

1 Amend **Section 203 - Excavation and Embankment** to read as follows:

2
3 **"SECTION 203 - EXCAVATION AND EMBANKMENT**

4
5 **203.01 Description.** This section describes excavating, hauling, and
6 disposing of surplus excavated material and placing and compacting specified
7 materials necessary to construct project.

8
9 Roadway excavation includes excavating and compacting, or disposing
10 of, all materials of whatever character encountered in the work.

11
12 For terminology used in this section, refer to Section 101 – Definitions
13 and Terms and ASTM D 653 – Standard Terminology Relating to Soil, Rock,
14 and Contained Fluids.

15
16 **203.02 Materials.**

17
18 **(A) Unsuitable Material.** Soils that cannot be properly compacted,
19 or soils that have roots or other organic matter, garbage. Debris, junk,
20 or any deleterious matter on the surface of buried.

21
22 **(B) Excavated Material.** All material excavated from project site for
23 roadway contraction.

24
25 **(C) Selected Material.** Suitable excavated material for specific use
26 from areas within the highway right-of-way.

27
28 **(B) Borrow Excavated Material.** Accepted materials from designated
29 borrow sources outside right-of-way or excavation limits, conforming to
30 the requirements of Subsection 106.02 – Material Sources. Borrow
31 excavated material shall conform to the size and quality specified in the
32 contract documents. When the contract documents do not specify size
33 of quality, borrow excavated material shall be of a quality source suitable
34 for the purpose intended. Borrow excavated material shall be free of
35 any roots or other organic, garbage, trash, junk, or other deleterious
36 material.

37
38 **203.03 Construction Requirements.** Clear and grub in accordance with
39 Section 201 - Clearing and Grubbing before excavating. Excavate and embank
40 road, road intersections and road entrances to a smooth and uniform surface.
41 Excavate so as not to disturb material outside limits of slopes or limits of
42 grading.

43
44 **(A) Excavation.**

46 (1) **General.** Obliterate old roadways according to Section
47 202 - Removal of Structures and Obstructions. Blasting will not
48 be allowed.
49

50 When encountering possible archaeological, historical, or
51 burial site findings, comply with the requirements of Subsection
52 107.13(B) - Archaeological, Historic, and Burial Sites.
53

54 (2) **Widening or Flattening Cut Slopes.** Submit proposed
55 locations for widening or flattening planned cut slopes to obtain
56 material required:
57

58 (a) For embankment construction;
59

60 (b) To preclude the opening of unsightly borrow pits; or
61

62 (c) To increase the stability of cut slopes.
63

64 Do not proceed with proposed slope widening or
65 flattening until the Engineer accepts proposed locations.
66

67 (3) **Cut Slopes.** Round the tops and ends of cut slopes
68 according to the contract documents.
69

70 Finish soil cut slopes that are flatter than one-half horizontal
71 to one vertical true and straight in accordance with slope lines and
72 grades shown in the contract documents.
73

74 Finish cut slopes that are one-half horizontal to one vertical
75 or steeper in rock excavation in a rough condition, with debris and
76 loose material removed. When completed, the average plane of
77 excavated slopes shall conform to the slopes shown in the contract
78 documents. No points shall vary from planned slopes by more than
79 6 inches when measured at right angle to the slope.
80

81 (4) **Potential Slide Areas.** Excavate and remove unstable
82 material by:
83

84 (a) Benching to lines and grades designated by the
85 Engineer; or
86

87 (b) Excavating material to a slope designated by the
88 Engineer, from an elevation at or near roadway grade;
89

90 Use this material in roadway construction or dispose of
91 when ordered by the Engineer.
92

93 **(5) Subexcavation.** When excavation to the finish grade
94 results in a subgrade or slopes of unsuitable material as defined in
95 Subsection 203.02 – Materials, the Engineer will require:
96

97 **(a)** Removing unsuitable material and
98

99 **(b)** Backfilling to finished grade with acceptable material
100 in accordance with Subsection 203.03(C) – Embankment
101 Construction.
102

103 Notify the Engineer two weeks prior to the start of
104 subexcavation operations. The Engineer will perform necessary
105 cross-sectional measurements before authorizing backfill
106 placement.
107

108 **(B) Excavated Material.**
109

110 **(1) Selected Material.** Use selected material for:
111

112 **(a)** Embankment fill;
113

114 **(b)** Finishing the top portion of the roadbed;
115

116 **(c)** Constructing roadbed shoulders;
117

118 **(d)** Structure backfill;
119

120 **(e)** Constructing berms,
121

122 **(f)** Erosion control;
123

124 **(g)** Landscaping; and
125

126 **(h)** Other purposes according to the contract
127 documents. For other uses according to the plans, or
128

129 Place selected material on the roadbed in accordance with
130 Subsection 203.03(c) - Embankment Construction and selected
131 topsoil for erosion control in accordance with Section 209 - Erosion
132 Control.
133

134 Keep selected material in place until it can be hauled, and
135 compacted in its final position. If allowed by the Engineer,
136 selected material may be stockpiled at locations accepted by the
137 Engineer, for later placement in final position.
138

139 The Engineer will not include for payment as stockpiled
140 material, selected material placed in windrows along tops of
141 roadway slopes for erosion control work.
142

143 Unsuitable material; will become the property of the
144 Contractor and be hauled away at no increase in contract price or
145 contract time.
146

147 **(2) Borrow Material.** Arrange to obtain borrow material and
148 pay the costs involved. Notify the Engineer 20 working days
149 before opening borrow areas. Allow sufficient time for testing the
150 borrow material by the Engineer.
151

152 Control of borrow material shall be according to Section 106
153 - Control of Materials.
154

155 Excavate to dimensions and elevations established for
156 borrow pit. Remove borrow material after the Engineer completes
157 staking out and cross sectioning of the borrow excavated and in-
158 place sites for measurement and payment purposes. Establish and
159 specify the finished borrow areas approximately true to line and
160 grade. Complete the finished borrow areas so no water may
161 collect or stand therein.
162

163 Do not place borrow material until after placing the selected
164 material in fill.
165

166 When it is necessary to remove an existing fence, replace it
167 with a comparable fence after work that required fence removal has
168 been completed. If necessary, confine livestock during fence
169 removal. When required for security purposes, provide and
170 maintain temporary fencing. Furnish and install permanent fencing
171 after temporary fencing is no longer needed.
172

173 **(3) Surplus Selected Material.** Unless otherwise shown in the
174 contract documents, and not over soft ground, use surplus
175 selected material when and in locations accepted by the Engineer
176 to: widen embankments uniformly or flatten slopes; dispose of
177 along roadway or other designated locations. Dispose of surplus
178 selected material below adjacent roadbed grade. Complete
179 embankments before disposing of surplus selected material.

180 When indicated in the contract documents, the quantity of
181 surplus selected material is approximate only. Replace shortage
182 of material caused by premature disposal of surplus selected
183 material at no increase in contract price or contract time.
184

185 Upon completion of disposal operations, grade disposal
186 areas to provide a level surface. Unusual surplus selected
187 material shall become the Contractor's property. Supply
188 topographic map of disposal area.
189

190 **(4) Highly Sensitive Soil.** When soil having high moisture
191 content, loses its stability and becomes plastic or muddy, excavate
192 with the least manipulation or churning of soil.
193

194 **(C) Embankment Construction.**
195

196 **(1) General.** Use suitable excavated or borrow material in the
197 construction of embankments. Do not place rocks, broken
198 concrete, or other solid materials in embankment areas where
199 deep foundations such as driven piles or drilled shafts are to be
200 placed.
201

202 When placing and compacting material for embankment on
203 hillsides and existing embankments, or building embankment half
204 width at a time continuously bench slopes that are steeper than
205 four horizontal to one vertical while bringing the work up in layers.
206

207 Benching shall be of sufficient width to permit construction
208 equipment to operate. Begin each horizontal cut at the intersection
209 of original ground and the vertical sides of the previous cuts.
210 Recompact the material cut along with the new embankment
211 material.
212

213 When embankments across swampy ground cannot
214 support the weight of trucks or other hauling equipment, the lower
215 part of the fill may be constructed by dumping successive loads of
216 gravel, cobbles, and boulders in a uniformly distributed layer of a
217 thickness not greater than necessary or use permeable separator
218 with granular material of adequate thickness to support vehicle
219 placing the layers. Construct remainder of embankment according
220 to the contract documents.
221

222 When depositing embankment material on only one side of
223 abutments, wingwalls, piers, or culvert headwalls, do not
224 overcompact the area next to the structure. Do not place fill next
225 to the end bent of a bridge higher than the bottom of the backwall

226 of the bent until after the superstructure is in place. Conduct
227 operations so that the embankment is constructed at approximately
228 the same elevation on both sides of the structure at the same time.

229
230 Finish embankment slopes as shown in the contract
231 documents, to approximate lines and grades established and such
232 that slopes contain no unsightly or undue irregularities.
233

234 Place embankment material in horizontal layers not
235 exceeding 8 inches in loose thickness. Compact as specified
236 before placing the next layer. Spread each lift to get uniform
237 thickness before compacting. Level and manipulate continuously
238 to ensure uniform density as compaction of each layer progresses.
239 Add or remove water to obtain required density. Route
240 construction equipment uniformly over entire surface of each layer.
241

242 When embankment material consists predominantly of rock
243 fragments, hardpan or cemented gravel that cannot be broken
244 readily, and includes 25 percent or more of materials larger than 6
245 inches in greatest dimension but less than 30 inches in greatest
246 dimension, place such material in the embankment in layers not
247 exceeding 3 feet. Uniformly distribute such material throughout the
248 embankment. Construct lifts below an elevation 3 feet below
249 pavement structure. Construct balance of embankment of suitable
250 material, smooth and place in layers not exceeding 8 inches in
251 loose thickness. Compact as specified for embankments.
252

253 While depositing embankment material place sufficient earth
254 or other fine material around large material to fill interstices and to
255 produce a dense compact embankment. Furnish earth or other
256 fine material to fill the interstices when not available in excavated
257 material.
258

259 Processing embankment material to reduce maximum size
260 of particles so that material can be placed in specified lifts.
261

262 Deposit embankment material having an SE value equal to
263 or greater than 15 within the top 3 feet of the embankment,
264 excluding pavement structure. Place embankment material below
265 the top 3 feet of embankmen grade with material having sand
266 equivalent value equal to or greater than area being filled. Break
267 up clods or hard lumps of earth over 6 inches in greatest
268 dimension before compacting material in embankment, except as
269 provided above.
270

Construct the center of embankment layers slightly higher than the sides. Construct sidehill embankments with the intersection of original ground and the embankment being the high point of the layer. Uniformly slope embankment to the outer side. For embankment layers, do not exceed a cross fall of one foot in 20 feet.

Caves are often present in lava formations. The Engineer will determine if caves are too close to the road surface. Excavate to open their tops when ordered by the Engineer. Fill and compact caves with accepted materials.

Maintain stability of constructed embankments until final acceptance of the contract documents. Maintain embankments to grade and cross section shown in the contract documents. Replace portions that become displaced or damaged prior to acceptance at no increase in contract price or time.

(2) Relative Compaction Test. The relative compaction test is a procedure for determining the ratio of the dry unit weight (density) of in-place soil to the maximum dry unit weight of the same soil, as determined by the following methods:

(a) Maximum Dry Unit Weight. Test for maximum dry unit weight according to AASHTO T 180 for soil aggregate mixtures with less than 35 percent passing the No. 200 sieve, and for soils with 35 percent or more passing the No. 200 sieve, having sand equivalent of 15 or more. Test for maximum unit weight in accordance with AASHTO T 99 for soils with 35 percent or more passing the No. 200 sieve, having sand equivalent of less than 15. Perform percent passing No. 200 sieve and sand equivalent tests in accordance with AASHTO T 11 and AASHTO T 176, respectively. For both maximum dry unit weight tests, use Method "A" if the particles are under No. 4 mesh in size, and Method "D" if the particles are over No. 4 mesh in size, and apply the correction for fraction over 3/4-inch. Use Hawaii Test Method HDOT TM 5 for sample preparation of sensitive soils when so designated by the Engineer.

(b) Density of Soil In-Place. Test for soil in-place density in accordance with Hawaii Test Method HDOT TM 1, HDOT TM 2, and HDOT TM 3.

318 **(3) Compaction of Embankment With Moisture And Density**
319 **Control.** When original ground surface in embankment sections
320 is within 3 feet of finished profile grade, the original ground
321 contained in the prism within 3 feet of the finished grade and within
322 the width of the traveled way plus 3 feet on each side, shall have a
323 relative compaction of 95 percent or more.
324

325 When original ground within 3 feet of the finished grade
326 does not conform to the specified relative compaction, excavate
327 material until specified relative compaction is achieved or to 3 feet
328 below finished grade.
329

330 When material 3 feet 6 inches below finished grade does
331 not have a relative compaction of at least 90 percent, compact
332 material until 90 percent or more relative compaction is attained.
333 After compacting lower 6 inches to a relative compaction of 90
334 percent, backfill excavated material or other material designated in
335 the excavated area. Place backfill material in layers not exceeding
336 8 inches in loose thickness before compaction. Compact each
337 layer to a relative compaction of 95 percent or more.
338

339 Construct embankments in layers not to exceed 8 inches in
340 loose thickness except as specified in Subsection 203.03(C)(4) -
341 Compaction of Embankment Without Moisture and Density Control.
342 Compact each layer within 3 feet of finished grade to 95 percent or
343 more relative compaction. Compact material below a plane 3 feet
344 below finished grade to 90 percent or more relative compaction.
345

346 **(4) Compaction Of Embankment Without Moisture And**
347 **Density Control.** Compact rock embankments to the maximum
348 compaction obtainable by routing loaded hauling equipment over
349 the entire width of the layer and supplemented by using rollers
350 accepted by the Engineer. At the start of construction, conduct a
351 test program to determine the number of passes of a compactor
352 needed to achieve the required compaction. The number of
353 passes will then be used as the field criterion for compaction.
354

355 Keep dumping and rolling areas separately. Do not cover
356 lift by another until achieving compaction in accordance with this
357 subsection.
358

359 **(D) Subgrade Preparation.** Prepare subgrade to the required density,
360 cross section, and grade.
361

362 **(1) General.** Prepare subgrade after completing and backfilling
363 drainage facilities and structures and compacting earthwork.

Remove rocks or lumps and fill voids with suitable materials. Material used to fill voids shall conform to specified material to be placed on the subgrade.

(2) **Density Requirement.** Compact finished subgrade to a relative compaction of 95 percent for a depth of 6 inches immediately before placing subsequent material thereon.

(3) **Surface Tolerances of Subgrade.** Finish subgrade upon which pavement structure is placed shall not vary more than 0.04-foot above or below theoretical grade.

203.04 Method of Measurement. The Engineer will measure:

(A) **Roadway excavation per cubic yard.** The Engineer will compute the quantities of roadway excavation by average end area method and centerline distances. Curvature correction will not be applied to quantities within roadway prism, as shown in the contract documents. In computing excavation quantities from outside the roadway prism, where roadway centerline is used as a base, curvature correction will be applied when the centerline radius is 1,000 feet or less.

When roadway excavation quantities by average end area method cannot be computed due to the nature of a particular operation or changed conditions, the Engineer will determine and use computation method that will produce an accurate quantity estimate.

(B) **Borrow excavated material per cubic yard.** The Engineer will compute quantities of borrow material incorporated into the work on a volume basis using average end area method in place at the work site.

The Engineer will include binder material entering and becoming a part of borrow excavated material placed on roadbed in volume of borrow excavated material when the average end area method is used to calculate the in-place volume.

(C) **Selected material for planting soil and selected material for decorative boulder is paid on a lump sum basis.** Measurement does not apply.

203.05 Basis of Payment. The Engineer will pay for the accepted pay items listed below at the contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and the contract documents.

The Engineer will pay for each of the following pay items when included in the proposal schedule:

Pay Item	Pay Unit
Roadway Excavation	Cubic Yard

The Engineer will pay for:

(1) 15% of the contract bid price upon completion of obliterating old roadways and hauling;

(2) 30% of the contract bid price upon completion of preparing the subgrade;

(3) 40% of the contract bid price upon completion of placing selected material in final position, rounding of slopes; and using water for compaction;

(4) 15% of the contract bid price upon completion of disposing surplus excavation material;

Borrow Excavated Material	Cubic Yard
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The Engineer will pay for:

(1) 10% of the contract bid price upon completion of staking out and cross sectioning the existing condition at the borrow excavated and in-place sites and establishing the borrow area;

(2) 5% of the contract bid price upon completion of providing, replacing, and maintaining temporary and permanent fencing and confining livestock

(3) 15% of the contract bid price upon completion of all necessary storing and processing of the borrow material;

(4) 15% of the contract bid price upon completion of watering; hauling the material to the work site;

(5) 20% of the contract bid price upon completion of placing, grading, compacting the material in accordance with contract requirements at the work site;

(6) 15% of the contract bid price upon completion of restoring and regrading the borrow area;

(7) 10% of the contract bid price upon completion of staking out and cross sectioning the final condition at the borrow excavated and in-place sites;

(8) 10% of the contract bid price upon completion of removing and disposing of excess and unsuitable material from the work site

Selected Material for Planting Soil Lump Sum

Selected Material for Decorative Boulder Lump Sum

The Engineer will pay for accepted quantities of slide material excavated and removed from the following areas, as roadway excavation at the contract unit price per cubic yard: within planned roadway prism for slide material from outside planned roadway slopes that has slid onto the roadway; and potential slide areas outside planned roadway slopes, as ordered by the Engineer. Only quantities of slide material that are either reused in roadway construction or disposed of, as ordered by the Engineer, will be accepted for payment. Payment will be full compensation for work prescribed in this subsection, Subsection 203.03(A)(4) – Potential Slide Areas, and the contract documents.

The Engineer will pay for accepted quantities of subexcavation, as roadway excavation at the contract unit price per cubic yard, when ordered by the Engineer, for work prescribed in Subsection 203.03(A)(5) – Subexcavation. Payment will be full compensation for the work prescribed therein and in the contract documents.

The Engineer will pay for accepted quantities of unlined gutter excavation as roadway excavation at the contract unit price per cubic yard, when gutter is located as follows: within the median area of a divided highway; and between roadbed shoulder and adjacent cut slope. Payment will be full compensation for removing and disposing of excavated material; backfilling and compacting; and for the work prescribed in the contract documents.

The Engineer will not pay for stockpiling selected material or placing selected material in final position separately and will consider the cost as included in the unit prices for the various excavation contract pay items. The cost is for work prescribed in this section and the contract documents.

The Engineer will not pay for selected material from ditch, channel, or structure excavation, when used instead of borrow excavation.

498 The Engineer will not pay for overhaul separately and will consider the
499 cost as included in the unit prices for the various excavation contract pay items.
500 The cost is for work prescribed in this section and the contract documents.

501
502 The Engineer will not pay for embankment separately and will consider
503 the cost as included in the unit price for roadway excavation. The cost is for
504 work prescribed in this section and the contract documents.

505
506
507
508 **END OF SECTION**
509
510
511