



47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94

**(A) Excavation.**

**(1) General.** Obliterate old roadways in accordance with Section 202 - Removal of Structures and Obstructions. Blasting will not be allowed.

When encountering possible archaeological, historical, or burial site findings, comply with requirements of Subsection 107.13(B) - Archaeological, Historical, and Burial Sites.

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

- (a)** Constructing embankment.
- (b)** Precluding opening unsightly borrow pits.
- (c)** Increasing stability of cut slopes.

Do not proceed with proposed slope widening or flattening until the Engineer accepts proposed locations. Steepening of cut slopes will not be allowed.

**(3) Cut Slopes.** Round tops and ends of cut slopes in accordance with the contract documents.

Finish soil cut slopes true and straight in accordance with slope lines and grades indicated in the contract documents.

Finish cut slopes that are in rock excavation, in a rough condition, with debris and loose material removed. When completed, the average plane of excavated slopes shall conform to slopes indicated in the contract documents. No points shall vary from planned slopes by more than 6 inches when measured at right angles to slope.

**(4) Subexcavation.** When excavation to finished grade results in subgrade or slopes of unsuitable material as defined in Subsection 101.03 - Definitions, the Engineer will require the following:

- (a)** Removing unsuitable material.
- (b)** Backfilling to finished grade with acceptable material in accordance with Subsection 203.03(C) - Embankment Construction.

94 Notify the Engineer two weeks prior to start of subexcavation  
 95 operations. The Engineer will perform necessary cross-sectional  
 96 measurements before authorizing backfill placement.  
 97

98 When relative compaction of original ground is less than  
 99 compaction specified in Subsection 203.03(C)(3) - Compaction of Cut  
 100 Areas and Embankments With Moisture and Density Tests and  
 101 Subsection 203.03(C)(4) - Compaction of Embankments Without  
 102 Moisture and Density Tests, compact upper 6 inches of exposed  
 103 original ground in accordance with those subsections.  
 104

105 Unsuitable material shall become property of the Contactor and  
 106 disposal of unsuitable material shall be at no increase in contract price  
 107 or contract time.  
 108

109 **(B) Excavated Material.**

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

111 **(a)** Embankment fill.

112 **(b)** Finishing top portion of roadbed.

113 **(c)** Constructing roadbed shoulders.

114 **(d)** Structure backfill.

115 **(e)** Constructing berms.

116 **(f)** Erosion control.

117 **(g)** Landscaping.

118 **(h)** Other purposes in accordance with the contract  
 119 documents.  
 120

121 Place selected material on roadbed in accordance with  
 122 Subsection 203.03(C) - Embankment Construction and selected  
 123 topsoil for erosion control in accordance with Section 209 - Temporary  
 124 Water Pollution, Dust, and Erosion Control.  
 125

126 Keep selected material in place until it can be hauled and  
 127 compacted in its final position. If allowed by the contract documents,  
 128 selected material may be stockpiled at locations accepted by the  
 129 Engineer, for later placement in final position.  
 130

131 **(2) Borrow Excavated Material.** Arrange to obtain borrow  
 132 excavated material and pay costs involved in accordance with  
 133

142 Subsection 106.02 - Material Sources. Submit certified test data  
143 demonstrating borrow excavated material to be incorporated in the  
144 work conforms to the contract documents. Acceptance of test data  
145 will be subject to field verification testing by the Engineer. Notify the  
146 Engineer 20 working days before opening borrow areas.  
147

148 Control of borrow excavated material will be in accordance with  
149 Section 106 - Material Restrictions and Requirements.  
150

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

158 Place selected material in fill before placing borrow excavated  
159 material.  
160

161 **(3) Surplus Selected Material.** Unless otherwise indicated in the  
162 contract documents, and not over soft ground, use surplus selected  
163 material when and in locations accepted by the Engineer to do the  
164 following: widen embankments uniformly or flatten slopes; dispose of  
165 at Engineer's designated locations. Dispose of surplus selected  
166 material below adjacent roadbed grade. Complete embankments  
167 before disposing of surplus selected material.  
168

169 When indicated in the contract documents, the quantity of  
170 surplus selected material is approximate only. Replace shortage of  
171 material caused by premature disposal of surplus selected material at  
172 no increase in contract price or contract time.  
173

174 Upon completion of disposal operations, grade disposal area to  
175 provide level surface. Unused selected material shall become the  
176 Contractor's property. Supply topographic map of disposal area.  
177

178 **(4) Highly Sensitive Soil.** When soil having high moisture content  
179 loses its stability and becomes plastic or muddy, excavate with the  
180 least manipulation or churning of soil.  
181

182 **(C) Embankment Construction.**  
183

184 **(1) General.** Strip live, dead, or decayed vegetation, rubbish,  
185 debris, and other foreign material from ground surface on which  
186 embankment is to be placed. When embankment is required on  
187 existing slopes steeper than five horizontal to one vertical, bench  
188 those areas as work is brought up in layers. Construct bench of  
189 sufficient width to permit operation of placing and compacting

190 equipment. Use suitable excavated or borrow material, and cullet, or  
191 combination thereof in embankment construction. Use of  
192 embankment material containing cullet will not be allowed on surface  
193 of embankment. Placement of rocks, broken concrete, or other solid  
194 materials will not be allowed in embankment areas where deep  
195 foundations, such as driven piles or drilled shafts, are to be placed.

196  
197 When soft or swampy ground condition is encountered that  
198 cannot support weight of trucks or other hauling equipment, lower part  
199 of fill may be constructed with a working platform. Construct working  
200 platform by either placing successive loads of gravel, cobbles, and  
201 boulders in a uniformly distributed layer of thickness not greater than  
202 necessary; or by using permeable separator with granular material of  
203 adequate thickness to support construction equipment. Construct  
204 remainder of embankment in accordance with the contract  
205 documents.

206  
207 For minimum depth of 2 feet from subgrade, place  
208 embankment material with maximum size of 6 inches and sand  
209 equivalent (SE) of 10 or greater, but not less than SE of soil material  
210 upon which it is placed. Except as otherwise indicated in the contract  
211 documents, embankment material below 2 feet from subgrade may  
212 consist of material with maximum size of 6 inches and SE of less than  
213 10 but not less than SE of existing soil on which embankment is  
214 placed. Place embankment material in horizontal layers not  
215 exceeding 9 inches in loose thickness. Compact as specified before  
216 placing next layer. Manipulate material to ensure uniform density and  
217 surface smoothness, as compaction of each layer progresses. Add or  
218 remove water to obtain required density.

219  
220 Embankment fill below top 2 feet from subgrade may contain  
221 material with rock fragments, hardpan, or cemented gravel larger than  
222 6 inches but less than 3 feet in greatest dimension. Place in  
223 compacted lifts of thickness not exceeding approximate size of the  
224 rocks and not exceeding 3 feet. Process embankment material to  
225 reduce maximum size of particles so that material can be placed in  
226 specified lifts. Uniformly distribute larger rock throughout bottom of  
227 embankment and place sufficient selected material and other finer  
228 rock around large material to fill voids and to produce a dense,  
229 compact embankment. Provide earth or fine material to fill voids when  
230 not available in excavation.

231  
232 Finish embankment slopes, as indicated in the contract  
233 documents, to within plus or minus 3 inches of lines and grades  
234 established and such that slopes contain no unsightly or undue  
235 irregularities. Finish top of embankment surfaces in accordance with

236 Subsection 203.03(D) - Subgrade Preparation. Replace portions that  
 237 become displaced or damaged prior to acceptance at no increase in  
 238 contract price or contract time.

239

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

244

245 **(a) Maximum Dry Unit Weight.** Test for maximum dry unit  
 246 weight in accordance with AASHTO T 180, Method D. Use  
 247 Hawaii Test Method HDOT TM 5 for sample preparation of  
 248 sensitive soils when so designated by the Engineer. When  
 249 oversized materials larger than 3/4 inch exceed 5 percent by  
 250 weight of total sample, apply corrections to laboratory dry  
 251 density in accordance with AASHTO T 224. When oversized  
 252 materials larger than 3/4 inch exceed 30 percent, use  
 253 compaction procedure specified in Subsection 203.03(C)(4) -  
 254 Compaction of Embankments Without Moisture and Density  
 255 Tests.

256

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

260

261 **(3) Compaction of Cut Areas and Embankments With Moisture  
 262 and Density Tests.** Prior to shaping and compacting, condition soil to  
 263 moisture content within 2 percent above or below optimum moisture  
 264 content determined in accordance with AASHTO T 180. Except as  
 265 specified in Subsection 203.03 (C)(4) – Compaction of Embankments  
 266 Without Moisture and Density Tests, moisture condition embankment  
 267 material and place in layers not to exceed 9 inches in loose thickness,  
 268 and compact each layer of material as specified, before placement of  
 269 next lift. Determine maximum density and relative compaction in  
 270 accordance with Subsection 203.03(C)(2) – Relative Compaction  
 271 Test.

272

273 In-situ soil or embankment material contained in prism within 2  
 274 feet below subgrade and within width of traveled way, auxiliary lane,  
 275 and shoulder on each side shall have relative compaction of 95  
 276 percent or more. When in-situ material within 2 feet below subgrade  
 277 does not conform to specified relative compaction, excavate and  
 278 recompact material until specified relative compaction is achieved.

279

280 Top 6 inches of in-situ material and embankment material  
 281 below top 2 feet of subgrade, and beyond traveled way, auxiliary lane,  
 282 and shoulder prism, shall have relative compaction of at least 90

283 percent. When in-situ material cannot be compacted to 90 percent,  
284 provide working platform to allow 90 percent compaction of first lift.  
285

286 **(4) Compaction of Embankments Without Moisture and**  
287 **Density Tests.** Use trial fill section to determine required degree of  
288 compaction and method to obtain that compaction, for materials with  
289 sufficient coarse material that compaction cannot be determined by  
290 Subsection 203.03(C)(2) – Relative Compaction Test. Use trial  
291 section to determine type and size of compaction equipment, lift  
292 thickness, and number of passes required to obtain compaction  
293 acceptable to the Engineer.  
294

295 For rock fill placement in lifts not exceeding 2 feet in loose lift,  
296 the following compaction procedures may be used in lieu of trial  
297 section. For rock sizes not exceeding 9 inches in greatest dimension,  
298 place material in 12-inch loose lift and compact material full width  
299 using one of the following methods:  
300

301 **(a)** Two passes of a 50-ton compression-type roller.  
302

303 **(b)** Two passes of a vibratory roller having minimum  
304 dynamic force of 40,000 pounds impact per vibration and  
305 minimum frequency of 1,000 vibrations per minute.  
306

307 **(c)** Eight passes of a 10-ton compression-type roller.  
308

309 **(d)** Eight passes of a vibratory roller having minimum  
310 dynamic force of 30,000 pounds impact per vibration and  
311 minimum frequency of 1,000 vibrations per minute.  
312

313 Operate compression-type rollers at speeds less than 4 miles  
314 per hour and vibratory rollers at speeds less than 1.5 miles per hour.  
315 For rock sizes not exceeding 14 inches in greatest dimension, place  
316 material in 18-inch loose lift and compact material full width with  
317 increase in number of roller passes in Subsections (a) and (b) herein  
318 by two, and increase number of roller passes in Subsections (c) and  
319 (d) herein by four. For rock sizes not exceeding 18 inches in greatest  
320 dimension, place material in 24-inch loose lift and compact material  
321 full width with increase in number of roller passes in Subsections (a)  
322 and (b) herein by four, and increase number of roller passes in  
323 Subsections (c) and (d) herein by eight. Use trial fill section as  
324 specified in this subsection for embankment with rock sizes 19 to 36  
325 inches in maximum dimension.  
326

327 **(D) Subgrade Preparation.** Prepare subgrade to required density, cross  
328 section, and grade.  
329  
330

**203.**

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

332  
333 Remove rocks or lumps and fill voids with suitable materials.  
334 Material used to fill voids shall conform to specified material to be  
335 placed on subgrade.

336  
337 (2) **Density Requirement.** Compact finish subgrade to relative  
338 compaction of 95 percent for depth of 6 inches immediately before  
339 placing subsequent material thereon.

340  
341 (3) **Surface Tolerances of Subgrade.** Finish subgrade upon  
342 which pavement structure is to be placed shall not vary more than  
343 0.04-foot above or below theoretical grade.

344

345 **203.04 Measurement.** The Engineer will measure:

346

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

354

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

359

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

363

364 (C) Selected material for planting soil and selected material for decorative  
365 boulder will be paid on a lump sum basis. Measurement for payment will not  
366 apply.

367

368 **203.05 Payment.** The Engineer will pay for the accepted pay items listed below  
369 at the contract price per pay unit, as shown in the proposal schedule. Payment will  
370 be full compensation for the work prescribed in this section and the contract  
371 documents.

372

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

375

376



376	<b>Pay Item</b>	<b>Pay Unit</b>
377		
378	Roadway Excavation	Cubic Yard
379		
380	The Engineer will pay for:	
381		
382	(A) 15 percent of the contract bid price upon completion of obliterating old	
383	roadways and hauling.	
384		
385	(B) 30 percent of the contract bid price upon completion of preparing	
386	subgrade.	
387		
388	(C) 40 percent of the contract bid price upon completion of placing	
389	selected material in final position, rounding of slopes, and using water for	
390	compaction.	
391		
392	(D) 15 percent of the contract bid price upon completion of disposing of	
393	surplus excavation material.	
394		
395	Borrow Excavated Material	Cubic Yard
396		
397	The Engineer will pay for:	
398		
399	(A) 10 percent of the contract bid price upon completion of staking out and	
400	cross sectioning existing condition at borrow excavated and in-place sites	
401	and establishing borrow area.	
402		
403	(B) 5 percent of the contract bid price upon completion of providing,	
404	replacing, and maintaining temporary and permanent fencing, and confining	
405	livestock.	
406		
407	(C) 15 percent of the contract bid price upon completion of all necessary	
408	storing and processing of borrow material.	
409		
410	(D) 15 percent of the contract bid price upon completion of watering and	
411	hauling material to work site.	
412		
413	(E) 20 percent of the contract bid price upon completion of placing,	
414	grading, and compacting material in accordance with contract requirements	
415	at work site.	
416		
417	(F) 15 percent of the contract bid price upon completion of restoring and	
418	regrading borrow area.	
419		
420	(G) 10 percent of the contract bid price upon completion of staking out and	
421	cross sectioning final condition at borrow excavated and in-place sites.	
422		
423	(H) 10 percent of the contract bid price upon completion of removing and	
424	disposing of excess and unsuitable material from work site.	

**203.05**

425  
426 Selected Material for Planting Soil Lump Sum

427  
428 Selected Material for Decorative Boulder Lump Sum

429  
430 The Engineer will pay for accepted quantities of subexcavation, as roadway  
431 excavation at the contract unit price per cubic yard, when ordered by the Engineer,  
432 for work prescribed in Subsection 203.03(A)(4) – Subexcavation. Payment will be  
433 full compensation for the work prescribed therein and in the contract documents.

434  
435 The Engineer will pay for accepted quantities of unlined gutter excavation as  
436 roadway excavation at the contract unit price per cubic yard, when gutter is located  
437 as follows: within median area of a divided highway; and between roadbed shoulder  
438 and adjacent cut slope. Payment will be full compensation for removing and  
439 disposing of excavated material; backfilling and compacting; and for the work  
440 prescribed in the contract documents.

441  
442 The Engineer will not pay for stockpiling selected material, placing selected  
443 material in final position, or placing selected material in windrows along tops of  
444 roadway slopes for erosion control work, separately and will consider the cost as  
445 included in the unit prices for the various excavation contract pay items. The cost is  
446 for work prescribed in this section and the contract documents.

447  
448 The Engineer will not pay for selected material from ditch, channel, or  
449 structure excavation, when used instead of borrow excavation.

450  
451 The Engineer will not pay for overhaul separately and will consider the cost  
452 as included in the unit prices for the various excavation contract pay items. The cost  
453 is for work prescribed in this section and the contract documents.

454  
455 The Engineer will not pay for embankment separately and will consider the  
456 cost as included in the unit price for roadway excavation. The cost is for work  
457 prescribed in this section and the contract documents.

458  
459  
460

**END OF SECTION 203**