Table 1. Selected well and boring records.

Boring logs from New Jersey Department of Transportation soil boring logs
http://www.state.nj.us/transportation/refdata/geologic/

<table>
<thead>
<tr>
<th>Map number</th>
<th>Identification</th>
<th>Depth (ft)</th>
<th>recovered material</th>
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<tbody>
<tr>
<td>A-1</td>
<td>Log ID - B0022275</td>
<td>0-3</td>
<td>surficial gravel + sand</td>
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<td></td>
<td>Plan ID - P0001909</td>
<td>3-3.6</td>
<td>rock, siltstone, gray, medium to hard</td>
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<td>Boring Label – B-15</td>
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<td>A-2</td>
<td>Log ID - B0022284</td>
<td>0-4.8</td>
<td>surficial sand</td>
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<td>Plan ID - P0001912</td>
<td>4.9-6.4</td>
<td>rock, sandstone, gray/white, medium to hard</td>
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<td>Boring Label – B-15</td>
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<td>A-3</td>
<td>Log ID - B0007963</td>
<td>0-19.5</td>
<td>surficial gravel + sand</td>
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<td>Plan ID - P0000424</td>
<td>19.5-24.5</td>
<td>core 54% recovery, 2.7 ft hornfels, black</td>
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<td>Boring Label - 540W-3</td>
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<td>arkose, lt brown, fine grained</td>
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<td>A-4</td>
<td>Log ID - B0007949</td>
<td>0-35.7</td>
<td>surficial gravel, sand, silt + clay</td>
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<td>Plan ID - P0000423</td>
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<td>hornfels, black + white, thinly bedded</td>
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<td>Boring Label - 540W-13</td>
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<td>A-5</td>
<td>Log ID - B0009739</td>
<td>0-12.07</td>
<td>surficial gravel + sand</td>
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<td>Plan ID - P0000603</td>
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<td>sandstone, dk red to buff, fine to medium</td>
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<td>Boring Label – PB-8</td>
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<td>grained, slightly weathered, 0.15m shale at bottom</td>
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<td>A-6</td>
<td>Log ID - B0022281</td>
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<td>surficial sand</td>
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<td>siltstone, gray, v. soft to hard, close to med. spaced discontinuities</td>
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<td>A-7</td>
<td>Log ID - B0022277</td>
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<td>surficial sand + gravel</td>
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<td>siltstone, dark gray, hard, fresh, horizontal joints, vertical fractures</td>
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<td>siltstone, gray, medium to hard, close to medium spaced discontinuities</td>
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<td>A-9</td>
<td>Log ID - B0016491</td>
<td>0-6.5</td>
<td>surficial sand, silt + gravel</td>
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<td>Plan ID - P0001309</td>
<td>6.5-16.5</td>
<td>sandstone, dark red brown</td>
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<td>Field number – B-20</td>
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<td>A-10</td>
<td>Log ID - B0016474</td>
<td>0-10.2</td>
<td>surficial sand, silt + gravel</td>
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<td>Plan ID - P0001305</td>
<td>10.2-15.2</td>
<td>cored interval 31% recovery, yellow brown to</td>
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Field number - B-23
15.2-20.2 white sandstone and gneiss
cored interval 53% recovery, gray basalt (3 in),
pinkish brown f sandstone

A-11
Log ID - B0011158 0-8.5 surficial sand, silt + gravel
Plan ID - P0000657 8.5-23.5 gray diabase, medium grained, slightly
weathered
Field number - D-55

Abbreviated well logs from the Trans-Hudson Express (THE) Project for proposed Hudson River tunnel in
2007. Project was cancelled. Logs on file at the NJGWS. Well number is bolded; PE number is project well
identifier

277 PE-128W
0-52 surficial material
52-56 light yellow-gray and white-gray with occasional dark gray, mixed m-f grained and f-grained sandstone
56-66 light-medium-dark gray and light tan mixed siltstone; fine grained and m f grained sandstone; with few
coarse grained arkosic sandstone; thin to very thin bedded c-f grained arkosic sandstone; dark and light
gray, occasionally discolored orange-brown, m-f grained arkosic sandstone
66-76 light tan to brownish-gray mottled dark gray, interlayered f-grained and m-f grained sandstone and m-f
grained and c-f grained arkosic sandstone
76-81 light tan-gray c-f grained arkosic sandstone

278 PE-222
0-35 surficial material
35-40 light gray mottled brown, m-f grained arkosic sandstone; light tan and gray mottled brown f-grained silty
sandstone and siltstone
40-45 light gray mottled brown m-f grained arkosic sandstone
45-56 light gray mottled brown m-f grained arkosic sandstone; tan-white f-grained silty sandstone and siltstone
with scattered medium grains; light gray f-grained to m-f grained arkosic sandstone; light gray to
medium yellow-gray m-f grained arkosic sandstone; medium gray f-grained silty sandstone, diffuse
turbated bedding
56-66 medium tan-gray f-grained to m-f grained silty sandstone diffuse very thin bedding; light gray and tan
layered m-f grained arkosic sandstone, f-grained sandstone and siltstone, diffuse thin to very thin
bedding.
66-71 tan f-grained to m-f grained sandstone diffuse medium bedding. gray interlayered c-f grained and m-f
grained arkosic sandstone
71-76 gray interlayered c-f grained and m-f grained arkosic sandstone
76-81 gray mottled brown m-f grained and c-m grained arkosic sandstone, diffuse very thin to medium bedding
81-86 gray mottled brown, interbedded m-f grained and c-f grained arkosic sandstone, very thin to thin bedding
86-91 gray mottled brown, interbedded c-f grained and m-f grained arkosic sandstone. light gray mottled
brown, m-f grained arkosic sandstone.
91-96 light gray mottled brown m-f grained arkosic sandstone; light tan-white and gray mottled yellow-gray
siltstone and claystone
96-101 light gray occasionally mottled brown, m-f grained arkosic sandstone; light tan and dark gray mottled
orangish-gray, mixed siltstone and f-grained and m-f grained sandstone
101-112 dark gray to light tan mottled yellow-brown mixed m-f grained and f-grained sandstone and siltstone;
light tan and gray m-f grained arkosic sandstone interbedded with little f-grained arkosic sandstone
112-116 light tan and gray, m-f grained and f-grained arkosic sandstone and siltstone; medium to dark gray and
light tan mixed m-f grained and f-grained sandstone
116-126 light tan and gray mixed m-f grained sandstone and siltstone; light tan and gray mixed f-grained sandstone and siltstone; tan, occasionally mottled brown, m-f grained arkosic sandstone; yellow tan to dark gray siltstone

126-135 light gray mottled yellow-brown layered m-f grained and little c-m grained arkosic sandstone; yellow-brown mixed m-f grained sandstone and siltstone, bioturbated

135-141 light tan mottled yellow-brown and gray, layered siltstone, f-grained sandstone, and m-f grained arkosic sandstone, bioturbated burrows infilled with m-f grained sandstone

141-151 tan-gray mottled brown m-f grained arkosic sandstone with scattered c-grains

151-156 gray mottled, yellow-brown m-f grained arkosic sandstone with scattered coarse-grains mixed with light tan siltstone

156-161 gray and tan c-m grained arkosic sandstone, tan mixed f-grained silty sandstone; dark brown mixed f-grained sandstone and siltstone and gray m-f grained arkosic sandstone, gray m-f grained arkosic sandstone

161-166 dark brown mottled gray interlayered siltstone, shale and f-grained sandstone, tan-gray m-f grained arkosic sandstone, light tan and gray m-f grained arkosic sandstone

166-176 light tan and gray m-f grained arkosic sandstone with f-grained sandstone

176-186 light tan and gray m-f grained arkosic sandstone with few coarse grains, dark gray brown f-grained silty sandstone, light tan and gray f-grained silty sandstone coarsening downward to m-f grained arkosic sandstone

186-196 light tan and gray m-f grained coarsening downward to c-grained arkosic sandstone. light tan and gray m-f grained arkosic sandstone

196-201 light gray m-f grained arkosic sandstone, light tan siltstone bioturbated, light gray c-m grained arkosic sandstone

279 PE139W

0-60 surficial material

60-65 light tan-gray medium bedded, c-f grained arkosic sandstone; tan-white and yellow-brown, very thin to laminated, f-grained sandstone

65-74 tan-white and yellow-brown, very thin to medium bedded m-f grained arkosic sandstone

74-85 light gray, medium gray, light yellow-tan and brown mixed siltstone and f-grained and m-f grained sandstone

85-92 mixed siltstone and f-grained and m-f grained sandstone; gray, mottled tan, diffuse mix of f-grained silty sandstone and m-f grained arkosic sandstone

92-95 gray and tan diffuse mixture of f-grained silty sandstone and m-f grained arkosic sandstone; light tan and gray m-f grained arkosic sandstone

95-105 m-f grained arkosic sandstone; light tan and dark gray interbedded f-grained sandstone and siltstone; light tan gray mottled yellow-brown mixed siltstone and f-grained and m-f grained sandstone; gray-tan c-f grained arkosic sandstone

105-115 light yellowish gray occasionally mottled red-brown c-m grained arkosic sandstone; granule and pebble conglomeritic sandstone

115-125 light tan-gray granule and pebble sandy conglomerate; light tan-gray mottled yellow-brown red-brown and dark gray c-f grained arkosic sandstone

125-135 light gray and tan interbedded siltstone and m-f grained and f-grained sandstone; dark brown mottled light orange; mixed siltstone and f-grained and m-f grained sandstone

135-145 dark brown siltstone; light gray, tan and dark brown interbedded siltstone and f-grained sandstone; light tan, gray, occasionally mottled brown along bedding planes, m-f grained sandstone

145-155 light tan and gray, occasionally mottled brown, m-f grained sandstone; tan and gray interbedded siltstone and f-grained and m-f grained sandstone
155-165 light tan, gray and brown mixed siltstone and f-grained and m-f sandstone; gray c-f grained arkosic sandstone; light gray interlayered f-grained and m-f grained sandstone
165-175 gray c-f grained arkosic sandstone; light gray interlayered siltstone and f-grained and m-f grained sandstone; gray interlayered m-f grained and c-m grained arkosic sandstone
175-185 gray interlayered c-m grained and m-f grained arkosic sandstone with tan, brown and dark gray layer of mixed f-grained and m-f grained sandstone
185-194 gray, interlayered c-m grained and m-f grained arkosic sandstone; interlayered tan and gray f-grained sandstone and dark brown f-grained silty sandstone
194-200 dark brown mottled tan and dark gray mixed f-grained silty sandstone and m-f grained sandstone; light f-grained and m-f grained sandstone grading down to gray c-f grained arkosic sandstone

280 PE-155W
0-95 surficial material
95-105 medium to light gray, mottled brown, c-m grained to m-f grained arkosic sandstone
105-115 light gray m-f grained arkosic sandstone; light gray and light purple m-f grained arkosic silty sandstone; light purple sandstone breccia; light gray m-f grained arkosic sandstone
115-125 light gray m-f grained arkosic sandstone; light gray-white silty sandstone
125-135 light gray-white mottled yellow-brown siltstone; light gray, occasionally mottled yellow-brown, diffuse laminated to medium-thick bedded, m-f grained arkosic sandstone with minor very thin-bedded c-m grained arkosic sandstone layers
135-145 light gray, little yellow-brown staining, medium to thick bedded, c-f grained arkosic sandstone, interlayered with minor very thin bedded f-grained silty sandstone; light gray-white, interbedded f-grained silty sandstone and siltstone; gray to light gray, little brown staining, m-grained grading downward to m-f grained arkosic sandstone; granule conglomeritic sandstone, lithic grain of clay rip-up clasts
145-151 light gray m-f grained, thin bedded arkosic sandstone
151-156 gray to light gray interbedded m-f grained, c-f grained and c-m grained laminated to thin-bedded arkosic sandstone, grading downward to f-grained sandstone
156-158 light tan f-grained, grading downward to m-f grained and c-f grained arkosic sandstone
158-165 brown, mottled black, dark gray and light brown bioturbated siltstone
165-175 dark brown, black and tan bioturbated siltstone mixed with m-f grained silty sandstone with occasional fossils; gray, interbedded f-grained, m-f grained and c-f grained arkosic sandstone
175-185 gray c-m grained, c-f grained and f-grained arkosic sandstone

281 PE-223
0-130 surficial material
130-132 gray interlayered m-f grained and c-f grained arkosic sandstone; gray granule and pebble arkosic conglomeritic sandstone; gray, mixed siltstone and f-grained silty sandstone
132-142 gray mottled yellow-brown mixed m-f grained arkosic sandstone, with scattered pebble-size grains, and mudstone; gray interlayered m-f grained and c-f grained arkosic sandstone, and minor f-grained arkosic sandstone
142-152 gray m-f grained arkosic sandstone; occasional thin-bedded c-f grained arkosic sandstone; occasional very thin to thin bedded mixed sandy siltstone and f-grained arkosic sandstone
152-162 gray and grayish-brown mixed siltstone f-grained sandy claystone and minor m-f grained arkosic sandstone; light tan m-f grained arkosic silty sandstone; light gray and tan interlayered clayey siltstone, siltstone, and f-grained silty sandstone; light tan m-f grained arkosic silty sandstone; interlayered dark brown siltstone and dark brownish-gray f-grained silty sandstone; light gray-tan mottled dark gray m-f grained arkosic sandstone
534

162-172 light to medium gray-brown mottled dark gray, mixed siltstone and f-grained and m-f grained arkosic silty sandstone; interlayered dark brown siltstone and dark brownish-gray f-grained silty sandstone; light gray-tan mottled dark gray m-f grained arkosic sandstone

172-182 gray, m-f grained arkosic sandstone; gray mottled tan, mixed f-grained silty sandstone and minor m-f grained arkosic sandstone; gray-green to dark red, mixed siltstone, f-grained silty sandstone, and m-f grained arkosic sandstone; dark red-brown occasionally mottled gray-green and tan, mixed siltstone and silty shale

182-192 dark red-brown occasionally mottled greenish gray mixed siltstone and silty shale

282 PE-158W
0-112 surficial material
112-117 dark red-brown siltstone interlayered with dark red-brown m-f grained arkosic silty sandstone
117-122 dark red-brown siltstone interlayered with m-f grained sandy siltstone and red-gray f-grained arkosic silty sandstone
122-127 dark red-brown siltstone mixed with m-f grained arkosic silty sandstone; light tan m-f grained arkosic sandstone
127-132 tan to dark gray m-f grained arkosic sandstone; gray-brown to dark red granule and pebble sandy conglomerate; dark red-brown mottled yellow brown siltstone with minor m-f grained sandy silty sandstone
132-137 dark red-brown siltstone; dark red-brown to tan gradationally interbedded m-f grained and c-f grained arkosic sandstone
137-142 light reddish-tan gradationally bedded, f-grained, m-f grained, c-m grained arkosic sandstone; light reddish-tan thin bedded granule and pebble sandy conglomerate; gray-tan mottled yellow-brown siltstone grading into f-grained silty sandstone
142-147 reddish tan mottled yellow-brown and gray siltstone and f-grained sandstone
147-152 light reddish-tan c-m grained arkosic sandstone; light-gray-tan t-grained to m-f grained arkosic sandstone; reddish-gray to brown, mottled orange, c-m grained arkosic sandstone
152-157 dark gray c-f grained arkosic sandstone; dark red mottled yellow-brown mixed siltstone, f-grained arkosic silty sandstone, and minor m-f grained sandstone lenses
157-162 light reddish-tan interlayered c-f grained f-grained and m-f grained arkosic sandstone; yellow-grain f-grained silty sandstone
162-167 light reddish-tan, thin to medium-thick gradationally interbedded m-f grained and c-f grained arkosic sandstone, with occasional laminated to very thin bedded f-grained sandstone and siltstone
167-172 light reddish-gray to tan, gradationally interlayered, medium-thick bedded, c-m grained and m-f grained arkosic sandstone with minor granule conglomeritic sandstone; gray mottled yellow-brown claystone and siltstone
172-177 dark gray-brown c-f grained arkosic sandstone; dark brownish-red siltstone; light reddish-tan m-f grained arkosic sandstone
177-182 light reddish-tan, gradationally interlayered m-f grained and c-f grained arkosic sandstone; dark gray mottled yellow-brown m-f grained arkosic sandstone grading to siltstone
182-187 dark gray m-f grained arkosic sandstone; dark red-brown to yellow-brown siltstone and sandy siltstone; light reddish-tan gradationally interlayered medium-bedded, m-f grained and c-m grained arkosic sandstone; mottled yellow-brown f-grained sandstone and siltstone

283 PE-001
0-90 surficial material
90-95 arkosic sandstone, lt reddish-gray, medium-thick to thin bedded, interlayered c-m grained, m-f grained and f grained
95-100 arkosic sandstone, lt reddish-gray occasionally mottled yellow-brown m-f grained, grades downward to brown purple-gray c-f grained arkosic silty sandstone and downward to gray m-f grained sandstone
100-105 dark red-brown occasionally mottled gray and brownish-yellow siltstone, close to moderate fracture spacing
105-110 dark red-brown siltstone, close to moderate fracture spacing
110-115 light tan m-f grained arkosic sandstone coarsening downward to c-f grained arkosic sandstone, very thin to thin gradational bedding
115-125 light tan mottled yellow-brown interbedded m-f grained and c-m grained arkosic sandstone; dark red-brown interbedded f-grained and m-grained silty arkosic sandstone; light tan f-grained arkosic sandstone
125-135 light tan c-m grained arkosic sandstone, conglomeratic with quartz, feldspar and lithic granule and pebble-size grains. light tan to light gray mottled yellow-gray f-grained silty sandstone. light tan to light gray interbedded m-f grained and f-grained arkosic sandstone, very thin to thin bedding
135-145 light gray mottled yellow-brown interbedded f-grained and m-f grained arkosic sandstone, very thin to thin bedding; dark red-brown mottled yellow-brown sandy siltstone; light gray to light tan interbedded f-grained, m-f grained and c-m grained arkosic sandstone; light tan to yellow-brown sandy siltstone.
145-155 tan interbedded m-f grained and c-m grained arkosic sandstone
155-165 tan interbedded m-f grained and c-m grained arkosic sandstone; dark red-brown, purple-brown and greenish-brown siltstone. light tan c-f arkosic sandstone. interbedded gray-green to dark red-brown siltstone and yellow-brown to light tan m-f grained arkosic sandstone
165-175 light tan, m-f grained arkosic sandstone. light tan to light yellow-brown c-m arkosic sandstone, frequently conglomeritic with quartz, feldspar and lithic granules and pebbles
175-185 light tan c-m grained arkosic sandstone frequently conglomeritic light reddish-tan m-f grained sandstone; yellow-brown to gray-green sandy siltstone. yellow-green to yellow-brown c-m grained arkosic sandstone
185-195 light tan-white m-f grained arkosic sandstone; light gray c-m grained arkosic sandstone. yellow-brown to gray sandy siltstone. light grey c-m grained arkosic sandstone
195-205 light gray c-m grained sandstone. light gray c-m grained arkosic sandstone; dark red-brown and gray-green siltstone; yellow-brown residual soil and completely weathered c-m arkosic sandstone; light tan to light gray granule to pebble sandy conglomerate with quartz, feldspar and lithic grains
205-214 light tan c-m grained arkosic sandstone

284 PE-224W
0-84 surficial material
84-89 light gray-white, mottled yellow-gray and purplish-gray interlayered m-f grained arkosic sandstone and minor siltstone
89-99 gray-white and gray, mottled yellow-brown m-f grained arkosic sandstone; dark red-brown interlayered m-f grained silty arkosic sandstone and siltstone; light tan-gray mottled light green m-f grained arkosic sandstone
99-109 light tan-gray m-f grained arkosic sandstone; dark red-brown siltstone mixed with dark purple brown m-f grained arkosic siltstone
109-119 dark red-brown mottled gray-green, interlayered siltstone and f-grained silty sandstone; light gray mottled yellow-brown interlayered c-f grained and m-f grained arkosic sandstone and c-m grained arkosic sandy conglomerate; dark red-brown and light gray, mottled yellow-brown and gray-green siltstone to f-grained and m-f grained arkosic silty sandstone
119-129 gray interlayered m-f grained and c-m grained arkosic sandstone and thin-bedded granule and pebble conglomerate; dark red-brown mottled yellow-green to gray green siltstone to f-grained silty sandstone; dark red-brown mottled yellow-brown granule and pebble arkosic sandy conglomerate
129-139 tan-gray, occasionally mottled yellow-brown, c-m and little m-f grained arkosic sandstone interlayered with granule and pebble conglomeritic sandstone; tan and gray, mottled yellow-gray, yellow-brown, and greenish-yellow, f-grained silty sandstone coarsening downward to m-f grained arkosic sandstone; yellow-gray mottled yellow-brown m-f grained arkosic sandstone
pink-gray to tan gray, mottled yellow-brown arkosic sandstone interlayered with thin to medium bedded granule and pebble arkosic conglomeritic sandstone to sandy conglomerate; gray-green, mottled yellow-brown and dark red-brown siltstone and f-grained sandy siltstone

interlayered thin-bedded, tan-gray granule and pebble arkosic sandy conglomerate and very thin to thin irregular lenses of gray-green mudstone and dark red-brown siltstone and f-grained sandy siltstone. brown and yellow-brown, thin-bedded m-f grained arkosic sandstone; gray stained brown and yellow-brown, c-m grained arkosic sandstone; dark red-brown, mixed c-m grained arkosic sandstone and m-f grained sandy siltstone

dark red-brown sandy siltstone; gray to brown, c-m grained arkosic sandstone; dark red-brown to light tan, occasionally mottled yellow-green and gray-green interlayered siltstone, f-grained silty sandstone, and little m-f grained arkosic sandstone; tan-gray arkosic sandstone

gray to tan-gray m-f grained arkosic sandstone; dark red-brown, light tan, and gray-green, stained yellow-brown interlayered siltstone, f-grained sandy siltstone and little m-f grained silty sandstone and little gray-green claystone; gray green granule and pebble sandy conglomerate; gray-white to light gray f-grained sandstone coarsening downward to m-f grained arkosic sandstone

gray-white to light gray interlayered m-f grained and c-m grained arkosic sandstone; dark brown m-f grained to c-m grained arkosic sandstone

dark red-brown occasionally mottled gray-green, interlayered f-grained silty sandstone, f-grained arkosic sandstone, and minor lenses of m-f grained and c-f grained arkosic sandstone; dark red-brown to medium gray interlayered m-f grained and c-f grained arkosic sandstone

PE-002W

0-65 surficial material

light gray c-m grained arkosic sandstone, occasional quarts and lithic pebbles

light c-m grained arkosic sandstone

light gray c-m grained arkosic sandstone; quartz and lithic granule to pebble sandy conglomerate;

light gray c-m arkosic sandstone with occasional granule-size grains; dark red-brown m-f grained arkosic sandstone with occasional granule-size grains

dark red-brown interlayered m-f grained arkosic sandstone, siltstone and mudstone; dark-brown m-f grained arkosic sandstone

medium gray c-m arkosic sandstone with occasional granules and pebbles; yellow-brown c-m arkosic sandstone; yellow-brown to brownish-gray arkosic sandstone

light brownish-gray c-m grained arkosic sandstone; light brownish-gray granule to pebble conglomerate with quartz, feldspar and lithic grains

light brownish-grain c-m grained arkosic sandstone

light brownish-grain c-m arkosic sandstone, numerous quartz and feldspar granules; granule to pebble conglomerate, quartz, feldspar and lithic granules

yellow-brown c-m grained arkosic sandstone; brownish-gray mottled yellow-brown granule to pebble conglomerate, quartz, feldspar and lithic granules and pebbles

greenish-gray c-m arkosic sandstone, occasional granule to pebble-sized grain; light brownish-gray c-m arkosic sandstone; purple-brown to gray-green interlayered laminated clayey siltstone and f-grained silty sandstone; brownish-gray c-m arkosic sandstone grading to granule-pebble conglomerate; greenish-gray to yellow-brown to dark brown-gray c-m grained arkosic sandstone

interlayered red-brown siltstone and light tan f-grained sandstone; interlayered light tan-gray m-g grained arkosic sandstone and light brown-gray c-m grained arkosic sandstone; yellow-brown silty m-f grained arkosic sandstone

dark red-brown f-grained silty sandstone, laminated to very thinly bedded; brown-gray c-m arkosic sandstone
139-144 dark red-brown mottled dark grey and yellow-brown c-m grading down to m-f grained silty arkosic sandstone; dark red brown mottled gray green mudstone and f-grained silty sandstone, laminated two very thinly bedded; light brown-gray to dark red-brown mottled gray-green and yellow-brown m-f grained arkosic sandstone

144-154 dark red brown light tan gray and gray occasionally mottled yellow brown and green brown interbedded siltstone f-grained arkosic sandstone m-f grained arkosic sandstone c-f grained arkosic sandstone; dark red-brown to dark brown f-grained arkosic silty sandstone; dark red-brown laminated clayey siltstone

154-164 dark red-brown, laminated to very thin bedded, interlayered m-f grained arkosic clayey sandstone, clayey siltstone and f-grained clayey sandstone; red-brown to light brownish-gray, occasionally mottled brownish-yellow, interlayered m-f grained and c-m grained arkosic sandstone in thin to medium-thick beds

164-174 red-brown occasionally mottled brownish-gray to brownish-yellow interlayered m-f grained c-m grained arkosic sandstone, in thin to medium-thick beds

174-179 dark brown occasionally mottled yellow-brown and green brown interbedded arkosic sandstone; brown to light brown occasional mottled yellow-tan, c-f grained arkosic sandstone in thin to medium-thick beds

179-189 brown mottled greenish-gray m-grained arkosic sandstone, medium strong to weak, diffuse medium bedded

286 PE-225 surficial material

0-60 brown c-f arkosic sandstone, diffuse medium to very thin bedding

60-65 light-gray, yellow gray and reddish-brown siltstone coarsening downward to m-f grained with little c-f grained arkosic siltstone; brown to light brown occasionally mottled yellow-tan, c-f grained arkosic sandstone

65-70 brown mottled greenish-gray m-grained arkosic sandstone, medium strong to weak, diffuse medium bedded

70-75 brown mottled greenish-gray m-grained arkosic sandstone, medium strong to weak, diffuse medium bedded

75-83 brown mottled yellow-tan, very thinly bedded f-grained sandstone, and c-m grained arkosic sandstone; brown mottled greenish gray c-m grained arkosic sandstone; brown m-f grained and c-m grained arkosic sandstone; brown mottled light gray c-m grained arkosic sandstone, coarsening downward to granule and pebble sandy conglomerate

83-93 dark brown and light gray interlayered m-grained and c-m grained arkosic sandstone with occasional pebbles to 15mm size; granule and pebble sandy conglomerate, quartz, feldspar and lithic grains to 50 mm size

93-99 brown and light brown laminated to very thin bedded f-grained and m-grained arkosic sandstone; brown and dark gray, occasionally mottled light gray, c-m arkosic sandstone

99-104 brown mottled greenish-gray interlayered f-grained siltstone and siltstone

104-114 dark red-brown, f-grained silty sandstone; mixed red-brown f-grained silty sandstone and light gray mottled yellow-tan m-f grained sandstone; light gray to green gray mottled yellow-tan m-f grained sandstone; dark red-brown f-grained silty sandstone mixed with gray m-f grained sandstone

114-122 green-gray mottled red-brown c-f grained arkosic sandstone and granule and pebble conglomerate, lithic pebbles up to 25mm size; layered dark red-brown mottled greenish gray c-f grained arkosic sandstone

122-124 dark red-brown layered c-f grained and m-f grained arkosic sandstone

124-134 interlayered dark red-brown and light gray f-grained silty sandstone and m-f grained sandstone; dark brown and light gray m-f grained arkosic sandstone
134-139 dark brown mottled light gray layered m-f grained and c-f grained arkosic sandstone; dark red-brown laminated siltstone, mudstone, and f-grained silty sandstone
139-146 dark red-brown laminated siltstone, mudstone, and f-grained silty sandstone; dark red-brown interbedded m-f grained and c-f grained arkosic sandstone, with siltstone and f-grained silty sandstone
146-147 dark red-brown m-f grained arkosic sandstone; dark red-brown, f-grained sandy clay and silt, residual soil
147-156 dark red-brown f-grained silty sandstone; dark red-brown clayey sand to sandy clay, residual soil; light tan thin-bedded, m-f grained c-f grained arkosic sandstone with brown, very thin-bedded silty sandstone; light gray m-f grained and c-f grained arkosic sandstone and red-brown silty clay and clayey sand; tan and brown, thin-bedded, m-f grained arkosic sandstone
156-165 interlayered brown, light gray and dark red-brown m-f grained and c-f grained arkosic sandstone, grayish-white f-grained sandstone, and little red-brown f-grained silty sandstone

287
0-37 surficial material
37-42 dark brown, c-f grained, arkosic sandstone
42-48 reddish-brown, f-grained sandstone, occasionally interbedded with red-brown siltstone and shale
48-50 red-brown f-grained sandstone interbedded with siltstone
50-55 red-brown, f-grained, sandstone, siltstone and shale, mostly indistinct bedding, occasional laminations and very thin lenses of light greenish-gray shale; light gray quartz-rich, c-f grained sandstone
55-65 light reddish-gray to red-brown c-f grained arkosic sandstone; granule to pebble conglomeritic sandstone; red-brown, thinly bedded, interlayered siltstone and f-grained sandstone
65-75 red-brown, thinly bedded siltstone and interbedded f-grained sandstone; light pinkish-gray-white, thin to medium bedded f-grained and m-f grained sandstone interlayered with red-brown c-f grained arkosic sandstone
75-85 red-brown and light gray interlayered siltstone and f-grained sandstone; red-brown and light gray interlayered f-grained, m-f grained and c-m grained arkosic sandstone
85-95 red-brown, m-f grained grading downward to c-m grained arkosic sandstone; red-brown and light gray interlayered siltstone, shale, m-f grained and c-f grained arkosic sandstone
95-105 interbedded light reddish-gray to dark red-brown m-f grained and c-m grained arkosic sandstone very thin to medium-thick gradational bedding coarsening downwards, except conglomeritic arkosic sandstone; dark red-brown siltstone
105-115 dark red-brown and light gray interbedded m-f grained and c-m grained arkosic sandstone and conglomeritic arkosic sandstone
115-123 dark red-brown, interbedded c-m grained and m-f grained arkosic sandstone with f-grained silty sandstone; light tan-gray m-f grained sandstone
123-133 red-brown and light gray thick bedded c-m grained arkosic sandstone interlayered with thin bedded m-f grained sandstone
133-142 dark brown and light gray interbedded c-m grained and m-f grained arkosic sandstone; conglomeritic arkosic sandstone; red-brown f-grained silty sandstone
142-144 red-brown, f-grained sandy siltstone and shale
144-154 red-brown to light gray coarsening downward from f-grained sandy siltstone to silty arkosic sandstone to arkosic sandstone; dark red-brown interbedded m-f grained and c-m grained arkosic sandstone; granule and pebble conglomeritic arkosic sandstone; arkosic sandstone as above, interlayered with very thin bedded, light yellowish to pinkish gray, c-m grained quartz sandstone
154-165 dark red-brown and light greenish gray, interbedded m-grained and c-m grained arkosic sandstone, granule and pebble conglomeritic arkosic sandstone, with quartz, feldspar and lithic grains; dark red-brown m-f grained arkosic sandstone
0-47 surficial material
47-52 dark brown c-f grained sandstone
52-56 red brown f-grained silty sandstone (?); white and light gray f-grained quartz sandstone;
56-61 light reddish gray to light reddish-brown m-f grained arkosic sandstone; layered red-brown and light gray
c-f arkosic sandstone; granule to pebble sandy conglomerate, dark red-brown clayey siltstone to f-grained
silty sandstone; mixed dark red-brown f-grained silty sandstone and light gray f-grained sandstone; light
gray f-grained grading downward to m-f grained subarkosic sandstone;
61-70 layered red-brown and light gray c-f arkosic sandstone; dark red-brown clayey siltstone and f-grained
silty sandstone; mixed dark red-brown f-grained silty sandstone and light gray f-grained sandstone; light
gray f-grained grading downward to m-f grained subarkosic sandstone, occasional lithic pebbles
70-80 light brownish gray to dark brown c-f arkosic sandstone; quartz lithic granule to pebble sandy
conglomerate;
80-89 dark brown interlayered, thin to medium bedded c-f grained arkosic sandstone and very thin bedded m-f
grain arkosic sandstone; quartz and lithic granule to pebble conglomericitic sandstone; dark purplish-brown
f-grained sandy siltstone; layered light pinkish-gray and dark brown m-f grained and c-f grained
arkosic sandstone; quartz and lithic granule to pebble conglomerate sandstone;
89-99 interlayered c-f arkosic sandstone; red-brown siltstone and interlayered very thin lenses of m-f grained
arkosic sandstone; interlayered light greenish-gray, brownish-red and dark brown, thick bedded, c-f
grained arkosic sandstone
99-108 layered dark brown and light gray c-m arkosic conglomeritic sandstone; red-brown laminated siltstone
and f-grained silty sandstone; light reddish tan to reddish brown m-f grained grading to c-f grained
arkosic sandstone; dark red-brown f-grained grading to m-f grained silty sandstone
108-118 medium red-brown to dark red-brown c-m grained arkosic sandstone light gray-green mudstone; red-
brown f-grained arkosic sandstone, light gray m-f grained quartz sandstone grading downward to red-
brown m-f grained arkosic sandstone
118-128 dark reddish-brown to light gray-green c-m grained arkosic sandstone; dark red-brown siltstone
interlayered with f-grained silty sandstone, red-brown mudstone; interlayered light greenish-gray and
red-brown m-f grained sandstone, gray-green f-grained clayey sandstone, light gray f-grained clayey
sandstone;
128-138 red-brown interlayered c-f grained arkosic sandstone and f-grained mudstone; red-brown to light gray-
green f-grained silty sandstone, light brownish-gray c-f grained arkosic sandstone
138-148 light brown to dark brown, occasionally mottled light gray-green c-f grained arkosic sandstone; mottled
light gray-green and dark red brown m-f grained arkosic silty sandstone;
148-154 mottled light gray-green and dark red-brown m-f grained arkosic silty sandstone, red, occasionally
mottled light gray c-f grained arkosic sandstone; red and light gray quartz and lithic granule to pebble
conglomerate;
154-164 interlayered light greenish-gray, dark red-brown and red c-m grained arkosic sandstone; light gray-green
quartz and lithic granule to pebble sandy conglomerate
164-173 light gray c-m grained subarkosic conglomeritic sandstone, light gray m-f grained quartz sandstone, light
greenish-gray c-f grained arkosic sandstone, dark red-brown m-f grained arkosic sandstone mixed with
silty sandstone
173-178 light greenish gray to medium red-gray c-f grained arkosic sandstone, mottled dark red, dark green and
tan m-f grained arkosic sandstone

290 PE-095
0-165 surficial material
165-170 f-grained siltstone
170-176 dark reddish-gray, mottled dark gray-green sandstone, occasionally coarse sand and granule-size angular lithic clasts; mottled reddish-brown and light quartz and lithic pebble conglomerate with dark gray-green, m-f grained silty sandstone matrix
176-186 quartz and lithic pebble conglomerate, red brecciated siltstone

291 PE-096
0-151 surficial material
151-156 dark brown and light gray c-f grained arkosic sandstone
156-166 dark red-brown c-m grained arkosic sandstone, dark re-brown siltstone and mudstone, light gray to medium brown-gray m-f grained arkosic sandstone, dark brown c-m grained arkosic sandstone, arkosic sandy granule conglomerate, brown c-f grained arkosic sandstone, arkosic granule conglomerate

292 PE-228
0-108 surficial material
108-113 dark reddish-brown m-f grained arkosic sandstone grading down to c-f grained arkosic sandstone; dark reddish-brown m-f grained arkosic sandstone
113-118 dark reddish-brown m-f grained arkosic sandstone; dark reddish-brown mottled greenish-gray c-f grained arkosic sandstone, coarsening downward to granule and pebble sandy conglomerate; dark reddish-brown m-f grained arkosic sandstone
118-123 dark reddish brown mottled greenish gray granule and pebble conglomerate, coarsening downward to granule and pebble conglomerate; dark reddish-brown occasionally mottled yellowish-tan, layered m-f and c-f grained arkosic sandstone
123-128 dark red-brown interlayered f-grained and m-f grained arkosic sandstone; light tan m-f grained arkosic sandstone coarsening downward to c-f grained arkosic sandstone

**Boring log for Lincoln Tunnel in NJGWS permanent note dated 1/30/1935 on file at NJGWS office**

293 114 Lincoln Tunnel
0-7.5 clay, sand and gravel
7.5-15 sand, gravel and crushed rock
15-76.5 coarse, badly broken trap rock
76.5-85.5 broken trap rock
85.5-100.5 broken trap and disintegrated rock
100.5-105.5 disintegrated rock
105.5-109.5 sandstone and fault gouge
109.5-114.5 broken shale and sandstone
114.5-133.5 crushed sandstone
133.5-144.5 coarse sandstone

**Abbreviated boring logs from Langan for Reconstruction of Roadway Platforms on Sinatra Drive North**
http://www.nj.gov/dep/floodresilience/docs/rbdh-feis/attachment-5-cultural-resources-technical-environmental-study-vol-2a-rbd-hr-feis.pdf  *Well number is bolded; B number is project well identifier*

294 B-5
1-55 surficial material
55-60 pink and white sandstone
60-65 pink and white sandstone
295

B-1

1-55  surficial material
55-60  white sandstone
60-65  white/pink sandstone

Note: in well descriptions v = very, f = fine, m = medium, c = coarse, lt = light, v = very, dk = dark