

PART 1 GENERAL**SUMMARY DESCRIPTION**

THIS SECTION INCLUDES GRAVITY RETAINING WALL SYSTEMS CONSISTING OF A COLUMN OF SEGMENTAL CONCRETE FACING UNITS RETAINING COMPACTED SOIL BACKFILL OR A NATIVE GROUND CUT. WORK SHALL CONSIST OF FURNISHING ALL MATERIALS, LABOR, EQUIPMENT, FIELD SUPERVISION, AND INSTALLING A GRAVITY WALL SYSTEM IN ACCORDANCE WITH GIVEN SPECIFICATIONS. ALL INSTALLATIONS SHOULD CONFORM TO PROJECT DRAWINGS PROVIDED BY THE OWNER OR THE OWNER'S ENGINEER.

SYSTEM DESCRIPTION

DESIGN REQUIREMENTS - DESIGN THE RETAINING WALL SYSTEM IN ACCORDANCE WITH THE DESIGN GUIDELINES PRESENTED IN DESIGN MANUALS FOR GRAVITY WALL SYSTEMS. ENGAGE AND PAY FOR THE SERVICES OF A DESIGNER TO DESIGN AND DEVELOP DESIGN DATA FOR THE RETAINING WALL SYSTEM. PERFORMANCE REQUIREMENTS – THE CONTRACTORS, MATERIAL SUPPLIERS, AND WALL SYSTEM SUPPLIERS SHALL HAVE SUFFICIENT PAST PROJECT EXPERIENCE AND SHALL BE APPROVED BY THE OWNER'S ENGINEER AT LEAST TWO WEEKS PRIOR TO THE BID OPENING.

SUBMITTALS

PRODUCT DATA – MANUFACTURER'S MATERIALS SPECIFICATIONS, INSTALLATION INSTRUCTIONS, AND GENERAL RECOMMENDATIONS.

DELIVERY, STORAGE, AND HANDLING

AT THE TIME OF DELIVERY, THE CONTRACTOR SHALL INSPECT AND CONFIRM PROPER TYPE AND GRADE OF MATERIALS. ALL PRODUCT SPECIFICATIONS SHALL BE REVIEWED TO ASSURE THAT ALL SPECIFIED MATERIALS HAVE BEEN DELIVERED.

THE CONTRACTOR SHALL STORE AND HANDLE ALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL AVOID EXCESSIVE MUD, WET CONCRETE, EPOXY, OR OTHER DELETERIOUS MATERIALS FROM COMING IN CONTACT WITH AND AFFIXING TO MATERIALS.

THE CONTRACTOR SHALL DISCARD ALL DAMAGED MATERIALS AND NOT USE THEM IN WALL CONSTRUCTION.

PART 2 PRODUCTS**MANUFACTURERS**

A. ULTRABLOCK, INC. OR APPROVED SUBSTITUTE.

MATERIALS

THE UNITS SHALL HAVE 28-DAY COMPRESSIVE STRENGTH OF AT LEAST 2,500 PSI. THE MAXIMUM ABSORPTION OF 10 PCF AND ADEQUATE FREEZE-THAW PROTECTION (ABSORPTION BY WEIGHT 6%) SHALL, IN GENERAL, SATISFY THE LOCAL REQUIREMENTS OF HIGH ELEVATION (MOUNTAINOUS) AREAS WHERE THERE IS A POTENTIAL FOR SPALLING DUE TO FREEZE-THAW.

ALL INDIVIDUAL UNITS SHALL BE FREE OF CRACKS AND OTHER DEFECTS THAT WOULD INTERFERE WITH THE PLACEMENT AND LOCKING OF UNITS. ALL SHEAR KEYS SHALL BE IN GOOD CONDITION.

UNIT DIMENSIONS SUCH AS HEIGHT, WIDTH, DEPTH, AND BATTER SHALL MATCH DETAILS SHOWN ON PLANS. A TOLERANCE OF 1/2 INCH FOR LENGTH, WIDTH TOLERANCE OF PLUS 1/2 INCH AND MINUS 3/4 INCH AND A TOLERANCE OF 1/4 INCH SHALL BE USED FOR HEIGHT. BLOCKS ARE TYPICALLY POURED FACE DOWN CREATING A NON-FINISHED SIDE ON THE BACK OF BLOCK.

56
57 THE CHAMFERED CORNERS OF THE UNITS SHALL PROVIDE APPROXIMATELY 8 SQ. IN.
58 OF DRAINAGE AREA PER UNIT. CLEARANCE OF ROUGHLY 1/2" AROUND LOCKING
59 GROOVES/SHEAR KEYS SHALL PROVIDE ADDITIONAL DRAINAGE.

60
61 ULTRABLOCK™ UNITS SHALL HAVE FOLLOWING DIMENSIONS (SELECT WHATEVER IS
62 APPLICABLE).

63 1. ULTRABLOCK™ FULL BLOCK

- 64
- A. SIZE: 29.5"X29.5"X59" B. WEIGHT: 4,320 LBS.
 - C. COLOR: NATURAL D. D. GRADE: STANDARD
 - E. FACE: QUARRY STONE

65
66 2. ULTRABLOCK™ HALF BLOCK

- 67
- A. SIZE: 29.5"X29.5"X29.5" B. WEIGHT: 2,160 LBS.
 - C. COLOR: NATURAL D. GRADE: STANDARD
 - E. FACE: QUARRY STONE

68
69 **DRAINAGE MATERIALS**

70 DRAINAGE FILL MATERIALS SHALL CONSIST OF FREE DRAINING, ALL-WEATHER, COARSE-
71 GRAINED MATERIALS THAT IS PLACED BEHIND THE UNITS AS SPECIFIED ON THE PLANS. THE
72 DRAINAGE FILL GRADATION SHALL BE AS FOLLOWS AS DETERMINED BY ASTM D 422 TEST
73 PROCEDURE:

74 100 TO 75 PERCENT PASSING IN A 1-IN. SIEVE 50 TO 75 PERCENT PASSING A 3/4-IN. SIEVE 0 TO
75 60 PERCENT PASSING A NO 4 SIEVE
76 0 TO 50 PERCENT PASSING A NO 40 SIEVE
77 0 TO 5 PERCENT PASSING A NO 200 SIEVE

78
79 THE ENGINEER AND/OR ARCHITECT MAY SPECIFY A SUBSTITUTE SUCH AS A DRAINAGE
80 COMPOSITE OR OTHER EQUIVALENT GEOSYNTHETIC DRAINAGE MATERIALS TO BE
81 APPROVED BY THE DESIGNER. THE DRAINAGE COMPOSITE SHALL BE – 6 OZ. PER SQ.YD.
82 POLYPROPYLENE NON-WOVEN GEOTEXTILE,
83 AASHTO M288-96, CLASS 2, BONDED TO BOTH SIDES OF A POLYETHYLENE NET STRUCTURE,
84 PRODUCED BY. MINIMUM ALLOWABLE TRANSMISSIVITY – NOT LESS THAN 1.5 GAL. PER MIN.
85 PER FT. OF WIDTH WHEN TESTED IN ACCORDANCE WITH ASTM D4716-95 AT A CONFIRMING
86 PRESSURE OF 10,000 LBS PER SQ.FT. MINIMUM ALLOWABLE PEEL STRENGTH OF GEOTEXTILE
87 FROM THE POLYETHYLENE NET SHALL BE NOT LESS THAN 250 GM. PER IN. OF WIDTH WHEN
88 TESTED IN ACCORDANCE WITH ASTM F904-91.

89
90 THE DRAINAGE COLLECTION PIPE SHALL BE PLACED AS SHOWN ON THE PLANS. THE PIPE
91 SHALL BE A PERFORATED OR SLOTTED, PVC OR CORRUGATED HDPE PIPE. THE PIPE SHALL
92 BE WRAPPED IN FILTER FABRIC. THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH
93 ASTM D3034.

94
95 **RETAINED BACKFILL / STRUCTURAL BACKFILL MATERIALS**

96 RETAINED/STRUCTURAL BACKFILL MATERIALS SHALL CONSIST OF GRANULAR MATERIALS
97 (GP, GW, SW, SP, SM PER UNIFIED SOIL CLASSIFICATION) MEETING THE FOLLOWING
98 GRADATION AS DETERMINED BY ASTM D 422 TEST PROCEDURE:
99 100 TO 75 PERCENT PASSING IN A 2-IN. SIEVE 100 TO 75 PERCENT PASSING A 3/4-IN. SIEVE 100
100 TO 20 PERCENT PASSING A NO 4 SIEVE

101 0 TO 60 PERCENT PASSING A NO 40 SIEVE
102 0 TO 35 PERCENT PASSING A NO 200 SIEVE

103
104 THE MAXIMUM AGGREGATE SIZE SHALL BE LIMITED TO ¾ INCH UNLESS APPROPRIATE
105 VALUES FOR GEOGRID INSTALLATION DAMAGE HAVE BEEN USED.

106
107 THE PLASTICITY INDEX OF MATERIALS PASSING NO.200 SIEVE SHALL BE LESS THAN 20.

108
109 THE PH VALUE SHALL BE IN THE RANGE OF 2 TO 12 AS DETERMINED BY ASTM G51
110 PROCEDURE.

111
112 **ACCESSORIES**

113 GEOTEXTILE FILTER FABRIC– A POLYPROPYLENE NON-WOVEN GEOTEXTILE PRODUCED BY
114 OR EQUAL AS APPROVED BY THE DESIGNER WITH GRAB TENSILE STRENGTH (ASTM
115 D4632) OF
116 LB/FT AND WATER FLOW RATE (ASTM D4491) OF .
117 EROSION CONTROL BLANKET – THE RETAINING WALL SYSTEM DESIGNER MUST INCLUDE A
118 REINFORCED, POLYMERIC, PERMANENT EROSION CONTROL BLANKET ON ALL SOIL
119 STRUCTURE/SLOPE FACINGS BEHIND, IN FRONT, AND ADJACENT TO THE RETAINING WALLS.
120 ALL COMPONENTS SHALL BE INERT TO CHEMICALS NORMALLY ENCOUNTERED IN A NATURAL
121 SOIL ENVIRONMENT. THE TENSILE STRENGTH SHALL BE NOT LESS THAN (ASTM D5035-95).
122 THE DURABILITY CRITERIA SHALL INCLUDE RETAINING A MINIMUM OF 80 PERCENT OF
123 STRENGTH AFTER 1,000 HOURS OF ULTRAVIOLET EXPOSURE (ASTM D4355-92).

124
125 **PART 3 EXECUTION**

126
127 **QUALIFICATION**

128 THE CONSTRUCTOR AND THE SITE SUPERVISOR SHALL HAVE SUCCESSFULLY COMPLETED
129 SEVERAL PROJECTS INCLUDING THE INSTALLATION OF GRAVITY WALL SYSTEMS. THE
130 CONTRACTOR SHALL CARRY ADEQUATE INSURANCE AND BOND.

131
132 **EXCAVATION**

133 PRIOR TO THE BEGINNING OF EXCAVATION, A SUPPLIER'S REPRESENTATIVE EXPERIENCED IN
134 WALL CONSTRUCTION SHALL ASSIST THE CONTRACTOR REGARDING WALL FOUNDATION
135 EXCAVATION, SPECIFICALLY THE PREPARATION OF FOUNDATION SUBGRADE FOR DESIGN
136 WALL BATTER AND OTHER EXCAVATION PROCEDURES RELATED TO SUBGRADE
137 PREPARATION, PLACEMENT OF BLOCKS, AND DRAINAGE ENVELOPE BEHIND THE WALL.

138
139 THE CONTRACTOR SHALL PROVIDE ADEQUATE EXCAVATION SUPPORT DURING
140 CONSTRUCTION IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
141 IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO ASSURE SITE SAFETY DURING EXCAVATION
142 AND OTHER CONSTRUCTION ACTIVITIES.

143
144 THE SUBGRADE SHALL BE EXCAVATED TO MEET DESIGN REQUIREMENTS SHOWN ON
145 GRADING PLANS.
146 EXCAVATIONS SHALL BE MADE VERTICALLY TO THE PLAN ELEVATION AND HORIZONTALLY TO
147 THE DESIGNED GEOGRID LENGTHS SO THAT OVER-EXCAVATION IS MINIMIZED. WIDTH OF
148 EXCAVATION SHOULD ALLOW FOR WALL BASE AND DRAINPIPE.
149 START EXCAVATION AT THE LOWEST WALL LEVEL. IF WALL STEPS UP IN ONE BLOCK HEIGHT,
150 THE BASE BLOCK SHOULD BE INSTALLED AT THE LOWEST LEVEL IN ORDER TO ESTABLISH
151 GRADE AND FACE LOCATION OF THE SECOND LEVEL.

152
153 OVER-EXCAVATED OR FILLED AREAS SHALL BE WELL COMPACTED AND INSPECTED AND
154 APPROVED BY A QUALIFIED GEOTECHNICAL ENGINEER.

155

156 A QUALIFIED GEOTECHNICAL ENGINEER SHALL EVALUATE AND APPROVE EXCAVATED
157 MATERIALS THAT ARE USED AS BACKFILL IN THE REINFORCEMENT ZONE. ALL BACKFILL
158 MATERIALS SHALL BE PROTECTED FROM THE WEATHER.

159

160 **FOUNDATION PREPARATION**

161 FOUNDATION TRENCH SHALL BE EXCAVATED TO THE DIMENSIONS INDICATED ON THE
162 CONSTRUCTION DRAWINGS.

163

164 A QUALIFIED GEOTECHNICAL ENGINEER SHALL INSPECT AND APPROVE THE REINFORCED
165 ZONE AND LEVELING PAD FOUNDATION SOIL SUBGRADE IN ORDER TO ENSURE ADEQUATE
166 BEARING CAPACITY. SUBGRADE SOIL AREAS NOT MEETING REQUIRED BEARING STRENGTH
167 SHALL BE MARKED IN THE FIELD AND THE CONTRACTOR SHALL REMOVE AND REPLACE THESE
168 AREAS WITH APPROVED FILL MATERIALS.

169

170 FOUNDATION SUBGRADE SOILS AND ANY BACKFILL MATERIALS SHALL BE COMPACTED TO A
171 MINIMUM OF 95 PERCENT STANDARD PROCTOR DRY DENSITY IN ACCORDANCE WITH ASTM
172 D698-98 BEFORE PLACING THE LEVELING PAD.

173

174 **LEVELING PAD INSTALLATION**

175 THE LEVELING PAD SHALL CONSIST OF 6 INCHES THICK LAYER OF ¾-INCH MINUS WELL-
176 GRADED AGGREGATES COMPACTED TO 95% OF ASTM D 1996 MODIFIED PROCTOR DENSITY,
177 UNLESS SPECIFIED OTHERWISE BY THE DESIGN ENGINEER.

178

179 A SUPPLIER'S REPRESENTATIVE EXPERIENCED IN WALL CONSTRUCTION SHALL ASSIST THE
180 CONTRACTOR REGARDING LEVELING PAD PREPARATION FOR ACHIEVING SPECIFIED WALL
181 BATTER. THE WALL DESIGNER SHALL INSPECT AND APPROVE THE LEVELING PAD PRIOR TO
182 THE PLACEMENT OF BLOCKS.

183

184 AS A MINIMUM, START AT THE LOWEST WALL LEVEL, LOCATE THE FRONT FACE OF THE WALL,
185 RUN A STRING ABOUT 1 INCH IN FRONT AND 2 INCHES ABOVE THE BASE. USE 2X6 OR 2X8
186 PIECES OF WOOD BOARDS AND STEEL STAKES TO MAKE A FORM FOR ACHIEVING DESIGN
187 BATTER. SET FRONT BOARD IN LINE WITH THE STRING AND AT BASE ELEVATION OF THE
188 WALL. LOCATE AND PLACE THE BACK BOARD AT A DISTANCE EQUAL TO THE BASE WIDTH OF
189 THE WALL. SET ELEVATION OF BACK BOARD SO THAT DESIGN BATTER CAN BE ACHIEVED.
190 WITHOUT MOVING THE STRING LINE, START LEAP-FROGGING THE BOARDS IN LINE WITH THE
191 STRING AND MOVE FORWARD ALONG THE LENGTH OF THE WALL. IT IS BEST TO PREPARE THE
192 ENTIRE LEVELING PAD/BASE BEFORE PLACING THE BLOCKS.

193

194 **UNIT/BLOCK INSTALLATION**

195 INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER GUIDELINES.

196

197 A TRACK-MOUNTED EXCAVATOR IS THE IDEAL EQUIPMENT FOR BLOCK INSTALLATION. A WIRE
198 RIGGING WITH SWIVEL HOOKS, OSHA APPROVED AND RATED FOR WEIGHT OF THE BLOCKS
199 CAN BE ATTACHED TO THE EXCAVATOR AND USED FOR LIFTING, MOVING, AND PLACING THE
200 BLOCKS.

201

202 THE CONTRACTOR SHALL CAREFULLY PLACE THE FIRST COURSE OF UNITS ONLY AFTER THE
203 LEVELING PAD HAS BEEN APPROVED BY THE DESIGNER FOR ADEQUATE BATTER.
204 BLOCK PLACEMENT SHOULD START AT THE LOWEST ELEVATION. AT THE START OF THE WALL,
205 MAKE A LINE PERPENDICULAR TO THE FACE OF THE WALL SO THE FIRST BLOCK CAN BE
206 PLACED SQUARE TO THE WALL FACE. SET BLOCKS AT THE BACK OF THE WALL FIRST, I.E. IF
207 THE WIDTH OF THE WALL BASE IS LARGER THAN THE BLOCK WIDTH, THEN THE FIRST BLOCK
208 SHALL BE PLACE AT THE BACK FOLLOWED BY THE FRONT BLOCK.

209

210 ALL UNITS SHALL BE PLACED TOGETHER AND PARALLEL TO THE STRAIGHT OR CURVED LINE

211 OF THE WALL FACE.

212
213 THE UNITS SHALL BE INSTALLED FREE OF ALL PROTRUSIONS, DEBRIS BEFORE INSTALLING
214 THE NEXT COURSE OF UNITS AND/OR PLACING THE GEOGRID MATERIALS.

215
216 DO NOT PLACE ANY MORE THAN 5 TO 6 BLOCKS ALONG THE FIRST COURSE BEFORE
217 STARTING ON THE SECOND COURSE.

218
219 AT THE COMPLETION OF THE PLACEMENT OF EACH COURSE, A STRING LINE SHALL BE PULLED
220 TO CONFIRM THAT THE WALLS GEOMETRY IS BEING MAINTAINED.

221
222 ALL BATTERED WALL CORNERS SHALL BE INSTALLED AND LOCKED PER THE BLOCK
223 MANUFACTURER'S RECOMMENDATION AS APPROVED BY THE WALL DESIGNER.

224
225 **DRAINAGE FILL, UNIT FILL, AND DRAINAGE PIPE PLACEMENT**

226 THE UNITS DO NOT REQUIRE CORE FILL SINCE THERE ARE NO VOIDS.

227
228 THE DRAINAGE BACKFILL SHALL BE PLACED WITHIN AN ENVELOPE OF 12 INCHES BEHIND THE
229 WALL AND SHALL CONSIST OF A FREE DRAINING, COARSE-GRAINED GRANULAR MATERIALS
230 OR OPEN GRADED MATERIALS MEETING THE REQUIREMENTS OF SECTION 2.02.03 UNLESS
231 SPECIFIED OTHERWISE BY THE DESIGNER.

232
233 THE DRAINAGE COLLECTION PIPE (MINIMUM 3-INCH DIAMETER) SHALL BE PLACED
234 IMMEDIATELY BEHIND THE WALL AT THE BOTTOM OF THE WALL WITH A MINIMUM OF 1.5%
235 GRADIENT TO MAINTAIN A POSITIVE GRAVITY FLOW INTO A SUITABLE RECEPTACLE UNLESS
236 SPECIFIED OTHERWISE BY THE DESIGNER.

237
238 **RETAINED BACKFILL PLACEMENT**

239 AS SHOWN ON THE PLANS, THE RETAINED BACKFILL MATERIAL SHALL BE PLACED IN MAXIMUM
240 LIFTS OF 10 INCHES AND SHALL BE COMPACTED TO A MINIMUM 95 PERCENT STANDARD
241 PROCTOR DRY DENSITY IN ACCORDANCE WITH ASTM D698-98.

242 ONLY HAND-OPERATED COMPACTION EQUIPMENT SHALL BE USED WITHIN 5 FEET OF THE
243 BACK FACE OF THE UNITS. THIS AREA SHALL BE COMPACTED TO A MINIMUM 90 PERCENT OF
244 STANDARD PROCTOR DRY DENSITY IN ACCORDANCE WITH ASTM D698-98.

245
246 SOIL DENSITY TESTING SHALL NOT BE PERFORMED WITHIN 5 FEET OF THE TAIL OF THE
247 SEGMENTAL CONCRETE FACING UNITS.

248
249 THE TOE OF THE WALL SHALL BE FILLED AND COMPACTED AS THE WALL IS BEING
250 CONSTRUCTED.

251
252 THE FILL AREAS SHALL BE GRADED OR PROTECTED SO THAT ANY SURFACE WATER RUN-OFF
253 IS DIRECTED AWAY FROM THE WALL FACE.

254
255 **TOLERANCE**

256 WALL BATTER TOLERANCE OF 1/8 IN. PER FT. MAXIMUM SHALL BE ALLOWED.

257
258
259 END OF SECTION

260

1 **PART 1 GENERAL**

2
3 **SECTION INCLUDES**

4 FURNISH, INSTALL, AND TEST POTABLE WATER DISTRIBUTION SYSTEM, AS SHOWN ON PLANS
5 AND SPECIFIED HEREIN.

6
7 **GENERAL**

8 FURNISH ONLY COMMERCIAL QUALITY MATERIALS AND EQUIPMENT. ALL ITEMS PROPOSED
9 FOR USE WILL BE SUBJECT TO TESTING TO ENSURE COMPLIANCE WITH THE SPECIFICATIONS.
10 PROVIDE MATERIALS OF THE SAME FUNCTION THAT ARE OF THE SAME TYPE AND THE SAME
11 MANUFACTURER.

12
13 SUBMIT A LIST OF PROPOSED MATERIALS FOR APPROVAL AS SOON AS PRACTICABLE AFTER
14 AWARD AND BEFORE ARRANGING FOR PROCUREMENT OF ANY MATERIALS, ESPECIALLY
15 THOSE MATERIALS OR PRODUCTS NOT SHOWN OR SPECIFIED. IF ANY INITIALLY PROPOSED
16 MATERIALS ARE NOT APPROVED, SUBMIT SUBSTITUTES FOR APPROVAL. ANY MATERIALS
17 INSTALLED WITHOUT APPROVAL WILL BE SUBJECT TO REMOVAL AND REPLACEMENT WITH
18 ACCEPTABLE MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

19
20 MATERIALS MAY BE DESIGNATED BY TRADE NAME OR BY MANUFACTURER'S CATALOGUE
21 INFORMATION AS SHOWN OR SPECIFIED. THE USE OF A SUBSTITUTE MATERIAL MAY BE
22 ALLOWED IF A WRITTEN REQUEST FOR SUBSTITUTION AND PROOF OF EQUIVALENT QUALITY
23 AND SUITABILITY ARE FURNISHED. MAKE ANY REQUEST FOR SUBSTITUTION WITH AMPLE
24 TIME FOR APPROVAL WITHOUT DELAYING THE WORK.

25
26 **QUALITY ASSURANCE**

27 PERMITS: CONSTRUCTION PERMITS REQUIRED BY REGULATING UTILITY AUTHORITY.
28 APPLICABLE CODES: OREGON PLUMBING SPECIALTY CODE (OPSC) CURRENT EDITION

29
30 **CERTIFICATIONS:**

31 FURNISH THE CURRENT "CERTIFICATE OF COMPLIANCE" ISSUED BY THE UNDERWRITER'S
32 LABORATORIES, INC. CERTIFYING THAT REPRESENTATIVE SAMPLES OF FITTINGS AREA IN
33 ACCORDANCE WITH ANSI/NSF STANDARD 61: DRINKING WATER SYSTEMS COMPONENTS -
34 HEALTH EFFECTS. INSTALLATION OF DUCTILE IRON PIPE, CAST IRON FITTINGS, OR DUCTILE
35 IRON FITTINGS WILL NOT BE ACCEPTED BY THE OWNER WITHOUT SUBMITTAL OF A VALID
36 CERTIFICATE.

37
38 **SUBMITTALS**

39 SUBMIT FOR THE FOLLOWING ITEMS:
40 PIPE, JOINTS, FITTINGS, VALVES, VALVE BOXES, BACKFLOW PREVENTION DEVICE, MARKING
41 TAPE AND WIRE.

42
43 **DEFINITIONS**

44 **AASHTO** - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.

45 **OSSC** - OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION

46 **OPSC** - OREGON PLUMBING SPECIALTY CODE

47 **PWDS** - PUBLIC WORKS DESIGN STANDARDS

48 **ASTM** - AMERICAN SOCIETY FOR TESTING MATERIALS

49 **AWWA** - AMERICAN WATER WORKS ASSOCIATION

50
51 **APPLICABLE MATERIALS AND CONSTRUCTION STANDARDS**

52 CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE LATEST EDITION OF THE OREGON
53 STANDARD SPECIFICATIONS FOR CONSTRUCTION, UNLESS OTHERWISE SPECIFIED HEREIN.
54 REFERENCE TO THIS SPECIFICATION IS CONTAINED HEREIN BY THE USE OF THE WORDS
55 "STANDARD SPECIFICATION".

56

57 STANDARD SPECIFICATIONS CAN BE DOWNLOADED AT:
58 <http://library.state.or.us/repository/2008/200804291419562/>

59
60 WHERE STANDARD CONSTRUCTION SPECIFICATIONS OF A PARTICULAR JURISDICTION TAKES
61 PRECEDENCE, IT SHALL BE THE "STANDARD SPECIFICATION".
62 WHERE OREGON PLUMBING SPECIALTY CODE TAKES PRECEDENCE, IT SHALL BE THE
63 "STANDARD SPECIFICATION".

64
65

66 PART 2 PRODUCTS

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68

68 WATER DISTRIBUTION PIPE AND FITTINGS:

69 DUCTILE IRON PIPE:

70 **GENERAL** - USE CENTRIFUGALLY CAST DUCTILE IRON PIPE MEETING THE REQUIREMENTS OF
71 AWWA C151. DUCTILE IRON PIPE SHALL HAVE A CEMENT-MORTAR LINING AND SEAL COATING
72 MEETING THE REQUIREMENTS OF AWWA C104. DUCTILE IRON PIPE TO BE JOINED USING
73 BOLTED FLANGED JOINTS SHALL BE STANDARD THICKNESS CLASS 53. ALL OTHER DUCTILE
74 IRON PIPE SHALL BE STANDARD THICKNESS CLASS 50 OR THE THICKNESS CLASS SPECIFIED
75 OR INDICATED.

76 **NONRESTRAINED JOINTS** - NONRESTRAINED JOINTS SHALL BE RUBBER GASKET, PUSH-ON
77 TYPE, OR MECHANICAL TYPE MEETING THE REQUIREMENTS OF AWWA C111.

78 **RESTRAINED JOINTS** - RESTRAIN PIPE, FITTINGS, AND VALVES BY USING AN APPROVED
79 BOLTED OR BOLTLESS SYSTEM. DESIGN THE RESTRAINT SYSTEM TO OPERATE AT A
80 WORKING PRESSURE EQUAL TO THE HYDROSTATIC TEST PRESSURE IDENTIFIED IN
81 STANDARD SPECIFICATIONS 01140.51(A) OR AS SHOWN. NO DEVICE UTILIZING ROUND POINT
82 SET SCREWS WILL BE ALLOWED. RESTRAINT SYSTEMS PROVIDED FOR PIPE BELLS SHALL BE
83 CERTIFIED FOR USE BY THE PIPE MANUFACTURER.

84
85

85 POLYVINYL CHLORIDE (PVC) PIPE:

86 **PVC PIPE SMALLER THAN 14 INCH DIAMETER** - PVC PIPE 4 INCHES IN DIAMETER UP TO BUT
87 NOT INCLUDING 14 INCHES IN DIAMETER SHALL MEET THE REQUIREMENTS OF AWWA C900,
88 HAVE THE SAME OUTSIDE DIMENSIONS AS DUCTILE IRON PIPE, AND HAVE A MINIMUM
89 DIMENSION RATIO (DR) OF 18 OR AS SPECIFIED OR INDICATED.

90 **JOINTS** - JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D 3139 USING A RESTRAINED
91 RUBBER GASKET CONFORMING TO ASTM F 477. SOLVENT-WELDED PIPE JOINTS ARE NOT
92 ALLOWED.

93
94

95 **PVC PIPE UNDER 4 INCHES** - PVC UNDER 4 INCHES IN DIAMETER SHALL MEET THE
96 REQUIREMENTS OF ASTM D 2241. PIPE MATERIAL SHALL BE PVC 1120, PVC 1220, OR PVC 2120,
97 AND SHALL HAVE MINIMUM WALL THICKNESS EQUAL TO OR GREATER THAN A STANDARD
98 DIMENSION RATIO (SDR) OF 21, OR AS SPECIFIED OR INDICATED. JOINTS SHALL MEET THE
99 REQUIREMENTS OF ASTM D 3139 USING A RESTRAINED RUBBER GASKET MEETING THE
100 REQUIREMENTS OF ASTM F 477. SOLVENT WELDED PIPE JOINTS WILL ONLY BE ALLOWED
101 WHEN SPECIFIED OR INDICATED.

102

102 WATER FITTINGS

103 **GENERAL** - BOLTS, NUTS AND WASHERS USED FOR SECURING FITTINGS SHALL BE OF
104 SIMILAR MATERIALS. STEEL BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A 307 FOR
105 CARBON STEEL, OR ASTM F 593 FOR STAINLESS STEEL. NUTS SHALL MEET THE
106 REQUIREMENTS OF ASTM A 563 FOR CARBON STEEL AND ASTM F 594 FOR STAINLESS STEEL.
107 IRON BOLTS AND NUTS SHALL MEET THE REQUIREMENTS OF ASTM A 536, GRADE 65-45-12.
108 GALVANIZE CARBON STEEL BOLTS, NUTS AND WASHERS ACCORDING TO STANDARD
109 SPECIFICATIONS 02560.40.

110 ALL MATERIALS IN CONTACT WITH POTABLE WATER SHALL CONFORM TO ANSI/NF
111 STANDARD 61, DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS, OR EQUIVALENT.

112 **DUCTILE IRON PIPE FITTINGS** - FITTINGS FOR DUCTILE IRON PIPE SHALL MEET THE
113 REQUIREMENTS OF AWWA C110 OR AWWA C153, AND SHALL HAVE A MINIMUM WORKING

114 PRESSURE RATING OF 250 PSI. JOINTS SHALL MEET THE REQUIREMENTS OF AWWA C111.
115 FITTINGS SHALL BE CEMENT MORTAR LINED AND SEAL COATED, MEETING THE
116 REQUIREMENTS OF AWWA C104. GASKETS FOR FLAT FACED OR RAISED FACED FLANGES
117 SHALL BE 1/8 INCH THICK NEOPRENE HAVING A DUROMETER READING OF 60, ± 5. THE TYPE,
118 MATERIAL AND IDENTIFICATION MARK FOR BOLTS AND NUTS SHALL BE PROVIDED.

119 **FITTINGS FOR POLYVINYL CHLORIDE (PVC) PIPE 4 INCHES AND LARGER** - FITTINGS FOR PVC
120 PIPE 4 INCHES IN DIAMETER AND LARGER SHALL BE THE SAME AS SPECIFIED FOR DUCTILE
121 IRON PIPE.

122 **FITTINGS FOR POLYVINYL CHLORIDE (PVC) PIPE UNDER 4 INCHES** - FITTINGS FOR PVC PIPE
123 UNDER 4 INCHES IN DIAMETER SHALL MEET THE REQUIREMENTS OF ASTM D 2466.

124 **BOLTED, SLEEVE-TYPE COUPLINGS FOR PLAIN-END PIPE** - BOLTED, SLEEVE TYPE
125 COUPLINGS, REDUCING OR TRANSITION COUPLINGS, AND FLANGED COUPLING ADAPTERS
126 USED TO JOIN PLAIN END PIPE SHALL MEET THE REQUIREMENTS OF AWWA C219. BURIED
127 COUPLINGS TO CONNECT DUCTILE IRON, GRAY CAST IRON OR PVC PIPE SHALL BE DUCTILE
128 IRON.

129

130 WATER VALVES

131 **GENERAL** - PROVIDE VALVES WITH OPERATING NUTS, HAND WHEELS OR POWER-ACTUATING
132 DEVICES AS SPECIFIED OR INDICATED. WHERE OPERATING NUTS ARE CALLED FOR, FURNISH
133 A STANDARD 2 INCH OPERATING NUT. VALVES SHALL BE NON-RISING STEM TYPE, OPEN
134 COUNTERCLOCKWISE, AND BE EQUIPPED WITH AN O-RING STUFFING BOX. ALL MATERIALS IN
135 CONTACT WITH POTABLE WATER SHALL CONFORM TO ANSI/NSF STANDARD 61, DRINKING
136 WATER SYSTEM COMPONENTS - HEALTH EFFECTS, OR EQUIVALENT. WHEN INDICATED, COAT
137 ALL INTERIOR AND EXTERIOR FERROUS SURFACES OF VALVES WITH A PROTECTIVE EPOXY
138 COATING MEETING THE REQUIREMENTS OF AWWA C550.

139 GATE VALVES:

140 **MINIMUM PRESSURE** - GATE VALVES SHALL MEET THE REQUIREMENTS OF AWWA C500, AWWA
141 C509, OR AWWA C515. THE MINIMUM DESIGN WORKING PRESSURE SHALL BE 200 PSI FOR
142 PIPE 2 INCHES TO 12 INCHES IN DIAMETER, AND 150 PSI FOR PIPE 14 INCHES TO 16 INCHES IN
143 DIAMETER.

144

145 VALVE BOXES

146 INSTALL VALVE BOXES ON ALL BURIED VALVES. BOXES SHALL BE OF CAST IRON, TWO-PIECE,
147 SLIP TYPE STANDARD DESIGN WITH A BASE CORRESPONDING TO THE SIZE OF THE VALVE.
148 BOXES SHALL BE COAL-TAR PAINTED BY THE MANUFACTURER USING ITS STANDARD. THE
149 COVER SHALL HAVE THE WORD "WATER" CAST IN IT.

150

151 METER BOX

152 *ARMORCAST PRODUCTS COMPANY* FIBERGLASS CONCRETE PRODUCTS OR APPROVED
153 SUBSTITUTE. MODEL NO. SHOWN ON PLANS, OR AS REQUIRED BY THE LOCAL
154 JURISDICTION'S PUBLIC WORKS DEPARTMENT.

155

156 BACKFLOW PREVENTION DEVICES

157 BACKFLOW PREVENTION DEVICES SHALL BE CAPABLE OF WITHSTANDING A MINIMUM DESIGN
158 WORKING PRESSURE OF 150 PSI, AND SHALL CONFORM TO THE FOLLOWING AND PLANS:

159 **DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY** - DOUBLE CHECK VALVE
160 BACKFLOW PREVENTION ASSEMBLIES SHALL CONSIST OF TWO SPRING LOADED,
161 INDEPENDENTLY OPERATING CHECK VALVES, LOCATED BETWEEN TWO TIGHTLY CLOSING
162 RESILIENT SEATED SHUTOFF VALVES, WITH FOUR RESILIENT SEATED TEST COCKS, ALL
163 MEETING THE REQUIREMENTS OF AWWA C510 AND THE OREGON STATE HEALTH DIVISION.

164

165 THRUST BLOCKS AND ANCHOR BLOCKS

166 MATERIALS CONFORMING TO STANDARD SPECIFICATIONS.

167

168 MARKING TAPE AND WIRE:

169 **MARKING TAPE** - MARKING TAPE SHALL CONSIST OF INERT POLYETHYLENE PLASTIC
170 IMPERVIOUS TO ALL KNOWN ALKALIS, ACIDS, CHEMICAL REAGENTS AND SOLVENTS LIKELY
171 TO BE ENCOUNTERED IN THE SOIL. THE WIDTH OF THE TAPE SHALL BE AS RECOMMENDED BY

SW POLK FIRE DISTRICT - SALT CREEK STATION

172 THE MANUFACTURER FOR THE DEPTH OF INSTALLATION. THE TAPE SHALL BE BLUE AND
173 IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK WITH THE
174 WORDS "CAUTION - WATER".
175 **DETECTABLE MARKING WIRE** - DETECTABLE MARKING WIRE SHALL BE NO. 12 AWG, MINIMUM,
176 SOLID COPPER WITH BLUE COLORED POLYETHYLENE INSULATION. JOINTS OR SPLICES IN
177 WIRE SHALL BE WATERPROOF.

178
179

180 **PART 3 EXECUTION**

181
182

182 **EXCAVATION**

183 EXCAVATE PIPE TRENCH AS REQUIRED BY SECTION 31 20 00.

184
185

185 **PIPE BEDDING AND PIPE INSTALLATION**

186 BED PIPE AND INSTALL PIPE ZONE BACKFILL AS REQUIRED BY SECTION 31 20 00.

187 LAY AND JOINT PIPE AS REQUIRED BY STANDARD SPECIFICATIONS AND RECOMMENDED BY
188 PIPE MANUFACTURER.

189 **DUCTILE IRON PIPE** - INSTALL DUCTILE IRON PIPE ACCORDING TO AWWA C600 AND THE
190 MANUFACTURER'S RECOMMENDATIONS.

191 **POLYVINYL CHLORIDE (PVC) PIPE** - INSTALL PVC PIPE ACCORDING TO AWWA C605 AND THE
192 MANUFACTURER'S RECOMMENDATIONS.

193
194

194 **VALVES AND VALVE BOXES**

195 **GENERAL** - INSTALL VALVES ACCORDING TO THE PLANS AND THE MANUFACTURER'S
196 RECOMMENDATIONS. JOIN TO THE PIPE ACCORDING TO SECTION 01140 AND AWWA
197 STANDARDS FOR THE TYPE OF CONNECTING ENDS FURNISHED. THOROUGHLY CLEAN AND
198 REPAIR JOINTS PRIOR TO INSTALLATION.

199 **VALVE AND VALVE BOX INSTALLATION** - SET VALVES AND VALVE BOXES PLUMB. INSTALL
200 VALVE STEM EXTENSIONS WHEN REQUIRED. CENTER THE VALVE BOX OVER THE OPERATING
201 NUT OF THE VALVE. PLACE VALVE BOXES OVER THE VALVE OR VALVE OPERATOR SO THAT
202 THE VALVE BOX DOES NOT TRANSMIT SHOCK OR STRESS TO THE VALVE. INSTALL THE
203 LOWER CASTING OF THE UNIT FIRST, SUPPORTED BY BACKFILL OR BY A CLOSED-CELL FOAM
204 COLLAR NOT LESS THAN 2 INCHES IN THICKNESS. DO NOT ALLOW THE CASTING TO REST
205 DIRECTLY ON THE BODY OF THE VALVE OR ON THE WATER MAIN.

206
207

207 **THRUST RESTRAINT:**

208 **RESTRAINED JOINTS** - WHERE INDICATED OR APPROVED BY THE ENGINEER, RESTRAIN
209 JOINTS AT BENDS, TEES, DEAD ENDS, CROSSES, AND ALL PIPE JOINTS WITHIN THE INDICATED
210 OR SPECIFIED DISTANCE ON EACH SIDE OF THE BENDS, TEES, DEAD ENDS, AND CROSSES.
211 INSTALL JOINT RESTRAINT SYSTEMS ACCORDING TO THE MANUFACTURER'S
212 RECOMMENDATIONS.

213
214

214 **TRENCH BACKFILL**

215 BACKFILL TRENCH AND COMPACT AS REQUIRED BY SECTION 31 20 00.

216
217

217 **WATER METER BOXES**

218 CONSTRUCT AS REQUIRED BY DRAWINGS.

219
220

220 **MARKING TAPE AND WIRE:**

221 **INSTALLATION** - INSTALL MARKING TAPE AND WIRE OVER ALL NONMETALLIC WATER LINES,
222 INCLUDING SERVICE CONNECTIONS. PLACE A CONTINUOUS SOLID COPPER WIRE ALONG THE
223 TOP OF ALL WATER PIPE, INCLUDING SERVICE LINES. SECURE TO THE TOP OF THE PIPE AT
224 MAXIMUM 10 FOOT INTERVALS USING 6 INCH STRIPS OF 2 INCH WIDE DUCT TAPE. TIE ALL
225 SPLICES AND MAKE THEM ELECTRICALLY CONTINUOUS AND WATERPROOF. PROVIDE ACCESS
226 TO TERMINAL ENDS OF THE WIRE AT ALL VALVE BOXES, METER BOXES, FIRE HYDRANTS, AND
227 VAULTS. THE RESULT OF THIS INSTALLATION SHALL BE A CONTINUOUS WIRE CIRCUIT

228 ELECTRICALLY ISOLATED FROM GROUND. PLACE THE MARKING TAPE APPROXIMATELY ONE
229 FOOT ABOVE THE TOP OF THE PIPE FOR ITS FULL LENGTH.

230 **ACCESSIBILITY** - MAKE ENDS OF WIRE ACCESSIBLE IN WATER METER BOXES, VALVE BOXES
231 OR CASINGS, OR OUTSIDE THE FOUNDATION OF BUILDINGS WHERE THE PIPE ENTERS THE
232 BUILDING. PROVIDE WIRE ACCESS AT LOCATIONS NO MORE THAN 1,000 FEET APART.

233 **TESTING** - TEST FOR CONTINUITY AND ISOLATION FROM GROUND IN THE WIRE AFTER ALL
234 WORK HAS BEEN COMPLETED ON THE TEST SECTION. PERFORM INTERMEDIATE TESTING
235 AFTER BACKFILLING OPERATIONS AND PRIOR TO SURFACE RESTORATION WORK. TEST
236 CONTINUITY BETWEEN ACCESS LOCATIONS BY USE OF A TEMPORARY WIRE CONNECTING
237 TEST POINTS IN-LINE WITH AN OHMMETER. MEASURE RESISTANCE WITH AN APPROVED
238 OHMMETER THAT HAS BEEN PROPERLY CALIBRATED. THE CONTINUITY OF A TEST SECTION
239 WILL BE ACCEPTED IF THE RESISTANCE OF THE TEST SECTION DOES NOT EXCEED 5 OHMS
240 FOR EACH 500 FEET OF LOCATION WIRE BEING TESTED. MEASURE ISOLATION FROM GROUND
241 WITH AN APPROVED 1000 VOLT MEGGER, APPLIED FOR ONE MINUTE. THE ISOLATION OF A
242 TEST SECTION WILL BE ACCEPTED IF THE ISOLATION RESISTANCE OF THE TEST SECTION IS
243 AT LEAST 10 MEGOHMS. LOCATE AND REPAIR ALL BREAKS OR DEFECTS IN THE WIRE AND RE-
244 TEST UNTIL SPECIFIED RESULTS ARE OBTAINED.

245

246 **HYDROSTATIC TEST, DISINFECTION**

247 PERFORM ALL HYDROSTATIC TESTS REQUIRED BY HYDROSTATIC TESTS OF STANDARD
248 SPECIFICATION 01140.51. MEET ACCEPTANCE CRITERIA.

249 PERFORM DISINFECTION TEST ACCORDING TO STANDARD SPECIFICATION 01140.52.

250

251

252

END OF SECTION

1 **PART 1 GENERAL**

2
3 **SECTION INCLUDES**

4 FURNISH AND INSTALL SANITARY SEWER AS SHOWN ON PLANS AND SPECIFIED HEREIN.

5
6 **QUALITY ASSURANCE**

7 PERMITS: CONSTRUCTION PERMITS REQUIRED BY REGULATING UTILITY AUTHORITY.

8
9 **APPLICABLE MATERIALS AND CONSTRUCTION STANDARDS**

10 CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE LATEST EDITION OF THE OREGON
11 STANDARD SPECIFICATIONS FOR CONSTRUCTION, UNLESS OTHERWISE SPECIFIED HEREIN.
12 REFERENCE TO THIS SPECIFICATION IS CONTAINED HEREIN BY THE USE OF THE WORDS
13 "STANDARD SPECIFICATION".

14
15 WHERE STANDARD CONSTRUCTION SPECIFICATIONS OF THE CITY OF INDEPENDENCE TAKES
16 PRECEDENCE, IT SHALL BE THE "STANDARD SPECIFICATION".

17
18 WHERE OREGON PLUMBING SPECIALTY CODE TAKES PRECEDENCE, IT SHALL BE THE
19 "STANDARD SPECIFICATION".

20
21 **CERTIFICATIONS:**

22 THE MANUFACTURER OR FABRICATOR SHALL FURNISH APPROPRIATE CERTIFICATION, BASED
23 ON THE MANUFACTURER'S QUALITY CONTROL TESTS, THAT THE MATERIALS USED IN THE
24 PRODUCTION OF THE PIPE MEET THESE SPECIFICATIONS. MATERIALS AND STRENGTH SHALL
25 BE AS SPECIFIED FOR THE PARTICULAR KIND OF PIPE AND FITTINGS REQUIRED.

26 USE FLEXIBLE ELASTOMERIC GASKET JOINTS ON ALL PIPES AND FITTINGS. FURNISH CAPS OR
27 PLUGS WITH EACH FITTING, OUTLET OR STUB AS REQUIRED, WITH THE SAME TYPE GASKET
28 OR JOINT AS THE PIPE.

29
30 ALL FITTINGS SHALL BE OF SUFFICIENT STRENGTH TO WITHSTAND ALL HANDLING AND LOAD
31 STRESSES ENCOUNTERED. MATERIAL JOINING THE FITTINGS TO THE PIPE SHALL BE FREE
32 FROM CRACKS AND SHALL ADHERE TIGHTLY TO EACH JOINING SURFACE.

33
34 CAP OR PLUG ALL FITTINGS AND PROVIDE WITH GASKETS OF THE SAME MATERIAL AS USED
35 IN THE PIPE JOINT. FIT WITH AN APPROVED MECHANICAL STOPPER, OR INSTALL AN
36 INTEGRALLY CAST KNOCKOUT PLUG. THE CAP OR PLUG SHALL BE CAPABLE OF
37 WITHSTANDING TEST PRESSURES WITHOUT LEAKING AND, WHEN LATER REMOVED, SHALL
38 PERMIT CONTINUATION OF PIPING WITH JOINTING SIMILAR TO JOINTS IN THE INSTALLED LINE.

39
40 **SUBMITTALS**

41 PIPE.

42
43 **DEFINITIONS**

44 **AASHTO** - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.

45 **OSSC** - OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION

46 **OPSC** - OREGON PLUMBING SPECIALTY CODE

47 **PWDS** - PUBLIC WORKS DESIGN STANDARDS

48 **ASTM** - AMERICAN SOCIETY FOR TESTING MATERIALS

49 **AWWA** - AMERICAN WATER WORKS ASSOCIATION

50
51
52 **PART 2 PRODUCTS**

53
54 **SANITARY SEWER PIPE**

55 **POLYVINYL CHLORIDE PIPE (PVC)** - FURNISH PVC STORM PIPE AND FITTINGS WITH 2 FEET OR
56 MORE COVER THAT HAVE A MINIMUM PIPE STIFFNESS OF 46 PSI OR A MINIMUM SDR OF 35

57 AND MEET THE REQUIREMENTS OF SEWER PIPE ASTM D 3034, ASTM F 679, OR ASTM F 794.
58 USE ASTM D 1785 SCHEDULE 40 WHEN REQUIRED BY OPSC FOR SANITARY SEWER SERVICE
59 LINES.

60

61 **TRACER WIRE**

62 USE 12-GAUGE STRANDED OR SOLID COPPER INSULATED HIGH MOLECULAR WEIGHT
63 POLYETHYLENE (HMW-PE) TRACER WIRE. THE HMW-PE INSULATED COVER SHALL BE GREEN
64 AND A MINIMUM 45 MIL THICK. THE WIRE SHALL BE UL RATED FOR 140 °F.

65

66

67 **PART 3 EXECUTION**

68

69 **EXCAVATION**

70 EXCAVATE PIPE TRENCH AS REQUIRED BY SECTION 31 20 00.

71

72 **PIPE BEDDING AND PIPE INSTALLATION**

73 BED PIPE AND INSTALL PIPE ZONE BACKFILL AS REQUIRED BY SECTION 31 20 00.

74 LAY AND JOINT PIPE AS REQUIRED BY STANDARD SPECIFICATIONS AND RECOMMENDED BY
75 PIPE MANUFACTURER.

76

77 **TRENCH BACKFILL AND RESURFACING**

78 BACKFILL TRENCH, COMPACT AND RESURFACE AS REQUIRED BY SECTION 31 20 00.

79

80 **MANHOLES AND CLEANOUTS**

81 CONSTRUCT AS REQUIRED BY STANDARD SPECIFICATIONS AND DRAWINGS.

82

83 **TRACER WIRE**

84 INSTALL TRACER WIRE IN ALL TRENCHES FOR SANITARY AND STORM SEWERS. PLACE THE
85 TRACER WIRE DIRECTLY OVER THE PIPE CENTERLINE AND ON TOP OF THE PIPE ZONE
86 MATERIAL. PLACE A BRANCH TRACER WIRE OVER EACH PIPE CONNECTED TO THE MAIN
87 SEWER.

88 MAKE TRACER WIRE SPLICES USING A SOLDERLESS CONNECTION KIT THAT EFFECTIVELY
89 MOISTURE SEALS TWO OR MORE CONDUCTORS FOR DIRECT BURIAL AND SECURELY JOIN
90 THE WIRES BOTH MECHANICALLY AND ELECTRICALLY. INSULATE SPLICES TO BE MOISTURE
91 AND WATERPROOF. SPLICES WRAPPED WITH TAPE WILL NOT BE ACCEPTED AS
92 WATERPROOF. HAVE ALL SPLICE KITS APPROVED PRIOR TO INSTALLATION.
93 TEST ALL TRACER WIRE WITH LOCATING EQUIPMENT PRIOR TO ACCEPTANCE.

94

95

96

END OF SECTION

1 **PART 1 GENERAL**

2
3 **SECTION INCLUDES**

4 FURNISH AND INSTALL STORM DRAIN SYSTEM AS SHOWN ON PLANS AND SPECIFIED HEREIN.

5
6 **QUALITY ASSURANCE**

7 PERMITS: CONSTRUCTION PERMITS REQUIRED BY REGULATING UTILITY AUTHORITY.

8
9 **APPLICABLE MATERIALS AND CONSTRUCTION STANDARDS**

10 CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE LATEST EDITION OF THE OREGON
11 STANDARD SPECIFICATIONS FOR CONSTRUCTION, UNLESS OTHERWISE SPECIFIED HEREIN.
12 REFERENCE TO THIS SPECIFICATION IS CONTAINED HEREIN BY THE USE OF THE WORDS
13 "STANDARD SPECIFICATION".

14
15 WHERE STANDARD CONSTRUCTION SPECIFICATIONS OF THE CITY OF INDEPENDENCE TAKES
16 PRECEDENCE, IT SHALL BE THE "STANDARD SPECIFICATION".

17
18 WHERE OREGON PLUMBING SPECIALTY CODE TAKES PRECEDENCE, IT SHALL BE THE
19 "STANDARD SPECIFICATION".

20
21 **CERTIFICATIONS:**

22 THE MANUFACTURER OR FABRICATOR SHALL FURNISH APPROPRIATE CERTIFICATION, BASED
23 ON THE MANUFACTURER'S QUALITY CONTROL TESTS, THAT THE MATERIALS USED IN THE
24 PRODUCTION OF THE PIPE MEET THESE SPECIFICATIONS. MATERIALS AND STRENGTH SHALL
25 BE AS SPECIFIED FOR THE PARTICULAR KIND OF PIPE AND FITTINGS REQUIRED.

26 USE FLEXIBLE ELASTOMERIC GASKET JOINTS ON ALL PIPES AND FITTINGS. FURNISH CAPS OR
27 PLUGS WITH EACH FITTING, OUTLET OR STUB AS REQUIRED, WITH THE SAME TYPE GASKET
28 OR JOINT AS THE PIPE.

29
30 ALL FITTINGS SHALL BE OF SUFFICIENT STRENGTH TO WITHSTAND ALL HANDLING AND LOAD
31 STRESSES ENCOUNTERED. MATERIAL JOINING THE FITTINGS TO THE PIPE SHALL BE FREE
32 FROM CRACKS AND SHALL ADHERE TIGHTLY TO EACH JOINING SURFACE.

33
34 CAP OR PLUG ALL FITTINGS AND PROVIDE WITH GASKETS OF THE SAME MATERIAL AS USED
35 IN THE PIPE JOINT. FIT WITH AN APPROVED MECHANICAL STOPPER, OR INSTALL AN
36 INTEGRALLY CAST KNOCKOUT PLUG. THE CAP OR PLUG SHALL BE CAPABLE OF
37 WITHSTANDING TEST PRESSURES WITHOUT LEAKING AND, WHEN LATER REMOVED, SHALL
38 PERMIT CONTINUATION OF PIPING WITH JOINTING SIMILAR TO JOINTS IN THE INSTALLED LINE.

39
40 **SUBMITTALS**

41 PIPE, STRUCTURES, VAULTS AND BOXES.

42
43 **DEFINITIONS**

44 **AASHTO** - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.

45 **OSSC** - OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION

46 **OPSC** - OREGON PLUMBING SPECIALTY CODE

47 **PWDS** - PUBLIC WORKS DESIGN STANDARDS

48 **ASTM** - AMERICAN SOCIETY FOR TESTING MATERIALS

49 **AWWA** - AMERICAN WATER WORKS ASSOCIATION

50
51
52 **PART 2 PRODUCTS**

53
54 **STORM DRAIN PIPE**

55 **POLYVINYL CHLORIDE PIPE (PVC)** - FURNISH PVC STORM PIPE AND FITTINGS WITH 2 FEET OR
56 MORE COVER THAT HAVE A MINIMUM PIPE STIFFNESS OF 46 PSI OR A MINIMUM SDR OF 35

57 AND MEET THE REQUIREMENTS OF SEWER PIPE ASTM D 3034, ASTM F 679, OR ASTM F 794.
58 USE ASTM D 1785 SCHEDULE 40 WHEN REQUIRED BY OPSC FOR STORM SEWER SERVICE
59 LINES.

60

61 DUCTILE IRON PIPE (DI)

62 CONFORM TO ANSI A21.51 CLASS 150 OR AWWA C151 LINED WITH CEMENT MORTAR AND SEAL
63 COATED IN ACCORDANCE WITH ANSI STANDARD A21.4 AND AWWA C104 WITH PUSH ON JOINT
64 OR MECHANICAL JOINTS AS SPECIFIED, CONFORMING TO FEDERAL SPECIFICATION WW-P-
65 421C AND ANSI SPECIFICATION A21.11.

66

67 FOOTING DRAIN PIPE (FD)

68 POLYVINYLCHLORIDE PIPE, PERFORATED 1/2" HOLES AT 5" CENTERS, 2 ROWS 120 DEGREES
69 APART, 10 FT. LENGTHS.; ASTM D2729, RUBBER JOINT GASKET ASTM F 477, PIPE JOINTS
70 TESTED TO MEET ASTM D 3212. PIPE SHALL HAVE INTEGRAL BELL-END UTILIZING GASKET-
71 TYPE JOINTS. FITTINGS SHALL BE GASKET-TYPE AND COMPLY WITH PIPE SPECIFICATION.

72

73 SQUARE OR ROUND CATCHBASINS, FRAMES AND GRATES

74 CONSTRUCT AS DETAILED.

75

76 TRENCH DRAIN

77 **GENERAL** - KLASSIKDRAIN K200S 8" TRENCH DRAIN MANUFACTURED BY ACO POLYMER
78 PRODUCTS, INC. OR APPROVED SUBSTITUTE. INSIDE CLEAR DIMENSION AS NOTED ON PLANS
79 WITH, INTERLOCKING ENDS, FULL LENGTH ANCHOR RIBS AND GRATE LOCKING SYSTEM.

80 **MATERIAL** – POLYMER CONCRETE.

81 **LENGTH** – 39.37" (1 METER) SLOPED AS REQUIRED FOR SITE.

82 **SLOPE** - 0.5% BUILT-IN BOTTOM SLOPE.

83 **METAL EDGE RAIL** – GALVANIZED STEEL

84 **GRATE** – ACO PART NUMBER 661Q IRON GRATES. GRATES SHALL HAVE OPENINGS OF 0.39" X
85 3.75" SLOT OPENINGS. GRATES SHALL SEAT INTO CHANNELS WITHOUT ROCKING AND SHALL
86 BE LOCKED TO THE CHANNEL.

87 **GRATE LOAD CLASS** – CLASS E (135,000 LBS. / 2,321 PSI MINIMUM)

88 **ACCESSORIES** – END PLATES, OUTLET PLATES, OUTLET ADAPTERS, LOCKING DEVICES AND
89 INSTALLATION DEVICES AS SPECIFIED BY MANUFACTURER.

90 **IN-LINE CATCHBASIN** – K2-902G/S 8" INTEGRAL CATCHBASIN.

91

92 TRACER WIRE

93 USE 12-GAUGE STRANDED OR SOLID COPPER INSULATED HIGH MOLECULAR WEIGHT
94 POLYETHYLENE (HMW-PE) TRACER WIRE. THE HMW-PE INSULATED COVER SHALL BE GREEN
95 AND A MINIMUM 45 MIL THICK. THE WIRE SHALL BE UL RATED FOR 140 °F.

96

97

98 PART 3 EXECUTION

99

100 EXCAVATION

101 EXCAVATE PIPE TRENCH AS REQUIRED BY SECTION 31 20 00.

102

103 PIPE BEDDING AND PIPE INSTALLATION

104 BED PIPE AND INSTALL PIPE ZONE BACKFILL AS REQUIRED BY SECTION 31 20 00.

105 LAY AND JOINT PIPE AS REQUIRED BY STANDARD SPECIFICATIONS AND RECOMMENDED BY
106 PIPE MANUFACTURER.

107

108 TRENCH BACKFILL AND RESURFACING

109 BACKFILL TRENCH, COMPACT AND RESURFACE AS REQUIRED BY SECTION 31 20 00.

110

111 MANHOLES AND CLEANOUTS

112 CONSTRUCT AS REQUIRED BY STANDARD SPECIFICATIONS AND DRAWINGS.

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TRACER WIRE

INSTALL TRACER WIRE IN ALL TRENCHES FOR SANITARY AND STORM SEWERS. PLACE THE TRACER WIRE DIRECTLY OVER THE PIPE CENTERLINE AND ON TOP OF THE PIPE ZONE MATERIAL. PLACE A BRANCH TRACER WIRE OVER EACH PIPE CONNECTED TO THE MAIN SEWER.

MAKE TRACER WIRE SPLICES USING A SOLDERLESS CONNECTION KIT THAT EFFECTIVELY MOISTURE SEALS TWO OR MORE CONDUCTORS FOR DIRECT BURIAL AND SECURELY JOIN THE WIRES BOTH MECHANICALLY AND ELECTRICALLY. INSULATE SPLICES TO BE MOISTURE AND WATERPROOF. SPLICES WRAPPED WITH TAPE WILL NOT BE ACCEPTED AS WATERPROOF. HAVE ALL SPLICE KITS APPROVED PRIOR TO INSTALLATION. TEST ALL TRACER WIRE WITH LOCATING EQUIPMENT PRIOR TO ACCEPTANCE.

END OF SECTION