

    - 1 copy to APS
    - 1 copy to be retained by the City of Peoria Engineering Department
    - 1 copy to be retained by the City of Peoria Public Works Department
    - 1 copy to be returned to the developer

    No fax copies will be accepted.

16. All street lights installed within the SRP service area shall be installed by SRP. Any street lights installed by contractors other than SRP will not be accepted by the City. Installation and type of equipment shall meet SRP standards.

17. The developer is responsible to pay APS and/or SRP all street light fees prior to the City issuing the final acceptance of the development project.

18. A City of Peoria permit shall be obtained prior to installation of street lights.

19. All subdivisions with public streets are subject to the formation of a Street Light Improvement District (SLID). As such, all operating, maintenance and administrative costs associated with the streetlights located within the subdivision will be assessed to the individual homeowners. See Chapter 2 for more information.

20. All subdivisions with private streets are not subject to a Street Light Improvement District. The monthly operating and maintenance costs

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

associated with the streetlights within the private street subdivision will be the sole responsibility of the Homeowners Association.

21. The City of Peoria will assume responsibility for the monthly operating and maintenance costs for all streetlights on arterial and collector streets.

22. Ornamental type street lights may be installed with the approval of the Engineering Department Director or their designee.

23. In new subdivisions with private streets, the developer electing ornamental lights shall provide the street lights system at no cost to the City. Street light design and pole locations are to be reviewed and approved by the Engineering Department. Street lights shall be installed concurrently with other required off-site improvements. The City will not be responsible for inspection of the street lights. The developer will be responsible for the installation of the street lights. The cost of operating and maintaining the street lights on private streets will be the sole responsibility of the HOA. In established subdivisions, no ornamental street lights will be allowed to be installed. Only the same type of street light poles as are existing will be allowed to be installed, unless otherwise approved.

24. All new subdivisions, ne roadways, and in-fill projects on existing roadways shall use LED luminaires as specified in this Section unless otherwise approved by the City Engineer. LED luminaires shall conform to the requirements **Section X.X**.

25. Street lights shall be fully shielded in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaire, is projected below a horizontal plane running through the lowest point on the fixture where light is emitted. External shields or reflectors to prevent up-light are not allowed.

26. The developer shall coordinate all design, electrical service criteria and needs with the utility company serving the electricity to the lighting system.

27. The developer shall conform to the latest requirements of the serving utility and pay all fees for design and energization.

28. Plans for street lighting shall show the locations, distance between lights, luminaire types/sizes, mounting heights, pole types, and other information that is identified in Street Lighting Plan Checklist.

29. Street lights for local and minor collector streets shall generally be located at the side lot lines. On major collector and minor arterial streets, street lights shall be placed on both sides of street. Major arterials shall typically have lights placed in the median using double mast arm poles.

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

30. All pole foundations and pull boxes to be at sidewalk grade unless otherwise noted.

31. Refer to Chapter 3 for plan submittal requirements. Once final review has been completed, four (4) sets of plans and cover sheet must be submitted for signature. Approval of the plans is good for nine (9) months. When the plans have been signed, the four (4) sets will be distributed as follows:

    - 1 - Held by Engineering
    - 1 - Sent to Public Works Field Operations
    - 1 - Sent to Consultant
    - 1 - Sent to Electrical Company (APS/SRP)

The developer shall pay all permit, power connection and plan review fees.

7.6 Intersection Lighting

Intersection lighting levels should be at least equal to the sum of the values recommended by IES for each street that forms the intersection. Photometric lighting analysis shall be provided to show that this requirement is satisfied.

Intersection at all local and collector type streets shall have at least one street light at the intersection. Minor and major arterial intersections shall have at least 2 street lights at the intersection. At signalized intersections, street light plans shall be coordinated with street lights mounted on traffic signals.

7.7 LED Luminaire Requirements

1. A nominal Correlated Color Temperature (CCT) of 4000 °K binned per ANSI C78.377-2008.

2. A typical Color Rendering Index (CRI) greater or equal to 65.

3. The complete luminaire designated shall operate one or more optimized LED arrays from a nominal120-277 volt, 60Hz power source and shall be capable of starting and operating the optic assembly(s) within the limits specified by the LED manufacturer.

4. The luminaire shall contain prewired integral drivers and optical assembly that shall provide an asymmetric medium distribution type. Labeling shall be in accordance with ANSI standards.

5. The arterial LED luminaire shall be 125W or less and provide a minimum of 11,800 initial lumens.

6. The collector LED luminaire shall be 75W or less and provide a minimum of 6,800 initial lumens.

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

7. The residential LED luminaire shall be 60W or less and provide a minimum of 5,000 initial lumens.

8. Maximum LED drive current shall not exceed 700 mA.

9. Manufacturer must have a minimum of a 15-year history of designing and manufacturing outdoor luminaires and at least 10 years of LED design history in some form of outdoor application which can include signage, traffic signals or roadway/parking fixtures.

10. A limited system warranty must be provided for the replacement or repair of the luminaire due to any electrical failure (including light source and or power supplies/drivers) for 10 years.

11. Luminaire shall conform to IESNA TM-15 BUG rating of B3-UO-G2 or better. Uplight shall be zero light above 90-degrees.

12. UL 1598 listed operating temperature range of -10° C to +50° C.

13. Lumen maintenance at 50,000 hours and 40°C ambient based on testing per TM-21 shall be 91%, or greater.

14. Each optical assembly shall be a fixture sub-assembly and be comprised of:

    - A precision reflector system that is metallic coated with a high quality reflectance finish material containing a long life finish designed to last the life of the fixture without corroding, peeling or fading under normal operating conditions.
    - A 16 gauge aluminum metal core printed circuit board assembly, designed to operate as a class 1 circuit.
    - LED's shall be surface mounted to the aluminum core board using advanced SMT manufacturing processes
    - The circuit board shall be attached to a machined surface on the casting using tri-lobular thread forming screws so as to maximize heat transfer over the life of the fixture.
    - Each optical assembly circuit board shall use discrete LED. No chip on board optics allowed.
    - The LED pad temperature shall not exceed 75°C at 25°C ambient.
    - Each fixture shall contain a single serviceable transparent flat tempered glass optical lens.
    - Optical cavity must be vented while maintaining the IP66 enclosure rating.

15. The luminaire fixture assembly shall have the following electrical requirements:

    - Off-state power draw of 0 watts (excluding PE or remote-control devices).
    - 7-pin locking ANSI C136.41 dimming photocell receptacle.

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

- Drivers shall be dimming type with 0-10 volt leads wired to 7-prong photocell receptacle.
- A minimum system power factor of .9 tested and specified at 120v input at full power.
- Maximum THO < 20% tested and specified at 120v input at full power.
- Driver and LED modules shall be replaceable as separate units with tool-less plug-in electrical connections.
- Cooling shall be done with heat sinks. No fans, pumps, or liquids shall be used.
- Driver shall have a minimum life rating of 90,000 hours.
- UL Class 1- power supply units (i.e. drivers) operating in DC constant current mode
- EMI compliance with FCC 47 CFR Part 15 Class A.
- Electrical components have a Class A sound rating.
- The luminaire shall contain the factory-installed driver supplied with the optic assembly.
- The driver, optic assembly and housing shall be from the same manufacturer.
- The electrical system shall have integral surge protection per IEEE/ANSI C62.41.-1991, 6kV/3kA Location Category 83 (120 Events).
- Electrical cavity shall use only copper wire within the fixture.
- Electronic components for the fixture shall have quick disconnect connectors.

16. Terminal block shall be oriented to be lineman friendly within the electrical cavity to allow for easy wire Luminaire shall have a minimum 3-lead terminal board mounted within the housing. Terminal board screws shall be of the captive type with wire grips that raise and lower with the terminal screw. Terminals shall be capable of accepting #8 to #14 AWG wire.

17. Main voltage harness and wiring insulation shall be AWM rated for 125°C and 600 Volt.

18. The die-cast aluminum housing construction will incorporate heat sink fins that are integrally cast with the housing to maximize heat transfer and minimize thermal impacts of environmental conditions such as debris- clogged fins.

19. The fixture power door shall be die-cast aluminum from a precision machined die cast tool steel mold.

20. The fixture assembly for the power door shall have a threaded screw that can be tightened to positively secure the door against the main fixture casting.

21. Shall contain a hinge system that does not require any tools to remove the door from the fixture.

22. Warranty shall not be affected by opening the power door and/or accessing the electrical cavity.

23. Meets 3G vibration per ANSI C136.32-2001.

24. Finish shall be corrosion resistant Polyester powder paint capable of surviving the ASTM B117 salt fog environment for a minimum of 500 hours without blistering or peeling.

25. The coating must demonstrate the gloss retention of great than or equal to 90% for 500 hours QUV test per ASTM G154 UVB-313, 4-hour UV-8 60 degrees Celsius, 4-hour condensation 50 degrees. Dry film thickness of the dark bronze powder paint shall be a minimum of 2.0 mils thickness. Fixture color shall match the pole color.

26. Luminaire housing shall be UL listed for wet locations.

27. Slipfitter in the housing shall contain two-bolt single piece clamp fastening to mount on 1.66" to 2.375" O.D. horizontal tenons and provide+/- 5 degrees of tilt adjustment.

28. The fixture shall not be greater than 26 in x 15 in x 5.5 in (L x W x H).

29. The effective projected area shall not exceed 0.5 square foot maximum and 28lb weight.

30. Luminaires must be independently tested and comply with IESNA LM79-08 and LMS0-08. A copy of all LM79 and LM80 independent test reports shall be provided to the City.

31. CCT and CRI and shall be tested and measured in accordance with LM-79.

32. Lumen depreciation data shall be provided to the City per LM-80 and TM-21 at 40° C ambient.

33. Documentation showing compliance with all performance, mechanical, and photometric requirements as detailed above shall be provided to the City, if requested

7.8 Photocontrol Requirements

1. Photocell shall operate at nominal 120-277V.

2. Photocell shall be designed for use with LED and will protect the LED fixture from inrush current spikes.

3. Photocell shall use infrared filtering phototransistor light sensing element.

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

4. Unit shall include 320J MOV Surge Protection and consume .5W power at 120V.

5. Operating temperature range is -10C to 50C.

6. Unit will turn on at 1.5fc and off by 2.25FC. The unit will fail on.

7. Product shall have a 10-year warranty for use with LED.

7.9 Street Light Plan Checklist

The latest version of the Street Light Plan Checklist can be found on the City of Peoria's website. This Checklist will be periodically updated by the City. At the time of the publication of these Standards it was as follows:

1. Retain a professional engineer of the appropriate discipline to design streetlight and coordinate plans with the City staff.
2. Street light plans must be to scale (typically 1 in = 40 ft). Final light pole locations will be shown on the Paving and/or Utility plans.
3. City street lighting plan submittals will be coordinated through the normal approval plan process.
4. The approved street light plans shall be submitted by the City to the appropriate utility company (Arizona Public Service or Salt River Project) to prepare the streetlight improvement plans.
5. Submit a minimum of 4 sets of the street light improvement plans to the City for issuance of the streetlight improvement construction permit.

QUICK LINKS
General Plan

Street Lighting Warranty Agreement

8. WATER INFRASTRUCTURE DESIGN

8.1 General Information

This Chapter provides ordinance, policy and standards for establishing design criteria for constructing and modifying water system infrastructure and facilities to be owned and operated by the City. Water system facilities include the following: groundwater wells, booster pump stations, pressure reducing valves, storage reservoirs, treatment facilities, and all other appurtenances required for proper treatment, conveyance and delivery of water within the system.

The information provided in this Chapter is not intended to cover all situations that arise but shall provide general guidance. This is not a substitute for sound engineering principles.

Refer to the Quick Links in this Chapter for additional information and guidance when design water infrastructure systems in the City of Peoria. Contact City staff for specific utility facility design guidelines through the Site Development process.

8.2 City Code, Standards and Master Plan

It is the responsibility of the design engineer to review the most current edition of the Integrated Water Utilities Master Plan (IWUMP) and determine what additional water infrastructure is necessary to serve a proposed development. The Water Services Department will utilize the most current edition of the IWUMP and operational knowledge of the system to determine which facilities or upgrades are required.

The criteria for development of water infrastructure in the City of Peoria shall be in conformance with:

- The most current edition of the IWUMP. Copies of the IWUMP can be requested through the Public Records Request process."
- Various City codes, including, but not limited to Chapter 25 of the City of Peoria Code apply to the development of the municipal water system and contain information regarding the development in association with land development.

8.2.1 System Requirements

The following tables (**Tables 8-1 through 8-4**) are from the 2015 IWUMP and shall be utilized for water system design with the City. It is the responsibility of the user to verify the most recent and updated information.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

TABLE 8 - 1 HISTORICAL TOTAL PER-CAPITA WATER USE (IWUMP-2015)

YEAR	ESTIMATED POPULATION[1]	TOTAL WATER PRODUCTION (mgd)	PER CAPITA WATER USE (gpcd)
2010	139,200	21.3	153
2011	140,800	22.1	157
2012	142,700	23.1	161
2013	145,200	23.7	163

NOTE:

(1) From MAG municipal planning area projections approved May 28, 2013. Years 2010-2012 are MAG population estimates as of July 1. Only includes portions of Peoria within Maricopa County. Private water company areas are excluded.

TABLE 8 - 2 WATER SYSTEM PERFORMANCE CRITERIA (IWUMP-2015)

DESCRIPTION	CRITERIA
DEMAND AND PRODUCTION CRITERIA	
AVERAGE DAY DEMAND	
Gallons per capita per day (gpcd)[1]	163
Land Use Category (gpad)[2]	700-3000
PEAKING FACTORS	
Maximum Day/Average Day	1.5
Peak Hours/Maximum Day	2.1
Peak Hour/Average Day	3.2
Production[3]	Maximum Day Demand plus 10%
STORAGE CRITERIA	
Equalizing	20% of Maximum Day Demand
Fire	Volume according to Table 8-4 for each pressure zone
Emergency	10% of Maximum Day Demand
TRANSMISSION/DISTRIBUTION	
VELOCITY CRITERIA	
Maximum Day (MD)	
Pipe <36" (Head Loss)	< 5 fps (2 to 7 feet/1000 feet)
Pipe ≥ 36" (Head Loss)	< 6 fps (1 to 2.5 feet/1000 feet)
Peak Hour (PH) (Head Loss)	≤ 7 fps (< 10 fps/1000 feet)
Fire Flow Condition	< 10 fps, ≥ 20 psi
SIZE CRITERIA (MINIMUM DIAMETER, INCHES)	
Section Lines/Major Arterial	16
North-South Mid-Section Lines	12
East-West Mid-Section Lines	8
All Other Lines	8
BOOSTER PUMP STATION CRITERIA	
Without Elevated Storage	Capacity equal to larger of peak hour or MD plus fire; plus 10%

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

With Adequate Elevated Storage	Capacity equal to maximum ay demand; plus 10%
Firm Capacity	Capacity with the largest pump out of service
FIRE DEMAND CRITERIA [4]	
Master Planning Fire Flow Requirements[5]	Residential = 2 hours at 1500 gpm Commercial/Industrial/Schools = 4 hours at 3500 gpm
ADJUSTMENTS TO CRITERIA FOR "SATELLITE" DEVELOPMENT[6]	
PEAKING FACTORS	
Maximum Day/Average	1.6
Peak Hour/Maximum Day	2.5
Peak Hour/Average Day	4.0
STORAGE CRITERIA	
The early phases of development should take into consideration the demands of construction water and fire flow requirements placed on the water system. In addition to the equalizing and emergency criteria, it is recommended that sufficient storage be provided in the initial phases of development to meet a low risk commercial fire (4 hours at 3500 gpm).	
BOOSTER PUMPING CRITERIA	
Booster pumping capacity should be based on the greater of peak hour demand or a low risk commercial fire flow rate.	

NOTES:

(1) 2013 estimated water service area population of 147,550 (excludes areas served by private water companies) and 2013 total water production of 23.7 mgd.

(2) See Chapter 2, Table 2.5 of the IWUMP-2015

(3) Production well supply shall be 33% greater than the required production well capacity to allow for scheduled/unscheduled outages of well production facilities.

(4) Fire flow is applied on the maximum day demand.

(5) Master Planning Fire Flow Requirements are general and applied for system planning purposes. Actual fire flow requirements for future, individual structures shall be determined in accordance with IFC 2006 requirements as adopted by the City of Peoria in Chapter 9 of the City Code. The 2006 IFC allows reductions in fire flow requirements for structures with approved automatic sprinkler systems and installation practices, which can be grated at the discretion of the City Fire Marshall.

(6) Adjustments to criteria that can be applied to early phases of "satellite" development, or development that has limited connection to the City's infrastructure. These criteria are to be used at the City's discretion.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List

Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

TABLE 8 - 3 TOTAL PER-CAPITA WATER USE (IWUMP-2015)

LAND USE TYPE	UNIT WATER DEMAND (gpad)	DEVELOPED AREA (ac)	DEMAND (mgd)
COMMUNITY COMMERCIAL	1177	514	0.6
GOLF COURSE	487	523	0.3
INDUSTRIAL	700	109	0.1
PARK/OPEN SPACE	1251	426	0.5
SCHOOLS(1)	1251	---	---
PUBLIC/QUASI-PUBLIC	1128	568	0.6
REGIONAL COMMERCIAL	1314	846	1.1
RESIDENTIAL/ESTATE (0-2.0 DU/AC)	704	1984	1.4
RESIDENTIAL/LOW (2.0-5.0 DU/AC)	1849	8138	15.0
RESIDENTIAL/MEDIUM (5.0-8.0 DU/AC)	1921	1262	2.4
RESIDENTIAL/MEDIUM HIGH (8.0-15.0 DU/AC)	2457	233	0.6
RESIDENTIAL/HIGH (15.0+ DU/AC)(1)	3000	86	0.3
MIXED USE – LOW INTENSITY	1484	214	0.3
MIXED USE – HIGH INTENSITY(1)	3000	190	0.6
TOTAL	---	15095	23.8

NOTE:

(1) School land use type was created from "public/quasi-public" land use type for the purposes of making future projects. It was not classified separately for this analysis.

TABLE 8 - 4 REQUIRED FIRE FLOW AND FIRE RESERVE STORAGE (IWUMP-2015)

	FIRE FLOW (gpm)	FIRE FLOW (mgd)	DURATION (hr)	FIRE RESERVE STORAGE(1) (MG)
1000	1000	1.4	4	0.3
2000	1500	2.2	6	0.6
4000	2000	2.9	8	1.0
10000	3000	4.3	10	1.8
17000	4000	5.8	10	2.4
28000	5000	7.2	10	3.0
40000	6000	8.6	10	3.6
56000	7000	10.0	10	4.2
80000	8000	11.5	10	4.8
96000	9000	13.0	10	5.4
125000	10000	14.4	10	6.0

NOTE:

(1) American Insurance Association.

8.3 Federal, State and County Regulations

A. Arizona Department of Environmental Quality (ADEQ)

ADEQ's Engineering Manual Bulletin No. 8 "Disinfection of Water Systems" and No. 10, "Guidelines for the Construction of Water Systems" published by the Arizona Department of Environmental Quality and Arizona Administrative Code, "Title 18 – Environmental Quality", contain specific requirements for submittals, approvals and notifications when extension of a public waterline is proposed. Some of the provisions of these documents are outlined in this Chapter.

B. Maricopa County Environmental Services Department (MCESD)

MCESD is required to review and approve all public water main extensions and construction of water-related facilities within the City's service area prior to the City approving the final plans.

Relocation or realignment of an existing waterline to resolve a utility conflict does not require MCESD approval.

8.4 Private Water Companies

Portions of Peoria's municipal area are provided water service by private water companies.

Proposed private waterlines located within the City's rights-of-ways or easements will require an agreement between the City and the private water company delineating liability and maintenance responsibilities. Waterline design and materials shall comply with the requirements for City waterlines.

Private water companies should review and approve the construction of, and modification to, water systems within their franchise areas. The developer will submit to the Development and Engineering Department written documentation that the private water company has approved facilities shown on the final plans before the City grants approval.

The City will not provide water service within private water company franchise areas and will not review private water system plans unless the work will occur within the City's rights-of-ways or easements. Applicable review fees must be paid when the City reviews private water system plans. A note will be placed on the final plans stating that the operation and maintenance of privately owned lines is not the responsibility of the City.

8.5 Agreements

Developers and property owners who install improvements to the public water system may be eligible to request a credit, oversizing, or payback agreement with the City allowing for partial reimbursement of costs to design and construct those improvements. This should be discussed with your assigned Site Development Representative.

8.6 Requirements to Connect

All developments, including single-family residences, are required to connect to the City's water system per Peoria City Code, Chapter 25. The connection to the City's

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

water system and the extension of the waterline per City requirements are a condition of issuance of a building permit.

The City's water testing standards require at least one water sampling station per developed square mile. New residential developments are required to construct the water quality sampling stations per Standard Detail PE-371. Sampling station frequency and location will be coordinated by the Water Services Department during plan review.

Waivers to this requirement may be granted by the Water Services Department per the City's waiver process outlined in **Section 1.8**. Typical waiver considerations include the following:

- Single lot developments if such development is on a major arterial road.
- The extension of the waterline is greater than 1320-feet from the City water system.
- The applicant demonstrates the inability to obtain necessary easements upon reasonable pursuit.

8.7 Design Reports

Water and/or Wastewater Basis of Design (BOD) reports for new development, redevelopment, or modifications may be required as described below.

Note that for larger master planned communities, phased developments, and rezoned properties a more extensive Water Master Plan may be required to evaluate offsite water availability and infrastructure needs. Discuss this issue with your assigned Site Development Representative.

When is a water and/or wastewater BOD Report required?

- Except in those cases as described below, separate water and wastewater BOD reports shall be required to be submitted, reviewed, and ultimately accepted as "Final" by the Water Services Department for all new residential, commercial, or industrial development or redevelopment that may impact water and wastewater physical infrastructure, capacity, or availability. Note that, in some cases, only a water or a wastewater BOD may be required.
- New development or redevelopment shall not require submittal of a formal BOD report(s) when officially directed as such by the Water Services Department. This is typically applied in cases where there is little to no concern regarding the impact on water and/or wastewater capacity created by the new development/redevelopment, and no special engineering or planning accommodations or analysis is anticipated to be required to supply water and sewer service in accordance with City requirements.
- Note that the Water Services Department may stipulate additional supplemental information in lieu of, or in addition to, a BOD report to satisfy any concerns or questions they may have.

Are there different stages of the water and sewer BODs and at what development stage are they typically submitted?

- Generally, preliminary BOD's are required to be submitted and approved during any proposed rezoning cases.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

- Generally, final BOD's are required to be submitted and approved during the preliminary plat or development review approval phase.
- Note that the Water Services Department may stipulate additional supplemental information in lieu of, or in addition to, a BOD report to satisfy any concerns or questions they may have.

8.7.1 Preliminary Basis of Design Reports

The requirement for Preliminary Basis of Design Reports will be indicated on the application checklist when required for a case submittal (zoning, preliminary plat, development review, etc.). The Preliminary Basis of Design Reports must be reviewed and accepted by the Water Services Department prior to final approval of any rezoning case, preliminary plat or construction plans and specifications.

Preliminary basis of Design reports (BODs) will evaluate a site's existing and proposed water and fire demands to determine if adequate supply is available or if offsite infrastructure is required.

Preliminary BOD Report Format

The Preliminary BOD report(s) shall generally include the following items:

- Basic text description of existing conditions, proposed development and proposed utility modifications. This should include an understanding of current pressure zone conditions.
- Fire hydrant flow tests
- Determination of required fire flow. Show calculations to support this.
- Preliminary site/utility plan showing the following:
    - Proposed building(s) and details: units, area(sf), finished floor height, etc.
    - Onsite waterline layout with relevant appurtenances and site features e.g. water meter(s)-domestic and landscape, domestic backflow preventer, fire lines and hydrants, etc.
    - Existing utilities to the extent possible to demonstrate appropriate water or sewer routing
    - Proposed connection to existing water and sewer (extend from building)
    - Any proposed new utilities or modifications.
    - The applicant should only show information that has been field verified or gone through preliminary design, i.e. no purely conceptual layouts.

- Water or wastewater demand calculations per the City's current IWUMP.
- A hydrant pressure test conducted as close as possible to the development to verify distribution system capacity. Note: this test needs to be scheduled through, and witnessed by, the appropriate City staff.
- Any additional analysis determined necessary by the Water Services Department will generally be discussed in the pre- application meeting but may also be required subsequent to the preliminary BOD submission and may include requirements to complete tasks such as hydraulic

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

analysis/modeling and offsite analysis so that any resulting requirements can be accurately stipulated.
- Note that the Water Services Department will require revisions and resubmission of preliminary BODs that do not meet the necessary requirements.

8.7.2 Final Basis of Design Reports

Final Basis of Design Reports must be reviewed and accepted by the Water Services Department prior to approval of any preliminary plat or construction plans and specifications. Final Water BODs shall provide an analysis of a development's impact on the local water distribution system and verify conformance with City requirements. These reports are reviewed and accepted by the Water Services Department then utilized by Site Development as support for their review of the formal submitted construction drawing/plans. The report's objectives are to demonstrate the following (as applicable):

- Design conformance with the City's current IWUMP.
- Prove that there are no hydraulic or technical limitations or deficiencies with the proposed design
- Conformance with the City's design and development criteria and standards

The Final BODs shall generally include the following items:

- All relevant information required for a preliminary BOD as-noted above but updated to reflect final design status.
- An updated hydrant flow test if the previous applicable flow test is more than 1-year old.
- Water and sewer hydraulic modeling information and results as detailed below.
- Updated final site/utility plan with the elements described under the preliminary BOD section above.
- Any information related to comments or items the Water Services Department noted or required on the approved preliminary BOD (if one was submitted)
- Note that the Water Services Department will require revisions and resubmission of final BODs that do not meet the necessary requirements.

Design Policy

A Professional Civil Engineer registered in the State of Arizona must analyze a new development's impact on the City's water system. The effects of multiple scenarios shall be evaluated to ensure that sufficient water supply and pressure is available to meet the needs of that development and that the proposed water system layout/design is adequate. The BOD Report shall provide supporting map detail to serve as a master utility plan for the project.

General Final BOD Report Format Guidelines

- Digital submissions of all documents are preferred as single combined and indexed PDF files.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

- If hard copies are submitted, then two BOD report copies shall be submitted as letter-sized (8 1/2 x 11) and comb bound.
- Provide a table of contents.
- Maps and other supporting materials shall be 11x17 and attached as an appendix at the end of the report.
- Reports must be sealed, signed, and dated on the cover by a Professional Engineer currently licensed to practice in the State of Arizona.

Report Cover & Vicinity Map

Covers shall include:

- The development's name, full address, and case number.
- The developer/owner name, address, and phone number.
- The engineer or design firm's name, address, and phone number.
- The original BOD submittal date and any subsequent revision dates.
- A vicinity map to identify the project's location with respect to major cross streets and City quarter-section (alternatively this can be placed on the first page of the report after the TOC).

Introduction

- Summarize the proposed development including the number of residential units, square footages of non-residential development and intended use, and related site improvements.
- Summarize any previous site development.

Existing Conditions

- State the existing zoning and land use.
- Describe the existing topography, vegetation, and landform features.
- Include a description of existing utilities in the vicinity.
- Summarize and attach the results of a recent certified hydrant flow test of the existing water system.
- Include a listing of any existing site water meters including size, location, and use for fee credit purposes.

Proposed Conditions

- Describe the proposed connections to the City's water system and extension of any waterlines into the site.
- Describe the project's location within the appropriate water zone(s) and show any boundaries.
- Indicate second sourcing for all water extensions when necessary to meet requirements of the Fire Department or Water Services Department.
- Determine the required fire flow referencing the City's current adopted Fire Code

Required Computations & Hydraulic Modeling

- For required hydraulic modeling, utilize the City's pressure zone hydraulic grade line (HGL) provided in the current IWUMP to demonstrate the project's ability to meet fire and pressure requirements. Supporting calculations are required. A hydrant flow test, conducted with the

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

preliminary BOD is not solely acceptable as a means to demonstrate the ability to meet these requirements.

- Water demands shall generally be determined based on the unit demands in gpm listed in IWUMPor as accepted or directed by the Water Services Department, or as described within this Chapter. The Water Services Department reserves the right to require the use of potentially higher water demand peaking factors or directly apply demand flows for particular developments if deemed justified e.g. some restaurants or specialty developments. Refer to Section 8.2.1 for demand information.
- Computer hydraulic modeling shall use H2ONET, WATERCAD, or EPANET software, or other City approved software.
- In addition to network diagrams clearly present all inputs, details, and analysis output in organized tables.
- Include all relevant hydraulic network diagrams listed for each of the following required hydraulic analysis scenarios:

    - Model Scenario 1: Average day demand in gpm at all demand nodes.)
    - Model Scenario 2: Peak hour demand in gpm at all demand nodes.
    - Model Scenario 3: Maximum day demand in gpm at all demand nodes with worst case fire flow

      Requirements:

      i. The determined fire flow must be applied to the single worst case location in the proposed system where fire flow will be required. Typically, this is the furthest and/or highest point from the main water supply connection. If not clear what the worst-case fire flow demand point is, the fire flow shall be applied to each potential point in the model until the worst-case point is determined.

      ii. A minimum of 30 psi must be maintained at the worst case hydrant supply line tee/tap under this condition with a simultaneous minimum of 15 psi maintained at all domestic demand nodes (i.e., at the highest finished floor elevation and post service line and appurtenances) (Refer to scenario 4 for guidance on modeling the service line up to the demand nodes).

- Model Scenario 4: Maintain the minimum domestic service pressure at the worst case domestic demand node (location/elevation) under peak hour flow conditions.

- Notes: A minimum of 50 psi must be maintained at the domestic service meter for the worst hydraulic case domestic demand node, while applying peak hour design conditions. Typically, this will be the demand node with the lowest modeled pressure in the previous scenarios.

Network Diagrams

Model simulations shall be documented in a graphical or tabular format to demonstrate that the water distribution system will provide the required flow at

suitable pressures and water main velocities. Fire flow model results shall also be documented.

Summary

- Summarize the proposed water improvements stating that all the City's design standards and policies have been met or note why the developer is requesting any variance or exception.
- Include a brief project schedule indicating the proposed start and completion of the development's improvements.
- State any intent to request a credit, oversize or payback agreements along with a description of the applicable water infrastructure.

Supporting Maps

- Include a scaled site plan showing all existing and proposed utility lines and all existing and proposed improvements. Provide separate maps if site demolition involves significant removal of existing utilities and improvements.
- Screen existing topography and clearly label all existing and proposed contours, or provide spot elevations with sufficient information to evaluate pipe cover.
- Indicate locations and sizes of proposed meters (domestic and landscape), backflow preventers, fire lines and fire hydrants.
- Show, dimension and label all property lines, rights-of-way, tract and easement lines.
- Indicate any water zone boundary lines corresponding to the topography.

8.8 Water Infrastructure

Water facilities (wells, reservoirs and booster pump stations) are typically designed and constructed by the City through its Capital Improvement Program. Developers needing to construct water facilities should contact the Water Services Department through their Site Development Representative.

8.8.1 City Wells

The Water Services Department shall be notified of any proposed well drilling. Under the Arizona Groundwater Management Code, the Arizona Department of Water Resources (ADWR) regulates all groundwater wells in Arizona. The Water Services Department will not support the drilling of a private well when public water is available within 1320 feet of the property.

Additional information is available from ADWR at 602-771-8500.

8.8.2 Reservoirs

Storage facilities must provide emergency fire protection and be designed to maximize the efficient use of water production wells and pumping facilities. Therefore, storage in each designated service area shall exceed the following criteria:

- 3-hour fire flow reserve plus 25% of the maximum day demand per the IWUMP

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

8.8.3 Booster Pump Stations

Booster pumps will be designed as required to maintain adequate pressure for domestic and fire protection water supply.

A preliminary design report must be prepared and submitted to the City for review and acceptance by the Water Services Department prior to submittal of improvement plans. This report shall outline the type of equipment and controls proposed for the station along with the proposed hydraulics. A final design report and project specifications prepared by a registered civil engineer licensed in the State of Arizona must be accepted by the Water Services Department prior to approval of the improvement plans.

8.8.4 Waterlines

The City of Peoria water system is a network of waterlines grouped into functional classifications described below. All development shall provide for water distribution and service lines of appropriate sizes and in standard locations. These are minimum requirements and the City may require larger sizes in unusual circumstances or in order to satisfy fire flow and pressure requirements.

All water systems must demonstrate redundancy (i.e. connected to two separate waterlines) as approved by the Development and Engineering Department.

TABLE 8 - 5 WATERLINE FUNCTIONAL CLASSIFICATIONS

Functional Classification	Size	Standard Locations
Transmission	*	*
Distribution	16 -inch	• Along section lines • Major arterial streets • Limited access parkway
	12-inch	• Along north-south midsection collectors (1/2 mile) • Minor arterial streets
	8-inch (minimum)	• Along east-west midsection collectors (1/2 mile) • In all other locations
Service	6-inch (minimum)	• Fire Services • Smaller fire services must obtain written approval from the Fire Department.
	2-inch 1.5-inch 1-inch**	• Single Family Residential developments • Reclaimed water service lines shall not be located under driveways or under concrete aprons adjacent to driveways.
	Sized per Engineer	• All other types of developments

*Size and location will be in accordance with the most current edition of the IWUMP, but typically follow the guidelines above
**No smaller sizes will be allowed

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

If the waterline deviates from the section line or mid-section line, as in the case of curvilinear roads, the waterline shall be sized as directed in this section.

Non-standard sizes such as 10", 14" and 18" will not be allowed unless approved by the Water Services Director.

Service taps are prohibited on any line, which is designed to service fire sprinkler systems or fire hydrants, on transmission waterlines, and on all waterlines larger than 16-inch.

8.9 Transmission and Distribution Design Standards and Guidelines

8.9.1 Location

Waterlines within the City shall be in the locations shown in **Table 8-6** unless otherwise approved:

TABLE 8 - 6 WATERLINE LOCATIONS

Street Classification	Location
Major Arterial Streets and Limited Access Parkways	• Must be approved by the Water Services Department.
Minor Arterials	• 13-feet to the north or east from the centerline
Collector Streets	• 9-feet to the north or east from the centerline
Local Streets	• 6-feet to the north or east from the centerline t

All waterlines shall be parallel to the street centerlines or property lines, or as close as possible. All horizontal deflections in waterlines shall comply with the pipe manufacturer's recommendations for deflection at joints. 50% of the recommended deflection will be allowed. Street crossings shall be perpendicular to the centerline of the street being crossed.

Vertical and horizontal separation from sewer lines shall be in accordance with MAG Section 610.5 and MAG Standard Detail 404-1.

8.9.2 Rights-of-Way/Easements

Rights-of-way and easements shall be dedicated prior to any construction or with the Final Plat of the development.

- The minimum clear width of the easement for distribution and transmission waterlines shall be 20-feet. The minimum width for a shared easement with sanitary sewer shall be 30-feet. There is a minimum of 10-feet each side of the water facility. Larger easement widths will be

QUICK LINKS
Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

required for deeper installations as determined by the Water Services or Engineering Department.

- The minimum clear width of the easement for service waterlines shall be 12-feet. There is a minimum of 6-feet each side of the water facility. Larger easement widths will be required for deeper installations as determined by the Water Services or Engineering Departments.
- Waterlines shall be centered in easements. No other parallel utilities shall be located within the water or sewer easement.
- Water easements are to be dedicated for the specific use, maintenance and repair of the waterline, and any associated appurtenances. Water easements are to be dedicated as part of a Final Plat or by separate instrument with written approval from the Engineering Department.
- Underground retention and above ground retention basins are not permitted to cross or be within designated public water or public sewer easements.
- Trees and substantial plantings are not permitted within designated public water or public sewer easements where the easement provides primary access to the utilities. Plantings must typically be at least 5' from the centerline of the pipeline.
- Meters, fire hydrants, and valves located on private property shall be contained within a dedicated public water easement, 6-feet from the sides and 6-feet behind the appurtenance.

8.9.3 Cover and Separation

The minimum cover from finish grade to top of the pipe shall be as specified in MAG 610.4 with the following exceptions:

- The minimum cover from finish grade to top of pipe for all waterlines less than 12" diameter located in major streets shall be as specified by the design engineer, but no less than 48-inches, unless approved in writing by the Water Services Director.
- The minimum cover from finish grade to top of pipe for waterlines which are 12- inches in diameter or larger located in major streets shall be as specified by the design engineer, but no less than 60-inches, unless approved in writing by the Water Services Director.

Extra protection per MAG 610.5.5 and Standard Details 404-1, 404-2, and 404-3 is required:

- Where cover is less than 4-feet due to topography or potential conflicts with facilities such as canals, washes, or rivers.
- Where the bottom of a waterline is within one foot above the top of the pipe of any irrigation, storm drainer, sanitary sewer, or reclaimed waterline. An acceptable protection method not covered in MAG is the offsetting of joints combined with the use of an approved CLSM mix between the two pipes. CLSM placement shall be per MAG Section 604.
- Where the top of waterline is within two feet of the bottom of the pipe of any irrigation, storm drain, sanitary sewer, or reclaimed waterline. An acceptable protection method not covered in MAG (excluding sanitary sewer) is the offsetting of joints combined with the use of CLSM mix

between the two pipes. Where a crossing occurs with a sanitary sewer gravity or force main, extra protection methods must be per MAG Requirements. CLSM placement shall be per MAG Section 604.

- Where waterlines pass under a significant structure greater than 10-feet wide such as box culverts, railroads, highways, canals, etc. The waterline(s) shall be installed inside a pipe casing as approved by the Engineering Department.
- Pipe casing per Peoria Standard Detail PE-399 will be allowed as extra protection for new and existing waterlines.
- As deemed necessary by the plan reviewer.

8.9.4 Pipe Materials

Pipe materials allowed for construction in Peoria shall be per **Table 8-7** and the Maricopa Association of Governments, Uniform Specifications and Details for Public Works Construction.

TABLE 8 - 7 PIPE MATERIALS

SIZE*	ALLOWED MATERIALS
8" -12"	➢ Ductile Iron Pipe, Pressure Class 350 ➢ Polywrap for Ductile Iron Pipe – conformance with MAG Standard Specifications
16" and larger	➢ Ductile Iron Pipe, Pressure Class 250 ➢ Polywrap for Ductile Iron Pipe – conformance with MAG Standard Specifications

*All waterlines shall comply with NSF 61, latest edition and be lead free. No exceptions for non-potable systems.

8.9.5 Bedding and Backfill

Bedding and backfill shall be per City of Peoria Standard Detail PE-401. Alternate bedding may be approved on a case by case basis by the Development and Engineering Department. Backfill requirements provided by the design engineer shall apply when such provisions are deemed by the City inspector to be more restrictive than the MAG specification. Pavement replacement for trenches shall utilize "T-Top" trench repair methods outlined in MAG Standard Detail 200-1.

8.9.6 Wash Crossings

All wash crossings will be constructed using restrained joint ductile iron pipe. Bury requirements to place waterlines under washes or channels shall be based upon the 100-year peak design discharge (Q_{100}) in the channel or wash.

Scour depth will be estimated using Arizona State Standard Attachment (SSA) 5-96, Guideline 2, Level I, as published by the ADWR. The engineer will estimate the depth of scour and design the top of pipe to conform to **Section 8.9.3**. The engineer shall submit the scour analysis with the final plans.

All pipelines located within the scour zone must be protected by installing a cut-off wall downstream of the pipeline to stabilize the scour depth. Cut-off walls will be structurally designed to the scour conditions calculated. The developer is

responsible for obtaining any permits required from the Army Corps of Engineers, Flood Control District of Maricopa County or other agency prior to plan approval.

8.9.7 Valves

A. Types/Sizes

Gate valves required to control the operation of the water system shall be installed per Peoria Standard Detail PE-270, PE-398 and shall conform to MAG 630. Solid wedge gate valves meeting AWWA standards for potable water shall be used for waterline sizes up to and including 16-inches in diameter. All gate valves shall be resilient seated and open counterclockwise.

Butterfly valves shall be required on mains 24-inches in diameter and larger.

B. Spacing

Generally, there shall be two valves per tee and three valves per cross. However, it is preferred to limit the number of unnecessary inline valves. The maximum valve spacing shall be per **Table 8-8**.

TABLE 8 - 8 MAXIMUM VALVE SPACING

	Spacing
Industrial, Commercial and Multi-Family Developments	500 feet
Single-Family Residential Development	800 feet
Transmission Mains (16-inches)	1320 feet
Transmission Mains (greater than 16-inches)	2640 feet

- Any 8-inch and larger waterline that will be extended in the future shall have a valve, along with a 20-foot minimum stub with cap and 2-inch curb stop, at the terminus per MAG Standard Detail 390-Yype A (Type B in unimproved areas).
- For all waterlines crossing significant structures greater than 10 feet wide, such as drainage canals, and railroads, one valve shall be placed on each side of the structure as directed by the Engineering Department.
- The maximum number of hydrants to be out of service per closure is two.
- The maximum number of residential units to be out of service per closure is 20.
- The maximum number of valves to isolate a segment of waterline is four.

C. Location

Generally, the intent is to locate the valve lids so that wheel line of normal vehicular traffic does not track over the casting. The location for the valve covers and lids should not be closer than 6 feet from the gutter line where possible.

- Valves shall not be located in valley gutters. The centerline of the valve shall be a minimum of 2-feet from the edge of the valley gutter.
- All water valves located outside of paved areas shall have a "Curve-Flex" Utility Marker as manufactured by Carsonite (CFR4-08-Blue) or approved equal.
- Valves shall be at least 3-feet clear of any constructed obstructions and 6-feet clear of any landscaping.
- Consideration shall be given to the location of driveways, especially residential, adjacent to the valve cover whereby a vehicle or other obstruction may be temporarily located, to perpetually maintain the 6-foot clearance.
- See City of Peoria Standard Detail PE-398 for valve locations from a tee and cross.

D. Operation

- Representatives of the Water Services Department are the only personnel authorized to operate water valves on the City's existing water system.
- To request a water system shut down a "Peoria Distribution System-Shut Down Request Form" must be submitted. This form must be submitted at least 10 days in advance of any requests to shut down any lines in the City of Peoria's water distribution system.

8.9.8 Tapping Sleeves

Tapping sleeves are not allowed on Asbestos Cement or other deficient pipe sections. Replace the pipe section with ductile iron pipe and fittings as needed.

Tapping sleeves are allowed to be installed on ductile iron waterlines 12-inch and less in diameter in good condition. Tapping sleeves are not allowed to be installed on waterlines 16-inch or larger. Any exceptions must be approved in writing by the Engineering Department.

Size on size taps are not allowed. Any exceptions must be approved in writing by the Engineering Department.

8.9.9 Water Services and Meters

Water services, pipe and fittings, whether new or replaced, shall be per City of Peoria Standard Detail PE-363. The Developer shall make all service taps.

A. Size

The size of the service will be as determined by the Design engineer, sized and designed in accordance with requirements of the Uniform Plumbing Code and per the sizes herein.

1. Water Meters 2-Inch Diameter and Smaller: Water meters 2-inch and smaller shall be located per City of Peoria Standard Detail PE-363. Water meters will be supplied and installed by the City of Peoria Meters Services Section. Meter shall be sized no more than one half size smaller than the service size.
2. Water Meters Larger than 3-Inch Diameter: Water meters 3-inch and larger shall be installed above grade in accordance with Peoria Standard

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

Detail PE-354. Water meters will be supplied by the City of Peoria Meters Services Section. Water Meters shall be installed by the Developer.

A 20-scale detail is required for all large meters (3" and larger). The design engineer must provide a detail on the plans which depicts the meter and backflow device including manufacturer and model number, vandal enclosure, fittings, landscape, and easements at the proposed location per City requirements. If there is a change to meter or backflow device, the detail must be modified as a plan revision prior to installation in the field.

The meter size shall be dictated by the service size. Mani folding is not permitted unless written approval is obtained from the Water Services Director.

Individual pressure reducing valves sized equivalent to the meter size shall be installed on private services where static pressures will exceed 80 psi. Individual boosters, if necessary, must be approved by the PW-Utilities Director or their designee.

B. Location

- There will be one service per lot and one meter per service line unless specific written request is submitted to the Engineering Department and written approval is acknowledged by the City.
- Water services installed outside of public right-of-way shall be contained within a dedicated easement for access, maintenance and reading of meters.
- Water meters shall not be located in parking lots, driveways, or in areas of paving or where traffic may cause damage to the service, meter or meter box. Meters will not be fenced in and must be accessible at all times.
- In landscape areas, proposed grading shall direct runoff to flow away from the meter installation.
- Above ground vandal enclosures are required for all meters 3-inch and larger.
- A 3-foot minimum separation is required between taps and an 18-inch minimum separation is required from any fittings or mainline joints

8.9.10 Backflow Prevention

Backflow protection will be required on the domestic and irrigation potable water supply lines to all commercial facilities to prevent the possibility of polluting or contaminating the potable water system Additional backflow prevention assemblies may be required to isolate potential internal hazards per reviewer request.

Containment (or secondary protection) will be installed at the service connection or downstream side of the water meter. The backflow assembly will be installed as close as possible to the water meter for domestic and landscape irrigation services, or as close as possible to the property line or main line tie-in for the fire sprinkler system. It is not permitted to combine the meter and the backflow into one assembly, there should be a minimum of 5-foot separation between the

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

meter and backflow prevented. A (RP) Reduced Pressure Principle Backflow Preventer shall be installed as standard containment protection. Any backflow prevention assembly other than an (RP) must have written approval from the Water Services Department. Installation of secondary backflow protection shall be in accordance to City of Peoria Standard Details PE-351-1&2, PE-352-1, PE-353-1&2, and/or PE-455.

Internal (or primary protection) may be required within the potable water system of a facility at the point of use to isolate potential internal hazards. Internal backflow assembly requirements will be determined during the plan review process. Installation of internal backflow assemblies shall be in accordance to City of Peoria Standard Detail PE-352-2.

A. Installation & Inspection

- All backflow assembly installations shall be in accordance with International Plumbing Code, latest adopted edition, and current City of Peoria Code. Installation shall be completed by a qualified licensed contractor and comply with current City of Peoria Standard Details. Backflow assembly testing may only be conducted by City of Peoria Recognized Testers (Refer to Quick Links).
- A final inspection will be required by a member of the Environmental/Building Safety Division prior to the issuance of a Certificate of Occupancy.

B. Fire Systems

- All American Water Works Association classes 1, 2, and 3 fire systems six (6) inches in size and larger or any system 3- inches in size and larger constructed of a piping material not approved as a potable water system material per the International Plumbing Code, latest adopted edition, shall have a Double Check Valve (DC). All American Water Works Association classes 4, 5, and 6 shall have a (RP). In all other circumstances a (RP) is required.
- Proposed fire lines less than 6-inches in size require special approval. If approved, all fire line services less 6- inches in size and in excess of one hundred fifty 150 feet from mainline tie-in to fire riser shall have at a minimum a (DC) located as close as possible to the property line or mainline tie-in. Fire lines less than 150 feet from the main line tie-in shall have a Double Check Valve (DC) installed on the fire riser. Fire line backflow prevention assemblies shall be installed according to City of Peoria Standard Details 351-1&2 and/or 353-1&2. The Water Services Department and/or the Fire Community Services Division shall provide final approval for all backflow prevention assemblies and configurations. Fire sprinkler systems must be sized to allow for a minimum 10 psi head loss plus the losses associated with all fittings, valves, elbows, risers and additional appurtenances.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List

Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

8.9.11 Air Release Valves

Air release valves will be installed at all changes in slope of waterlines 8 inches or larger in diameter, as follows:

- When waterline changes from a positive slope to a zero slope, or a negative slope in the primary direction of flow
- When waterline changes from a zero slope to a negative slope in a primary direction of flow;
- For vertical alignment changes to cross under or over another facility, such as utility, drainage washes, etc.
- Air release valves may be omitted if service taps or fire hydrant laterals are located to allow for the elimination of air.
- Slopes less than or equal to 0.002 ft. /ft. shall be treated as zero slopes. In the absence of any changes in slope, air release valves will be installed not more than 2,640 feet apart.
- All air release valves will be a combination air/vacuum release type per City of Peoria Standard Detail PE-395.

Air release valves will be installed on 6-inch waterlines under the following circumstances:

- At the high point of the line if no lateral, fire hydrant, or water service connection is proposed at that location to adequately remove trapped air.
- For vertical separation and vertical alignment for crossing under or over another facility, such as utility, drainage washes, etc.

8.9.12 Thrust Restraint

Mechanical Thrust Restraint may be provided with U.S. Pipe TR FLEX, Griffin, SNAP-LOK RJ pipe or American Ductile Iron Flex-Ring Joint Pipe. Joint restraint may be provided with Meg-a-Lug or equivalent, as approved by the Engineering Department.

Thrust Blocks will be concrete only per MAG Standard Details 301 and/or 340 and Class “B” concrete per MAG Specification 725.

8.9.13 Tracer Wire

Final plans shall call out tracer wire (#6 coated copper wire) on all new water pipelines.

8.9.14 Removal/Abandonment

Removal of asbestos cement pipe (ACP) shall be in accordance with EPA National Emission Standard for Hazardous Pollutants (NESHAP), ADEQ and MCESD requirements.

If abandonment is allowed submit abandonment plans to include filling procedure for filling the abandoned pipe and the proposed slurry mixture to be used. All abandoned pipes must be shown on the as-built drawings and marked appropriately.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

8.9.15 Dead End Waterlines

- The maximum length for a dead-end waterline is 400 feet unless approved in writing by the Engineering Department.
- Capped dead-end lines will be fitted with a flushing pipe per MAG Standard Detail No. 390, Type B or a flushing assembly per City of Peoria Standard Detail PE-410 or a fire hydrant per City of Peoria Standard Details.
- An automatic flushing valve will be required on dead end transmission mains per City of Peoria Standard Detail PE-410. Automatic flushing valves will also be required on dead end waterlines exceeding 400 feet in length. Automatic flushing valves are to be connected to a water meter and discharge to the sanitary sewer.

8.9.16 Design Flow & Head Loss

The ultimate design flow within the City's water transmission and distribution system will be based on the City's current IWUMP. Water demand for each development will be calculated using the average day demand factors, as described in **Section 8.2.1**, to ensure that the existing distribution supply is sufficient. Designs will include all necessary improvements, including booster pumping stations, reservoirs, lines and appurtenances to meet the system's ultimate demand.

1. The four hydraulic modeling scenarios detailed in **Section 8.7.1** will demonstrate that the system is adequately designed.
2. The maximum allowable pipe head loss for the various water pipelines is as follows:

    - Transmission mains: 8 feet per 1,000 feet (3.5 psi per 1,000 feet)
    - Distribution lines: 10 feet per 1,000 feet (4.3 psi per 1,000 feet)
    - Service lines - domestic, dedicated fire, or combined domestic/fire: size as required to satisfy both hydraulic modeling requirements and Fire Code. Generally, velocities of more than 5 feet per second are undesirable. Velocities more than 7.5 feet per second are not allowed.
    - As otherwise designated by the Water Services Department

8.10 Fire Protection

8.10.1 Fire Hydrants

Fire hydrants shall be per City of Peoria Standard Details PE-360-1 (residential) or PE-360-2 (non-residential), as applicable. All of the hydrants that are connected to the City of Peoria distribution system must be public hydrants.

A. <u>Number of Hydrants Required</u>

- The minimum required fire flow and minimum required number of fire hydrants are per Table B105.1 and Table C105.1 from the International Fire Code, approved edition.
- Reduction of fire flow up to 50% is possible, but not automatic, when the buildings have fire sprinkler systems installed. Formal request in writing shall be made to the Fire Department. Please include information of water availability, water purveyor, total building square footages, proposed

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

usage, construction type of the buildings, sprinkler system information, and water storage information (if applicable). If approved, the Fire Department will issue a Fire Flow Reduction approval letter.

- Fire hydrants shall be installed on all dead-end lines as close to the end as possible.

B. Hydrant Spacing

1. Residential
   - 500-feet maximum in a single-family residential development.

2. Non-Residential
   - Average Spacing shall be per Table C105.1 of the 2006 IFC, except for Fire-Flow up to 5000 gpm, the average spacing shall be 300-feet.
   - 300-feet maximum in a multi-family residential development.
   - 300-feet maximum in commercial/industrial areas.

3. Collector Roads
   - 1000-feet maximum
   -
4. Arterial streets with 4 or more traffic lanes; Roadways with a traffic count of more than 30, 000 vehicles per day; or Roadways with median dividers:
   - 1000-feet maximum spacing on each side of the road in alternating positions, resulting in a hydrant every 500 feet along the roadway.

5. For higher risk protection, determination shall be made by the Fire Department, regarding fire hydrant spacing, flow and pressure requirements.
6. Fire hydrant runs in excess of 100-feet in length require 8-inch diameter waterlines and additional valves.

C. Private Hydrants: (owned and maintained by Private Water Companies)

Hydrants proposed in the service area of a private water company shall adhere to all City of Peoria standards unless otherwise approved by the Fire Department.

D. Materials

Materials allowed for construction in Peoria shall be per Maricopa Association of Governments, Uniform Specifications and Details for Public Works Construction and **Table 8-9**.

TABLE 8 - 9 HYDRANT TYPES AND ALLOWABLE MATERIALS

TYPE	ALLOWED MATERIALS
Fire Hydrants	➢ Wet Barrel – AVK, Clow Jones and Mueller ➢ Break-Off Check Valves – Clow Model LB400 or AVK Series 2488 Flowguard II

E. Markers

- Markers shall be as specified in City of Peoria Standard Detail PE-362.
- Hydrant Markers are required for all public or private hydrants.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

8.10.2 Fire Flow Test

Fire Flow Tests shall be in accordance with the City of Peoria Fire Flow Testing Procedure as published by the City of Peoria Fire Department on the City of Peoria website.

In order to accurately predict the strength of the distribution system a fire flow test is required. The flow test results are valid for 180 days.

Flow tests are not provided by the City. The developer shall be responsible for obtaining a qualified testing agent. Test results must be prepared by a registered engineer in the state of Arizona or by an individual or firm with a level II NICET certification in Fire Sprinklers.

It is required that the Fire Department observes the test and acknowledges approval of the flow. Contact the Fire Department to schedule the observation of the flow test.

8.11 Water Resources and Conservation

The criteria for guiding management of the essential and finite water resources available to the City of Peoria are The Principles of Sound Water Management.

8.12 Consultant Deliverables

A. Plans

All plans shall be prepared per requirements in Chapter 3.

B. Utility Reports

Refer to the Planning and Community Development Department process guide and the IWUMP

- Preliminary Water and Sewer Analysis Report
  This is used to determine the potential impact that the development would have to the existing water and sewer infrastructure. This report will also be used to verify that the proposed density and water use of the proposed development is consistent with the City's general plan and the City's water allocation for the proposed parcel.

- Master Water and Master Sewer Reports
  When required this report should show the infrastructure required for the utilities in the development to function per City of Peoria standards. Individual Final Water and Final Sewer Reports will be required for each parcel at the time of submittal. Individual phased reports should be consistent with the data, calculations, and assumptions shown in the Master Reports.

C. Approval to Construct (ATC) Application

Completed with signatures should be submitted during plan review. Sign-off from the "public water supply provider" on page 2 of 3 the Approval to Construct (ATC) will be issued by the Water Services Department after the ATC application has

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

been submitted and will not be provided until the utility plans are substantially approved.

D. Approval to Construct (ATC)

A copy of the Approval to Construct (ATC) issued by Maricopa County Environmental Services Department (MCESD) and the cover sheet signed by MCESD must be submitted to Engineering prior to receiving final plan approval from the City.

8.13 Construction and Acceptance

8.13.1 Water Infrastructure Construction

All construction shall be per the latest MAG Uniform Standard Details and Specifications for Public Works Construction and subject to City of Peoria modifications, as outlined in this Manual.

A. Tie-ins

Construction plans shall indicate that any tie-ins to the existing, active system shall be made only after completion of all new work and written approval of the City Engineering Inspector.

B. Pressure Testing

Pressure testing of new mains shall be by the contractor per MAG Section 610.15 and documented on City forms (available from the City Engineering Inspectors), except fire sprinkler lines. Fire sprinkler lines shall be tested per the Uniform Fire Code adopted by the City. Water usage for line filling is to be reported to the Water Services Department on City forms.

C. Chlorination, Flushing and Bacteriological Testing

Chlorination and flushing of new mains shall be performed by the contractor per MAG Section 611 and Part V of ADEQ Engineering Bulletin No. 8, except as stated below.

- Before being placed in service, all newly installed pipe, valves, hydrants, and appurtenances shall be flushed, disinfected, kept clean, and will be sampled for acceptable bacteriological analysis.
- Newly installed waterlines will have a sample taken from each and every 500-foot interval, and at each end. For each hydrant lateral over 18-feet in length, a sample will be taken at the hydrant end. Hoses for sampling will not be allowed. On new waterlines without hydrant, temporary sampling taps shall be provided, and then removed and plugged after acceptable bacteriological results are received. Hydrant used for sampling shall be fitted with an approved sampling tap.
- The Contractor shall coordinate with the Engineering Department for the location of sampling taps.

1. Pre-disinfection Flushing
   - Pipe shall first be flushed to remove any solid or contaminated material. Flushing velocity shall be at least 2.5-feet per second in the

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

pipe. Flushing period shall be at least 5 minutes for every 150-feet of new pipe but in no case less than 30 minutes.

- One 3" hydrant meter will, under normal pressure of 40 psi, provide this velocity in pipe sizes up to and including 8-inches.
- For pipe sizes exceeding 8-inches diameter, additional hydrant meters will be needed to provide the required flow as shown in **Table 8-10**.

TABLE 8 - 10 REQUIRED FLOW TO FLUSH WATERLINES

Pipe Diameter (inches)	Flow Requires (gpm) to Produce 2.5 feet per second (fps) Velocity in Waterline	Number – Hydrants Required
12	900	2
16	1600	3
24	3600	7

2. Final Flushing and Testing

Following chlorination, all treated water shall be flushed from the pipe until the replacement water treated throughout its lengths shows an absence of chlorine. If chlorine is normally used in the source of supply, tests shall show a residual not in excess of that carried in the system. Flushing velocity shall be at least 2.5-feet per second in the waterline. Flushing period shall be at least 5 minutes for every 150-feet of new waterline but in no case less than 30 minutes. All hydrants on the new waterline shall be flushed to remove excess chlorine from the hydrant and hydrant branch.

3. Documentation

Document on City forms (available from the City Engineering Inspectors). Samples will be taken and tested by the City. Water usage for line filling and flushing is to be reported to the Water Services Department on City forms.

D. Protection of Monuments

The Developer is responsible for protecting and restoring if damaged, construction survey stakes and property corner monuments used by the City to locate the water services.

E. Water Service Installations

Requirements for lowering, extending and relocating meters are as follows:

- A construction permit is required for any work on the City water system regardless of the location of the facility. Construction permits can be obtained through the Engineering Department.
- The contractor or licensed plumber, shall obtain permission from the Meter Services Division to complete all work including meter disconnects and reconnects.
- Materials shall be copper and bronze in accordance with City of Peoria Standard Detail PE-363.

QUICK LINKS
Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List
Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

- The Contractor's representative shall be responsible for water customer notification.

F. Fire Hydrant Setbacks and Waterline Relocations

All work shall be done by contractor including chlorination and testing requirements that apply to this type of work. Contractor shall not operate valves. Representatives of the Water Services Department are the only personnel authorized to operate water valves on the City's existing water system.

G. Switch-overs/Abandonments

Work will be done by contractor after written authorization by the City Water Services Department. Follow City of Peoria "Abandonment of Facilities in the City's ROW Policy.

H. Asbestos – Cement Pipe

All work on asbestos-cement pipe shall be in accordance with AWWA 20406 Work Practices for Asbestos Cement Pipe and OSHA's Asbestos Standard for construction, 1926.1101.

8.13.2 Water Infrastructure Acceptance

Copies of the following documents must be submitted to the Engineering Department prior to acceptance of the waterline(s) by the City. Refer to Chapter 2 of this document for as-built requirements. Final Letter of Acceptance (FLOA) will be released by the City of Peoria Engineering Department after all other items have been completed.

- "Water Accounting Form" indicating all water quantities used for line fill, flushed quantities and any other water used not recorded by water meters.
- Waterline Flushing documentation.
- Waterline Pressure Testing documentation.
- Residual testing.
- Waterline Disinfection and Bacteriological Testing documentation certified by a State of
- Arizona Registered Water Distribution Operator including laboratory analytical results.
- A copy of the "Engineer's Certification of Completion".
- A copy of the "Certificate of Approval of Construction" (AOC) issued by MCESD.

QUICK LINKS

Integrated Water Utilities Master Plan

International Fire Code (Amended)

Peoria City Code Chapter 25

ADEQ Bulletin 8

ADEQ Bulletin 10

MCESD

City of Peoria Request for Waiver

Recognized Testers List Water Distribution System Shut Down Request Form

Principles of Sound Water Management

Water System Pressure Zones (IWUMP 2015)

Future Pressure Zones (IWUMP 2015)

9. WASTEWATER INFRASTRUCTURE DESIGN

9.1 General Information

This Chapter provides ordinance, policy and standards for establishing design criteria for constructing and modifying wastewater systems facilities to be owned and operated by the City. Wastewater system facilities include the: sewer lines (gravity and force mains), lift stations, chlorine flushers, odor control sites, and all other appurtenances required for proper treatment, conveyance and disposal of wastewater within the system.

The information provided in this Chapter is not intended to cover all situations that arise but shall provide general guidance. This is not a substitute for sound engineering principles.

Refer to the Quick Links in this Chapter for additional information and guidance when design water infrastructure systems in the City of Peoria. Contact City staff for specific utility facility design guidelines through the Site Development process.

9.2 City Code, Standards and Master Plan

It is the responsibility of the design engineer to review the most current edition of the Integrated Water Utilities Master Plan (IWUMP) and determine what additional wastewater infrastructure is necessary to serve the proposed development. The Water Services Department will utilize the most current edition of the IWUMP and operational knowledge of the system to determine which facilities or upgrades are the required.

The criteria for development of wastewater infrastructure in the City of Peoria shall be in conformance with:

- The most current edition of the IWUMP. Copies of the IWUMP can be requested through the Public Records Request Process.
- Various City codes, including, but not limited to Chapter 25 of the City of Peoria Code apply to the development of the municipal water system and contain information regarding the development in association with land development.

9.2.1 System Requirements

The following table (**Table 9-1**) is from the 2015 IWUMP and shall be utilized for wastewater system design with the City. It is the responsibility of the user to verify the most recent and updated information.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

TABLE 9 - 1 ADJUSTED UNIT WASTEWATER LOADS BY LAND USE TYPE (IWUMP-2015)

LAND USE TYPE	UNIT WATER DEMAND (gpad)	WATER TO WASTEWATER FACTOR[1] (%)	UNIT WASTEWATER LOAD (gpad)
COMMUNITY COMMERCIAL	1177	70%	824
GOLF COURSE	487	0%	0
INDUSTRIAL	700	70%	490
PARK/OPEN SPACE	1251	0%	0
SCHOOLS	1251	70%	876
PUBLIC/QUASI-PUBLIC	1128	70%	790
REGIONAL COMMERCIAL	1314	70%	920
RESIDENTIAL/ESTATE (0-2.0 DU/AC)	704	**35%**	246
RESIDENTIAL/LOW (2.0-5.0 DU/AC)	1849	**35%**	647
RESIDENTIAL/MEDIUM (5.0-8.0 DU/AC)	1921	**45%**	864
RESIDENTIAL/MEDIUM HIGH (8.0-15.0 DU/AC)	2457	**60%**	1474
RESIDENTIAL/HIGH (15.0+ DU/AC)	3000	**60%**	1800
MIXED USE – LOW INTENSITY	1484	65%	965
MIXED USE – HIGH INTENSITY	3000	70%	2100

NOTE:

(1) Represents the percent of water demand estimated to become wastewater. Values shown in bold test were adjusted lower that the system values to apply to new development wastewater flows and consequently reclaimed water produced.

9.3 Federal, State and County Regulations

A. Arizona Department of Environmental Quality (ADEQ)

Engineering Bulletin No. 10, "Guidelines for the Construction of Wastewater Systems" published by the Arizona Department of Environmental Quality (ADEQ), and Arizona Administrative Code, "Title 18 - Environmental Quality," contain specific requirements for submittals, approvals, and notifications when extension of a public sanitary sewer line is proposed.

B. Maricopa County Environmental Services Department (MCESD)

MCESD is required to review and approve all public sanitary sewer line extensions and construction of wastewater related facilities within the City's service area, prior to the City approving the final plans.

As stipulated by the Maricopa County Health Code, all sewage systems including the installation of septic tank systems require an "Approval to Construct" document, which is issued by the MCESD.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

MCESD also requires a Sewer Service Agreement be executed by the City of Peoria for all industrial and residential subdivisions including condominiums.

9.4 Agreements

The City of Peoria will issue a letter to Maricopa County Environmental Services Department acknowledging that the City has adequate capacity in the public sanitary sewer system to serve the proposed development. The Engineer shall submit the request for the acknowledgement letter to the Peoria Water Services Department. Development of this letter shall be contingent upon the information provided in the Preliminary Sewer Report.

9.5 Requirements to Connect

All developments, including single-family residences, are required to connect to the City's wastewater system per Peoria City Code, Chapter 25.

Waivers to this requirement may be granted by the Water Services Department if the public sewer is determined to not be available to the subject property per the City's waiver process outlined in **Section 1.8**. Typical waiver considerations include the following:

- The applicant demonstrates the inability to obtain necessary easements upon reasonable pursuit.
- There is not adequate capacity or depth in the existing public sanitary sewer.

9.6 Design Reports

Water and/or Wastewater Basis of Design (BOD) reports for new development, redevelopment, or modifications may be required as described below.

Note that for larger master planned communities, phased developments, and rezoned properties a more extensive IWUMP may be required to evaluate offsite water availability and infrastructure needs. Discuss this issue with your assigned Site Development Representative.

When is a water and/or wastewater BOD Report required?

- Except in those cases as described below, separate water and wastewater BOD reports shall be required to be submitted, reviewed, and ultimately accepted as "Final" by the Water Services Department for all new residential, commercial, or industrial development or redevelopment that may impact water and wastewater physical infrastructure, capacity, or availability. Note that, in some cases, only a water or wastewater BOD may be required.
- New development or redevelopment shall not require submittal of a formal BOD report(s) when officially directed as such by the Water Services Department. This is typically applied in cases where there is little to no concern regarding the impact on water and/or wastewater capacity created by the new development/redevelopment, and no special engineering or planning accommodations or analysis is anticipated to be required to supply water and sewer service in accordance with City requirements.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Note that the Water Services Department may stipulate additional supplemental information in lieu of, or in addition to, a BOD report to satisfy any concerns or questions they may have.

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Are there different stages of the water and sewer BODs and at what development stage are they typically submitted?

- Generally, preliminary BOD's are required to be submitted and approved during any proposed rezoning cases.
- Generally, final BOD's are required to be submitted and approved during the preliminary plat or development review phase.
- Note that the Water Services Department may stipulate additional supplemental information in lieu of, or in addition to, a BOD report to satisfy any concerns or questions they may have.

9.6.1 Preliminary Basis of Design Reports

Preliminary basis of design reports will evaluate a site's existing and proposed sewer demands to determine if adequate line capacity exists to sewer the development or if additional infrastructure will be required.

1. Preliminary BOD Report Format
   The Preliminary BOD report(s) shall generally include the following items:

   - Basic text description of existing conditions, proposed development and relevant details, and proposed utility modifications.
   - An estimate of existing and proposed sewer demand.
   - A preliminary site/utility plan showing the following:

     - Proposed building(s) and details: units, square footages, finished floor height, etc.
     - Onsite sewer line layout with relevant appurtenances and site features e.g. manholes, service laterals, clean outs, taps, etc.
     - Existing utilities to the extent possible to demonstrate appropriate water or sewer routing
     - Proposed connection to existing water and sewer (extend from building)
     - Any proposed new utilities or modifications, especially water and sewer
     - The applicant should only show information that has been field verified or gone through preliminary design i.e. no purely conceptual layouts.

   - Any additional analysis determined necessary by the Water Services Department will generally be discussed in the pre- application meeting but may also be required subsequent to the preliminary BOD submission and may include requirements to complete tasks such as hydraulic analysis/modeling and offsite analysis so that any resulting requirements can be accurately stipulated.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Note that the Water Services Department will require revisions and resubmission of preliminary BODs that do not meet the necessary requirements

2. Report Submittal Requirement
   Final Basis of Design Reports must be reviewed and accepted by the Water Services Department prior to approval by the Development Review Board (DRB). Final Water BODs shall provide an analysis of a development's impact on the local wastewater distribution system and verify conformance with City requirements. These reports are reviewed and accepted by the Water Services Department then utilized by Plan Review as support for their review of the formal submitted construction drawings/plans. The report's objective is to demonstrate the following (as applicable):

   - Design conformance with the City's current IWUMP
   - Prove that there are no hydraulic or technical limitations or deficiencies with the proposed design
   - Conformance with the City's design and development criteria and standards

   The Final BODs shall generally include the following items:

   - All relevant information required for a preliminary BOD as-noted above but updated to reflect final design status.
   - An updated sewer flow monitoring data if current data is more than 1-year old.
   - Sewer hydraulic modeling information and results as detailed below.
   - Updated Final site/utility plan with the elements described under the preliminary BOD section above.
   - Any information related to comments or items the Water Services Department noted or required on the approved preliminary BOD (if one was submitted)
   - Note that the Water Services Department will require revisions and resubmission of Final BODs that do not meet the necessary requirements.

9.6.2 Final Basis of Design Reports

Final Basis of Design Reports shall provide an analysis of a development's impact on the local sewer system. These reports are reviewed and accepted by the the Water Services Department then utilized by Plan Review staff as support for their review of the construction drawings. The report's objectives are to demonstrate design conformance to the City's current IWUMP and/or established local conditions.

Design Policy

A Professional Civil Engineer currently registered in the State of Arizona must analyze new development that will impact the City's sewer system. The effects of multiple scenarios shall be evaluated to ensure that sufficient capacity is available per the pipe design criteria described elsewhere in this Chapter and that the proposed sewer system design and sizing are adequate for the development. The

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

Final BOD Report shall provide supporting map detail to serve as a master utility plan for the project.

General Final BOD Report Format Guidelines

- Digital submissions of all documents are preferred as single, combined, and indexed PDF files.
- If hard copies are submitted, then two BOD report copies shall be submitted as letter-sized (8 1/2 x 11) and comb bound.
- Provide a table of contents.
- Maps and other supporting materials shall be 11x17 and attached as an appendix at the end of the report.
- Reports must be sealed, signed, and dated on the cover by a Professional Engineer currently licensed to practice in the State of Arizona.

Report Cover & Vicinity Map

Covers shall include:

- The development's name, full address, and City case number.
- The developer/owner name, address, and phone number.
- The engineer or design firm's name, address, and phone number.
- The original BOD submittal date and any subsequent revision dates.
- A vicinity map to identify the project's location with respect to major cross streets and City quarter- section (alternatively this can be placed on the first page of the report after the TOC)

Introduction

- Summarize the proposed development including the number of residential units, square footages of non-residential development and intended use, and related site improvements.
- Summarize any previous site development.

Existing Conditions

- State the existing zoning and land use.
- Describe the existing, topography, vegetation and landform features.
- Include a description of existing utilities in the vicinity.
- Summarize and attach the results of any certified sewer flow monitoring.

Proposed Conditions

- Describe the proposed connection(s) to the City's sewer system.
- Describe general depth of the sewer to accommodate the building pads.
- Describe any proposed drop structures and measures taken to minimize development of odors.
- State reasons for any shallow or steep sewer slopes approaching the allowable sewer grades stated elsewhere in this Chapter.
- Describe the need and method of sizing for any grease or sand/oil interceptors.
- Address maintenance responsibilities of the proposed sewer system.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

Required Design Documentation/Computations/Hydraulic Modeling

- Include a discussion of which design procedures, policies and methodologies will be incorporated into the engineering of the wastewater system.
- List the title and version of any software used in the design analysis.
- Base wastewater flows on the unit demands listed in IWUMP or other sources acceptable to the Water Services Department. Verify any variance from the stated design flows with the Water Services Department.
- Give particular attention to wastewater peaking factors used for restaurants or specialty developments.
- For developments that will have a swimming pool(s) or water features, provide calculations that show the backwash or drain rate and include in the evaluation of the wastewater collection system.
- Calculated pipe data include ID, upstream and downstream nodes, invert elevations, pipe material, slope, length, diameter, Manning's n-value, peak flow, flow depth, flow depth/diameter ratio, actual flow velocity, full flow design capacity and average pipe cover.
- Provide calculations for the sizing of grease interceptors or sand/oil interceptors.
- Include a scour analysis when crossing washes with flow greater than 499 cfs.

Summary

- Summarize the proposed sewer improvements stating that all the City's design standards and policies have been met or note why the developer is requesting any variance or exception.
- Include a brief project schedule indicating the proposed start and completion of the developer's improvements.
- State any intent to request a credit, oversize or payback agreements along with a description of the applicable sewer infrastructure.

Supporting Maps

- Include a scaled site plan showing all existing and proposed utility lines and all existing and proposed improvements including line sizes and service locations. Provide separate maps if site demolition involves significant removal of existing utilities and improvements.
- Screen existing topography and clearly label all existing and proposed contours, or provide spot elevations with sufficient information to evaluate pipe cover.
- Indicate locations of grease interceptors or sand/oil interceptors.
- Show, dimension and label all property lines, rights-of-way, tract and easement lines.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

9.7 Wastewater Infrastructure

9.7.1 Lift Stations

Lift stations and force mains are typically designed and constructed by the City through its Capital Improvement Program. Developers needing to construct these facilities must contact the Water Services Department and request a meeting.

9.7.1 Wastewater Lines

The City's sewer system includes four classifications of wastewater lines, which are determined by use or location within the system, identified in **Table 9-2.** Wastewater lines shall be sized to accommodate their ultimate service area. Larger mains may be required dependent upon the maximum flows anticipated with full development of the ultimate service area, with additional consideration given to land use.

TABLE 9 - 2 WASTEWATER LINE FUNCTIONAL CLASSIFICATIONS

Functional Classification	Size	Description
Interceptor	*	• Receives flows from a number of trunk sewers, and lateral sewers, and conveys such wastewater to a point for treatment or disposal • No service connections are allowed into interceptor sewers.
Trunk	15-inch and greater	• Receives flow from lateral sewers and connects to an interceptor sewer. • Trunk sewers may have some limited connections to services.
Lateral	8-inch 12-inch	• Collects flow from one or more services and discharges to another lateral sewer or a trunk sewer.
Service	**	• Extends and connects the customer's private building sewer to the lateral sewer. • Shall not be located under driveways or under concrete aprons adjacent to driveways.

*Size varies (large)
**Size varies (small)

The minimum size line for any public main is 8- inch diameter. Nonstandard sizes will not be allowed unless approved by the Water Services Department.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

9.8 Wastewater Line Design Standards and Guidelines

9.8.1 Location

All sewers shall be parallel to the centerlines or as close to parallel as possible. Wastewater lines within the City shall be in the locations shown in **Table 9-3** unless otherwise approved:

TABLE 9 - 3 WASTEWATER LINE LOCATIONS

Street Classification	Location
Major Arterial Streets and Limited Access Parkways	• Must be approved by the Water Services Department.
Minor Arterials	• 13-feet to the south or west from the centerline
Collector Streets	• 6-feet to the south or west from the centerline
Local Streets	• 6-feet to the south or west from the centerline • For curvilinear streets the offset from the street centerline can range from 6 to 9-feet south or west.

In cases where public sewers are authorized outside of public rights-of-way, all such sewers shall be centered and parallel to the property lines or as close to parallel as possible.

Vertical and horizontal separation from water lines shall be in accordance with MAG Section 610.5 and MAG Standard Detail 404-1. Minimum horizontal separation from the sewer line to other underground utilities shall be 6-feet.

Public sewer lines will not be permitted within the limits of retention/detention basins and their appurtenances.

Curved sewers are prohibited.

9.8.2 Rights-of-Way/Easements

Sewer easements are to be dedicated for the specific use, maintenance and repair of the sewer line, and any associated appurtenances. Sewer easements are to be dedicated as part of a Final Plat or by separate instrument with written approval from the Engineering Department.

- Sewer lines shall be located within public rights-of-way or centered within a 20-foot wide easement dedicated for sewer line, or within a 30-foot wide easement (minimum width) dedicated for both water and sewer lines. Larger easement widths with a minimum clear width equal to twice

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

the depth of cover will be required for deeper installations as determined by the Water Services Department.

- No other parallel utilities shall be located within the public water or sewer easement.
- Underground retention and above ground retention basins are not permitted to cross or be within designated public water or public sewer easements.
- Trees and substantial plantings are not permitted within designated public water or public sewer easements where the easement provides primary access to the utilities. Plantings must typically be at least 5' from the centerline of the pipeline.

9.8.3 Cover and Depth

Wastewater facilities' cover and depth requirements are as follows:

- Maximum depth for sewer lines and manholes shall be 12-feet, unless detailed loading calculations and materials selection is approved with the written request by the Developer's Design Engineer to the Engineering Department and with written approval by the Water Services Department. The proposed design shall be submitted to the Engineering Department for review.
- When connecting to an existing manhole, verify that there is an existing base and channel to accommodate the new sewer connection. If necessary, construct a new manhole base with channel in the existing manhole.
- All laterals shall have a minimum of 5-feet of cover measured from finished grade to the invert of the lateral. During construction the depth of cover may be less than 5-feet, such as during preparation of street sub-grade, installation of foundations, culverts or utilities.
- All trunk sewers and interceptors shall have a sufficient depth to serve the ultimate service area with a minimum cover of 6-feet.

A. <u>Encasements or Casing</u>

Extra protection per MAG 610.5.5 and Standard Details 404-1, 404-2, and 404-3 is required:

- Where cover is less than 4-feet (due to topography or potential conflicts with facilities such as canals, washes, or rivers).
- Where the bottom of any irrigation, storm drain, sanitary sewer, force main or other gray water pipe is less than 2-feet over the top of the sanitary sewer.
- Where a sanitary sewer crosses less than 2-feet above any water line, force main or pressure main.
- Where wastewater lines pass under a significant structure greater than 10-feet wide such as box culverts, railroads, highways, canals, etc. The sewer line(s) shall be installed inside a pipe casing as approved by the Engineering Department.
- As deemed necessary by the plan reviewer.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

9.8.4 Pipe Material

The design engineer must specify the exact pipe material in the construction drawings that are in accordance with the City approved pipe materials in **Table 9-4**. Modifications to the pipe material will require a formal plan revision and must be approved by the design engineer and the City of Peoria.

TABLE 9 - 4 WASTEWATER PIPE MATERIALS

TYPE	ALLOWED MATERIALS
Sewer Line	➢ Vitrified Clay Pipe (VCP) 8" and Larger – conformance with MAG Standard Specifications, as amended ➢ PVC SDR 35 Sewer Pipe 8" through 15" diameter – Conformance with MAG Standard Specifications, as amended ➢ SCH-40 PVC – Sewer Service Pipe
Sewer Force Main	➢ PVC AWWA C-900, DR14 or DR 18 for 12" diameter or less ➢ Ductile Iron Pipe with approved lining for 12" or greater diameter or 10' or greater depth

9.8.5 Bedding and Backfill

Refer to City of Peoria Standard Detail PE-401. Bedding compaction densities shall be per MAG Specification Table 601-2. Specially designed and alternate beddings may be approved on a case by case basis by the Engineering Department.

Minimum trench backfill requirements shall be Type I per MAG Specification 601.4.3, with compaction densities per MAG Specification Table 601-2. Backfill requirements provided by the Developer's Design Engineer shall apply, when such provisions are more restrictive than MAG Specification.

Within the existing pavement section of public streets, the backfill shall be ½ sack Controlled Low Strength Material (CLSM) per MAG Specification 728. Pavement replacement type and compaction type shall be indicated per MAG Standard Details and Specifications on each sheet or as modified in the City of Peoria General Notes.

Pavement sawcuts shall be in straight lines parallel to the trench, to a depth which exceeds the pavement thickness. Sawcut lines shall be a minimum of 100-feet in length before a jog in the alignment of the sawcut is permitted.

9.8.6 Wash Crossings

All wash crossings will be constructed using restrained joint ductile iron pipe with an approved lining. Bury requirements to place sewer lines under washes or channels shall be based upon the 100-year peak design discharge (Q_{100}) in the channel or wash.

Scour depth will be estimated using Arizona State Standard Attachment (SSA) 5-96, Guideline 2, Level I, as published by the Arizona Department of Water Resources. The engineer will estimate the depth of scour and design the top of

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

pipe to conform to Section 6-1.413 of SSA 5-96. The engineer shall submit the scour analysis with the final plans.

All pipelines located within the scour zone must be protected by installing a cut-off wall, downstream of the pipeline to stabilize the scour depth. Cut-off walls will be structurally designed to the scour conditions calculated. The developer is responsible for obtaining any permits required from the Army Corps of Engineers, Flood Control District of Maricopa County or other agency prior to plan approval.

9.8.7 Slopes and Design Flows

Sewer pipe design requirements are as follows:

- Pipe slopes are to maintain a minimum mean flow velocity for pipes flowing full of 2.0 feet per second for all diameters except for 8-inch for which the minimum slope is 2.5 feet per second. The maximum mean flow velocity for pipes flowing full is 8 feet per second.
- The minimum slope for an 8-inch sewer line is 0.50% (0.005 feet per foot).
- At "end of the line" sewers (the portions of sewer lines between the last two manholes), the slope of sewers serving less than 30 households shall be 0.76%, and that of sewers serving less than 10 households shall be 1.00%.
- The "n" value of the pipe shall be 0.013 for all new construction.
- Actual velocities shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.
- The sanitary sewer system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.
- The depth to diameter (d/D) ratio for gravity sanitary sewer pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.
- The d/D ratio for gravity drains greater than 12 inches diameter shall not exceed 0.70 for the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.
- Measures to mitigate hydrogen sulfide shall be analyzed at manhole drops, abrupt changes in pipe slope or direction and at changes in pipe diameter.

Private on-site sewer lines shall be constructed of materials and at slopes as specified in the City of Peoria adopted Plumbing Code.

9.8.8 Manholes

Generally, the intent is to avoid locating the manhole covers so that wheel line of normal traffic does not track over the casting. The location for the covers and lids should not be closer than 6-feet from the street drainage flow line or gutter line.

No part of any manhole shall be located any closer horizontally than the depth of cover or 6-feet, whichever is greater, from any wall, fence or structure, etc.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

Manholes shall be per MAG Standard Details and Specifications with the following design requirements:

- Lateral pipes shall not enter a manhole at an angle greater than 90 degrees to the sewer trunk line.
- Manholes with a through line shall have the invert on a continuous slope or a minimum 0.10-foot drop through the manhole.
- Manholes with a line intersecting the through line: the intersecting line invert shall be a minimum of 0.10 foot above the flow line of the through line. The lines shall intersect at not more than a 90-degree angle.
- Manholes on boundaries of the subdivision or improvement district shall have stubs with shaped inverts in appropriate directions for future connections.
- Manholes which exceed 10 feet in depth shall be 5-foot in diameter, without steps.
- Epoxy coating of manhole interior walls and bases, including bench and channel, is required for manholes that have at least one of the following criteria:
    - 10-feet or greater in depth
    - 5-foot in diameter (and larger)
    - located in an Arterial Road
    - located in a non-residential service area
    - force main outfalls
    - as required by the Water Services Department
- Coating materials and installation shall be per the following allowed materials:
    - RLS Raven 405
    - Joseph Painting Sewer Shield 101
    - Neopoxy NPR-5300
    - Sauereisen Sewergard No 210
    - Epoxy coated manhole base and coating system with a minimum wet film thickness of 125 mils
- All sanitary sewer manholes shall be installed with gasket, joint sealer, or water stop between the base and riser section as approved by the Engineering Department.
- In all cases the rim elevation shall be a minimum of 0.10 feet above the flow line of the roadway gutter to prevent stormwater infiltration into the sanitary sewers.
- All Private Sewer Manholes lids shall have “Private Sewer” labeling, and shall not be labeled “City of Peoria”.
- Brick manholes are prohibited.
- All manholes located outside of roadways shall have locking lids and have a “Curve- Flex” Utility marker manufactured by Carsonite or approved equal.
- Manhole steps are prohibited

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Drop manholes will be allowed only if the pipe slopes exceed maximum slope requirements and if approved by the Engineering Department. Construction of drop manholes shall comply with MAG Standard Detail 426.

A. Spacing

- Manholes are required at all changes in grade and alignment.
- Maximum manhole spacing shall be:
  - 400-feet for 8-inch or 10-inch sewers
  - 500-feet for 12-inch or larger
- A manhole shall be placed on the upstream end of all sewer lines. If sewer system is to be phased, a stub shall be provided. The stub shall be capped and plugged.
- Clean-outs are prohibited. Existing clean-outs shall be removed and replaced by Developer with a manhole per these guidelines.

9.8.9 Sewer Taps

Sewer Tap shall be sized and located per **Table 9-5**.

TABLE 9 - 5 SEWER TAPS

Location	Minimum Size	Notes
Single Family Residential Development	4-inch*	• All 8-inch and larger services shall discharge to a manhole • Proposed tap Locations shall be shown on all plans • Any location changes in the field must be approved by the Water Services Department
Multi-Family Residential Development	6-inch	
Commercial Lots	6-inch	

*Larger taps shall be sized as determined by the Developer's design engineer

B. Materials and Details:

- New sewer taps and sewer service piping shall be per MAG Standard Detail 440-1. Tap location shall be supplemented by a curb stamp per MAG Standard Detail 440-4 (stamped S on top of the curb).
- Taps are not allowed into manholes unless approved by the Engineering Department.
- A 3-foot minimum separation between service taps is required. A 5-foot minimum separation between a service tap and the outside diameter of a manhole is required.
- All taps shall be stationed using the closest downstream manhole as station 0+00.
- All taps shall be perpendicular to the lateral.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Taps are not allowed into existing 12-inch or larger sewers.
- Provide one single service tap for each residential or commercial building lot. Additional taps are not allowed unless approved by the Engineering Department with written approval by the Water Services Department.
- A backwater valve shall be provided on service connections to major sewer lines, at manholes where there is potential for the migration of sewer gas into the service line, and at locations where the finish floor is not 12-inches higher than the upstream manhole. Backwater valves shall be located on private property and shall be accessible for maintenance by the property owner.

9.8.10 Force Mains

Force mains shall outfall into a manhole. Nonstandard sizes will not be allowed unless approved by the Water Services Department.

9.8.11 Odor Control

Odor control systems shall be installed at the cost of the developer in sewer systems when required by the Water Services Department. In some circumstances a flushing valve will be required. Dedication of property at no cost to the City of Peoria may be required for the odor control system.

9.9 Pretreatment

9.9.1 Commercial Developments – Interceptor Requirements

A grease, oil, lint and/or sand interceptor(s) shall be required for laundries, eating establishments, service stations, auto repair shops, car washes and other facilities which the Water Services Department determines are necessary for the proper handling of liquid wastes containing grease or oil in excessive amounts or any flammable wastes, sand, or other harmful ingredients. Eating establishments include, but are not limited to restaurants, cafeterias, bars, fast food, schools, nursing homes, clubs, hotels/motels, hospitals, or any other non-private residence food service facility generating grease bearing waste going to sanitary sewer.

Where necessary, as determined by the Water Services Department, any non-residential user of the sewer system shall provide at their expense, such pretreatment as necessary to reduce objectionable characteristics or pollutants below the Local Limits established by City Code Chapter 25, or any national pretreatment standards established by the Code of Federal Regulations Title 40 Part 403 and in accordance with City Code Chapter 25.

9.10 Consultant Deliverables

A. <u>Plans</u>

All plans shall be prepared per Chapter 3 of this Manual.

B. <u>Utility Reports</u>

Refer to the Planning and Community Development Department process guide and IWUMP

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Preliminary Water and Sewer Analysis Report
  This is used to determine the potential impact that the development would have to the existing water and sewer infrastructure. This report will also be used to verify that the proposed density and water use of the proposed development is consistent with the City's general plan and the City's water allocation for the proposed parcel.

- Final Sewer Report
  Required for all sites in which public sewer is extended. The calculations in this report will be used to verify that the proposed public sewer design provides adequate cover, slope, and design velocities.

- Master Water and Master Sewer Reports
  When required this report should show the infrastructure required for the utilities in the development to function per City of Peoria standards. Individual Final Water and Final Sewer Reports will be required for each parcel at the time of submittal. Individual phased reports should be consistent with the data, calculations, and assumptions shown in the Master Reports.

C. Approval to Construct (ATC) Application

Completed with signatures should be submitted during plan review. The Sewage Collection System Name is "City of Peoria". The Sewage Treatment Facility Name is one of three current City of Peoria facilities: Butler WWTP, Beardsley WWTP, and Jomax WWTP. Refer to the Wastewater Master Plan to look up which service area the project is within. The "Sewer Capacity Letter" will be issued by the Water Services Department after the ATC application has been submitted and will not be provided until the utility plans are substantially approved.

D. Approval to Construct (ATC)

A copy of the Approval to Construct (ATC) issued by Maricopa County Environmental Services Department (MCESD) and the cover sheet signed by MCESD must be submitted to Engineering prior to receiving final plan approval from the City.

9.11 Construction and Acceptance

9.11.1 Wastewater Infrastructure Construction

All construction shall be per the latest MAG Uniform Standard Details and Specifications for Public Works Construction, and subject to City of Peoria modifications, latest edition.

A. Tie-ins

Construction plans shall call for the contractor to tie-in new work to the existing, active system, only after completion of the new work and written approval of the Engineering Inspector to make the tie-in.

B. Testing/Inspections

All new sanitary sewer manholes installed shall be tested for integrity either by an exfiltration test or by a negative air pressure (vacuum) test.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

- Exfiltration testing shall be performed in accordance with MAG Section 615.11(B) and Arizona Department of Environmental Quality (ADEQ) Engineering Bulletin No. 11, Chapter 4, Section B. When using the exfiltration test method, water loss shall not exceed 0.1 gallons per vertical foot of manhole in a 24-hour period.
- Negative air pressure (vacuum) testing shall be performed in accordance with ASTM C 1244. Testing shall be performed at the top of the manhole cone for manholes located in paved areas. Manholes outside paved areas shall be vacuum tested at the ring and cover. Apply a negative air pressure of ten (10) inches of mercury (136 inches water) on the manhole and measure the time in seconds for the vacuum to drop to nine (9) inches of mercury (122 inches water). The manhole will pass this test if the time for the vacuum to drop the specified amount meets or exceeds the values shown in **Table 9-6**.

TABLE 9 - 6 TEST DURATION (SECONDS)

Manhole Depth	48" Diameter	60" Diameter
10 feet or less	60	75
10 – 15 feet	Not Applicable	90
15 feet or greater	Not Applicable	105

If manhole joint compound is pulled out during the vacuum test, the manhole shall be disassembled and the joint repaired or replaced as necessary. The vacuum testing shall then be repeated until the manhole passes.

1. Closed Circuit TV (CCTV) Inspection
   Perform CCTV inspections in accordance with NASSCO's Pipeline Assessment Certification Program. CCTV inspections shall be provided in digital (DVD) format utilizing a measuring device ahead of the camera to identify deflections in the line. Measuring device shall be able to measure water depth from 0-2 inches in ¼ inch increments.

2. Epoxy Coating Systems
   Perform inspections and testing according to City specifications. Administer adhesion testing for the underlayment and the finished coating system. Perform spark testing for all surfaces of the complete installation in accordance with ASTM D-4787.

C. Protection of Monuments

The Developer is responsible for protecting and restoring if damaged, construction survey stakes and property corner monuments used by the City to locate the service lines

D. Sewer Service Installations

Requirements for lowering, extending and relocating sewer service lines are as follows:

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

a) A construction permit is required for any work on the City system regardless of the location of the facility. Construction permits can be obtained through the Engineering Department.
b) The Contractor's representative shall be responsible for customer notification.

All building sewers and service line installations shall be completed by a qualified licensed contractor and comply with current City of Peoria Standard Details, latest edition of the International Plumbing Code Chapter 10, and City of Peoria Code Chapter 25. A final inspection will be required by a member of the Industrial Users/Building Safety Division prior to the issuance of a Certificate of Occupancy.

E. Switch-overs/Abandonments

Work will be done by contractor after written authorization by the Water Services Department. Follow City of Peoria "Abandonment of Facilities in the City's ROW" Policy.

9.11.2 Wastewater Infrastructure Acceptance

Copies of the following documents must be submitted to the Engineering Department prior to acceptance of the wastewater line(s) by the City. Refer to Chapter 3 of this document for as- built requirements. Final Letter of Acceptance (FLOA) will be released by the City of Peoria Engineering Department after all other items have been completed.

- A copy of the "Certificate of Approval of Construction" (AOC) issued by MCESD.
- A copy of the "Engineer's Certification of Completion".
- Pressure and Vacuum Testing documentation.
- Deflection Testing documentation.
- Video CCTV. Inspection Records on DVD.
- Copy of interceptor inspection documentation.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Bulletin 10

City of Peoria Request for Waiver

Phased Wastewater System Recommendations (IWUMP 2015)

Future Wastewater System (IWUMP 2015)

10. RECLAIMED WATER INFRASTRUCTURE DESIGN

10.1 General Information

This Chapter provides ordinance, policy and standards for establishing design criteria for constructing and modifying reclaimed water systems facilities to be owned and operated by the City. Reclaimed water system facilities include the: recharge wells, booster stations, inline boosters, pressure reducing valves, reservoirs, treatment facilities, and all other appurtenances required for proper treatment, conveyance and disposal of reclaimed water within the system.

10.2 City Code, Standards and Master Plan

It is the responsibility of the design engineer to review the most current edition of the Integrated Water Utilities Master Plan (IWUMP) and determine what additional reclaimed water infrastructure is necessary to serve the proposed development. The Water Services Department will utilize the most current edition of the IWUMP and operational knowledge of the system to determine which facilities or upgrades are required.

The criteria for development of reclaimed water infrastructure in the City of Peoria shall be in conformance with:

- The most current edition of the IWUMP. Copies of the IWUMP can be requested through the Public Records Request Process.
- Various City codes, including, but not limited to Chapters 25 of the City of Peoria Code apply to the development of the municipal water system and contain information regarding the development in association with land development.
- The Water Services Department Standard Operating Procedure (SOP) for Reclaimed & Non-Potable Water Retrofit Systems.

10.3 Federal, State and County Regulations

A. Arizona Department of Environmental Quality (ADEQ)

Reclaimed water infrastructure within the City should comply with the Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit and Arizona Pollutant Discharge Elimination System regulations.

10.4 Requirements to Connect

Connection to the City's reclaimed water system shall be per Peoria City Code, Chapter 25.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

10.5 Reclaimed Water Infrastructure

The City of Peoria reclaimed system is a network of reclaimed waterlines grouped into functional classifications. All development shall provide for reclaimed water distribution and service lines of appropriate sizes and in standard locations. These are minimum requirements and the City may require larger sizes in unusual circumstances or in order to satisfy fire flow and pressure requirements.

TABLE 10 - 1 RECLAIMED WATERLINE FUNCTIONAL CLASSIFICATIONS

Functional Classification	Size	Standard Locations
Transmission	*	*
Distribution	12-inch	• Along section lines • Major arterial streets • Limited access parkway
	8-inch	• Along north-south midsection collectors (1/2 mile) • Along east-west midsection collectors (1/2 mile) • Minor arterial streets
	4-inch	• In all other locations
Service	2-inch 1.5-inch 1-inch**	• Residential developments • Reclaimed water service lines shall not be located under driveways or under concrete aprons adjacent to driveways.
	Sized per Engineer	• All other types of developments

*Size and location will be in accordance with the most current edition of the Peoria Water Reuse Master Plan.
**No smaller sizes will be allowed

If the reclaimed waterline deviates from the section line or mid-section line, as in the case of curvilinear roads, the reclaimed waterline shall be sized as directed in this section.

Nonstandard sizes such as 10”, 14”, and 18” will not be allowed unless approved by the Public Works Director or his/her designee.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

10.6 Design Standards and Guidelines

10.6.1 Location

Reclaimed waterlines within the City shall be in the locations shown in **Table 10-2** unless otherwise approved:

TABLE 10 - 2 RECLAIMED WATERLINE LOCATIONS

Street Classification	Location
Major Arterial Streets and Limited Access Parkways	• Must be approved by the Water Services Department.
Minor Arterials	• 7-feet to the north or east from the centerline
Collector Streets	• 3-feet to the north or east from the centerline
Local Streets	• 0-feet to the north or east from the centerline

All Reclaimed waterlines shall be parallel to the street centerlines or property lines, or as close as possible. All horizontal deflections in reclaimed water lines shall comply with the pipe manufacturer's recommendations for deflection at joints. 50% of the recommended deflection will be allowed. Street crossings shall be perpendicular to the centerline of the street being crossed.

Vertical and horizontal separation from water lines and sewer lines shall be in accordance with MAG Section 610.5 and MAG Standard Detail 404 except as modified herein. When it comes to separation from sewer mains, reclaimed and non-potable waterlines shall use the same requirements as potable waterlines. When it comes to separation from potable waterlines, reclaimed and non-potable waterlines shall use the same requirements as wastewater lines.

10.6.2 Rights-of-Way/Easements

Rights-of-way and easements shall be dedicated prior to any construction or with the Final Plat of the development. Reclaimed water easements are to be dedicated for the specific use, maintenance and repair of the reclaimed waterline, and any associated appurtenances. Reclaimed water easements are to be dedicated as part of a Final Plat or by separate instrument with written approval from the Engineering Department.

Reclaimed waterlines shall be located within public rights-of-way or centered within a 20- foot wide easement dedicated for reclaimed water line, or within a 30-foot wide easement (minimum width) dedicated for both water and reclaimed water lines. Larger easement widths when combined with sanitary sewers with a minimum clear width equal to twice the depth of cover will be required for deeper installations as determined by the Water Services or Engineering Department.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

No other parallel utilities shall be located within the public water, reclaimed water or sewer easement.

Underground retention and above ground retention basins are not permitted to cross or be within designated public water or public reclaimed water easements.

Meters, and valves located on private property shall be contained within a dedicated public easement, 6-feet from the sides and 6-feet behind the appurtenance.

Trees and substantial plantings are not permitted within designated public reclaimed water easements where the easement provides primary access to the utilities. Plantings must typically be at least 5' from the centerline of the pipeline.

10.6.3 Cover and Depth

The minimum cover from finish grade to top of the pipe shall be as specified in MAG 610.4 with the following exceptions

- The minimum cover from finish grade to top of pipe for all waterlines less than 12 inches diameter located in major streets shall be as specified by the design engineer, but no less than 48-inches unless approved in writing by the Public Works Utilities Director or his/her designee.
- The minimum cover from finish grade to top of pipe for waterlines which are 12- inches in diameter or larger, located in major streets shall be as specified by the design engineer, but no less than 60-inches, unless approved in writing by the Public Works Director or his/her designee.

Extra protection per MAG 610.5.5 and Standard Details 404-1, 404-2, and 404-3 is required:

- Where cover is less than 4-feet to potential conflicts with facilities such as canals, washes, or rivers.
- Where the bottom of pipe of the reclaimed water line is between one to two feet above the top of pipe of any irrigation, storm drain, sanitary sewer, force main or other gray water pipe.
- Where the top of pipe of the reclaimed waterline is greater than 2-feet below any irrigation, storm drain, sanitary sewer, force main or other gray water pipe. No reclaimed water lines are allowed to be located less than 2-feet below the bottom of the irrigation, storm drain, sanitary sewer, force main or other gray water pipe.
- Where reclaimed waterlines pass under a significant structure greater than 10-feet wide such as box culverts, railroads, highways, canals, etc. The reclaimed waterline(s) shall be installed inside a pipe casing as approved by the Engineering Department.
- Pipe casing per Peoria Standard Detail PE-399 will be allowed as extra protection for new and existing reclaimed waterlines.
- As deemed necessary by the plan reviewer.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

10.6.4 Pipe Material

The design engineer must specify the exact pipe material in the construction drawings that are in accordance with the City approved pipe materials shown in **Table 10-3**. Modifications to the pipe material will require a formal plan revision and must be approved by the design engineer and the City of Peoria. Paint color for all materials shall be Pantone 512 or equivalent.

TABLE 10 - 3 RECLAIMED PIPE MATERIALS

TYPE	ALLOWED MATERIALS
Reclaimed Water Line	➢ Ductile Iron Pipe as specified for Waterlines ➢ PVC AWWA C-900 DR14 or DR18 for 12" diameter or less

10.6.5 Valves

A. Types/Sizes

Gate valves required to control the operation of the water system shall be installed per Peoria Standard Detail PE-270, PE-398 and shall conform to MAG 630. Gate valves shall be used for reclaimed waterline sizes up to and including 16-inches in diameter. All gate valves shall be resilient seated and open counterclockwise.

Butterfly valves shall be required on mains 24-inches in diameter and larger.

Tapping sleeves are allowed to be installed on reclaimed waterlines 12-inch and less in diameter. Tapping sleeves are not allowed to be installed on reclaimed waterlines 16-inch or larger. Any exceptions must be approved in writing by the Water Services Department. Size on size connections is not allowed. Any exceptions must be approved in writing by the Water Services Department.

B. Spacing

Generally, there shall be two valves per tee and three valves per cross. However, it is preferred to limit the number of unnecessary inline valves. Maximum valve spacing shall be per **Table 10-4**.

TABLE 10 - 4 MAXIMUM VALVE SPACING

	Spacing
Industrial, Commercial and Multi-Family Developments	500 feet
Single-Family Residential Development	800 feet
Transmission Mains (16-inches)	1320 feet
Transmission Mains (greater than 16-inches)	2640 feet

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

Any 8-inch and larger reclaimed water line that will be extended in the future shall have a valve, along with a 20-foot minimum stub with cap and 2-inch curb stop, at the terminus per MAG Standard Detail 390-type A. (Type B in unimproved areas)

For all reclaimed water lines crossing significant structures greater than 10 feet wide, such as drainage canals, and railroads, one valve shall be placed on each side of the structure as directed by the Engineering Department.

C. Location

Generally, the intent is to locate the valve lids so that wheel line of normal vehicular traffic does not track over the casting. The location for the valve covers and lids should not be closer than 6 feet from the gutter line where possible.

Valves shall not be located in valley gutters. The centerline of the valve shall be a minimum of 2-feet from the edge of the valley gutter.

All reclaimed water valves located outside of paved areas shall have a "Curve-Flex" Utility Marker as manufactured by Carsonite (CFR4--Purple) or approved equal.

Valves shall be at least 3-feet clear of any constructed obstructions.

Consideration shall be given to the location of driveways, especially residential, adjacent to the valve cover whereby a vehicle or other obstruction may be temporarily located.

See City of Peoria Standard Detail PE-398 for valve locations from a tee and cross.

D. Operation

Representatives of the Water Services Department are the only personnel authorized to operate reclaimed water valves on the City's existing reclaimed water system.

To request a reclaimed water system shut down a "Peoria Distribution System-Shut Down Request Form" must be submitted. This form must be submitted at least 10 days in advance of any requests to shut down any lines in the City of Peoria's reclaimed water distribution system.

10.6.6 Reclaimed Water Services and Reclaimed Water Meters

Reclaimed water services, pipe and fittings, whether new or replaced, shall be per City of Peoria Standard Detail PE-363.

A. Size

The size of the service will be as determined by the Design engineer, sized and designed in accordance with requirements of the Uniform Plumbing Code and per the sizes herein.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

- Reclaimed Water Meters 2-Inch Diameter and Smaller
  Reclaimed water meters 2-inch and smaller shall be located per City of Peoria Standard Detail PE-363. Reclaimed water meters will be supplied and installed by the City of Peoria Meters Services Section. Meter shall be sized no more than one half size smaller than the service size.

- Reclaimed Water Meters Larger than 3-Inch Diameter
  Reclaimed water meters 3-inch and larger shall be installed above grade in accordance with Peoria Standard Detail PE- 354. Reclaimed water meters will be supplied by the City of Peoria Meters Services Section. Reclaimed water meters shall be installed by the Developer.

  A 20-scale detail is required for all large meters (3" and larger). The design engineer must provide a detail on the plans which depicts the meter and backflow device including manufacturer and model number, vandal enclosure, fittings, landscape, and easements at the proposed location per City requirements. If there is a change to meter or backflow device, the detail must be modified as a plan revision prior to installation in the field.

  The meter size shall be dictated by the service size. Manifolding is not permitted unless written approval is obtained from the Public Works Director or his/her designee.

B. Location

- There will be one service per residential lot and one meter per service line unless specific written request is submitted to the Engineering Department and written approval is acknowledged by the City. The Developer shall make all service taps.
- Reclaimed water services installed outside of public right-of-way shall be contained within a dedicated easement for access, maintenance and reading of meters.
- Reclaimed water meters shall not be located in parking lots, driveways, or in areas of paving or where traffic may cause damage to the service, meter or meter box. Meters will not be fenced in and must be accessible at all times.
- In landscape areas, proposed grading shall direct runoff to flow away from the meter installation.
- Above ground vandal enclosures are required for all meters 3-inch and larger.
- A 3-foot minimum separation is required between taps and an 18-inch minimum separation is required from any fittings or mainline joints.

10.6.7 Backflow Prevention

Backflow protection is normally required on reclaimed water system services per the Water Services Department SOP.

All backflow assembly installations shall be in accordance with Chapter 8 of the

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

Engineering Standards Manual. A final inspection will be required by a member of the Environmental Resources Division of the Water Services Department prior to usage.

Cross connection testing shall be conducted according to the Water Services Department SOP for Reclaimed & Non-Potable Water Retrofit Systems.

10.6.8 Air Release Valves

Air release valves will be installed at all changes in slope of reclaimed waterlines 8 inches or larger in diameter, as follows:

- When reclaimed waterline changes from a positive slope to a zero slope, or a negative slope in the primary direction of flow
- When reclaimed waterline changes from a zero slope to a negative slope in a primary direction of flow;
- For vertical alignment changes to cross under or over another facility, such as utility, drainage washes, etc.
- Air release valves may be omitted if service taps are located to allow for the elimination of air.
- Slopes less than or equal to 0.002 ft. /ft. shall be treated as zero slopes. In the absence of any changes in slope, air release valves will be installed not more than 2,640 feet apart.
- All air release valves will be a combination air/vacuum release type per City of Peoria Standard Detail PE-395.

Air release valves will be installed on 6-inch reclaimed waterlines under the following circumstances:

- At the high point of the line if no lateral or service connection is proposed at that location to adequately remove trapped air.
- For vertical separation and vertical alignment for crossing under or over another facility, such as utility, drainage washes, etc.

10.6.9 Thrust Restraints

Mechanical Thrust Restraint may be provided with U.S. Pipe TR FLEX, Griffin SNAP-LOK RJ pipe or American Ductile Iron Flex Ring Joint Pipe. Joint restraint may be provided by Meg-a-Lug or equivalent, as approved by the Engineering Department.

Thrust Blocks will be concrete only per MAG Standard Details 301 and/or 340 and Class “B” concrete per MAG Specification 725.

10.6.10 Bedding and Backfill

Refer to City of Peoria Standard Detail PE-401. Bedding compaction densities shall be per MAG Specification Table 601-2. Specially designed and alternate beddings may be approved on a case by case basis by the Engineering Department.

Refer to PE-401 Minimum trench backfill requirements shall be Type I per MAG Specification 601.4.3, with compaction densities per MAG Specification Table 601-

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

2. Backfill requirements provided by the design engineer shall apply when such provisions are more restrictive than the MAG specification.

Pavement replacement type and compaction type shall be indicated per MAG Standard Details and Specifications on each sheet or as modified in the City of Peoria General Notes.

10.6.11 Wash Crossings

All wash crossings will be constructed using restrained joint ductile pipe. Bury requirements to place water lines under washes or channels shall be based upon the 100-year peak design discharge (Q100) in the channel or wash.

Scour depth will be estimated using Arizona State Standard Attachment (SSA) 5-96, Guideline 2, Level I, as published by the Arizona Department of Water Resources. The engineer will estimate the depth of scour and design the top of the pipe to conform to Chapter 8. The engineer shall submit the scour analysis with the final plans.

All pipelines that must be located within the scour zone at the required depth as indicated above. If the pipeline is located less than the minimum required depth of bury as indicated above, must be protected by installing a cut-off wall, downstream of the pipeline to stabilize the scour depth. Cut-off walls will be structurally designed to the scour conditions calculated. The developer is responsible for obtaining any permits required from the Army Corps of Engineers, Flood Control District of Maricopa County or other agency prior to plan approval.

10.7 Consultant Deliverables

A. Plans

All plans shall be prepared per Chapter 3 of the Engineering Standards Manual.

B. Utility Reports

Refer to the Planning and Community Development Department process guide and IWUMP

- Preliminary Water and Sewer Analysis Report
  This is used to determine the potential impact that the development would have to the existing water, reclaimed water and sewer infrastructure. This report will also be used to verify that the proposed density and water use of the proposed development is consistent with the City's general plan and the City's water allocation for the proposed parcel.

- Final Reclaimed Water Network Analysis
  Required for all sites in which reclaimed waterline is extended/ looped in order to service the proposed development, in areas identified as having problematic or low pressures, or for services that have an unusually reclaimed high water demand. The modeling in this report will be used to verify that adequate service and irrigation flows can be obtained with the proposed reclaimed waterline construction.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

C. Approval to Construct (ATC) Application

Completed with signatures should be submitted during plan review. The System Name is one of three current City of Peoria facilities: Butler Drive WRF, Beardsley WRF, and Jomax WRF. Refer to the Water Reuse Master Plan to look up which service area the project is within.

D. Approval to Construct (ATC)

A copy of the ATC issued by Maricopa County Environmental Services Department (MCESD) and the cover sheet signed by MCESD must be submitted to Engineering prior to receiving final plan approval from the City.

10.8 Construction and Acceptance

10.8.1 Reclaimed Water Infrastructure Construction

Before being placed in service, all newly installed pipe, valves, hydrants, and appurtenances shall be flushed and kept clean.

Pipe shall first be flushed to remove any solid or contaminated material. Flushing velocity shall be at least 2.5-feet per second in the pipe. Flushing period shall be at least 5 minutes for every 150-feet of new pipe but in no case less than 30 minutes.

The Developer is responsible for protecting and restoring if damaged, construction survey stakes and property corner monuments used by the City to locate the reclaimed water services.

A construction permit is required for any work on the City reclaimed water system regardless of the location of the facility. Construction permits can be obtained through the Engineering Department.

The contractor or licensed plumber, shall obtain permission from the Meter Services Division to complete all work including meter disconnects and reconnects.

Materials shall be copper and bronze in accordance with City of Peoria Standard Detail PE-363.

The Contractor's representative shall be responsible for reclaimed water customer notification.

Reclaimed Waterline Relocations to Eliminate Conflicts. All work shall be done by contractor including testing requirements that apply to this type of work. Contractor shall not operate valves; Representatives of the Water Services Department are the only personnel authorized to operate reclaimed water valves on the City's existing reclaimed water system.

Switch-overs and Abandonments. Work will be done by contractor after written authorization by the City's Water Services Department. Follow City of Peoria "Abandonment of Facilities in the City's ROW" Policy.

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

10.8.2 Reclaimed Water Infrastructure Acceptance

Copies of the following documents must be submitted to the Engineering Department prior to acceptance of the reclaimed water line(s) by the City. Refer to Chapter 2 of this document for as-built requirements. Final Letter of Acceptance (FLOA) will be released by the City of Peoria Engineering Department after all other items have been completed.

- A copy of the "Certificate of Approval of Construction" (AOC) issued by MCESD.
- A copy of the "Engineer's Certification of Completion".
- "Water Accounting Form" indicating all potable and reclaimed water quantities used for line fill, flushed quantities and any other water used not recorded by water meters.
- Reclaimed Waterline Flushing documentation.
- Reclaimed Waterline Pressure Testing documentation

QUICK LINKS

Integrated Water Utilities Master Plan

ADEQ Reclaimed Water

Drought Management Plan

City of Peoria Standard Operating Procedures (SOP)

Water Reclamation Facilities and Basins (IWUMP 2015)

Reclaimed Water System Model (IWUMP 2015)

Reclaimed Water Utilization Strategies (IWUMP 2015)

11. LANDSCAPE AND LANDSCAPE IRRIGATION

This Chapter is intended to aid designers in developing hardscape, landscape, irrigation and general aesthetic improvements. The information provided in this Chapter is not intended to cover all situations that arise but shall provide general guidance. This is not a substitute for sound design principles. Contact City staff for specific landscape and landscape irrigation design guidelines through the Site Development process.

11.1 City Code and Standards

The process of development can have a negative effect on the natural topography and vegetation of an area. The landscape requirements are adopted in the City's Zoning Ordinance for the following specific purposes:

- To aid in stabilizing the environment's ecological balance by contributing to the process of air purification, oxygen regeneration, groundwater recharge and storm water runoff retardation, while at the same time aiding in noise, glare and heat abatement;
- To provide visual buffering between land uses of differing character;
- To enhance the beautification of the City;
- To protect the character and stability of residential, business, institutional and industrial areas;
- To preserve the value of land and building; and,
- To conserve energy and other natural resources.

11.2 Landscaped Medians and Right-of-Way

All street rights-of-way classified as collector or higher contiguous with the proposed development or located within the interior of a development not used for street pavement, curbs, gutters, sidewalks, or driveways shall be landscaped in addition to the required on-site landscaped areas. Right-of-way landscaping shall be designed to minimize maintenance issues.

Developers shall refer to the Zoning Ordinance for recommended plants.

11.3 Landscape Guidelines

All streetscape designs and infrastructure must meet the following minimum requirements.

11.3.1 Maintenance Responsibility

Maintenance of newly constructed and/or modified landscaped medians and right-of-ways will be the responsibility of the developer, property owner, or a homeowner's association. Refer to the Zoning Ordinance for additional information on maintenance responsibilities.

11.3.2 Median Widths

Median width is measured from back of median curb to back of median curb (inside to inside). No plant material is allowed in medians less than 4 feet.

QUICK LINKS

Landscape Plan Review Process Guide

11.3.3 Placement of Trees and Shrubs

The density of trees and shrubs shall be in conformance with the Design Review Manual and Zoning Ordinance. Consider the mature tree height and placement of trees to minimize potentially adverse effects on above-ground utilities or signage. Trees should be located so that the expected mature tree canopy does not ultimately extend into the street rights-of-way as shown in **Figure 11-1** and **Figure 11-2** below.

FIGURE 11 - 1 ARTERIAL/COLLECTOR ROADWAY CLEARANCE

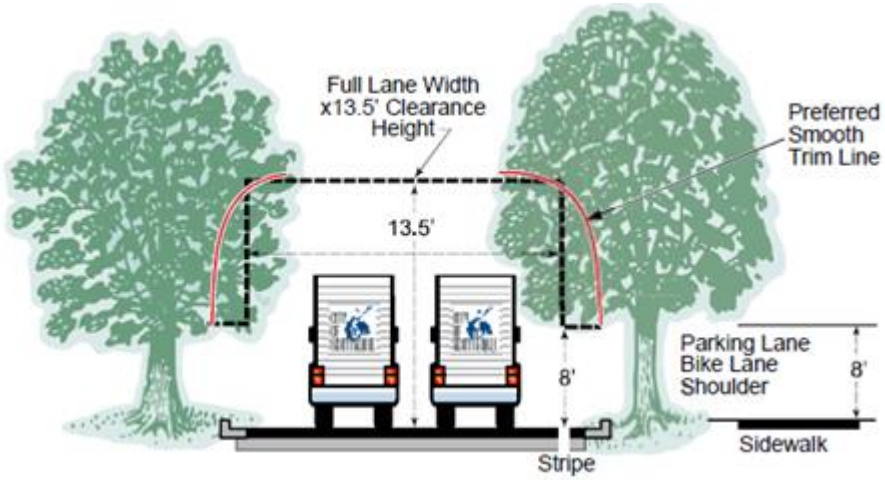
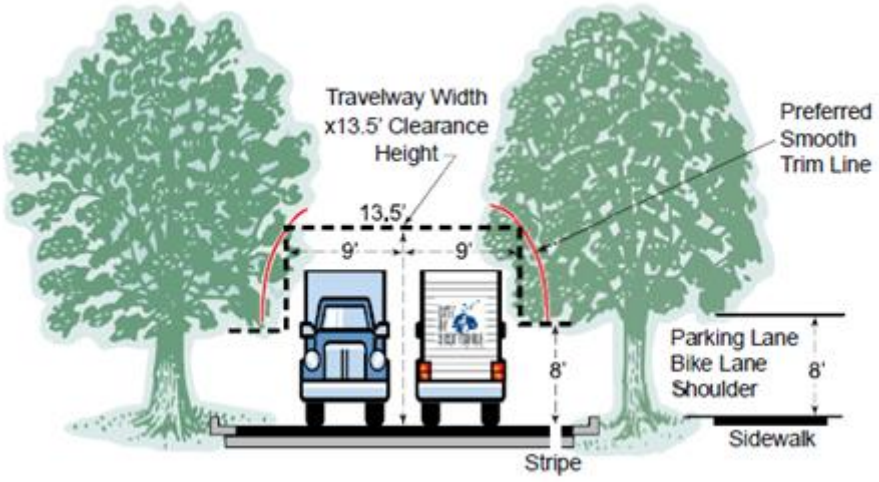


FIGURE 11 - 2 LOCAL ROADWAY CLEARANCE



Other planting guidelines are as follows:

- Planting distance between trees shall be no less than the mature canopy width.
- Landscaping clearance shall be provided to prevent conflict with signs, lighting, sidewalks/paths, fire equipment or median crossings.
- Landscaping must not create hazards to public safety through plant growth habit, structure, or location.

QUICK LINKS

Landscape Plan Review Process Guide

- There shall be a physical separation (concrete curbing) provided between public and private landscaping/irrigation systems.
- Thorn less trees and shrubs should be used adjacent to public facilities (trails, parking, sidewalks, etc.)

11.3.4 Quantity and Sizes

The number and size of trees, shrubs and groundcover shall be per the Zoning Ordinance.

11.3.5 Grading

Mounding is typically not allowed. Any mounding proposed must be approved by the City during plan review. Mounds within sight distance easements must not exceed a height of 18 inches as measured above the final grade elevation. All mounding should blend with the adjacent existing terrain. The maximum slope of any mounding shall be 1:4 (25%).

The finished landscape grade with decomposed granite or mulch should be smooth, uniform, and a minimum of 1-inch below the top of curb or sidewalk.

11.3.6 Decomposed Granite

Size must be ½ inch of various colors to match adjacent landscaped areas. The decomposed granite color must match native earth tones.

A sample will be submitted to a representative from Parks Department for approval prior to the contractor ordering and bringing it onto the site.

Decomposed granite will be distributed uniformly to a depth of 3 inches covering the entire landscape area.

11.3.7 Boulders

Boulders are not acceptable for City of Peoria landscaped medians and rights-of-way, unless otherwise approved by Development and Engineering Department.

11.3.8 Plant Selection and Hydroseeding

All plant materials and seed mixes shall be as identified in the Zoning Ordinance.

11.4 Irrigation Guidelines

11.4.1 General Irrigation Design Criteria

Irrigation design shall be per the Zoning Ordinance and as described herein.

- The median irrigation system is to be located entirely within the median. Sleeving from median-to- median is acceptable. Sleeving must continue until the median is at least 4-feet wide and past any pavers
- The contractor is responsible for initiating the account and having the water meter set.
- Trees, shrubs, succulents and cacti shall be valved separately.
- The median irrigation system must have separate power and water meters from other irrigation systems.

QUICK LINKS

Landscape Plan Review Process Guide

- Plans must indicate valve flow rates, size, designation (tree, shrubs and cactus) and station number.
- Plans must indicate distance from mainline to sidewalk, curb or wall.
- Approved Irrigation System Types: Centralized control or solar powered
- Valve Box lids shall include station number and id of trees, shrubs, succulents and cacti (TR-No., SH-No., etc.)

11.4.2 Controllers

- Controllers for median landscaping shall be placed in the center of the median, a minimum of 50 feet before the beginning of the turn bay.
- Approved controllers are either centralized in type or solar. Contact the City's Engineering Department for specific centralized controller type.

11.4.3 Power Source

- The contractor is responsible for initiating account and service connection.
- If the power source cannot be placed within the median or the rights-of way, a utility easement must be provided. This location is to be indicated and noted on the final irrigation plans and also inside of the controller cabinet.

11.4.4 Water Source

- Show both the water source and location of the proposed tap on the final irrigation plans.
- Contact the Engineering Department for information on tapping into City waterlines.
- Plans must indicate existing and design operating water pressure requirements.
- The water meter should be located within a median or the public rights-of-way wherever possible. The water meter box and cover shall be constructed per Standard Detail PE-363.

11.4.5 Remote Control Electric Valves

- Valves are to be of brass construction, and a minimum size of 1 inch. All valves to be installed with double unions.
- Ball valves must be installed immediately upstream of all control valves. Ball valves shall be PVC.
- All direct buried control valve wiring shall be a minimum 14 gauge.
- Master valves are to be installed on all irrigation mainlines. Contact the City's Engineering Department for specific master valve type.

11.4.6 Backflow Prevention

Refer to **Section 8.9.10** for information on Backflow Prevention.

11.5 Sight Distance

Any plant material installed in a questionable area (such as safety triangles, sight lines) may be identified by traffic engineering for removal by the contractor. Sight distance must be considered for vehicles entering and exiting adjacent properties, as well as for vehicles using abutting roadways.

QUICK LINKS

Landscape Plan Review Process Guide

A. Sight Distances

- To determine sight distances, use the criteria specified in **Chapter 6**.
- The sight line shall be clearly indicated and delineated on the final landscape plan submittal.

B. Planting within the Sight Triangle

- Shrubs planted within the sight triangle are to have a mature height of not more than 3 feet 6 inches. Height will be from edge of pavement, and total height will include the height of any mounding.
- Trees planted within the safety triangle are to have a canopy pruned to a height of 8 feet or greater upon installation. Height will be from edge of pavement, and total height will include the height of any mounding.

11.6 Alterations and As-Builts

If field conditions require relocating a water meter, backflow prevention device, controller, valve, or any other major component of the irrigation system as shown on approved plans, contact WHO? prior to any installation.

The contractor must provide an accurate set of as-built drawings signed off by the City's designee for landscape maintenance oversight and CAD drawings per Chapter 3 of this Manual to the Planning and Community Development Department representative prior to the final acceptance of a system.

11.7 Landscape and Landscape Irrigation Inspections

City staff will arrange a pre-construction meeting with the contractor to review approved plans, MAG requirements, testing, maintenance responsibility, etc.

City staff will inspect the following items before and during construction for compliance with City-approved plans and City addendums to MAG:

- Water meter and backflow preventer and master valve location
- Controller type and location
- Remote control valve type, location and operation
- Source of power (inside enclosure)
- Type of pipe and trench depth
- Laterals and trench depth
- Emitters and flush pits
- Sleeves under asphalt
- Pressure check system
- Backflow preventer and enclosure (Notify City Cross Connection Control for inspection and testing)
- Plant palette and location
- Planting depth
- Tree staking
- Sight distance triangles
- Pre-emergent
- Decomposed granite/organic mulch
- Nursery Stock

QUICK LINKS

Landscape Plan Review Process Guide

City staff will perform a final inspection with the contractor after completion of work for approval to begin warranty period.

11.8 Parks

Contact the Planning and Community Development Department for guidance on developing park master plans, review and approval process, and requirements for park designs. The design review of each park is done on an individual basis.

11.9 Trails

This section addresses the planning, design, maintenance and construction of trails within the City. The term "trails" refers to unpaved, non- motorized, shared-use pathways and mountain trails, which are accessible by the general public.

11.9.1 General Information

Paths and trails and their associated amenities are the connective, non-vehicular transportation and recreation corridors tie the City's neighborhoods to all types of destinations such as parks, schools, open spaces, shopping areas and employment centers. These facilities are designed for all types of users with various levels of abilities.

A. Multi-Use Path

Facility is used by bicyclists, pedestrians, joggers, strollers, wheelchair users, in-line skaters, and other non-motorized users and anyone wanting a smooth and consistent surface. The requirements for Multi-Use Trails is provided in Chapter 6.

B. Soft-Surface Trails

The system of multi-use unpaved trails includes those with a regional scope as well as trails that connect neighborhoods to the larger trail network, and include primary trails, secondary trails, back country trails, and equestrian-only trails. Levels and types of use are the biggest determinant for which type of trail is located along a particular corridor

- Primary Trails
  These trails follow regional and long distance major corridors, such as the New River, Agua Fria, and Central Arizona Project Canal. They tend to link larger destinations such as regional parks, open spaces, and large commercial areas.

- Secondary Trails
  These trails connect neighborhoods to the larger trail system. Examples of secondary trails are those within more rural neighborhoods or those that provide more localized networks connecting destinations such as neighborhood parks and schools. They often parallel roadways, but can also occur within utility corridors and open space corridors.

- Back Country Trails
  These trails are within preserved open space or mountainous, non-developed, or protected areas. These may be part of either the primary or

QUICK LINKS

Landscape Plan Review Process Guide

secondary trail network, depending upon existing or expected level of use. They are built with greater sensitivity to the existing natural environment and are therefore narrower than trails in developed parts of the City.

- Equestrian-Only Trails
  In keeping with other plans that have been completed, Equestrian-Only Trails are to be located in the typically gravelly or sandy wash bottoms of New River and the Agua Fria River. The soft surface material is not conducive to multi-use trails.

11.9.2 Trail Design

The City objective is to design, construct and maintain trails that:

- Provide safe, non-motorized transportation links, and/or close-to-home recreation opportunities.
- Provide legal public access to destination points and other areas of interest.
- Blend with the surrounding environment.
- Minimize impacts on the natural environment.
- Minimize impacts on adjacent landowners.
- Require minimum levels of maintenance.
- Provide trail designation, wayfinding and connectivity signage.
- As-builts shall be required for Shared-Use Pathways and Primary Trails

A. Design Considerations

- Human Factors
  Trails must be planned and constructed with the needs of the trail user in mind. Trail users tend to desire routes that access and connect areas of significant community activity such as schools, businesses, shopping areas and parks, as well as other areas of interest such as viewpoints, water sources, natural areas, desert preserves, scenic and vista corridors, and interesting geologic features. Visual qualities are important to trail users; therefore trails should be designed to blend with the surrounding environment. Views from the trail to the surrounding environment should also be considered. Trail users enjoy changes in scenery, thus the increasing demand for loop trails and trail networks that allow the user to return to the starting point without traveling the same trail twice. Loop trails also provide the comfort of knowing that the trail will return to the starting point, thus reducing the chance of anyone becoming lost. Trail users tend to favor the easiest, most obvious route. If the designated trail is not the easiest and most obvious, trail users will begin to create new, unauthorized trails.

- Coinciding Easements
  Trails are frequently located within common tracts and easements dedicated for other purposes such as drainage, flood control, public utility, natural area open space, and scenic and vista corridors. In situations where these common tracts and easements are wider than that needed for a trail easement, it is recommended to dedicate the same area of these coinciding common tracts and easements for the purposes of

QUICK LINKS
Landscape Plan Review Process Guide

public trail use. This will increase the flexibility to properly layout, design and construct public trails, and will allow the trail to be positioned away from undesirable areas such as low-flow drainage channels, areas of extreme topography, dense vegetation, critical animal habitats and adjacent properties. This will also allow future realignment of the trail, should such realignment become necessary. In cases where a separate width of trail easement is delineated within other easements or common tracts, it is extremely important that the alignment of the trail easement be reviewed in the field to assure suitability.

- Trail Viewshed
  The lines of sight from a trail to the surrounding landscape and from the surrounding landscape to a trail are important design considerations. Views from the trail to the surrounding landscape improve the quality of the trail user's experience; therefore, trails should be designed to provide users varying views of the surrounding area. However, obscuring views of the trail from the surrounding landscape is also important, since adjacent landowners may not want to view the trail from their properties.

- Native Plants
  The design, construction and maintenance of trails within the City must take into account the Desert Lands Conservation Overlay. Trails should be aligned to avoid disturbance of and have a minimum effect on the following plant species: whitethorn acacia, catclaw acacia, crucifixion thorn, hackberry, blue palo verde, foothill palo verde, desert willow, juniper, ironwood, cottonwood, mesquite, scrub oak, sugar sumac, Arizona rosewood, saguaro, barrel cacti, ocotillo, and soaptree yucca.

- Sensitive Wildlife Habitat
  Trail design and construction within natural desert park and preserve areas should be evaluated in terms of the effect that the trail will have on sensitive wildlife habitats. The Arizona Game and Fish Department should be consulted during the trail design process to assure that the trail will not have a negative impact on such resources. The best means of preventing negative impacts on wildlife is to simply avoid sensitive areas. Seasonal trail closures may be necessary in some situations.

- Archaeological and Cultural Resources
  Trail design and construction should be evaluated in terms of the effect the trail will have on archaeological and cultural resources. Potential options to prevent and mitigate damage to these resources include:

  - Altering the trail alignment to avoid archaeological and cultural resources.
  - Protecting the resources by utilizing methods to obscure them from view.
  - Mitigating the cultural resource, this involves removal and thorough documentation of the items by a professional archaeologist. The documentation of the resource may then be interpreted as part of the trail opportunity.

QUICK LINKS
Landscape Plan Review Process Guide

- Design for Shared-Use
  Trails within the City are open to all non-motorized uses unless otherwise stated. Decisions to prohibit any non-motorized use from trails must be based on coordinated planning efforts involving appropriate user groups and City staff. Characteristics that should be considered as part of this process include, but are not limited to, longitudinal and cross slopes, surface materials, line of sight, amount of use, sensitivity of surrounding environment, soil types, and native plant and animal habitats.

  The following means of preventing potential user conflicts should be considered when planning, designing, constructing and maintaining shared-use trails:

  - Separate user types at trailheads and along the first, most crowded stretches of trail.
  - Provide adequate sight distances.
  - Build trails wide enough to accommodate expected levels and types of use.
  - Build and maintain trails wide enough for safe passing and/or nodes.
  - Design trails to control speeds where necessary by varying the trail surface and avoiding long, straight, downhill stretches.
  - Provide adequate trailhead facilities for all user types.

11.9.3 Trail Locations

Location work must begin early in the trail design process and be completed prior to construction. The amount and level of work that is required varies depending on the type of trail being designed and the terrain on which the trail is being constructed. The necessary steps to properly layout the trail include the following: Reconnaissance, Grade, Drainage and Staking/Flagging, refer to Paragraphs A through D below.

- Reconnaissance
  The reconnaissance process includes the identification and evaluation of alternative routes, which leads to final selection of the best possible route to meet the established objectives. Application of sound principles of trail location, alignment and grade will minimize future operation and maintenance problems.

- Grade
  The first step is to examine the most recent topographic maps and aerial photos of the area to identify significant landforms, drainage patterns and vegetation. The next step, for which there is no substitute, is to walk the area and examine potential routes. Conduct a systematic study of the area by walking various routes and viewing the area from different vantage points. Control points, which are features that are favorable for or inhibit trail construction, should be identified through this process. The control points will help to identify the best possible route, with the

QUICK LINKS
Landscape Plan Review Process Guide

understanding that situations may exist where a trail must pass through negative control points.

Control points that are favorable for trail construction:

- Existing road crossings (underpasses, overpasses and intersections with traffic lights or stop signs)
- Areas of light vegetation
- Natural desert wash crossings
- Scenic vistas
- Ridgelines
- Areas of well drained soils
- Hillside benches
- Good trailhead access

Control points that inhibit trail construction and should be avoided:

- Wet areas and poorly drained flat areas
- Frequent desert wash crossings
- Sensitive wildlife habitats
- Locations requiring bridges or culverts
- Desert wash bottoms
- Areas of heavy or fragile vegetation
- Areas adjacent to sources of excessive noise, such as airports
- Areas requiring switchbacks
- Areas of archaeological/cultural sensitivity
- Areas adjacent to plants which are poisonous to horses, such as oleanders
- Steep rocky slopes
- Lightning-prone areas
- Unstable or fragile soils
- Unsafe or uncontrolled road crossings
- Abrupt topographic changes
- Known habitats of threatened or endangered plant or animal species
- Bluffs, ledges, mineshafts and cliffs except where featured as scenic resources

- Drainage

  Proper drainage of surface water is the most important factor in design, construction and maintenance of trails. Surface erosion resulting from improper drainage will have a detrimental impact on the trail surface, causing damage to the natural environment and increasing maintenance requirements. The potential for erosion depends on three factors: soil type, velocity of water on the trail, and the distance water travels down the trail. Alteration of any of these factors can reduce the potential for erosion. Proper outsloping of the trail tread and the installation of grade dips will help decrease the potential for erosion of the trail surface. Existing drainage patterns of the surrounding area, such as concentrated drainage channels, must be maintained. Attempts to alter the existing

drainage patterns will have a negative effect on the natural environment and will most likely result in severe damage to the trail.

- Staking/Flagging
  Stakes or flags act as a guide so that the alignment, grade and distances can be easily followed during construction. A clinometer, topographic map, compass, measuring tape and notebook are all necessary tools. Proper location of the flag line is easily accomplished with three people acting as surveyor, rod holder and recorder. Stakes or flags should be located along the trail centerline with the location of dips, walls and other special structures indicated with color-coded flagging. The trail alignment should pass through control points that are favorable for trail construction and avoid control points which will inhibit trail construction. Normally, trail alignments follow the contours of the land and consist of a series of gently sweeping curves. Long straight segments with sharp angular turns should be avoided.

11.9.4 Backcountry Trails

The management objective for Backcountry Trails is to provide secondary transportation and recreation links through areas such as desert washes, scenic and vista corridors, and other desert open space areas. Backcountry Trails typically experience a lower level of use than Shared-Use Paths. User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes and where trail widths allow. Backcountry Trails are narrower than Shared-Use Paths; therefore, occasional single-file travel by users may be required. These trails are typically located within areas of level to moderate topography.

The design guidelines for mountain trails are as follows:

- Grade
  Grade will match existing terrain.

- Width
  The desired tread width is 4 feet. The trail tread is made up of native soils. Compaction may be used to prevent damage from use and to increase resistance to erosion.

- Vegetation Clearance
  Trails should be designed to have a minimum impact on plants identified for protection in the Desert Lands Conservation Overlay. Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

  Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread.
  Vertical clearance must be at least 10 feet above the trail tread, 12 feet is preferred. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no

QUICK LINKS
Landscape Plan Review Process Guide

hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.

- Drainage
  The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

- Easement Widths and Setback from Street and Private Walls
  Minimally Improved Trails must be contained in a minimum 25-foot-wide nonmotorized public access easement if located in a trail corridor identified in the Trails Plan as a Mountain Trail. Mountain Trails must be contained in a minimum 30-foot-wide non-motorized public access easement if located in a trail corridor identified in the Trails Plan as a Shared-Use Path.

  In situations where a non-motorized public access easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes. Minimally Improved Trails must be located the maximum distance feasible from the edge of the street. The desired distance is 50 feet with the minimum distance 20 feet.

11.9.5 Primary and Secondary Trails

User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow.

Secondary Trails will not be maintained by the City of Peoria.

The design guidelines for primary and secondary trails are as follows:

- Grade
  Maximum sustained grade should not exceed 5 percent. A maximum grade of 8 percent may be used for short distances not to exceed 200 linear feet.

QUICK LINKS
Landscape Plan Review Process Guide

- Tread
  The desired tread width is 8 feet with a minimum acceptable width of 6 feet. The trail tread should be comprised of native soils in undisturbed desert areas and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used it must be ¼ inch minus, Madison Gold or similar, wetted and compacted to a 4-inch depth. A soilstabilizer may also be added to the decomposed granite according to manufacturer's specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences and other physical barriers can also be used to delineate the trail.

- Vegetation Clearance
  Trails should be designed to have a minimum impact on plants identified for protection in the Desert Lands Conservation Overlay. Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them. Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.

- Drainage
  The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water.

- Easement Width and Setback from Street
  Primary and Secondary Trails shall be contained in a nonmotorized public access easement or ROW. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes. Trails along streets should be placed the maximum distance possible from the back of curb.

QUICK LINKS
Landscape Plan Review Process Guide

11.9.6 Tread Construction

- Surface Materials
  Trail surface materials must correspond to the specification for the appropriate trail classification.

- Cross Slope
  The cross slope, which is the slope of the tread surface perpendicular to the longitudinal slope, is a critical factor in the design, construction and maintenance of trails. The cross slope allows surface water to drain off the side of the trail rather than along the longitudinal slope. The three primary types of cross slopes are outslope, inslope and crowned. Outsloped and insloped trail surfaces typically occur on trails that traverse the side slope of a hill, and a crowned trail surface is typically found on trails that travel across relatively level ground, refer to **Figure 11-3**.

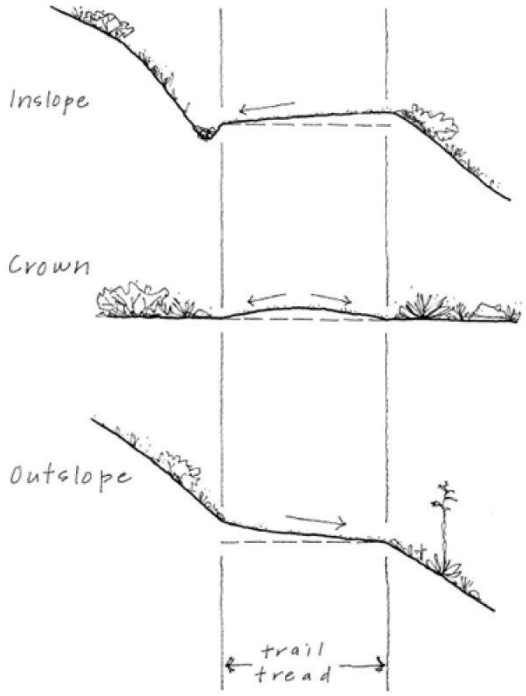
  - *Outslope:*
    Outslope is the most common type of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the uphill to the downhill edge of the trail. Standard outslopes range from 3 to 5 percent, depending on the trail classification.

  - *Inslope:*
    Inslope is the most infrequent variety of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the downhill to the uphill edge of the trail. Insloped trails are discouraged and only recommended when used as a component of switchback turns. Inslopes must be used in conjunction with rock-lined swales that collect the water and channel it away from the trail. The improper use of an insloped trail surface will cause extreme erosion to the trail surface and the surrounding environment; therefore, should not be built without consulting the Parks, Recreation and Community Facilities Department.

  - *Crowned:*
    A crowned surface is most commonly used on trails that traverse relatively level ground. A crowned trail surface slopes downward from the centerline to each outside edge for the purpose of preventing surface water from pooling on the trail surface. The slopes from the centerline to each edge should be 5 percent.

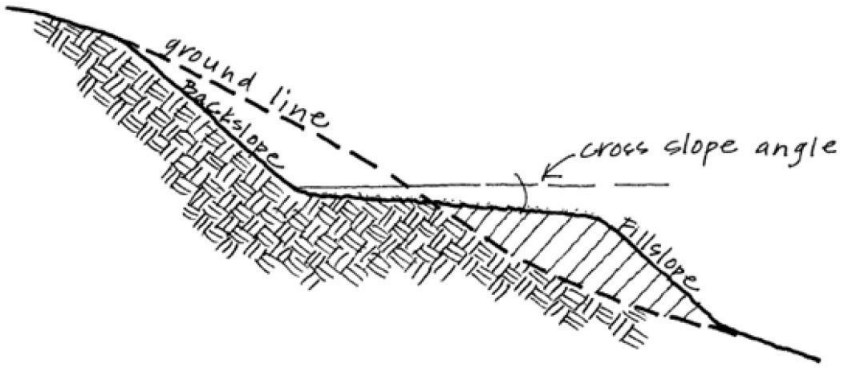
QUICK LINKS
Landscape Plan Review Process Guide

FIGURE 11 - 3 CROSS SLOPES



- <u>Backslope</u>
  The backslope is the area from which material is excavated on the uphill side of the trail tread. Backslopes range from steep to gentle depending on the side slope of the hill and the characteristics of the soil. As a general rule, the backslope and fill slope shalle be per Geotechnical Engineer's recommendations. Riprap on moderate backslopes and retaining walls on steeper backslopes may be needed to stabilize the backslope in areas with steep side slopes or unstable soils. The use of retaining walls to support the backslope will require excavating less material. Refer to **Figure 11-4**.

FIGURE 11 - 4 TYPICAL TRAIL PROFILE



QUICK LINKS
Landscape Plan Review Process Guide

- Fillslope
  Adding material to build up and support the downhill edge of the trail tread creates the fillslope. The material removed as parts of the backslope or from nearby borrow pits is often used in the fillslope. Riprap on moderate fillslopes and retaining walls on steeper fillslopes may be needed to support the fillslope in areas with steep side slopes or loose soils. The fillslope should be revegetated following construction to regain its natural appearance and to reduce the potential for erosion, see above **Figure 11-4**.

- Typical Trail Cross-sections
  Refer to **Figure 11-5** for examples of trail construction for various side slopes.

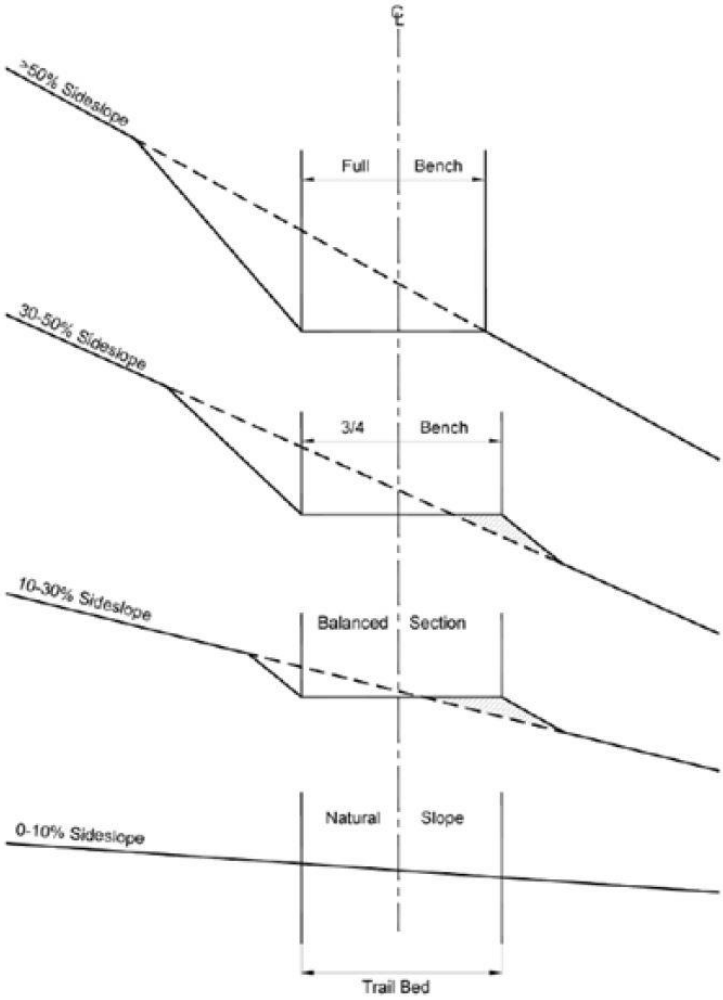
  - *Full Bench*
    Full bench construction involves the greatest amount of soil removal, but provides the most stable trail surface. In this type of construction, soil is removed from the backslope and cast down the hill. The excavated material is not used as fill to support the trail tread. Instead, the entire trail tread is supported by solid mineral soil. Full bench construction is best suited for trails on steep side slopes greater than 50 percent because fill will erode easily.

  - *3/4 Bench*
    This type of trail construction should be used on side slopes of 30 to 50 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill ¼ of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

  - *Balanced Section*
    Balanced section trail construction should be utilized on side slopes of 10 to 30 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill ½ of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

  - *Natural Slope*
    Natural slope construction is used when side slopes are less than 10 percent; it involves no cutting or filling, resulting in no backslope or fillslope.

FIGURE 11 - 5 TYPICAL TRAIL CROSS SECTIONS



11.9.7 Vegetation Clearance

Vegetation clearance is the removal of vegetation within specified clearing limits. The primary goal is to provide the specified clearance while maintaining the maximum amount of vegetation and the natural characteristics of the area. Trails shall be aligned to prevent disturbance to plants identified in the Desert Lands Conservation Overlay. Trails should be aligned to avoid large-scale removal of native plants not covered by the Desert Lands Conservation Overlay.

When branches must be removed, pruning shall comply with ANSI Standard #A300, otherwise known as the 3-cut pruning method:

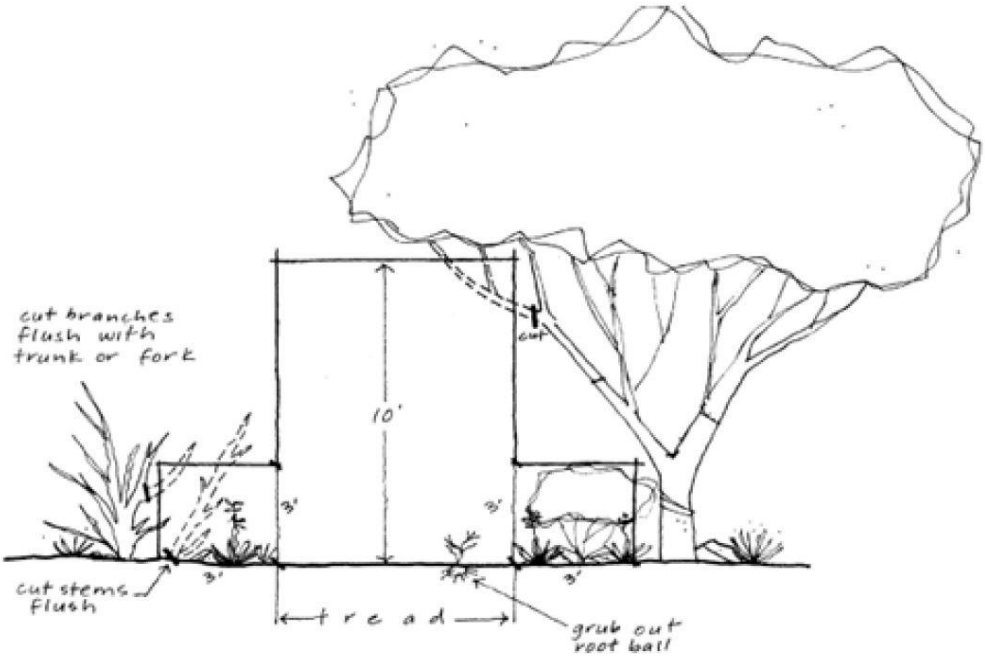
- One partial cut from the underside of the branch 6 to 8 inches from the trunk,
- A second cut from the top of the branch above the first cut to remove the branch, and
- The third cut to remove the stub.

Be sure not to cut into the branch collar, as this will damage the tree and slow the healing process. Chemical sealants should not be applied to native trees. Cholla

QUICK LINKS
Landscape Plan Review Process Guide

and prickly pear cacti should be trimmed at the segment joints. Plants that must be completely removed should be cut as close as possible to the ground surface and dispersed in areas not clearly visible from the trail, or completely removed from the site. Refer to **Figure 11-6**.

FIGURE 11 - 6 VEGETATION CLEARANCE



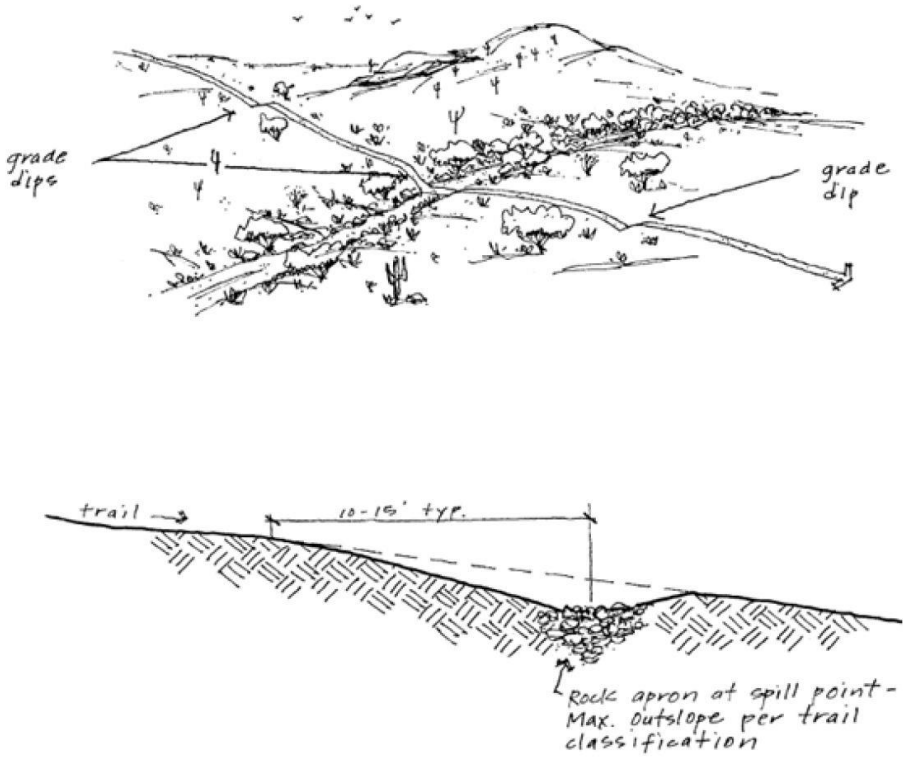
11.9.8 Surface Water Control

The proper control of surface water is a crucial element in trail design, construction and maintenance. Improper control will most likely have a negative effect on the surrounding environment and will result in damage to the trail that can be very expensive to repair. The need for surface water control structures depends on many different factors including, but not limited to soil type, longitudinal and cross slopes and existing drainage patterns. The most effective time to address surface water control issues is during initial trail design and construction.

- Grade Dips
  Grade dips are short segments of trail with a grade opposite to the prevailing longitudinal grade of the trail. They are most effective when installed during new trail construction and sited to take advantage of natural drainage patterns. The low point of the dip must be outsloped at the maximum percentage permitted for the given trail classification to assure that water will flow off and away from the trail. A rock apron may need to be constructed where the water flows out of the dip to prevent excessive erosion. Grade dips are generally more effective than waterbars, require less maintenance, and are more suitable for equestrians and mountain bicyclists. See **Figure 11-9** on the following page.

QUICK LINKS
Landscape Plan Review Process Guide

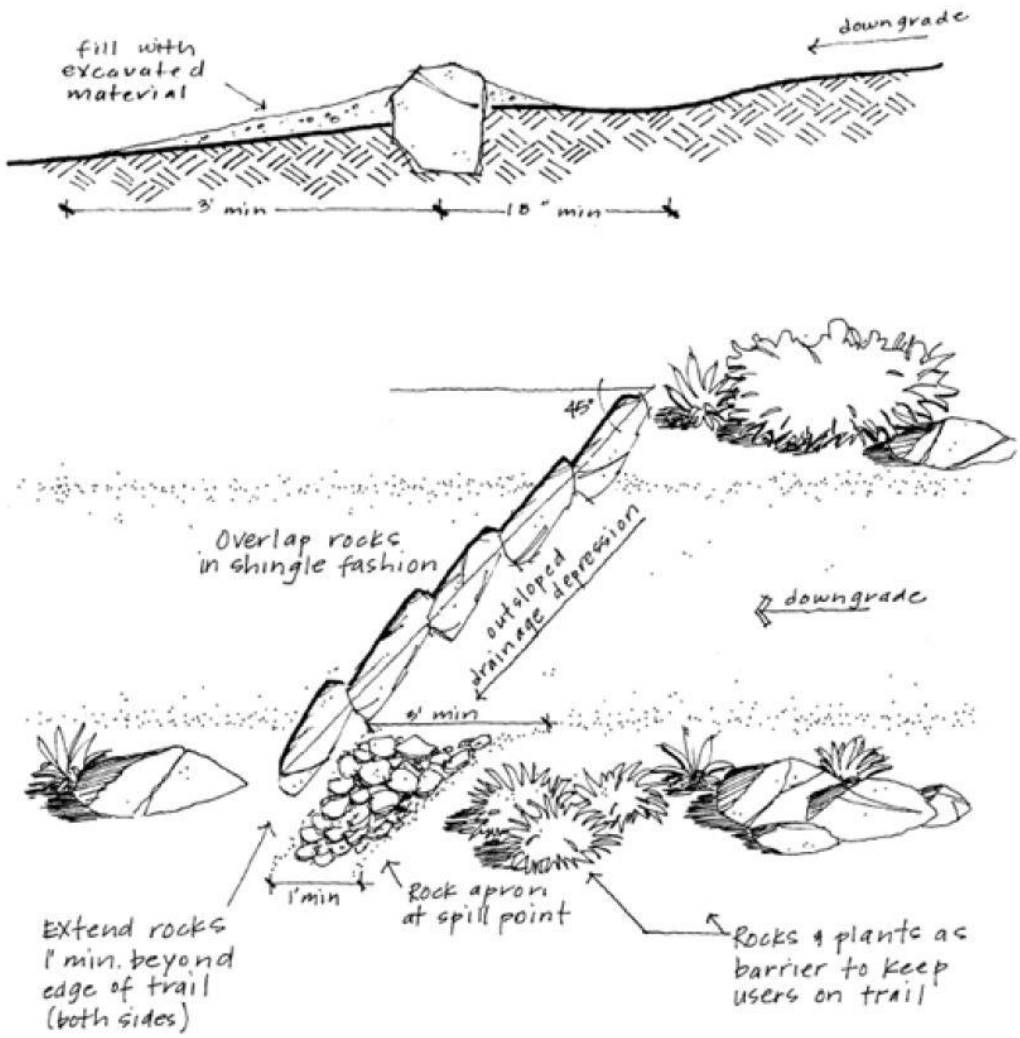
FIGURE 11 - 7 GRADE DIPS



- Rock Waterbar
  This type of waterbar is constructed by embedding large rectangular shaped rocks into the trail tread at a 45-degree angle to a depth roughly half their height. Rocks must be large enough to remain undisturbed by trail users and to effectively channel water off the trail. Rocks must be arranged in a shingle fashion, tightly overlapping each other towards the downhill side. Compact small rocks and fill around the base to ensure solid placement.

QUICK LINKS
Landscape Plan Review Process Guide

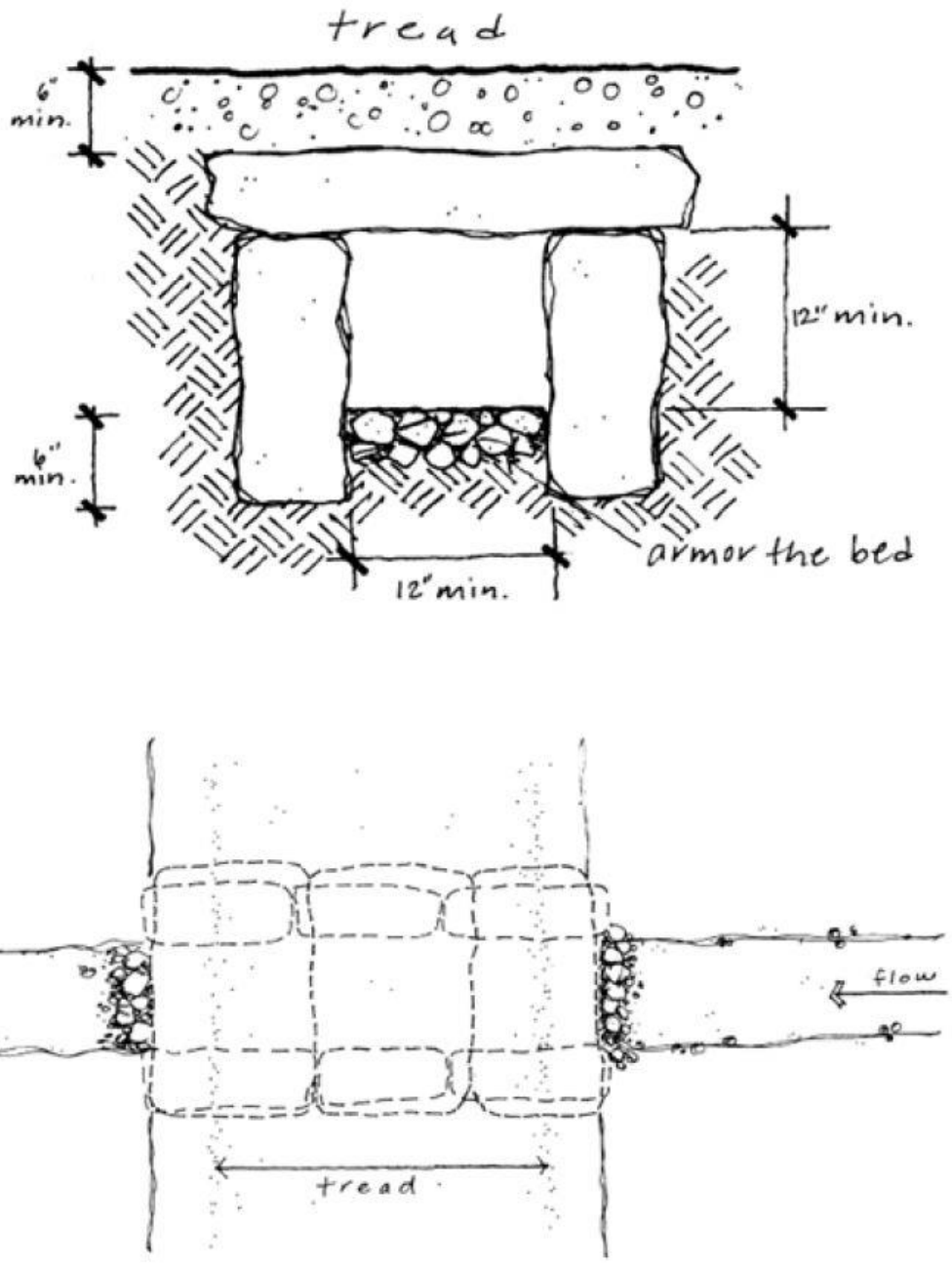
FIGURE 11 - 8 ROCK WATERBAR



- Culverts
  In desert environments, most watercourses flow only seasonally, therefore culverts are usually not necessary. Culverts tend to be maintenance intensive and can detract from the aesthetics of the natural environment. Culverts should only be constructed where a gentle grade must be maintained such as with a Barrier-free Trail or where there is permanently flowing water. In all other situations, a desert wash crossing should be used. Rock or pipe culverts must match the downstream gradient and have a diameter of at least 12 inches to accommodate necessary cleaning. Improperly constructed culverts will clog with debris, causing water to flow over and damage the trail tread. All rock used in the construction of culverts must be native.

- Rock Culvert
  The proper construction of rock culverts depends greatly on the proper selection and placement of rocks of sufficient size and shape. The bottom surface of the drainage must be armored with rocks to prevent erosion. Stone headwalls must be placed to armor the outside faces of the crossing. All rocks must be firmly placed similar to the construction of a retaining wall. Refer to **Figure 11-9** on the fallowing page.

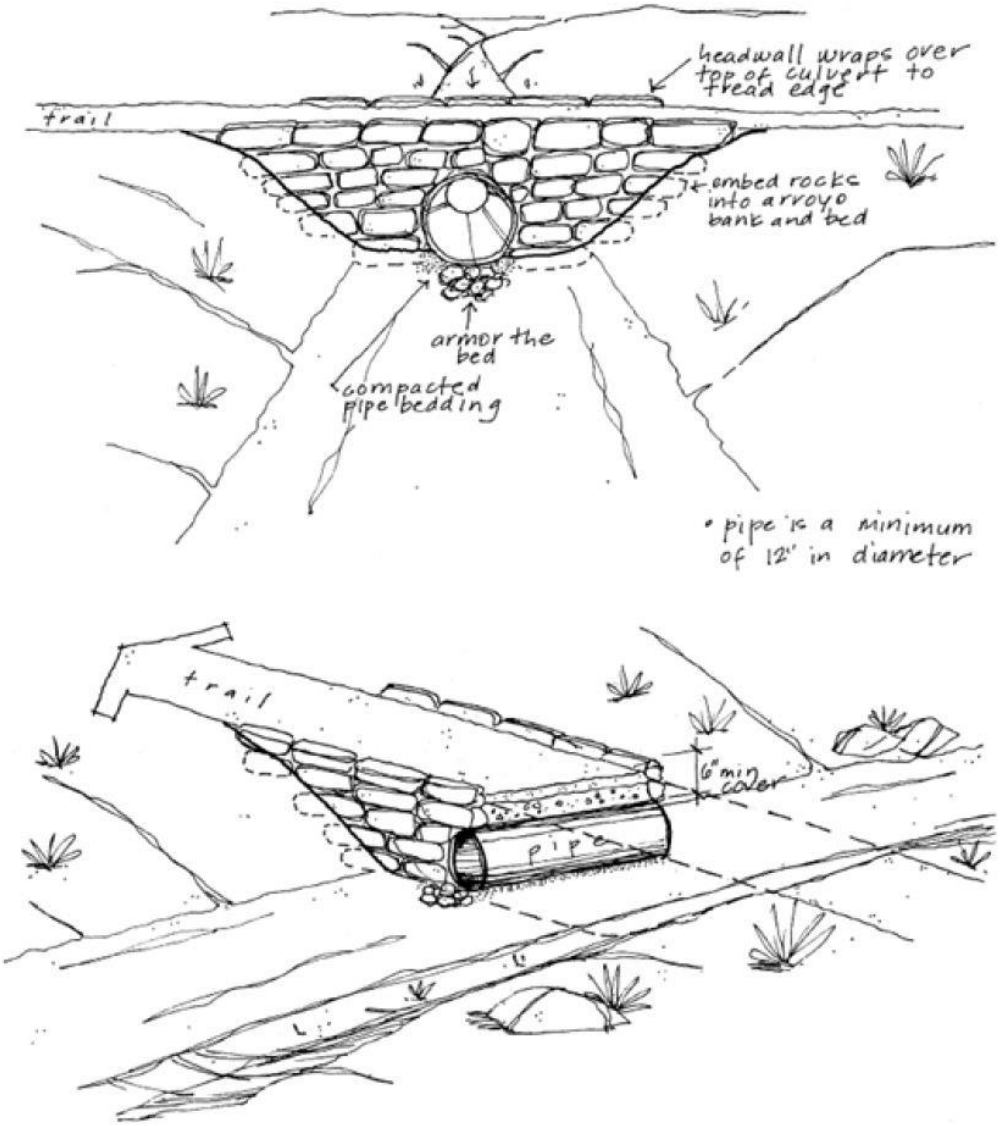
FIGURE 11 - 9 ROCK CULVERT



QUICK LINKS
Landscape Plan Review Process Guide

- Pipe Culvert
  Pipe diameter must be at least 12 inches. Embed the pipe in a stable foundation of gravel and soil and backfill with compacted gravel and soil. Construct a headwall of firmly placed native stone to protect the outside faces of the tread crossing and cover the pipe so it cannot be viewed from the trail. The trail tread should be at least 6 inches higher than the top of the pipe. See **Figure 11-10**.

FIGURE 11 - 10 PIPE CULVERT



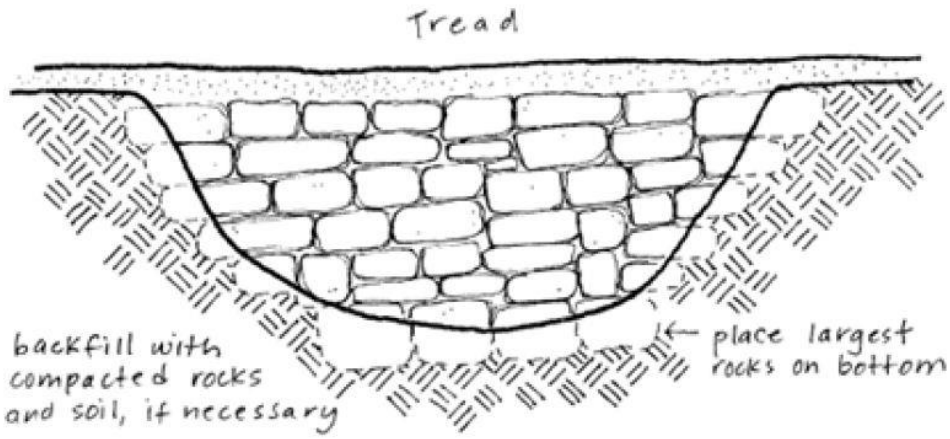
11.9.9 Special Structures

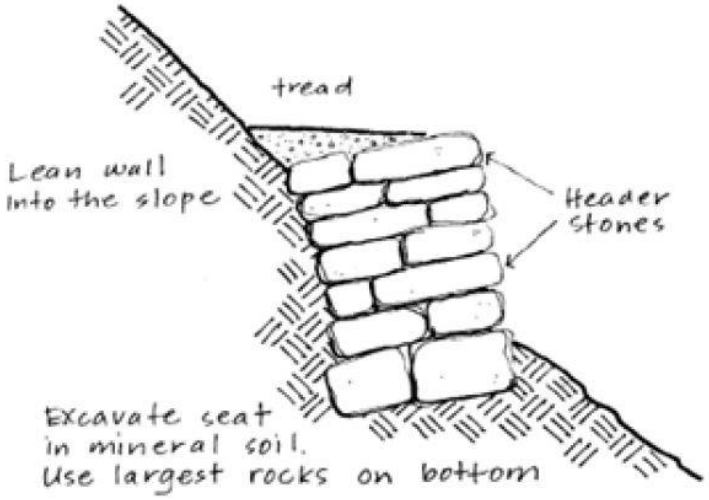
- Retaining Walls
  Retaining walls are stone structures used to stabilize trails on steep side slopes. A solid foundation is key to the strength and durability of a retaining wall. The foundation should be set in solid earth or rock, with

QUICK LINKS
Landscape Plan Review Process Guide

the base sloped inward towards the hillside. Rock used in construction should be derived from the surrounding area. Ideal rocks are durable, weather resistant and free of structural defects. Large rocks should be used in the foundation, smaller rocks in the middle tiers and large rocks again for the upper tiers. Approximately 25 percent of the rocks used in the wall must be header stones. A header stone is a rock placed with its longest dimension extending into the hillside, perpendicular to the face of the wall. All other rocks should be placed with their longest dimension parallel to the face of the wall. Thickness of the wall should be at least ½ its height, or 2 feet thick if the height is less than 5 feet. The outer face of the wall should slope inward towards the hillside at a rate of 3 inches per every 12 inches in height. Joints should be staggered at least 6 inches horizontally. Each rock should contact the rock below in at least three places. Shims must not be used because they are prone to shifting. If cement is used to provide additional stability, it must be colored to match the native rock. Backfill the wall with small stones and cover with soil until the proper tread surface is established. Refer to **Figure 11-11** below.

FIGURE 11 - 11 ROCK RETAINING WALLS



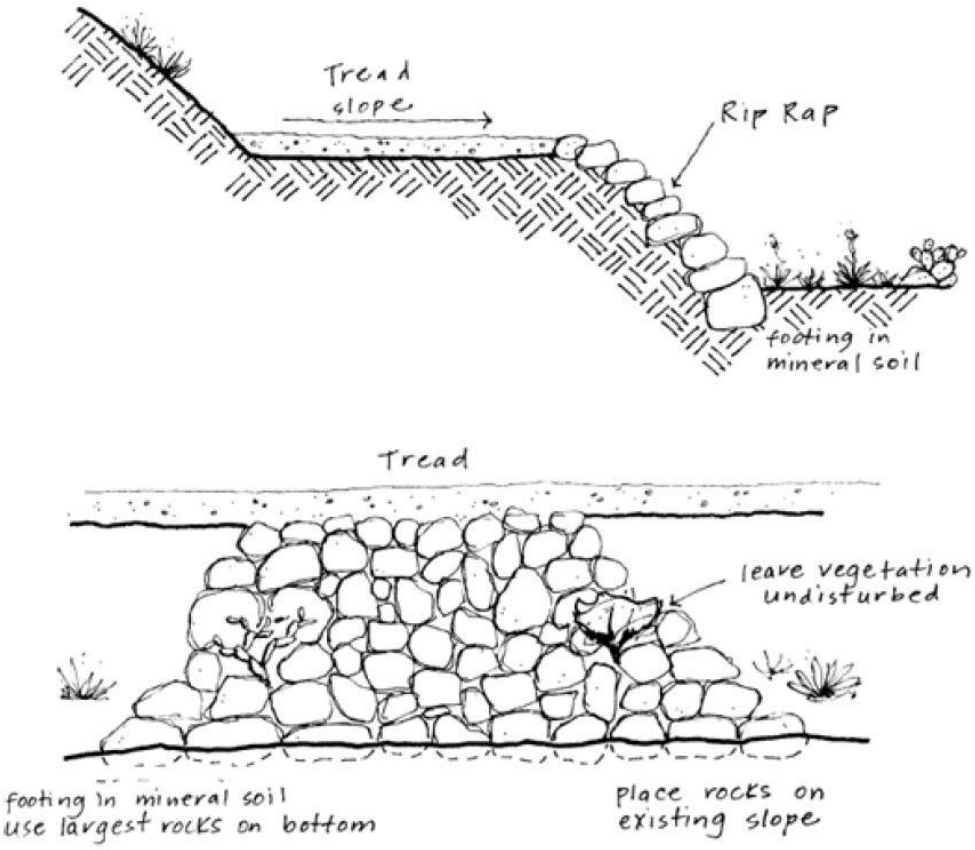


QUICK LINKS

Landscape Plan Review Process Guide

- Riprap
  Unlike a retaining wall, riprap does not support the weight of the trail tread. Instead, riprap is used to stabilize steep slopes above and below the trail tread (backslope and fillslope, respectively). Begin by clearing a firm foundation at the downhill edge of the riprap. Set the largest rocks in the foundation. Place smaller rocks on the surface of the slope continuing up the slope to the desired location. Be sure that the riprap does not impede the flow of surface water off the trail tread. Riprap can also be used to protect drainage and leadoff ditches from heavy erosion and to stabilize switchback turns. Riprap should be constructed of native rock. If cement is used to provide additional stability, it must be colored to match the native rock. Refer to **Figure 11-12** below.

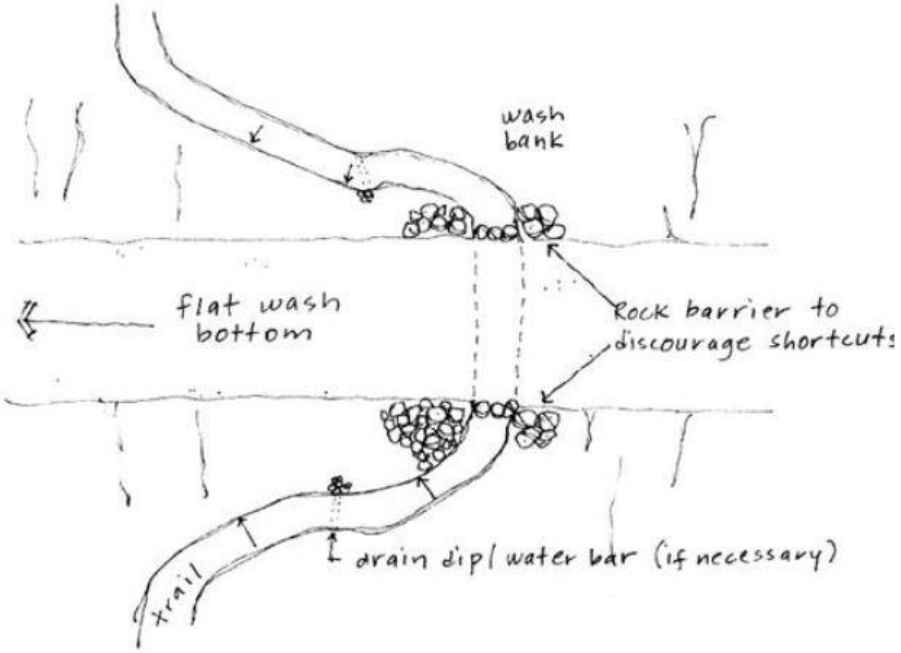
FIGURE 11 - 12 RIPRAP

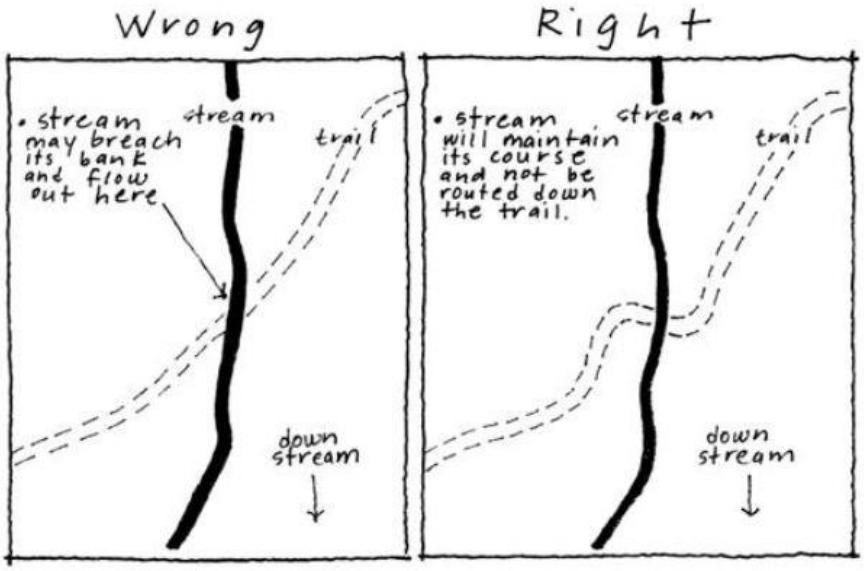


- Desert Wash Crossings
  When trails cross washes, the greatest concern is protecting the trail from flowing water. The trail segments approaching the crossing and the location where the trail meets each edge of the desert wash must be stabilized with securely placed rocks. Trail segments approaching the desert wash should range from 5 to 15 percent for all trail classifications and cross at a 90-degree angle to the desert wash to prevent water from leaving the primary channel and flowing along the trail surface. The slopes adjacent to the trail may need to be stabilized with riprap. A row of large

rocks should be embedded along the desert wash banks at the point of contact with the trail. Be sure that the flowing water will not undercut these rocks. Refer to **Figure 11-13** below.

FIGURE 11 - 13 DESERT WASH CROSSING



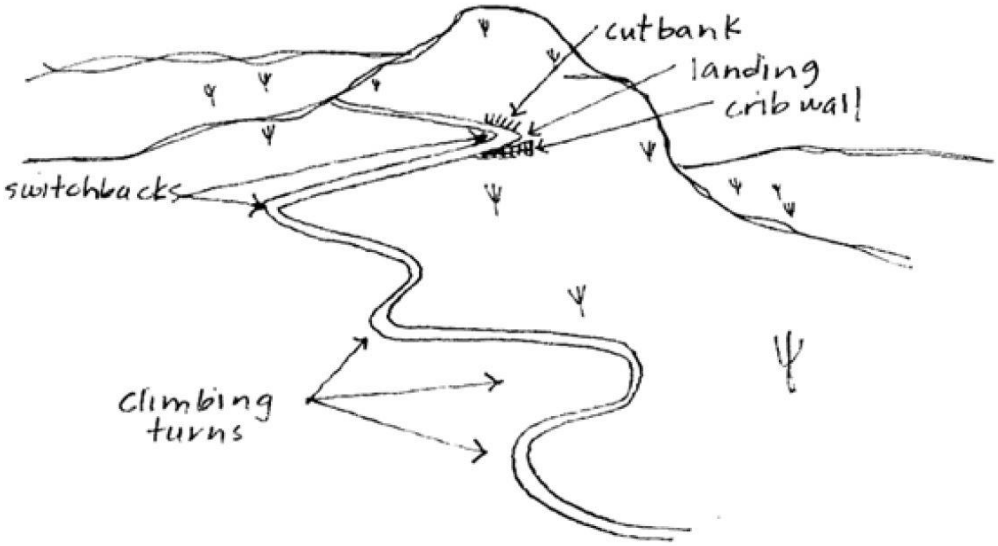


- Switchback and Climbing Turns
  These two trail design elements are used to change the direction of travel on a hillside and to gain elevation in a short distance. The difference between is that climbing turns maintain a consistent longitudinal slope through the turn, while switchbacks have a near level landing at the turning point. These structures can be very difficult to construct, therefore careful planning should be conducted to avoid using them. The Parks, Recreation and Community Facilities Department should be consulted in situations where switchbacks

QUICK LINKS
Landscape Plan Review Process Guide

may be necessary. Avoid stacking a set of many short switchbacks and/or climbing turns on a hillside. Longer trail segments between switchbacks and/or climbing turns are less visible and reduce short cutting by trail users. Understanding the psychology of the trail user is important in the design of these structures. The layout must convince users that the established trail is the easiest, most convenient route to ascend the slope. If users feel it is not, they will create short cuts, refer to **Figure 11-14** below.

FIGURE 11 - 14 SWITCHBACK AND CLIMBING TURN CONCEPTS



- <u>Switchback Turn</u>
  Switchback turns are typically used on side slopes of 20 to 45 percent, but can be used on slopes up to 55 percent with the use of retaining walls. These structures are extremely difficult and expensive to construct. Trail routes should be planned carefully to avoid areas of steep, impassible terrain that would require switchbacks.

  The key to a good switchback is proper placement on the terrain. Naturally occurring level areas or platforms are prime locations. Survey the hillside that the trail must ascend, locate the natural platforms and then connect the trail to these points. Trail segments leading to and away from the switchback must maintain the maximum longitudinal slope permitted for that trail classification. Locating switchbacks in areas where there are obstructions such as rock outcroppings or trees that will prevent short cutting is also desirable. Obstructions such as rocks, logs, or other debris may also be strategically placed to keep users from leaving the trail.

  Switchbacks consist of 2 approaches, a landing or turn platform, a drain for the upper approach and platform, and guide structures.

QUICK LINKS
Landscape Plan Review Process Guide

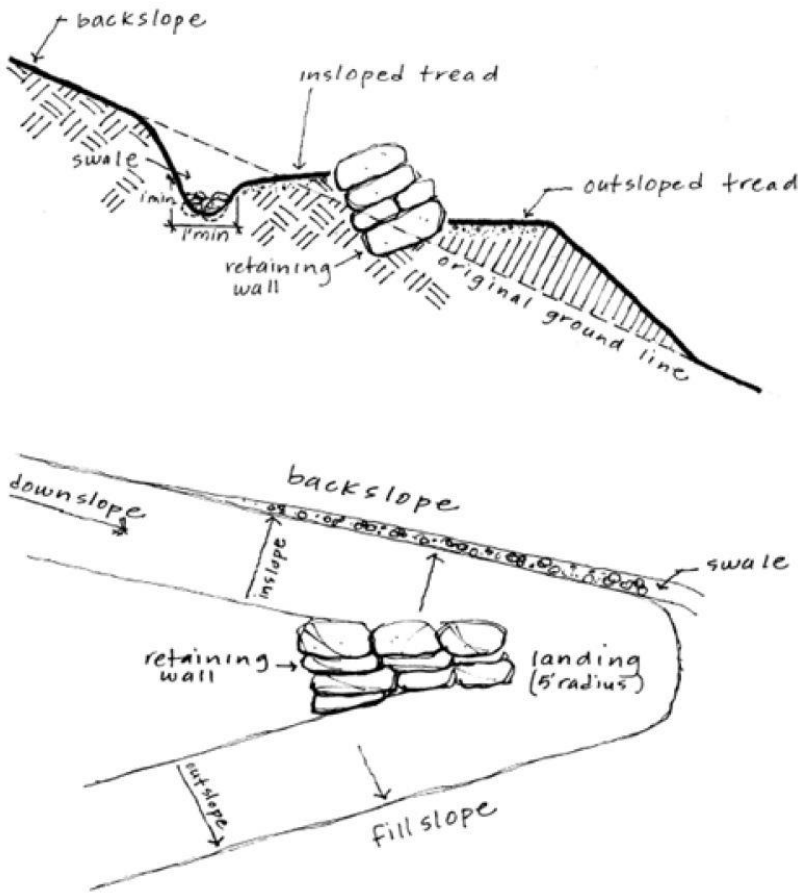
The upper approach and the upper half of the turn platform are excavated from the hillside. The lower approach and the lower half of the turn platform are constructed on fill. The construction of switchbacks on a full bench can be very labor intensive and expensive. The last 65 feet of each approach before reaching the turn platform should be as steep as the trail classification will allow. The last 10 feet of the approaches should be smoothly transitioned into the grade of the turn platform. A flat grade approaching the turn platform must be avoided because that design will cause trail users to short cut the switchback, refer to **Figure 11-15** below.

As the upper approach descends toward the turn, a drain dip should be installed. Below this point, the tread and the upper half of the turn platform must be insloped towards a swale. The ditch must be 1-foot-deep and 1-foot-wide and have a rock apron at the spill point.

The turn platform must not exceed a slope of 5 percent. The upper side is excavated from the hillside. The removed soil is then used to fill in the lower portion. Riprap or retaining walls may be required to provide stability to the backslope and fillslope. The turning radius must be no less than 8 feet to provide adequate turning area for equestrians and mountain bicyclists. The lower portion of the turn platform and the lower approach should be outsloped. Riprap or a retaining wall may be needed along the inner portion of the switchback to maintain the backslope of the lower approach.

QUICK LINKS
Landscape Plan Review Process Guide

FIGURE 11 - 15 SWITCHBACK TURN

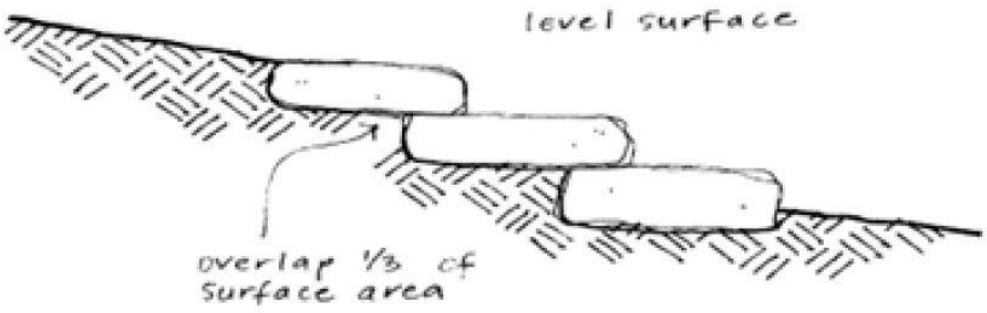


- Climbing Turns
  Climbing turns are similar to switchbacks because they are also used to reverse the direction of travel and gain elevation. Climbing turns differ however because they maintain a uniform longitudinal slope through the turn. There is no level turning platform. A climbing turn is built on the same slope as the hillside. Where the slope of the hillside turns, the climbing turn ascends at the same rate. Climbing turns must not be constructed on side slopes greater than 20 percent because they are prone to erosion. Climbing turns in appropriate terrain require very little work to construct. The approaches to the turn should be full bench construction. As the trail approaches the turn, the amount of excavation decreases. The turn itself requires no excavation other than the removal of the surface layer of leaf litter. Refer to **Figure 11-16** below.

FIGURE 11 - 16 CLIMBING TURN

- Steps
  The use of steps should be avoided due to unsuitability for equestrians and mountain bicyclists and excessive maintenance requirements. Steps should be used on hiker-only trails when elevation must be gained rapidly over a short distance and there is no other option. Steps must not be used on trails intended for use by equestrians or mountain bicyclists. Steps should be constructed of rock collected from the surrounding area. Rocks should be rectangular in shape, large enough to maintain their position (50 to 100 pounds each), and wide enough to span the width of the trail. Choose a location that will prevent trail users from traveling around the steps. Construction should begin with the lower steps and continue up the slope. Each step must be placed in an excavated seat and backfilled with small rocks and soil to assure stability. Refer to **Figure 11-17** below.

FIGURE 11 - 17 ROCK STEPS



QUICK LINKS
Landscape Plan Review Process Guide

- Trail Safety Barriers

    - Location
      The location of safety barriers should not restrict sight distances for roadway traffic or trail users. Refer to **Section 5.3** for roadway sight distance requirements. Special attention to the design and construction of barriers is particularly important near intersections. Safety barriers must be installed between a trail and a roadway if the trail is located within an unsafe distance to the roadway, or if the trail shares an underpass or overpass with a roadway. Safety barriers must also be installed if the trail is elevated above an adjacent roadway and the side slope is greater than 6:1, or where trails are in close proximity to other steep drop-offs. All safety barriers must be at least 3 feet from the edge of the trail.

    - Design Criteria
      Appropriate safety barriers include fences, railings, or suitably thick vegetation. Other types of materials may be suitable subsequent to approval of the Parks, Recreation and Community Facilities Department. The materials and character of the barrier must be compatible with adjacent development, landscaping and topography. The minimum height should be 4 feet for structural barriers and 5 feet for vegetation barriers.

    - Trail Access Gates
      Trail Access Gates may be required at the discretion of the Parks, Recreation and Community Facilities Department. Gates shall be designed to restrict motorized access to trails except as permitted for maintenance and emergency purposes. The gate design must permit equestrian passage without requiring the rider to dismount. These gates should be located at trailheads, where trails cross major roads, and at other points where motorized vehicles are likely to attempt to access a trail.

11.9.10 Road Crossings

- Overpasses
  An overpass is a structure spanning a roadway, canal, or desert wash, etc. that functions exclusively as a crossing for a shared-use trail. There are many different varieties of overpasses that may be acceptable. The Parks, Recreation and Community Facilities Department must be involved in the planning and design process, and must approve all overpasses prior to construction. In general, minimum clearance is 10 feet both horizontally and vertically.

- Bridges
  A bridge is a structure spanning a roadway, canal, desert wash, or other obstacle that serves as a crossing for a roadway as well as a shared-use trail. The Parks, Recreation and Community Facilities Department must be

QUICK LINKS
Landscape Plan Review Process Guide

involved in the planning and design process, and must approve all bridge crossings prior to construction. The minimum width of a trail crossing a bridge is 8 feet and the minimum vertical clearance is 10 feet.

- Underpasses
  These structures, used to provide passage for trail users under roadways, are typically constructed of pre-cast concrete box culverts. Other varieties of culverts are acceptable provided they meet the required dimensions and allow footing that is appropriate for all types of trail users. The width of a trail traveling through an underpass should not be less than 10 feet. Vertical clearance is an important concern, particularly for equestrian trail users. The minimum vertical clearance is 10 feet. Natural or vandal-resistant electric lighting should be installed for underpasses greater than 50 feet in length. Lighting shall achieve an average of 2- foot candles. Sight distances approaching and exiting the underpass must be adequate, to avoid creating a safety hazard. Underpass design should not allow for the accumulation of nuisance water on the trail. If water does not drain from the underpass by gravity flow, a pump system must be provided to remove the water. The surface of the underpass should be slip resistant, such as broom finished concrete.

- At-Grade Crossings
  An at-grade crossing occurs where a trail passes across the surface of a roadway. Safety of trail users is the primary concern when planning at-grade trail crossings. Ideal locations for such crossings are at roadway intersections with light amounts of traffic that have existing stop signs, traffic lights, or designated pedestrian crossings.

  Crossings should be on level grades where both trail users and motorists have long sight distances. Sight distances vary depending on the roadway classification; refer to Section 5.3 for more details. Additional safety precautions include installing pedestrian activated traffic signals, signs warning motorists of the trail crossing and signs warning the trail users of the road crossing.

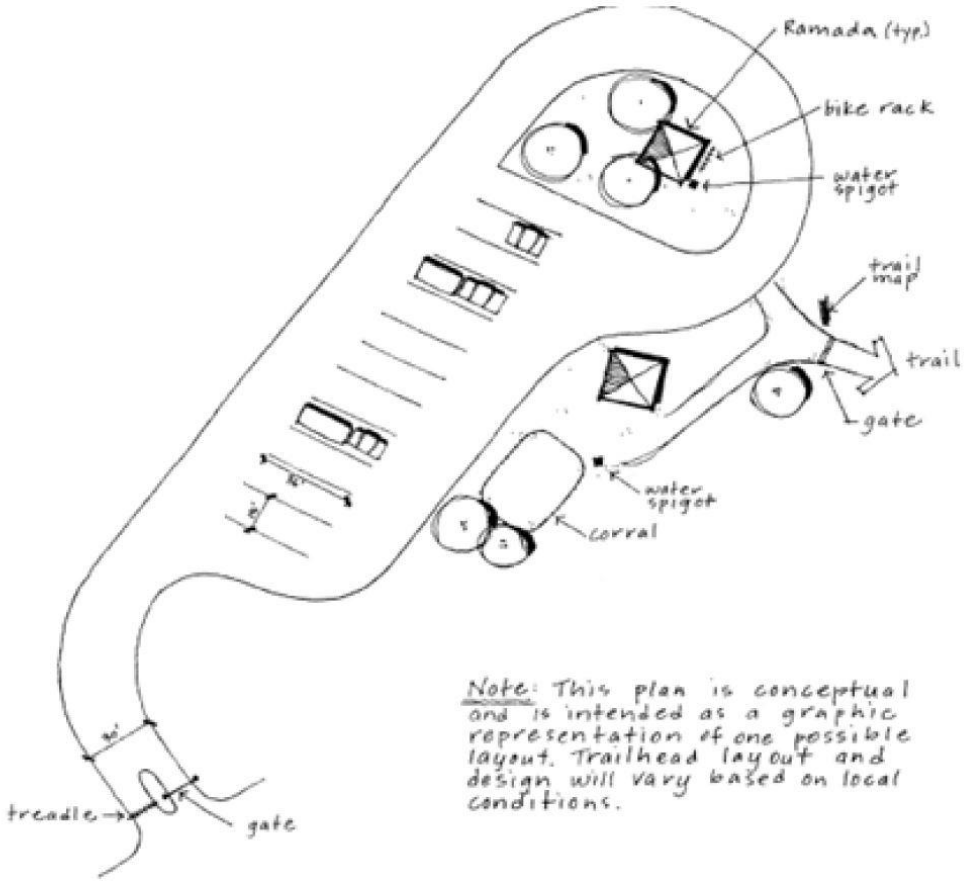
11.9.11 Trail Access Facilities

The design criteria for trail access facilities addressed in this Manual are conceptual. The planning, design and construction of such facilities will be conducted on a case-by- case basis and will require various levels of City review and approval beyond the scope of this Manual. Potential trailhead amenities include, but are not limited to, pull through horse trailer parking spaces; regular vehicle parking spaces; potable drinking water; water troughs for horses; hitching posts or corrals; year-round natural shade areas; bike racks; informational, interpretive and directional signage; entrance gates; restrooms; shade ramadas; and picnic tables. Refer to **Figure 11-18** below.

QUICK LINKS

Landscape Plan Review Process Guide

FIGURE 11 - 18 TRAIL ACCESS FACILITY CONCEPT



11.9.12 Trail Signs and Markers

- Sign Locations

  The proper location of signage is important in maintaining the safety of trail users, preserving the natural environment and promoting the presence of the trail. The number and location of signs should be carefully considered, as a lack of signage or poorly located signs can create hazardous situations for trail users. An overabundance of signs can also detract from the aesthetics of the trail and decrease the quality of the trail user's experience.

  Trail signs are typically located at trail intersections, locations where trails cross roadways and any other areas where it may be difficult to follow the route of the trail. Trail signs should be placed 1.5 feet to 3 feet from the edge of the trail. Refer to the Trails and Wayfinding Study.

QUICK LINKS

Landscape Plan Review Process Guide

12. PUBLIC UTILITIES – NON-CITY UTILITIES

12.1 Purpose

The City of Peoria administers all utility planning, permitting and construction processes in accordance with the Maricopa Association of Governments (MAG) Uniform Standard Specifications, the City of Peoria Supplement to MAG and the Arizona Utility Coordinating Committee (AUCC) Public Improvement Project Guide (PIPG).

The purpose of this Chapter is to present to those design professionals involved in a private land development projects, City projects other public utility projects, City franchisee's or City Licensee's that provide utility service, general information regarding the processes that are required during the construction document preparation, plan review, approval and permitting stages and provide construction guidelines for working in the public rights-of-way, public utility easements, and City of Peoria owned property.

12.2 City Code and Ordinances

The City of Peoria grants permission for placement of all proposed utilities and for all construction or maintenance work in public rights-of-way and public utility easements by issuing a permit, as specified in Chapters 19 and 23 of the City Code.

12.2.1 Telecommunications

No telecommunications corporation shall install, operate, maintain, construct telecommunications in the Public Highway of the City, or provide telecommunications service by means of facilities as installed, maintained or constructed in the City's rights-of-way or easements, unless a license to use the highways, has first been granted by City Council under Chapter 23 of the Peoria City Code.

12.2.2 Cable

A non-exclusive license to construct, operate, maintain, a cable system, within all or any portion of the City is required of anyone desiring to provide cable television service in the City. A license may be granted by City under Chapter 19 of the Peoria City Code. For additional information regarding the process to obtain a Cable License Agreement, please contact the Development and Engineering Department.

12.2.3 Pavement Cuts

Peoria City Code requires all pavement cut activities to have an approved permit and location be restored in accordance with City standards and specifications. Chapter 23 of the City Code requires a pavement restoration fee for cutting pavement that is newer than 3 years old. The City has established a pavement cut rate structure based on pavement age and size of cut. Pavement cuts include potholes, pavement damage, trenching, etc.

Due to the City's Pavement Management Program, efforts are made to avoid cutting new street pavement or newly resurfaced pavement. In the event that a

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

street opening occurs in pavement less than 3 years old cannot be avoided, a surcharge fee to cover damages and early deterioration will be assessed based on the fees shown in the City Code. On joint trench projects, the surcharge fee will be apportioned to the participating utilities. Potholing will not be exempt from the surcharge. Resurfaced pavements include micro-surfacing, slurry sealing and local street fog seals.

The City finds and determines that pavement cuts cause early deterioration of streets and imposes the following surcharge fees to cover damages and early deterioration as established by Chapter 23 of the City Code.

These surcharge fees are assessed in addition to the regular permit fees and are over and above any special backfill, compaction and pavement replacement stipulations that may be imposed as a condition of permitting. Refer to City of Peoria Development Fee Schedule (See Quick Links).

The pavement cut surcharge fee may be waived by the City Manager or his designee upon a finding by a preponderance of the evidence that all of the following conditions have been met:

- The pavement cut is not the result of improper planning or a lack of diligence on the part of the applicant.
- The pavement cut could not have been made prior to the installation of new paving
- The cut cannot be avoided by routing the line in a different manner or taking any other action.

For those streets that have been subject to pavement maintenance within the last 3 years, the applicant shall provide the same type of maintenance on the half street where the cut is made for a distance of 50-feet from each end of the pavement cut.

For all other streets, the applicant shall provide the same type of maintenance on the half-street where the cut is made for a distance of 50-feet from each end of the pavement cut.

12.2.4 Work Hours

All construction activity within the City of Peoria must comply with Chapter 13 of the City Code.

You must comply with Peoria Ordinance #06-32 restricting outdoor construction hours as listed below:

Construction Type	April 2 – September 29	September 30 – April 1
Concrete Work	5:00 a.m. to 7:00 p.m.	6:00 a.m. to 7:00 p.m.
Construction Work, within 500 ft. of Residential Area	6:00 a.m. to 7:00 p.m.	7:00 a.m. to 7:00 p.m.
Construction Work, more than 500 ft. of Residential Area	5:00 a.m. to 7:00 p.m.	5:00 a.m. to 7:00 p.m.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

Daily work locations must be submitted on the standard City form. This form must be submitted to the City by 6:30 a.m., and 24-hours in advance of the work scheduled. There will be a limit of six work locations within the City (per utility company) per day. Work location sheets should be faxed to the City's Engineering Inspector Supervisor, at (623) 773-5371.

Weekend/holiday or "off-hour" work is not permitted without the prior approval of the Engineering Inspection Supervisor.

Work Hours within Public Rights-of-Way
No interference with traffic flow on arterial streets shall be permitted during the hours of 7:00 a.m. to 9:00 a.m. or from 4:00 p.m. to 6:00 p.m., unless prior authorization is obtained in writing from the City of Peoria Traffic Engineer or their designee.

Moratorium
During certain times of the year and during special events the City of Peoria does not allow pavement cuts and/or lane restrictions Due to the high volume of traffic in these areas, the City tries not to disrupt traffic flow with barricading and plates. The City of Peoria will notify the utility companies of any restrictions to construction when the companies call-in to start construction.

12.2.5 Stormwater Management

Property owners, developers, engineers and construction personnel are required to develop plans and implement methods to control pollutants associated with stormwater discharges from construction activities. The plans and methods to control discharges from construction sites are required to comply with the City's Stormwater Management Plan, MS4 Permit and Chapter 24 of the City Code adopted as a result of changes in stormwater pollution regulations.

A Construction General Permit (CGP) for stormwater discharges that enter Arizona surface waters or a Municipal Separate Storm Sewer System (MS4) leading to Arizona surface waters, will be required if:

- Construction activities disturb 1 or more of acres of land
- Construction activities disturb less than 1 acre but are part of a larger common plan of development or sale that will ultimately disturb 1 acre or more
- Support activities from temporary plants or operations set up to produce concrete, asphalt or other materials exclusively for the permitted construction project

A Stormwater Pollution Prevention Plan (SWPPP) shall be prepared and shall accompany the non-City owned utility plan submittal for an area of land disturbance more than 1 acre.

For an area of land disturbance of less than 1 acre a "Best Management Practices (BMP) Exhibit shall be included and demonstrate placement of controls (BMPs) to prevent runoff of pollutants into any stormwater system or adjacent property.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

The exhibit shall include any perimeter control, drainage inlet protection devices, and wash protection devices necessary to control erosion and to prevent sediments and pollutants from leaving the site. Exhibits shall also identify the person responsible for implementation and maintenance of BMPs. Exhibits are considered to be living documents that are subject to change until the project is complete.

View AZPDES Stormwater Construction Activity General Permit (CGP) and fact sheet on the ADEQ website.

A SWPPP is required prior to submitting a Notice of intent (NOI) for the CGP. ADEQ offers a checklist and template to help operators ensure the site SWPPP meets permit requirements. The checklist includes guidance for preparing your initial SWPPP, as well as information to include throughout the duration of your construction project, such as control measures, inspections and corrective actions.

Even if the proposed work does not trigger a CGP, the City will expect that the utility stakeholder and its' contractor control erosion within the construction area and provide Best Management Practices to eliminate any and all sediment leaving the site.

12.3 Applicability

This Chapter identifies minimum criteria for design, permitting, construction and installation of private utilities in dedicated City Rights-of-Way (ROW), private streets and Public Utility Easements (PUE) per Chapter 23 of the City Code. Work completed in violation of this section shall be subject to investigative and remediation fees set forth by Chapter 2 of the City Code.

12.4 General Information

The City of Peoria grants permission for placement of all proposed utilities and for all construction or maintenance work in public rights-of-way and public utility easements through the Right-of-way/construction permits process. These permits are issued to utility companies, irrigation, power companies, governmental agencies, as well as other private companies providing cable television, communication lines, telecommunications, electricity, gas, irrigation, and wireless providers.

A Non-City utility is a company, corporation or entity that provide some type of utility service, whether it is electricity, telecommunications, water, or information services that are not owned, operated or generated by the City of Peoria, within the City of Peoria. Any use of "Non-City Utility" will refer back to this statement for clarification.

Non-City utilities are provided by but not limited to the following companies or utilities: Arizona Water Company, AT&T, Cox Communications, CenturyLink, Roosevelt Water Conservation District, Salt River Project, Southwest Gas Corporation, Arizona Public Service, Sunrise Water Company, Rose Valley Water, Valencia Water District, Maricopa County Department of Transportation, Accipiter Communications, Arizona Department of Transportation, Maricopa Water District, and wireless providers.

QUICK LINKS
City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

12.4.1 Placement in Right-Of-Way & Easements

A Non-City Utility is allowed to place facilities within the dedicated City's rights-of-way and public easements subject to the permit review and approval by the City of Peoria. All other private facilities are prohibited from utilizing the public rights-of-way and public easements without an executed license or franchise agreement, and an encroachment permit. In order to prevent or reduce utility conflicts between the City utilities and those provided by other companies, the City of Peoria has adopted ordinances and standards to regulate the use of the public rights-of-way, which includes dedicated right-of-way for public streets as well as the public utilities and facilities easements (PUFE) and public utility easements (PUE).

12.4.2 Availability of Non-City Utilities

The City does not provide information on Non-City Utilities. Questions regarding the products, services, operations and processes of the various utility providers should be directed to the individual utility companies

12.4.3 Coordination Required

The City of Peoria requires that Non-City Utility providers coordinate the location of their Non-City utilities/facilities within the public right-of-way and easements and within private streets. This coordination should be reflected on the plans submitted for review.

12.4.4 Conflict Review

The City of Peoria requires submittal of communication with all potential utility conflicts within the project area. This includes other Non-City Utilities as well as City Utilities. Proof of utility conflict resolution will be provided with the plan review.

12.4.5 Undergrounding

City policy requires that all electric lines and communication lines shall be constructed underground in accordance with the requirements of the Arizona Corporation Commission. Requests for overhead installation shall be submitted through the waiver process. Minimum overhead clearance shall be 18 feet. Overhead lines shall not obstruct or interfere with traffic signal visibility.

The underground installation shall comply with all utility company's requirements.

All required undergrounding of overhead utility lines, either within a proposed development project or within public rights-of-way or easements adjacent to the project, shall be completed prior to issuance of a certificate of occupancy.

In those instances where poles to be removed include street lights, the street lights shall be replaced with freestanding poles by the developer in accordance with current City street light standards.

12.4.6 Permit Required

Projects where the (re)developer's contractor(s) will be installing facilities (i.e., conduit) for the use of the Non-City Utilities are required to obtain a separate Right-Of-Way Permit.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

A contractor with the appropriate license, current City of Peoria business license, and current Certificate of Insurance on file may obtain this permit from the Permit Services Section of the Development and Engineering Department.

Permits for Maintenance or Repairs
Any maintenance or repairs performed on facilities located in the public right of way, public utility easements, or public utility and facility easements will require:

- That construction plans be submitted to the Development and Engineering Department for review, comment and/or approval.
- The contactor shall obtain a right of way permit from the Permit Counter of the Development and Engineering Department before repairs are made

12.5 Types of Permit

Permits are required for not only constructing or maintaining utility company facilities within rights-of-way, but also for all barricading for traffic control and locating existing facilities within public rights-of- way and public utility easements.

The City of Peoria requires permits in order to ensure that all utility company facilities are:

- Constructed in the proper location with adequate spacing.
- Built with acceptable materials and in accordance with current specifications.
- Installed in a safe manner.

In addition, the permit ensures:

- Infrastructure is protected.
- Landscaping is restored.
- Final completion is assured and accepted.
- Liability issues are properly addressed.

Engineered construction plans must be submitted for review as part of the permit process. The objectives are to make optimum utilization of the space available in the public rights-of-way and public utility easements to ensure compliance with all City policies; to coordinate with the construction work of other utility companies, agencies, and City projects; and to reduce risk and inconvenience to the public.

A general list of the permits issued by the Development and Engineering Department for work in the right-of-way is as follows:

12.5.1 Utility Permit

A Utility Permit issued by the Development and Engineering Department is required in order for work, trenching, potholing, boring, and maintenance to take place within the right-of-way. This permit allows the utility company, or a contractor hired by a utility company to conduct work within the right-of-way and is required prior to submitting the Traffic Control Plan. The permit number shall

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

be identified on the Traffic Control Plan (TCP) so that Traffic Engineering staff has all the information necessary to proceed with review of the TCP.

If the permit application is contingent upon a customer/developer provided trench and conduit, a trenching permit shall be obtained by the customer. No work shall begin within City right-of-way until the customer trenching permit has been issued.

12.5.2 Pothole Permit

If the permit application is contingent upon a customer/developer needing to pothole within City right-of-way to verify utility depths or pothole for any other reason, a pothole permit shall be obtained by the customer needing to pothole. No work shall begin within City right-of-way until either a miscellaneous trenching permit or pothole permit has been issued.

Vacuum excavation in the right-of-way shall be accomplished as follows:

1. A pothole permit is required for all utility location work, and an approved traffic plan must be with the crew at all times.
2. A site plan must be submitted to Engineering showing the location and quantity of potholes.
3. Potholes shall not exceed 12” x 12” and shall conform to MAG Standard Detail 212, and MAG Specification 355.
4. Within seven working days of the vacuum excavation a 6-inch thick hot mix permanent patch, placed in 2-inch lifts, will be placed over one of the following backfill strategies:
    - Pea gravel for full depth on holes to be re-excavated.
    - ½ sack CLSM from 6 inches above the top of the highest utility to the bottom of the new asphalt.
    - No steel plates or plugs will be allowed.
5. Unauthorized nighttime/weekend digging will not be allowed. At least one hole at each location must be marked with the initials of the excavating company. A spray stencil is acceptable.

12.5.3 Annual Emergency Permit

If the permit application is contingent upon a customer needing to repair or replace its facilities due to an emergency situation within the City right-of-way, an annual blanket permit shall be obtained by the customer. No work shall begin within City right-of-way until the annual blanket permit has been issued. Emergency shall be defined as anything that results in the unplanned disruption of existing service. Excavation is allowed under this permit. A pre-construction conference with City of Peoria staff is required before the start of any work related to this permit.

The exception to this rule is when a temporary facility is being constructed for the purpose of continuing an unexpected service disruption. In this case, a pre-construction conference is not required but notice within 24 hours to the City of Peoria Engineering Department Inspection Division via the on-line “Notice of Construction” is required. A Utility Permit submittal as a follow up to the

emergency construction work is required. Any temporary lines shall be removed within a six-week time-frame.

Other work allowed under the blanket permit:

- Emergency work.
- Non-emergency work that **IS NOT** in, or adjacent to, an arterial or collector street.
- Window cuts are restricted to MAG Section 355 - Utility Potholes - Keyhole Method unless otherwise approved in writing by the Engineering Director or his designee.
- Boring: Only "directional boring" will be allowed under the blanket permit.
- Emergency access to manholes, vaults, valves, etc.

12.5.4 Annual Maintenance Permit

If the permit application is contingent upon a customer needing to maintain its facilities within the City right-of-way, an annual maintenance permit shall be obtained by the customer. No work shall begin within City right-of-way until the semi-annual maintenance permit has been issued. Maintenance shall be defined as access to existing facilities to perform operations where no excavation is needed.

12.5.5 Traffic Control Plan

Although, it is not part of the construction plans that must be submitted, a Traffic Control Plan (TCP) must be approved by the City before construction may commence. A completed TCP submittal form and the traffic control plan must be submitted electronically via e-mail to the TCP mailbox at "tcp@peoriaaz.gov"

The Development and Engineering Department shall determine if traffic hazards at construction projects warrant the use of Police Assistants or AZ Post Certified Peace Officers to provide traffic control services. All City of Peoria projects shall use only City of Peoria Police Assistants or City of Peoria AZ Post Certified Officers, unless the Police Chief or their designee has determined that no such assistants or officers are available. Arrangements for Police Assistant or Police Officer services should be made with the liaison officer at the Peoria Police Department via email at "offduty@peoriaaz.gov"

12.6 Permit Application Plan Submittal and Approval

12.6.1 Minimum Standards

Submittals of the construction documents for the proposed Non-City Utility shall be made to the Engineering Counter.

Non-City Utility plans are typically submitted to the City by the public or private utility for approval to place their facilities within the public rights-of-way and public easements. The Non-City Utility facilities range from totally utility owned & provided to utility facilities within a developer provided conduit.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

The City of Peoria "Utilities Permit Application" is a one page, application that is filled out, signed by an appropriate and authorized representative of the utility provider, and included with the construction plan submittal.

A "Permit Application Form" is submitted to the City of Peoria Development and Engineering Department together with a minimum of three (four if the customer will be providing the trenching and conduit) complete sets of construction plans (drawings, details, notes, etc.). At least one set shall be an 11"x 17" size.

Prior to submittal of the permit application, the utility company is encouraged to verify and reconcile the address selected for the work. The verification can be made at the Development and Engineering Department. Upon receiving the application and plans, a technical review will be performed by the City in order to:

- Verify that the work is in the public right-of-way or public utility easement;
- Check for compliance with construction standards and City requirements;
- Approve alignments;
- Determine if the work is associated with a City of Peoria Capital Improvement Program (CIP) project;
- Determine if other work is occurring at the same time or on the same site;
- Verify that all joint trench opportunities have been incorporated into the design;
- Check for facilities alignment conflicts;
- Determine if the work is in newly paved streets or alleys;
- Check traffic flow requirements;
- Verify that proper pavement replacement or horizontal drilling requirements have been incorporated into the plans.

The City requires that all permitted projects comply with the Arizona Utility Coordinating Committee project models, including the Joint Trench Use Model and the Western Underground Trench Formula.

12.6.2 Telecommunications Cable Installation (Copper or Fiber Optic)

Cable providing telecommunications service by connecting regions or by connecting central offices within a metropolitan area, known as "Trunk Lines," shall be installed as described below:

- If the cable is to be installed within an open trench then the cable shall be placed within a schedule 40 PVC or an approved equivalent conduit. The conduit shall be buried at a minimum depth of 48 inches, measured to the top of the conduit. A 6-inch thick colored concrete cap shall be poured above the conduit. Color coded plastic warning tape with a minimum thickness of 5 mil and a minimum width of 3 inches shall be installed in the trench above and centered over the concrete cap at a depth of 12 to 18 inches below the surface.
- Cable crossing under existing paved streets shall be accomplished by jacking or boring unless open trenching is authorized by the City Engineer. The cable shall be placed within a schedule 40 PVC conduit, or approved equivalent, at a minimum depth of 48 inches.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

- Cables that are installed in existing duct banks shall be placed in a manner that provides the best protection for the cables in order to minimize the chance for damage to the cables by excavation around the duct banks.

Telecommunications cables other than "Trunk Lines" shall be installed as described below:

- If a cable is to be installed within the right-of-way of a local street then it shall be placed within a schedule 40 PVC or approved equivalent conduit. The conduit shall be placed at a minimum depth of 36 inches. However if the conduit is placed under a planned street pavement, it shall be placed at a minimum depth of 48 inches.
- Cable crossings under existing paved streets shall be accomplished by jacking or boring, unless open trenching is authorized by the Engineering Director.
- Cables to be installed in existing duct banks shall be placed within the bank in a manner that provides protection appropriate for the level of service provided by the cable. If a cable that is to be installed is fiber optic then a tracing or locating wire shall be installed in the conduit or the trench.

12.6.3 Wireless Telecommunication Equipment

The following design standards are available on the City's website and shall apply, in addition to the Notice of Antenna Site Standard Terms and Conditions, to a Small Wireless Facility proposed in the City of Peoria Right-of-Way.

- Small Cell Design Criteria – New Vertically
- Small Cell Design Criteria – Traffic Signals
- Small Cell Design Criteria – Existing Streetlights

Each site shall meet the minimum requirements. Staff will work with applicants to locate their Small Wireless Facility in the proposed location while minimizing negative impacts to the right-of-way. These design standards are not exhaustive, and the City retains the right to modify or adjust the requirements on a case-by-case basis.

12.6.4 Flood Irrigation Facilities

A. <u>Storm Drain Connections</u>

The City of Peoria prohibits the connection of any flood irrigation system to a public storm drain facility.

The City of Peoria prohibits the connection of any storm drain facility accepting public street storm water runoff, directly or indirectly, to the Salt River Project Irrigation System.

B. <u>Access to Facilities</u>

The City of Peoria requires that access to irrigation facilities be provided from the property side of the site. Public streets shall not be blocked and the public

street vertical curb shall not be mounted during operation or maintenance of irrigation structures.

C. Abandonment

The abandonment, retirement, deactivation and re-establishment of Salt River Project irrigation facilities requires:

- The Developer shall coordinate the request to deactivate Salt River Project irrigation facilities through the City of Peoria.
- The Developer shall enter into a re-establishment agreement with Salt River Project, if requested by the City or Salt River Project.
- The costs of re-establishing a Salt River Project facility will be borne by the Developer, the Developer's heirs or assignees.

12.6.5 Private Water Companies

Private Water Companies: For those land development projects that will be provided water utility service from private water companies, the City of Peoria will require:

- Improvement plans submitted for review that contains the water system design along with construction notes.
- A copy of the approval from the private water company to install their water utility mains & facilities within City of Peoria's rights of way and public utility easements.
- Upon plan approval, a separate Right-Of-Way Permit will be required to install these facilities.

12.6.6 Engineered Plans

Engineered construction plans must be submitted for review as part of the permit process. The objectives are to make optimum utilization of the space available in the public rights-of-way and public utility easements to ensure compliance with all City policies; to coordinate with construction work of other utility companies, agencies, and City projects; and to reduce risk and inconvenience to the public.

The purpose of this section is to provide the designer with information that is necessary to assist in the approval of utility plans. A list of common/generic items that must be included on all construction plans is provided below. This list should not be construed as an all-inclusive list as there may be specific information required by the reviewer to clearly identify scope of work. The following items are minimum requirements and should assist the designer in the development and approval of the utility plans.

Construction plans should contain as much information as possible to ensure approval. The following checklist is to offer comments on the plans submitted for approval for a utility construction permit. The checklist also serves to minimize comments on the plans and to maintain consistency among plan reviewers. Plan approval and issuing permits depend on following this section and providing all required and pertinent information on the construction documents.

A. Construction Plan Requirements

1. Job name/project name (development projects)
2. Work order number
3. Existing and proposed rights-of-way/ tract(s) and adjacent easements with dimensions. Right-of-way lines shall be labeled “RW” or “ROW”
4. Dimensioned ties to monument lines in streets and to property lines in alley and easements
5. Identify and dimension paving improvements. A typical detail is sufficient for every right-of-way on plan. Detail should include lip-of-gutter, curb, back of sidewalk, and front of sidewalk if not adjacent to the curb in areas with new development all existing and proposed paving improvement should be shown
6. A scale or dimension adequate to depict relationships among the physical features within the construction site and to identify potential conflicts. Scale should be no smaller than 1” = 40’.
7. All existing and/or proposed facilities that the proposed construction would cross and/or parallel within the limits of the right-of-way
8. Storm drains, sanitary sewer lines, water lines, over 12" in diameter shall be drawn to scale. All conduit systems over 12” in diameter or wide shall be shown to scale if proposed construction is within 2’ of existing conduit system
9. Locations and limits of proposed construction. Clearly differentiate between City of Peoria and others’ rights-of-way including but not limited to: Maricopa County, State Land, and ADOT
10. Aerial and underground utility crossings at a 90-degree angle to the road centerline
11. Current topography showing what exists in area of proposed construction that would be affected by that proposed construction
12. Vicinity map indicating major cross streets
13. North arrow, preferably with north up or to the right
14. A legend showing all symbols used on drawings
15. Blue stake note or symbol and information
16. Street names
17. Completed title block including job number and construction address
18. Utility company logo and job number
19. City of Peoria general notes for utility construction (**Exhibit xxx**)
20. Trench detail showing type, width, depth and number of conduit to be installed. Show pipe depth-shall be in accordance with the requirements in “**Exhibit xxx**”
21. Stationing and offsets for all existing and proposed facilities within the proposed construction site
22. Total linear trench/bore footage and total linear/bore footage in the right-of-way
23. Joint trench must identify all companies in trench
24. Variance letters for clearance less than six-feet from water and/or sewer mains and three-feet from services; includes private drives per City of Peoria standard details
25. Control point, distance/offset from control point

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

26. Existing utilities –show all existing utilities (above and below ground) dashed with sizes. Include any relocations or abandonments required for installation
27. Match lines: include match lines to indicate continuation on another sheet (assure consistency between match points)
28. Offset from centerline
29. All proposed equipment details shown and dimensioned on plan such as pedestals, transformers & pads, switching cabinets, manholes, etc.
30. Trench pavement restoration

B. Profile Requirements

1. Elevations taken from existing surface grade at intervals of 100' or less in the same alignment as proposed construction
2. Continuous line on the plans throughout the project
3. Finish and/or natural grade profile if it is within the proposed construction site
4. Identify all existing and proposed facilities that the proposed construction would cross
5. Storm drains, sanitary sewer lines, water lines, and chilled water lines over 12" in diameter shall be shown drawn to scale
6. All conduit systems over 12" in diameter or height shall be shown to scale if proposed construction is within 2' of existing conduit system
7. Vertical scale that adequately depicts installation of existing facilities. 1" = 2' or 1" = 5'
8. Elevations shall be City of phoenix datum and indicated on plans
9. Horizontal scale adequate to identify conflicts, no smaller than 1" = 40' is acceptable
10. Size, number, and type of pipe or conduit to be installed
11. A profile of all horizontal borings required

C. Special Requirements

1. Minimum overhead clearance shall be 18'
2. The MAG Standard Specifications and Details, including current City of Peoria supplements will be followed for the installation of both underground and overhead facilities. Permits for overhead lines must comply with any agreements with licensed or franchised utility companies.

D. Above Ground Structures

1. All structures height, width, length must be dimensioned

Cabinets Under Three-Feet in Height

- No structure to exceed 36-inches in height in front yard of residential homes
- Dimensions of structure
- Eighteen-inch setback from back of sidewalk to face of structure
- Flush to sidewalk elevation if adjacent to sidewalk
- Pad size and location in detail

Cabinets Over Three Feet in Height.

- No front yard placement of structures over 36-inches in height allowed.
- Dimensions of structure
- Three pictures (front, left and right views) of proposed site with cone at proposed structure locations
- Four pictures if along a rear yard if structure could possibly affect swimming pools, etc.
- Pad size and location in detail
- Structure cannot be placed in sight-triangle

12.6.7 Plan Review

City of Peoria staff will perform a conflict review of the proposed Non-City Utility plans to examine the relationship to existing and/or proposed City of Peoria utilities and facilities.

Plan review fees shall be collected at time of plan submittal and permit fees will be collected upon issuance of the permit in accordance with the fee schedule as set by Chapter 27 of the City Code. Proof of insurance with agreed to limit the liability and the City of Peoria named as additionally insured and certificate holder must be provided before any permits will be issued.

The fee and insurance requirements may be satisfied by license or franchise agreement.

Seal coat charges in accordance with MAG Standard Specification 336.2.4 are also collected upon permit issuance.

Upon completion of the review, a permit will either be issued to the applicant or the application will be returned for further modifications. If additions or corrections are required, the applicant will be notified and must resubmit after changes have been made. Note that these are target turn-around times only.

Utility Permits are generally issued for 90 calendar days and extensions may be issued on a case by case basis. If more than two extensions are requested, a new plan and permit submittal will be required. Special conditions or stipulations may have been added to the permit application before compliance.

The following on the Permit form evidences Approval of the Non-City Utility application:

- Identification of the date of the original issuance
- Identification of the date that the initial issuance of the permit expires
- As with the correction reports, the approved permits are available by pickup at the Permit Services section or by mail, if provided a pre-paid envelope.
- A conduit plan shall be shown on compliant developer or utility provider improvement plans prior to non-City utilities permit issuance.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

12.6.8 Permit Fees

Permit fees will be collected upon issuance of the permit in accordance with the fee schedule as set by Chapter 27 of the City Code. Proof of insurance with agreed to limits of liability and the City of Peoria named as additionally insured and certificate holder must be provided before any permits will be issued.

The fee and insurance requirements may be satisfied by license or franchise agreement.

Seal coat charges in accordance with MAG Standard Specification 336.2.4 are also collected upon permit issuance.

12.6.9 Permit Extensions

As stated on the permit, construction of the Non-City Utility facility shall begin within (90) days of the permit issuance, otherwise the permit expires by limitation and re-application must reoccur. Two extensions of the same application/permit form are allowed if work has not commenced within ninety (90 days of the permit issuance.

The Non-City Utility providers shall provide a copy of the prior permit issued along with the Non-City Utility plans.

Permits that have expired by limitation two times and the Non-City Utility facility is still required and/or necessary, the Non-City Utility provider shall complete a new application form and submit three (3) copies of the plans, (4) copies if trenching is required, for review and/or approval.

Other conditions that must be met:

- Contractors/subcontractors must be “approved” to work under utility permits. The City of Peoria will maintain a list of approved contractors and subcontractors.
- The utility company is to inspect its work with the City providing periodic oversight. Requests for City inspections must be coordinated with the Inspector assigned to the project. Excavations may not be backfilled without satisfactory City inspection.
- Non-emergency work in or adjacent to, an arterial or collector street (in the right-of-way) requires an individual permit. This work is not covered under the blanket permit.
- You must have an active permit.
- You must comply with Blue Stake Laws (AZ811).
- All contractors working within the City of Peoria rights-of-ways must comply with Ordinance 01-181.
- The contractor/subcontractor must maintain a copy of the permit on-site at all times.
- All work in the right-of-way or Public Utility Easements (P.U.E.’s) shall conform to applicable M.A.G. Specifications and Details except as amended by the City of Peoria Engineering Standards Manual and City of Peoria Standard Details.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

- Open pits (not in the street) are allowed to remain open for two weeks only.
- Open pits are to be properly secured (to the satisfaction of the City's Engineering Department Engineering Inspector)
- The City requires coring, vacuum excavation, backfilling and reinstatement of the asphalt core in to asphalt pavement to comply with MAG Uniform Standard Specifications and Details, Section 355, Utility Potholes – Keyhole Method and Detail 212, Utility Pothole Repair unless otherwise approved in writing by the Engineering Director or his designee.

12.7 Construction and Inspection

All construction activity within the City of Peoria must comply with Chapter 13 of the City Code.

Failure to follow these guidelines and procedures outlined may result in the Utility Inspector halting work for an undetermined length of time. Repeated failure of a contractor or subcontractor to follow these guidelines and procedures may result in that contractor or subcontractor being "banned" from working in the City of Peoria.

12.7.1 Inspections

The Construction Services Division of the Engineering Department performs inspections on all facilities located, constructed or installed within the public right-of-way and public easements.

The Construction Services Division of the Engineering Department will only perform a conflict inspection for those Non-City Utilities installed under the auspices of a "Utility Permit".

12.7.2 Pre-Construction Meeting/City Requirements

The contractor (or utility company) shall arrange a "pre-construction" meeting with the City Engineering Inspector and the utility company representative to discuss the following City requirements (there may be others):

- Possible conflicts with other utilities;
- No boring to be done within three feet of water or sewer mains without pot-holing;
- Accurate construction schedule;
- Identify responsible sub-contractor foreman who will remain on job site;
- Foreman must be able to communicate with Utility Inspector and have a cell phone;
- Identify responsible field representative for utility company (Qwest, SWG, etc.) Utility Company must have one point of contact available to the Utility Inspector;
- Landscaping, irrigation systems that may be disturbed;
- Contact homeowners before entering backyards (P.U.E.s);
- Complete work and repair damaged pavement, curb, gutter, sidewalk, landscape and irrigation systems within 15 calendar days;
- Provide restroom facilities as needed.

12.7.3 Construction Schedule

Requests to work in (or adjacent to) an arterial, collector or local street (work in right-of-way or Public Utility Easements) must be accompanied by a construction schedule. Construction schedules shall be approved by the Engineering Inspection Supervisor (prior to the start of construction). Schedules must include dates for all phases of construction (splicing, plating, etc.) through permanent pavement replacement. Any variance from the approved schedule shall be approved by the Engineering Inspection Supervisor.

12.7.4 Notification of Construction

Prior to the start of construction work, the City must be notified 24 hours prior to construction that construction will be commencing. Businesses and/or residences adjacent to the work shall be notified prior to the start of the construction work.

Proper notification must be made to all affected residents. This includes notifications/information signs required by the City of Peoria Engineering Standards Manual, and the hanging of door notices. Door notices shall be hung prior to blue staking and commencing work (non-emergency work). Lack of proper notification will result in the City halting all work for the day.

Hangers shall include the following information:

- Names of contractors, sub-contractors and local utility company contacts;
- Contact phone numbers (office and cell phones);
- Dates/times of scheduled work;
- Area impacted;
- Scope of work.

12.7.5 Construction Signs

All utility construction projects on major streets must have stationary signs posted at the beginning and end of the construction location, provided that the project is either one mile or greater in length or lasting 30 days or longer.

Signs must be posted one week before the project begins until the project is completed. The signs shall indicate the name and phone number of the permit holder, as well as the start and estimated completion dates for the project.

All other utility company construction projects (less than one mile in length or lasting less than 30 days) must have portable signs posted for the duration of the project indicating the permit holder's name and phone number. This does not apply to routine maintenance work.

12.7.6 Use of Construction Water

Any customer requesting construction water shall file/complete an application with the City Customer Service Center. The request to use water for construction shall be filed prior to any water being used for construction. Requests for construction water access shall include a water use summary with the following information: (1) location of project, (2) duration of requested water access, (3) estimate of daily water usage, and (4) estimate of total water usage. The water use summary shall be reviewed by the Utilities Director who reserves the right of denial for any construction water access or termination of use of construction

water for any inappropriate use of construction water. Upon approval, access to the City water distribution system shall be provided only at those locations approved by the Utilities Director.

City owned hydrants shall be metered for all construction water sold by the City. Any customer or property owner who has obtained potable, recharged, reclaimed or other water owned by the City that has not passed through a meter, or City approved calculating method, shall be subject to imposition of a Civil Sanction by the Engineering Director in accordance with the provisions of Chapter 25 of the City Code. Each day such a violation occurs shall be deemed a separate violation for purposes of this section and shall subject the property owner to a separate Civil Sanction in the amount provided by this section.

It shall be a violation of any construction water access approval and a violation of this code to open or operate any fire hydrant without the appropriate backflow device and meter or to draw or to attempt to draw, injure, damage or tamper with a fire hydrant. Authorization to utilize a fire hydrant shall be granted by the Utilities Director. Operation of hydrant turn nuts shall only be completed by authorized City personnel. In addition to the other provisions of this section, the Utilities Director may immediately revoke the approval for construction water use and remove the meter and all equipment accessing the City system and charge the property owner for the expense of such removal, together with an administrative fee of 20%.

12.7.7 Trench Backfill and Pavement Replacement Requirements

1. All backfill under existing pavement and concrete shall be ½ sack ABC slurry. This slurry backfill may be required in other incidences at the discretion of the Utility Inspector.
2. The AC mix design shall be “City of Phoenix C-3/4 inch mix”. Use of “bagged” or “canned” mix for permanent pavement replacement is prohibited.
3. Pavement thickness shall be 1.5 times the existing thickness. Pavement shall be replaced per M.A.G. Standard Detail 200 (“T-top”) with the exception that all backfill shall be ½ sack ABC slurry.
4. Materials testing may be required (paid for by the utility company) at the discretion of the Engineering Inspector.
5. Trench backfill and permanent AC pavement replacement must be completed within seven calendar days of excavation (unless requirement is waived by the Engineering Inspection Supervisor).
6. Pavement matching and replacement shall meet MAG Specification 336 and the City's Pavement Replacement Policy as directed by the Engineering Director or his designee
7. Must follow City of Peoria Standard Detail PE-211 for recessed plating. Plates must always be “pinned” and “cold-patched”. Plates must be recessed if existing speed limit is over 25 mph. If plates are not recessed (existing speed limits is 25 mph or less) bump signs must be appropriately placed.

12.7.8 Traffic Control/Barricading Requirements

1. Shall comply with City Ordinance #01-181, and the City of Peoria Engineering Standards Manual.
2. All work in or adjacent to arterial or collector streets shall require the submittal of a Traffic Control Plan (TCP). This plan shall be e-mailed to TCP@peoriaAZ.gov. TCP's may be required in other incidences at the discretion of the Engineering Inspection Supervisor.
3. All utility companies or their contractors must have an accepted TCP returned to them prior to start of work. The on-site utility/contractor's representative must have a copy of the permit and the accepted TCP available for the Engineering Inspector's review.
4. If any part of the barricading (per an accepted TCP) falls within 300 feetof a signalized intersection a police officer will be required. Police officers may be required in other incidences at the discretion of the Engineering Inspection Supervisor.
5. Shall also be governed by the City of Phoenix Traffic Barricade Manual and/or added specific traffic regulation, which shall be attached to the approved permit whenever applicable.
6. Conform to the latest applicable MAG Uniform Standard Details and Specifications

12.7.9 Working in Privately Owned Streets

Permission from the Homeowner's Association (HOA) is required when working in privately owned streets and a copy of HOA permission shall be submitted to the City with application; in addition, a City permit is also required since the City possess roadway, utility and other easements within the privately-owned streets.

12.7.10 Record Drawings

Recorded drawings of the complete construction shall be maintained by permittee in accordance with Arizona State Statutes and shall be provided by the permittee if requested by the Engineering Director.

12.7.11 Final Inspection/Walk Through

All project areas must be cleaned up, removed and landscape materials must be replaced, the irrigation system must be operational, and barricades and sand bags must be removed within three days of the completion of work.

All permits require final inspection and/or final walk-through. Please contact your assigned utility inspector and schedule a final walk-through.

12.8 General Notes for Utility Construction

1. All work performed in the City of Peoria ROW and alleys will require an accepted traffic control plan prepared by a barricade company approved to work in the City of Peoria and shall be governed by the latest City of Phoenix Traffic Control and Barricade Manual. The contractor/utility company shall have a copy of the approved construction plans, approved traffic control permit/plans and construction permit at the project site at all times.

QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

2. Plan approval by the City of Peoria for compliance with City requirements shall not prevent the City from requiring correction of errors found to be in violation of any law, ordinance, or City of Peoria requirements for utility construction in the ROW. The City of Peoria does not warrant any of the quantities shown on these plans.

3. All utility construction shall conform to the latest Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Work construction and to the City of Peoria Supplements to MAG details.

4. All utility work crossing existing streets must be accomplished by horizontal directional drilling, unless otherwise approved by City. All utilities crossing streets or roads being bored/horizontal directional drilled shall comply with MAG 608 and MAG 212 where possible. All street or road crossings shall be placed within conduit(s) or sleeves.

5. The Inspection Division must be notified no more than 5 business days and not less than 24- hours prior to commencement of construction. The permit number and location must be provided.

6. Proper notification must be made to all effected residents. This includes notification/information signs and hanging of door notices. Door hangers shall be hung prior to blue-staking and commencing non-emergency work.

7. All work requiring asphalt replacement, concrete replacement or resurfacing in the ROW will require a final inspection with the utility company representative at the time of completion. Temporary pavement replacement that uses cold-mix asphalt shall be replaced no later than 7-business days after initial placement. This also includes pavement markings.

8. All potholes for existing utility crossings or soil borings for future utilities will·be repaired with a full depth T-top per MAG Standard Detail 212. The City may require additional repairs, as required by the Engineering Inspector.

9. The following items shall be approved in the field by the Engineering Inspector to account for unforeseen conditions;
    a. Backfill and compaction;
    b. Concrete repair and curing;
    c. Asphalt repair and pavement matching.

10. When excavating in or adjacent to landscaping within the ROW, the contractor shall contact the property owner, HOA or management company regarding the location of underground irrigation facilities.

11. All trenches in existing and future pavement are required to be backfilled with a minimum of sack slurry controlled low strength material and all trenching within 2-feet of the back of curb or edge of pavement will require ABC compacted to 95% of sack slurry controlled low-strength material per MAG

Sections 604 and 728.

12. Any damage to public or private property shall be reported to the City of Peoria and the property owner. Repair and/or replacement, in kind, shall be coordinated with the property owner and/or the City.

13. All work that lies within a special flood hazard area (SFHA) will require a floodplain review by the Floodplain Administrator or their designee and additional stipulations may be required.

14. The jobsite shall be cleaned of any debris or spoils resulting from this project at the completion of the project.

15. The utility provider is responsible for obtaining a Nation Pollution Discharge Elimination System (NPDES) permit in accordance with Federal and State Regulations, including Notice of Intent (NOI), Notice of Termination (NOT), and Storm Water Pollution Prevention Plan (SWPPP), as necessary.

16. The utility provider is responsible for obtaining a Dust Control Permit in accordance with Maricopa County Rule 310.

12.9 Utility Coordination Processes

QUICK LINKS
City Code

Small Cell Documents

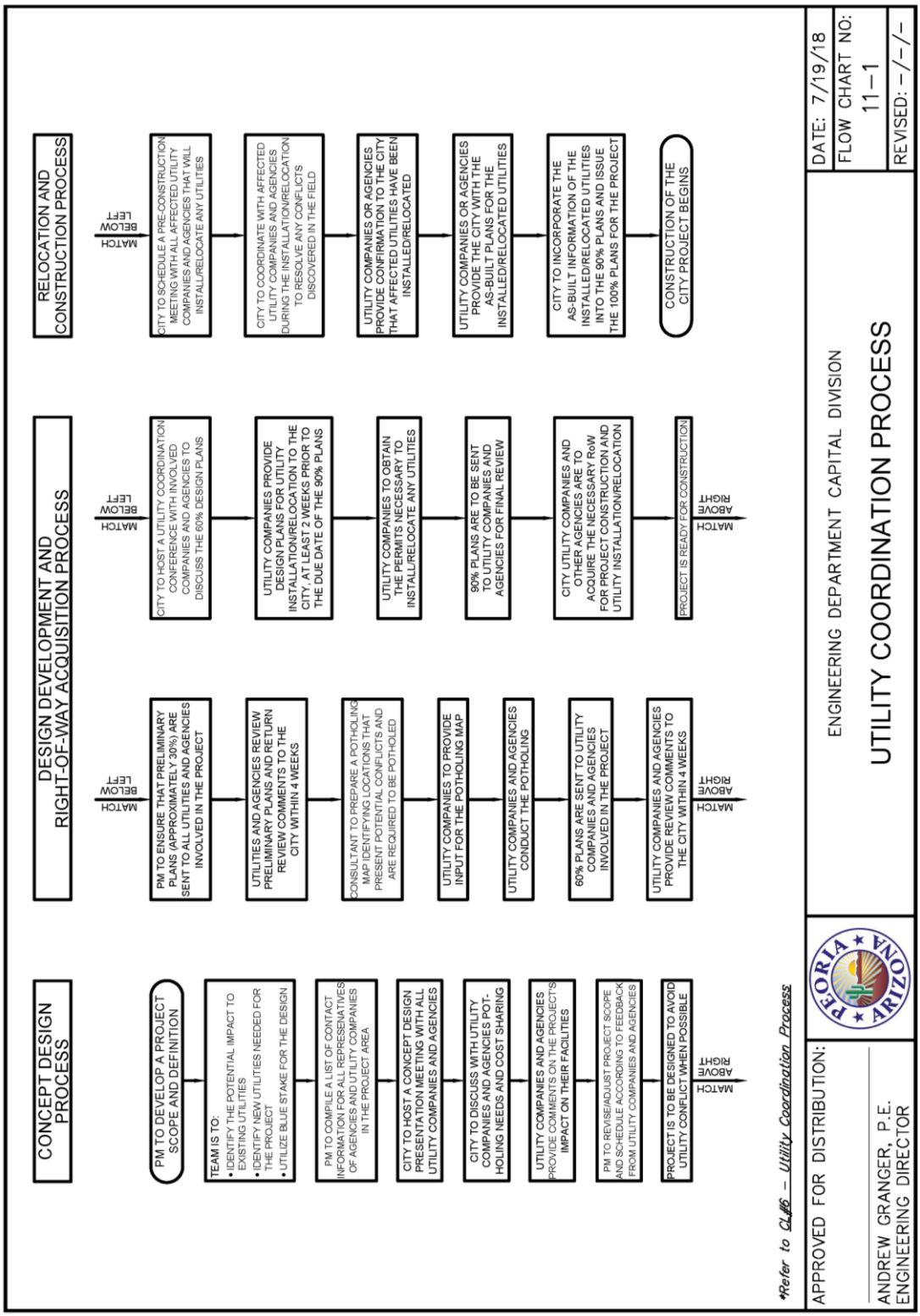
City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

12.9.1 Utility Coordination Process - CIP



QUICK LINKS

City Code

Small Cell Documents

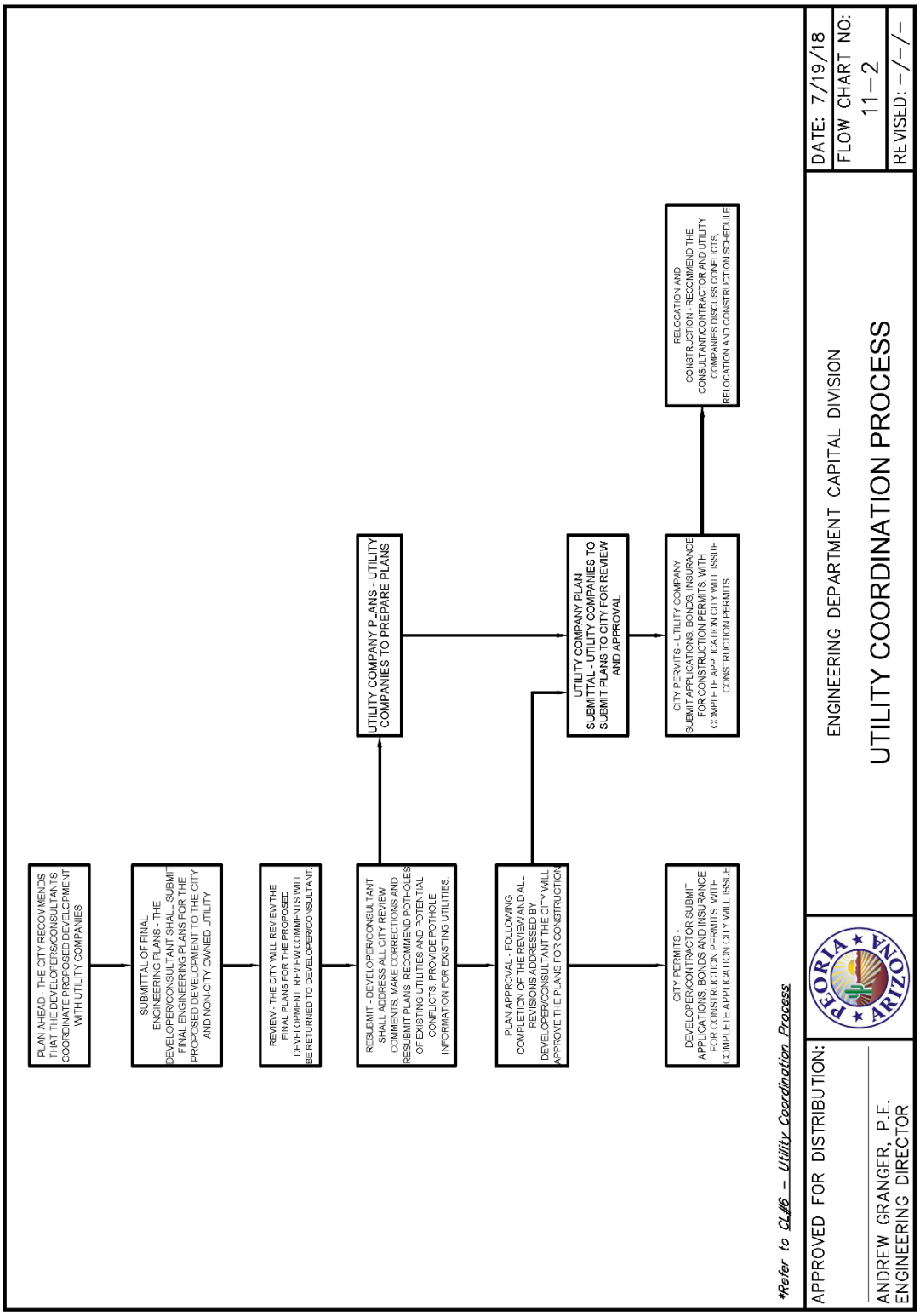
City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

12.9.2 Utility Coordination Process - Private



QUICK LINKS

City Code

Small Cell Documents

City of Peoria Permit Application

AZPDES CGP and Fact Sheet

ADEQ SWPPP Template and Checklist

Development Fee Schedule

13. SURVEY AND BENCHMARKS

13.1 General Information

The intent of this Chapter is to ensure all projects that involve surveys, aerial mapping, and right-of-way improvement plans will apply consistent methods and standards pertaining to ground surface measurement within the City of Peoria and to document the City's standard policies with respect to the responsibilities of perpetuating survey monuments. This Chapter covers permanent survey monuments, both record and non-record. It does not cover construction staking. It also does not cover all the City contractors' responsibilities as those are covered in the City's Standard Specifications for Public Works.

1. Plans should reflect all existing bench marks and survey monuments in the area of the project and if it is necessary to remove or destroy them due to new construction, follow the City procedure for the correct method of re-establishment.
2. All survey work in the City of Peoria will be performed under the direction of a professional land surveyor registered in accordance with requirements of the State of Arizona State Board of Technical Registration.

13.1.1 Definitions

Benchmarks

A point of reference by which something can be measured. A benchmark is usually a permanent mark established at a known elevation that is used as the basis for measuring the elevation of other topographical points. In the City, section corners, quarter-section corners, Maricopa County Geodetic Densification and Cadastral Survey (GDACS) control points, and National Geodetic Survey (NGS) control points are used as benchmarks. Published elevations can be found on the City's website.

Grid

The Arizona State Plane Coordinates System, Central Zone, based on the latest iteration of the North American Datum of 1983.

A combined scale factor shall be used to convert the horizontal control point values (grid) to ground measurements. The responsible survey registrant for each project shall provide the combined scale factor, adjustments, rotations and other pertinent meta-data used to obtain ground coordinates, as part of the project deliverable.

Ground

the surface of the earth and in relation to surveying, a modification of the grid coordinate system obtained by applying the combined scale-factor and possibly a rotation at a particular point on the grid with the intention of obtaining near accurate ground distances as would be measured with conventional survey equipment.

Monuments

In relation to surveying, an object used to define a property corner or survey control point. These would typically be brass caps found flush on pavement or in

QUICK LINKS
General Plan

Boundary Survey Minimum Standards

Benchmark and Monuments Map

Maricopa County Survey Data and Information

hand holes at section corners or street intersections and capped rebar and PK nails found at property corners. When set by a Registered Land Surveyor, they must bear the registrant's license number.

13.2 City Codes and Standards

The City is responsible for the perpetuation of survey monuments and/or the enforcement of survey monument perpetuation in accordance with State Statutes, this Chapter, the Arizona Boundary Survey Minimum Standards (ABSMS), the Federal Bureau of Land Management (BLM) Manual of Surveying Instructions and the National Geodetic Survey (NGS) Standards and Specifications for Geodetic Control Networks.

Under the direction of the Director, the Development and Engineering Department shall assure conformance with statutory requirements for the preservation of survey monuments. The Director shall, through Appointing Authorities, enforce the requirements of this regulation.

13.3 Federal, State and County Regulations

The perpetuation of survey monuments is required and intended to protect both public and private property rights in accordance with federal and state law.

13.4 Survey Standards

13.4.1 Boundary Surveys

All land survey work will be performed within the guidelines of the Arizona Boundary Survey Minimum Standards. These standards may be obtained from the State of Arizona Board of Technical Registration at 1110 West Washington Street, Suite 240, Phoenix, Arizona 85007, or online.

13.4.2 ALTA Surveys

ALTA surveys will be based on the latest revision of the American Land Title Association, and National Society of Professional Surveyors Minimum Standard Detail Requirements for ALTA/ NSPS Land Title Surveys.

13.4.3 Horizontal Datum

The horizontal datum for all engineering work (mapping, planning, design, right-of-way engineering and construction) for City of Peoria projects shall be the North American Datum of 1983, (NAD83) as defined by the City of Peoria's Survey Benchmark and Monuments Map.

13.4.4 Vertical Datum

The vertical control datum for use within the City of Peoria is the North American Vertical Datum of 1988 (NAVD88), as defined by the City of Peoria's Survey Benchmark and Monuments Map.

13.4.5 Ground Coordinate Systems

The use of modified coordinate systems to achieve accurate ground distances must be accompanied by a control statement provided on the plans or survey drawings to which they apply. Information included in the control statement should include but not be limited to: base point or base points used and their coordinates in both the grid and ground systems, scale factor, rotation, and

QUICK LINKS
General Plan

Boundary Survey Minimum Standards

Benchmark and Monuments Map

Maricopa County Survey Data and Information

calibration or localization parameters used. The use of a ground system does not override other provisions of this Manual and the modified coordinate system used must tie directly back into the Horizontal Datum as specified in **Section 13.4.3**.

13.5 Horizontal and Vertical Control System

13.5.1 Horizontal Control

Horizontal control for determining NAD83 coordinates will be based on published City of Peoria control station and monument data. GPS Global Navigation satellite system surveys may use a recognized local continuously operating broadcast/reference (COBS or CORS) station signal or Real Time Network (RTN) provided they check into two City of Peoria control monuments in the vicinity of the project. Control monument data used will be documented, described and referenced by name, position, elevation and date on the plans.

13.5.2 Vertical Control

Vertical control for determining NAVD88 elevations will be based on published City of Peoria control station and monument data in the vicinity of the project. GPS surveys should be augmented with level and continual survey work as necessary to obtain the desired accuracy for design.

13.5.3 Temporary Benchmarks

A Temporary Benchmark, offset from known City benchmark, may be required on improvement projects.

13.6 Public Improvement Projects

Survey monuments are at risk during overlay projects, slurry seals, utility group projects, sidewalk repair, ADA curb ramp projects, streetlights, road widening, park projects, trail projects, major buildings, storm drain, water, wastewater, and reclaimed water, traffic signals and all construction within the public right-of-way and private property.

13.7 Land Development Projects/Right-of-Way Permits

Survey monuments are at risk during the construction of land development projects such as subdivisions, buildings, retaining walls, utilities, driveways, encroachments into the right-of-way.

13.8 Monument Perpetuation Process for Public and Private Development Projects

Monument perpetuation shall be performed with every public improvement project, all work performed by City forces, contractors and every private land development project or Right-of-Way permit within the City.

All City departments working in the right-of-way shall submit all preliminary plans or contract documents to the Development and Engineering Department to evaluate the needs for monument perpetuation.

The initiating department shall require the design engineer to coordinate with a professional land surveyor and the Development and Engineering Department to ensure City survey requirements are met.

All construction plans shall show existing monuments and include the following general note (unless included in the specifications):

"THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY MONUMENTATION AND/OR BENCHMARKS WHICH WILL BE DISTURBED OR DESTROYED BY CONSTRUCTION. SUCH POINTS SHALL BE REFERENCED AND REPLACED WITH APPROPRIATE MONUMENTATION BY A LICENSED LAND SURVEYOR OR A REGISTERED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED BY THE LICENSED LAND SURVEYOR OR THE REGISTERED CIVIL ENGINEER AS REQUIRED BY THE ARIZONA REVISED STATUTES."

All private developments shall provide survey monuments at section corners, street centerline intersections, street centerline alignment changes (P.C.'s, P.T's or P.I.'s if it is within the pavement), and subdivision corners

All section corners, quarter corners, and center of sections shall be a brass cap in hand hole per MAG Standard Detail 120-1, Type A. All other required survey monuments shall be a brass cap per MAG Standard Detail 120-1 Type B. All existing monuments shall be preserved both horizontally and vertically.

All public works contracts that will possibly disturb monuments shall include monument perpetuation in the scope of work.

A separate Monument Sheet may be included in the plans for clarity purposes.

The contracted surveyor shall reference all monuments to be affected. Upon completion and acceptance of new improvements, the surveyor shall reset sufficient monuments and file a Corner Record or Record of Survey with the County Recorder.

Any survey monuments disturbed by construction must be reset and certified at the contractor's or Developer's expense. At least two other monuments on the City's survey list shall be referenced as a check. The survey notes showing these reference monuments and the elevation certification will be required before any project will be accepted as complete.

When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control, the monuments shall be located and referenced by or under the direction of a Registered Land Surveyor prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated. A Registered Land Surveyor shall make a diligent search for, and locate monuments lying within the streets, highways, other rights-of-way, or easements, and any monuments that may be disturbed by construction lying outside the streets, highways, other rights-of-way, or easements.

QUICK LINKS
General Plan

Boundary Survey Minimum Standards

Benchmark and Monuments Map

Maricopa County Survey Data and Information

13.8.1 Prior to Commencement of Construction

A Registered Land Surveyor shall provide to the City a sealed, Pre-Construction Results of Survey drawing referenced to the City of Peoria Coordinate System. Notwithstanding any requirements set forth by the current published version of the Arizona Boundary Survey Minimum Standards or Arizona Revised Statutes, the survey shall include, at a minimum, the following information:

- Depiction of the found monuments on a "vicinity-type" map
- City of Peoria coordinates (horizontal) for each monument
- Detailed description of the found monument including material type and size, cap or washer type and size, depth or height of monument in relation to adjacent grade, and all markings on the monument

Positional tolerances shall meet the standards as defined in the documents referenced in **Section 13.2**.

Any monuments uncovered or found during the course of construction shall not be disturbed or removed until observed, located, and referenced by a Registered Land Surveyor.

Upon completion of construction of the project, a Registered Land Surveyor shall verify existing monuments (protected in-place) and any new monuments installed by the contractor. The monument shall be punched and stamped by a Registered Land Surveyor according to Arizona Boundary Survey Minimum Standards.

13.8.2 Results of Survey

A Registered Land Surveyor shall provide to the City a sealed, Post-Construction Results of Survey drawing according to the same requirements in 12.8.1, with the addition of information as detailed in 12.8.1 iii relating to the new, re-established or replacement monuments. The Results of Survey shall be recorded with the Maricopa County Surveyor.

In addition, the surveyor shall complete:

- The City of Peoria-Monument Reset Form and record this document with the Maricopa County Recorder's Office.
- Once recorded, copies of the document will be submitted to the Maricopa County Department of Transportation Land Survey Department and the City of Peoria Engineering Department by the Surveyor or Developer.
- The survey notes showing these referenced monuments and elevations certifications shall be reflected on the as-built documents and submitted for approval to the Engineering Director before the project will be accepted as completed or bonds released.
- All monument information, as referenced above, shall be submitted within 60 days of City acceptance or Certificates of Occupancies will be withheld.

QUICK LINKS
General Plan

Boundary Survey Minimum Standards

Benchmark and Monuments Map

Maricopa County Survey Data and Information