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City of Scottsdale
Desert Greenbelt Project

VOLUME II: TECHNICAL ADDENDUM

REATA PASS/BEARDSLEY WASH CHANNEL RESPONSE ANALYSIS WITH ULTIMATE LEVEE ENCROACHMENT

The Desert Greenbelt
SCOTTSDALE, ARIZONA

January 1997
Prepared by:
Simons, Li & Associates, Inc.
Costa Mesa, California and Tempe, Arizona

CITY OF SCOTTSDALE DESERT GREENBELT PROJECT
MARICOPA COUNTY, ARIZONA

VOLUME II

TECHNICAL ADDENDUM

REATA PASS WASH/BEARDSLEY WASH CHANNEL RESPONSE ANALYSIS WITH ULTIMATE LEVEE ENCROACHMENT

Prepared for

City of Scottsdale

Prepared by

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January 2, 1997

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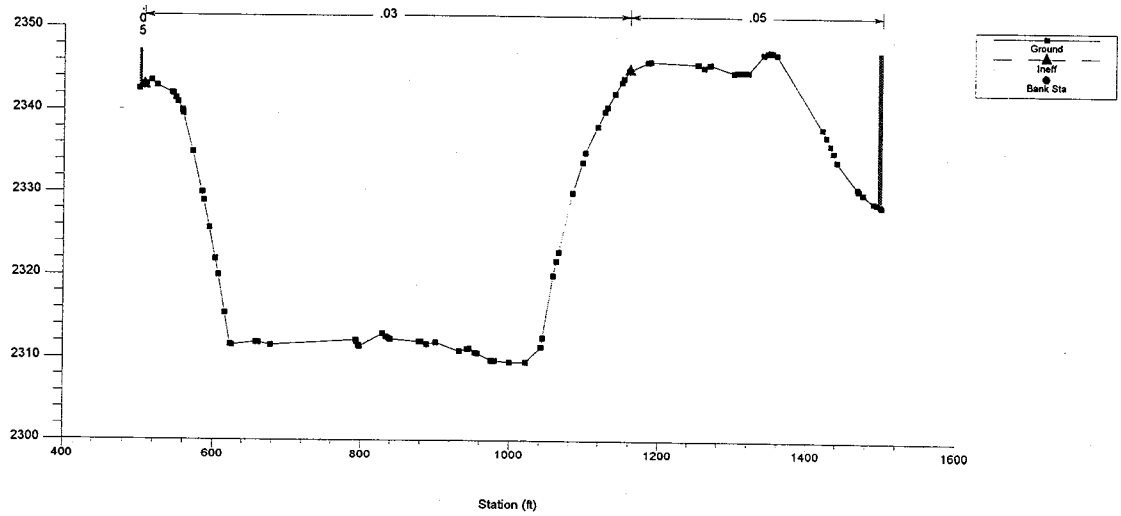
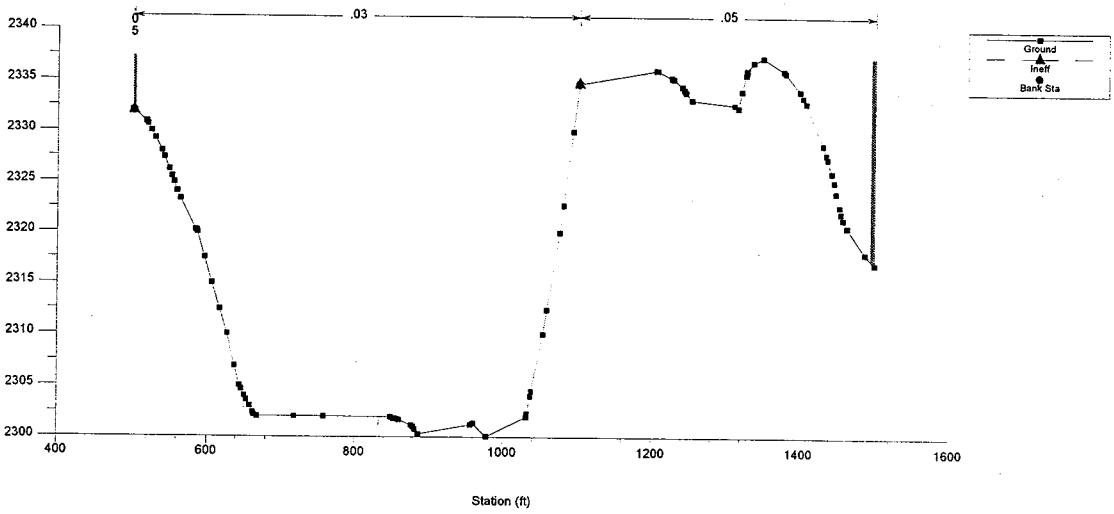
A: CHANNEL GEOMETRY

The hydraulic model (HEC-2) consists of 206 cross-sections. The cross-sectional plots are included in this section. Note that these cross sections are plotted looking downstream and represent Ultimate Channel conditions. Shaded areas show encroachments, which represent levees, floodwalls and blocked ineffective flow areas.

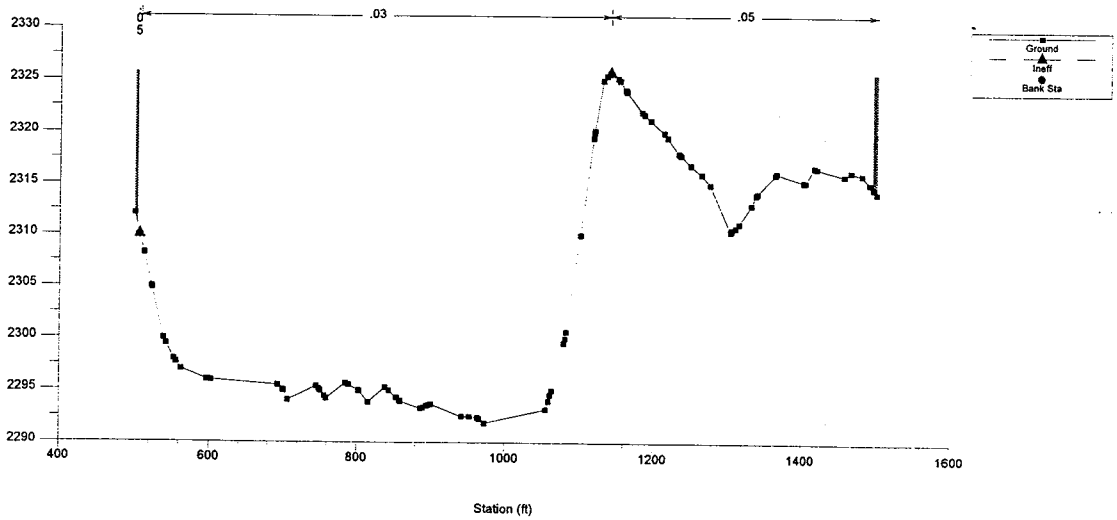
Reata Pass/Beardsley Wash
Riv Sta = 316.5



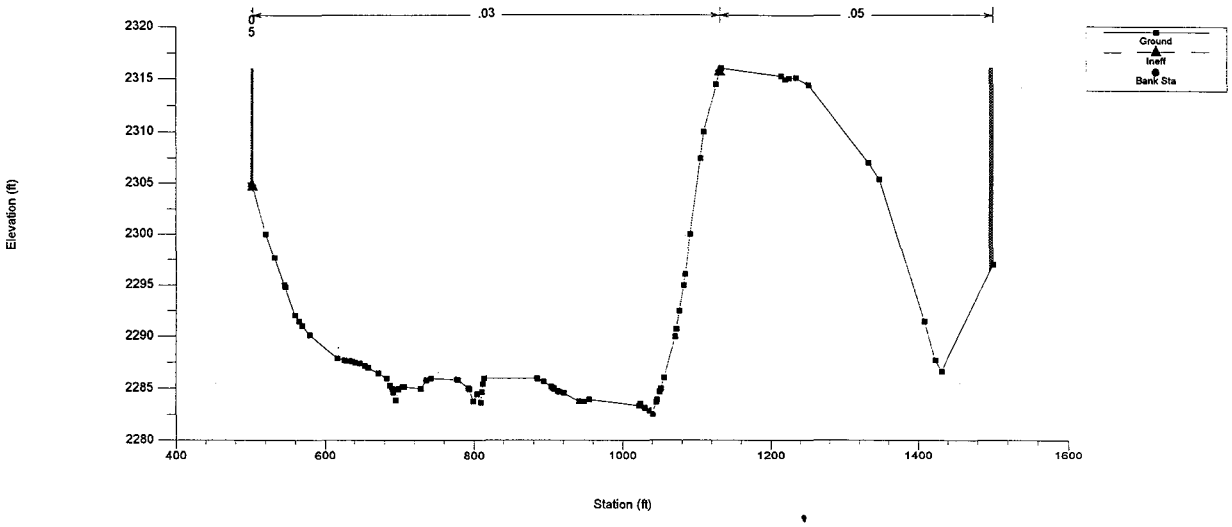
Reata Pass/Beardsley Wash
Riv Sta = 313.5



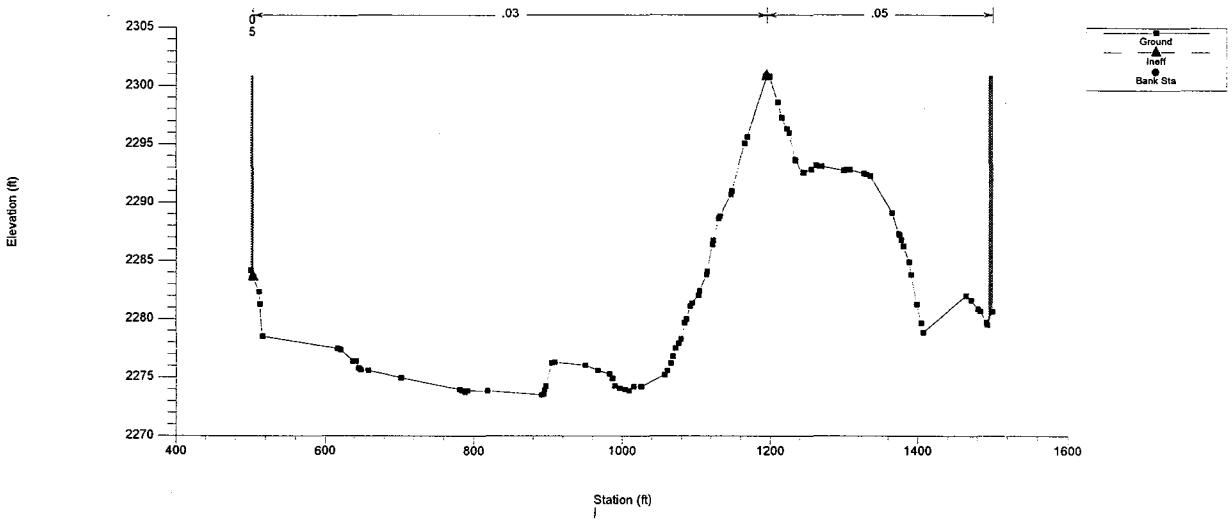
Reata Pass/Beardsley Wash
Riv Sta = 310.5



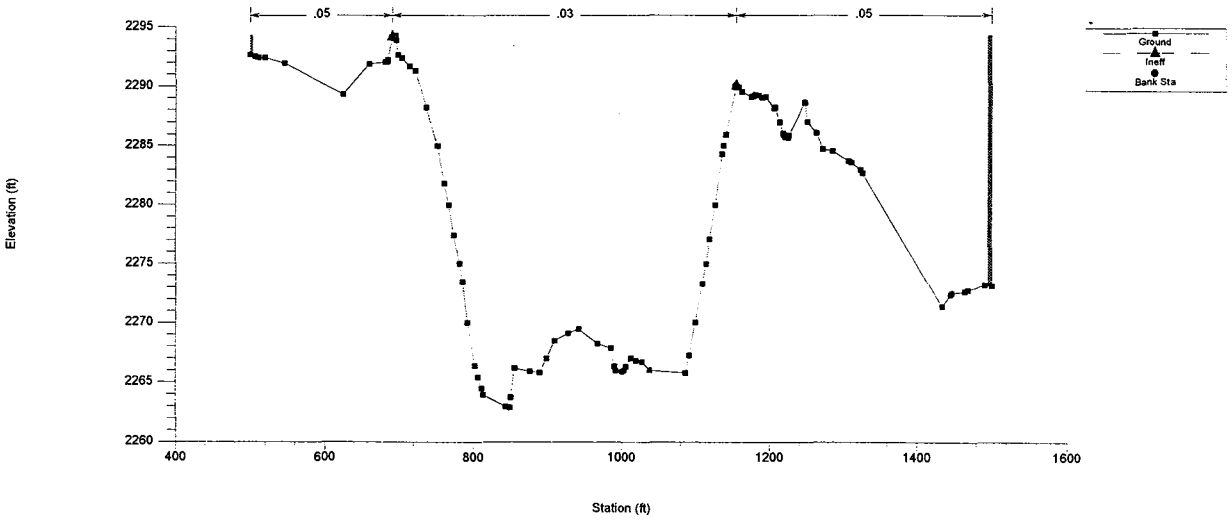
Reata Pass/Beardsley Wash
Riv Sta = 307.5



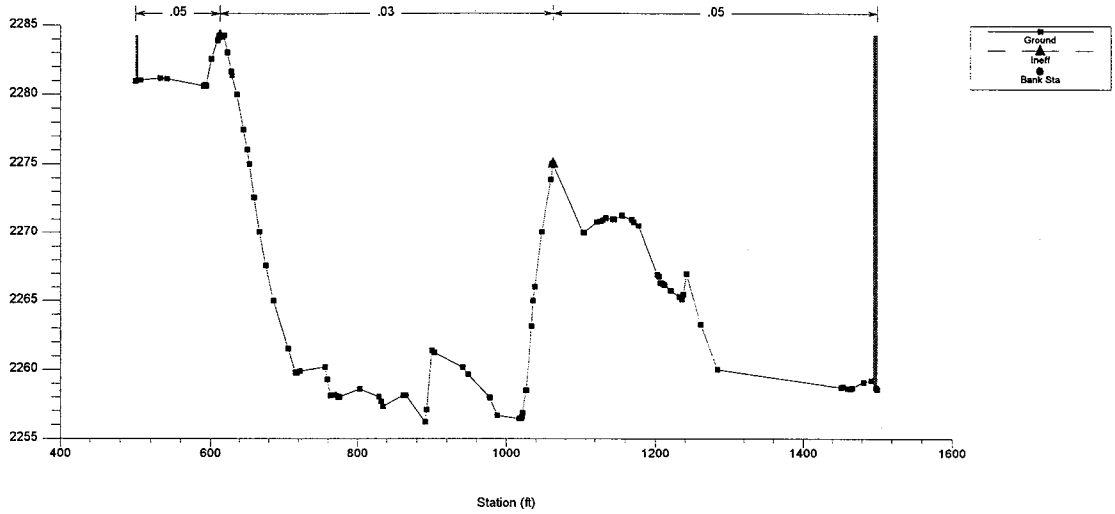
Reata Pass/Beardsley Wash
Riv Sta = 304.5



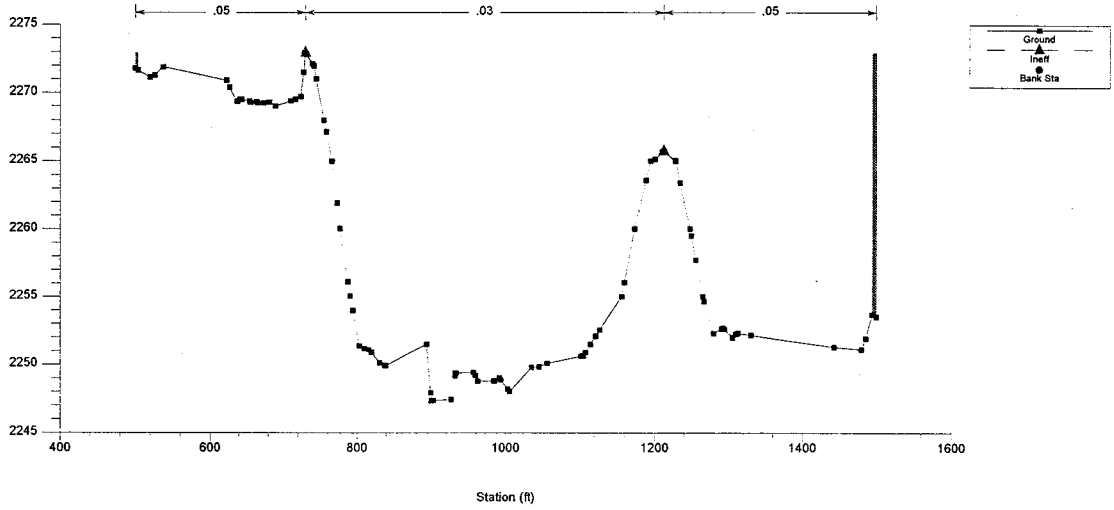
Reata Pass/Beardsley Wash
Riv Sta = 301.5



Reata Pass/Beardsley Wash
Riv Sta = 298.5



Reata Pass/Beardsley Wash
Riv Sta = 295.5



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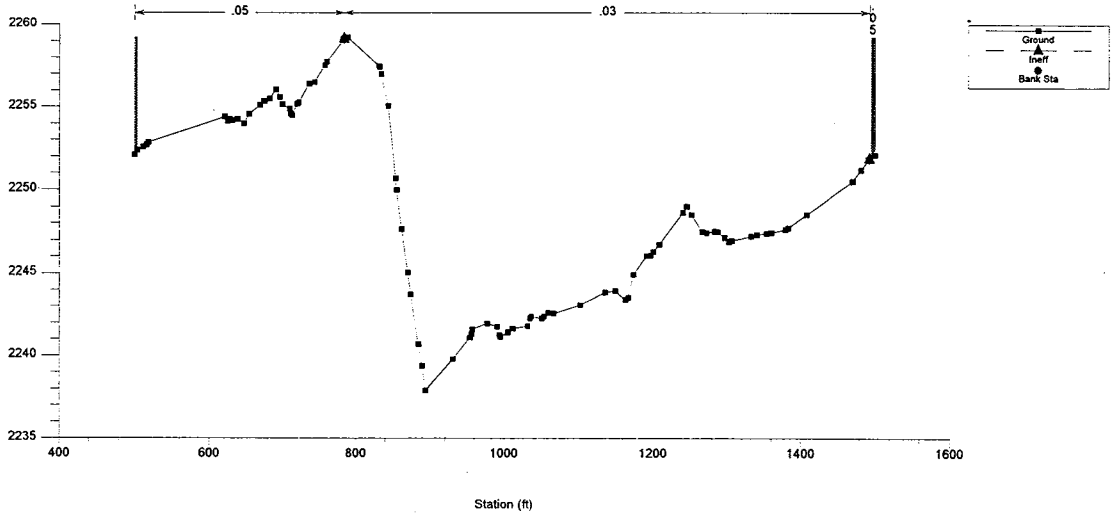
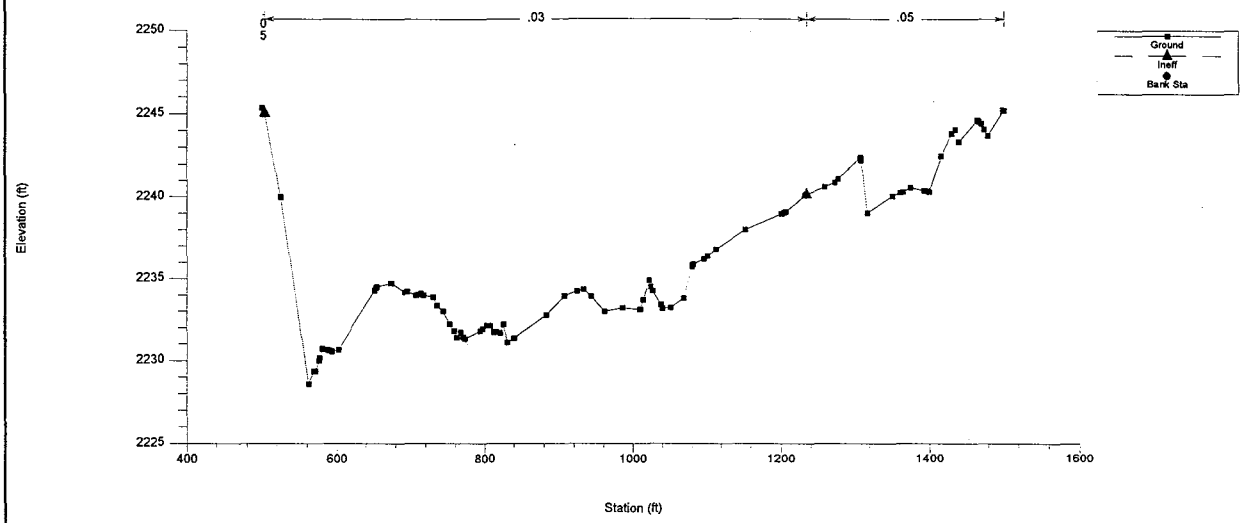
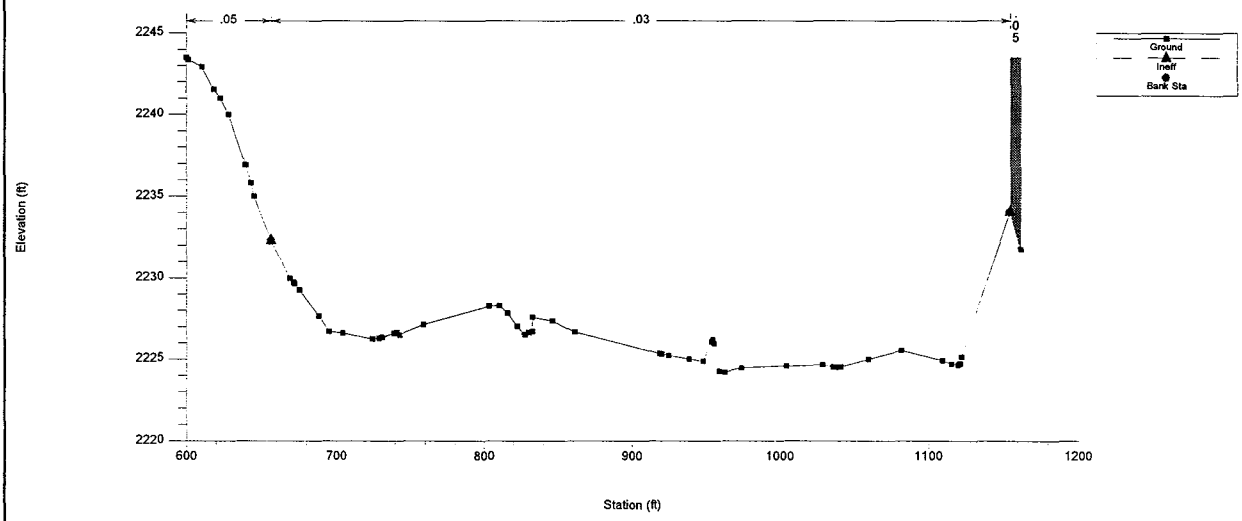
Riv Sta = 292.5



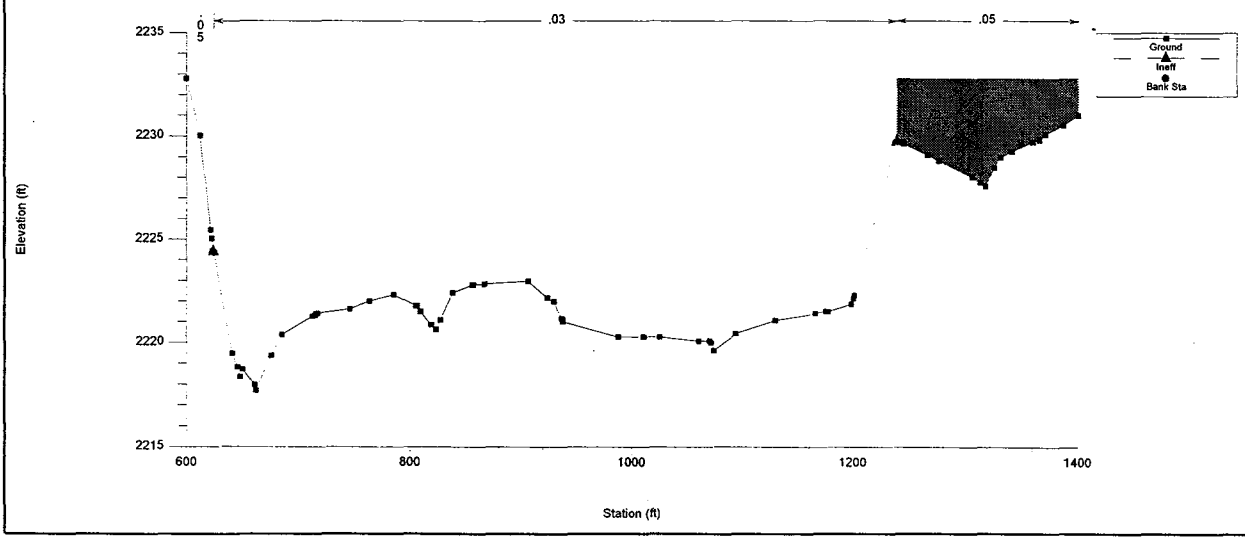
Reata Pass/Beardsley Wash
Riv Sta = 289.5



Reata Pass/Beardsley Wash
Riv Sta = 288



Reata Pass/Beardsley Wash
Riv Sta = 286.5



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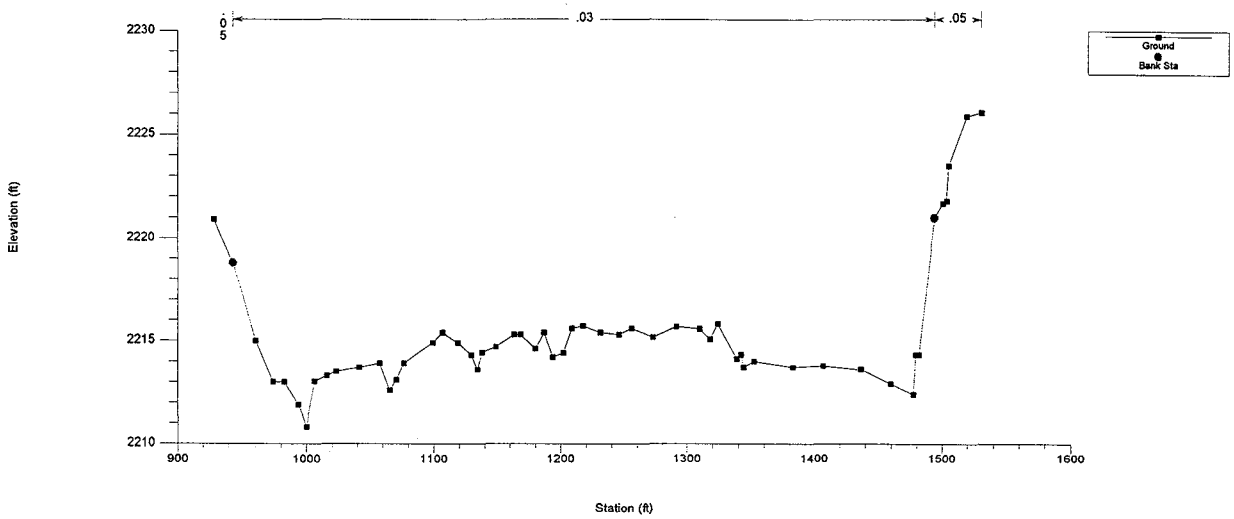
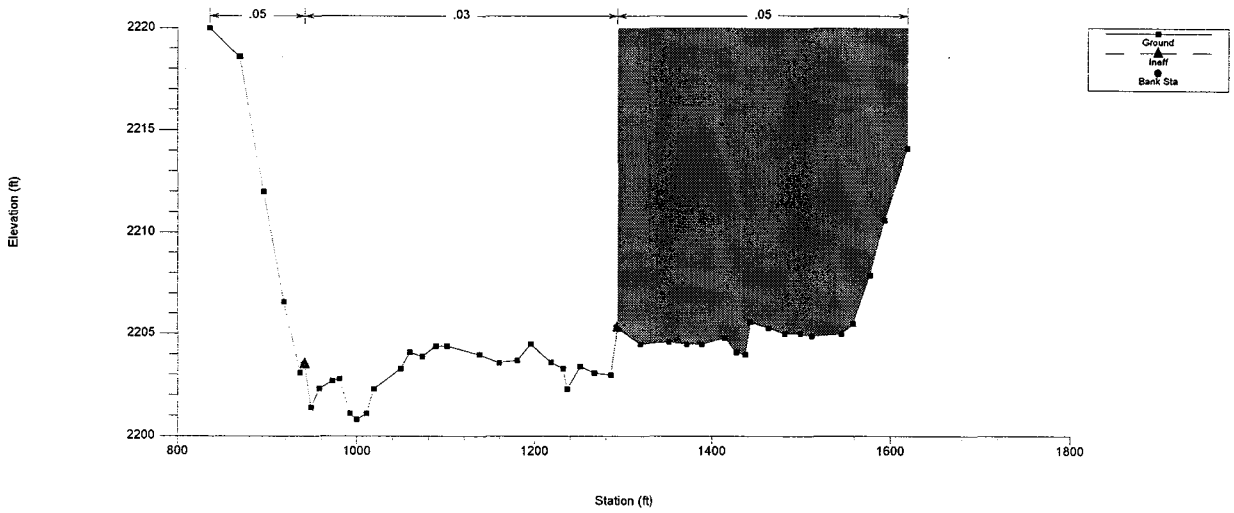
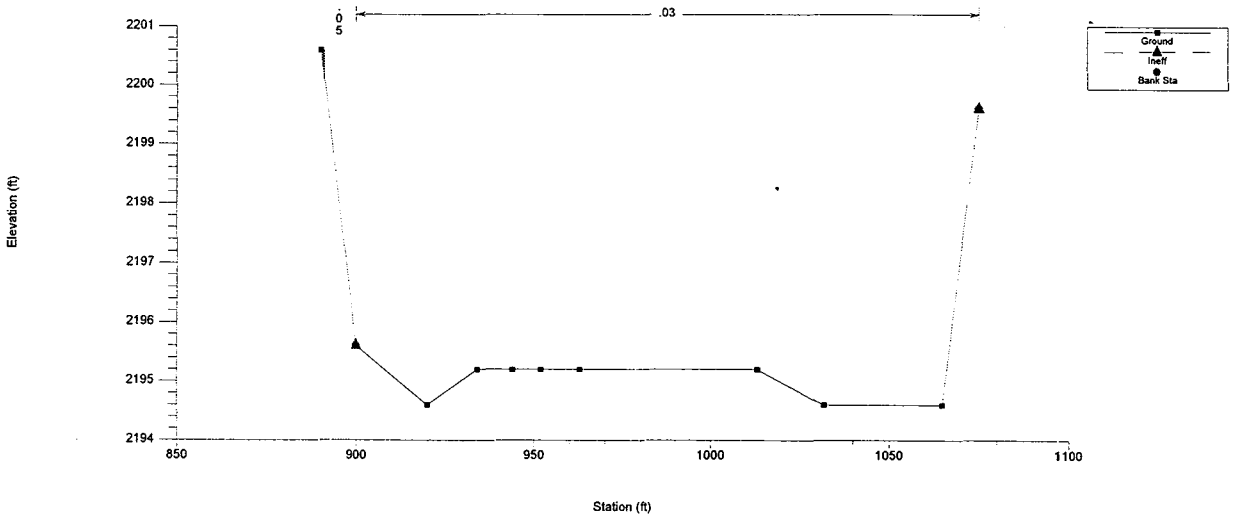
Riv Sta = 284.15



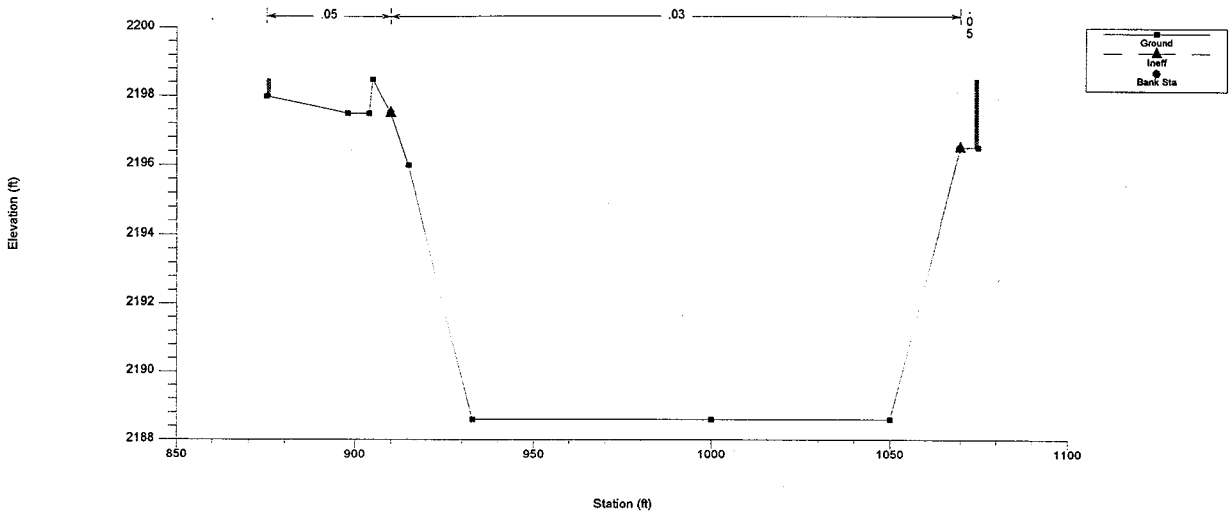
Reata Pass/Beardsley Wash
Riv Sta = 280.6



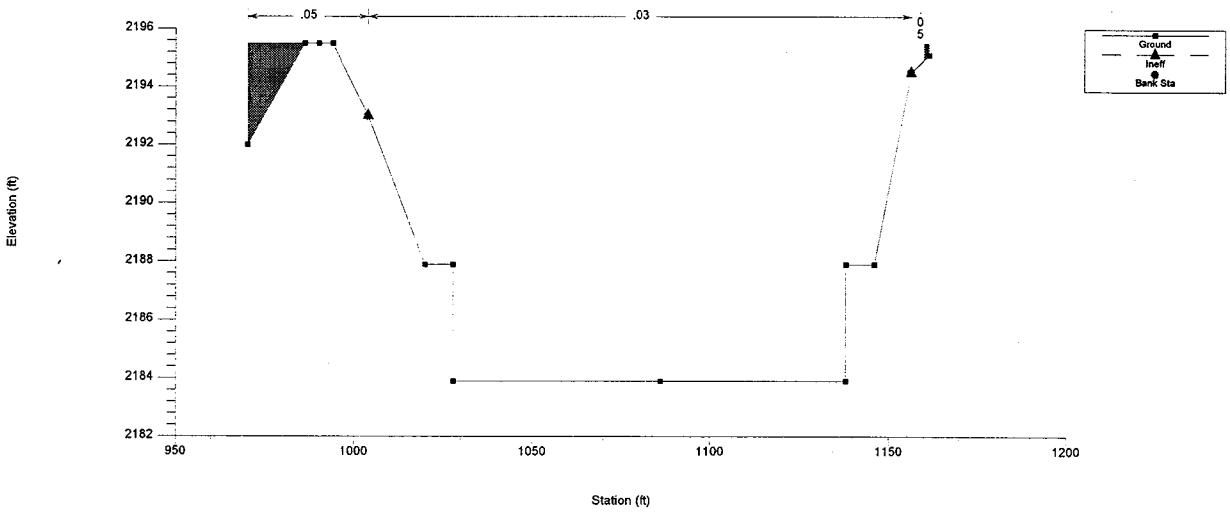
Reata Pass/Beardsley Wash
Riv Sta = 277.45



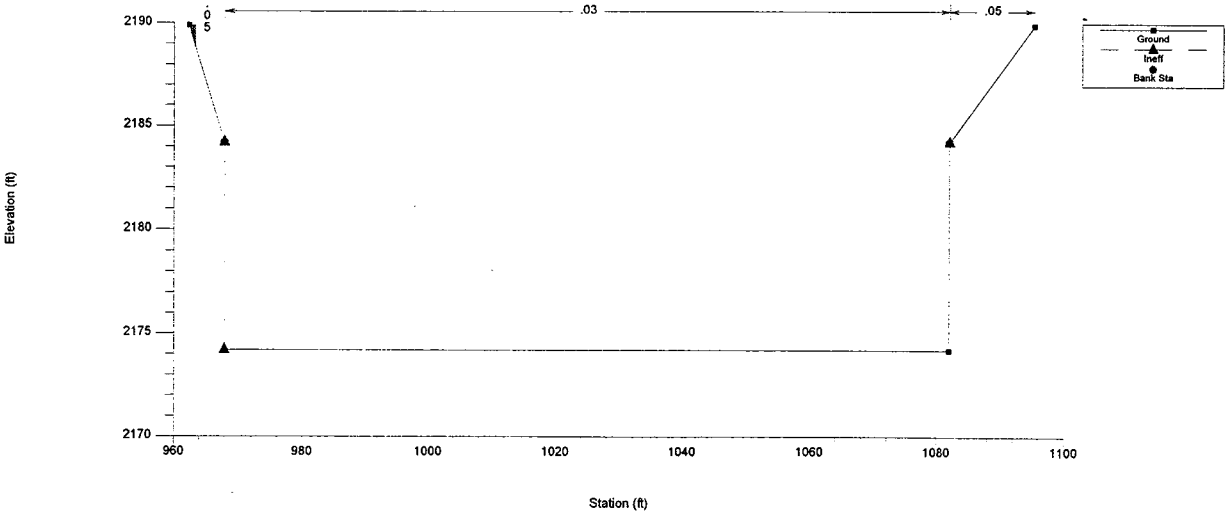
Reata Pass/Beardsley Wash
Riv Sta = 277.25



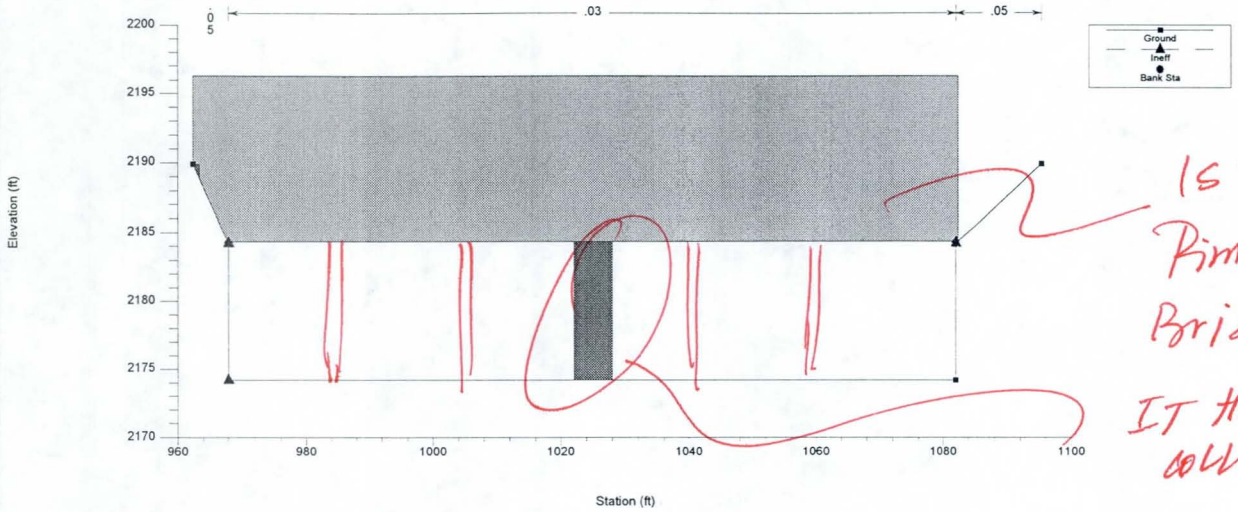
Reata Pass/Beardsley Wash
Riv Sta = 275.7



Reata Pass/Beardsley Wash
Riv Sta = 272.65

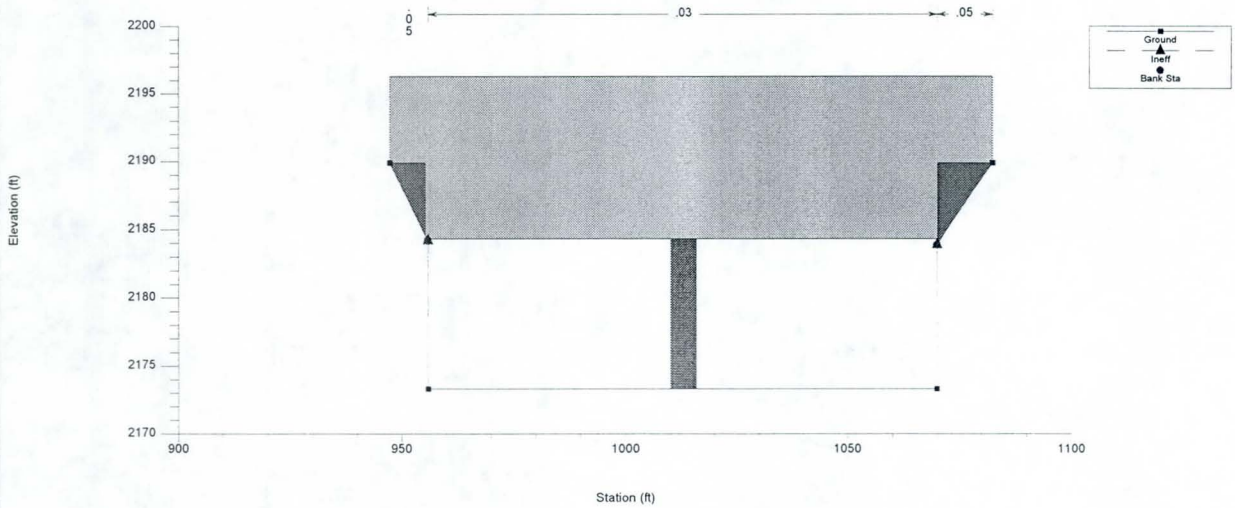


Reata Pass/Beardsley Wash
Upstream Inside Riv Sta = 272.45

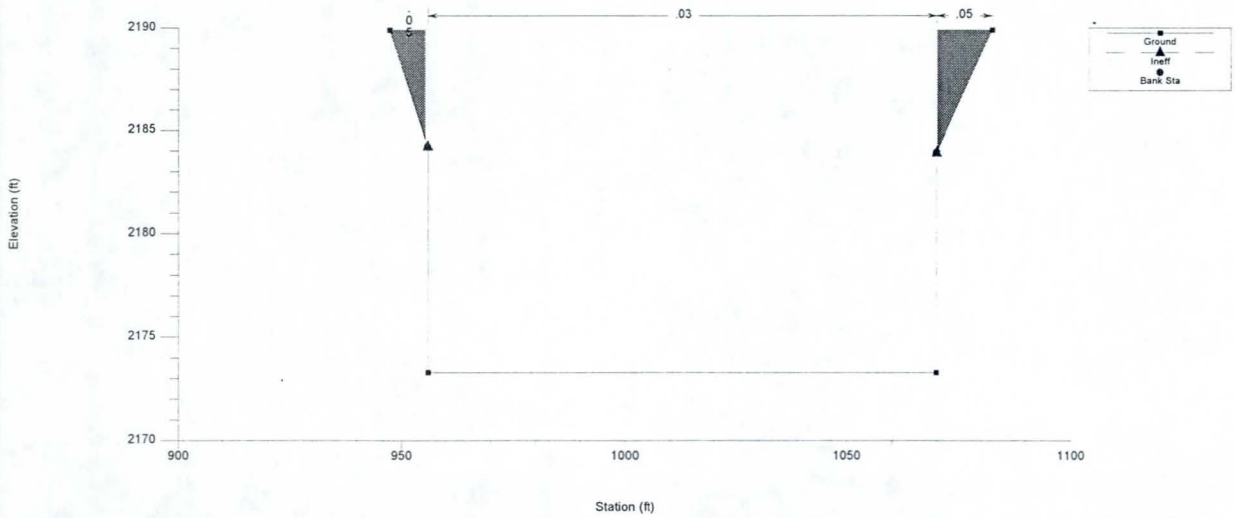


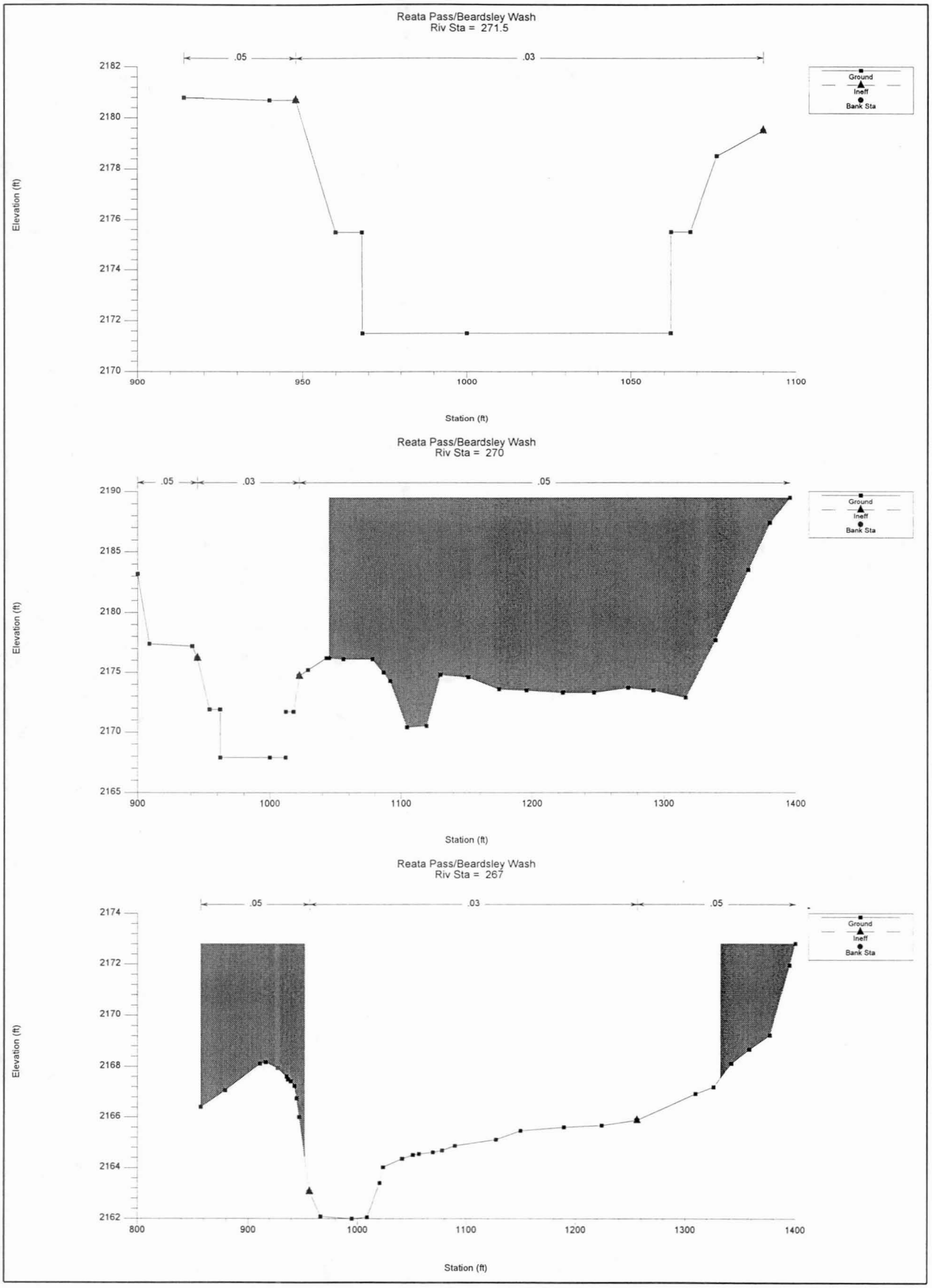
Is this Pimada Road Bridge!
IT HAS MORE COLUMNS!!

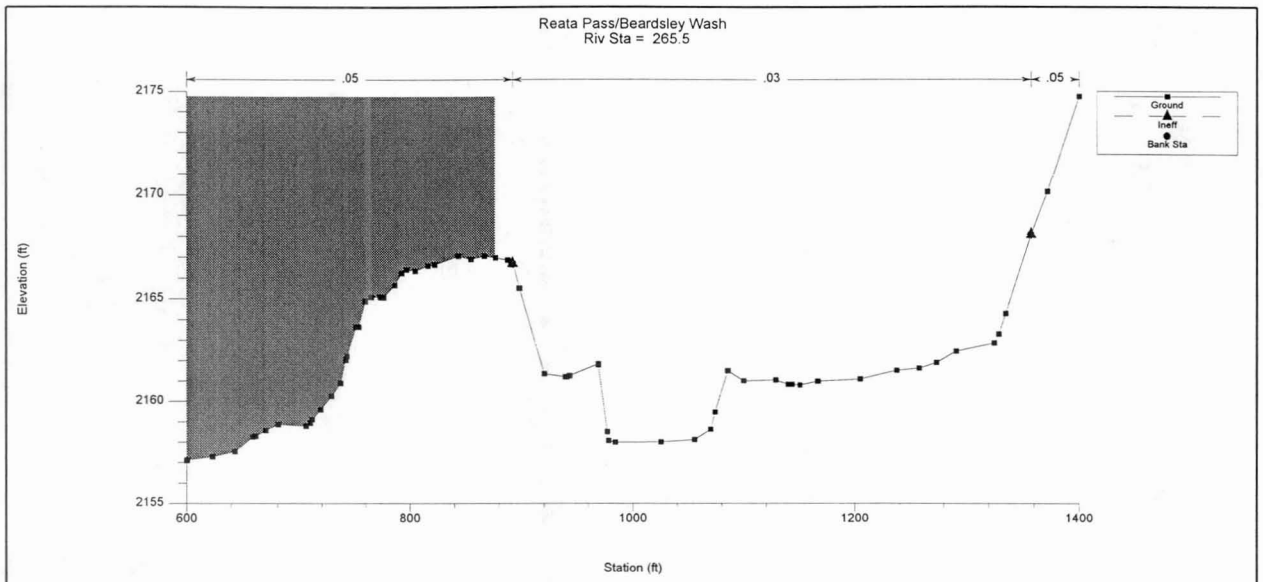
Reata Pass/Beardsley Wash
Downstream Inside Riv Sta = 272.45

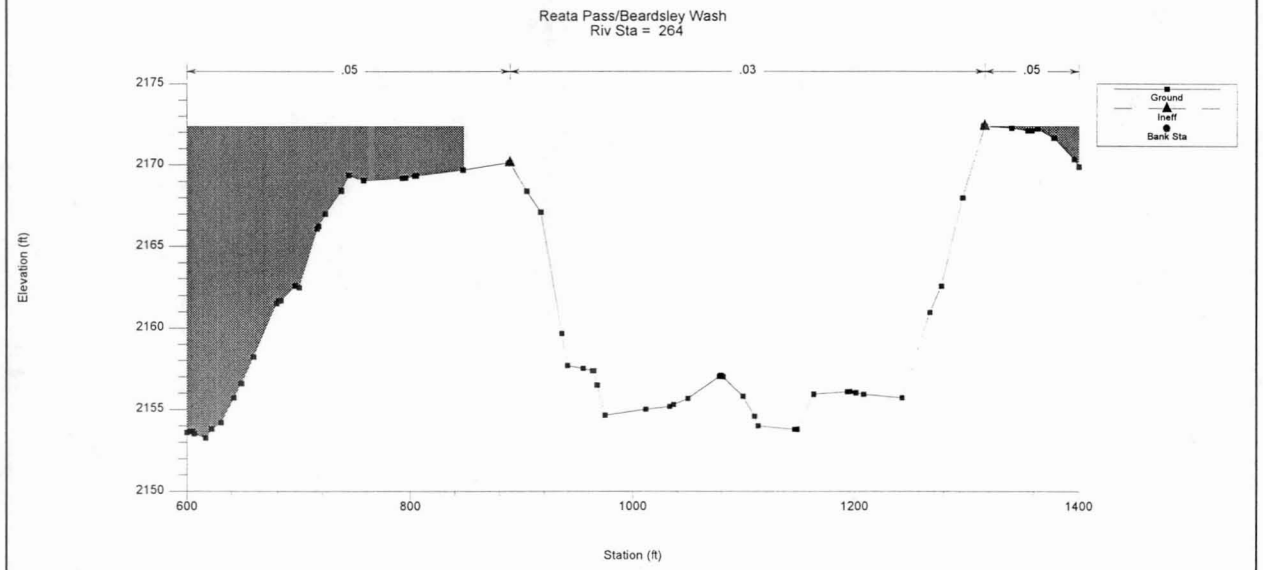


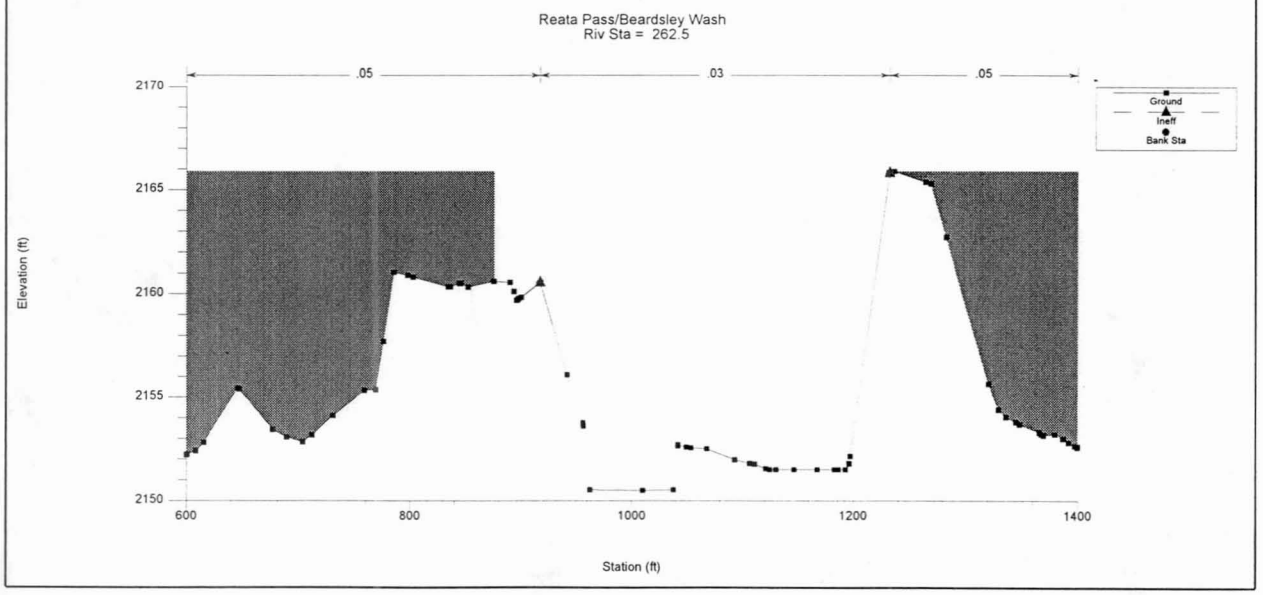
Reata Pass/Beardsley Wash
Riv Sta = 272.25

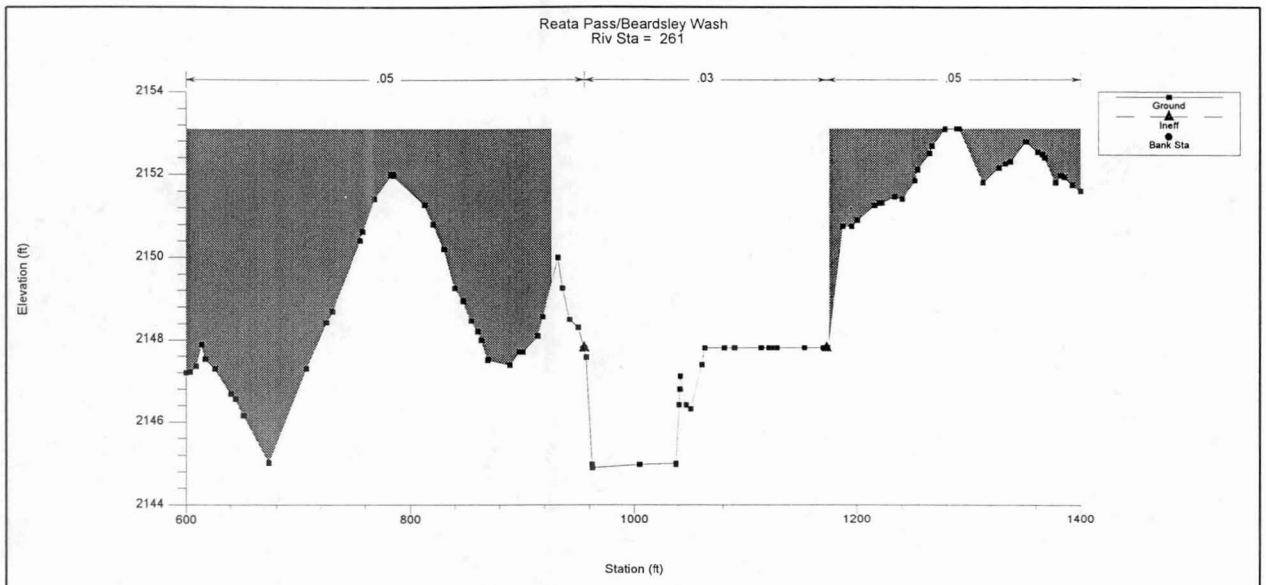


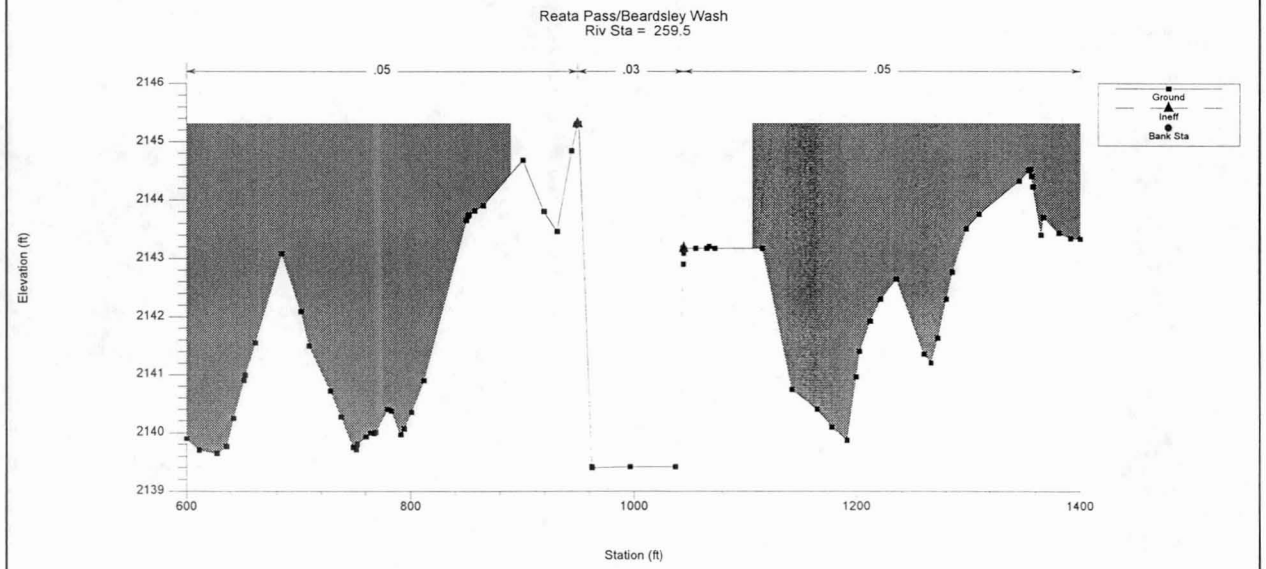

Reata Pass/Beardsley Wash
Riv Sta = 271.5
.05
.03
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 270
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 267
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

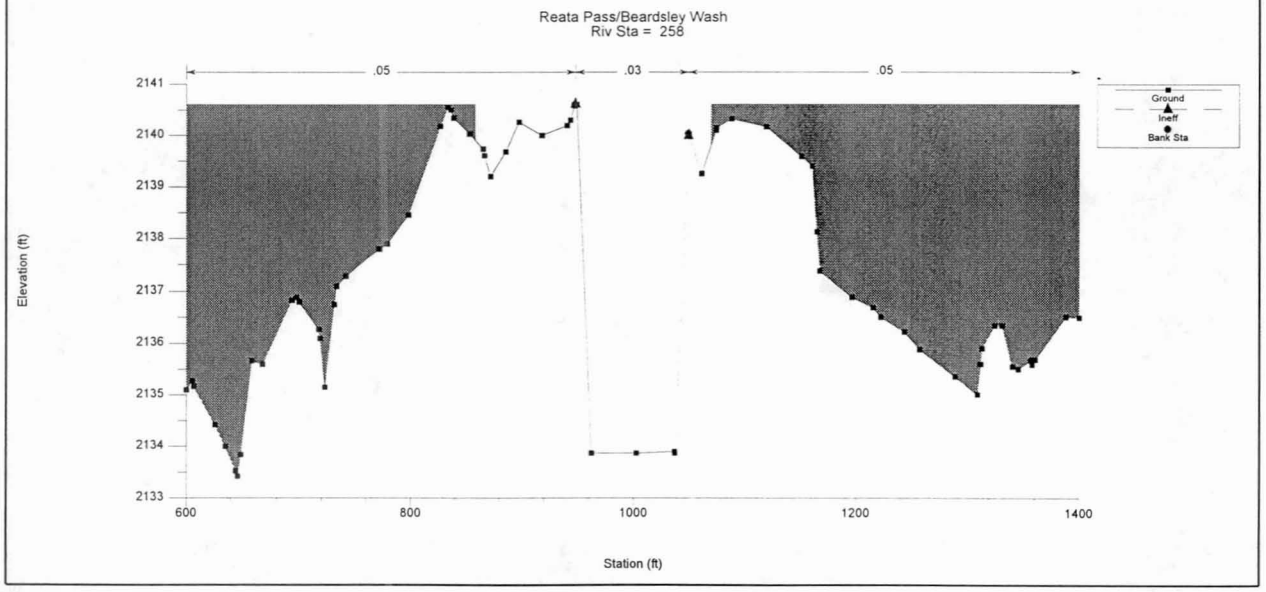

Reata Pass/Beardsley Wash
Riv Sta = 265.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2175
2170
2165
2160
2155
600
800
1000
1200
1400
Station (ft)

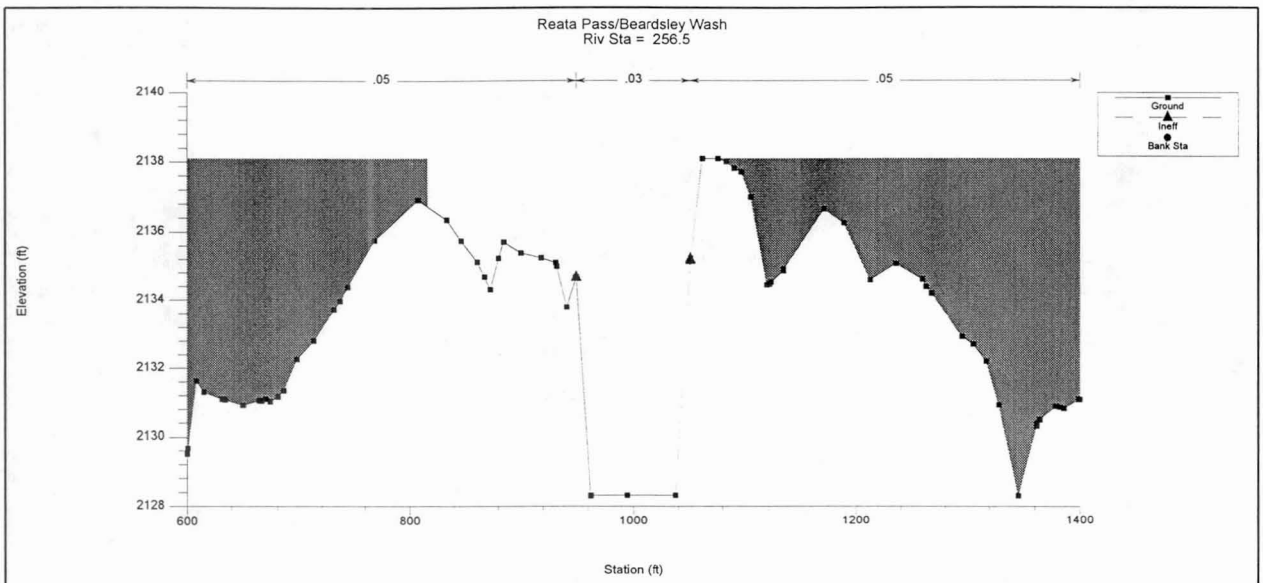

Reata Pass/Beardsley Wash
Riv Sta = 264
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2175
2170
2165
2160
2155
2150
600
800
1000
1200
1400
Station (ft)

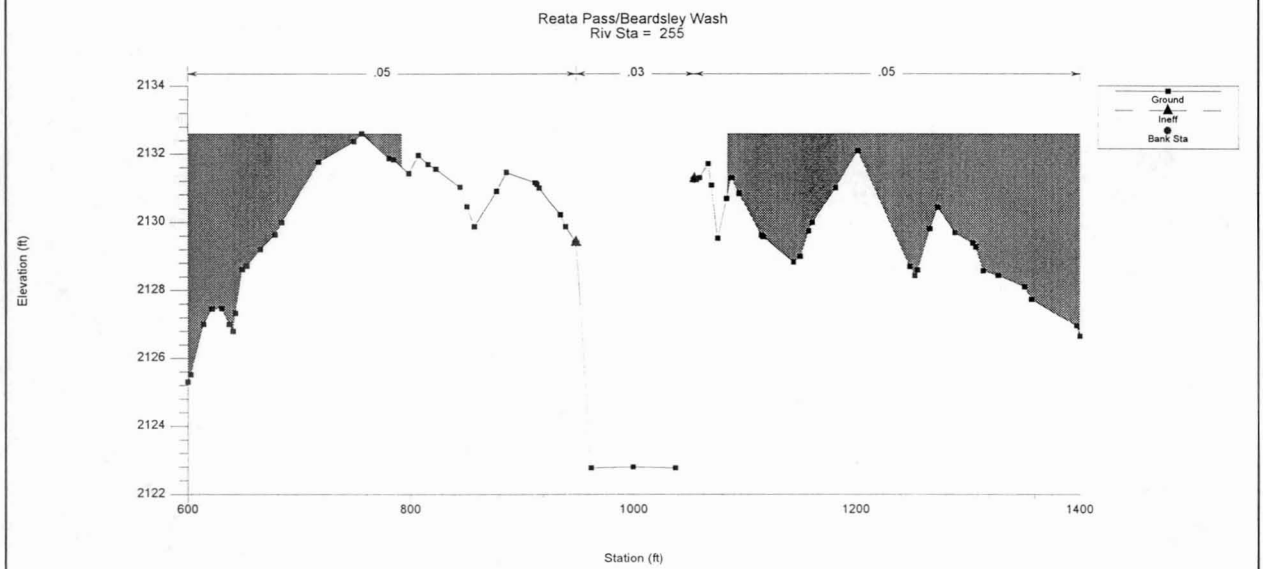

Reata Pass/Beardsley Wash
Riv Sta = 262.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2170
2165
2160
2155
2150
600
800
1000
1200
1400
Station (ft)

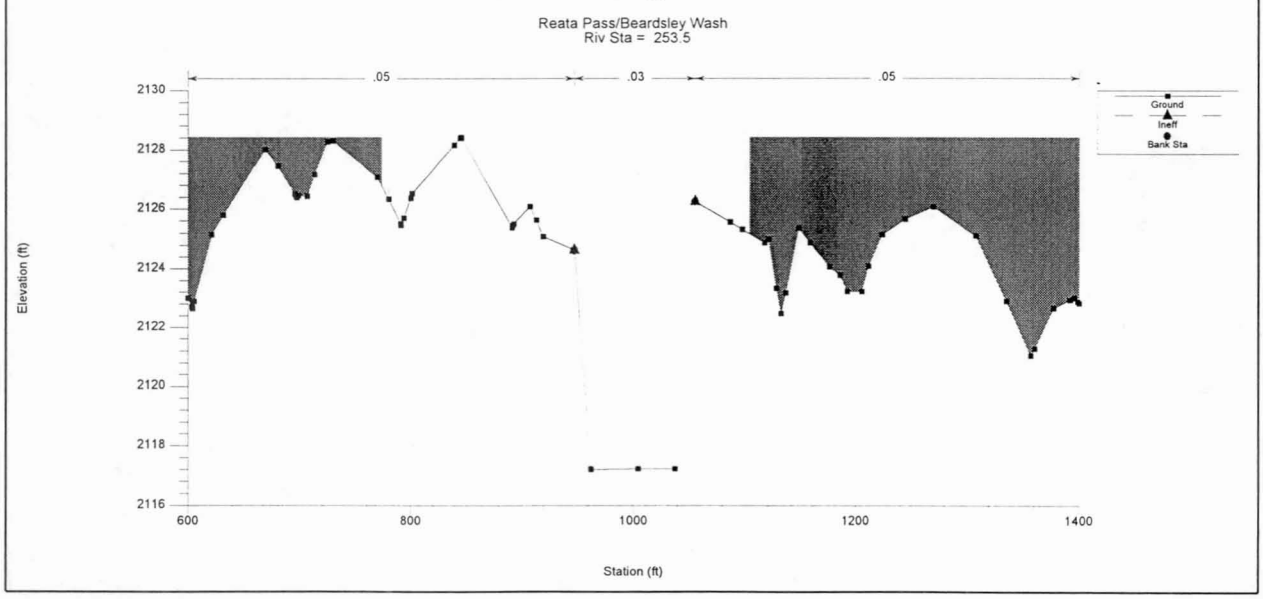

Reata Pass/Beardsley Wash
Riv Sta = 261
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2154
2152
2150
2148
2146
2144
600
800
1000
1200
1400
Station (ft)

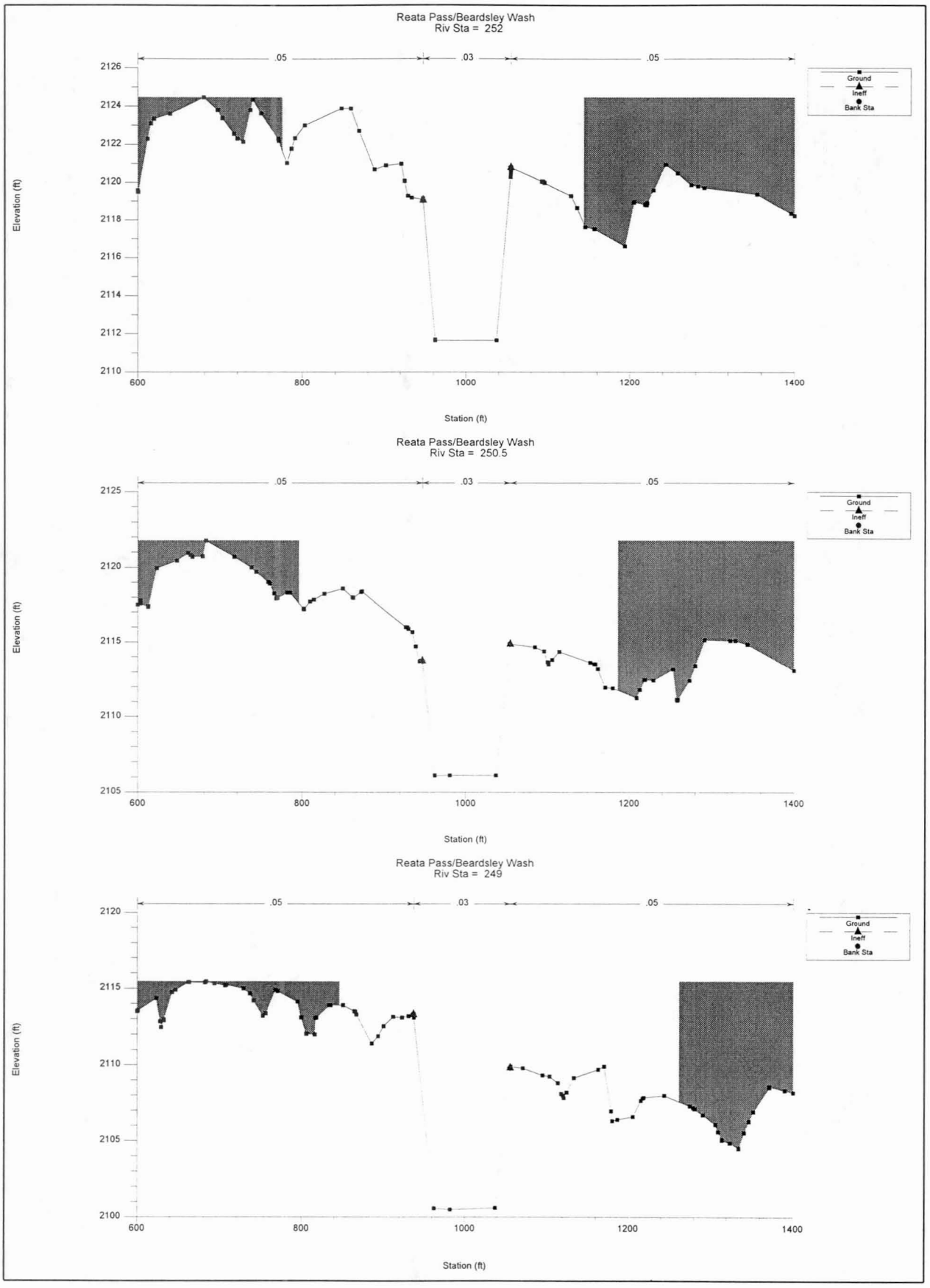

Reata Pass/Beardsley Wash
Riv Sta = 259.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2146
2145
2144
2143
2142
2141
2140
2139
600
800
1000
1200
1400
Station (ft)

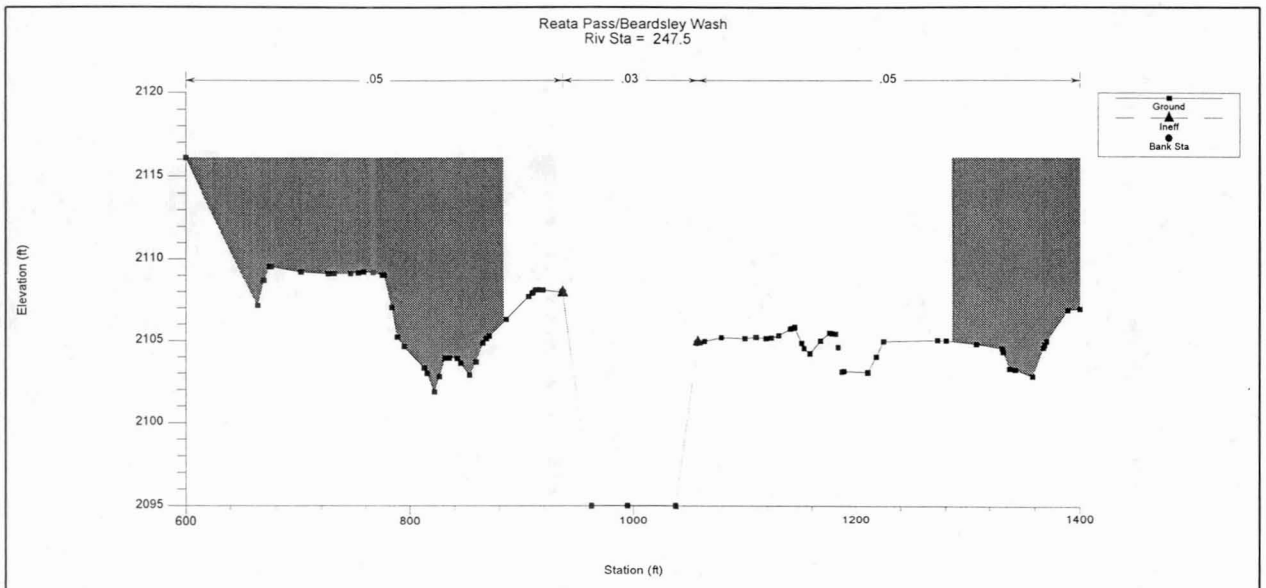

Reata Pass/Beardsley Wash
Riv Sta = 258
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2141
2140
2139
2138
2137
2136
2135
2134
2133
600
800
1000
1200
1400
Station (ft)

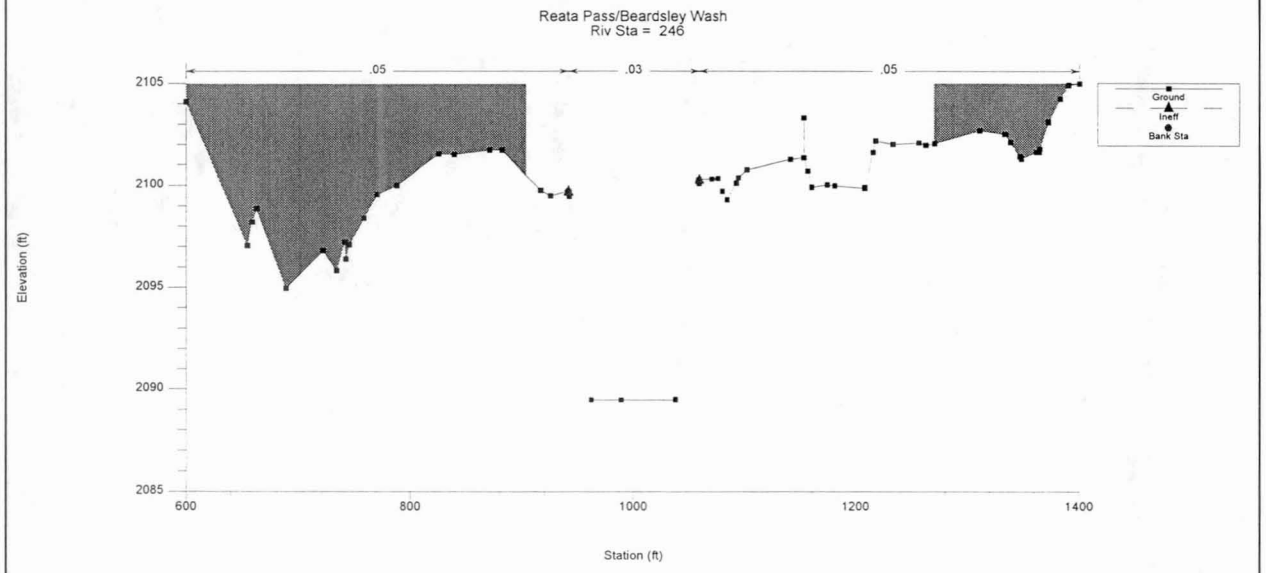

Reata Pass/Beardsley Wash
Riv Sta = 256.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2140
2138
2136
2134
2132
2130
2128
600
800
1000
1200
1400
Station (ft)

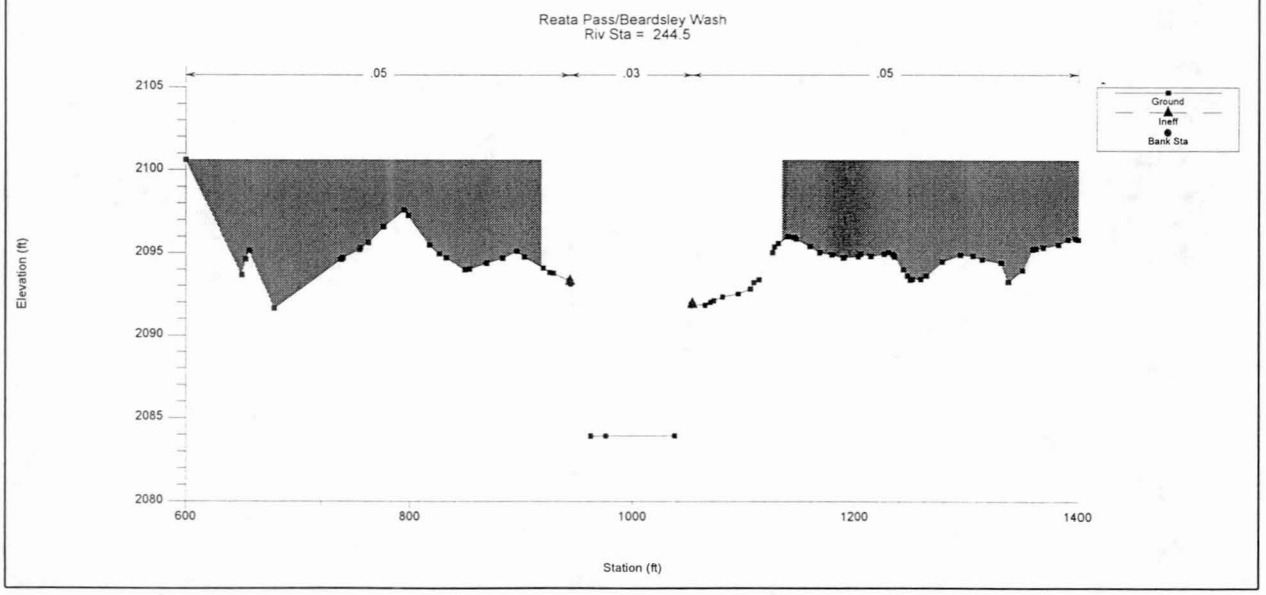

Reata Pass/Beardsley Wash
Riv Sta = 255
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2134
2132
2130
2128
2126
2124
2122
600
800
1000
1200
1400
Station (ft)

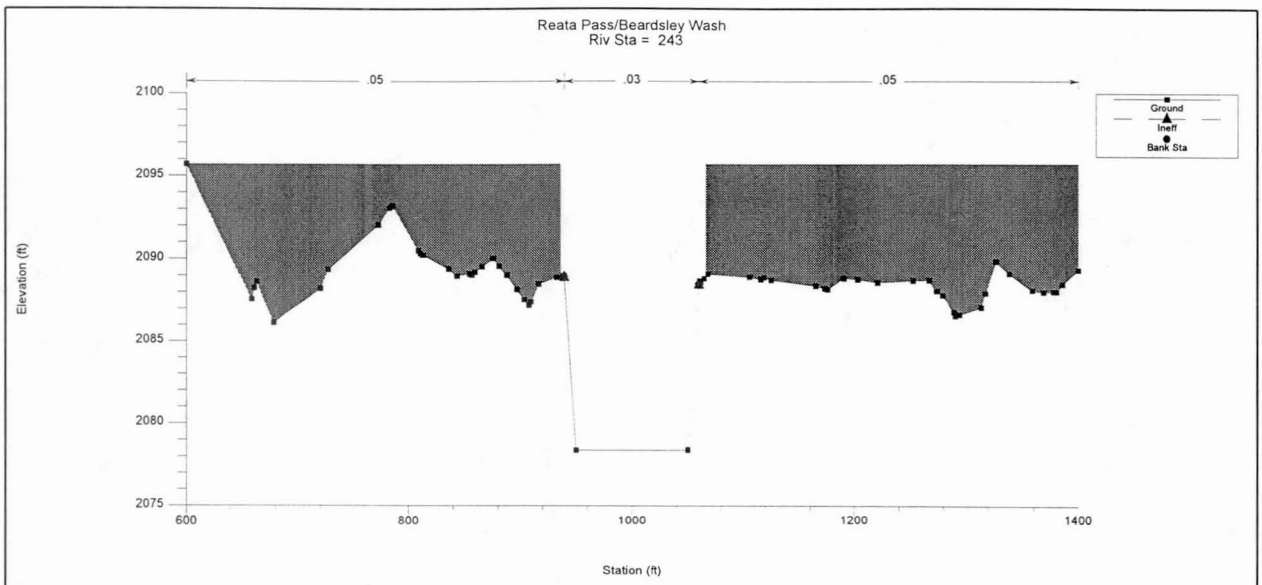

Reata Pass/Beardsley Wash
Riv Sta = 253.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2130
2128
2126
2124
2122
2120
2118
2116
600
800
1000
1200
1400
Station (ft)

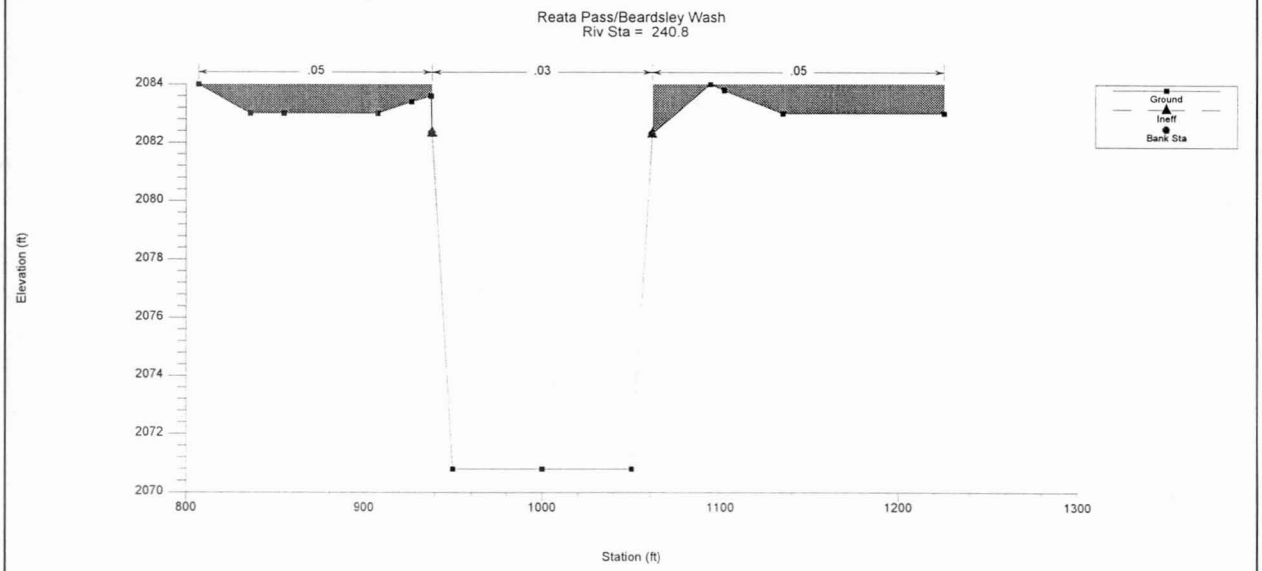

Reata Pass/Beardsley Wash
Riv Sta = 252
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 250.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 249
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

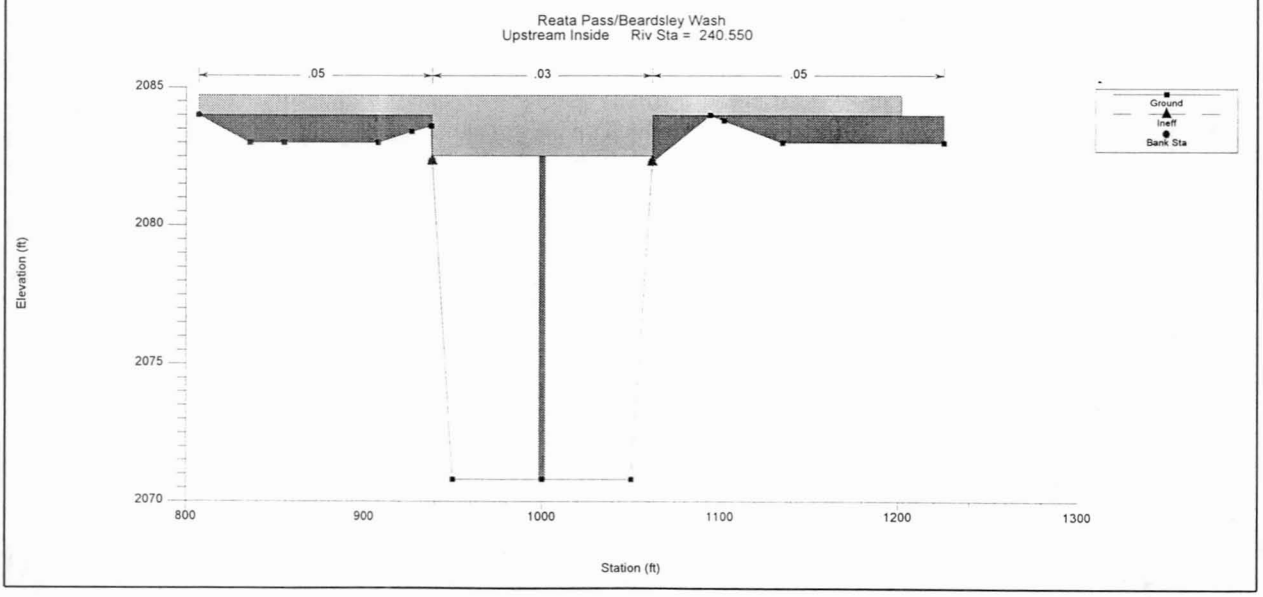

Reata Pass/Beardsley Wash
Riv Sta = 247.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2120
2115
2110
2105
2100
2095
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 246
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2105
2100
2095
2090
2085
600
800
1000
1200
1400
Station (ft)

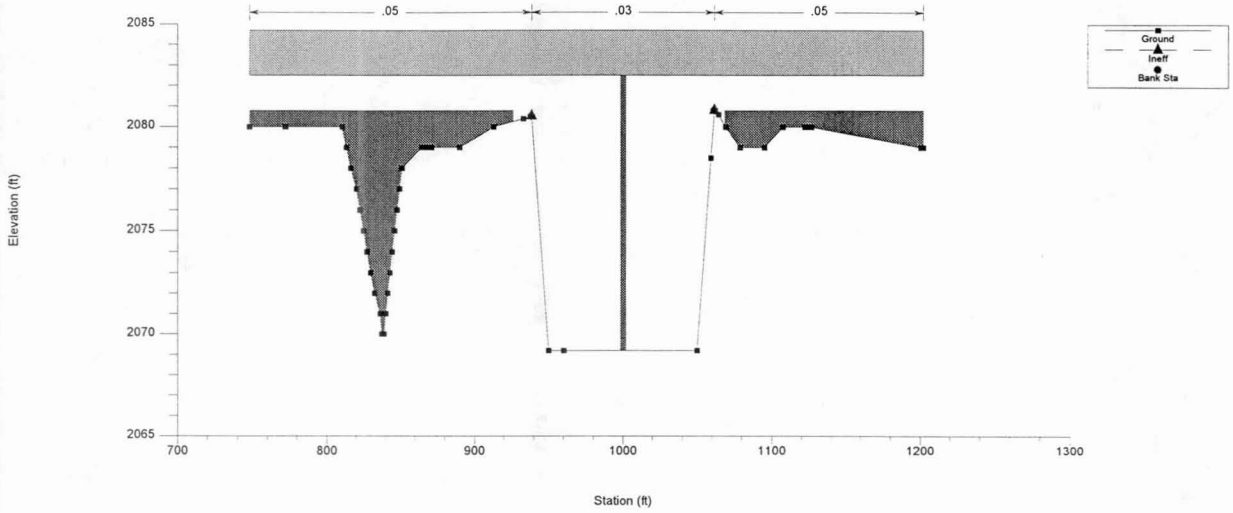

Reata Pass/Beardsley Wash
Riv Sta = 244.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2105
2100
2095
2090
2085
2080
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 243
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2100
2095
2090
2085
2080
2075
600
800
1000
1200
1400
Station (ft)

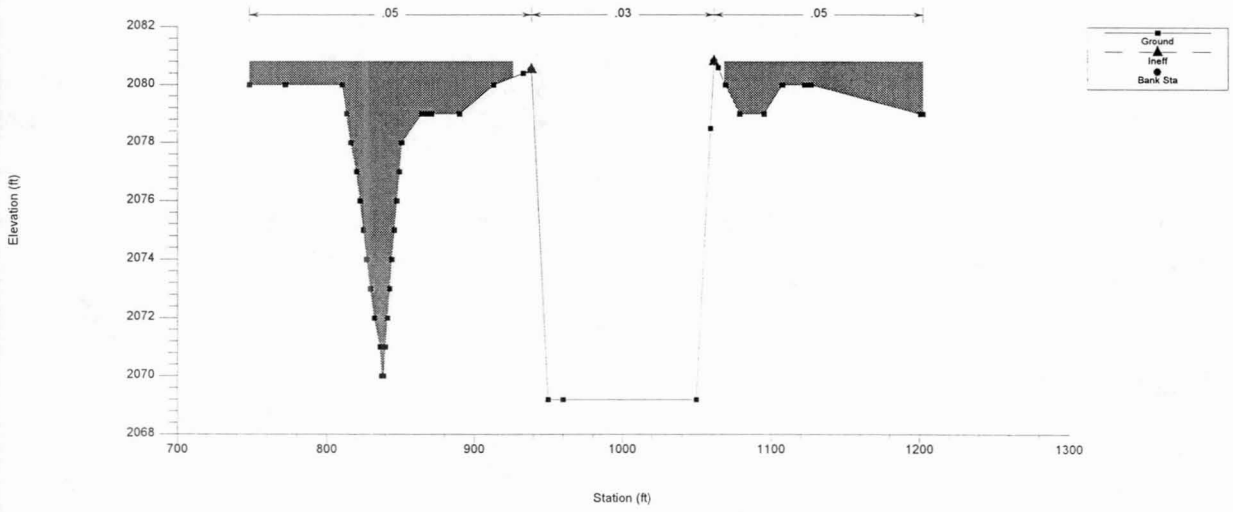

Reata Pass/Beardsley Wash
Riv Sta = 240.8
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2084
2082
2080
2078
2076
2074
2072
2070
800
900
1000
1100
1200
1300
Station (ft)


Reata Pass/Beardsley Wash
Upstream Inside Riv Sta = 240.550
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2085
2080
2075
2070
800
900
1000
1100
1200
1300
Station (ft)

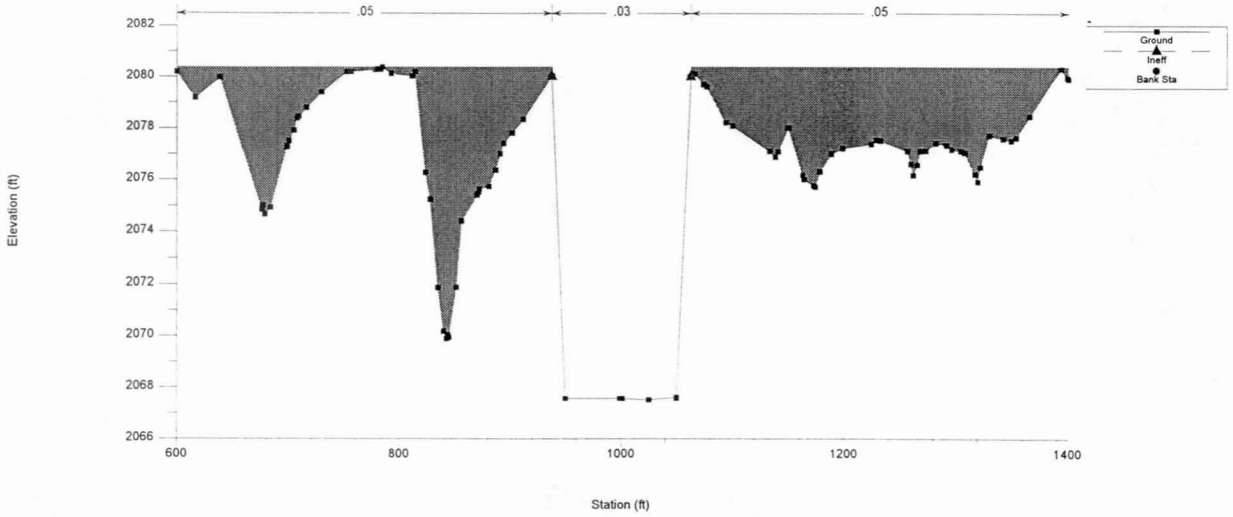
Reata Pass/Beardsley Wash
Downstream Inside Riv Sta = 240.550

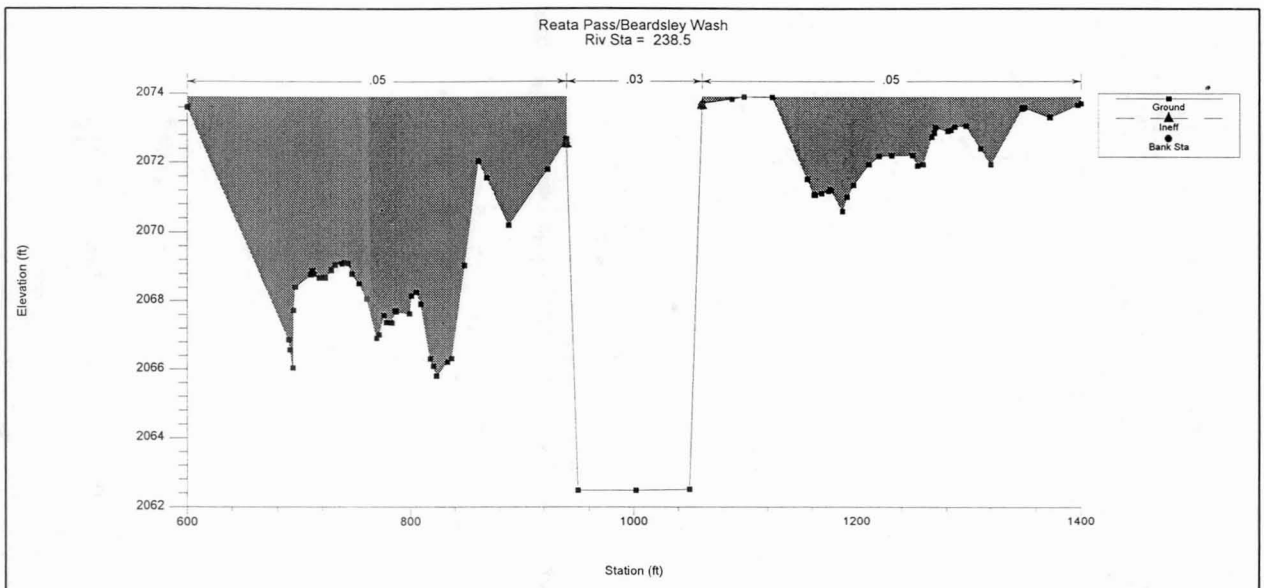


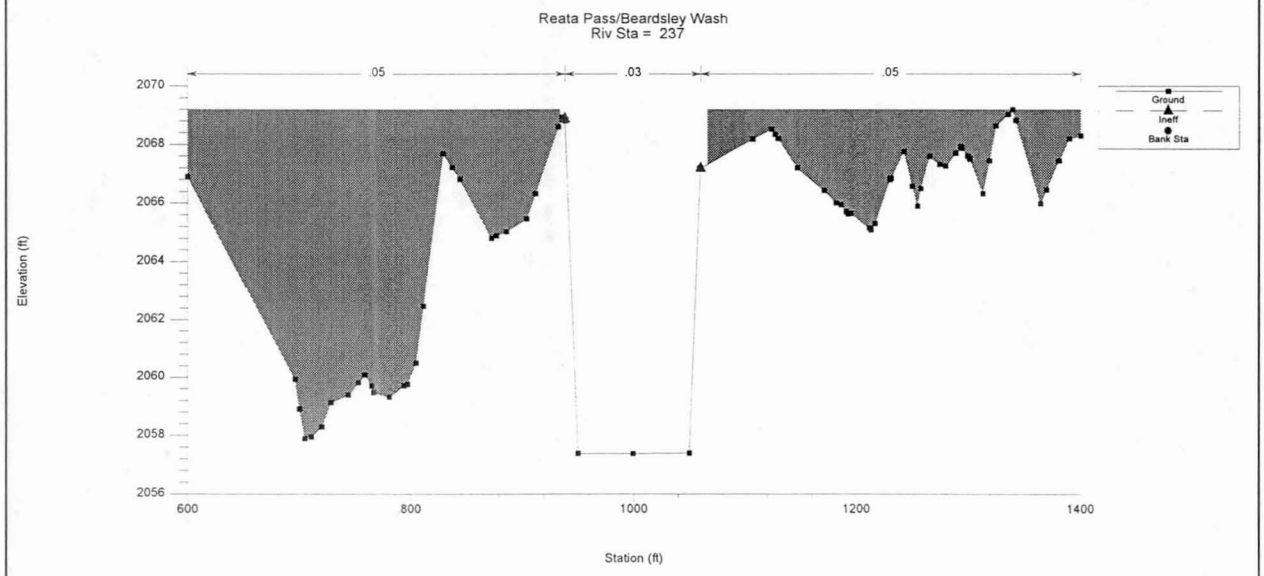
Reata Pass/Beardsley Wash
Riv Sta = 240.3

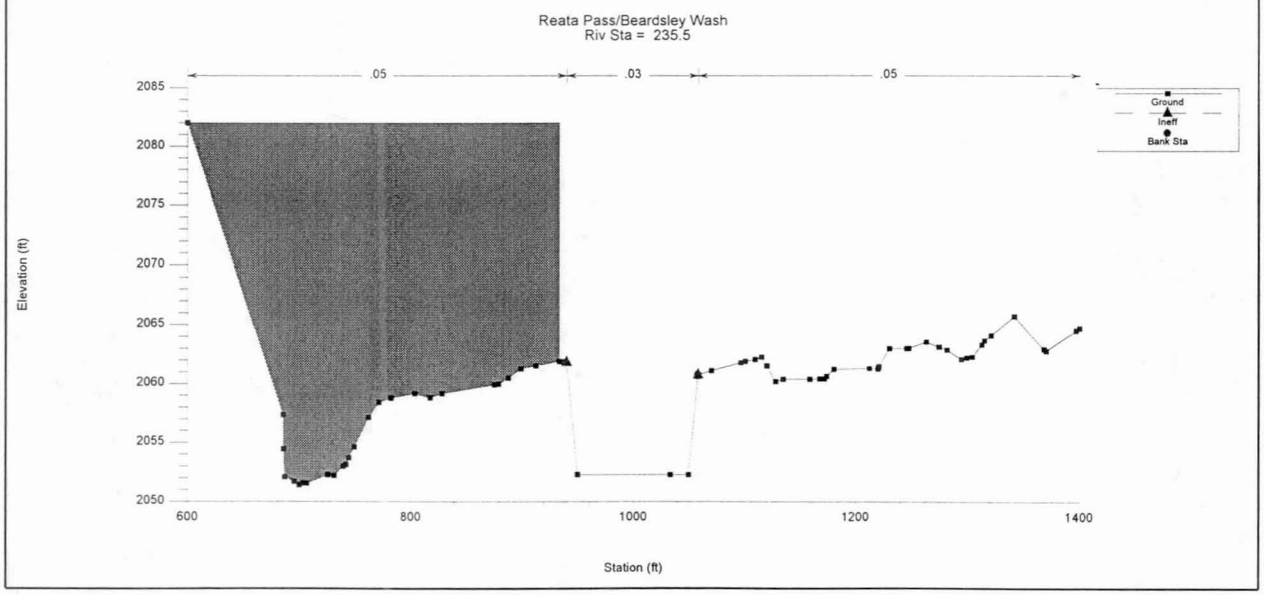


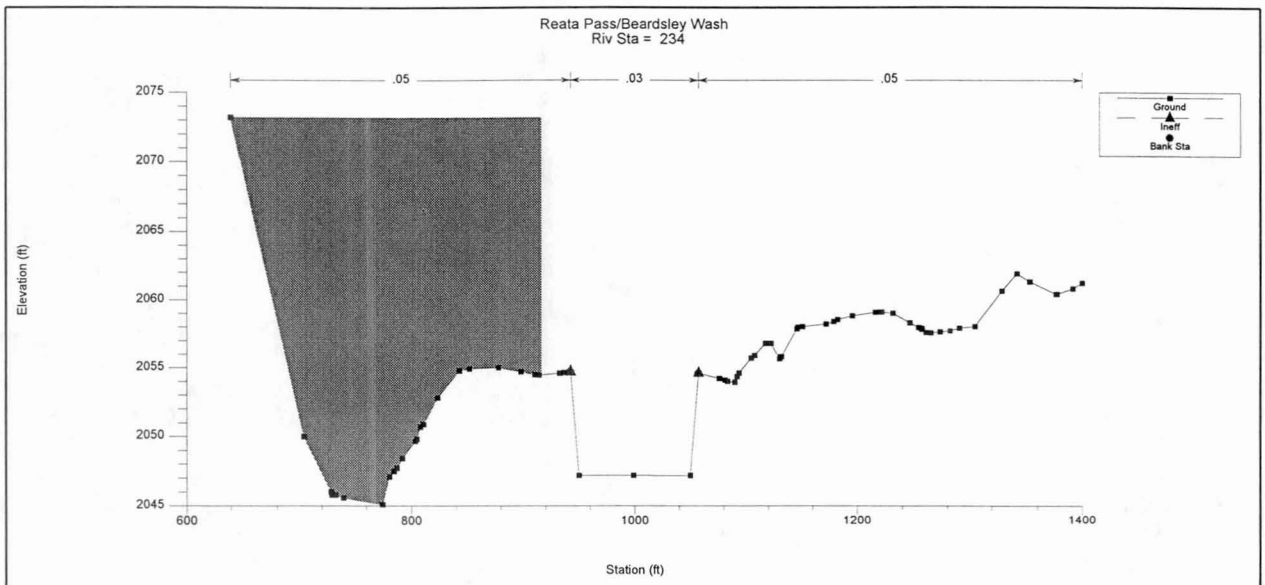
Reata Pass/Beardsley Wash
Riv Sta = 240

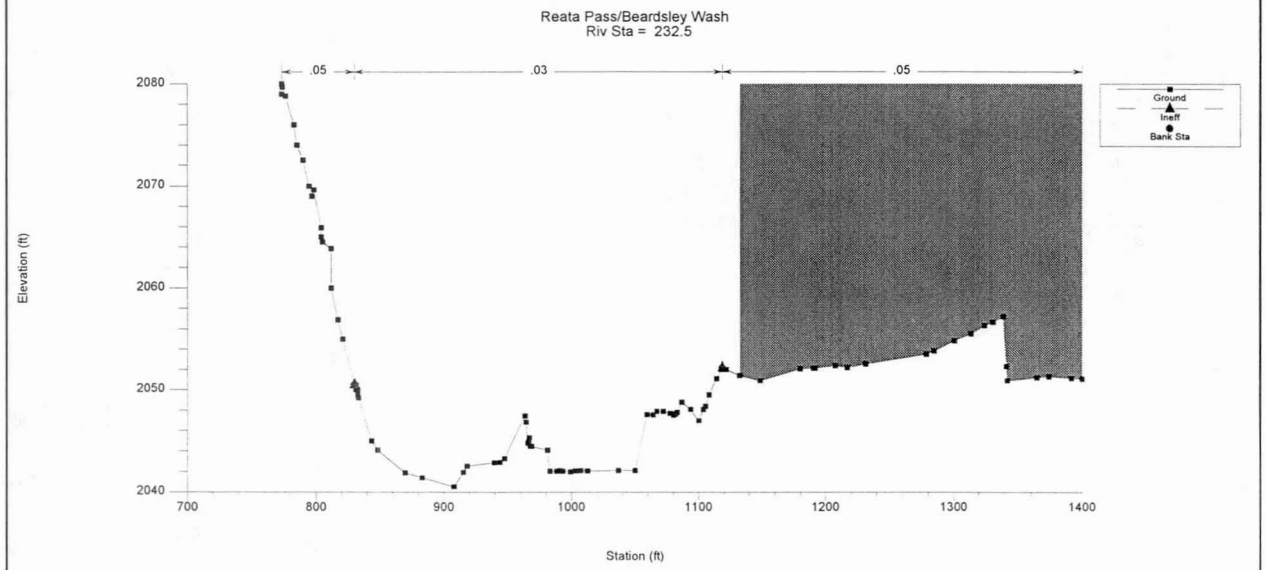


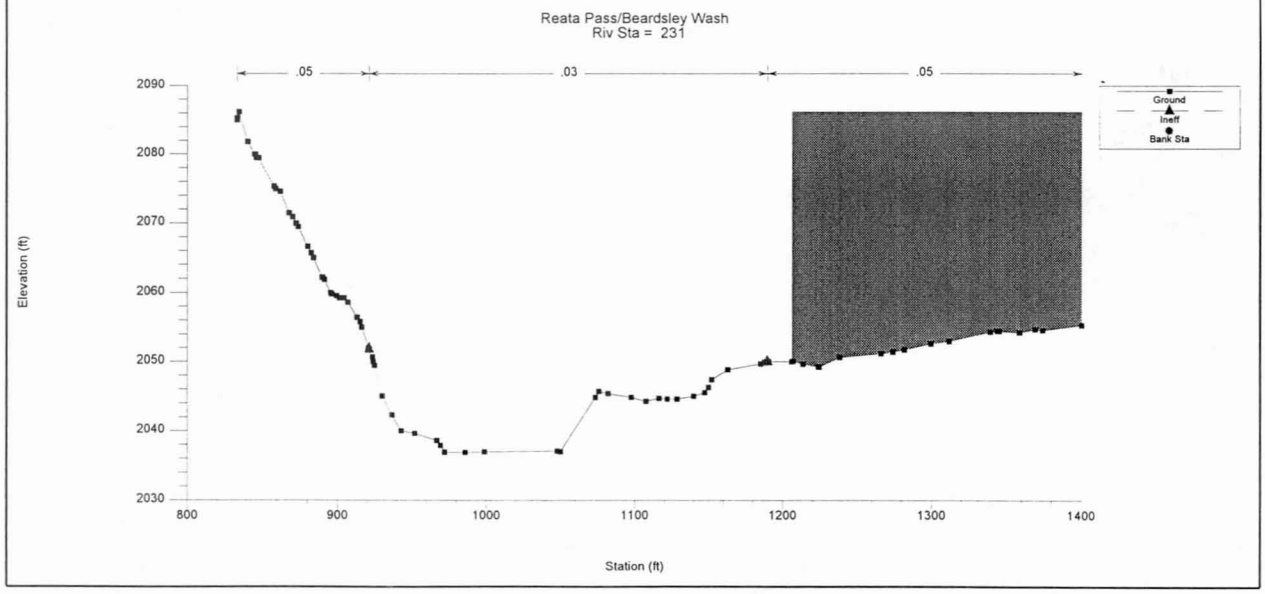

Reata Pass/Beardsley Wash
Riv Sta = 238.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2074
2072
2070
2068
2066
2064
2062
600
800
1000
1200
1400
Station (ft)

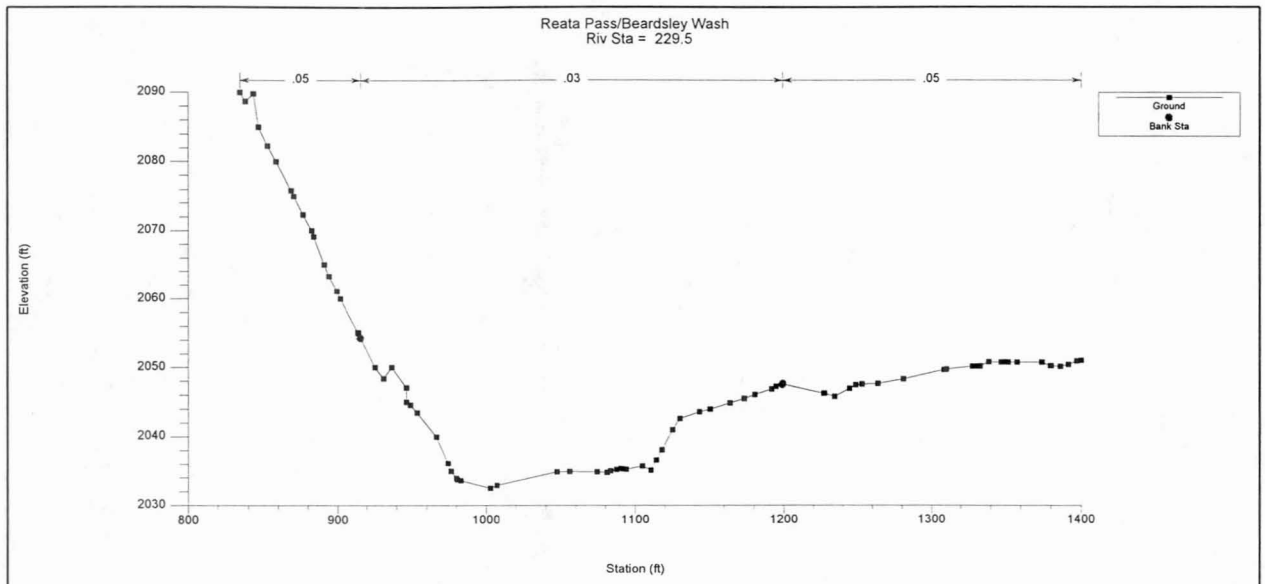

Reata Pass/Beardsley Wash
Riv Sta = 237
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2070
2068
2066
2064
2062
2060
2058
2056
600
800
1000
1200
1400
Station (ft)

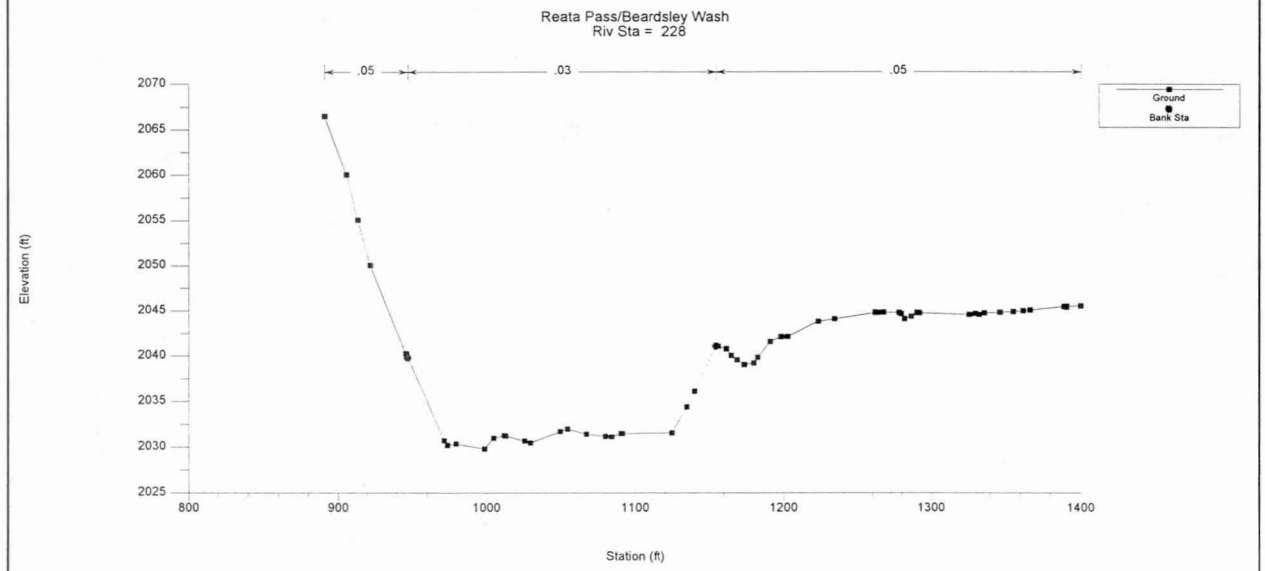

Reata Pass/Beardsley Wash
Riv Sta = 235.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
2085
2080
2075
2070
2065
2060
2055
2050
600
800
1000
1200
1400
Station (ft)

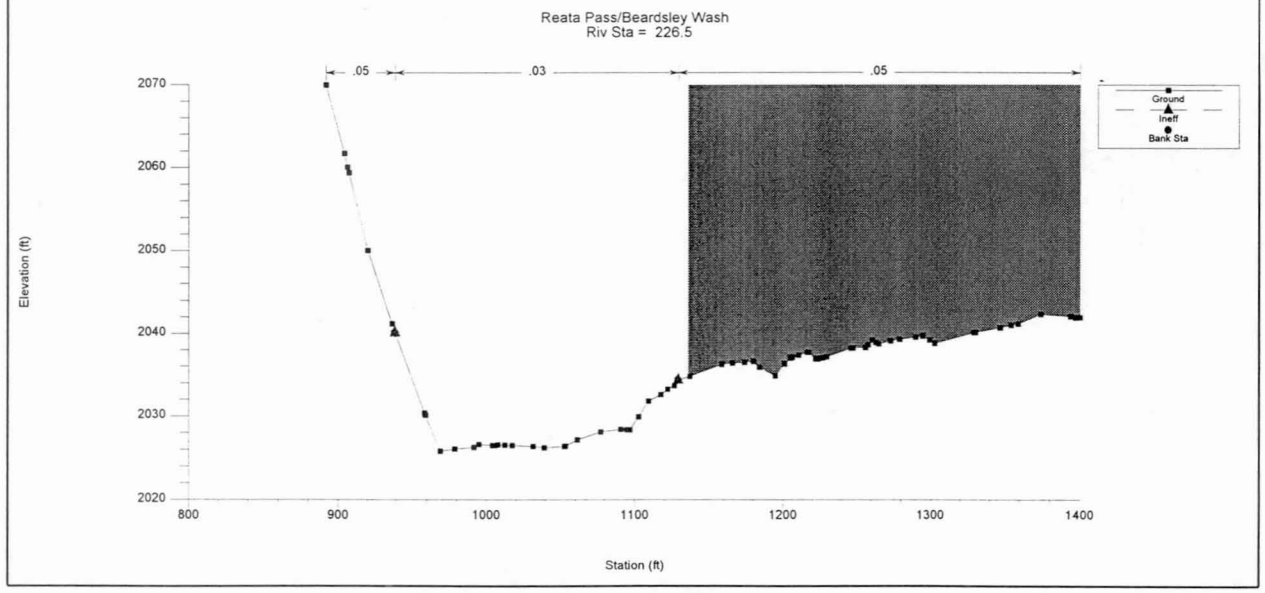

Reata Pass/Beardsley Wash
Riv Sta = 234
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 232.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

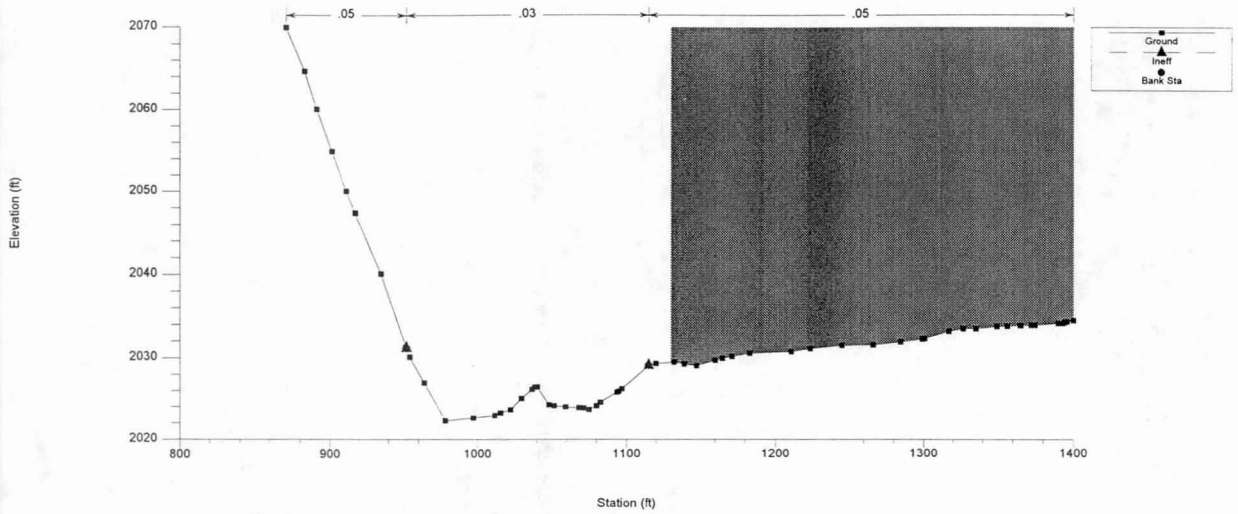

Reata Pass/Beardsley Wash
Riv Sta = 231
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 229.5
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
Station (ft)

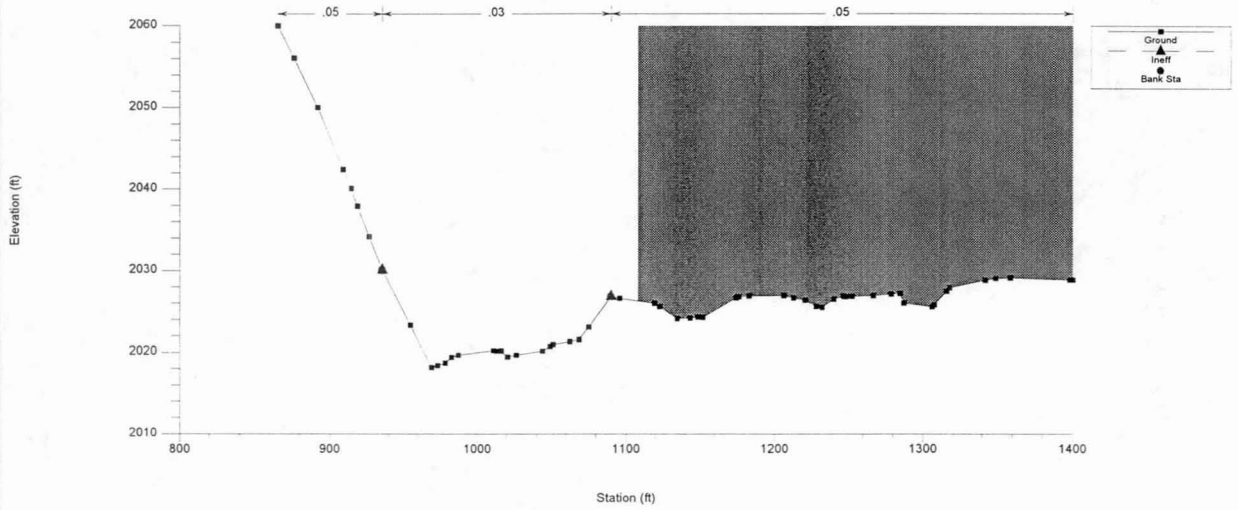

Reata Pass/Beardsley Wash
Riv Sta = 228
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 226.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

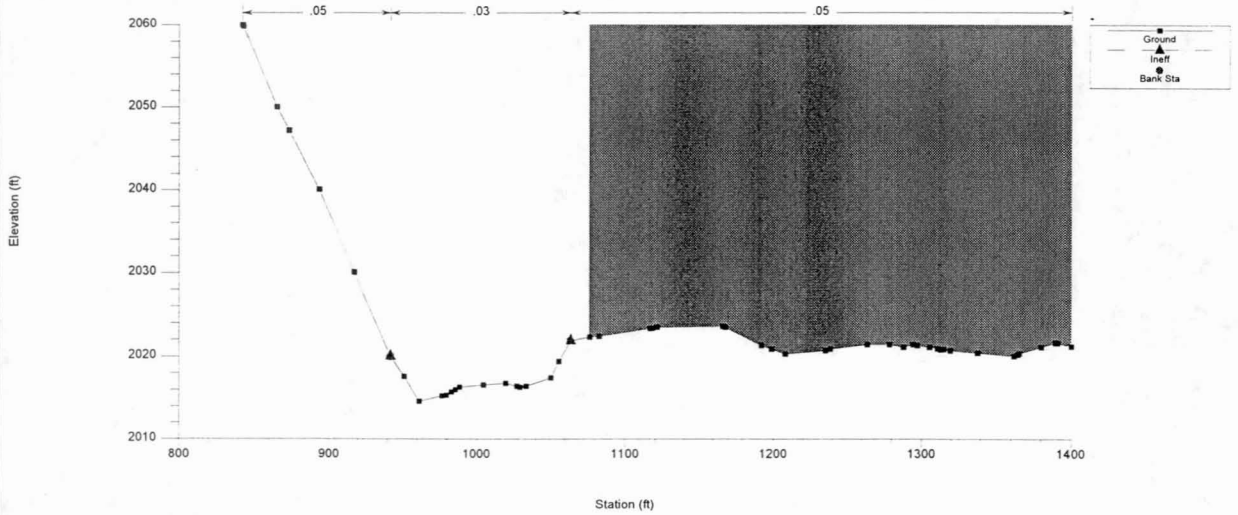
Reata Pass/Beardsley Wash
Riv Sta = 225

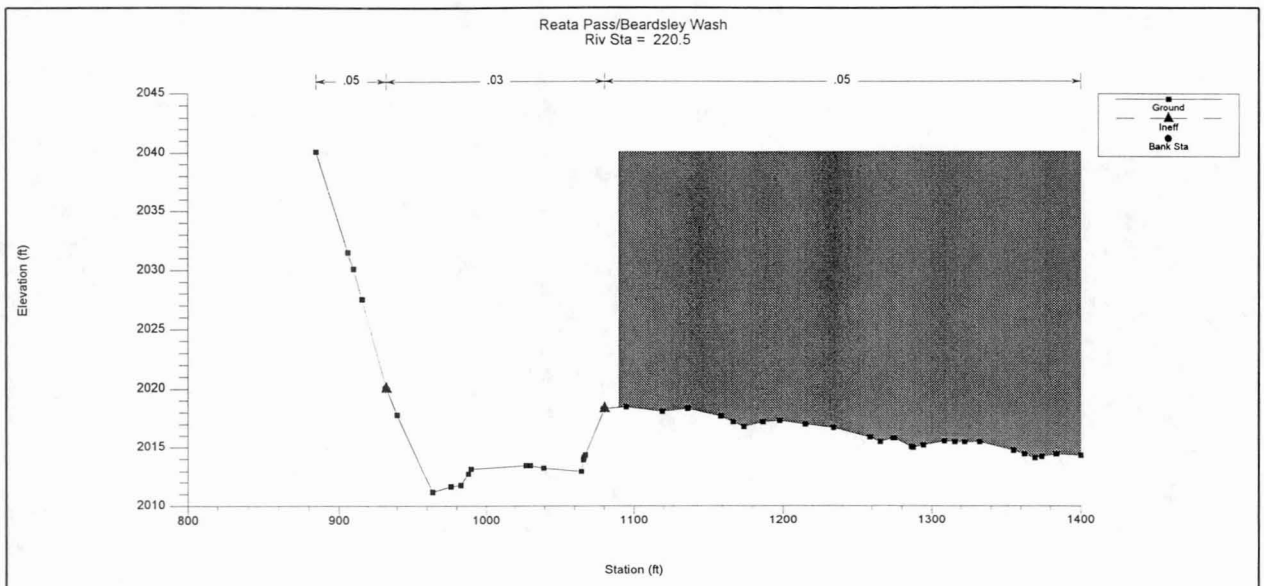


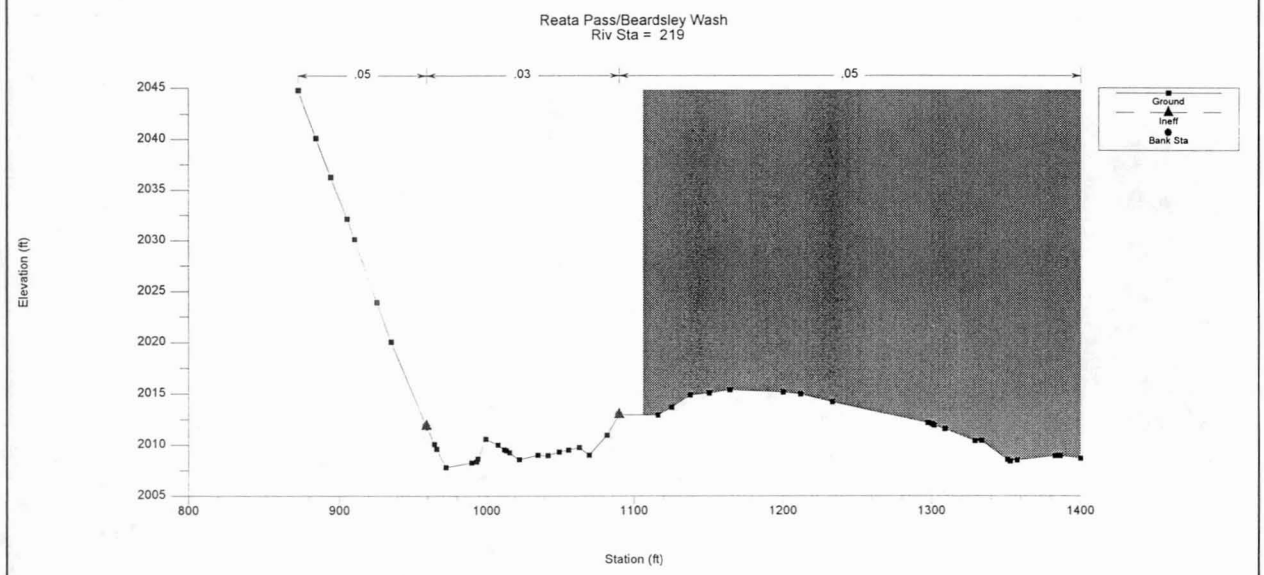
Reata Pass/Beardsley Wash
Riv Sta = 223.5

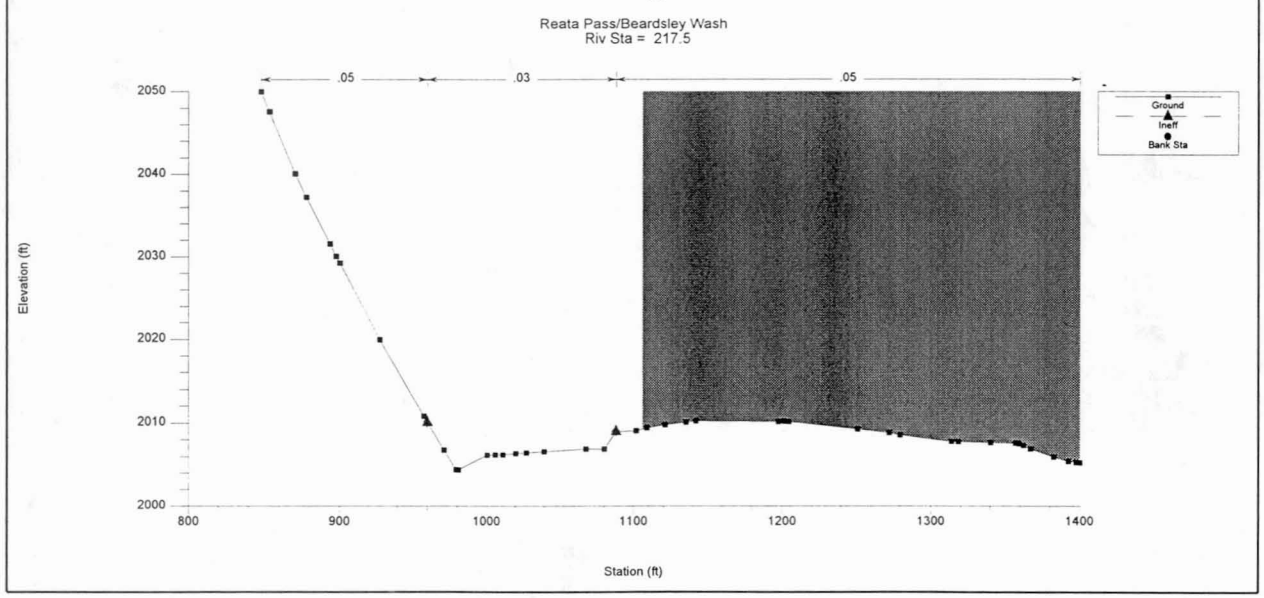


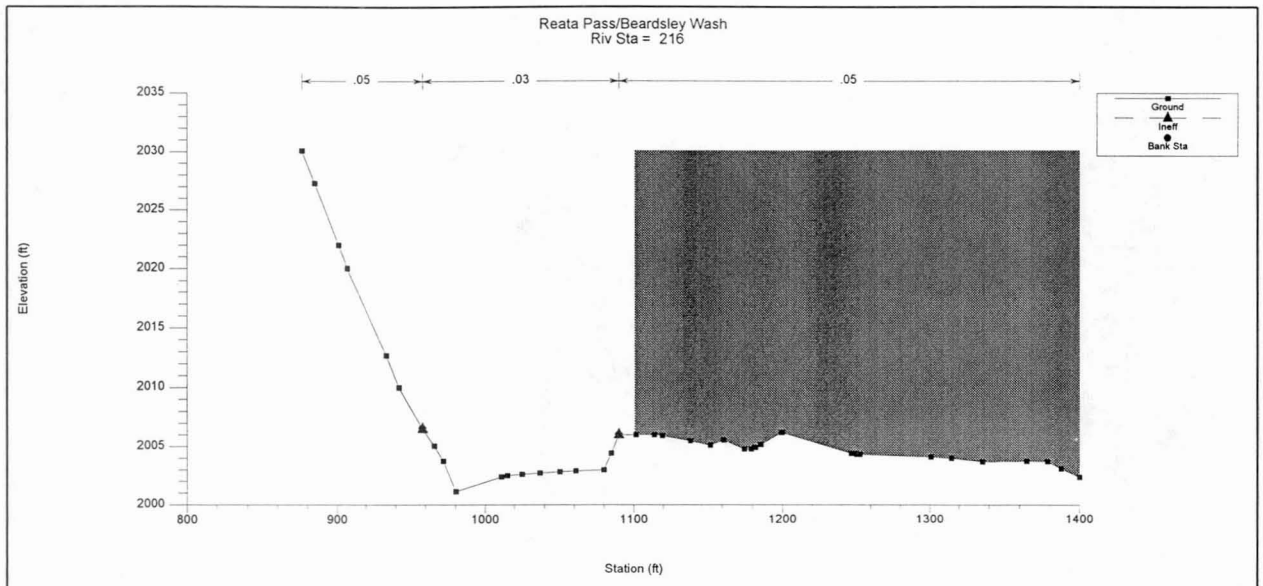
Reata Pass/Beardsley Wash
Riv Sta = 222

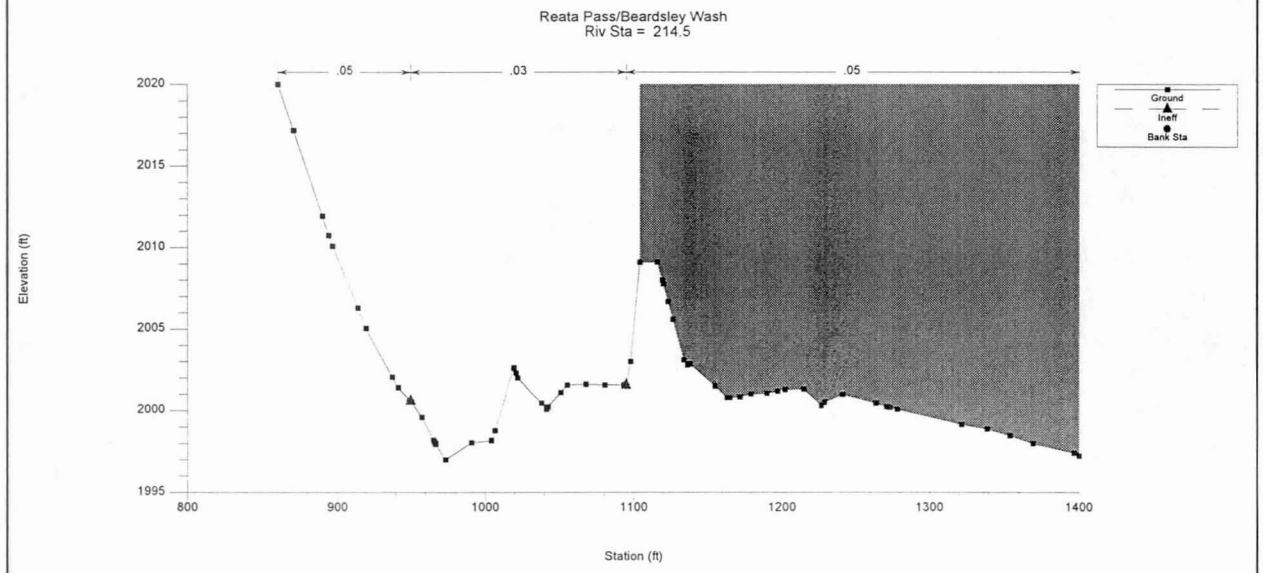


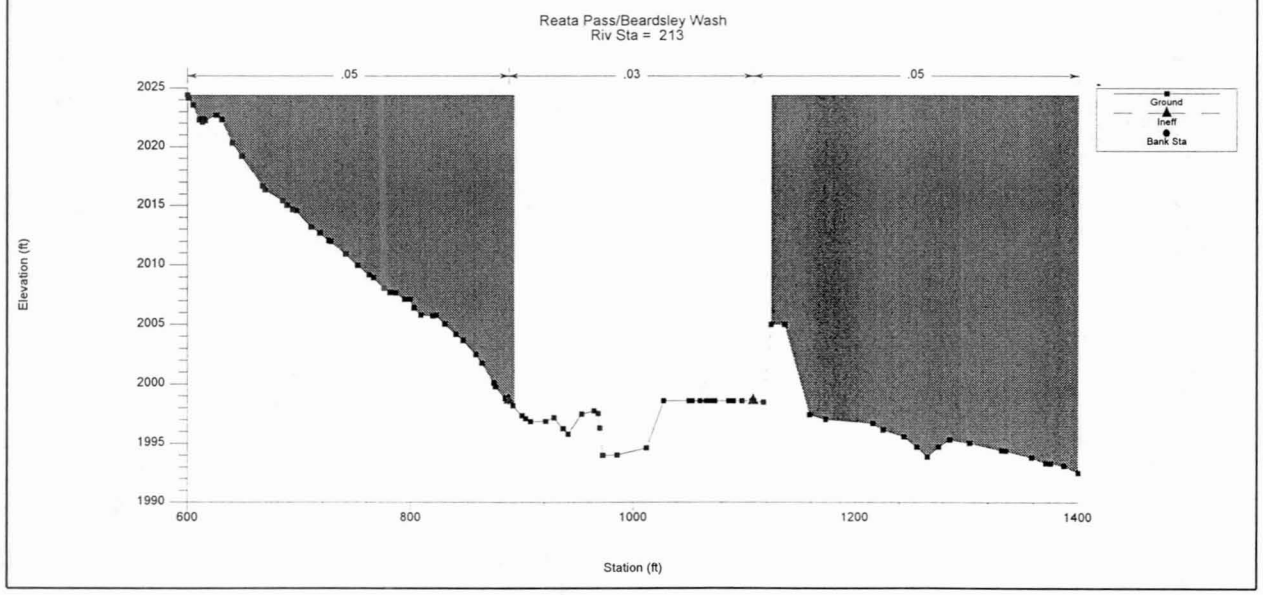

Reata Pass/Beardsley Wash
Riv Sta = 220.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 219
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

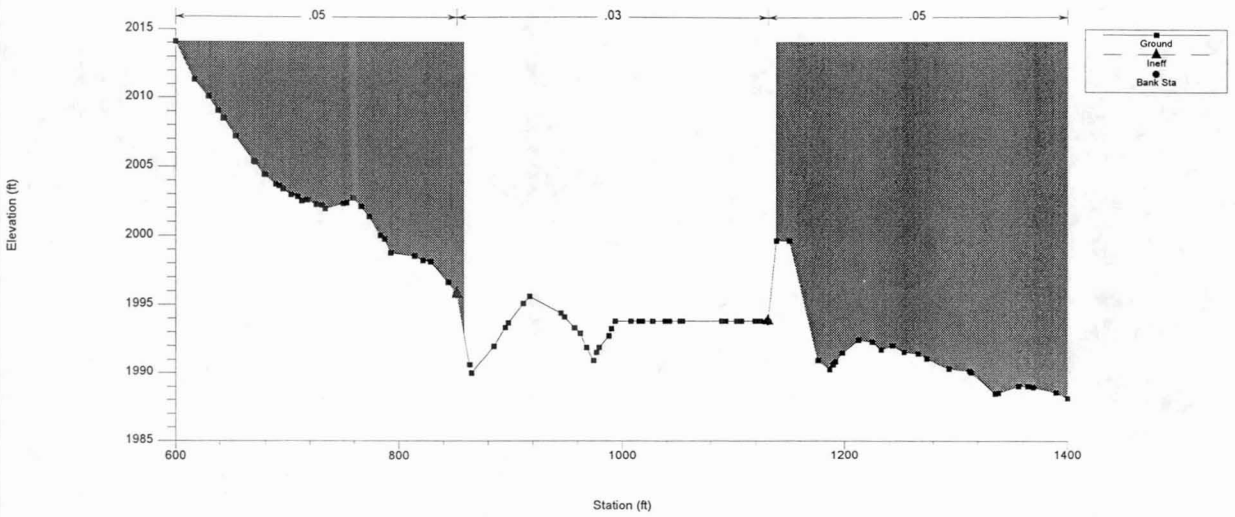

Reata Pass/Beardsley Wash
Riv Sta = 217.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 216
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

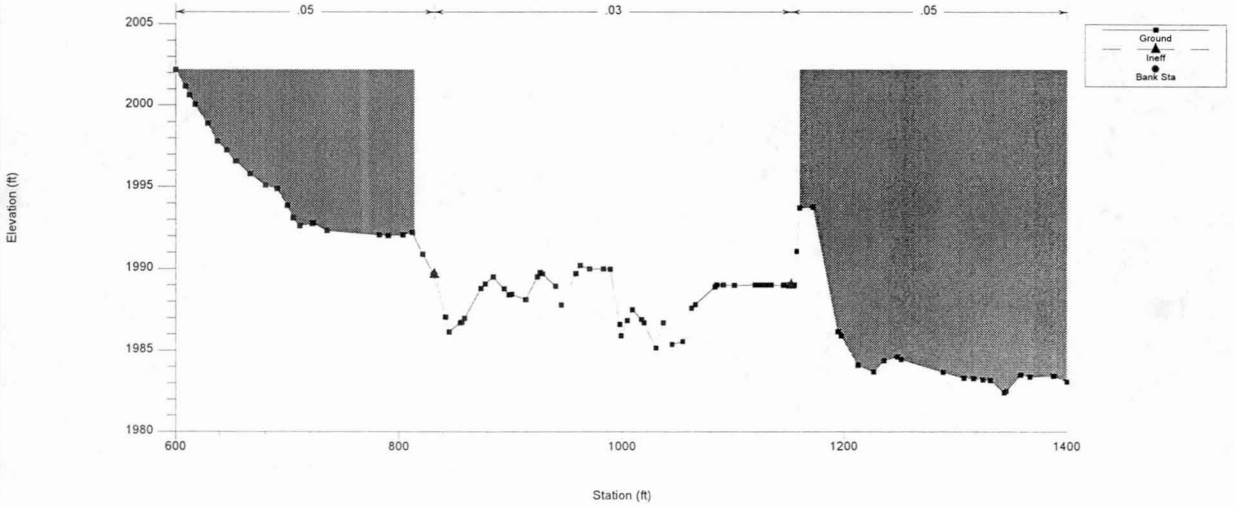

Reata Pass/Beardsley Wash
Riv Sta = 214.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 213
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

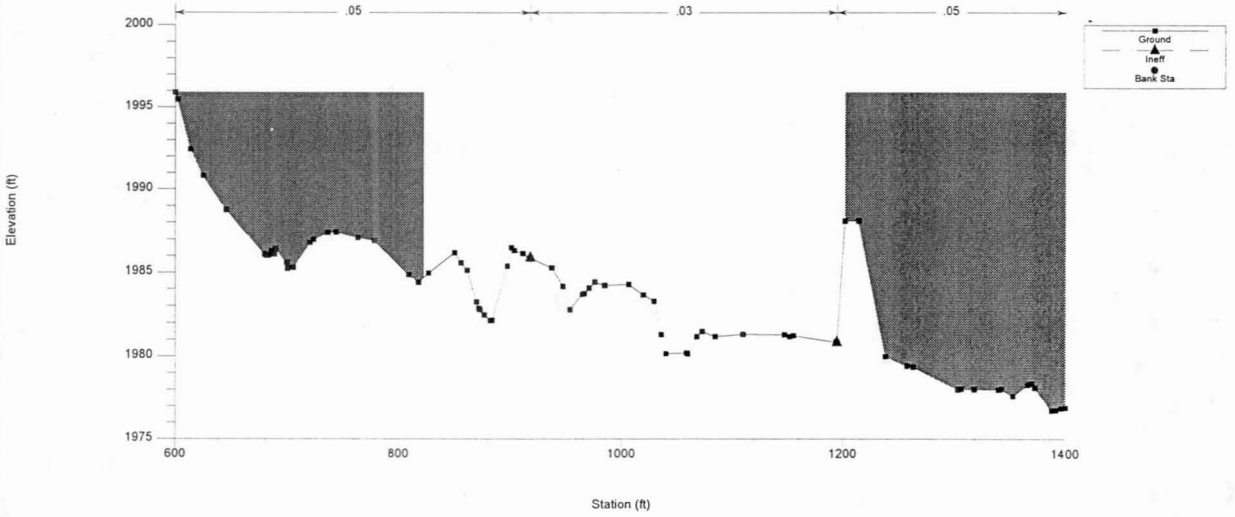
Reata Pass/Beardsley Wash
Riv Sta = 211.5

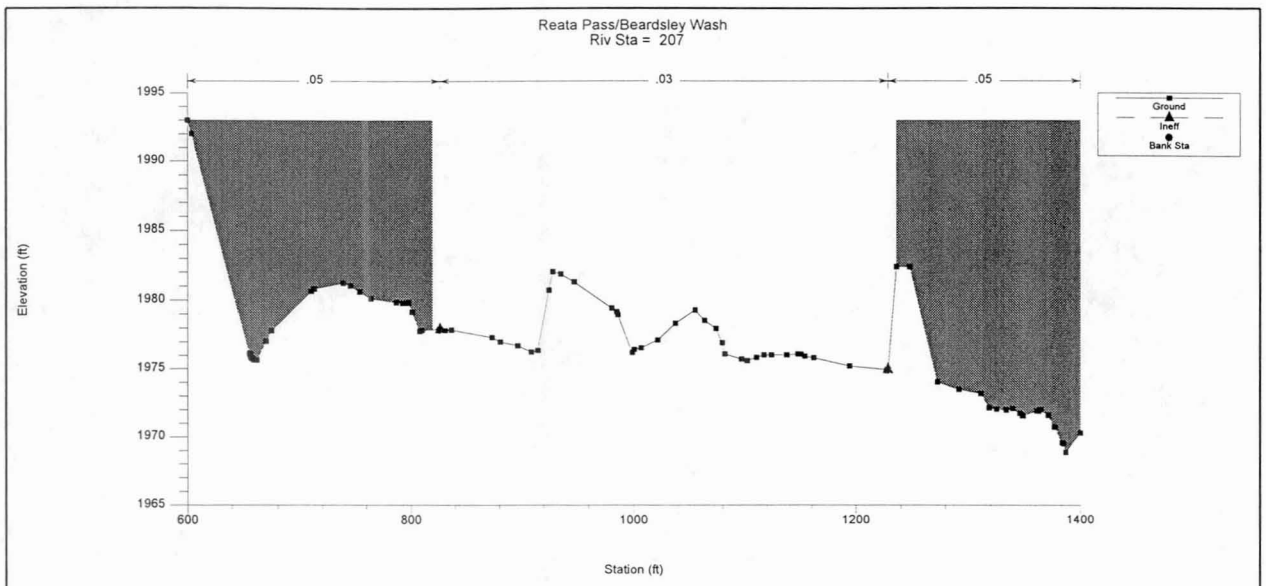


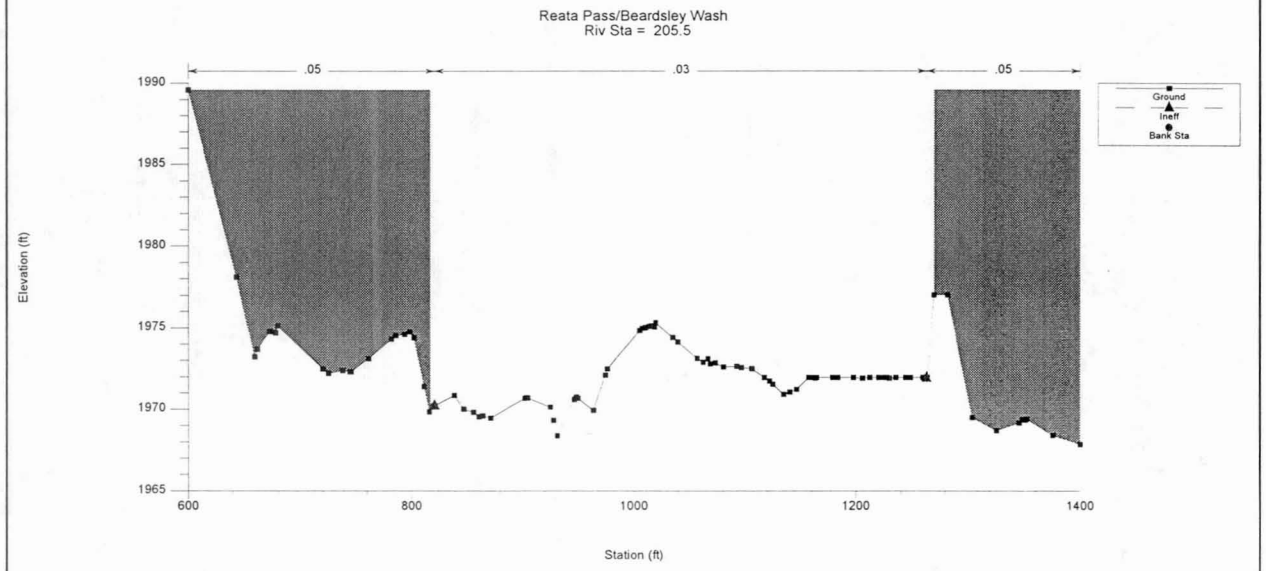
Reata Pass/Beardsley Wash
Riv Sta = 210

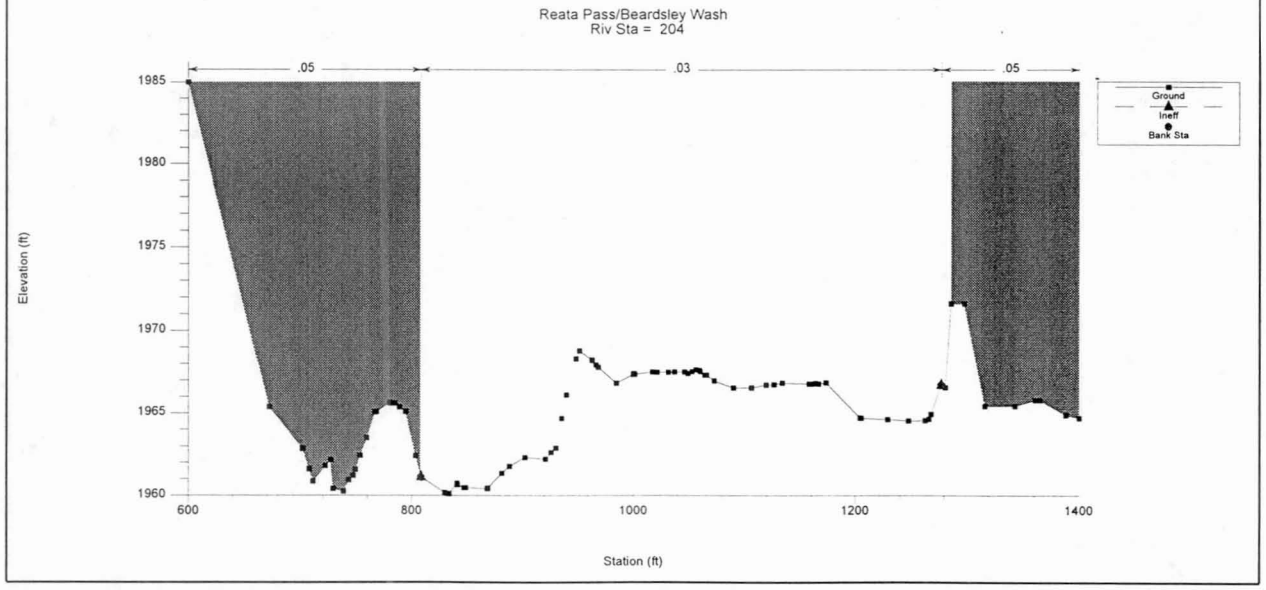


Reata Pass/Beardsley Wash
Riv Sta = 208.5

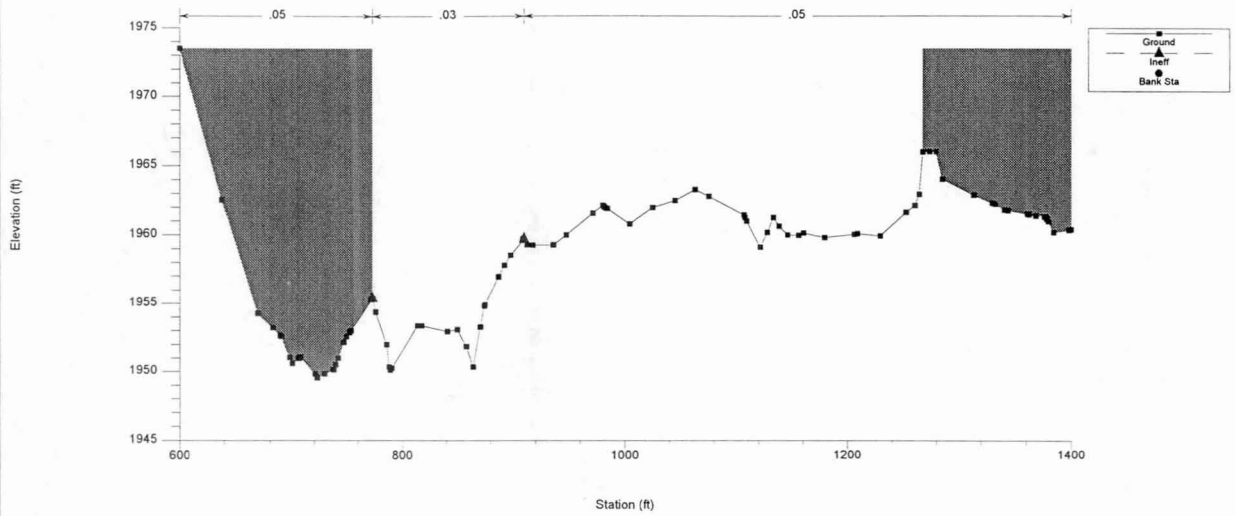



Reata Pass/Beardsley Wash
Riv Sta = 207
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1995
1990
1985
1980
1975
1970
1965
600
800
1000
1200
1400
Station (ft)

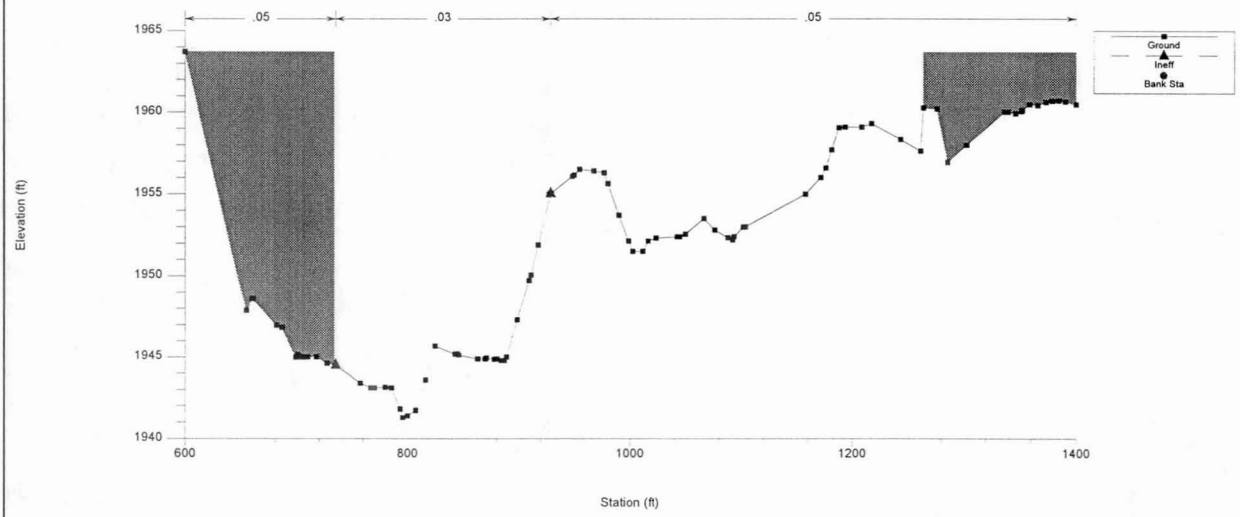

Reata Pass/Beardsley Wash
Riv Sta = 205.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1990
1985
1980
1975
1970
1965
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 204
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1985
1980
1975
1970
1965
1960
600
800
1000
1200
1400
Station (ft)

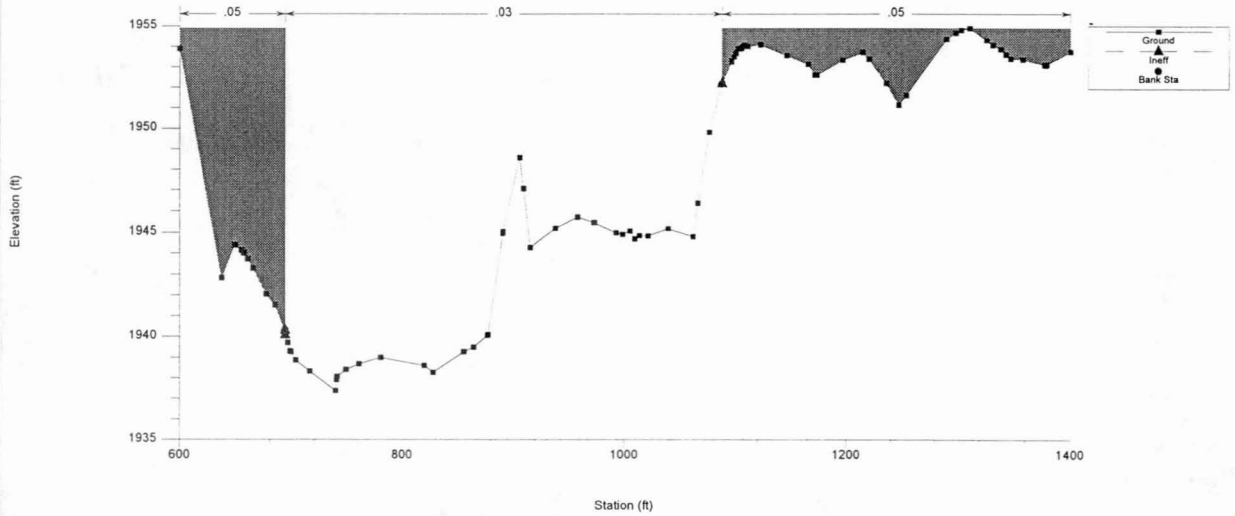
Reata Pass/Beardsley Wash
Riv Sta = 202.5

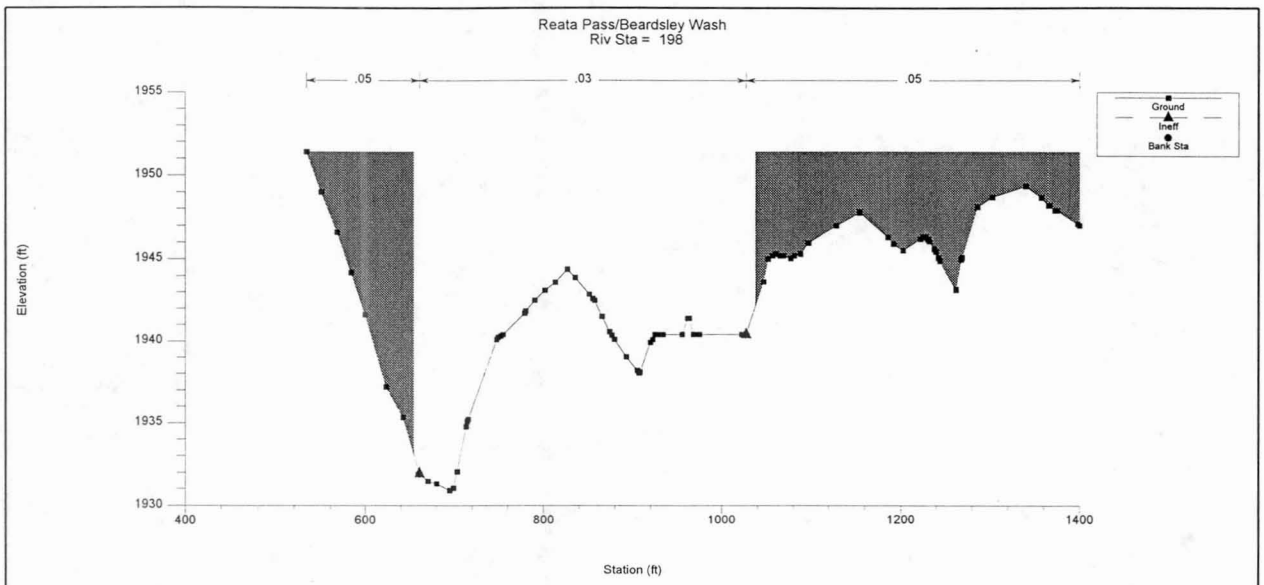


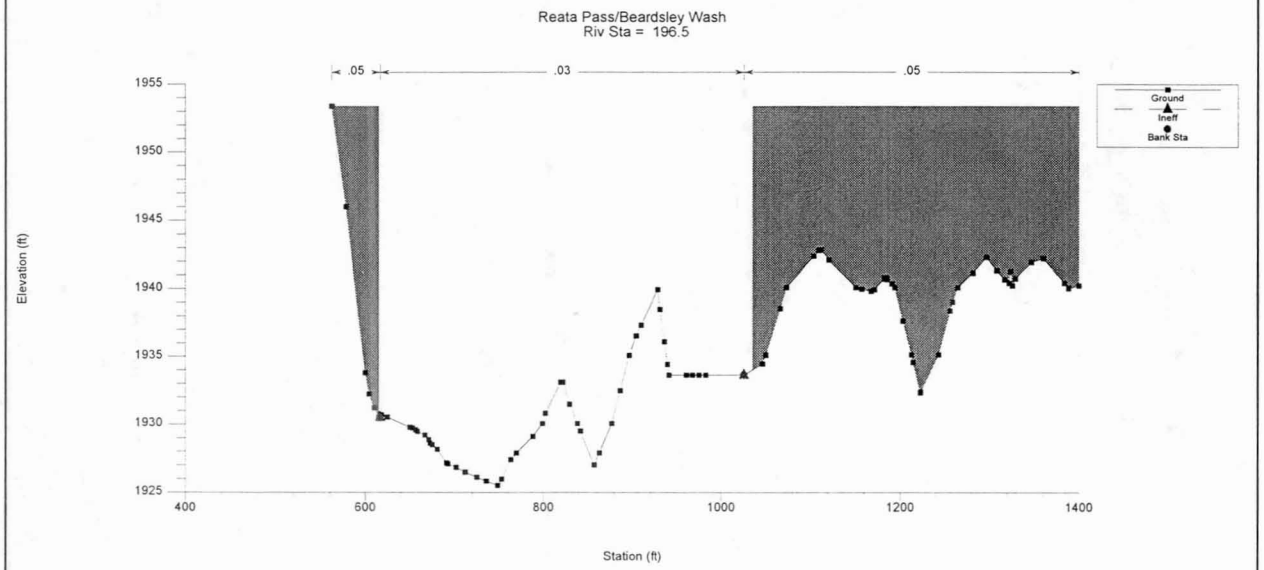
Reata Pass/Beardsley Wash
Riv Sta = 201

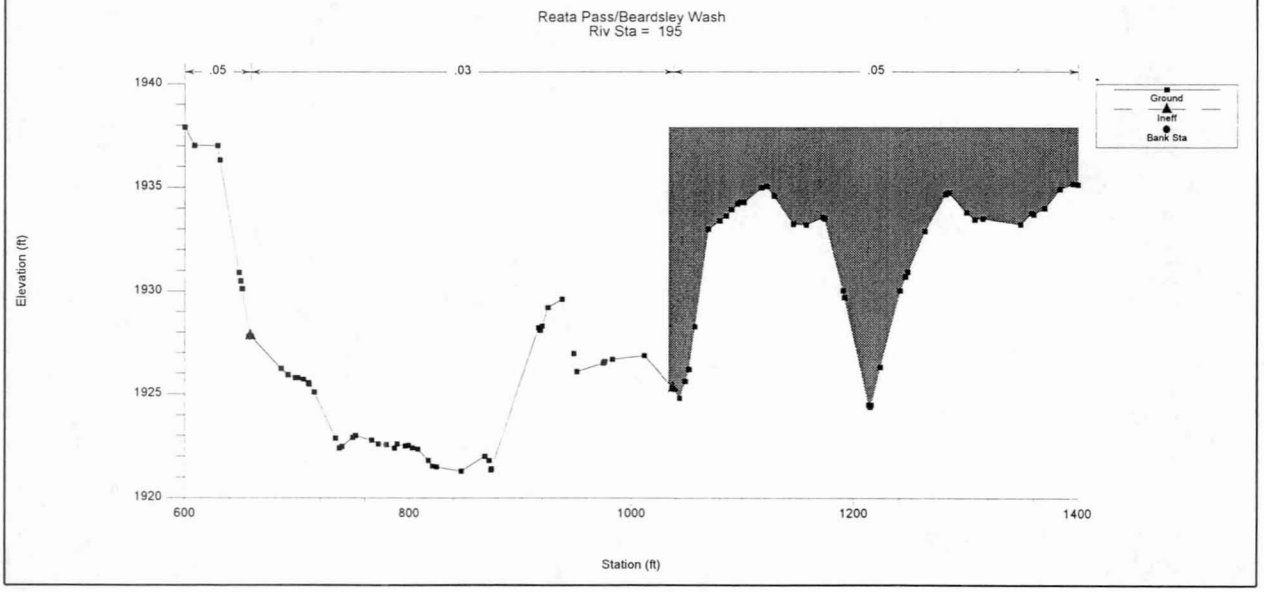


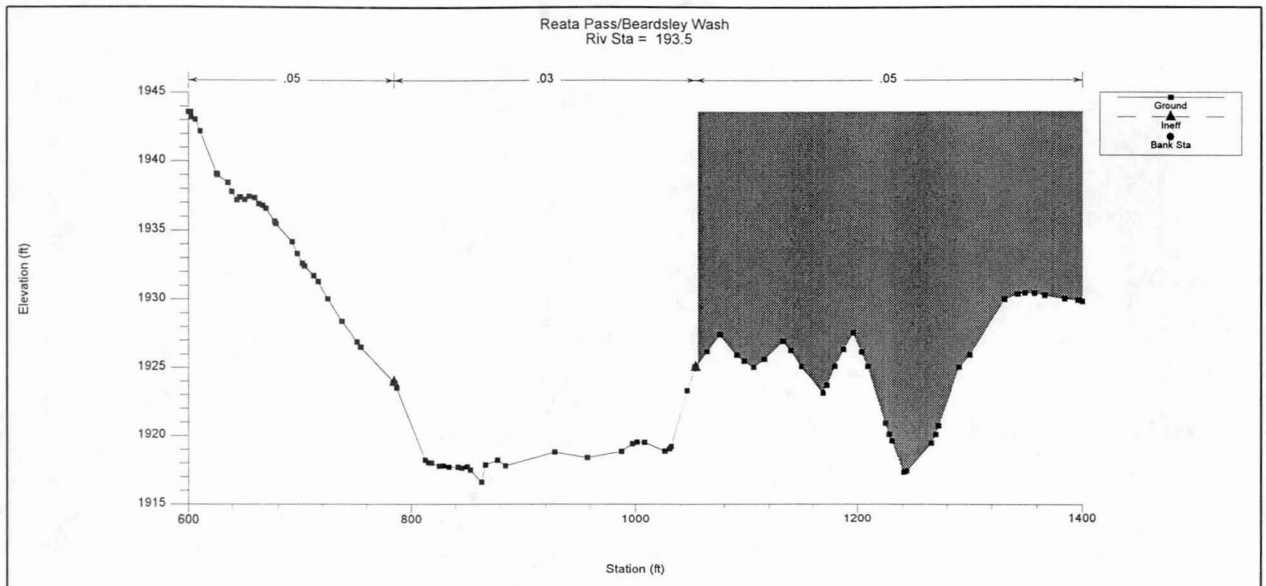
Reata Pass/Beardsley Wash
Riv Sta = 199.5

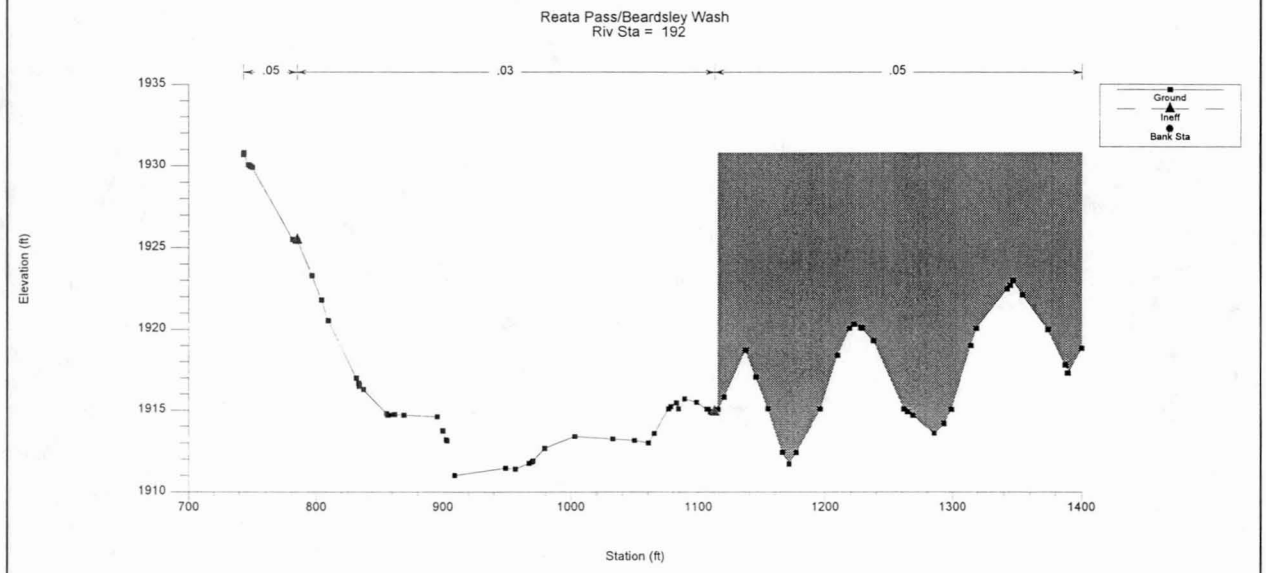


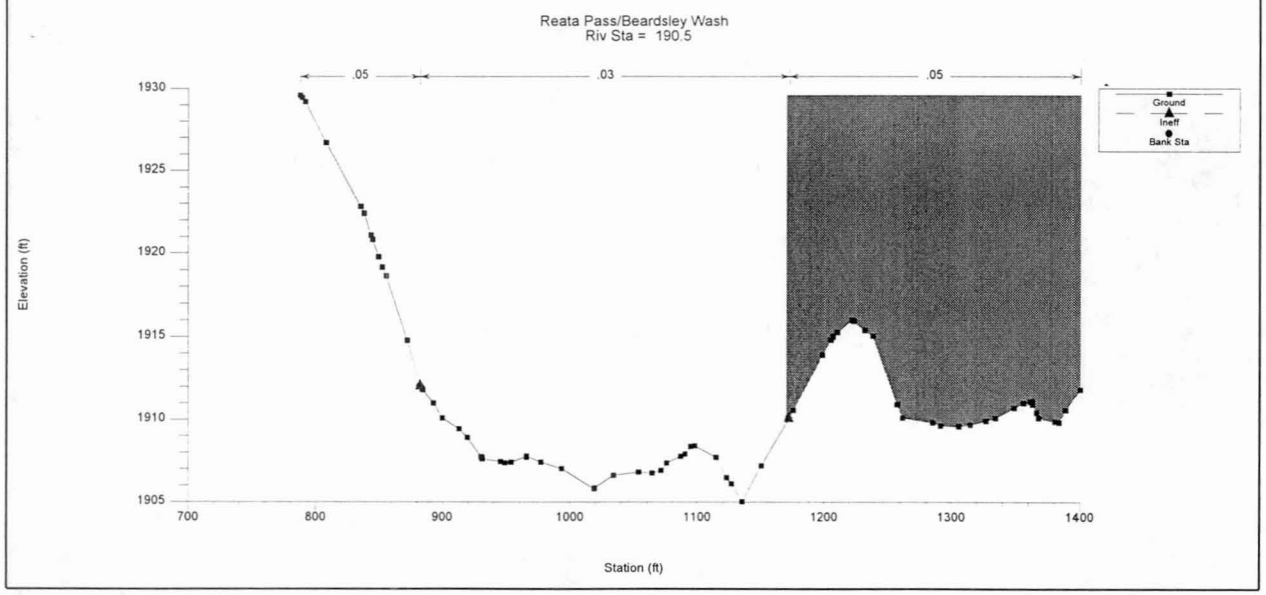

Reata Pass/Beardsley Wash
Riv Sta = 198
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1955
1950
1945
1940
1935
1930
400
600
800
1000
1200
1400
Station (ft)

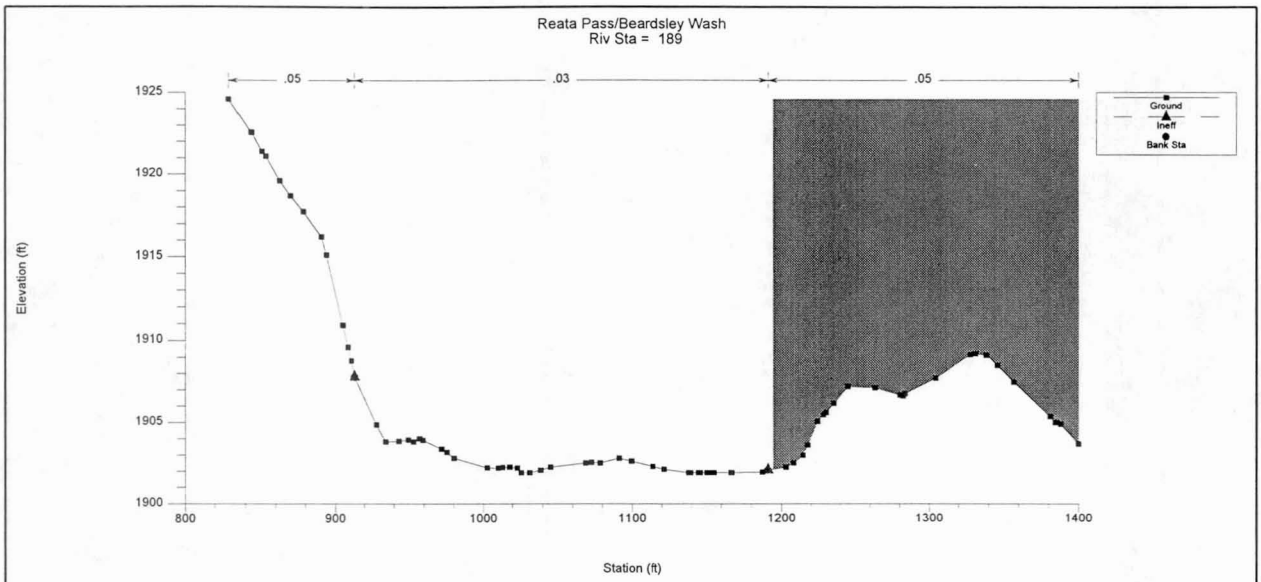

Reata Pass/Beardsley Wash
Riv Sta = 196.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1955
1950
1945
1940
1935
1930
1925
400
600
800
1000
1200
1400
Station (ft)

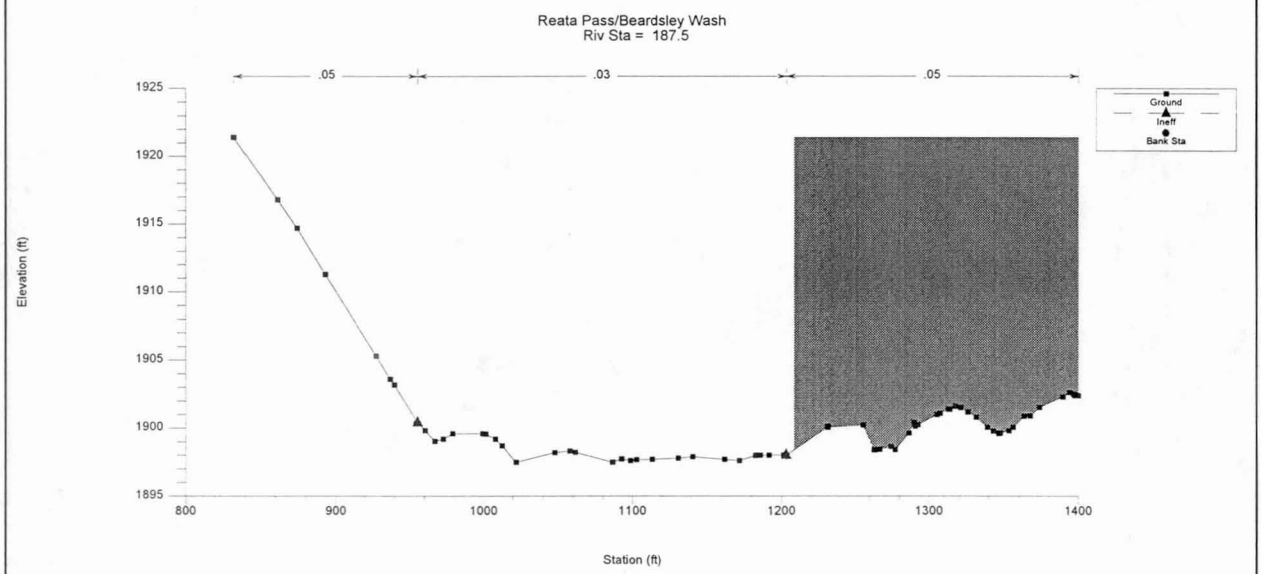

Reata Pass/Beardsley Wash
Riv Sta = 195
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1940
1935
1930
1925
1920
600
800
1000
1200
1400
Station (ft)

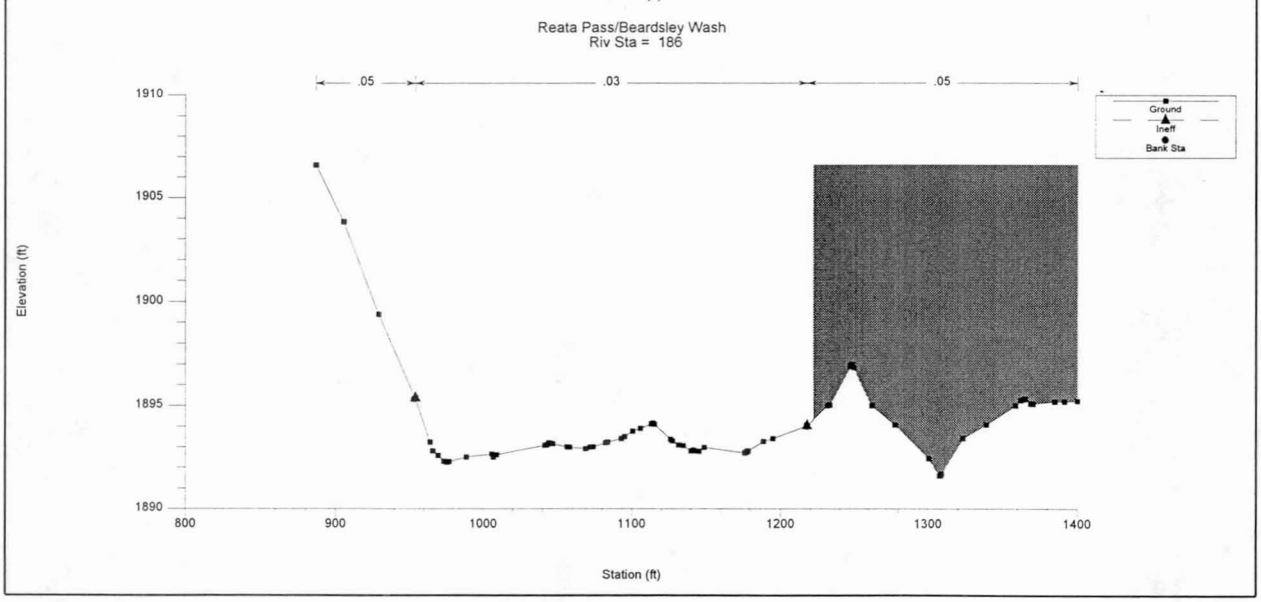

Reata Pass/Beardsley Wash
Riv Sta = 193.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1945
1940
1935
1930
1925
1920
1915
600
800
1000
1200
1400
Station (ft)

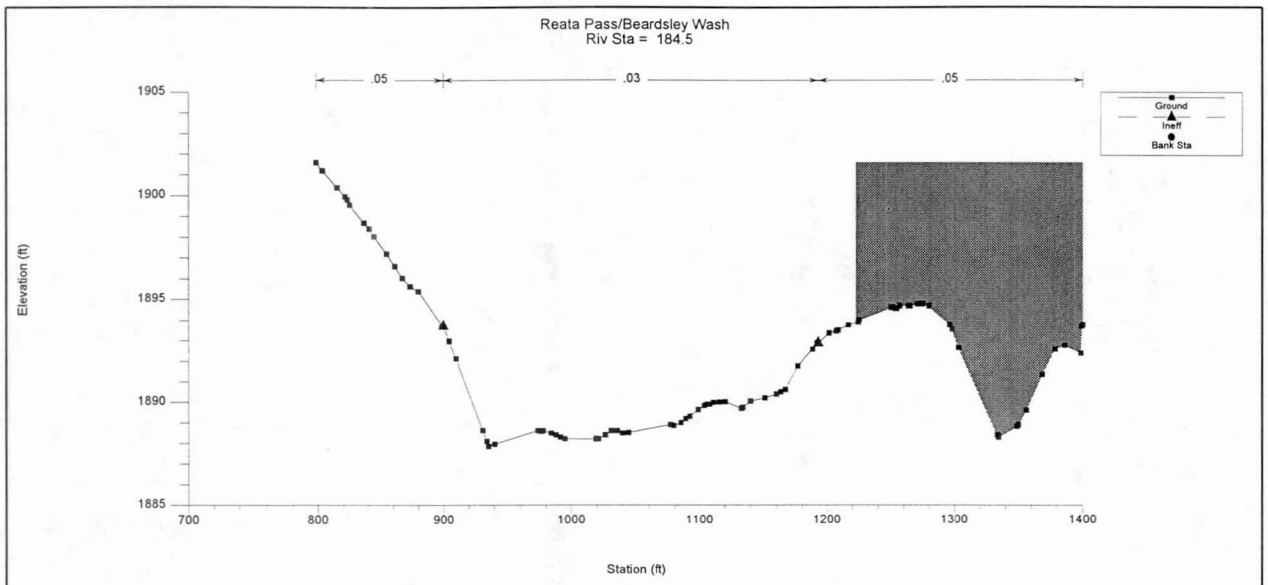

Reata Pass/Beardsley Wash
Riv Sta = 192
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1935
1930
1925
1920
1915
1910
700
800
900
1000
1100
1200
1300
1400
Station (ft)

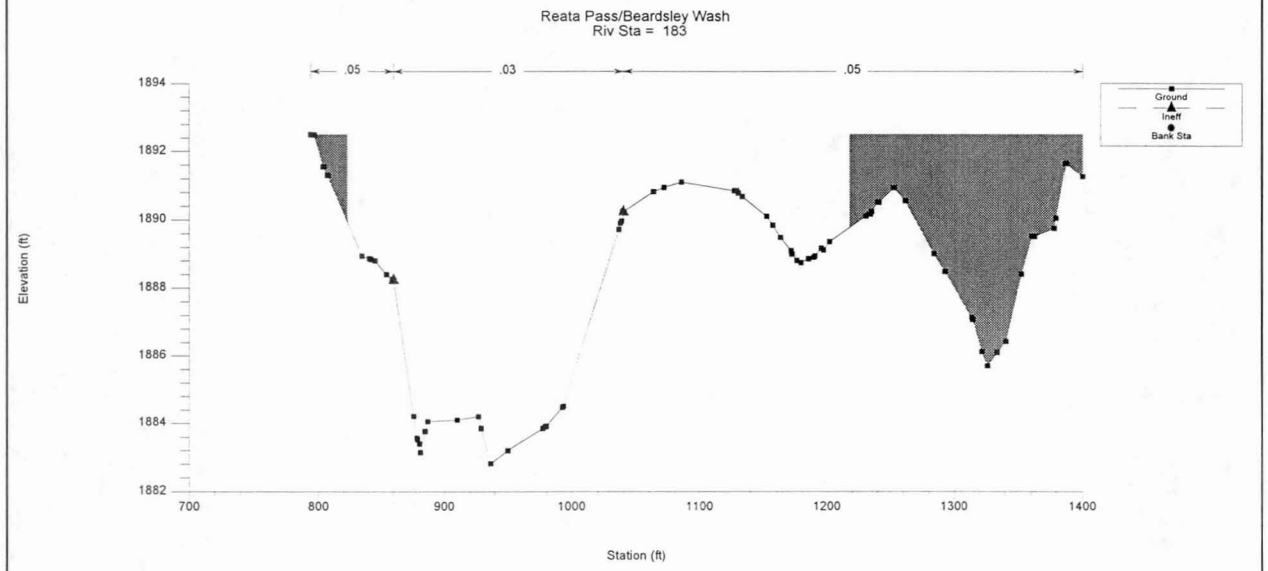

Reata Pass/Beardsley Wash
Riv Sta = 190.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1930
1925
1920
1915
1910
1905
700
800
900
1000
1100
1200
1300
1400
Station (ft)

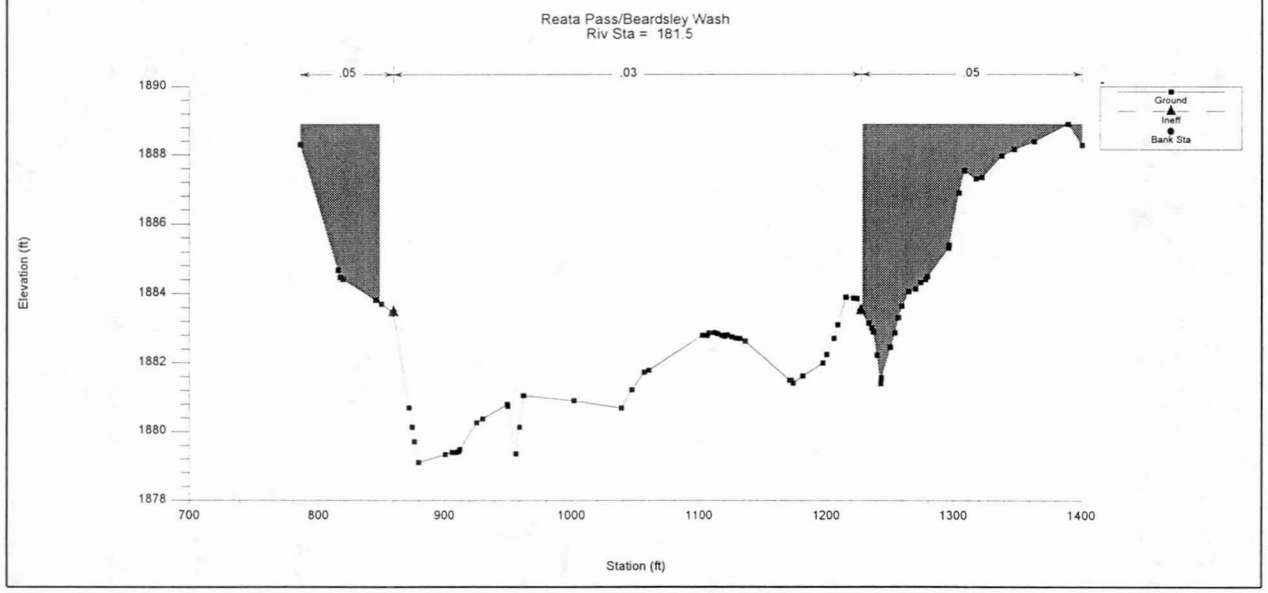

Reata Pass/Beardsley Wash
Riv Sta = 189
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1925
1920
1915
1910
1905
1900
800
900
1000
1100
1200
1300
1400
Station (ft)

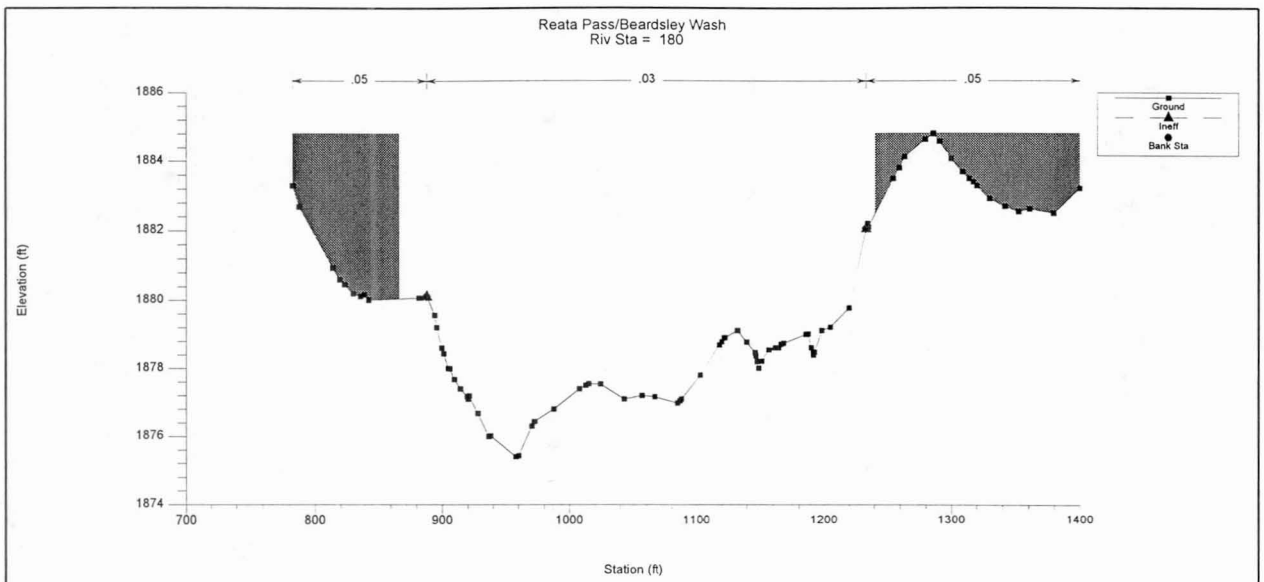

Reata Pass/Beardsley Wash
Riv Sta = 187.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1925
1920
1915
1910
1905
1900
1895
800
900
1000
1100
1200
1300
1400
Station (ft)

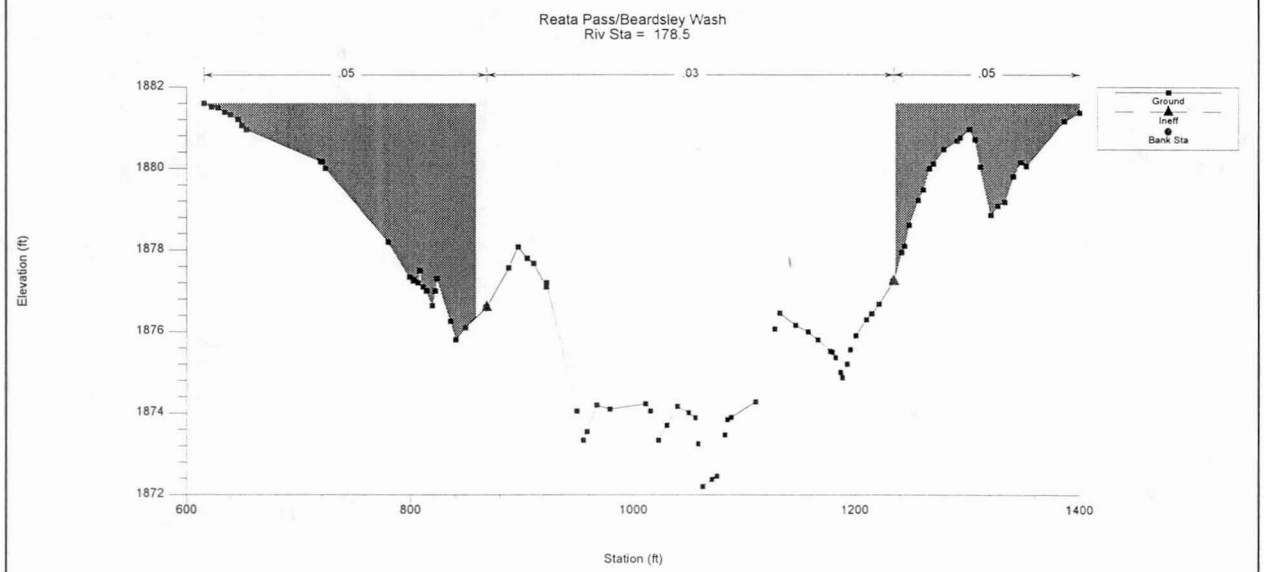

Reata Pass/Beardsley Wash
Riv Sta = 186
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1910
1905
1900
1895
1890
800
900
1000
1100
1200
1300
1400
Station (ft)

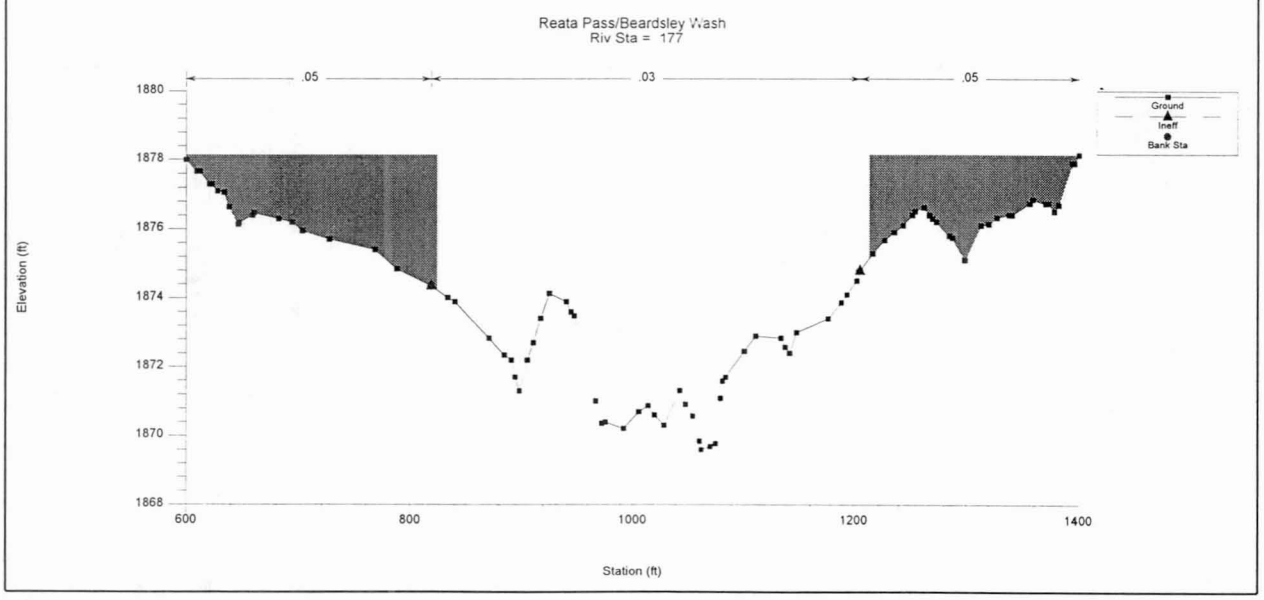

Reata Pass/Beardsley Wash
Riv Sta = 184.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1905
1900
1895
1890
1885
700
800
900
1000
1100
1200
1300
1400
Station (ft)

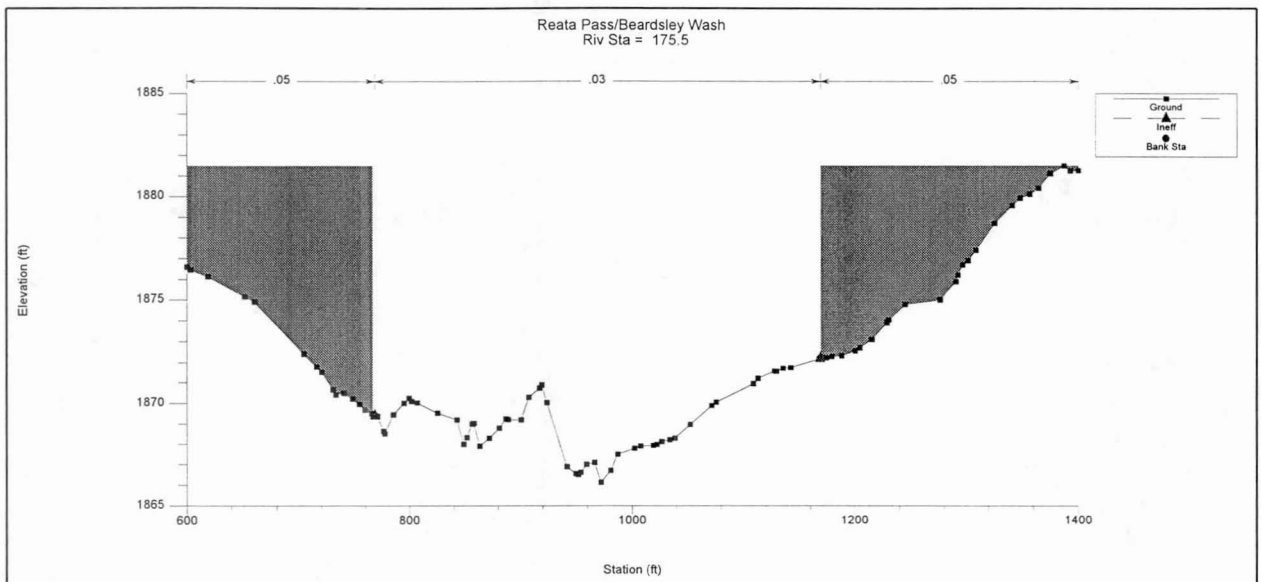

Reata Pass/Beardsley Wash
Riv Sta = 183
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1894
1892
1890
1888
1886
1884
1882
700
800
900
1000
1100
1200
1300
1400
Station (ft)

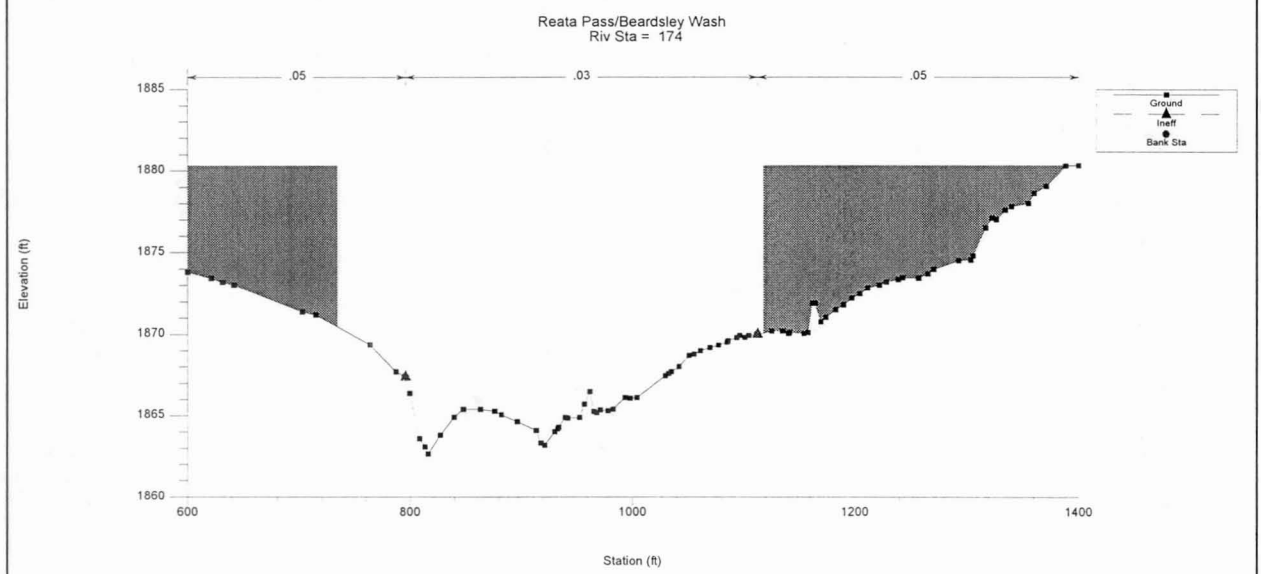

Reata Pass/Beardsley Wash
Riv Sta = 181.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1890
1888
1886
1884
1882
1880
1878
700
800
900
1000
1100
1200
1300
1400
Station (ft)

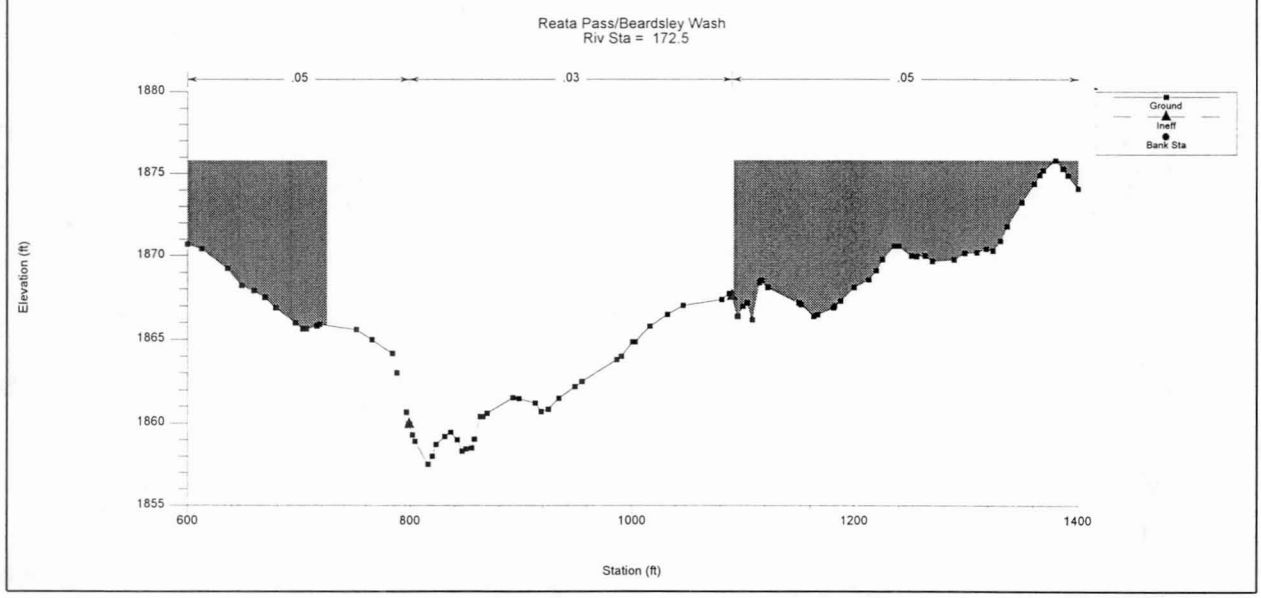

Reata Pass/Beardsley Wash
Riv Sta = 180
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1886
1884
1882
1880
1878
1876
1874
700
800
900
1000
1100
1200
1300
1400
Station (ft)

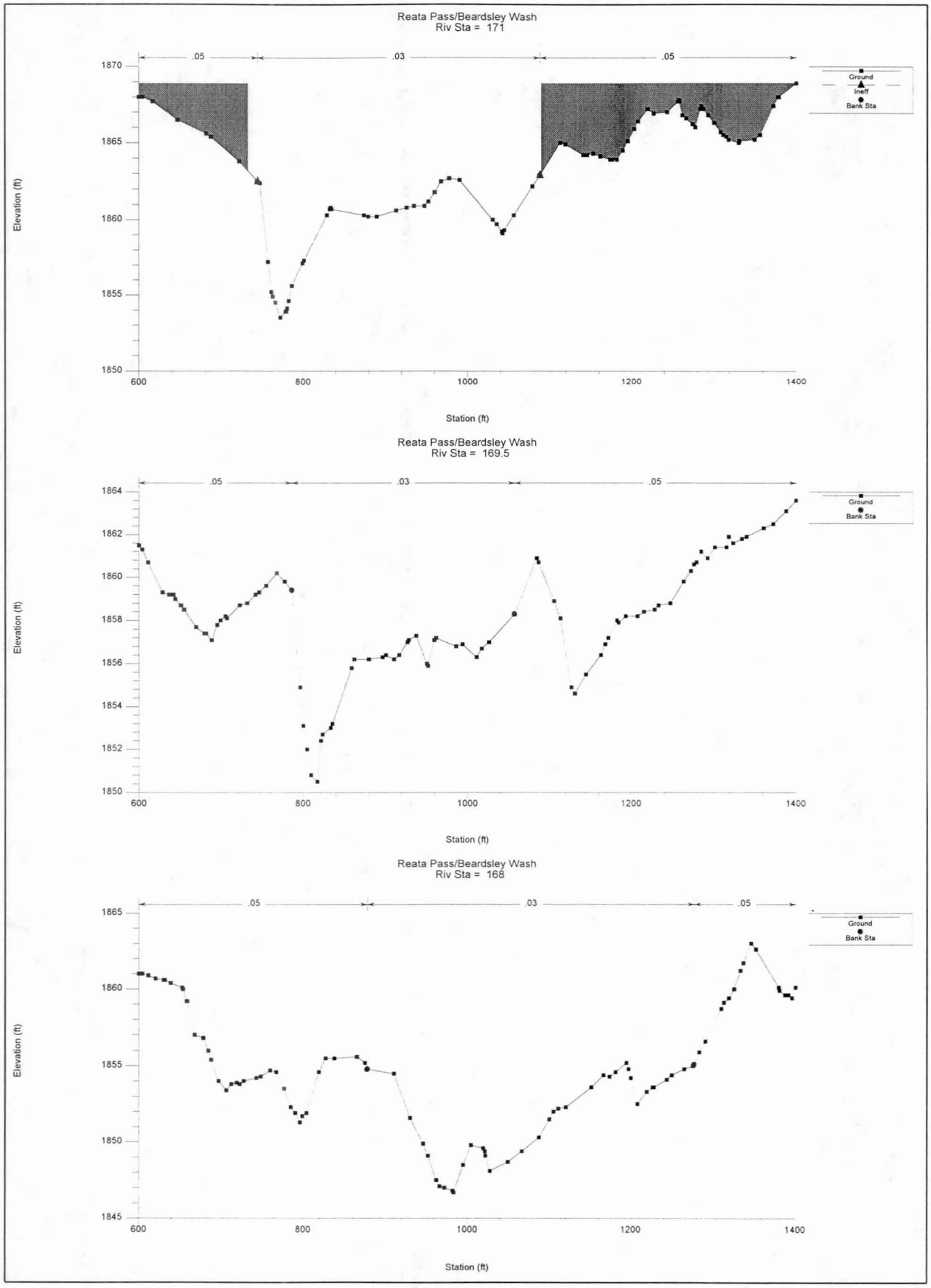

Reata Pass/Beardsley Wash
Riv Sta = 178.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1882
1880
1878
1876
1874
1872
600
800
1000
1200
1400
Station (ft)

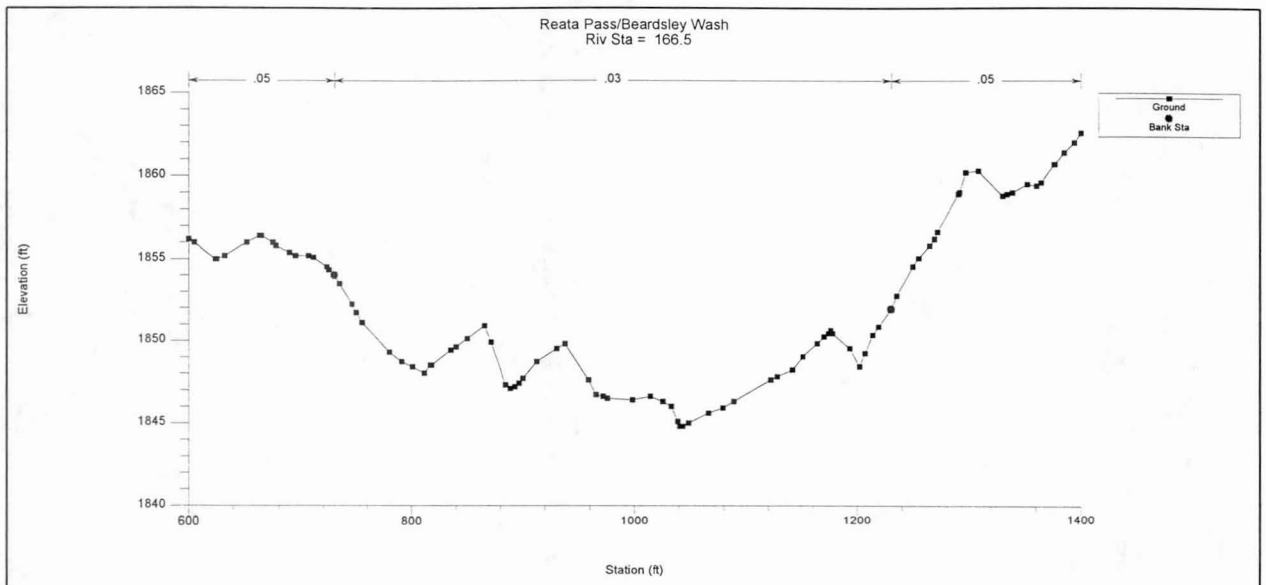

Reata Pass/Beardsley Wash
Riv Sta = 177
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1880
1878
1876
1874
1872
1870
1868
600
800
1000
1200
1400
Station (ft)

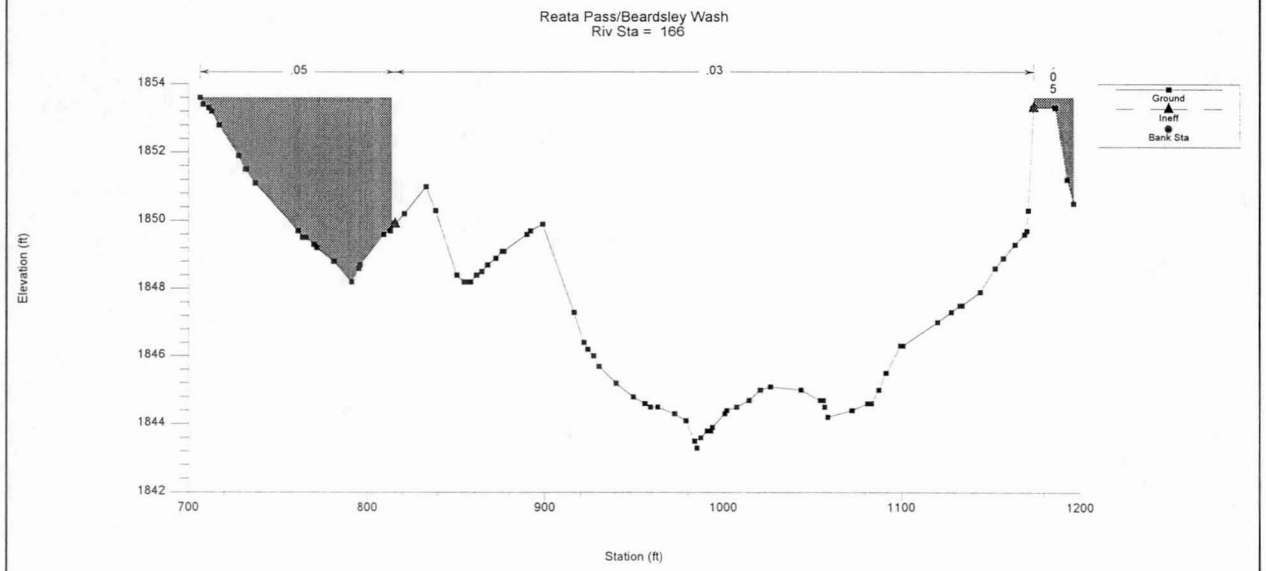

Reata Pass/Beardsley Wash
Riv Sta = 175.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1885
1880
1875
1870
1865
600
800
1000
1200
1400
Station (ft)

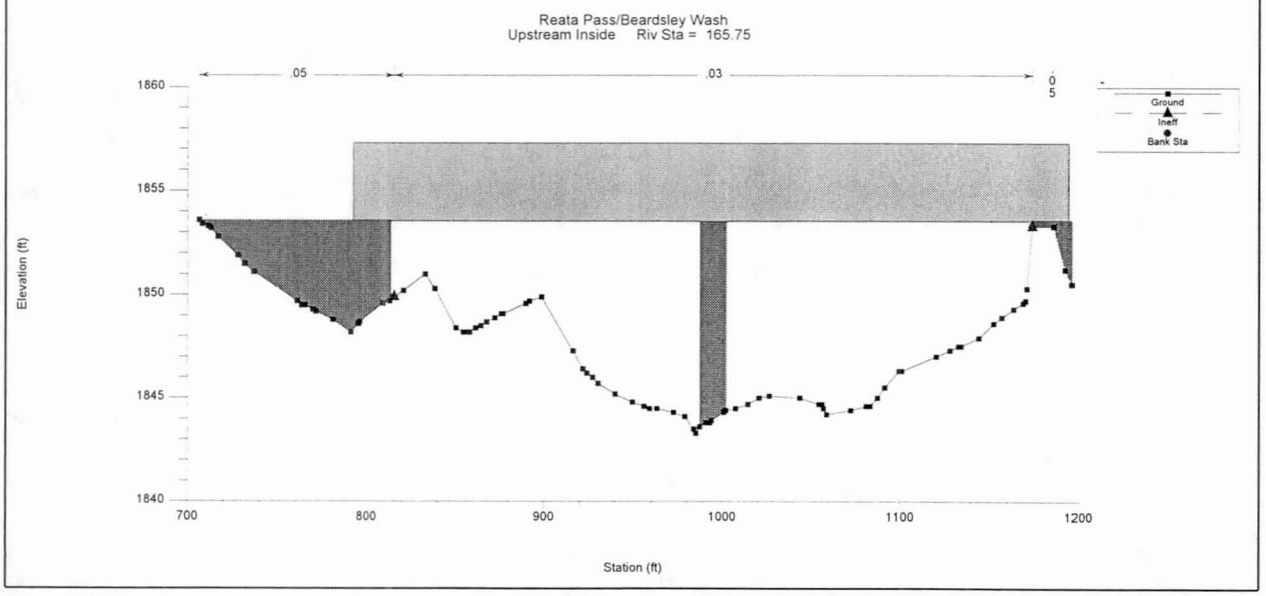

Reata Pass/Beardsley Wash
Riv Sta = 174
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1885
1880
1875
1870
1865
1860
600
800
1000
1200
1400
Station (ft)

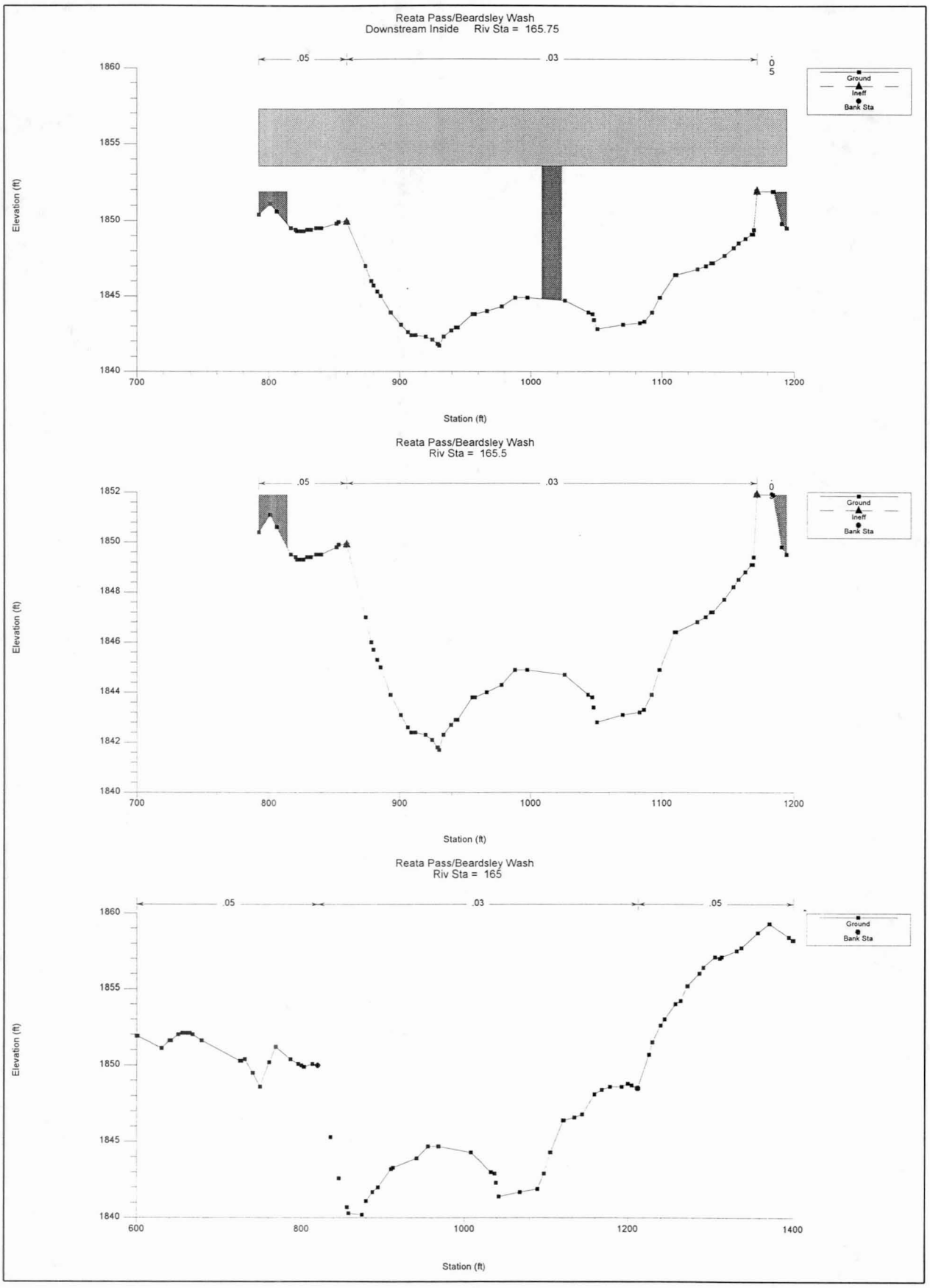

Reata Pass/Beardsley Wash
Riv Sta = 172.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1880
1875
1870
1865
1860
1855
600
800
1000
1200
1400
Station (ft)

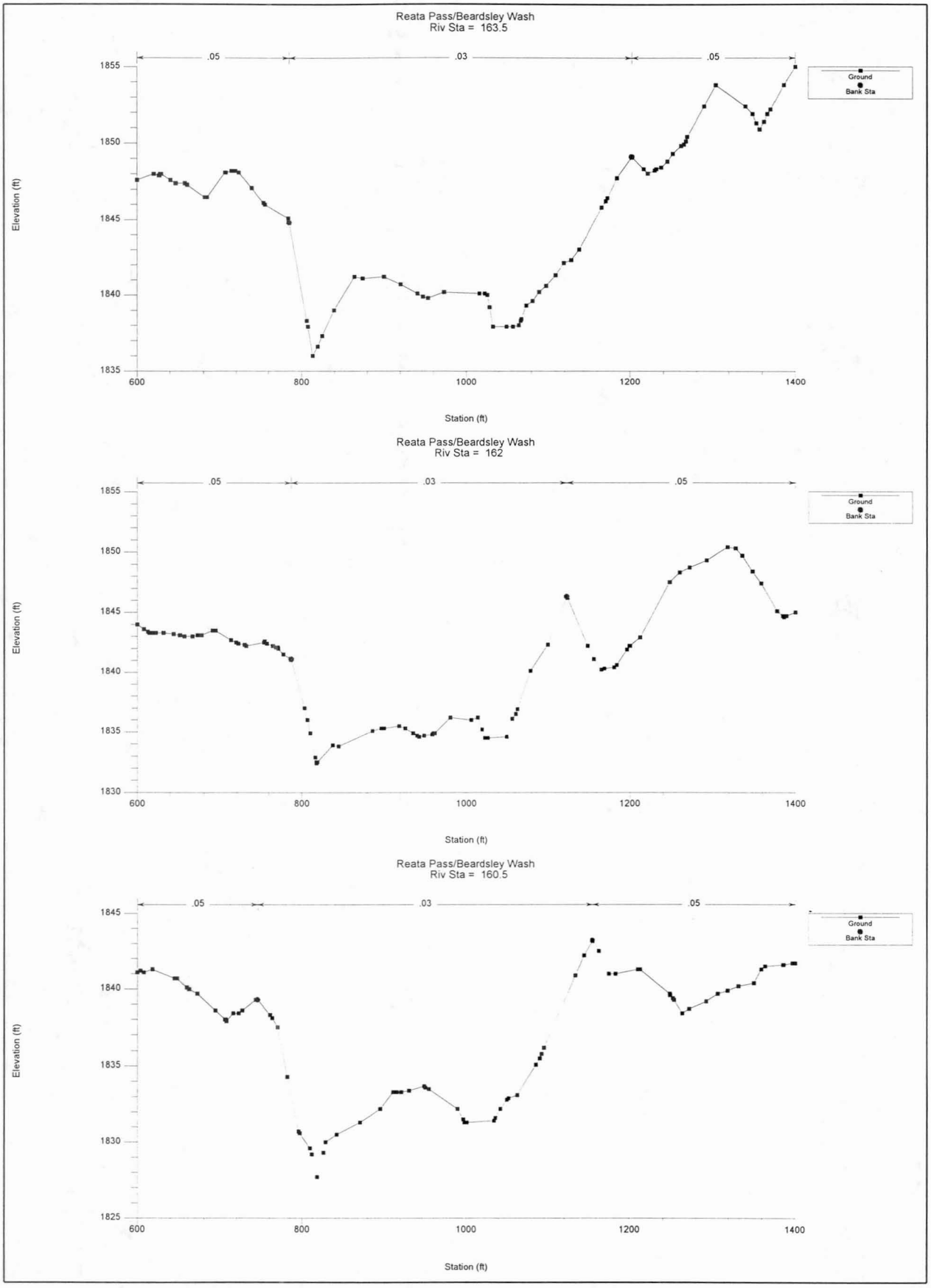

Reata Pass/Beardsley Wash
Riv Sta = 171
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 169.5
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 168
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
Station (ft)

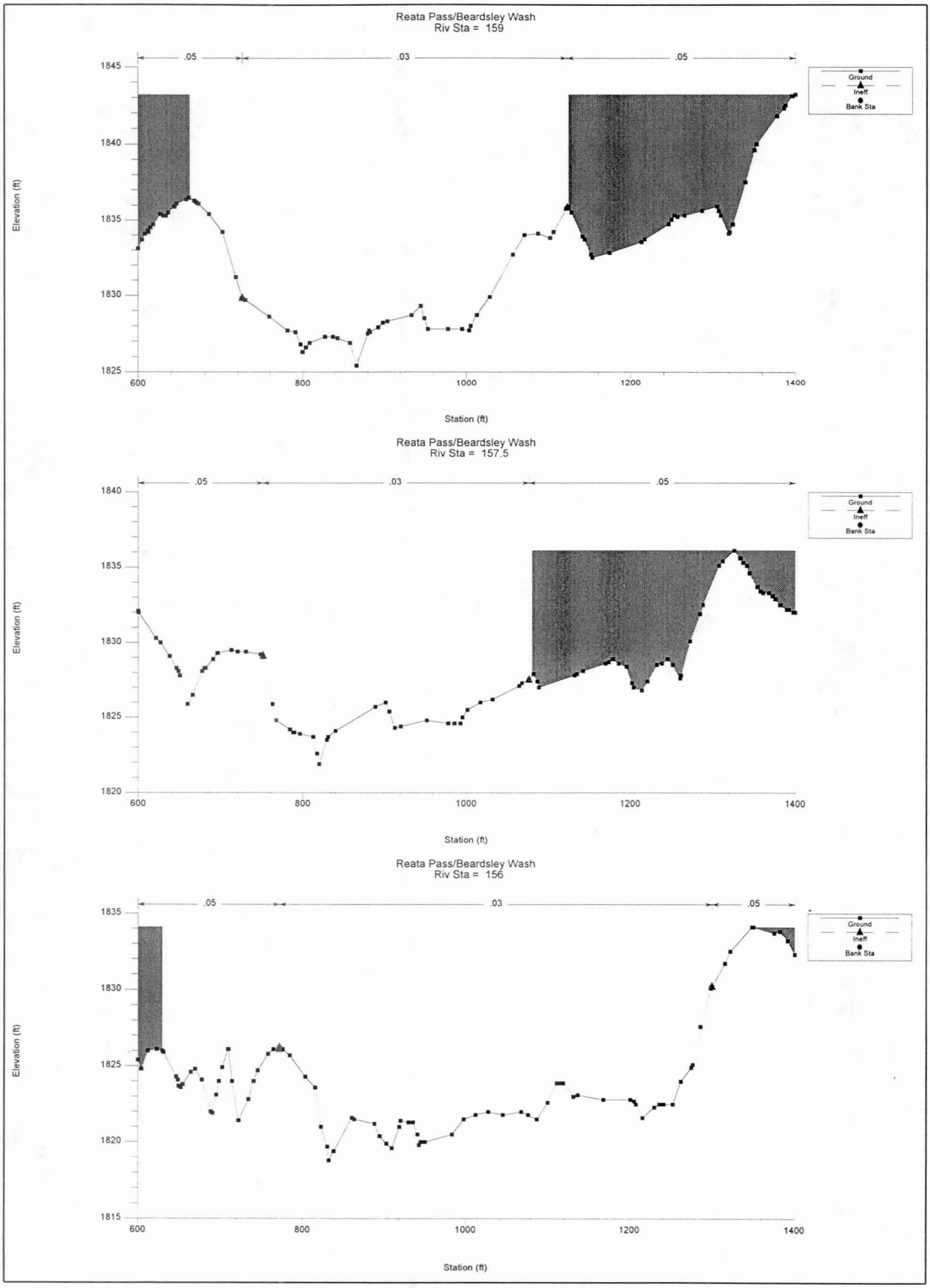

Reata Pass/Beardsley Wash
Riv Sta = 166.5
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
1865
1860
1855
1850
1845
1840
600
800
1000
1200
1400
Station (ft)

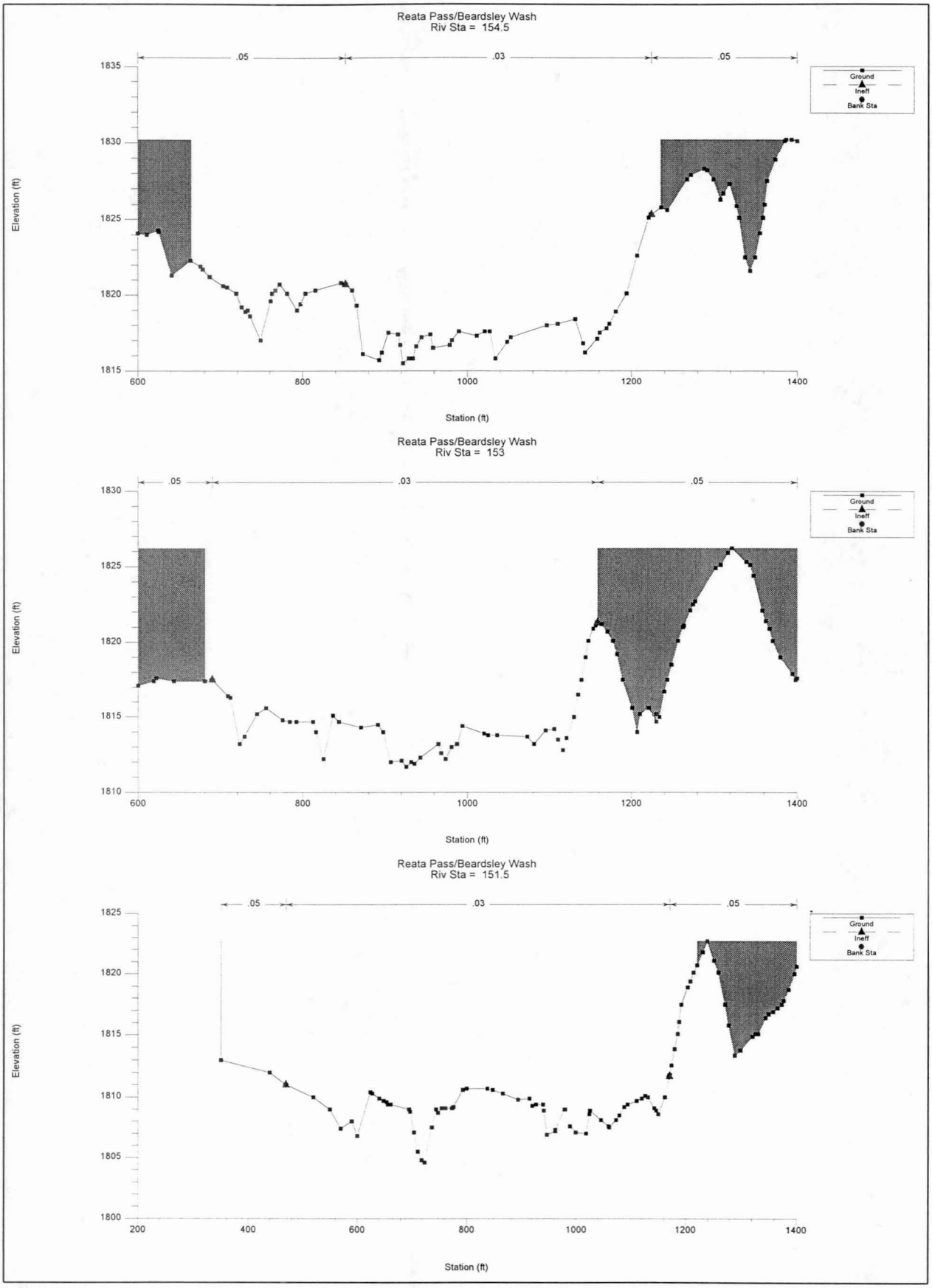

Reata Pass/Beardsley Wash
Riv Sta = 166
.05
.03
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
1854
1852
1850
1848
1846
1844
1842
700
800
900
1000
1100
1200
Station (ft)


Reata Pass/Beardsley Wash
Upstream Inside Riv Sta = 165.75
.05
.03
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
1860
1855
1850
1845
1840
700
800
900
1000
1100
1200
Station (ft)

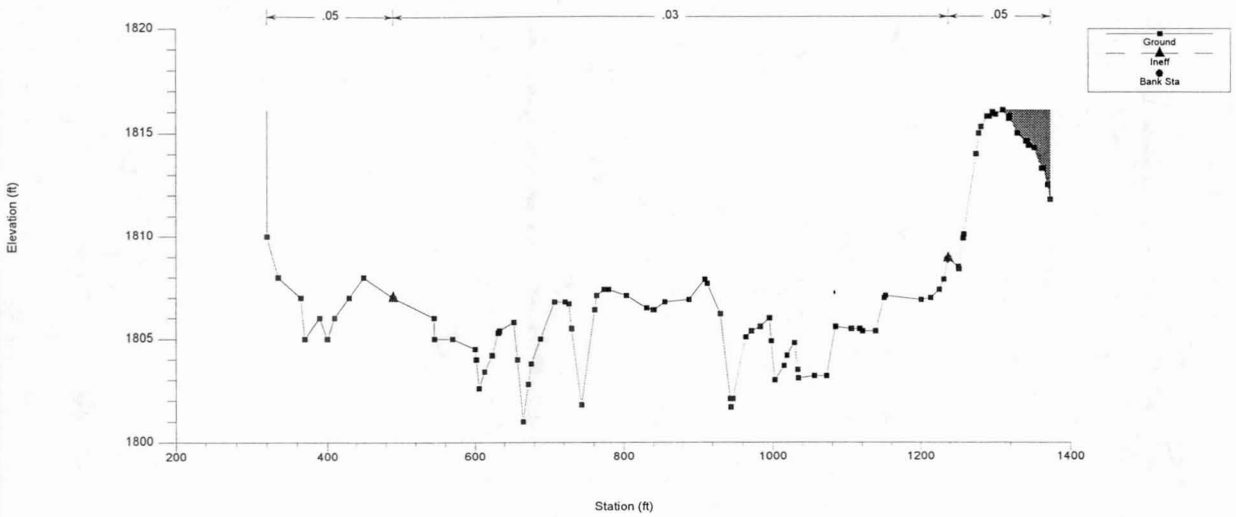

Reata Pass/Beardsley Wash
Downstream Inside Riv Sta = 165.75
.05
.03
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
1860
1855
1850
1845
1840
700
800
900
1000
1100
1200
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 165.5
.05
.03
0
Ground
Ineff
Bank Sta
Elevation (ft)
1852
1850
1848
1846
1844
1842
1840
700
800
900
1000
1100
1200
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 165
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
1860
1855
1850
1845
1840
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 163.5
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
1855
1850
1845
1840
1835
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 162
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
1855
1850
1845
1840
1835
1830
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 160.5
.05
.03
.05
Ground
Bank Sta
Elevation (ft)
1845
1840
1835
1830
1825
600
800
1000
1200
1400
Station (ft)

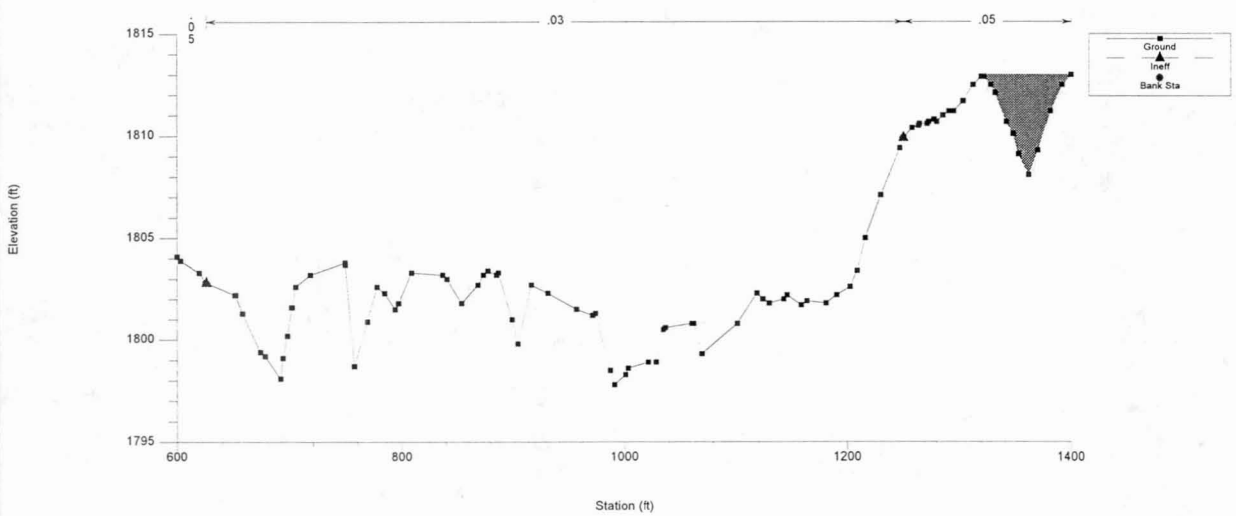

Reata Pass/Beardsley Wash
Riv Sta = 159
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1845
1840
1835
1830
1825
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 157.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1840
1835
1830
1825
1820
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 156
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1835
1830
1825
1820
1815
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 154.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 153
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 151.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

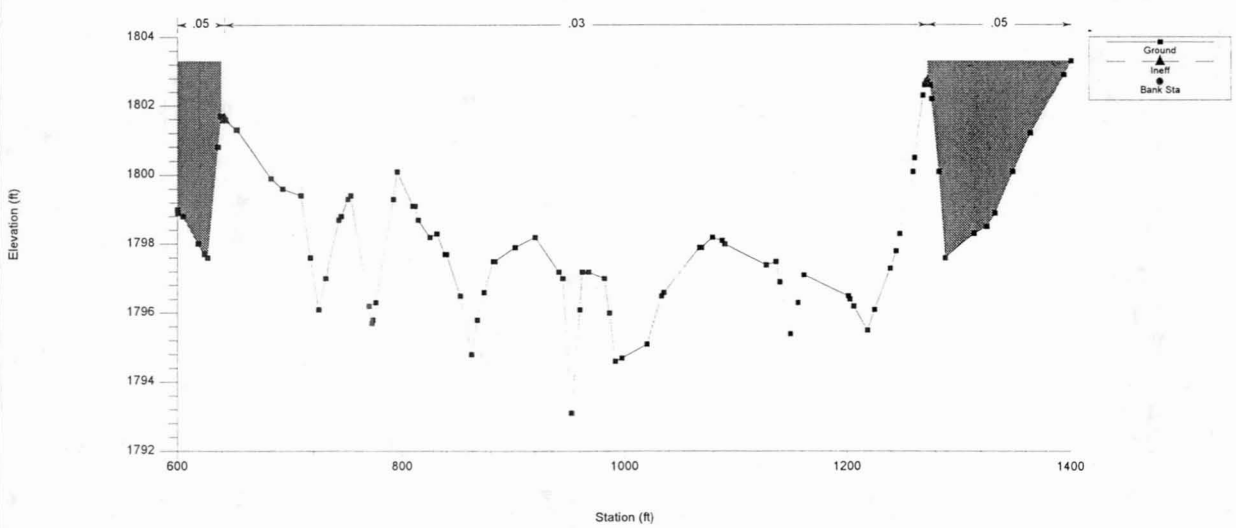
Reata Pass/Beardsley Wash
Riv Sta = 150

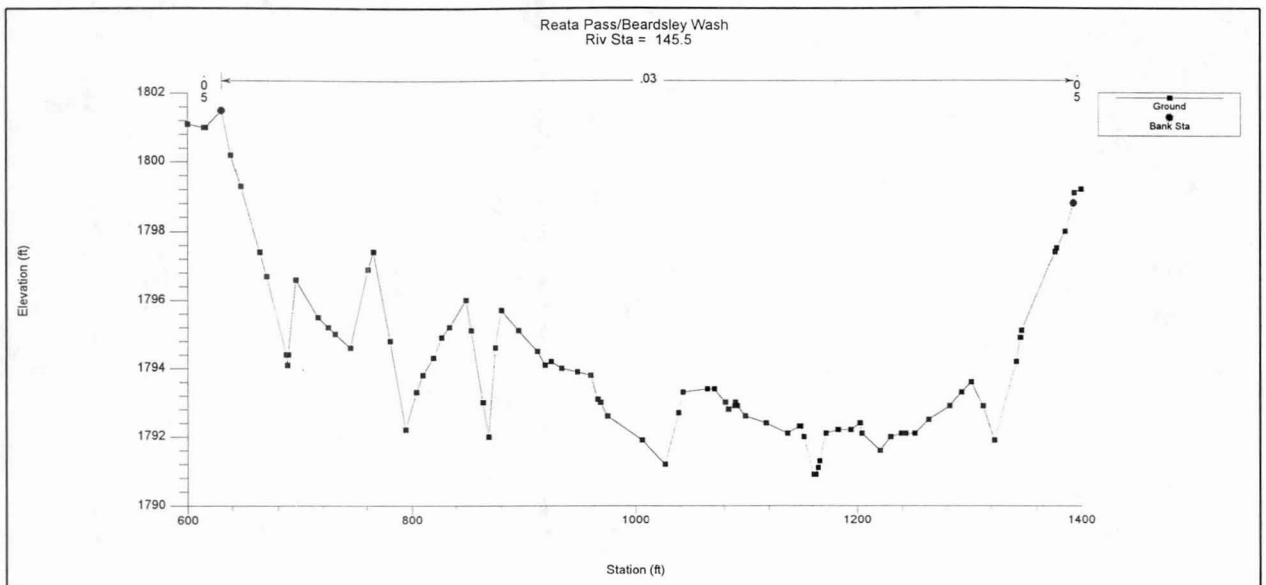


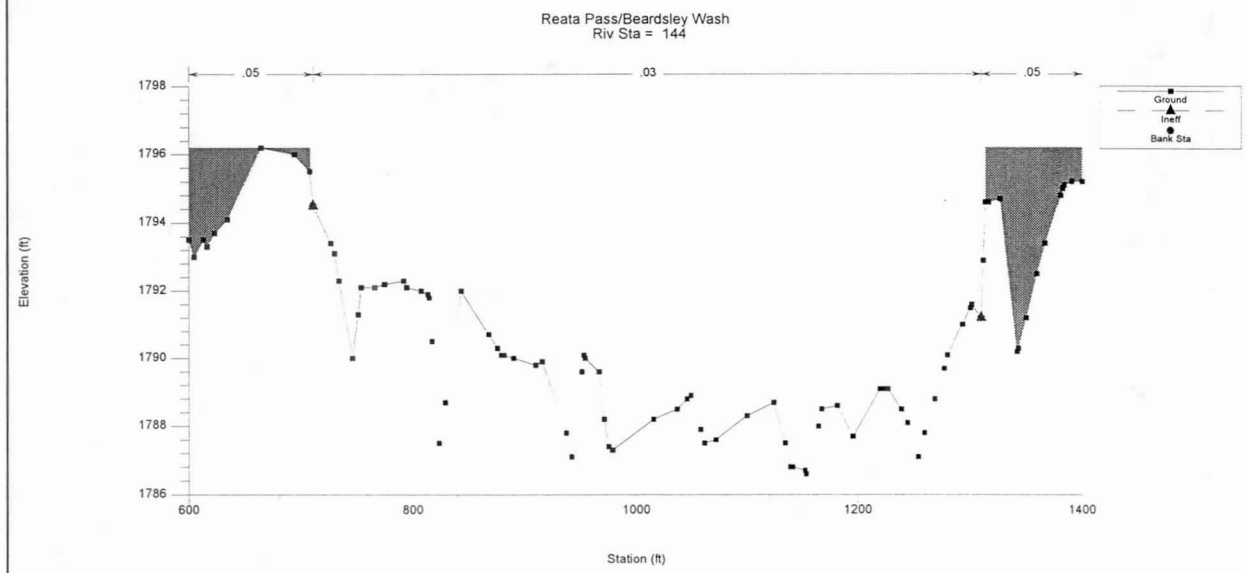
Reata Pass/Beardsley Wash
Riv Sta = 148.5

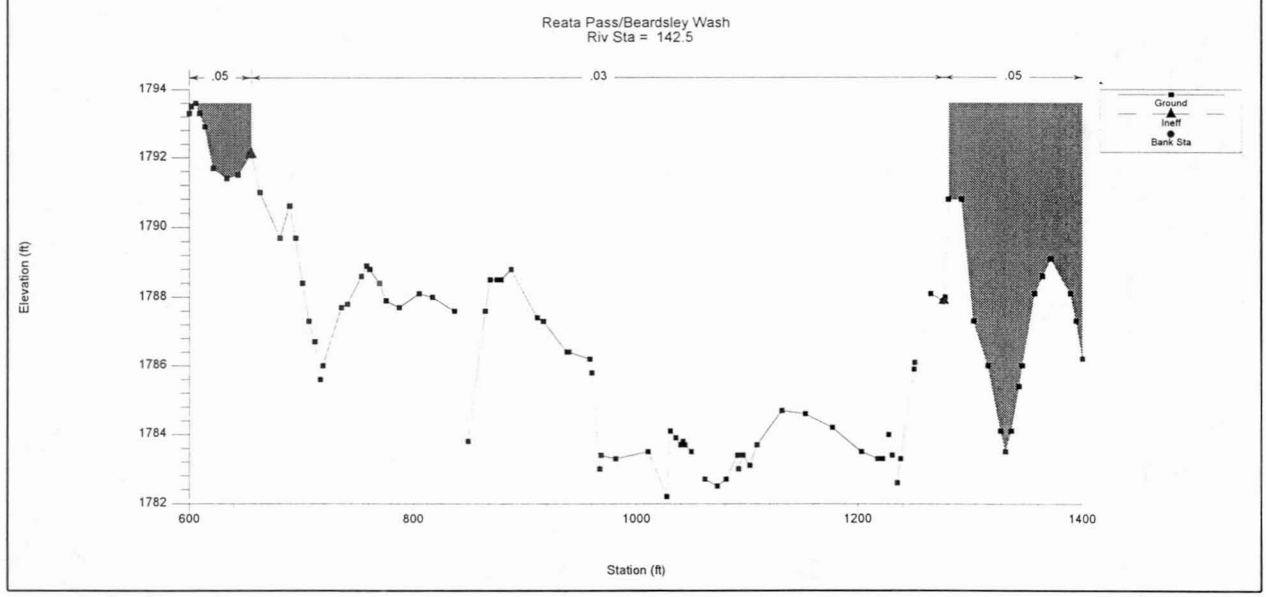


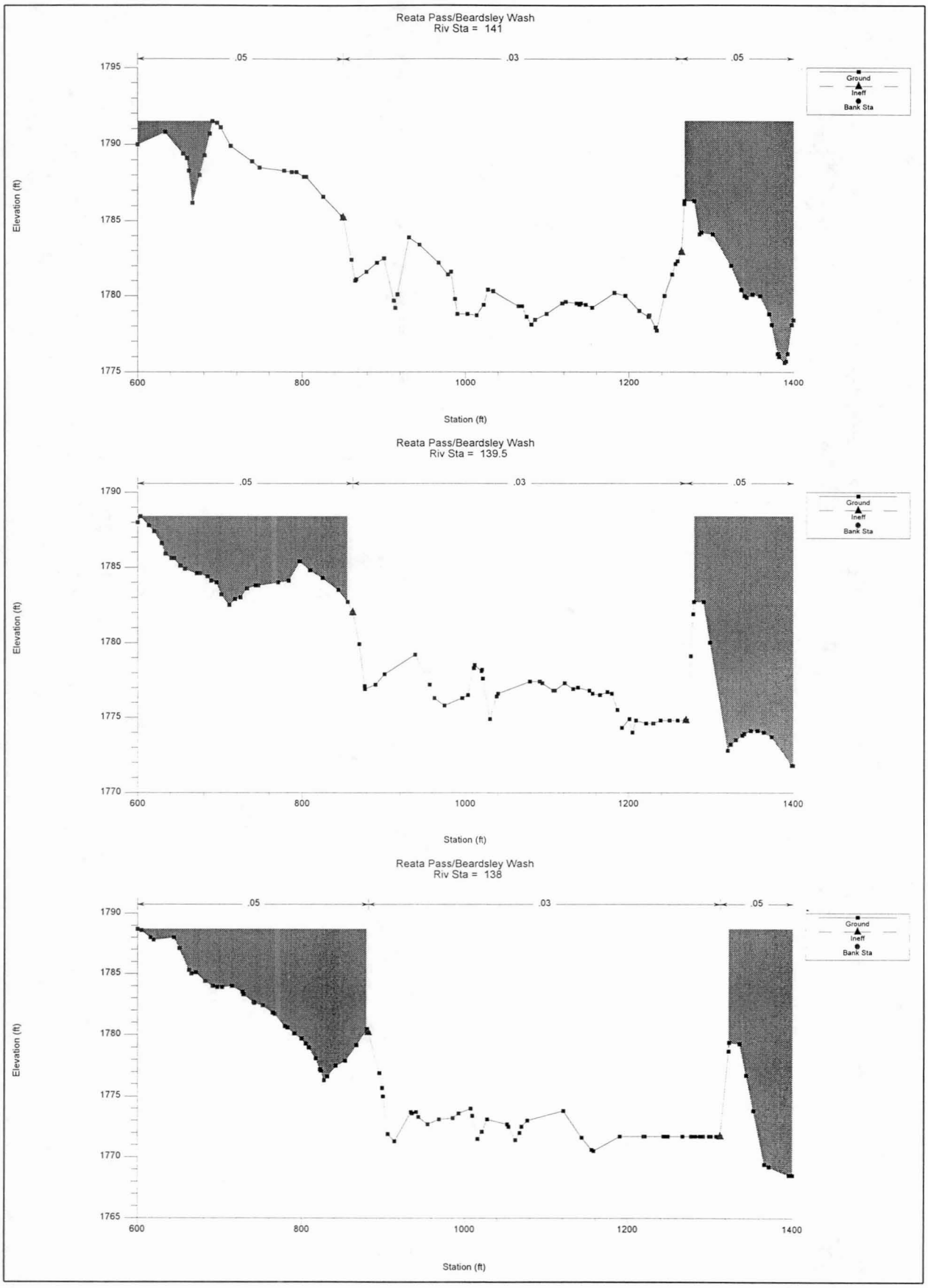
Reata Pass/Beardsley Wash
Riv Sta = 147

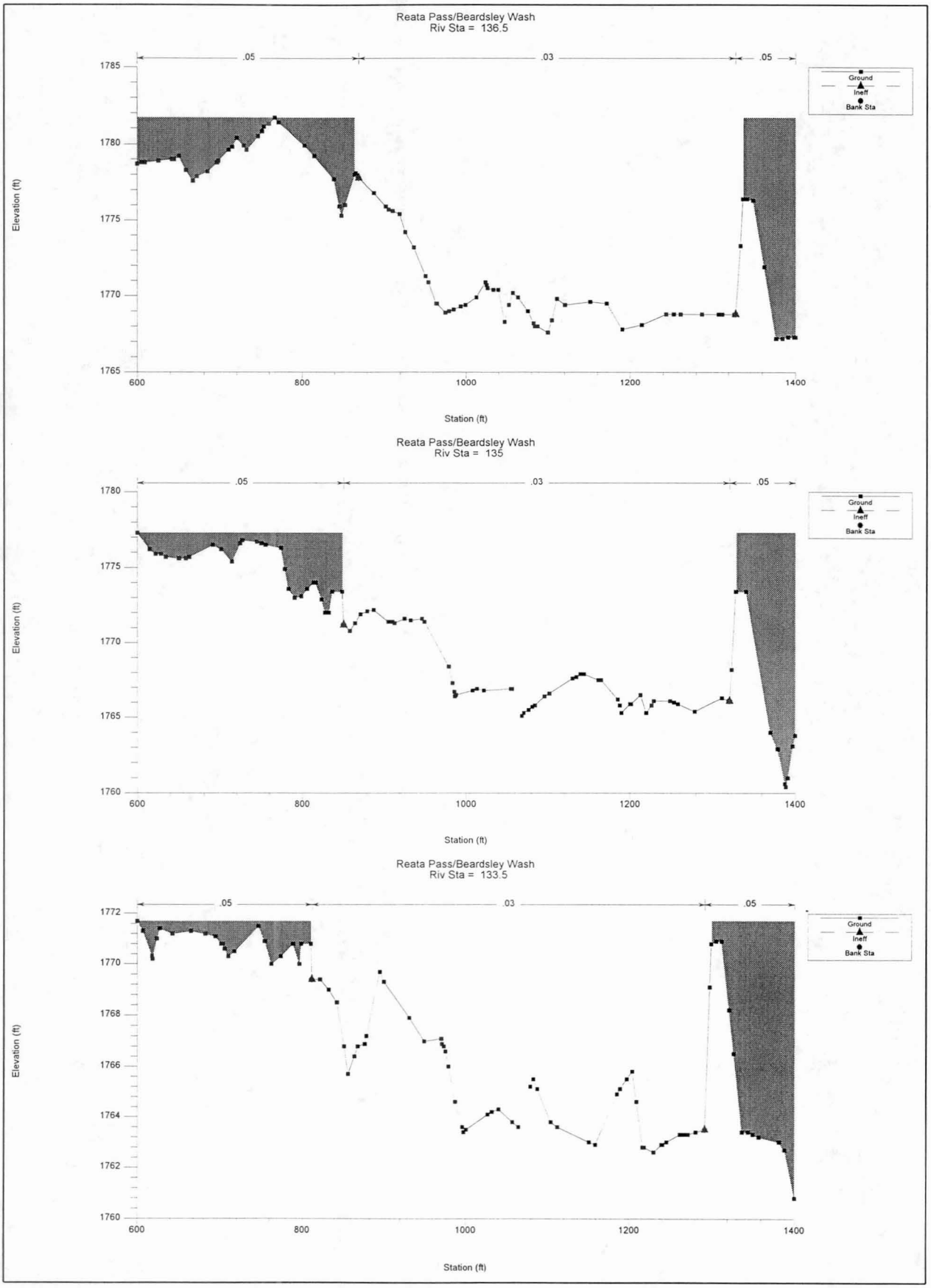


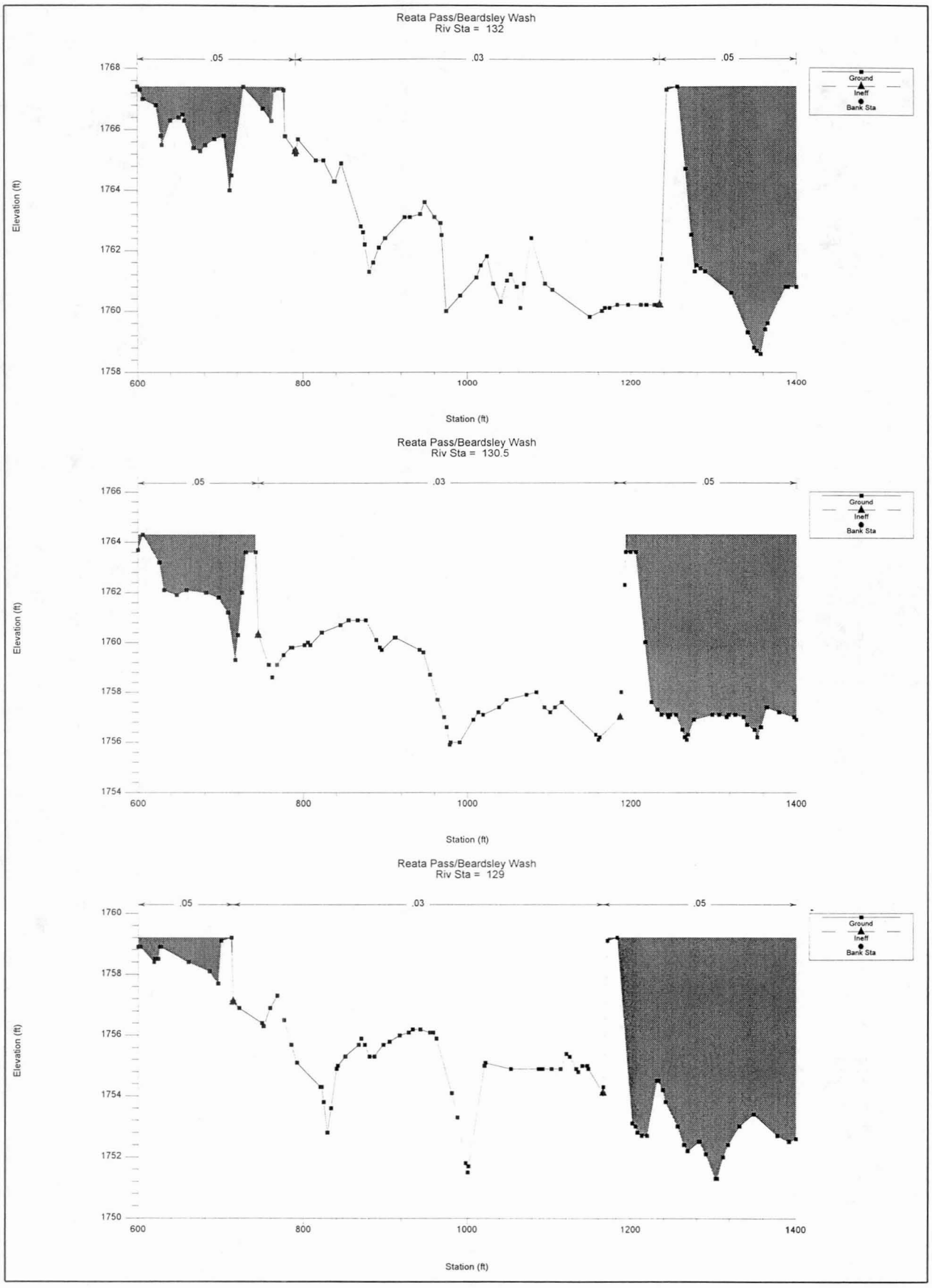

Reata Pass/Beardsley Wash
Riv Sta = 145.5
.03
Ground
Bank Sta
Elevation (ft)
Station (ft)

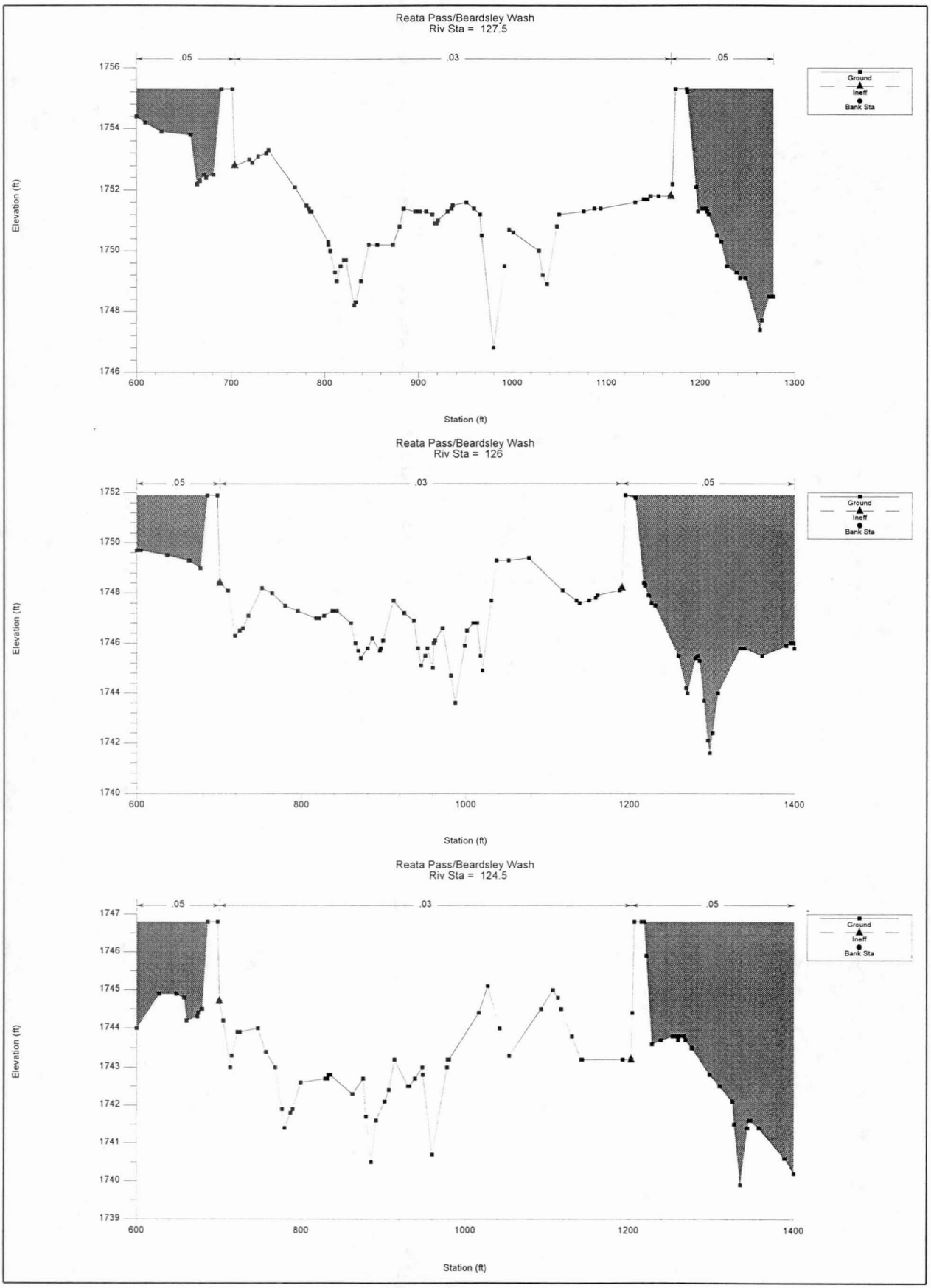

Reata Pass/Beardsley Wash
Riv Sta = 144
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

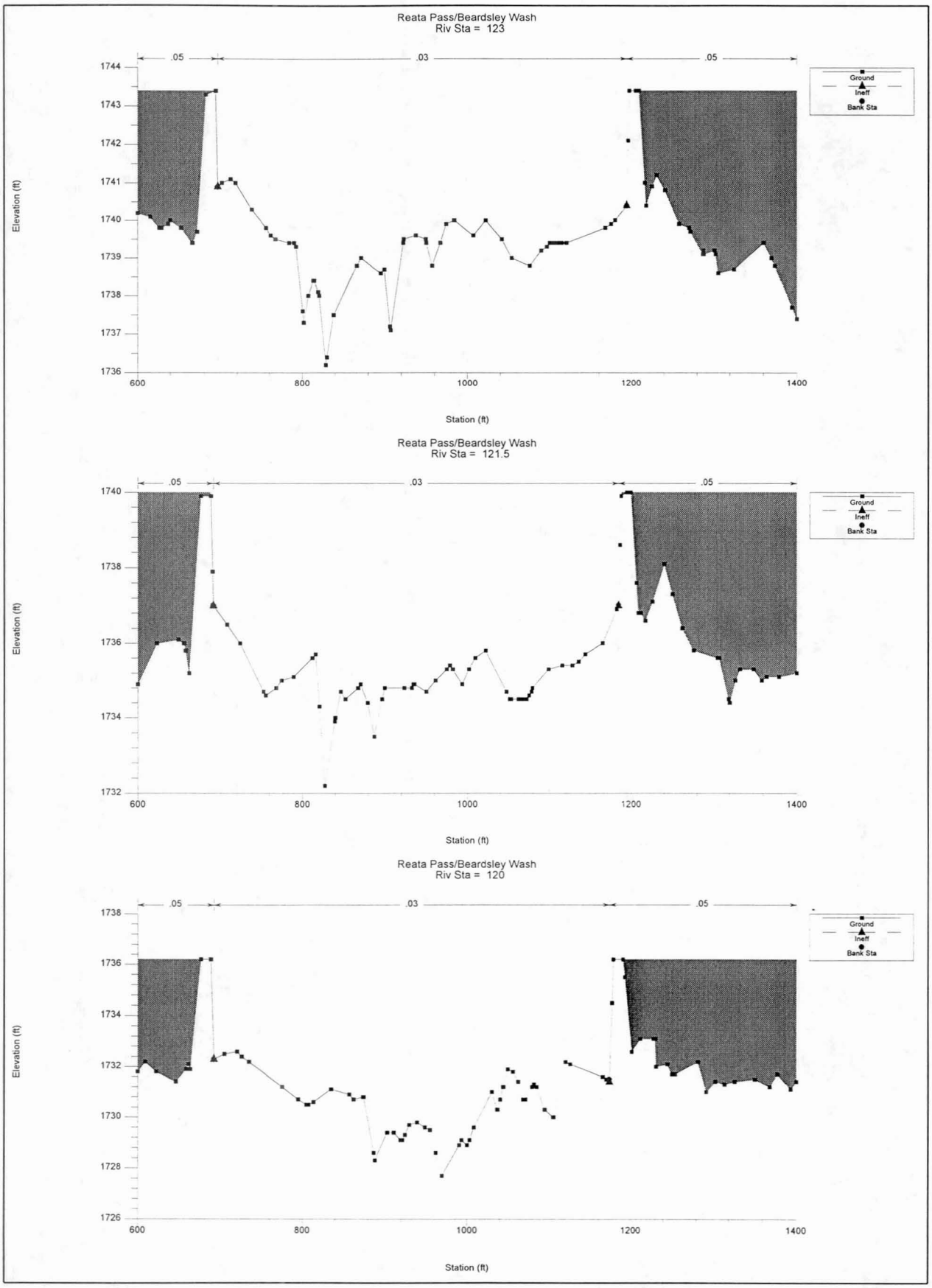

Reata Pass/Beardsley Wash
Riv Sta = 142.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

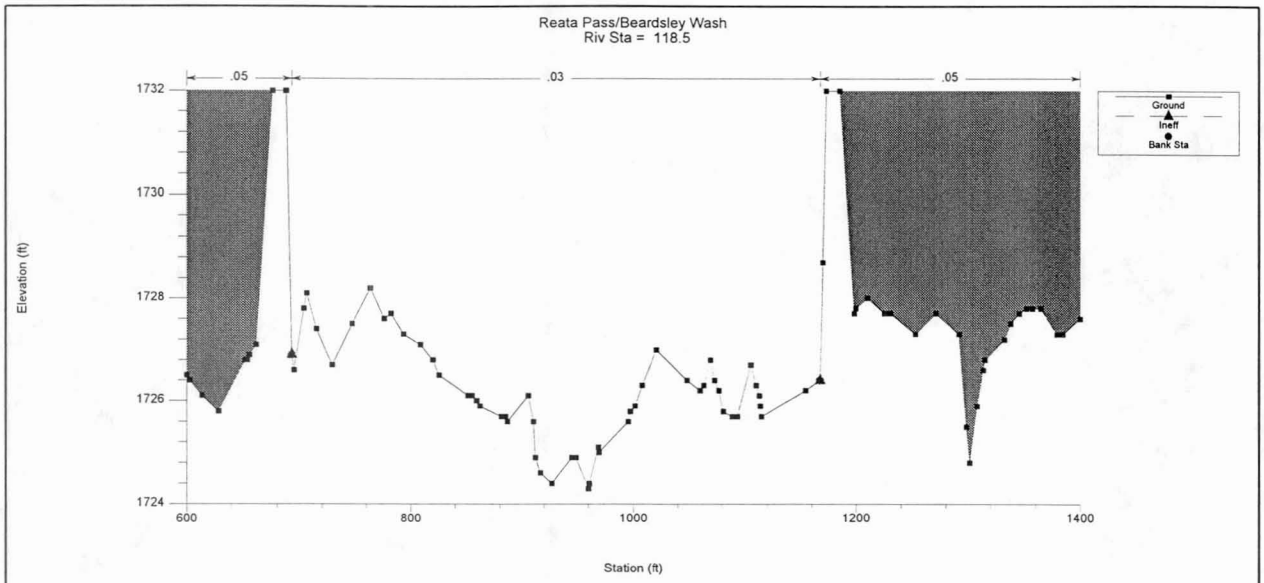

Reata Pass/Beardsley Wash
Riv Sta = 141
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1795
1790
1785
1780
1775
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 139.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1790
1785
1780
1775
1770
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 138
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1790
1785
1780
1775
1770
1765
600
800
1000
1200
1400
Station (ft)

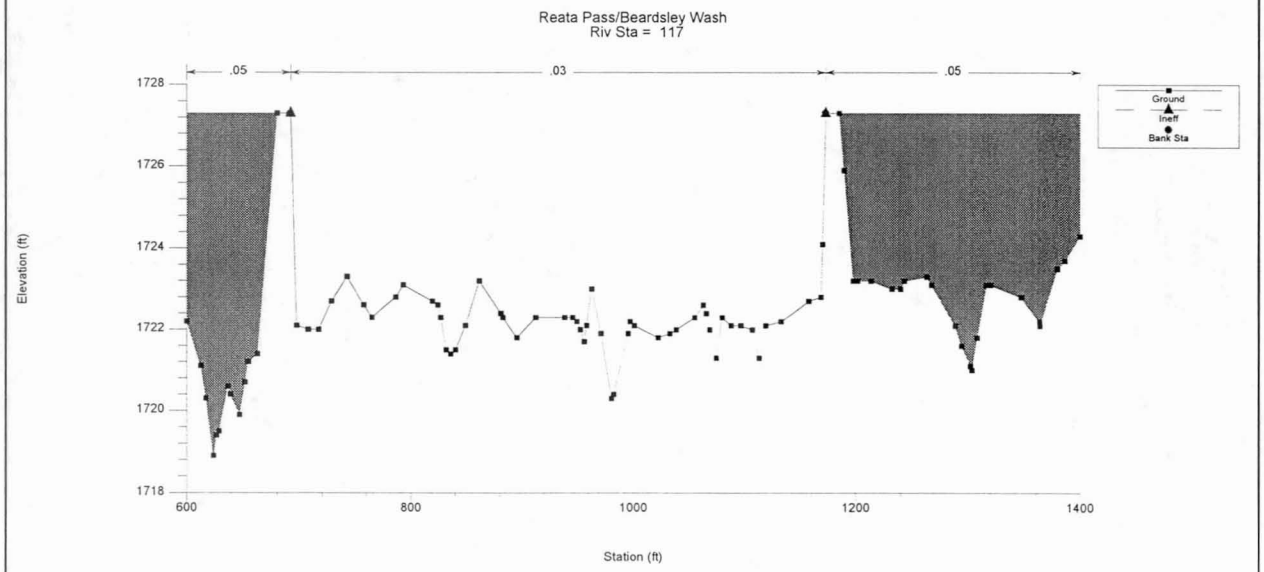

Reata Pass/Beardsley Wash
Riv Sta = 136.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1785
1780
1775
1770
1765
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 135
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1780
1775
1770
1765
1760
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 133.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1772
1770
1768
1766
1764
1762
1760
600
800
1000
1200
1400
Station (ft)

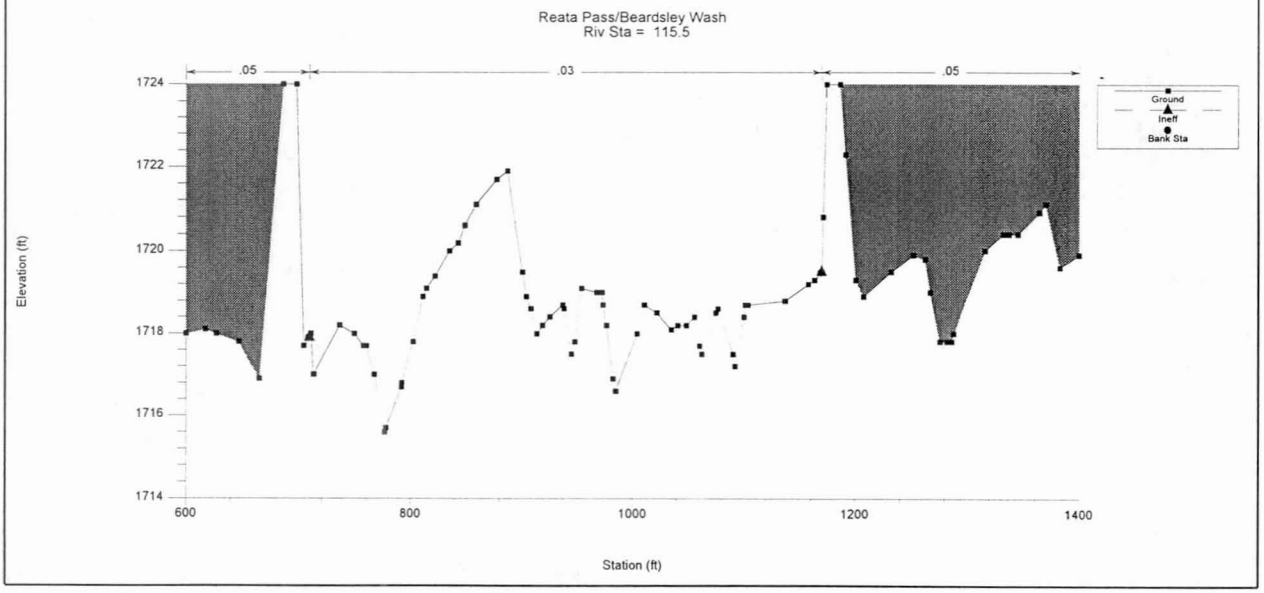

Reata Pass/Beardsley Wash
Riv Sta = 132
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1768
1766
1764
1762
1760
1758
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 130.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1766
1764
1762
1760
1758
1756
1754
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 129
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1760
1758
1756
1754
1752
1750
600
800
1000
1200
1400
Station (ft)

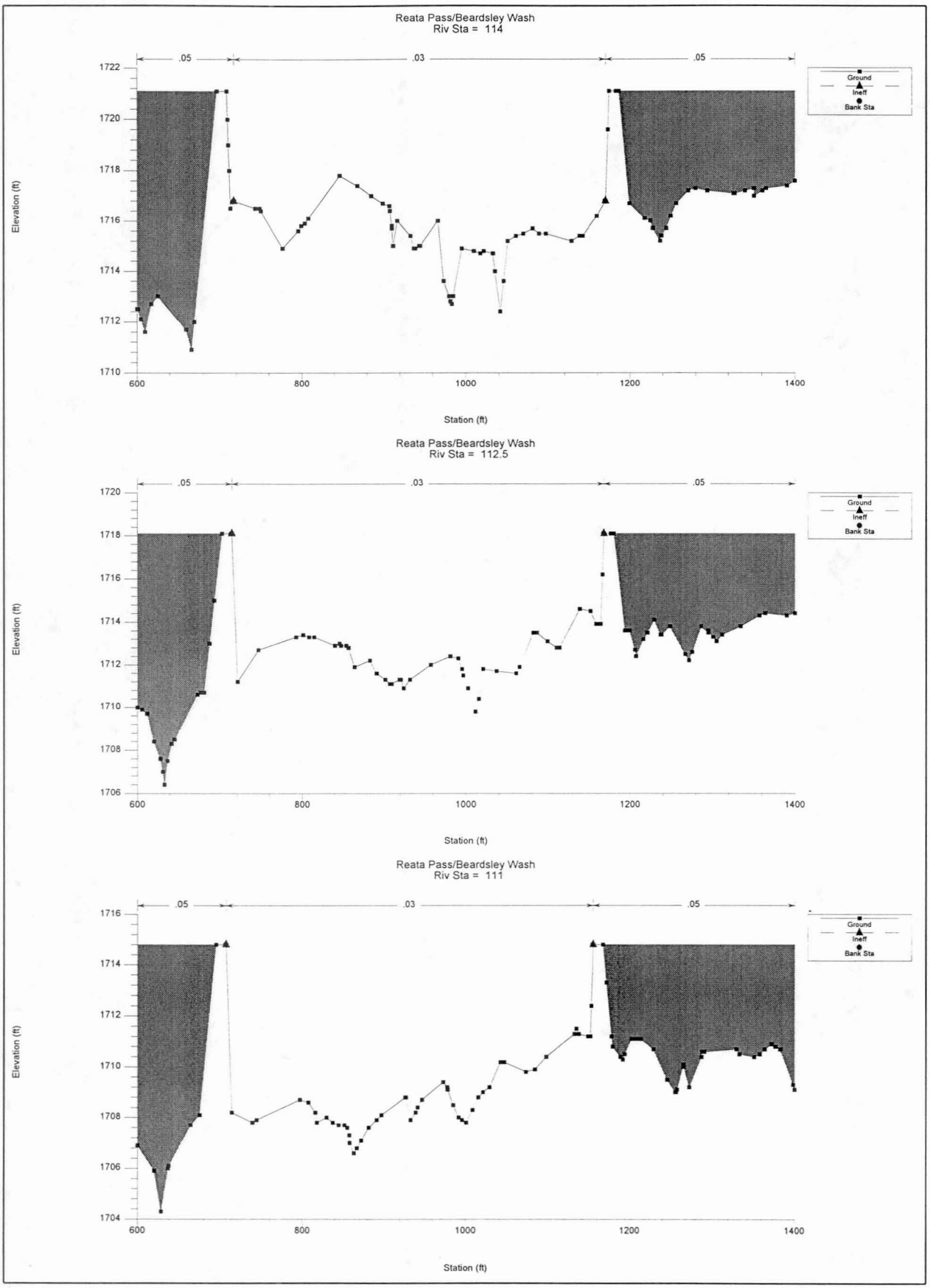

Reata Pass/Beardsley Wash
Riv Sta = 127.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 126
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 124.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

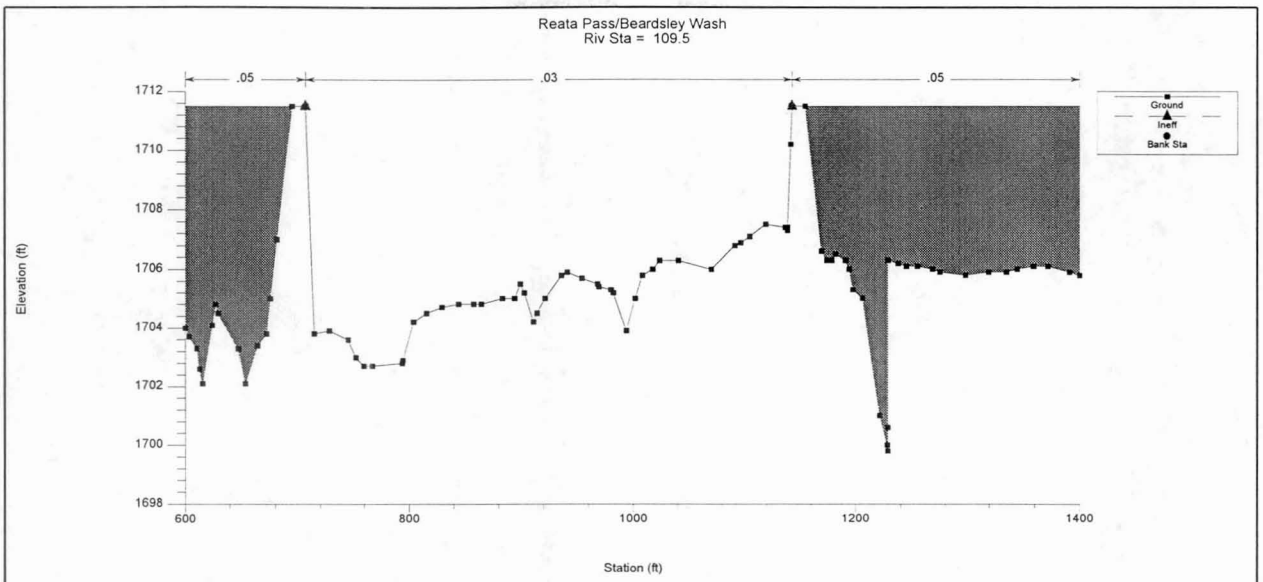

Reata Pass/Beardsley Wash
Riv Sta = 123
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 121.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 120
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

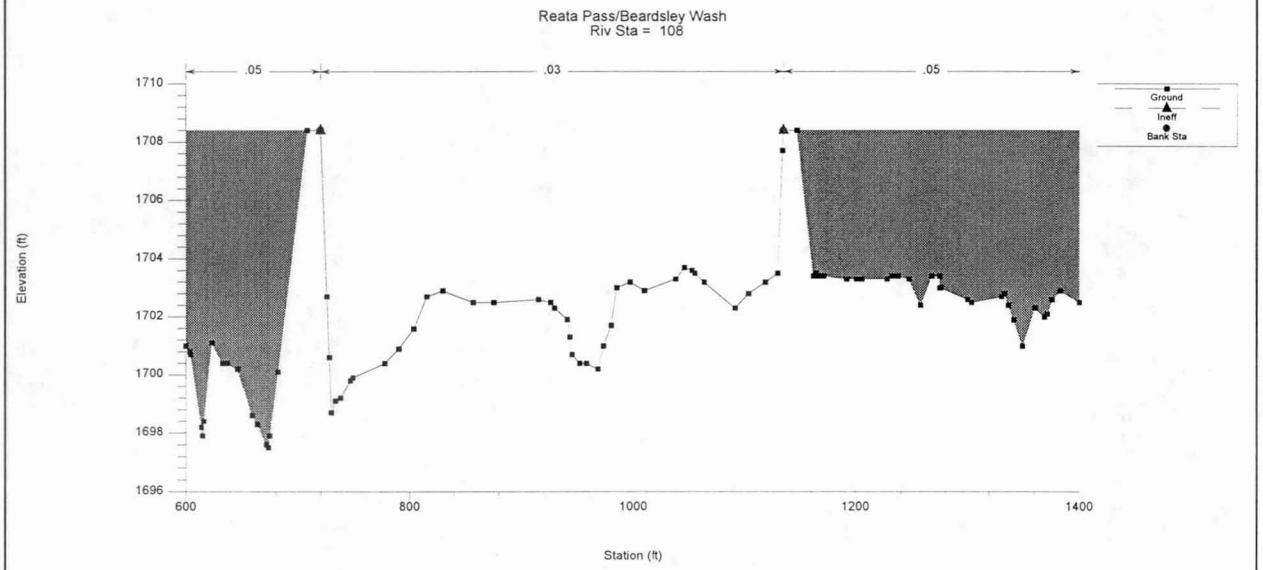

Reata Pass/Beardsley Wash
Riv Sta = 118.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1732
1730
1728
1726
1724
600
800
1000
1200
1400
Station (ft)

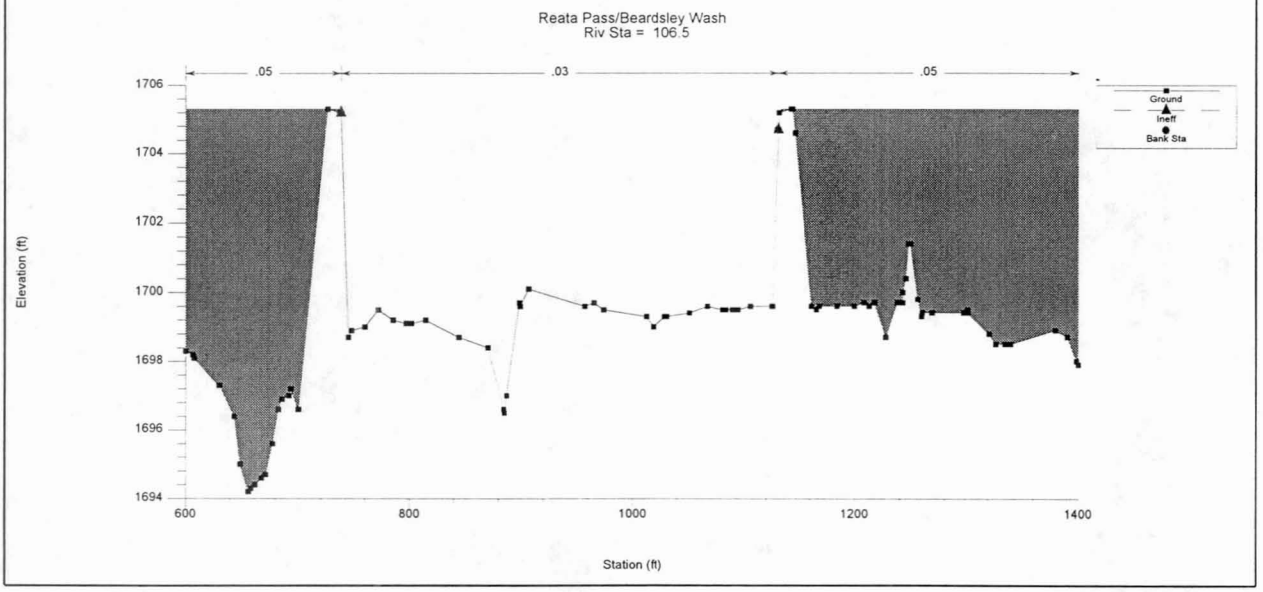

Reata Pass/Beardsley Wash
Riv Sta = 117
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1728
1726
1724
1722
1720
1718
600
800
1000
1200
1400
Station (ft)

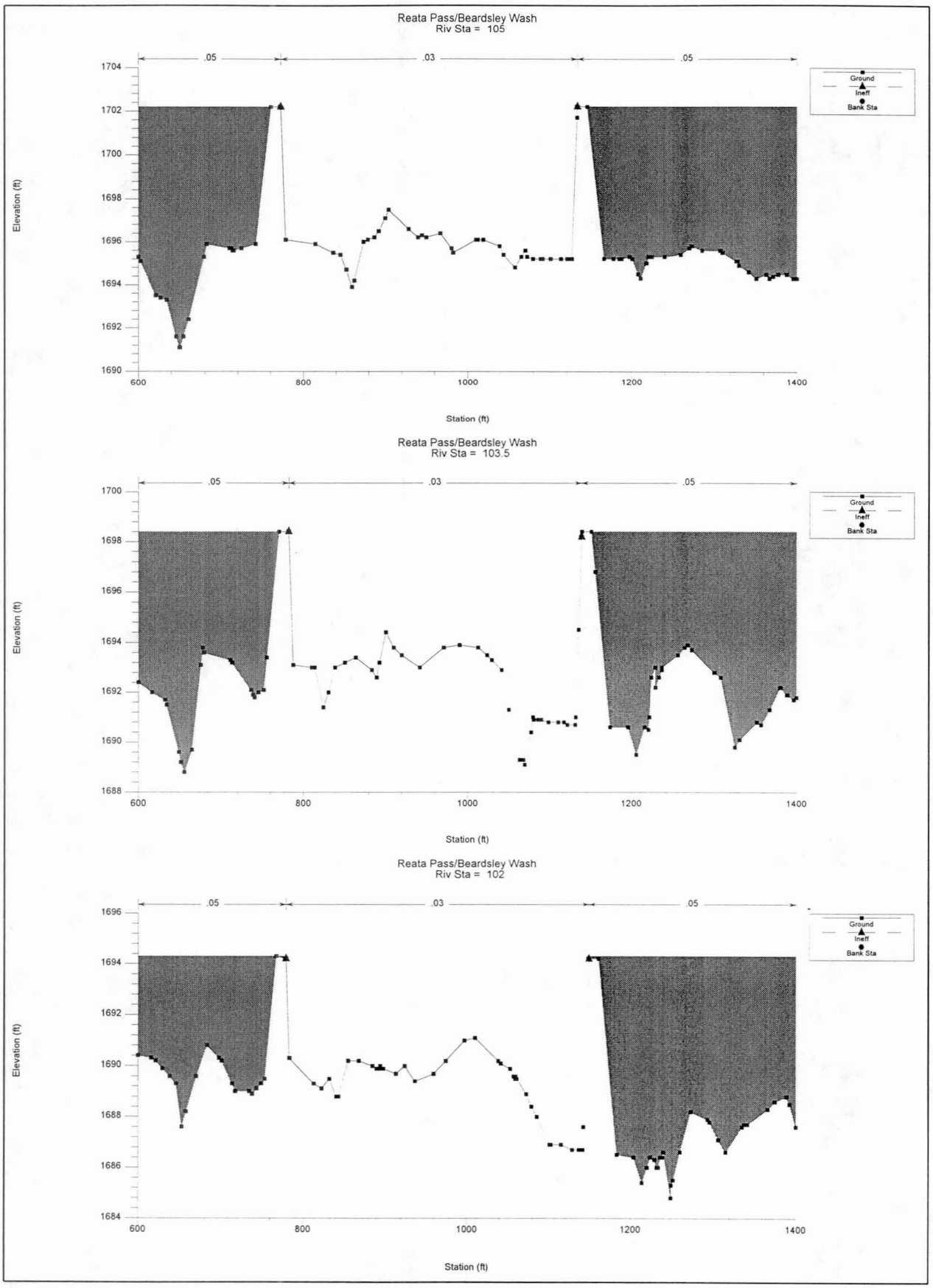

Reata Pass/Beardsley Wash
Riv Sta = 115.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1724
1722
1720
1718
1716
1714
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 114
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 112.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 111
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

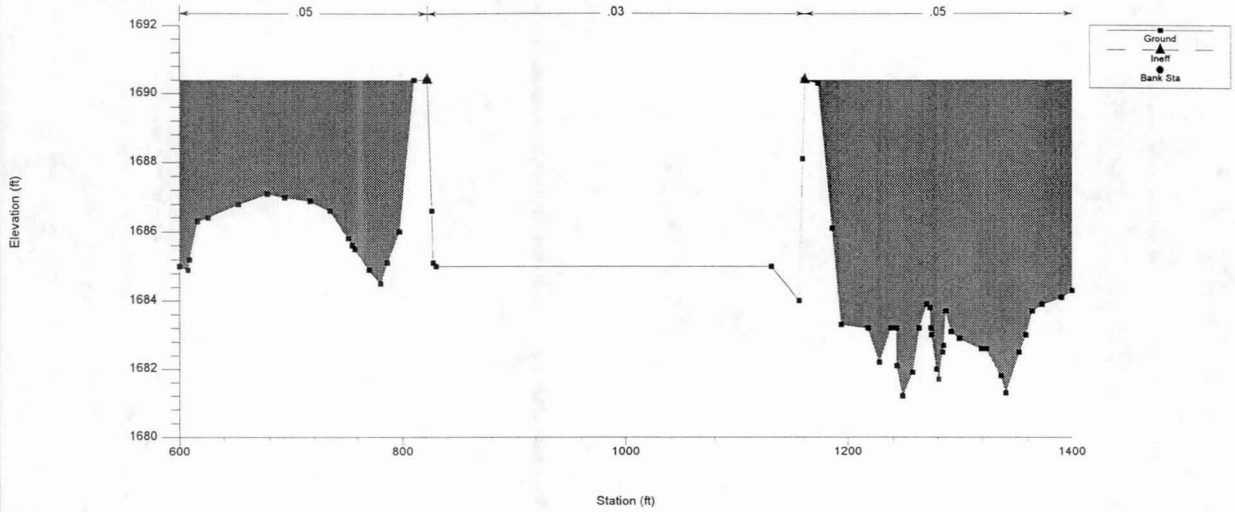

Reata Pass/Beardsley Wash
Riv Sta = 109.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1712
1710
1708
1706
1704
1702
1700
1698
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 108
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1710
1708
1706
1704
1702
1700
1698
1696
600
800
1000
1200
1400
Station (ft)

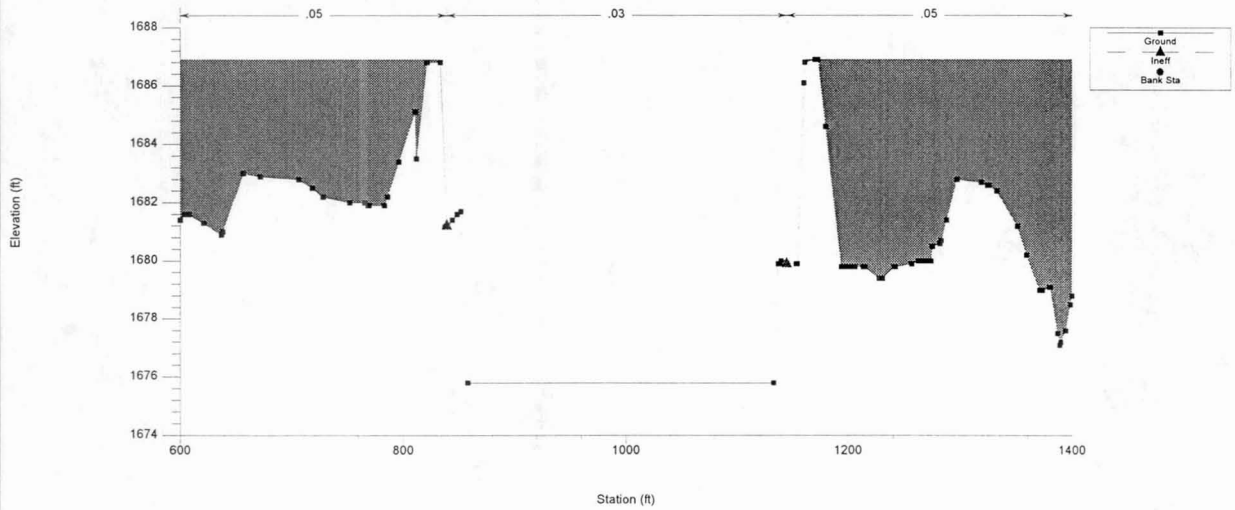

Reata Pass/Beardsley Wash
Riv Sta = 106.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1706
1704
1702
1700
1698
1696
1694
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 105
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 103.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 102
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

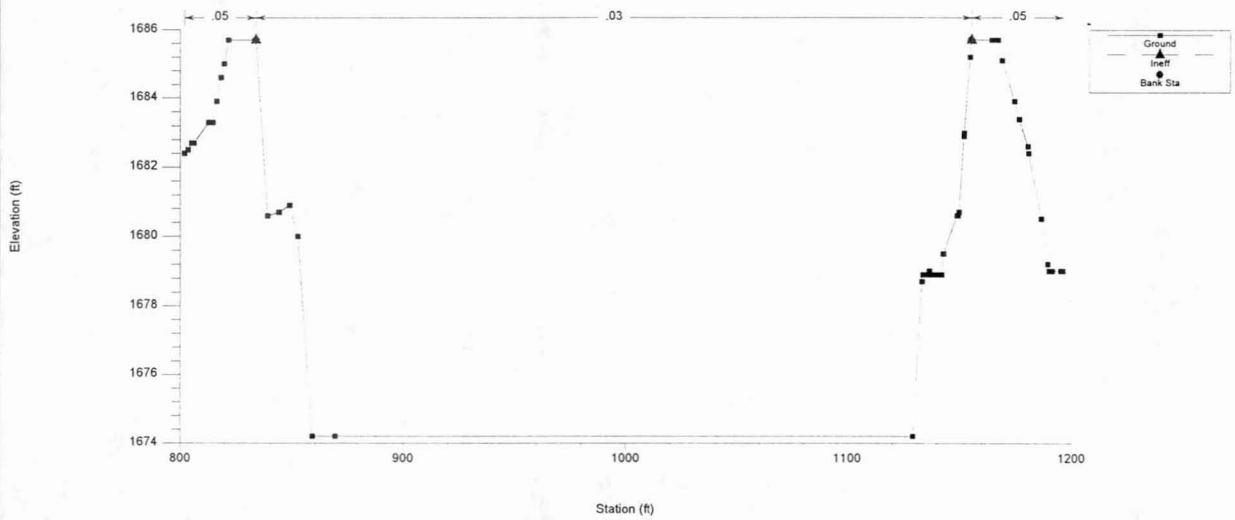
Reata Pass/Beardsley Wash
Riv Sta = 100.5



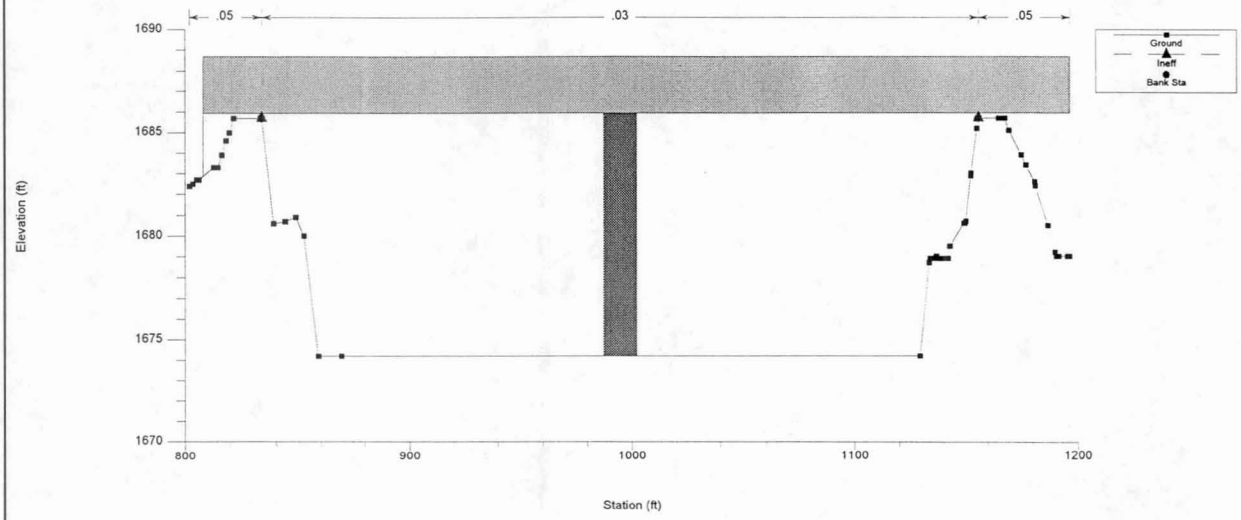
Reata Pass/Beardsley Wash
Riv Sta = 99



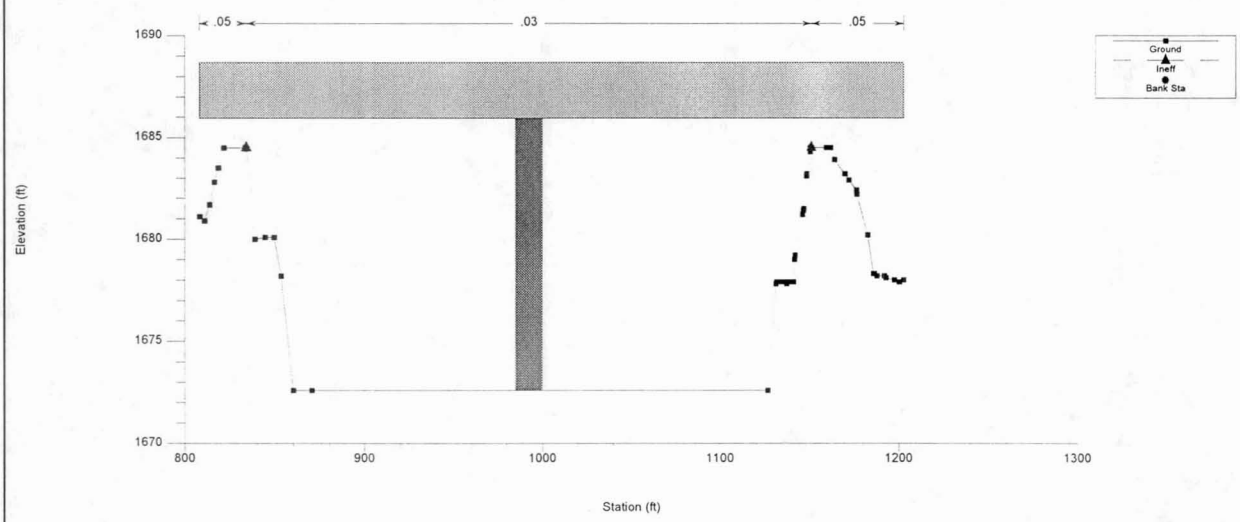
Reata Pass/Beardsley Wash
Riv Sta = 98.5



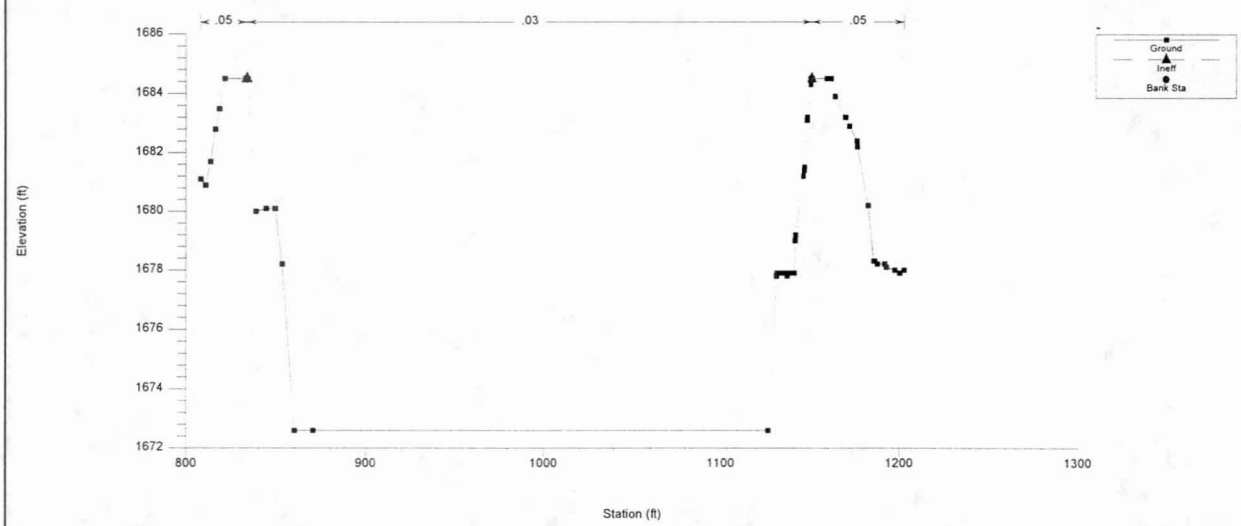
Reata Pass/Beardsley Wash
Upstream Inside Riv Sta = 98.25

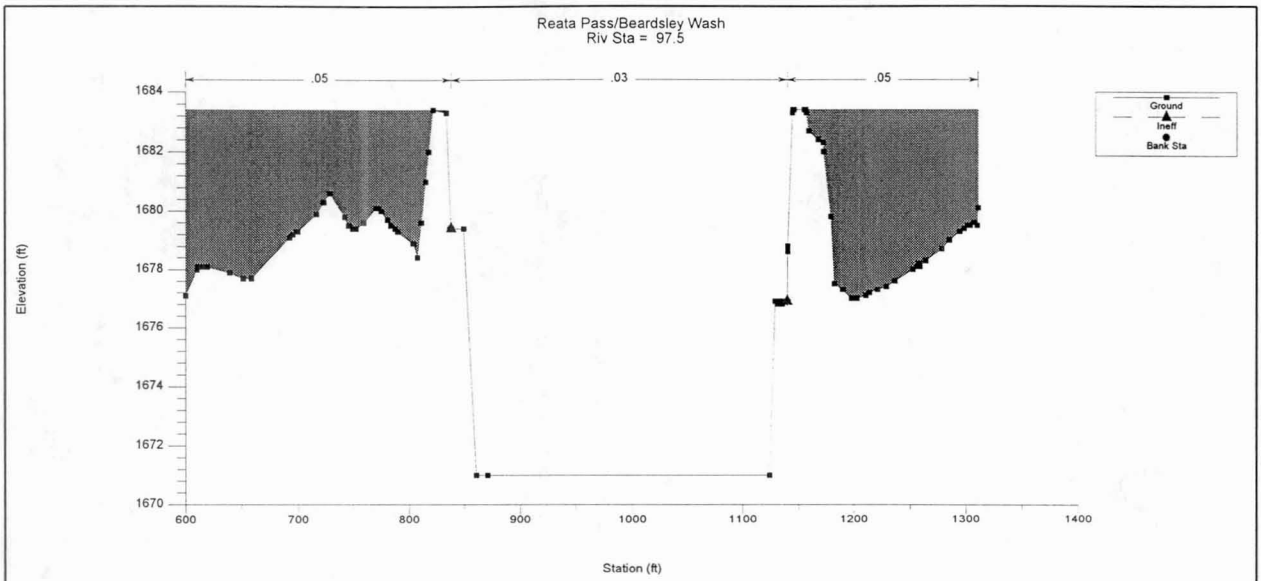


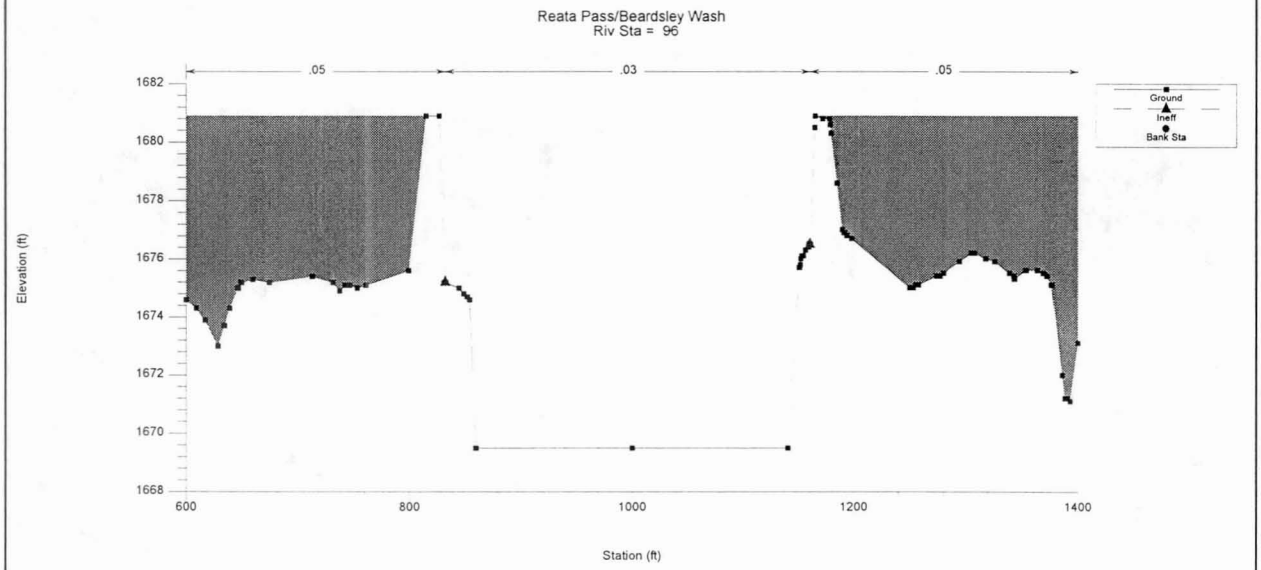
Reata Pass/Beardsley Wash
Downstream Inside Riv Sta = 98.25

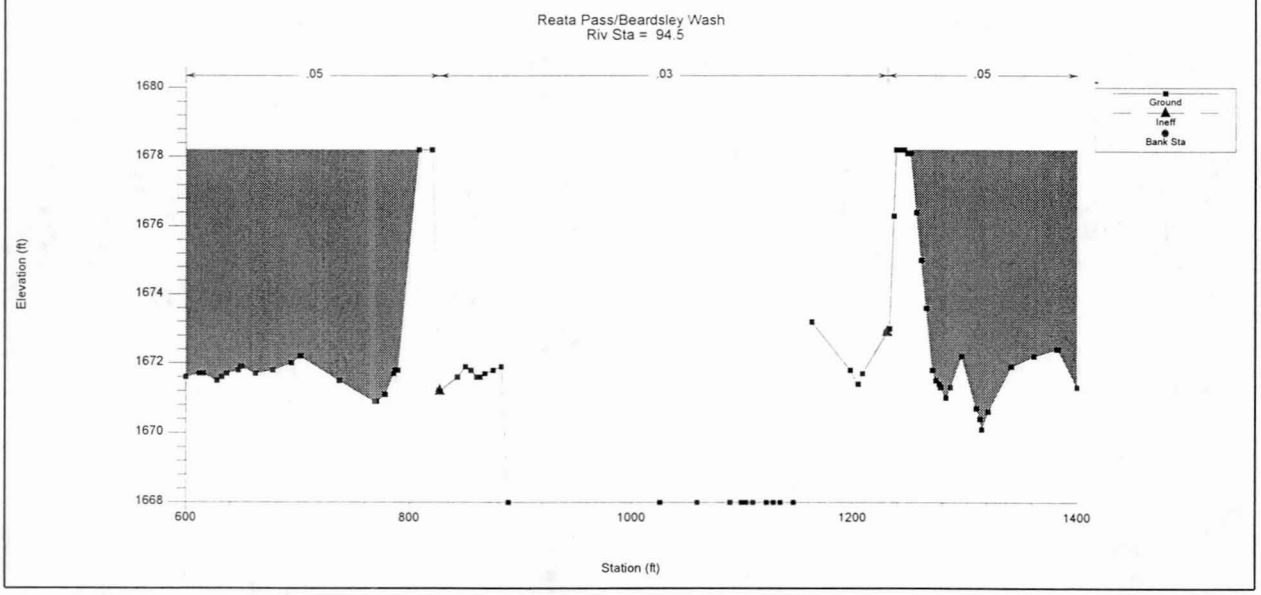


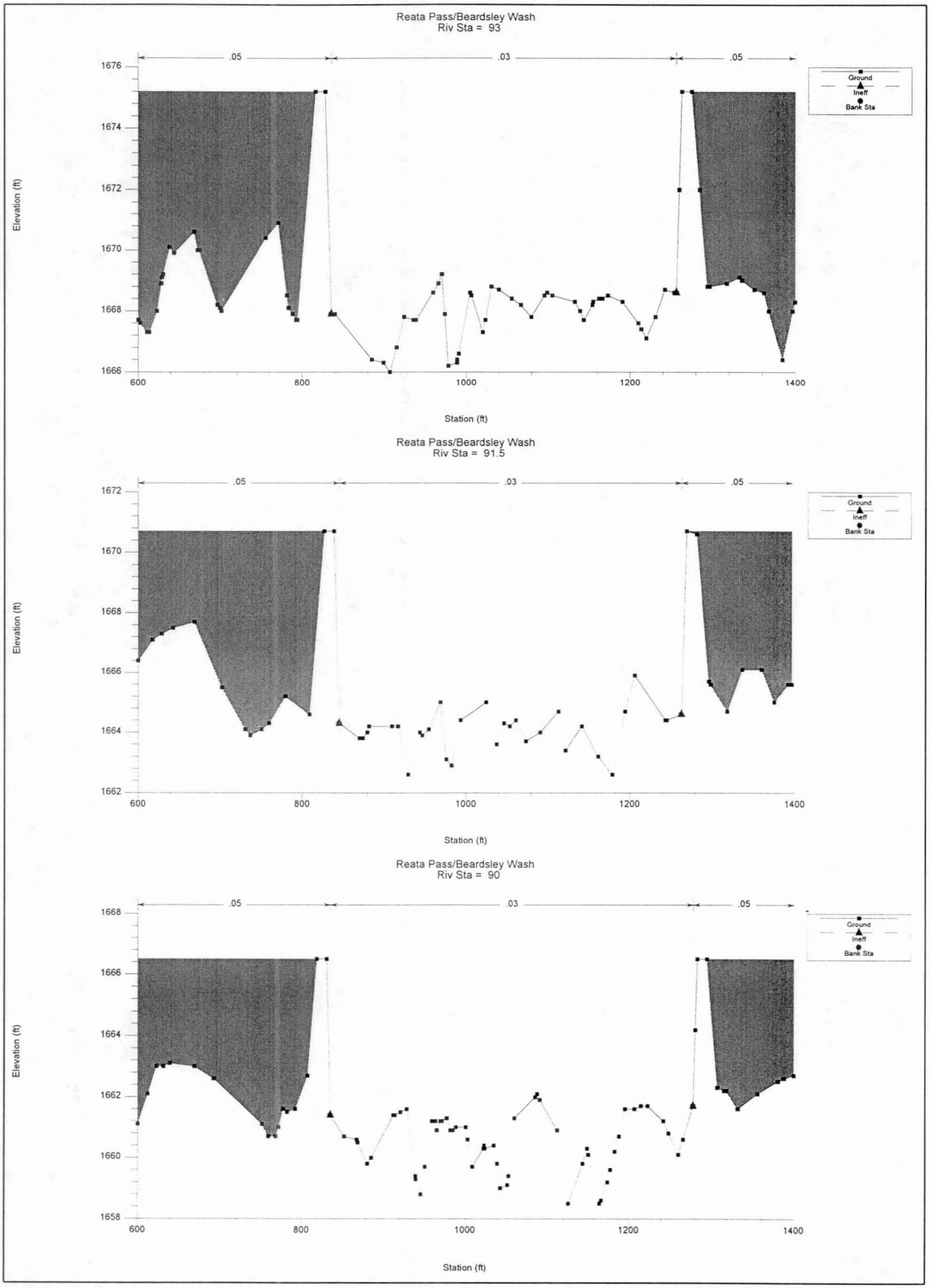
Reata Pass/Beardsley Wash
Riv Sta = 98

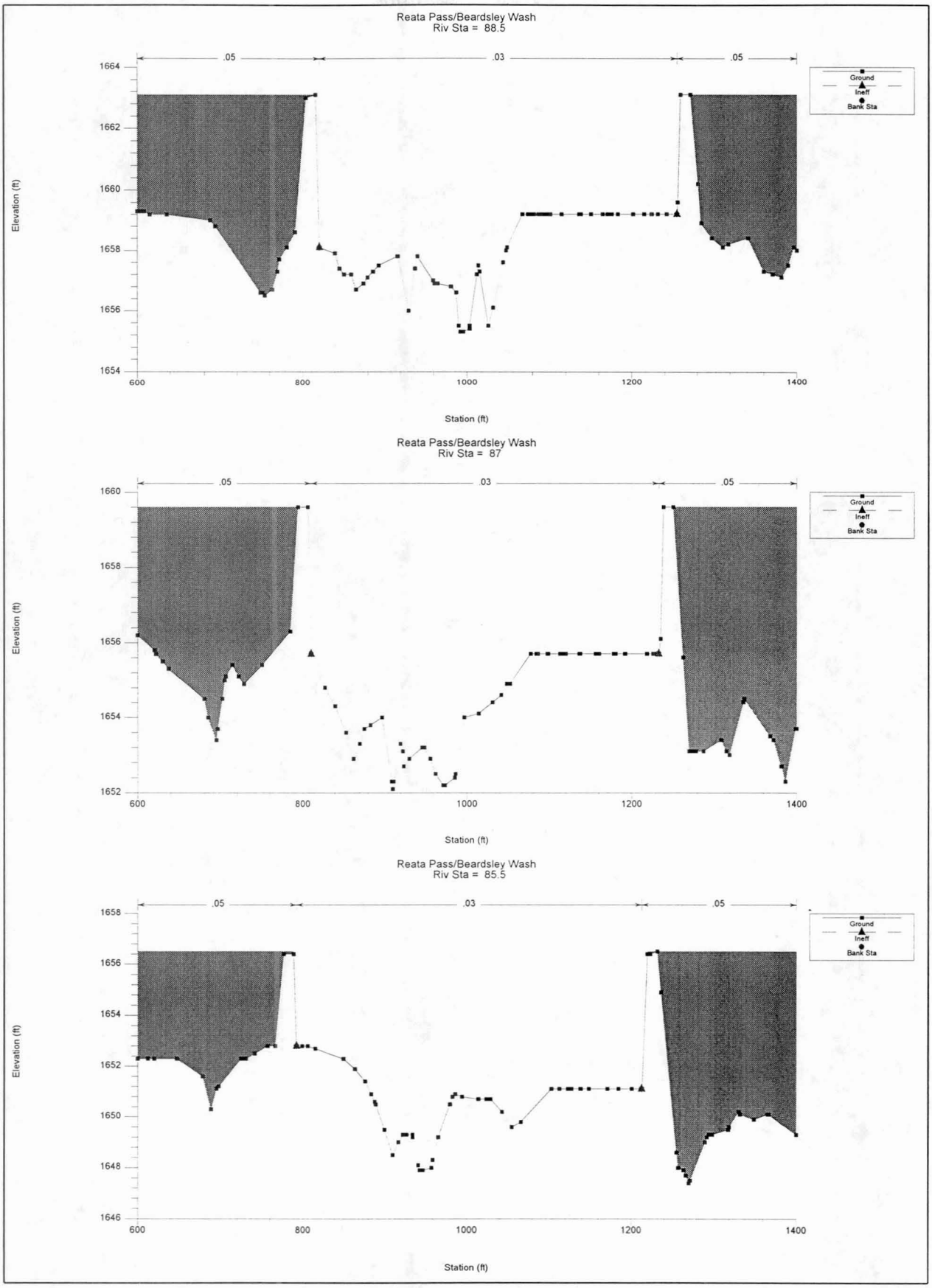


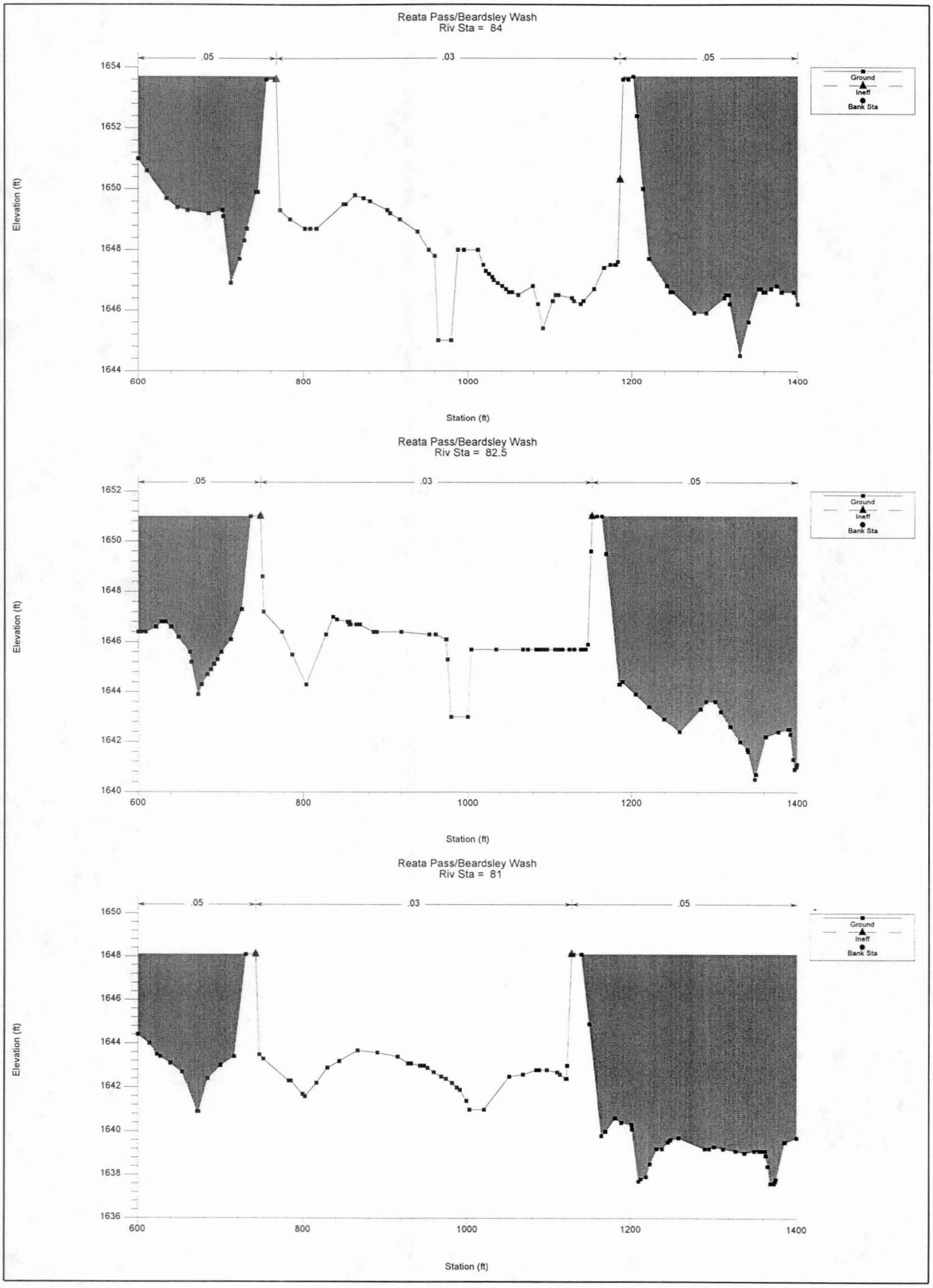

Reata Pass/Beardsley Wash
Riv Sta = 97.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1684
1682
1680
1678
1676
1674
1672
1670
600
700
800
900
1000
1100
1200
1300
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 96
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1682
1680
1678
1676
1674
1672
1670
1668
600
800
1000
1200
1400
Station (ft)

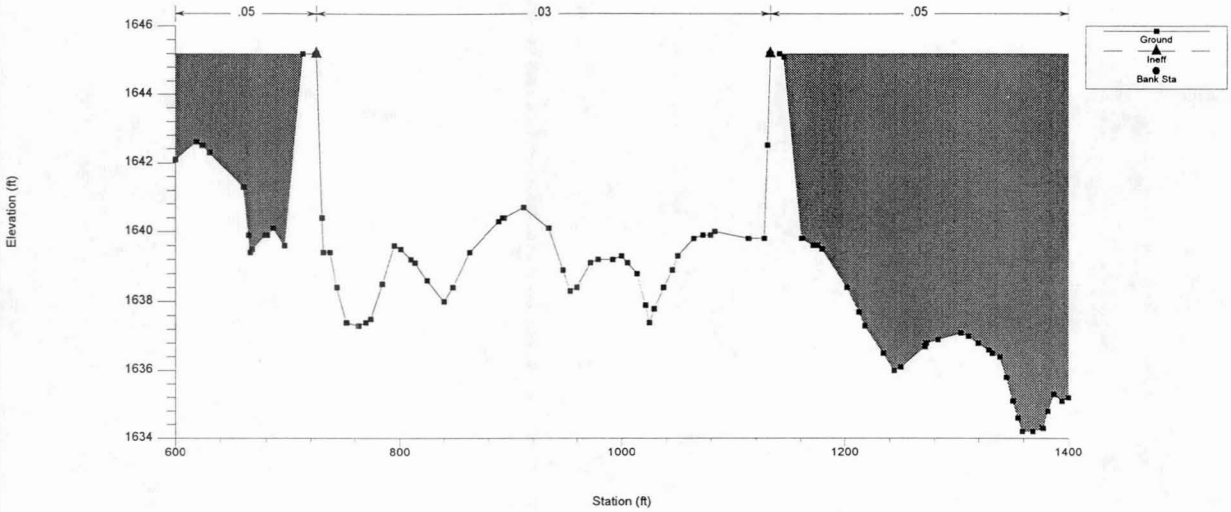

Reata Pass/Beardsley Wash
Riv Sta = 94.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1680
1678
1676
1674
1672
1670
1668
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 93
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1676
1674
1672
1670
1668
1666
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 91.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1672
1670
1668
1666
1664
1662
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 90
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1668
1666
1664
1662
1660
1658
600
800
1000
1200
1400
Station (ft)

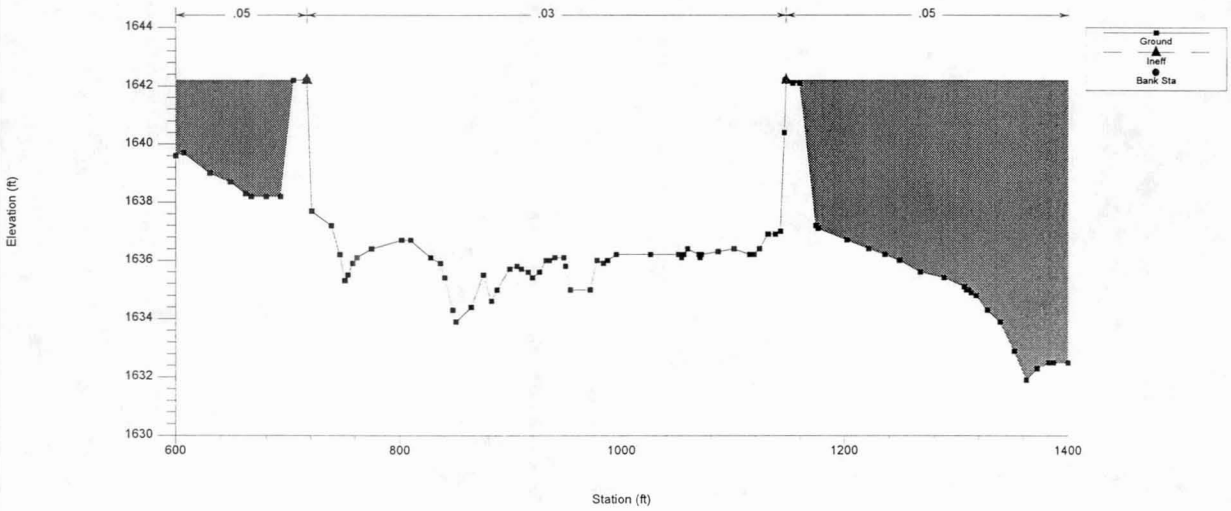

Reata Pass/Beardsley Wash
Riv Sta = 88.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1664
1662
1660
1658
1656
1654
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 87
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1660
1658
1656
1654
1652
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 85.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1658
1656
1654
1652
1650
1648
1646
600
800
1000
1200
1400
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 84
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 82.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 81
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

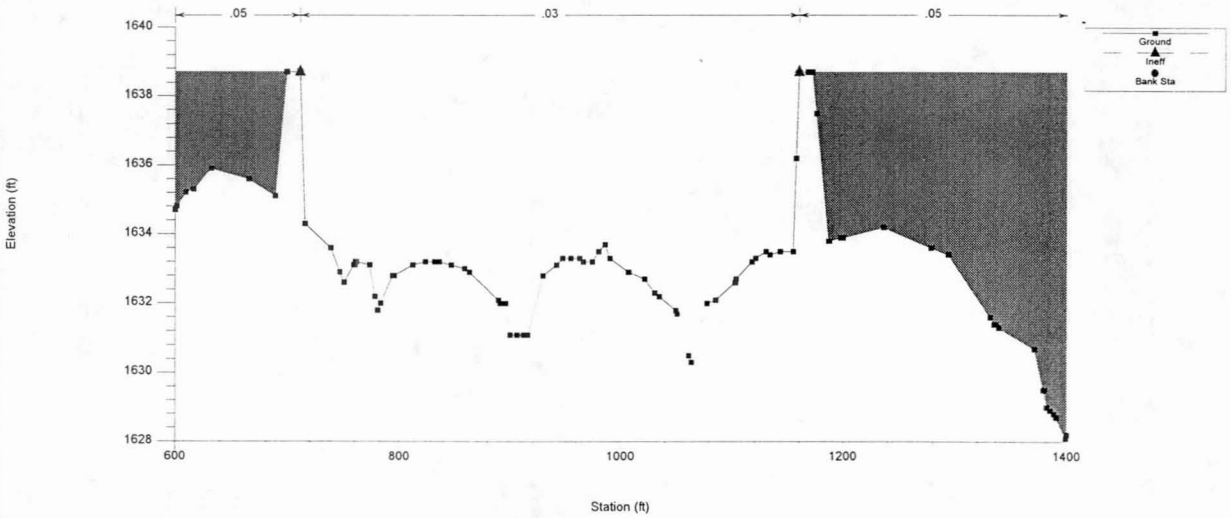
Reata Pass/Beardsley Wash
Riv Sta = 79.5



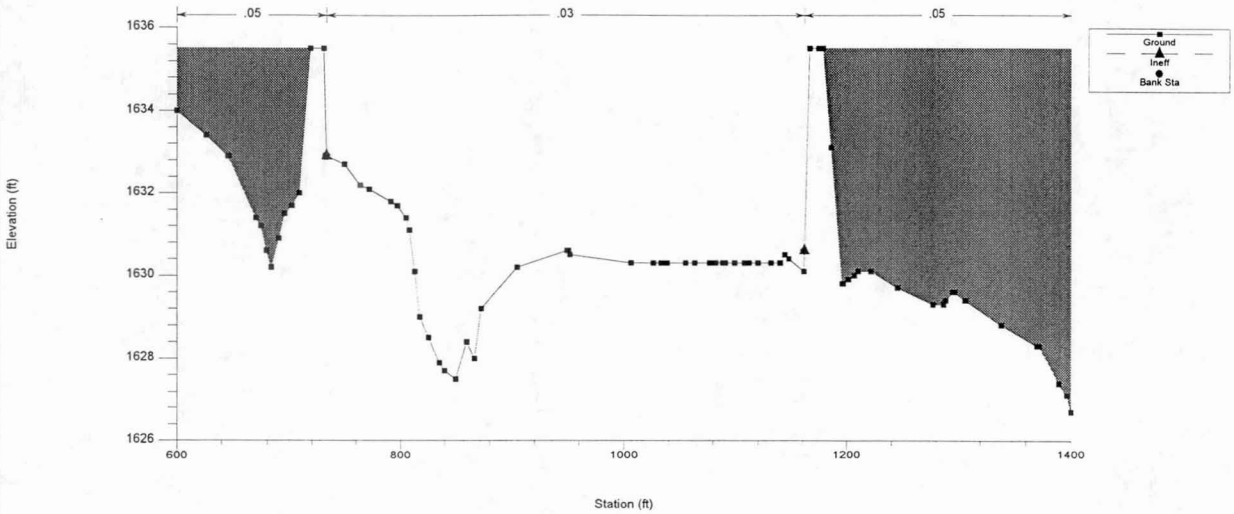
Reata Pass/Beardsley Wash
Riv Sta = 78



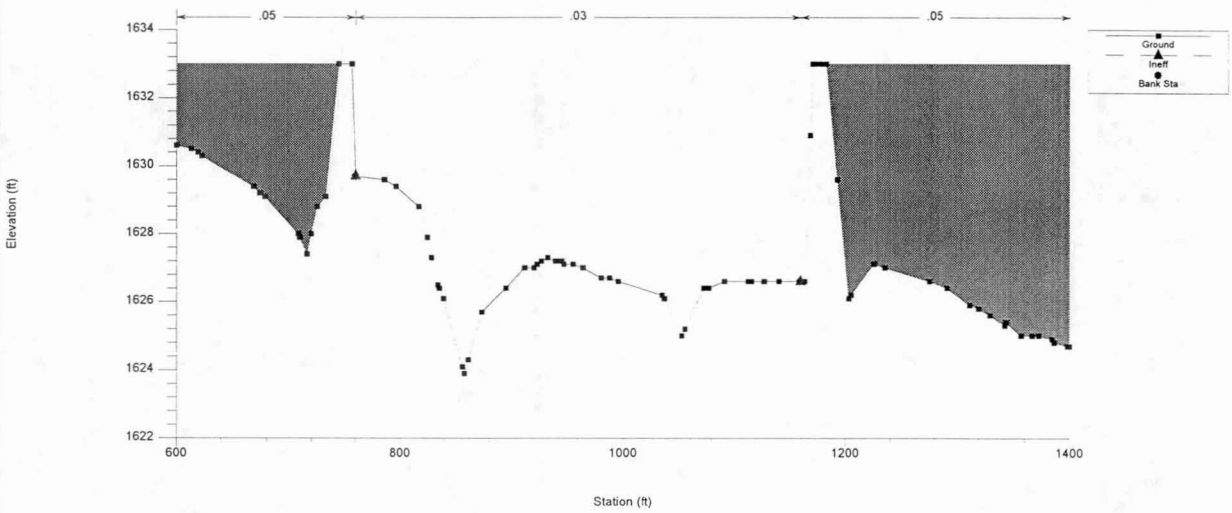
Reata Pass/Beardsley Wash
Riv Sta = 76.5



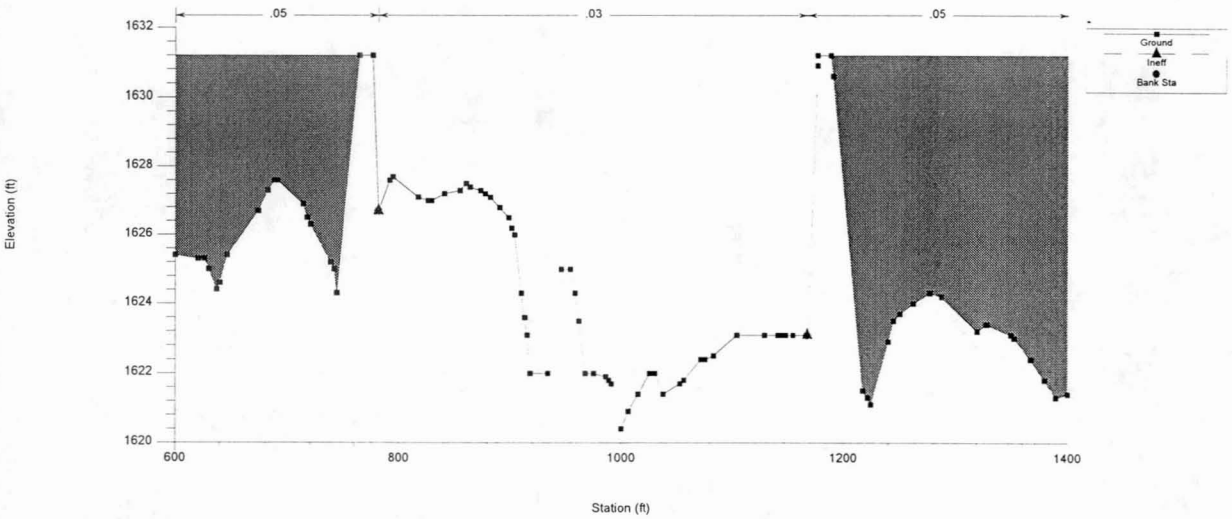
Reata Pass/Beardsley Wash
Riv Sta = 75

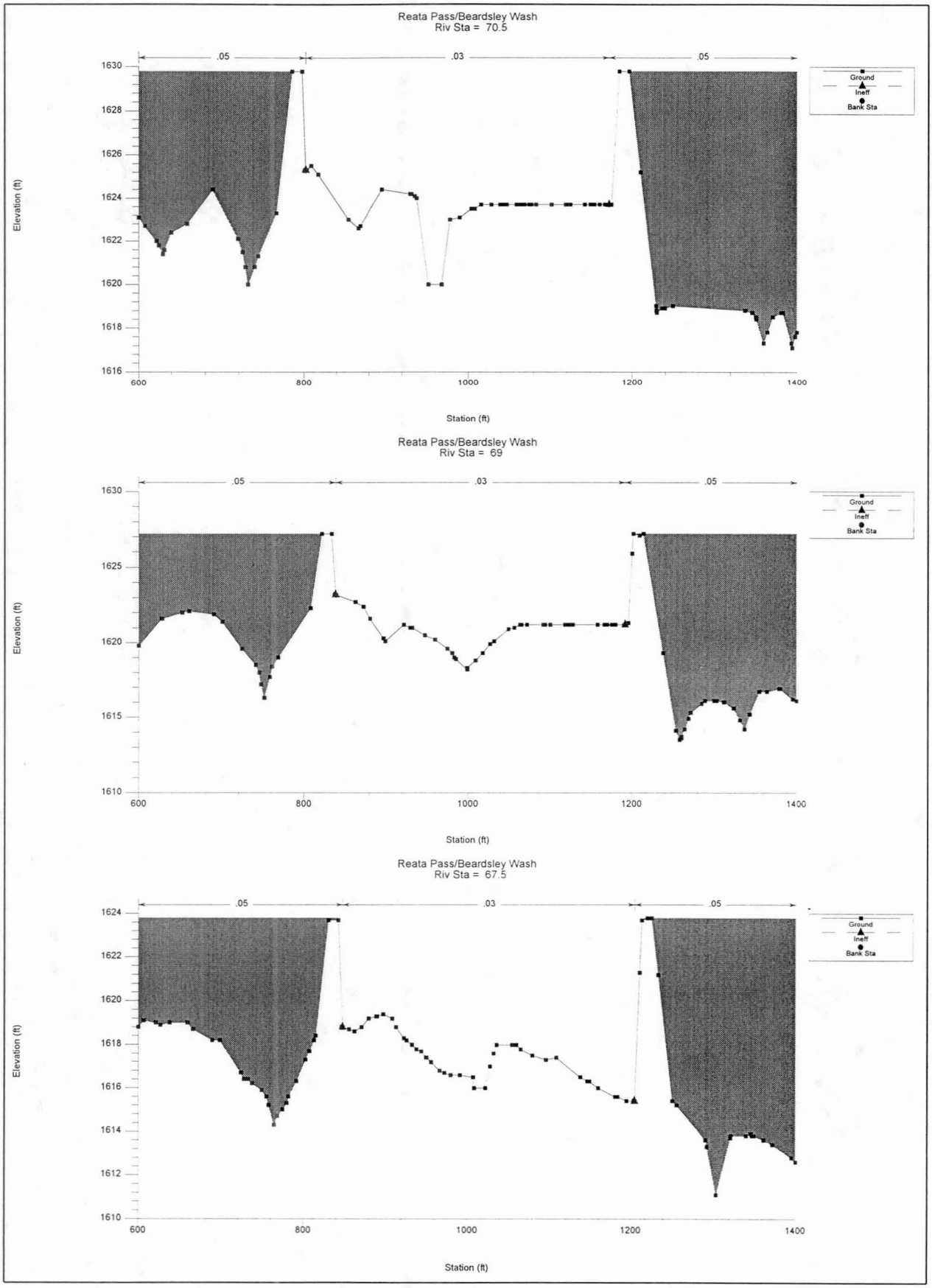


Reata Pass/Beardsley Wash
Riv Sta = 73.5

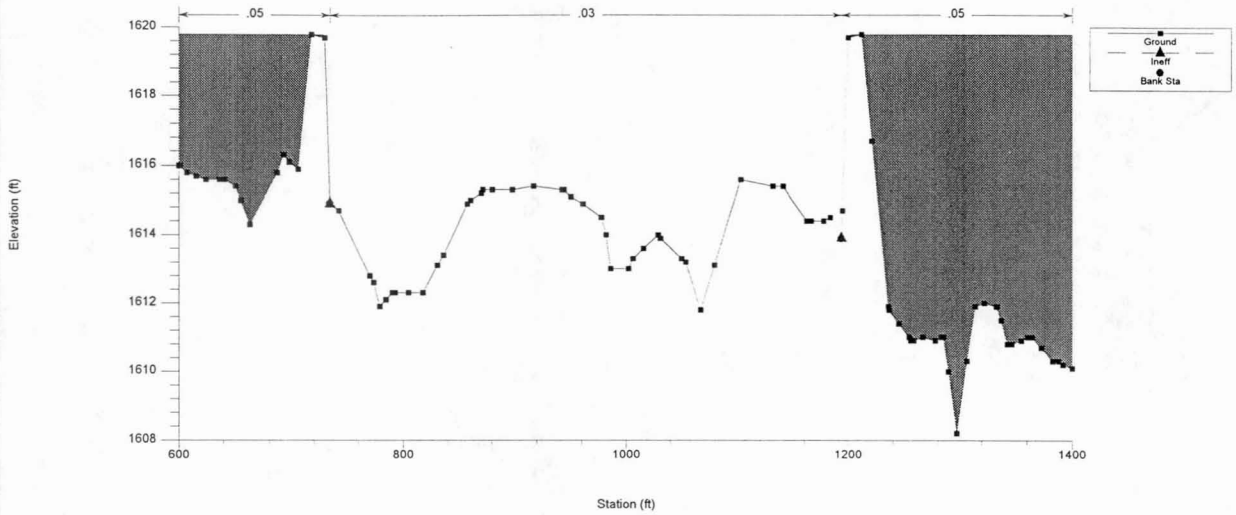


Reata Pass/Beardsley Wash
Riv Sta = 72

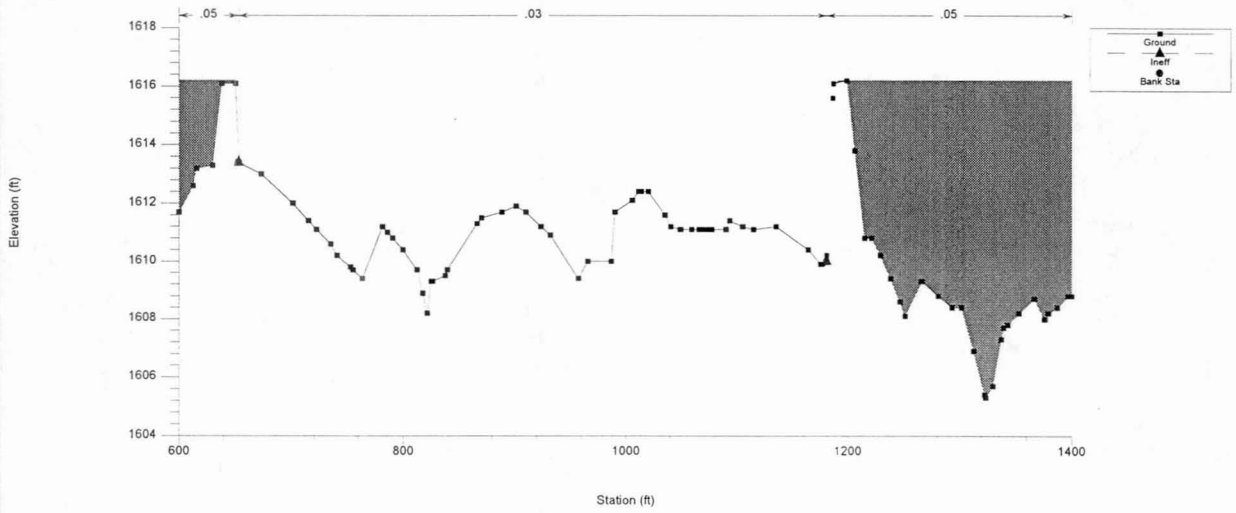



Reata Pass/Beardsley Wash
Riv Sta = 70.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 69
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 67.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

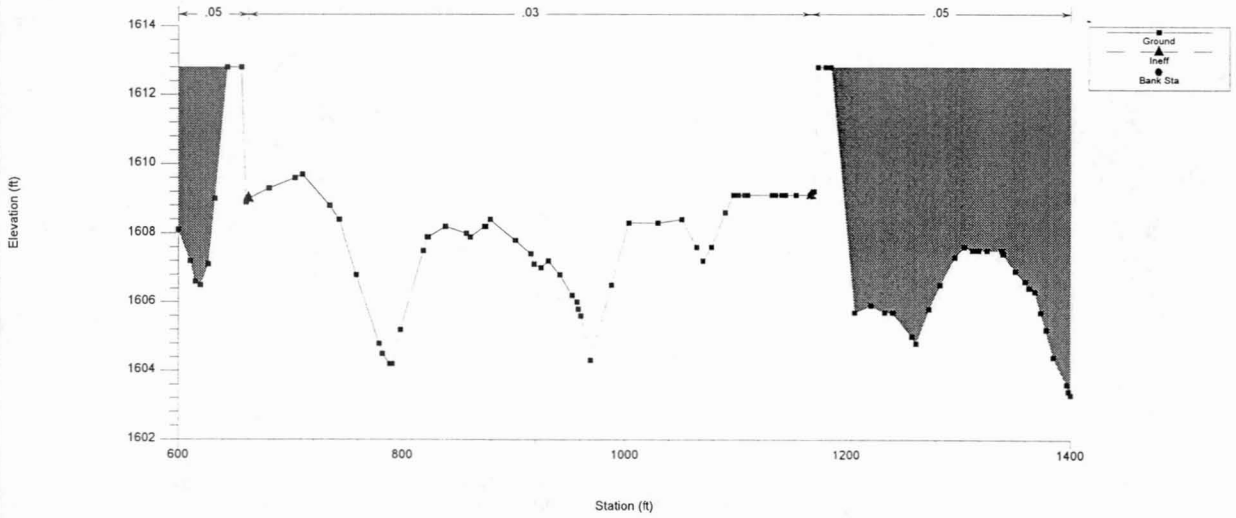
Reata Pass/Beardsley Wash
Riv Sta = 66

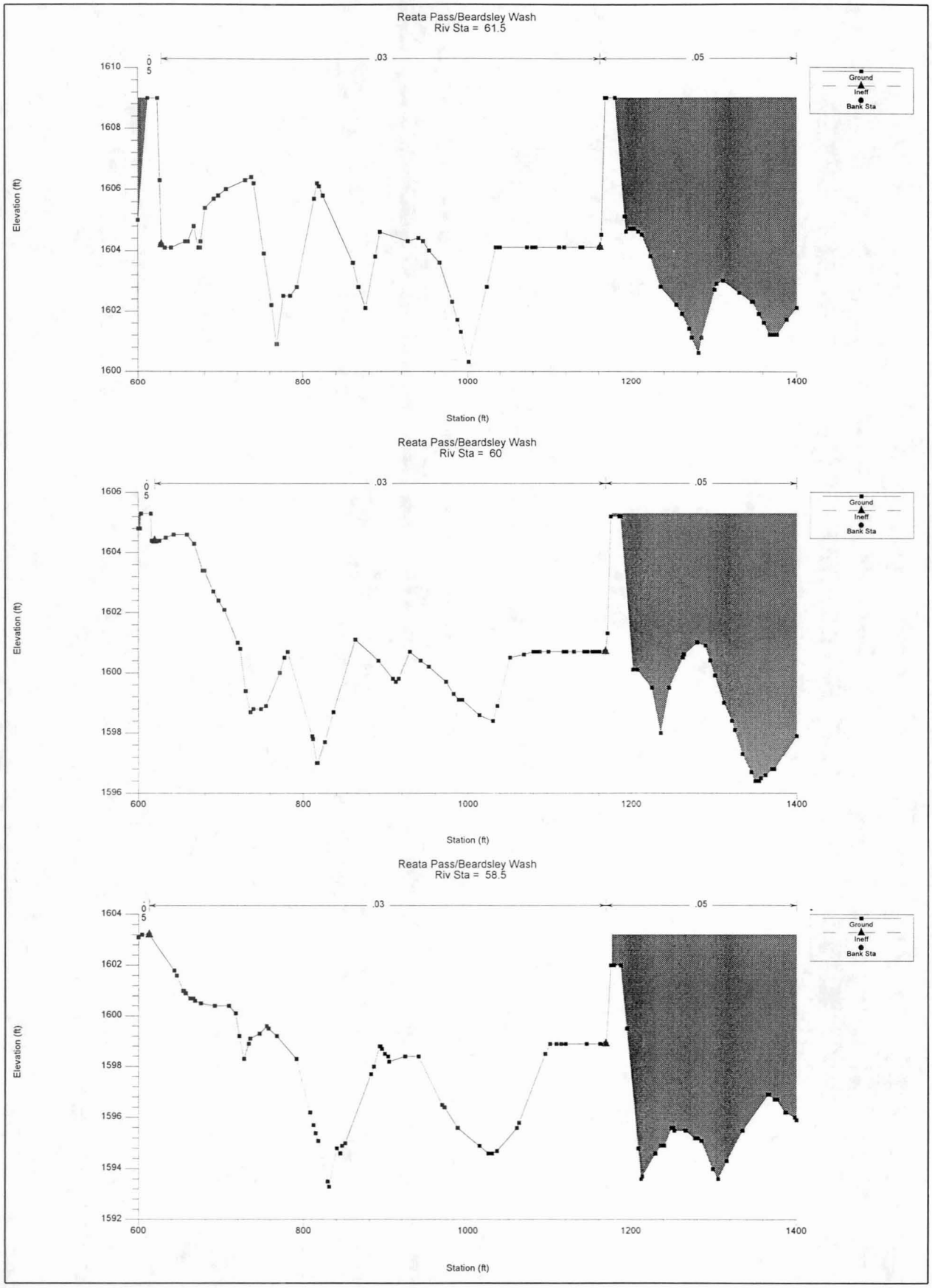


Reata Pass/Beardsley Wash
Riv Sta = 64.5

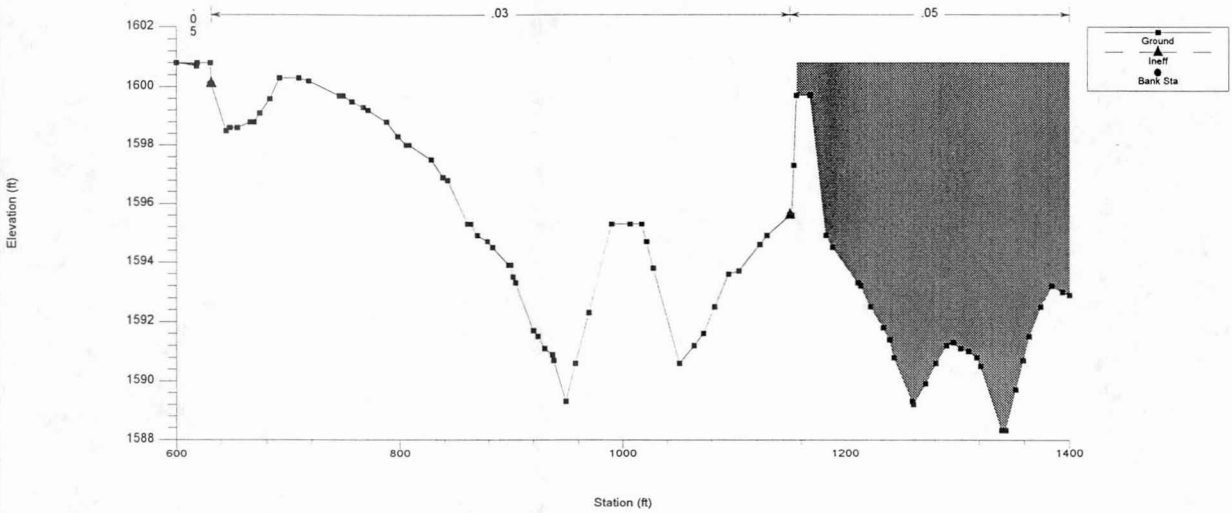


Reata Pass/Beardsley Wash
Riv Sta = 63

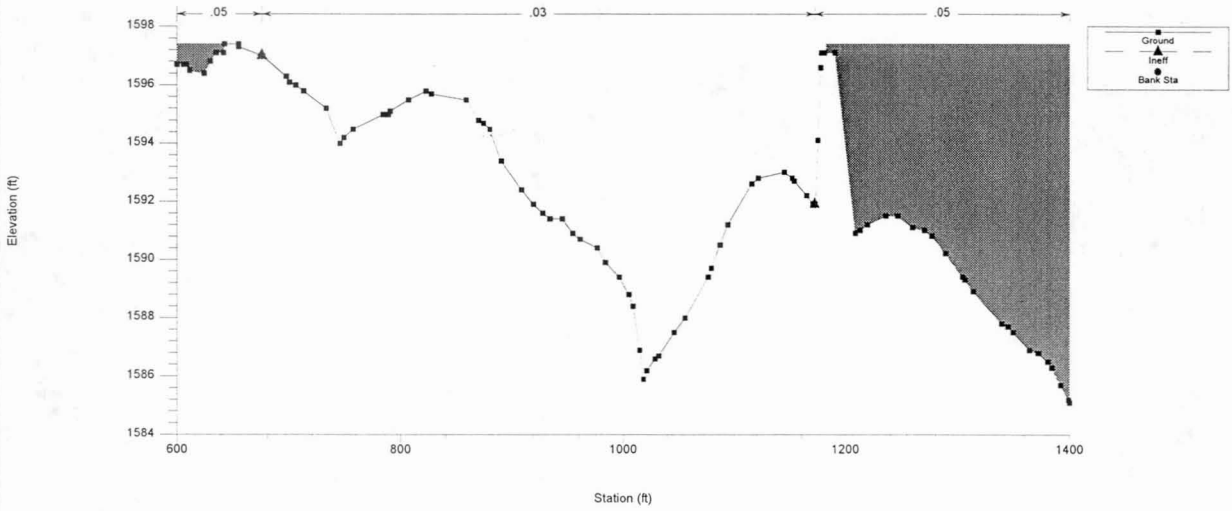



Reata Pass/Beardsley Wash
Riv Sta = 61.5
.03
.05
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 60
.03
.05
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 58.5
.03
.05
0
5
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

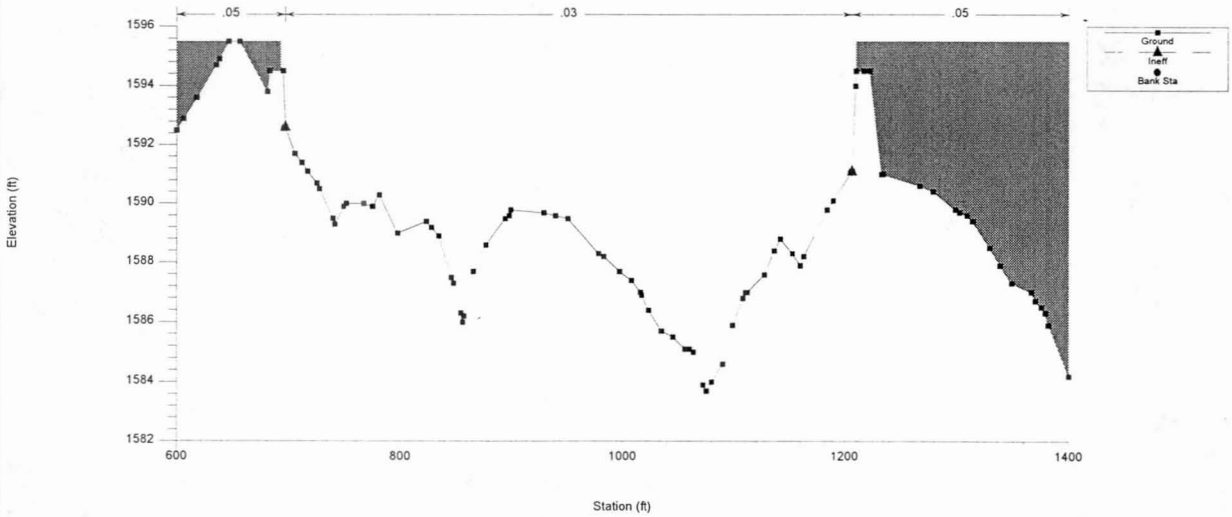
Reata Pass/Beardsley Wash
Riv Sta = 57

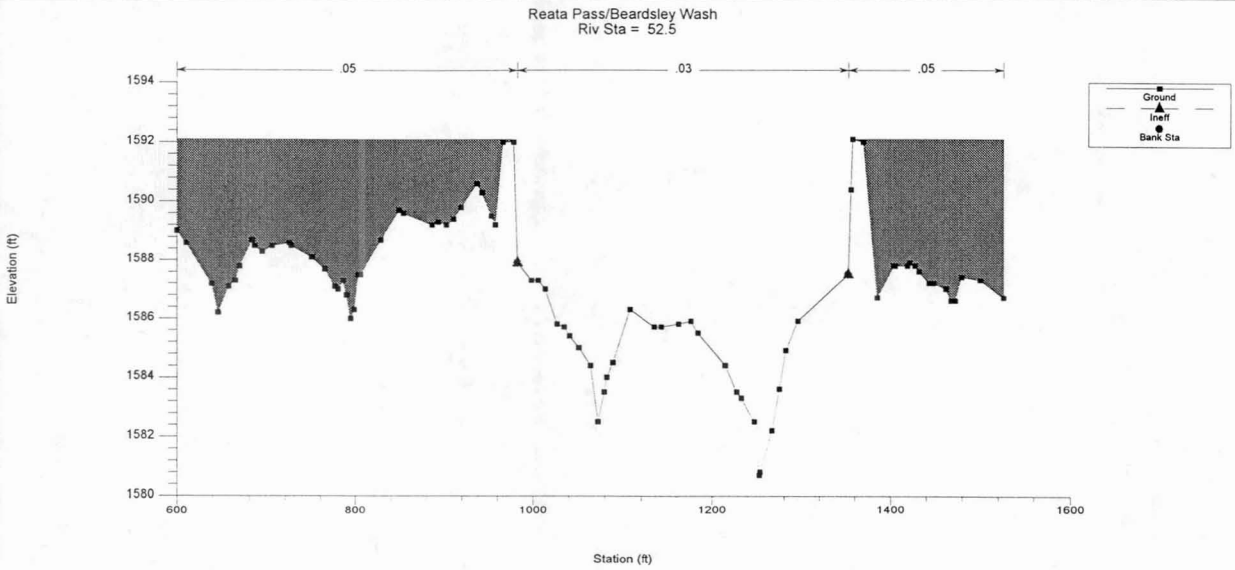


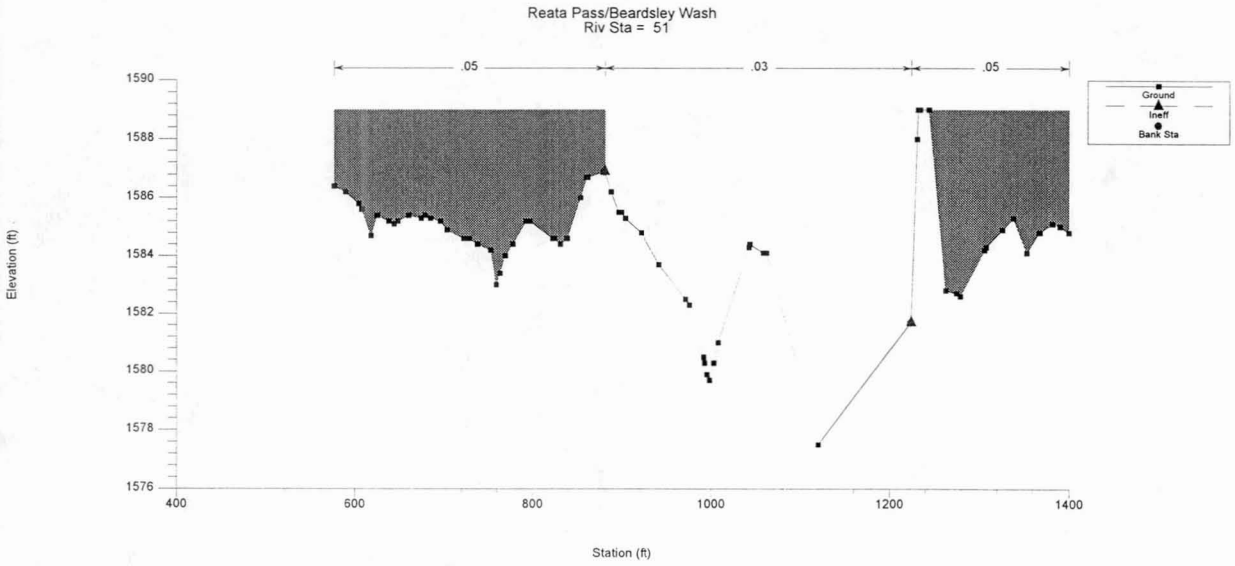
Reata Pass/Beardsley Wash
Riv Sta = 55.5

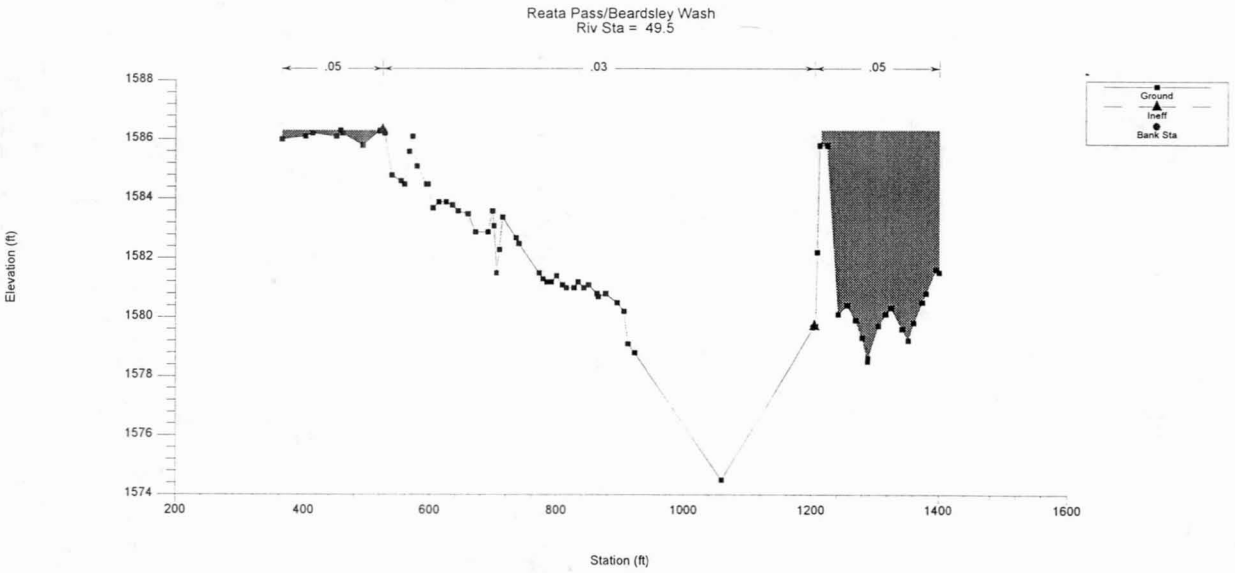


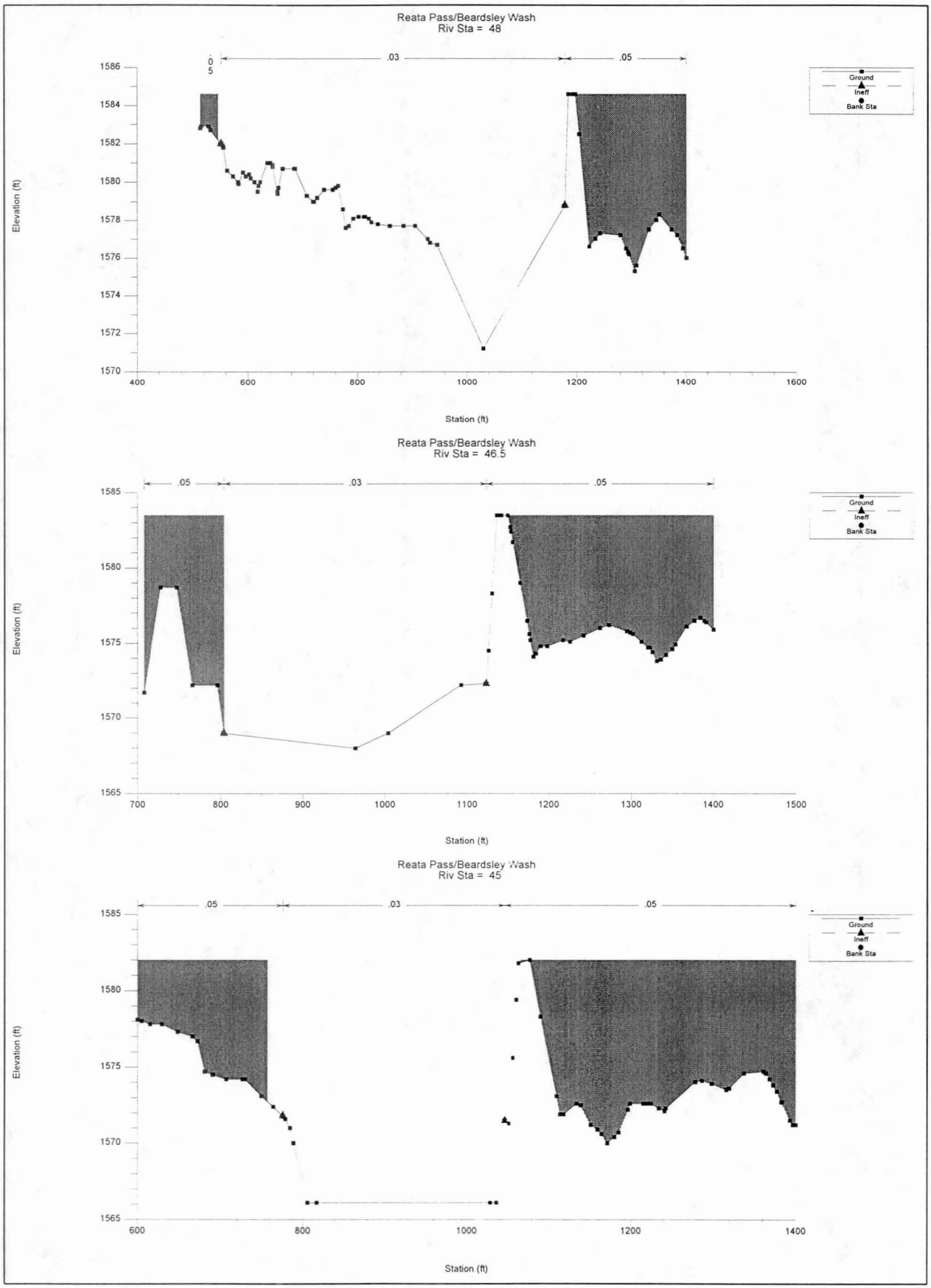
Reata Pass/Beardsley Wash
Riv Sta = 54



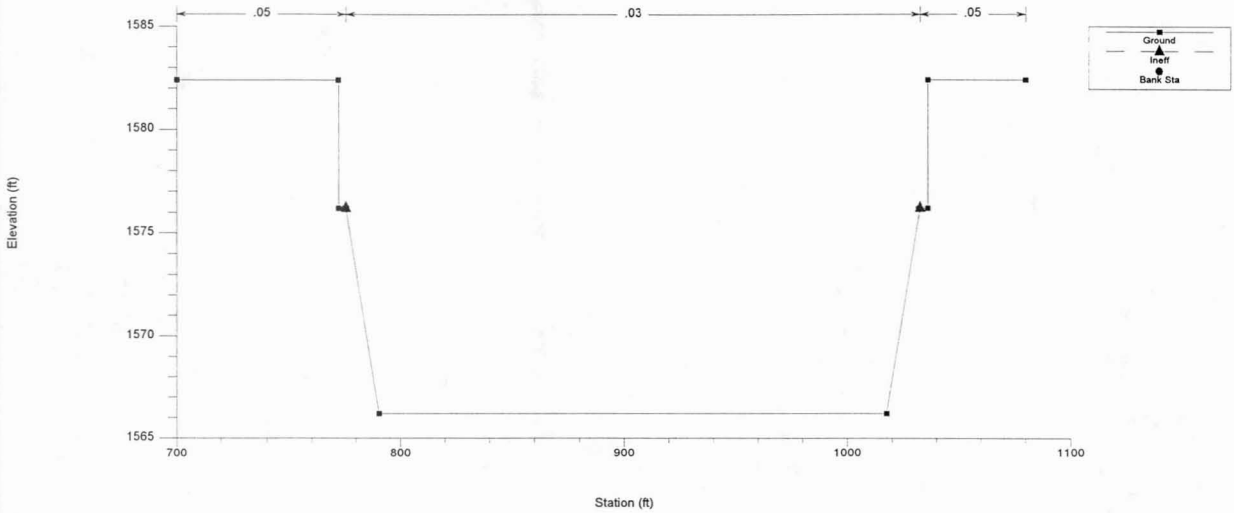

Reata Pass/Beardsley Wash
Riv Sta = 52.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1594
1592
1590
1588
1586
1584
1582
1580
600
800
1000
1200
1400
1600
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 51
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1590
1588
1586
1584
1582
1580
1578
1576
400
600
800
1000
1200
1400
Station (ft)

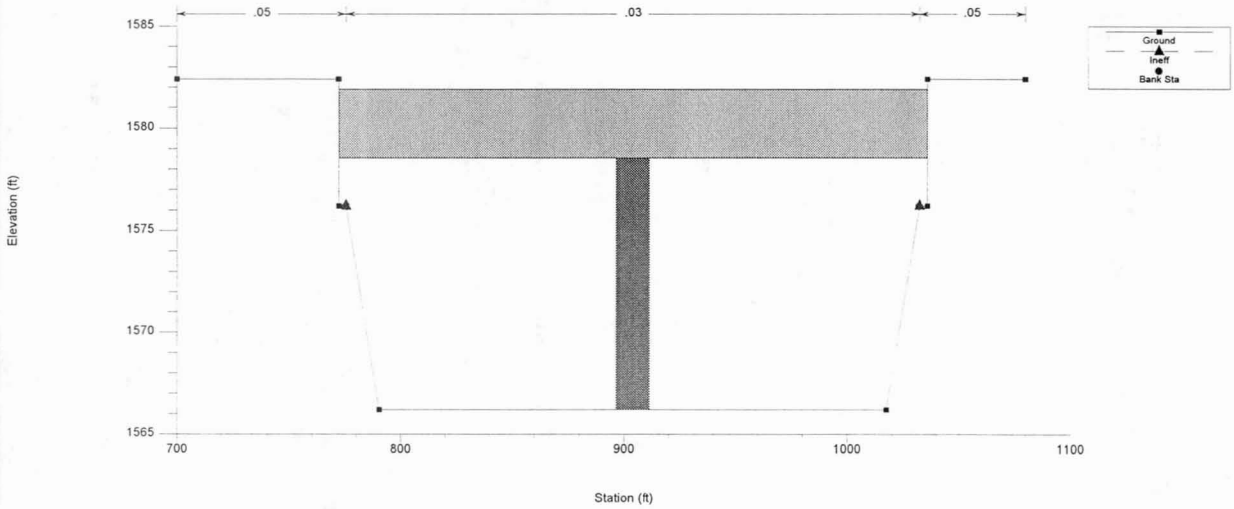

Reata Pass/Beardsley Wash
Riv Sta = 49.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1588
1586
1584
1582
1580
1578
1576
1574
200
400
600
800
1000
1200
1400
1600
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 48
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 46.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 45
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

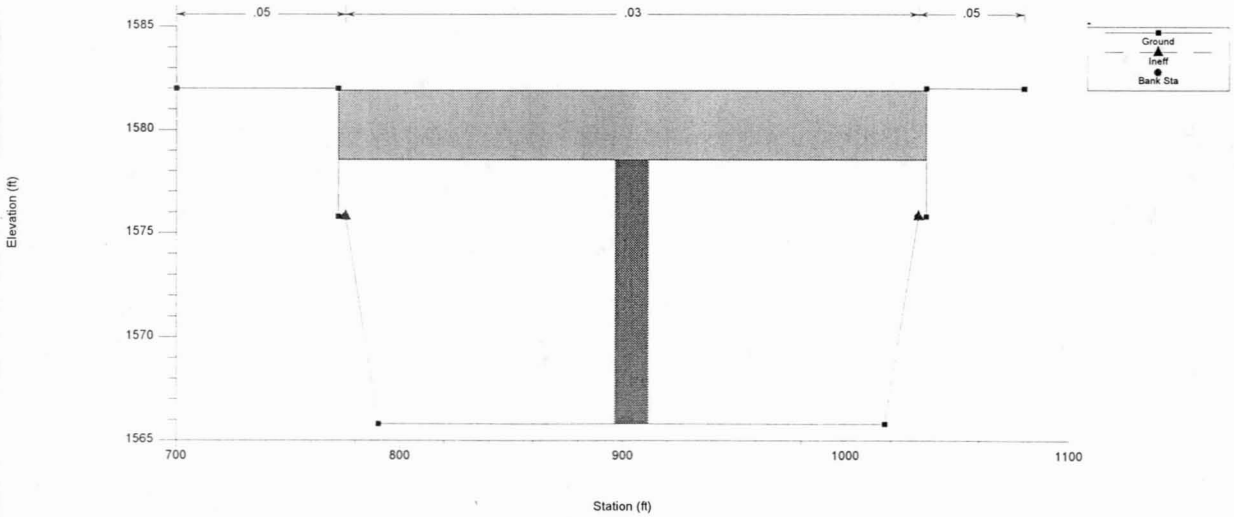
Reata Pass/Beardsley Wash
Riv Sta = 44.5

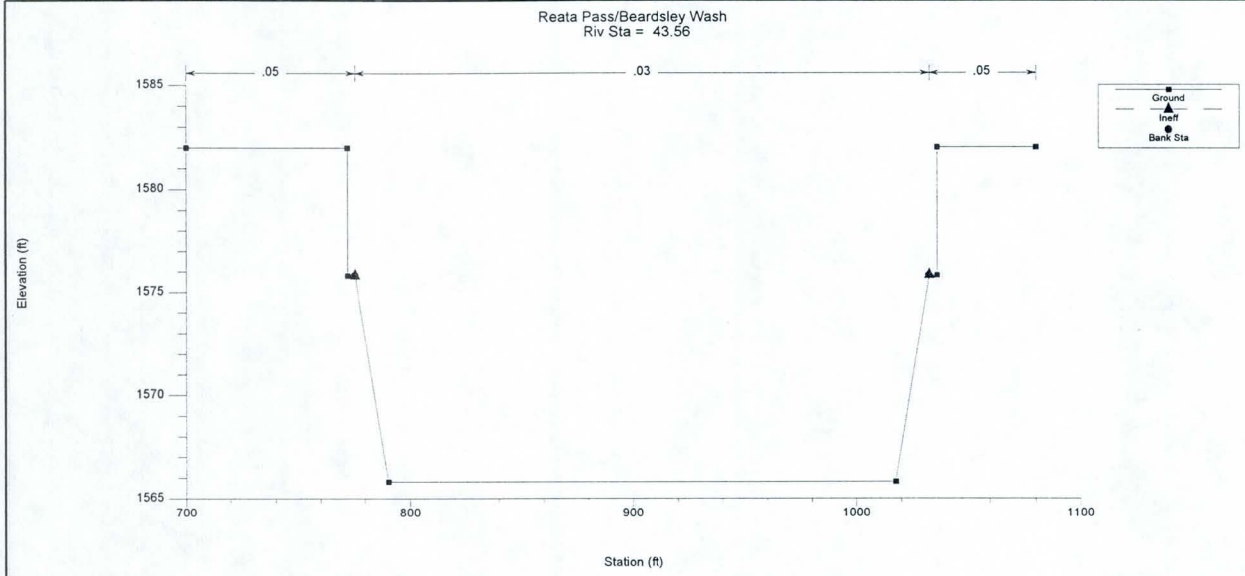


Reata Pass/Beardsley Wash
Upstream Inside Riv Sta = 44.0300

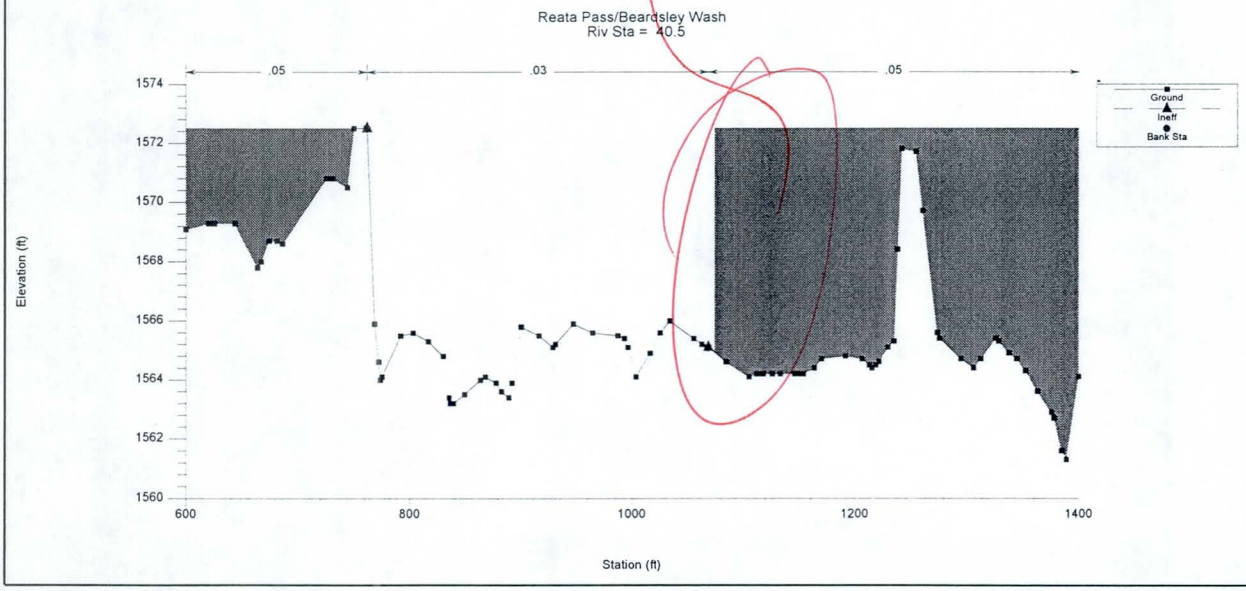


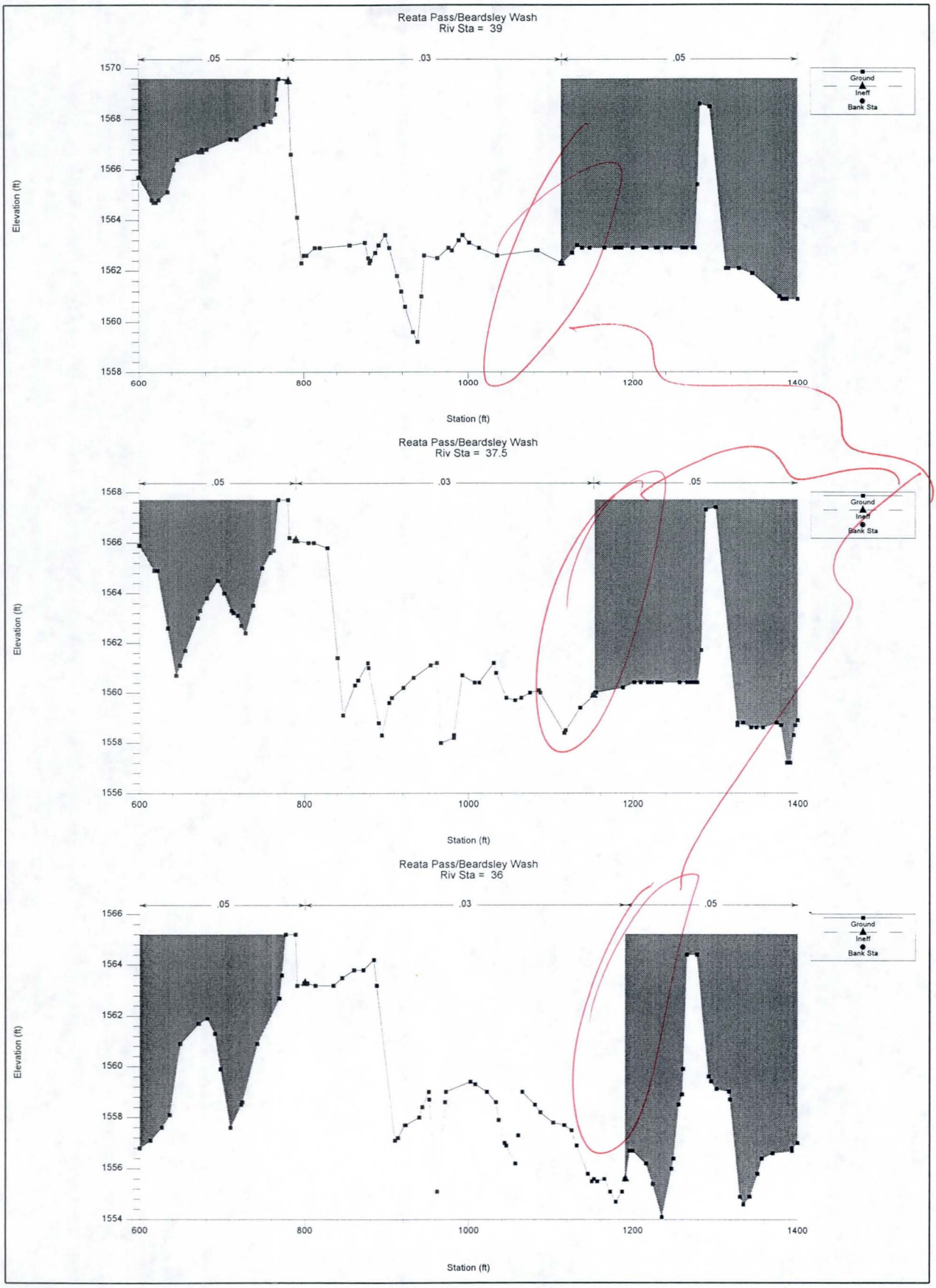
Reata Pass/Beardsley Wash
Downstream Inside Riv Sta = 44.0300



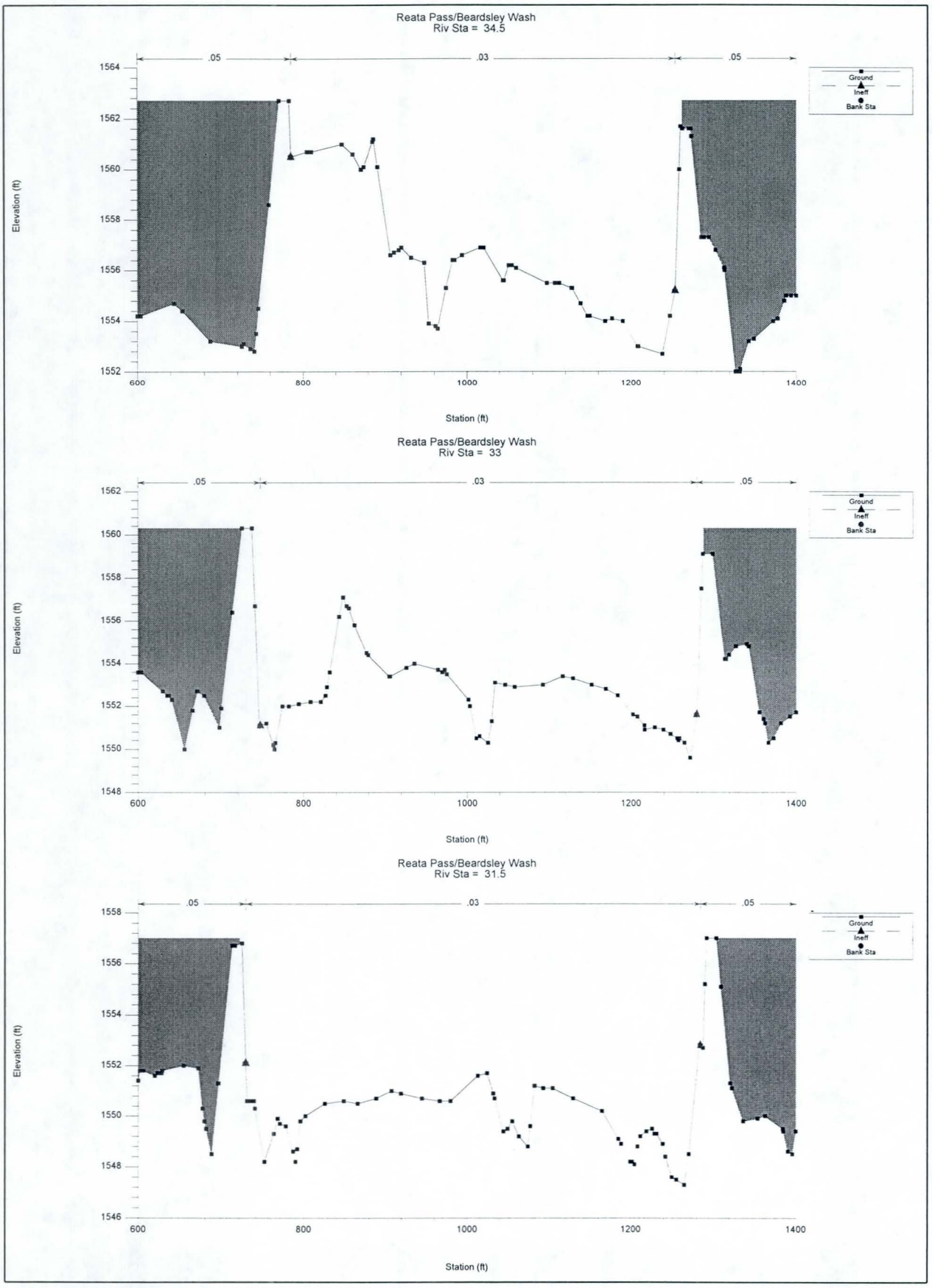


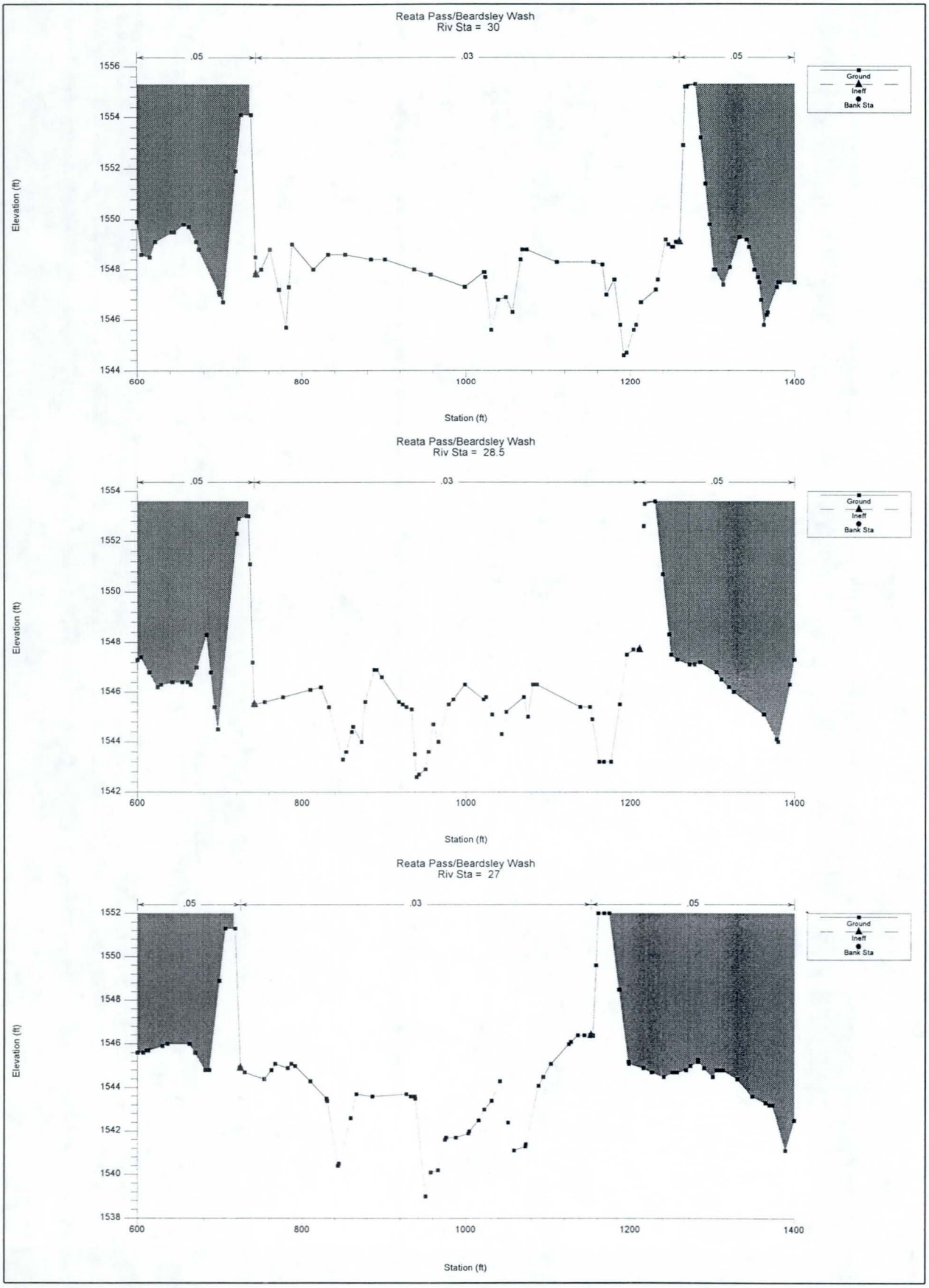
Why this blocked-

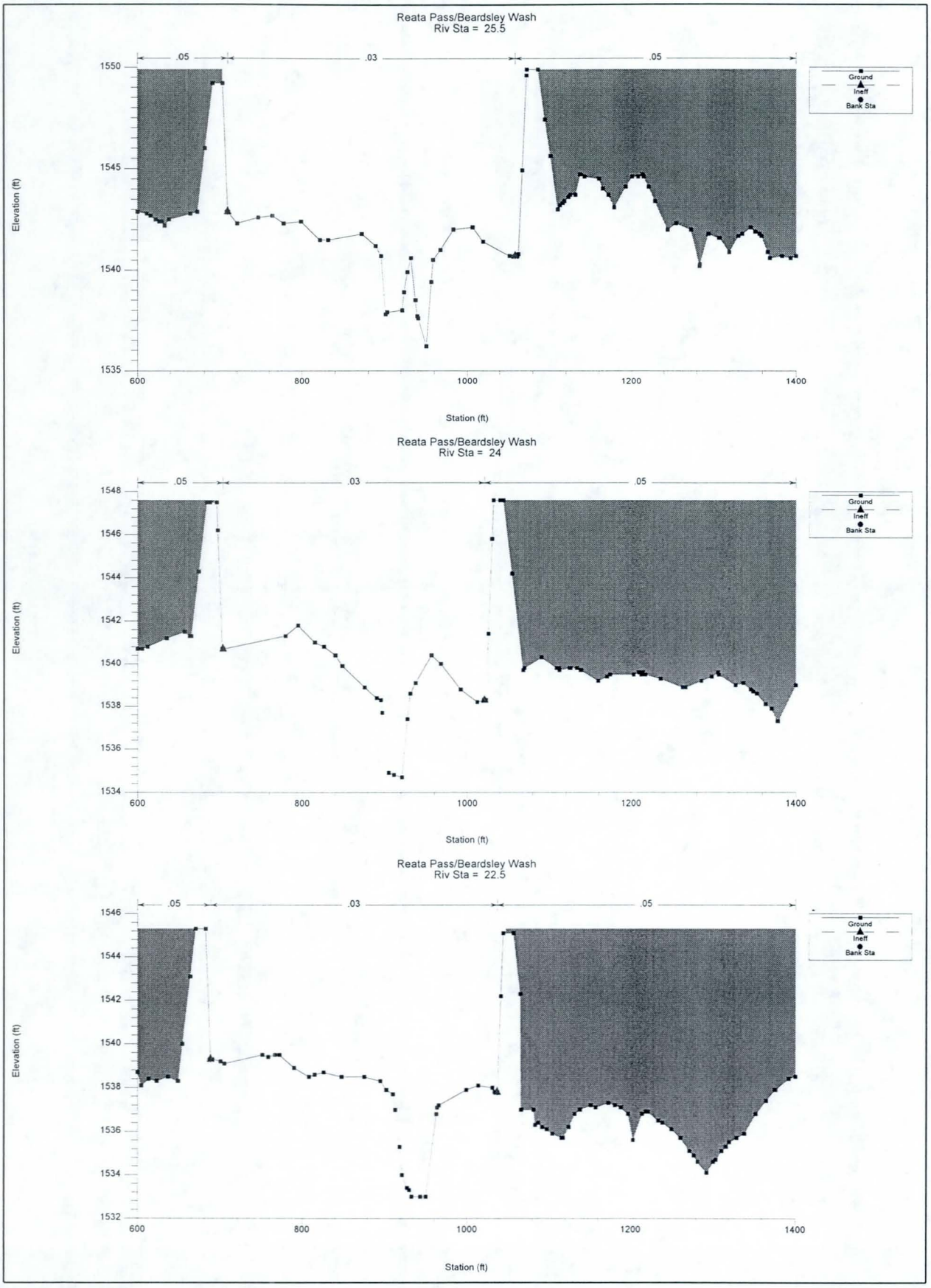




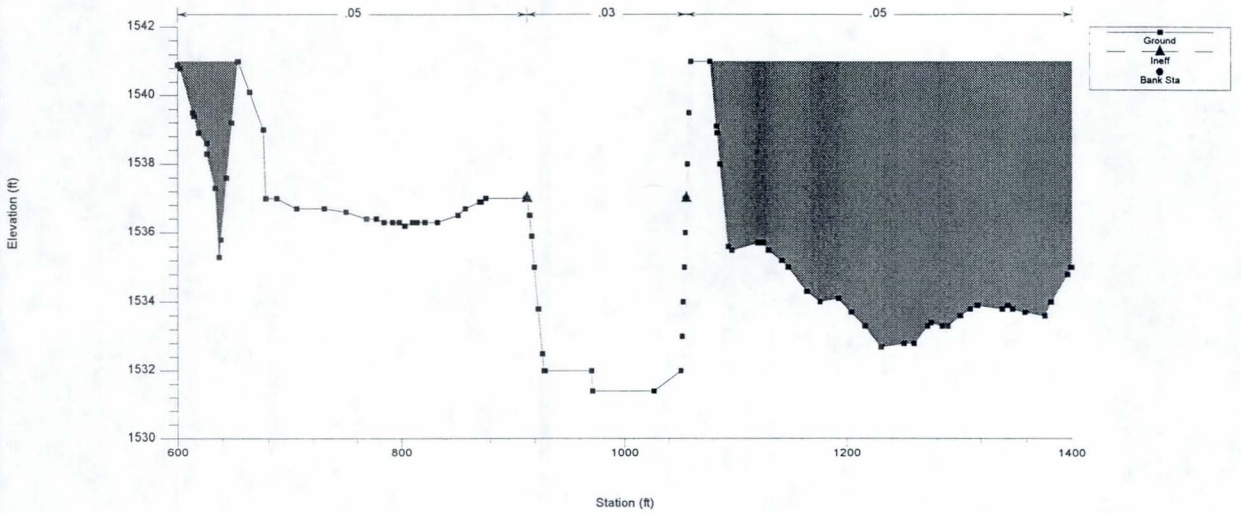
why this area blocked?


Reata Pass/Beardsley Wash
Riv Sta = 34.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 33
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 31.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

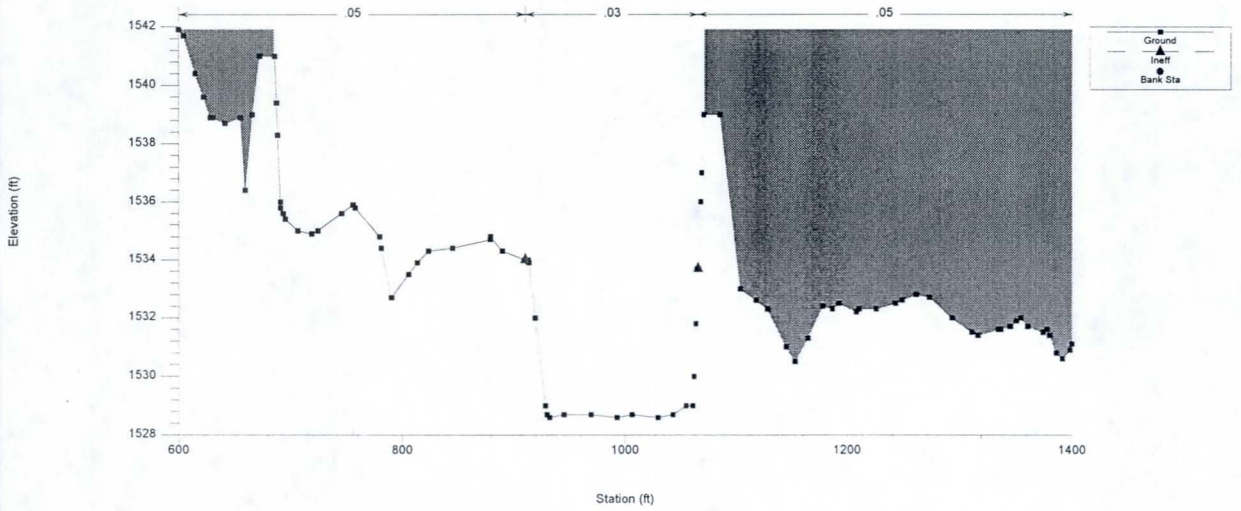

Reata Pass/Beardsley Wash
Riv Sta = 30
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 28.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 27
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 25.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 24
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 22.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

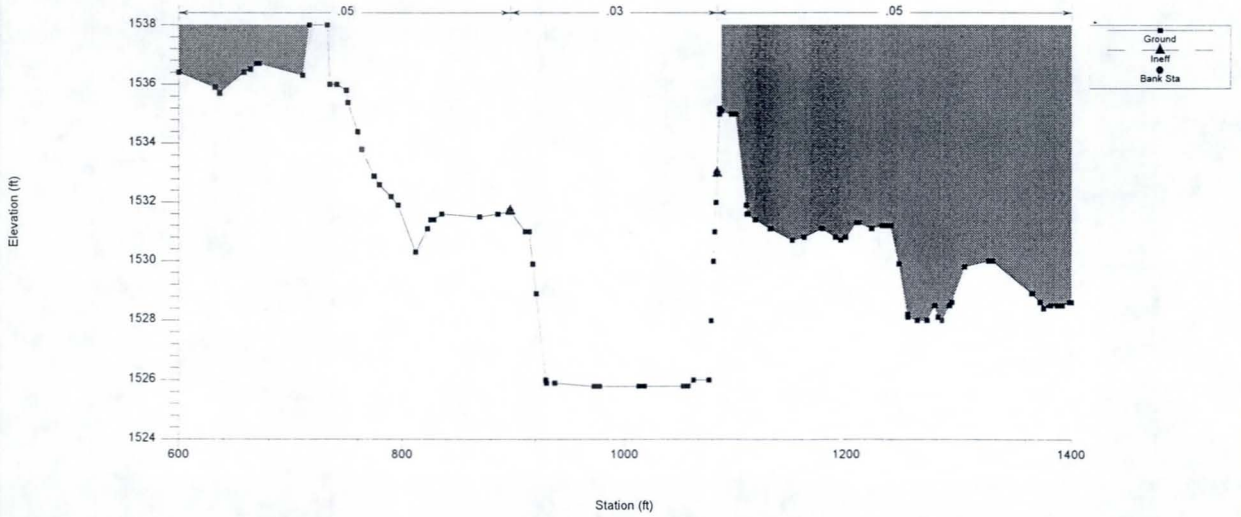
Reata Pass/Beardsley Wash
Riv Sta = 21

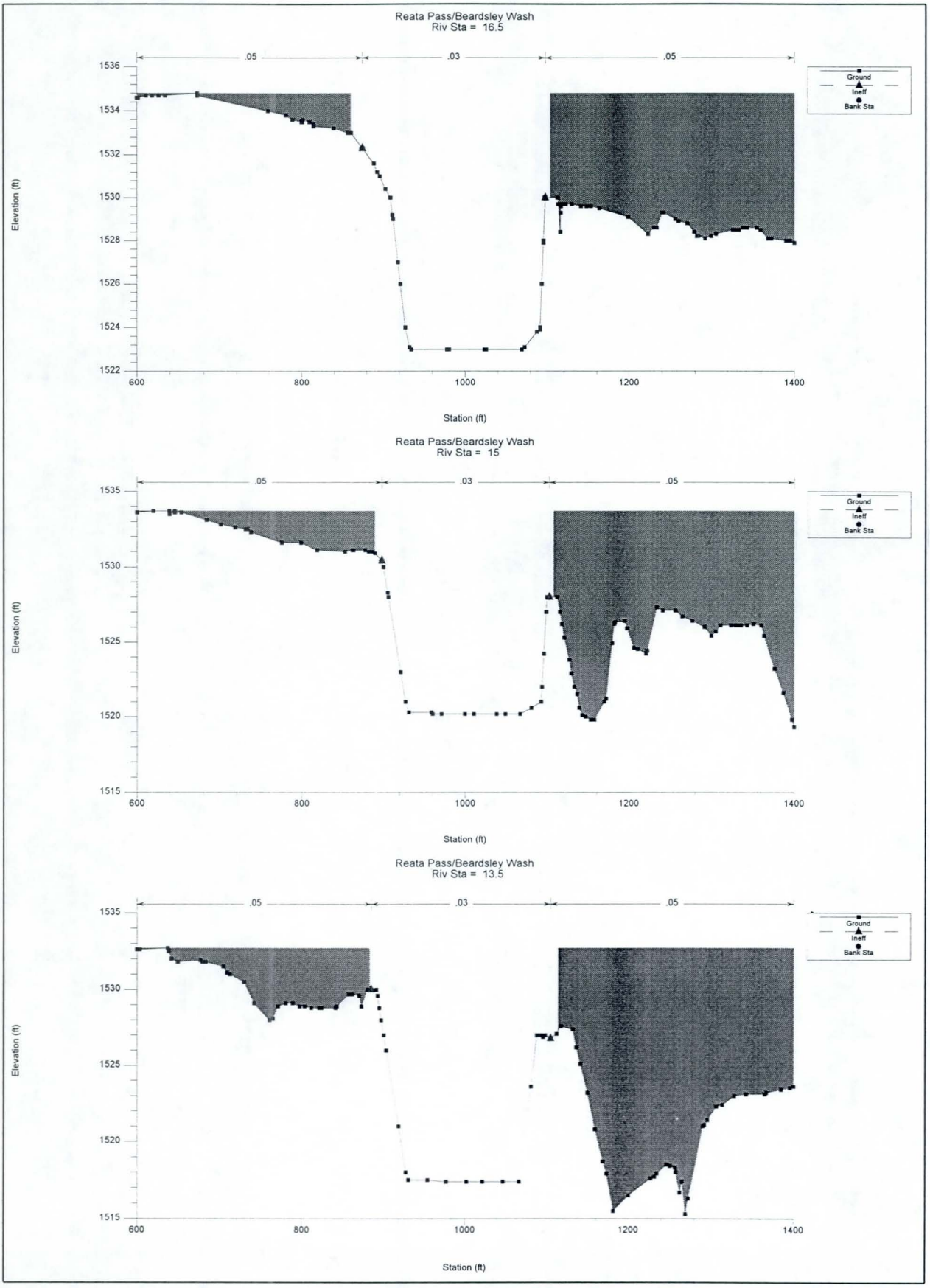


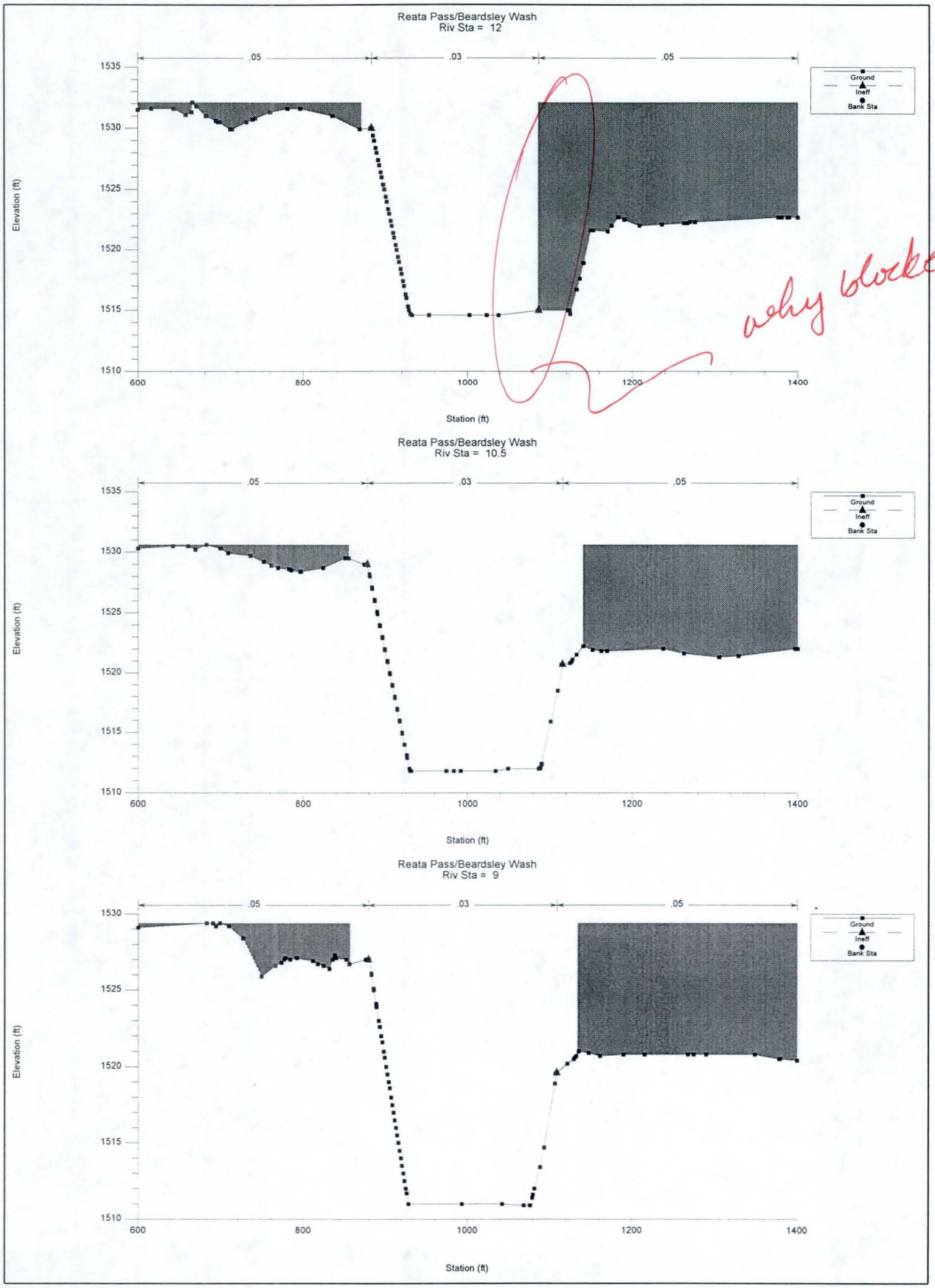
Reata Pass/Beardsley Wash
Riv Sta = 19.5

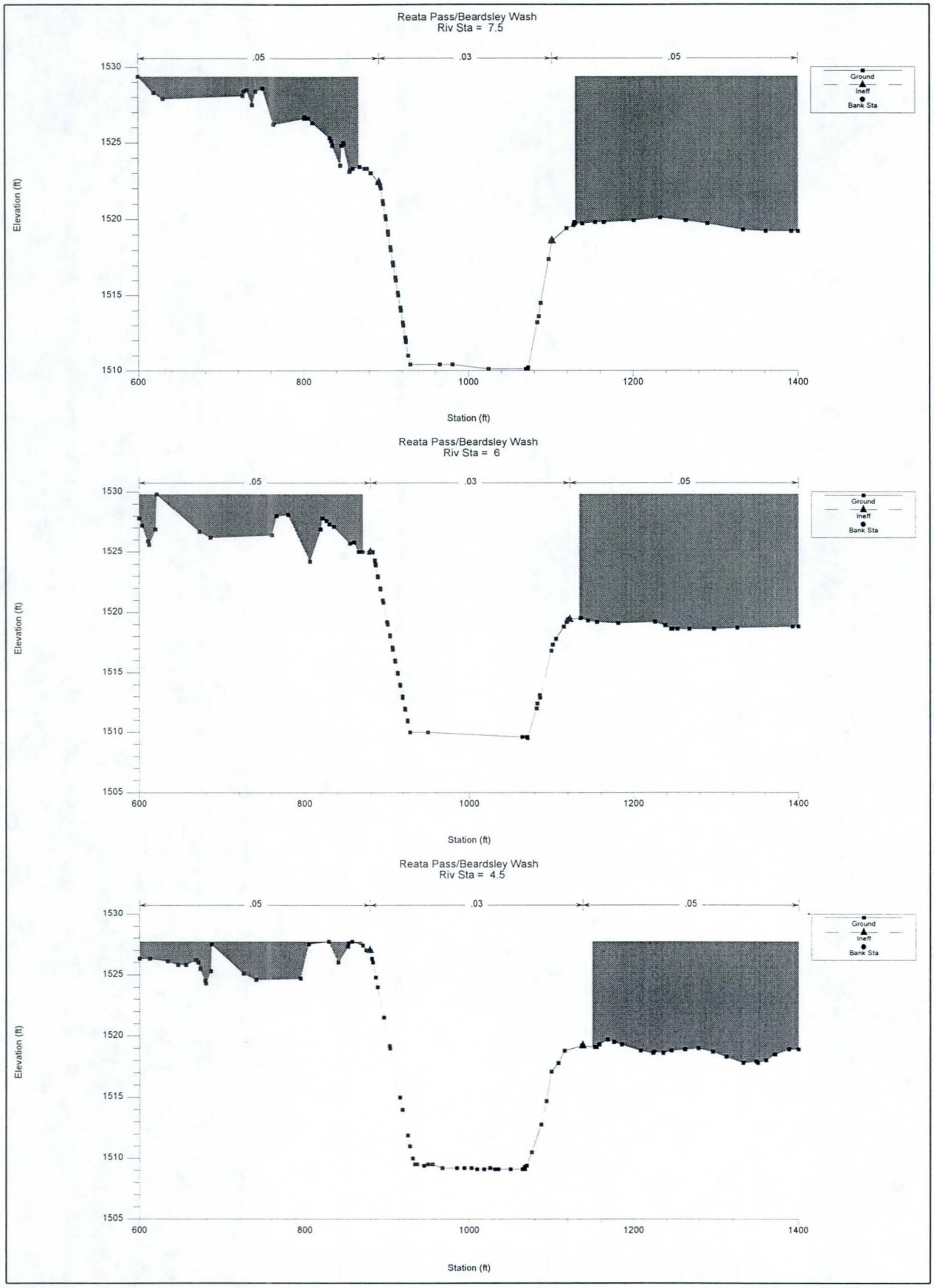


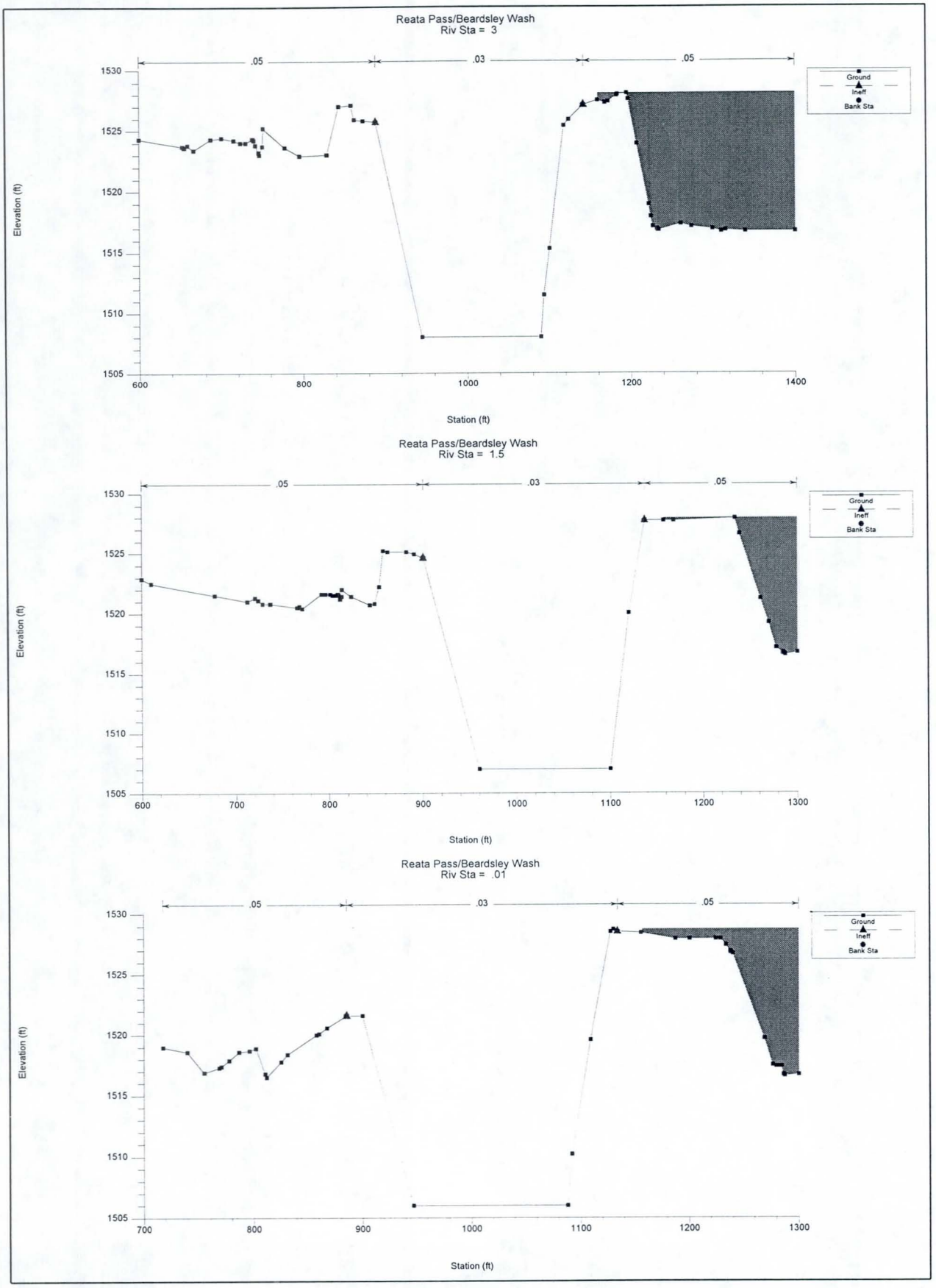
Reata Pass/Beardsley Wash
Riv Sta = 18




Reata Pass/Beardsley Wash
Riv Sta = 16.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 15
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 13.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Reata Pass/Beardsley Wash
Riv Sta = 12
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
why blocked?
Reata Pass/Beardsley Wash
Riv Sta = 10.5
Reata Pass/Beardsley Wash
Riv Sta = 9

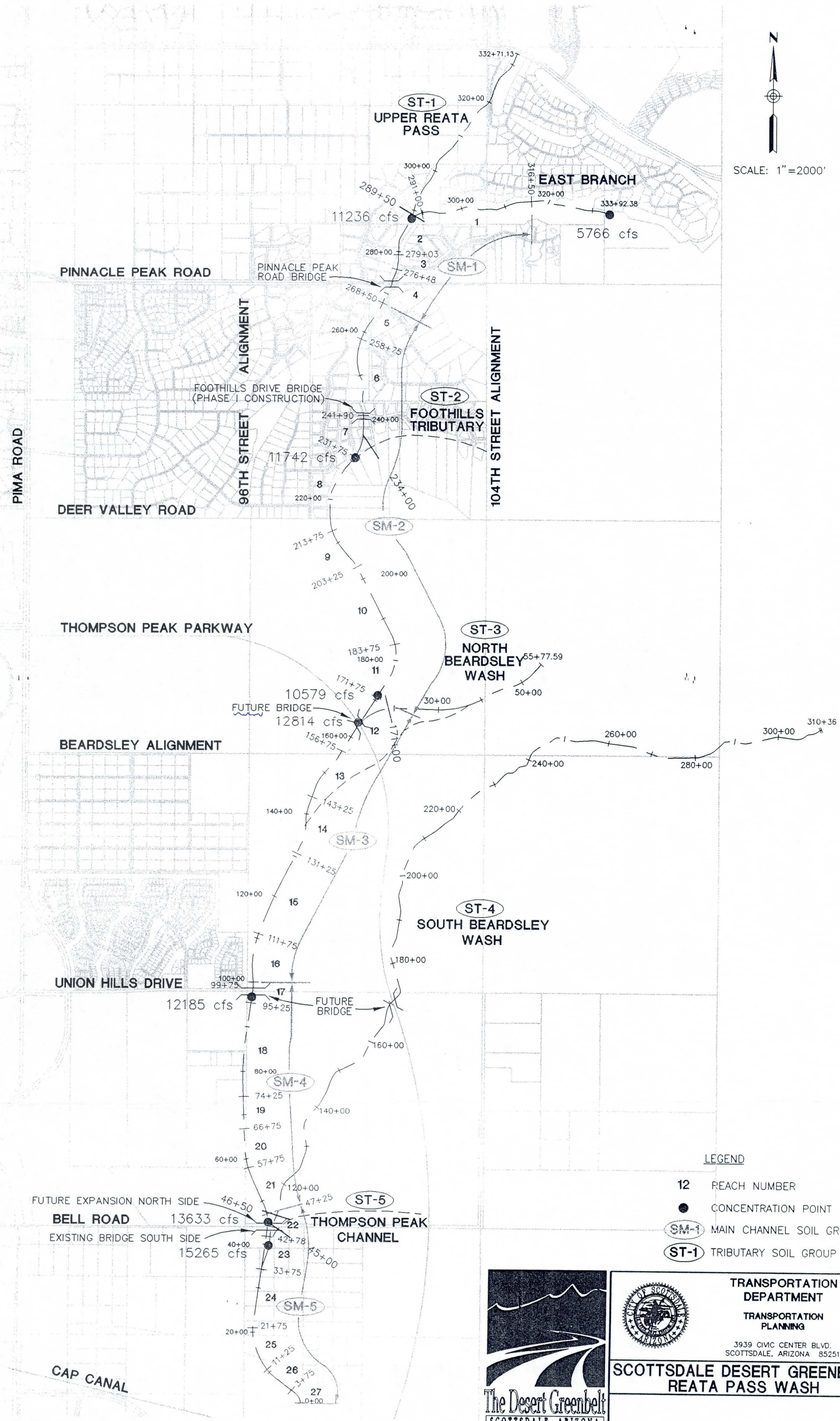

Reata Pass/Beardsley Wash
Riv Sta = 7.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 6
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
1505
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 4.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
1505
600
800
1000
1200
1400
Station (ft)

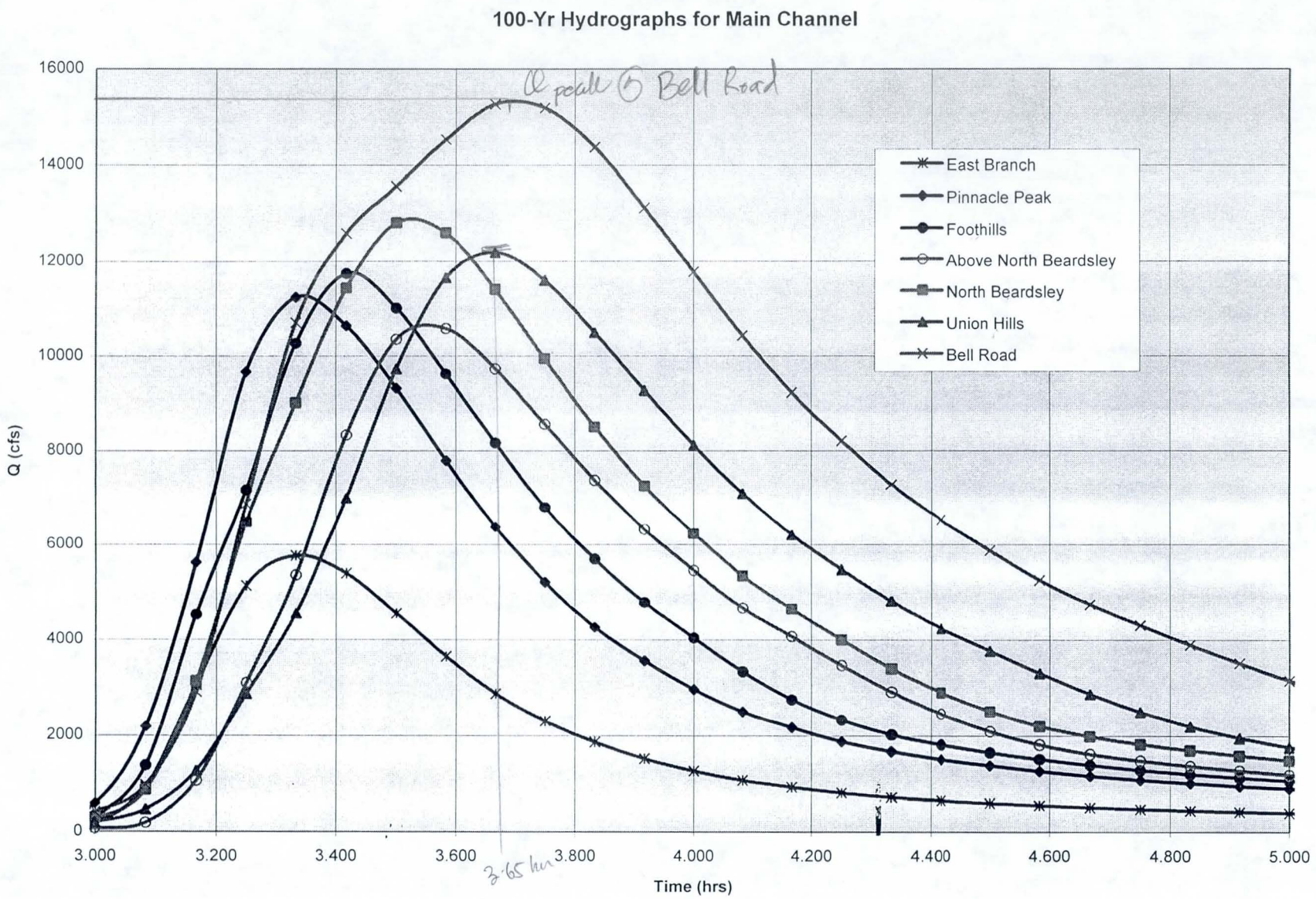

Reata Pass/Beardsley Wash
Riv Sta = 3
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
1505
600
800
1000
1200
1400
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = 1.5
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
1505
600
700
800
900
1000
1100
1200
1300
Station (ft)
Reata Pass/Beardsley Wash
Riv Sta = .01
.05
.03
.05
Ground
Ineff
Bank Sta
Elevation (ft)
1530
1525
1520
1515
1510
1505
700
800
900
1000
1100
1200
1300
Station (ft)

B: HYDROLOGIC ANALYSIS

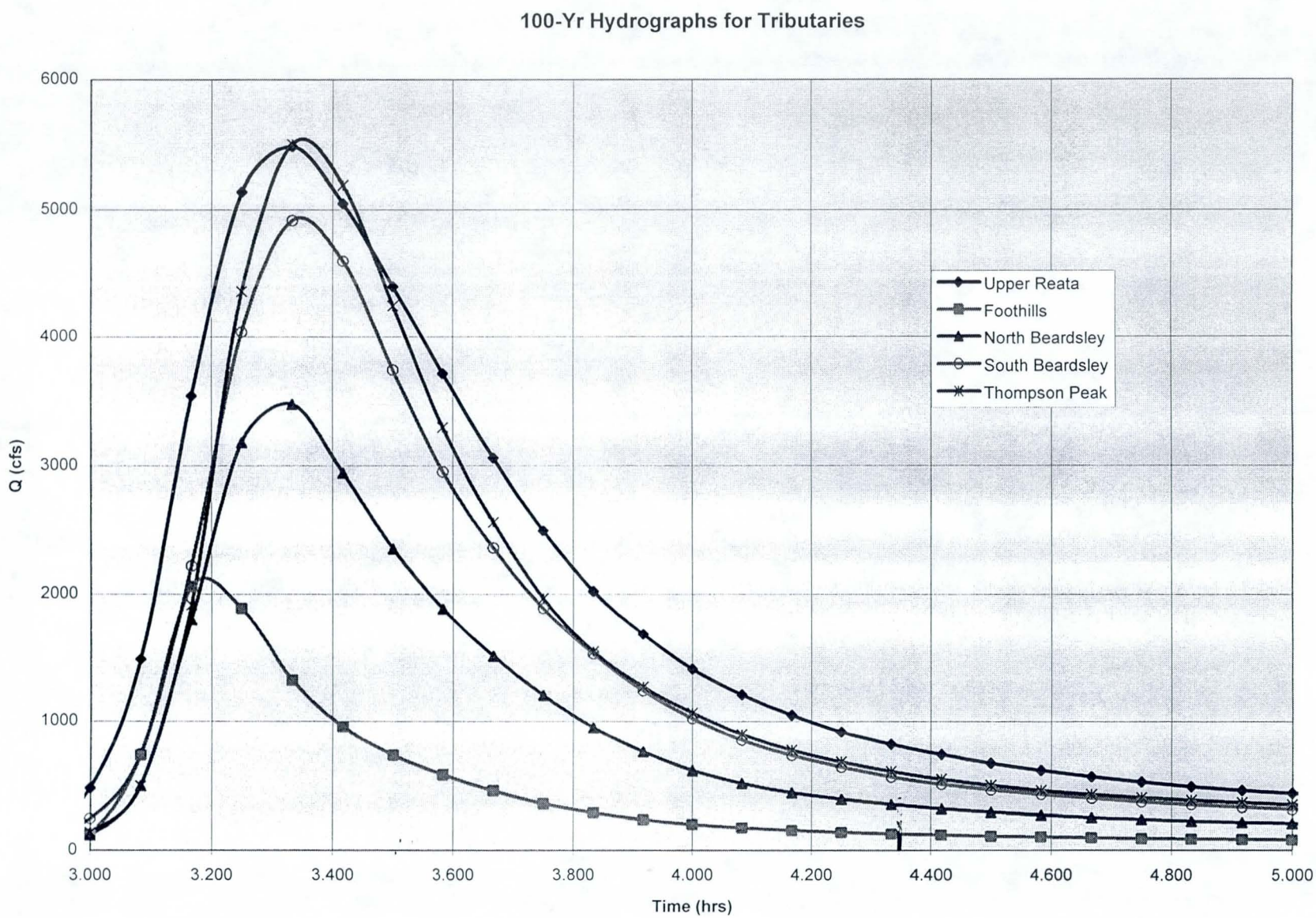
Results of the Hydrologic Analysis provided by Greiner are summarized in this section. Hydrologic information for various concentration points along the main channel and each of the five tributaries are included.

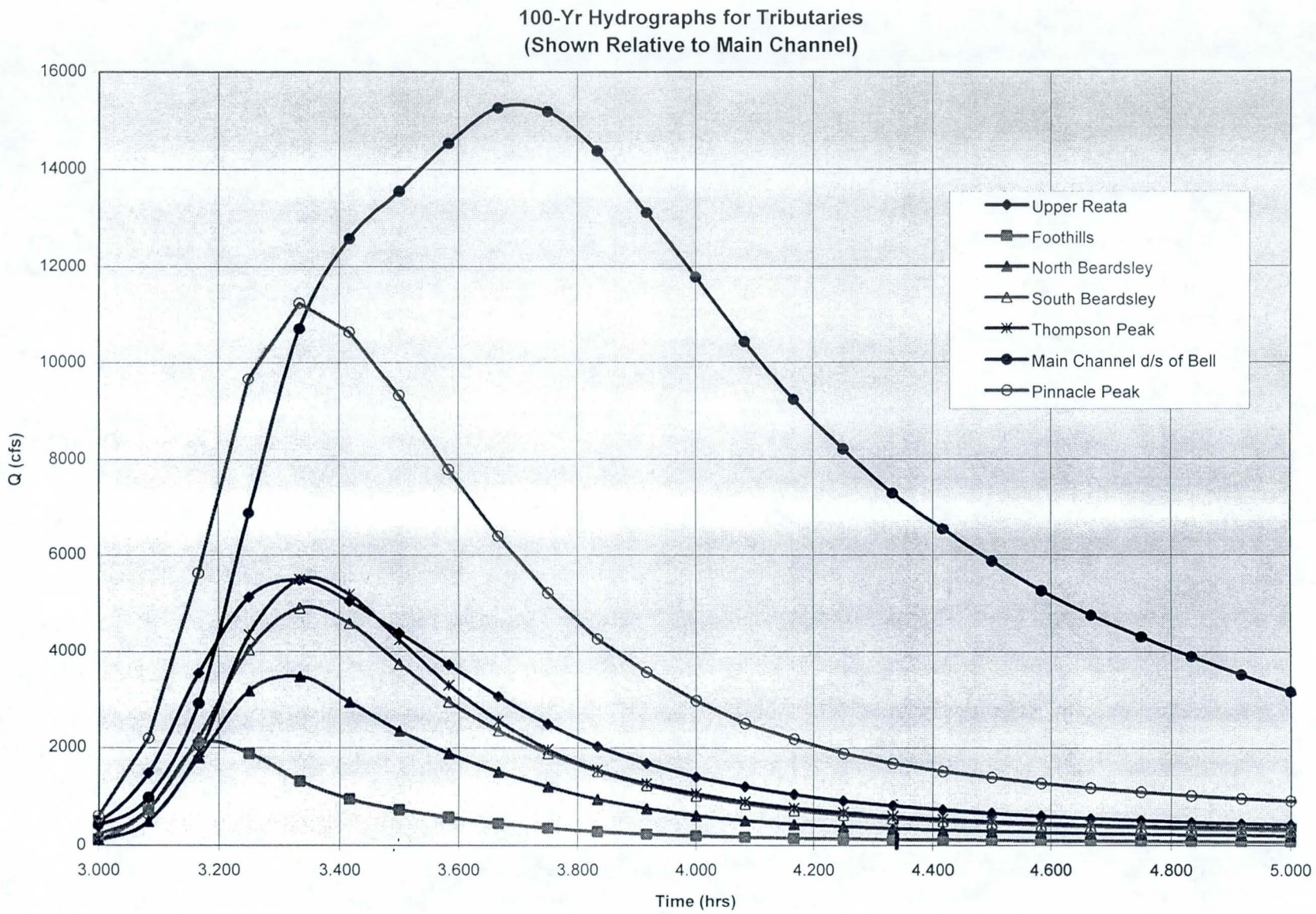
1. Watershed Map Showing the Concentration Points
2. 100-Yr Hydrographs - Main Channel and Tributaries
3. Discretized Hydrographs
4. Sequential Peak Flows along Main Channel for 3 Scenarios
5. Flood Frequency Curves


N
SCALE: 1"=2000'
ST-1
UPPER REATA PASS
EAST BRANCH
11236 cfs
5766 cfs
SM-1
PINNACLE PEAK ROAD
PINNACLE PEAK ROAD BRIDGE
PIMA ROAD
96TH STREET ALIGNMENT
104TH STREET ALIGNMENT
FOOTHILLS DRIVE BRIDGE (PHASE I CONSTRUCTION)
ST-2
FOOTHILLS TRIBUTARY
11742 cfs
DEER VALLEY ROAD
SM-2
THOMPSON PEAK PARKWAY
ST-3
NORTH BEARDSLEY WASH
10579 cfs
FUTURE BRIDGE
12814 cfs
BEARDSLEY ALIGNMENT
SM-3
ST-4
SOUTH BEARDSLEY WASH
UNION HILLS DRIVE
12185 cfs
FUTURE BRIDGE
SM-4
FUTURE EXPANSION NORTH SIDE
BELL ROAD
13633 cfs
EXISTING BRIDGE SOUTH SIDE
15265 cfs
ST-5
THOMPSON PEAK CHANNEL
SM-5
CAP CANAL
LEGEND
12 REACH NUMBER
CONCENTRATION POINT
SM-1 MAIN CHANNEL SOIL GROUP
ST-1 TRIBUTARY SOIL GROUP
The Desert Greenbelt
SCOTTSDALE, ARIZONA
TRANSPORTATION DEPARTMENT
TRANSPORTATION PLANNING
3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251
SCOTTSDALE DESERT GREENBELT
REATA PASS WASH


100-Yr Hydrographs for Main Channel
Q peak @ Bell Road
16000
14000
12000
10000
8000
6000
4000
2000
0
Q (cfs)
3.000
3.200
3.400
3.600
3.65 hrs
3.800
4.000
4.200
4.400
4.600
4.800
5.000
Time (hrs)
East Branch
Pinnacle Peak
Foothills
Above North Beardsley
North Beardsley
Union Hills
Bell Road

HEC-1 Computed Hydrographs (at Key Concentration Points)					100 - Y3			
	Time	Upper Main	C50	C2000	R2015A1	2060.4	2090	C2160C
	(Hrs)		U/S Pinnacle Peak Rd	Deer Valley Road	U/S of N. Beardsley	D/S of N. Beardsley	Union Hills Road	D/S of S. Bearsley
1	2.00	5	31	22	10	27	29	57
1	2.08	6	35	25	12	31	32	63
1	2.17	7	40	29	14	35	36	70
1	2.25	8	45	33	17	40	40	77
1	2.33	9	51	37	20	45	44	84
1	2.42	11	58	42	23	50	49	93
1	2.50	13	66	48	26	57	55	103
1	2.58	15	75	54	30	65	62	114
1	2.67	18	90	63	34	76	72	131
1	2.75	24	110	74	39	91	85	155
1	2.83	37	153	95	45	116	105	198
1	2.92	69	267	143	54	162	137	268
1	3.00	200	603	333	75	295	215	430
1	3.08	943	2198	1394	195	884	475	989
1	3.17	3062	5625	4542	1077	3148	1287	2918
1	3.25	5146	9665	7180	3110	6484	2883	6873
1	3.33	5766	11236	10267	5364	9019	4565	10702
1	3.42	5400	10634	11742	8329	11431	7000	12587
1	3.50	4561	9320	11008	10350	12814	9729	13566
1	3.58	3655	7790	9621	10579	12601	11649	14527
1	3.67	2884	6382	8161	9730	11396	12185	15265
1	3.75	2305	5220	6798	8558	9938	11592	15187
1	3.83	1869	4264	5694	7382	8502	10493	14367
1	3.92	1536	3566	4799	6331	7263	9277	13125
1	4.00	1281	2971	4043	5463	6239	8110	11771
1	4.08	1090	2503	3345	4682	5353	7101	10427
1	4.17	946	2176	2759	4072	4662	6216	9224
1	4.25	829	1882	2330	3474	4007	5483	8204
1	4.33	736	1681	2024	2919	3407	4828	7290
1	4.42	669	1517	1820	2459	2907	4247	6533
1	4.50	612	1393	1658	2095	2511	3772	5870
1	4.58	563	1279	1523	1818	2203	3310	5265
1	4.67	522	1183	1403	1630	1991	2877	4759
1	4.75	486	1100	1301	1492	1831	2500	4312
1	4.83	457	1030	1218	1383	1705	2200	3896
1	4.92	432	971	1146	1289	1595	1960	3520
1	5.00	411	923	1083	1207	1501	1773	3161
1	5.08	392	883	1031	1137	1419	1648	2869
1	5.17	376	846	986	1077	1347	1550	2635
1	5.25	362	812	944	1026	1285	1470	2416
1	5.33	351	781	907	981	1231	1398	2257
1	5.42	340	754	872	942	1183	1336	2131
1	5.50	329	728	841	908	1141	1282	2028
1	5.58	319	704	813	877	1102	1232	1940
1	5.67	309	681	786	847	1065	1187	1865
1	5.75	300	660	761	818	1030	1145	1800
1	5.83	291	639	737	791	997	1106	1739
1	5.92	282	620	714	766	965	1070	1684
1	6.00	274	602	693	742	936	1036	1630
1	6.08	265	583	671	719	907	1003	1579
1	6.17	256	561	649	696	877	971	1529
1	6.25	245	535	624	673	845	941	1478
1	6.33	232	505	595	649	809	909	1425
1	6.42	217	472	562	622	770	873	1368
1	6.50	201	438	525	592	726	835	1306
1	6.58	184	404	491	560	680	795	1239
1	6.67	166	367	454	526	633	752	1171
1	6.75	150	332	415	492	587	706	1100
1	6.83	135	300	377	460	546	660	1032
1	6.92	122	272	341	430	509	616	962
1	7.00	113	249	308	398	469	573	894
1	7.08	106	233	281	366	430	532	829
1	7.17	99	218	258	335	393	492	765
1	7.25	93	203	239	307	359	457	706
1	7.33	86	189	223	282	329	426	651
1	7.42	80	175	207	260	302	397	600
1	7.50	74	162	193	241	278	370	554
1	7.58	68	150	182	223	257	343	511
1	7.67	63	139	172	208	238	317	476
1	7.75	58	132	162	195	222	293	444
1	7.83	53	123	154	183	207	271	412
1	7.92	49	114	147	172	195	252	382
1	8.00	45	105	139	164	184	234	355
1	8.08	41	97	130	156	174	219	331
1	8.17	37	90	121	148	165	205	309
1	8.25	34	83	113	143	159	193	289
1	8.33	31	76	104	138	152	182	270
1	8.42	29	70	97	133	146	173	253
1	8.50	27	65	89	126	138	165	238
1	8.58	24	60	83	120	131	157	224
1	8.67	22	55	76	113	124	150	211
1	8.75	21	51	71	107	116	145	199
1	8.83	19	47	65	100	109	140	189
1	8.92	18	44	60	94	102	135	180
1	9.00	16	41	56	88	96	129	171
1	9.08	15	38	52	82	89	125	163
1	9.17	14	35	48	77	83	121	156
1	9.25	13	33	44	71	78	116	149
1	9.33	12	30	41	66	72	110	143
1	9.42	11	28	38	62	67	105	138
1	9.50	10	26	36	57	63	99	134
1	9.58	10	25	33	53	58	94	129
1	9.67	9	23	31	50	54	88	124
1	9.75	8	22	29	46	51	83	120
1	9.83	8	20	27	43	47	78	114
1	9.92	7	19	25	40	44	73	109
1	10.00	7	18	23	37	41	69	104
1	10.08	6	17	22	35	38	65	99
1	10.17	6	16	21	32	36	61	94
1	10.25	6	15	19	30	33	57	90
1	10.33	5	14	18	28	31	53	85
1	10.42	5	13	17	26	29	50	80
1	10.50	5	12	16	25	27	46	76
1	10.58	4	12	15	23	26	43	72
1	10.67	4	11	14	22	24	41	68
1	10.75	4	11	14	20	23	38	64
1	10.83	4	10	13	19	21	36	60
1	10.92	4	10	12	18	20	33	57
1	11.00	3	9	11	17	19	31	54
1	11.08	3	9	11	16	18	29	50
1	11.17	3	8	10	15	17	28	47
1	11.25	3	8	10	14	16	26	45
1	11.33	3	7	9	13	15	24	42
1	11.42	3	7	9	13	14	23	40
1	11.50	3	7	8	12	14	22	37
1	11.58	3	7	8	11	13	20	35
1	11.67	2	6	8	11	12	19	33
1	11.75	2	6	7	10	12	18	31
1	11.83	2	6	7	10	11	17	30
1	11.92	2	6	7	9	11	16	28


100-Yr Hydrographs for Tributaries
Q (cfs)
6000
5000
4000
3000
2000
1000
0
3.000
3.200
3.400
3.600
3.800
4.000
4.200
4.400
4.600
4.800
5.000
Time (hrs)
Upper Reata
Foothills
North Beardsley
South Beardsley
Thompson Peak


100-Yr Hydrographs for Tributaries
(Shown Relative to Main Channel)
Q (cfs)
16000
14000
12000
10000
8000
6000
4000
2000
0
3.000
3.200
3.400
3.600
3.800
4.000
4.200
4.400
4.600
4.800
5.000
Time (hrs)
Upper Reata
Foothills
North Beardsley
South Beardsley
Thompson Peak
Main Channel d/s of Bell
Pinnacle Peak

Discretized 100-Year Hydrographs at Locations along the Reata Pass/Beardsley Wash Main Channel (Q cfs at each Discretized Time)

Time (Hr)	Time Interval (Hr)	Locations along the Main Channel							
		Upper Reata	Downstream of Upper Tributary Confluence	Pinnacle Peak Road	Deer Valley Road	Downstream of N. Beardsley Confluence	Union Hills Road	Downstream of S. Beardsley Confluence	Downstream of Thompson Peak Confluence
3.08	0.08	572	1,401	864	135	590	345	516	710
3.17	0.08	2,003	3,912	2,968	636	2,016	881	1,385	1,954
3.25	0.08	4,104	7,645	5,861	2,094	4,816	2,085	3,406	4,896
3.33	0.08	5,766	11,236	8,724	4,237	7,752	3,724	6,104	8,788
3.42	0.08	5,583	10,935	11,742	6,847	10,225	5,783	8,538	11,645
3.50	0.08	4,981	9,977	11,375	9,340	12,814	8,365	10,579	13,077
3.58	0.08	4,108	8,555	10,315	10,579	12,708	10,689	12,267	14,047
3.67	0.08	3,270	7,086	8,891	10,155	11,999	12,185	13,633	15,265
3.75	0.08	2,595	5,801	7,480	9,144	10,667	11,889	13,457	15,226
3.83	0.08	2,087	4,742	6,422	8,146	9,396	11,218	12,973	14,953
3.92	0.08	1,703	3,915	5,247	6,857	7,883	9,885	11,700	13,746
4.00	0.08	1,409	3,269	4,421	5,897	6,751	8,694	10,458	12,448
4.08	0.08	1,136	2,737	3,694	5,073	5,796	7,606	9,247	11,099
4.17	0.08	1,018	2,340	3,052	4,377	5,008	6,659	8,147	9,826
4.33	0.17	837	1,929	2,392	3,488	4,035	5,522	6,807	8,257
4.50	0.17	672	1,537	1,841	2,491	2,959	4,300	5,372	6,580
4.67	0.17	566	1,202	1,531	1,848	2,251	3,325	4,260	5,315
4.83	0.17	488	1,011	1,230	1,502	1,848	2,539	3,083	3,697
5.17	0.33	414	955	1,057	1,219	1,493	1,875	2,090	2,332
5.50	0.33	352	899	998	994	1,281	1,416	1,766	2,161

Note: Shaded numbers indicate peak discharges

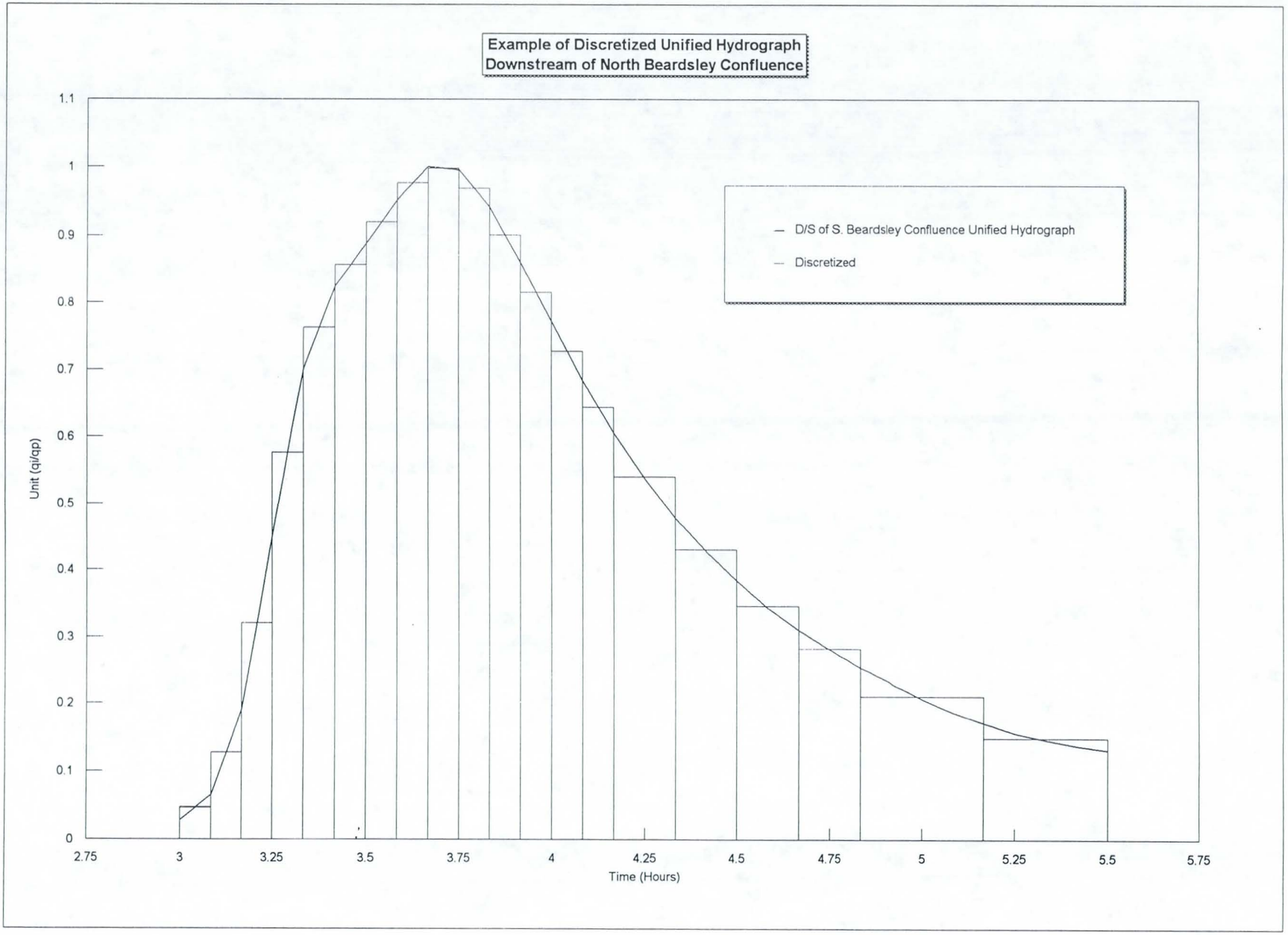
Q peak

why did the "Q" reduced going downstream?

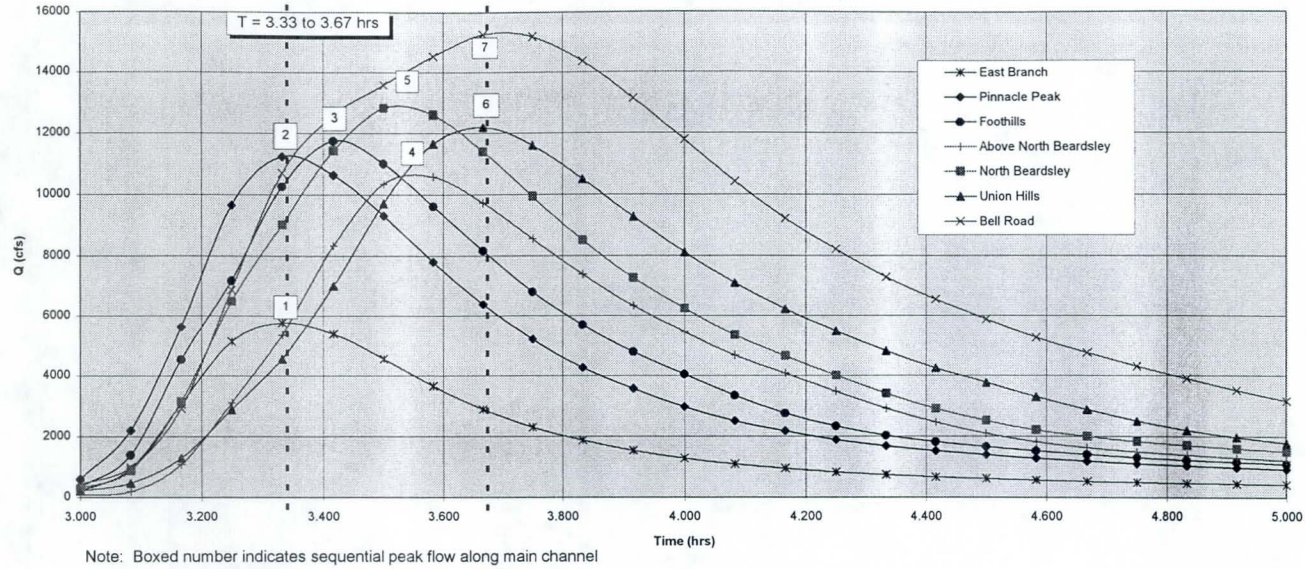
why did the "Q" reduced going downstream?

Discretized 10-Year Hydrographs at Locations along the Reata Pass/Beardsley Wash Main Channel (Q cfs at each Discretized Time)									
		Locations along the Main Channel							
Time (Hr)	Time Interval (Hr)	Upper Reata	Downstream of Upper Tributary Confluence	Pinnacle Peak Road	Deer Valley Road	Downstream of N. Beardsley Confluence	Union Hills Road	Downstream of S. Beardsley Confluence	Downstream of hompson Pea Confluence
3.08	0.08	266	632	384	61	261	151	224	307
3.17	0.08	932	1,765	1,321	285	891	385	602	846
3.25	0.08	1,910	3,449	2,609	939	2,129	910	1,479	2,121
3.33	0.08	2,684	5,069	3,883	1,900	3,427	1,626	2,651	3,807
3.42	0.08	2,599	4,933	5,227	3,071	4,521	2,524	3,709	5,045
3.50	0.08	2,319	4,501	5,064	4,189	5,666	3,651	4,598	5,665
3.58	0.08	1,912	3,860	4,591	4,745	5,619	4,666	5,333	6,085
3.67	0.08	1,522	3,197	3,958	4,555	5,305	5,319	5,927	6,613
3.75	0.08	1,208	2,617	3,329	4,101	4,717	5,190	5,851	6,596
3.83	0.08	971	2,139	2,780	3,575	4,077	4,820	5,563	6,402
3.92	0.08	793	1,766	2,335	3,075	3,485	4,315	5,086	5,955
4.00	0.08	656	1,475	1,968	2,645	2,985	3,795	4,546	5,393
4.08	0.08	529	1,235	1,644	2,275	2,563	3,320	4,019	4,808
4.17	0.08	474	1,055	1,359	1,963	2,214	2,907	3,541	4,257
4.33	0.17	390	870	1,065	1,564	1,784	2,410	2,959	3,577
4.50	0.17	313	693	820	1,117	1,308	1,877	2,335	2,851
4.67	0.17	263	542	681	829	995	1,451	1,851	2,302
4.83	0.17	227	456	548	674	817	1,108	1,340	1,602
5.17	0.33	193	431	471	547	660	818	909	1,010
5.50	0.33	164	406	444	446	566	618	768	936

Note: Shaded numbers indicate peak discharges

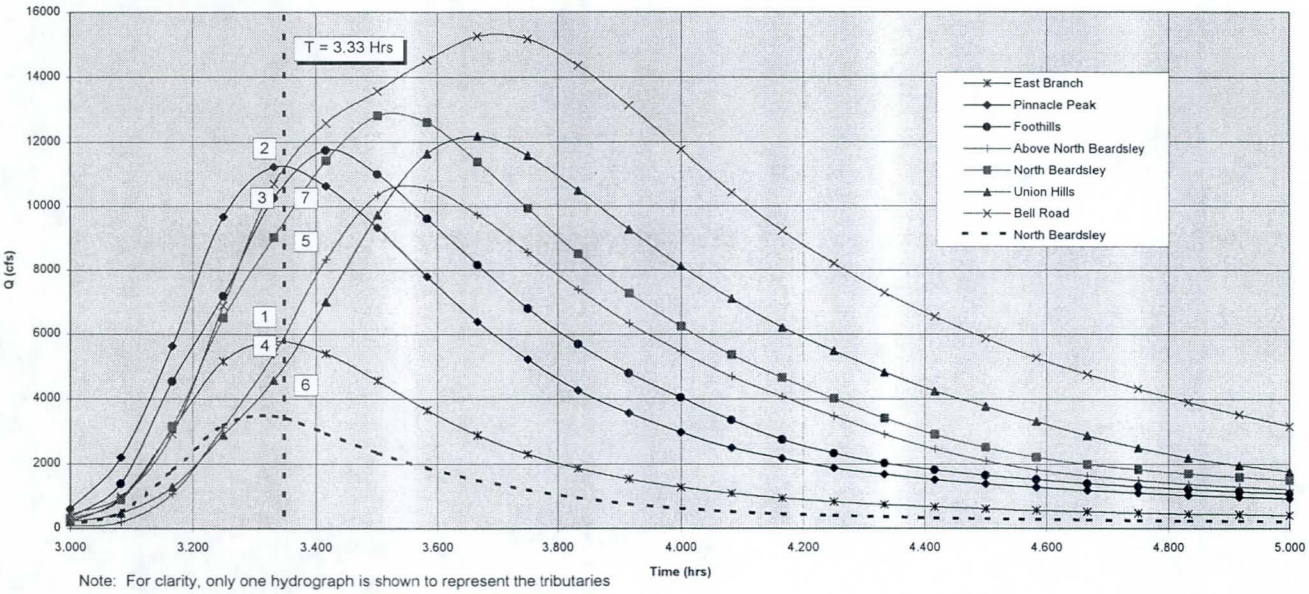

Example of Discretized Unified Hydrograph
Downstream of North Beardsley Confluence
D/S of S. Beardsley Confluence Unified Hydrograph
Discretized
Unit (qi/qp)
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2.75
3
3.25
3.5
3.75
4
4.25
4.5
4.75
5
5.25
5.5
5.75
Time (Hours)

Scenario 1: Peak to Peak (Time Ranges from 3.33 hrs to 3.67 hrs)



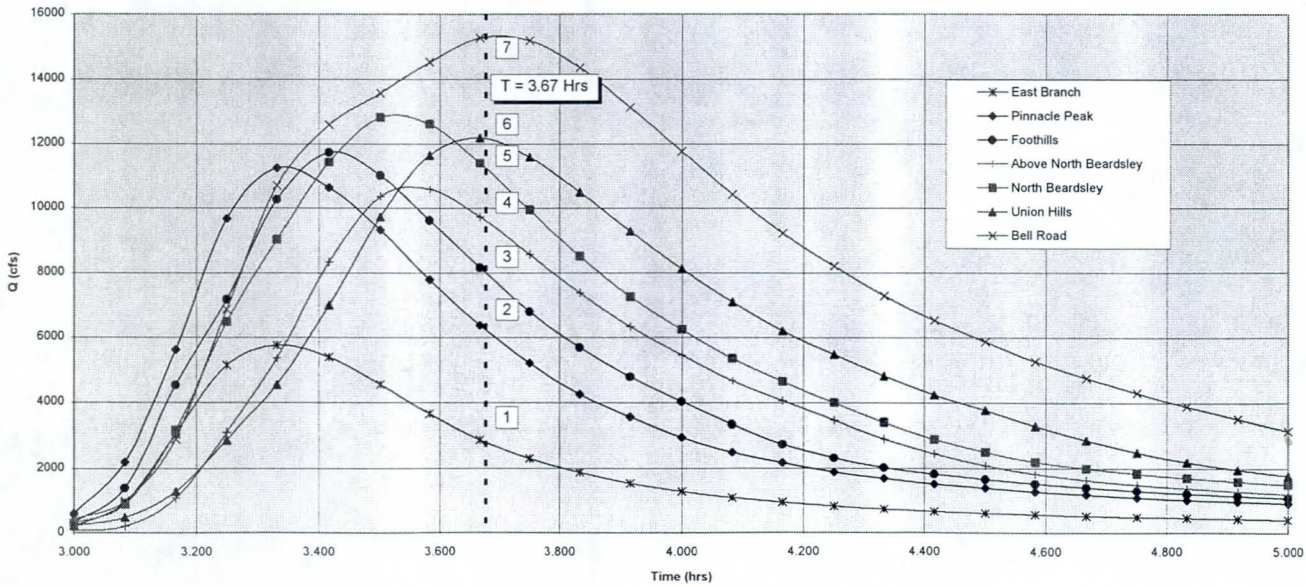
Note: Boxed number indicates sequential peak flow along main channel

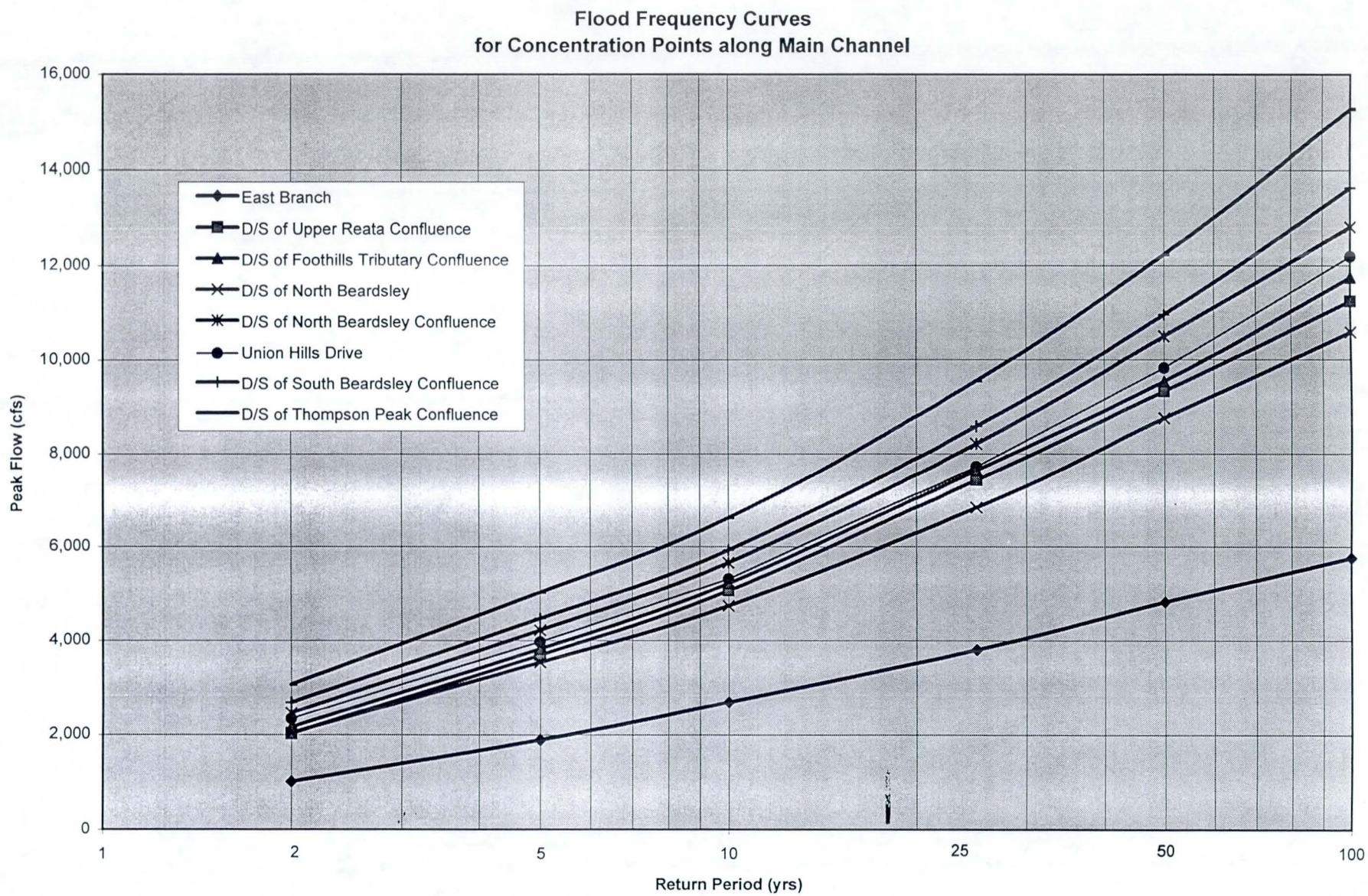
Scenario 2: Tributaries Peak (Time = 3.33 hrs)



Note: For clarity, only one hydrograph is shown to represent the tributaries

Scenario 3: Downstream Main Channel Peaks (Time = 3.67 Hours)




Flood Frequency Curves
for Concentration Points along Main Channel
Peak Flow (cfs)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1
2
5
10
25
50
100
Return Period (yrs)
East Branch
D/S of Upper Reata Confluence
D/S of Foothills Tributary Confluence
D/S of North Beardsley
D/S of North Beardsley Confluence
Union Hills Drive
D/S of South Beardsley Confluence
D/S of Thompson Peak Confluence

C: HYDRAULIC ANALYSIS

A HEC-2 hydraulic model was prepared for the main channel as well as the Upper Reata Wash channel, North Beardsley Wash channel and the South Beardsley channel. Hydraulic results from the HEC-2 model are included for the 100-yr, 50-yr, 25-yr, 10-yr, 5-yr, and 2-yr storms for each cross-section. The results are shown for mixed flows, although most of the stations were supercritical.

A normal depth analysis was performed for the remaining tributaries where detailed topographic information was not available. Normal depths were computed for Foothills tributary and Thompson Peak tributary.

1. Hydraulic Results by Cross-Section
2. Hydraulic Results by Reach
3. Reach Definitions
4. Normal Depth Results for Tributaries
5. Velocity-Width Plots for Reach Breakdown

May want to list some of the basic assumptions like

- "n" values
- "contraction/Expansion coeff.
- Channel stationing
- x-section stationing.
- and so on.....

100-Yr Hydraulics

Section ID	Q (cfs) total	Q (cfs) left bank	Q (cfs) channel	Q (cfs) right bank	Elevation (ft) thalweg	Elevation (ft) water sfc	Depth (ft)	Velocity (f/s) left bank	Velocity (f/s) channel	Velocity (f/s) right bank	Topwidth (ft)	Energy Slope	Froude #
316.50	5766	0	5766	0	2309.6	2313.2	3.6	0.0	7.7	0.0	426	0.0260	1.0
313.50	5766	0	5766	0	2300.1	2302.5	2.4	0.0	15.6	0.0	371	0.0290	2.7
310.50	5766	0	5766	0	2291.9	2295.6	3.7	0.0	8.5	0.0	386	0.0290	1.1
307.50	5766	0	5766	0	2282.5	2286.0	3.5	0.0	13.5	0.0	373	0.0318	2.2
304.50	5766	0	5766	0	2273.5	2276.1	2.6	0.0	10.1	0.0	373	0.0310	1.4
301.50	5766	0	5766	0	2262.9	2267.8	4.9	0.0	12.8	0.0	213	0.0253	1.5
298.50	5766	0	5766	0	2256.2	2259.9	3.7	0.0	12.9	0.0	229	0.0280	1.6
295.50	5766	0	5766	0	2247.4	2251.2	3.8	0.0	12.1	0.0	291	0.0280	1.7
292.50	5766	0	5766	0	2237.9	2243.5	5.6	0.0	11.7	0.0	247	0.0275	1.5
289.50	11236	0	11236	0	2228.6	2234.4	5.8	0.0	13.0	0.0	491	0.0333	1.7
288.00	11236	0	11236	0	2224.2	2227.5	3.3	0.0	15.6	0.0	393	0.0393	2.0
286.50	11236	0	11236	0	2217.7	2222.6	4.9	0.0	12.9	0.0	505	0.0352	1.7
284.15	11236	0	11236	0	2210.8	2216.1	5.3	0.0	11.8	0.0	530	0.0284	1.5
280.60	11236	180	11056	0	2200.8	2205.5	4.7	6.8	14.1	0.0	369	0.0227	1.7
277.45	11236	71	11165	0	2194.6	2199.4	4.8	4.8	14.8	0.0	182	0.0367	1.3
277.25	11236	0	11236	0	2188.6	2192.2	3.6	0.0	24.8	0.0	135	0.0485	2.4
275.70	11236	0	11236	0	2183.9	2188.8	4.9	0.0	20.4	0.0	130	0.0357	1.8
272.65	11236	0	11236	0	2174.2	2178.7	4.5	0.0	22.1	0.0	114	0.0473	1.8
272.25	11236	0	11236	0	2173.3	2179.0	5.7	0.0	17.2	0.0	114	0.0365	1.3
271.50	11236	23	11213	0	2171.5	2181.4	9.9	1.2	10.0	0.0	170	0.0067	0.6
270.00	11236	153	10740	343	2167.9	2178.7	10.8	2.9	15.3	4.9	138	0.0125	0.9
267.00	11236	165	11071	0	2162.0	2165.9	3.9	16.8	26.0	1.4	308	0.0458	3.8
265.50	11236	0	11236	0	2158.0	2162.6	4.6	0.0	13.6	0.0	392	0.0497	1.7
264.00	11236	0	11236	0	2153.8	2158.1	4.3	0.0	14.6	0.0	314	0.0253	1.6
262.50	11236	0	11236	0	2150.5	2154.6	4.1	0.0	14.7	0.0	253	0.0240	1.5
261.00	11236	129	11086	21	2144.9	2149.6	4.7	5.7	17.3	5.8	243	0.0237	1.8
259.50	11236	307	10060	869	2139.4	2145.4	6.0	4.5	19.6	6.4	216	0.0223	1.5
258.00	11236	0	11236	0	2133.9	2139.7	5.8	0.0	22.4	0.0	98	0.0257	1.8
256.50	11236	0	11236	0	2128.3	2133.6	5.3	0.0	24.7	0.0	96	0.0317	2.0
255.00	11236	0	11236	0	2122.8	2128.0	5.2	0.0	25.4	0.0	96	0.0350	2.1
253.50	11236	0	11236	0	2117.2	2122.4	5.2	0.0	25.7	0.0	96	0.0363	2.1
252.00	11236	0	11236	0	2111.7	2116.8	5.1	0.0	25.7	0.0	96	0.0367	2.1
250.50	11236	0	11236	0	2106.1	2111.2	5.1	0.0	25.8	0.0	95	0.0370	2.1
249.00	11236	0	11236	0	2100.5	2105.7	5.2	0.0	25.8	0.0	95	0.0373	2.1
247.50	11236	0	11236	0	2095.0	2100.1	5.1	0.0	25.8	0.0	96	0.0370	2.1
246.00	11236	0	11236	0	2089.5	2094.6	5.1	0.0	25.8	0.0	95	0.0367	2.1
244.50	11236	0	11236	0	2083.9	2089.0	5.1	0.0	25.8	0.0	95	0.0393	2.1
243.00	11236	0	11236	0	2078.4	2082.5	4.1	0.0	26.2	0.0	108	0.0424	2.3
240.80	11236	0	11236	0	2070.8	2075.5	4.7	0.0	23.0	0.0	109	0.0647	1.9
240.30	11236	0	11236	0	2069.2	2075.7	6.5	0.0	16.3	0.0	113	0.0533	1.2
240.00	11236	0	11236	0	2067.5	2072.9	5.4	0.0	20.0	0.0	111	0.0227	1.6
238.50	11236	0	11236	0	2062.5	2067.2	4.7	0.0	22.9	0.0	109	0.0287	1.9
237.00	11236	0	11236	0	2057.4	2062.0	4.6	0.0	23.5	0.0	109	0.0327	2.0
235.50	11236	0	11236	0	2052.3	2056.8	4.5	0.0	23.7	0.0	109	0.0330	2.0
234.00	11742	0	11742	0	2047.2	2052.0	4.8	0.0	23.6	0.0	110	0.0390	2.0
232.50	11742	0	11742	0	2040.5	2044.9	4.4	0.0	23.9	0.0	197	0.0417	2.7
231.00	11742	0	11742	0	2036.9	2043.0	6.1	0.0	18.2	0.0	133	0.0300	1.5
229.50	11742	0	11742	0	2032.5	2038.5	6.0	0.0	20.2	0.0	149	0.0257	1.8
228.00	11742	0	11742	0	2029.8	2034.9	5.1	0.0	19.0	0.0	176	0.0270	1.8
226.50	11742	0	11742	0	2025.8	2031.3	5.5	0.0	18.7	0.0	151	0.0227	1.6
225.00	11742	0	11742	0	2022.3	2028.9	6.6	0.0	17.4	0.0	156	0.0197	1.5
223.50	11742	0	11742	0	2018.2	2025.3	7.1	0.0	18.8	0.0	135	0.0193	1.5
222.00	11742	11	11731	0	2014.6	2021.6	7.0	3.5	20.0	0.0	125	0.0217	1.6
220.50	11742	0	11742	0	2011.2	2017.5	6.3	0.0	20.8	0.0	137	0.0250	1.8
219.00	11743	23	11672	48	2007.8	2013.7	5.9	4.4	20.6	3.8	152	0.0250	1.7
217.50	11742	7	11485	250	2004.4	2011.3	6.9	3.1	19.0	6.5	150	0.0223	1.5
216.00	11742	3	11671	68	2001.2	2007.3	6.1	2.4	20.1	5.0	146	0.0233	1.7
214.50	11742	388	11319	35	1997.0	2004.1	7.1	8.2	19.5	6.0	173	0.0277	1.7
213.00	11742	0	11650	92	1994.0	2000.0	6.0	0.0	18.6	6.7	226	0.0320	1.9
211.50	11742	0	11725	17	1990.0	1996.2	6.2	0.0	16.0	4.8	276	0.0347	1.7
210.00	11742	7	11701	34	1985.2	1990.4	5.2	3.2	17.0	6.9	331	0.0363	2.0
208.50	11742	0	11690	52	1980.2	1984.8	4.6	0.0	17.1	6.6	256	0.0380	1.9
207.00	11742	24	11664	54	1974.9	1978.6	3.7	5.0	17.7	7.8	324	0.0413	2.2
205.50	11742	107	11623	12	1967.8	1973.3	5.5	8.2	15.1	5.3	383	0.0407	1.9
204.00	11742	27	11715	0	1960.1	1965.6	5.5	5.4	19.2	0.0	210	0.0370	2.0
202.50	11742	2	11740	0	1950.1	1957.3	7.2	2.6	23.4	0.0	116	0.0437	2.0
201.00	11742	24	11718	0	1941.3	1946.7	5.4	7.7	27.2	0.0	163	0.0580	3.0
199.50	11742	0	11742	0	1937.4	1941.8	4.4	1.2	20.6	0.0	188	0.0477	2.1
198.00	11742	520	11214	8	1930.9	1941.5	10.6	8.7	12.6	2.3	289	0.0307	1.3
196.50	11742	0	11742	0	1925.5	1930.3	4.8	0.0	23.9	0.0	211	0.0427	2.8

100-Yr Hydraulics

Section ID	Q (cfs) total	Q (cfs) left bank	Q (cfs) channel	Q (cfs) right bank	Elevation (ft) thalweg	Elevation (ft) water sfc	Depth (ft)	Velocity (f/s) left bank	Velocity (f/s) channel	Velocity (f/s) right bank	Topwidth (ft)	Energy Slope	Froude #
195.00	11742	0	11742	0	1921.3	1926.0	4.7	0.0	18.1	0.0	219	0.0437	1.9
193.50	11742	0	11742	0	1916.6	1921.3	4.7	0.0	17.7	0.0	242	0.0347	1.9
192.00	11742	0	11734	8	1911.0	1915.8	4.8	0.0	17.7	4.3	272	0.0377	2.0
190.50	11742	0	11742	0	1905.0	1909.8	4.8	0.0	18.0	0.0	263	0.0377	2.0
189.00	11742	0	11669	73	1901.9	1905.2	3.3	0.0	16.5	7.1	268	0.0320	1.8
187.50	11742	3	11628	111	1897.5	1901.1	3.6	2.4	16.3	7.4	257	0.0297	1.7
186.00	11742	0	11703	39	1892.3	1895.6	3.3	1.5	17.7	6.2	269	0.0317	2.0
184.50	11742	0	11742	0	1887.8	1892.0	4.2	0.0	15.4	0.0	270	0.0253	1.6
183.00	11742	17	11725	0	1882.8	1889.0	6.2	2.1	15.9	0.0	196	0.0237	1.4
181.50	11742	0	11742	0	1879.1	1883.0	3.9	0.0	18.9	0.0	347	0.0330	2.5
180.00	11742	14	11728	0	1875.4	1880.4	5.0	1.9	12.9	0.0	357	0.0280	1.4
178.50	11742	47	11694	1	1872.2	1877.6	5.4	4.2	12.9	1.7	355	0.0193	1.4
177.00	11742	0	11742	0	1869.6	1874.7	5.1	0.0	12.8	0.0	380	0.0203	1.5
175.50	11742	21	11721	0	1866.1	1871.5	5.4	4.5	13.1	0.0	357	0.0190	1.5
174.00	11742	58	11684	0	1862.7	1868.7	6.0	3.3	13.5	0.0	279	0.0180	1.3
172.50	10579	257	10322	0	1857.5	1863.9	6.4	8.7	17.3	0.0	204	0.0203	1.8
171.00	12814	8	12805	1	1853.5	1863.2	9.7	1.7	11.6	1.3	358	0.0220	1.1
169.50	12814	152	11128	1534	1850.5	1858.4	7.9	4.6	16.6	9.7	430	0.0260	1.9
168.00	12814	177	12637	0	1846.7	1853.1	6.4	5.3	17.1	0.0	265	0.0293	1.8
166.50	12814	0	12813	1	1844.8	1852.7	7.9	0.0	5.9	0.7	494	0.0253	0.5
166.00	12814	0	12814	0	1843.3	1849.0	5.7	0.0	14.4	0.0	282	0.0250	1.4
165.50	12814	0	12814	0	1841.7	1849.6	7.9	0.0	8.5	0.0	309	0.0210	0.7
165.00	12814	0	12814	0	1840.2	1845.7	5.5	0.0	16.7	0.0	281	0.0217	1.8
163.50	12814	0	12814	0	1836.0	1842.5	6.5	0.0	14.4	0.0	338	0.0270	1.6
162.00	12814	0	12814	0	1832.4	1838.0	5.6	0.0	16.1	0.0	269	0.0247	1.7
160.50	12814	0	12814	0	1827.7	1834.8	7.1	0.0	14.9	0.0	303	0.0250	1.6
159.00	12814	5	12809	0	1825.4	1830.6	5.2	2.7	15.8	0.0	315	0.0250	1.7
157.50	12814	0	12812	2	1821.9	1828.0	6.1	0.0	13.6	1.9	325	0.0247	1.4
156.00	12814	0	12814	0	1818.8	1823.6	4.8	0.0	14.9	0.0	431	0.0260	1.9
154.50	12814	0	12814	0	1815.5	1820.1	4.6	0.0	13.7	0.0	333	0.0263	1.4
153.00	12814	0	12814	0	1811.7	1815.9	4.2	0.0	14.6	0.0	420	0.0320	1.8
151.50	12814	0	12814	0	1804.6	1810.2	5.6	0.0	14.3	0.0	567	0.0350	2.0
150.00	12814	468	12346	0	1801.0	1807.2	6.2	5.2	10.1	0.0	760	0.0263	1.4
148.50	12814	3	12811	0	1797.8	1803.3	5.5	1.8	11.9	0.0	556	0.0240	1.5
147.00	12814	0	12814	0	1793.1	1798.9	5.8	0.0	13.0	0.0	507	0.0273	1.6
145.50	12814	0	12814	0	1790.9	1794.8	3.9	0.0	12.7	0.0	518	0.0270	1.6
144.00	12814	0	12814	0	1786.6	1790.7	4.1	0.0	13.0	0.0	450	0.0253	1.6
142.50	12814	0	12814	0	1782.2	1786.6	4.4	0.0	14.1	0.0	356	0.0253	1.6
141.00	12814	0	12814	0	1777.7	1782.3	4.6	0.0	15.1	0.0	349	0.0263	1.7
139.50	12814	0	12700	114	1774.0	1779.0	5.0	0.0	13.4	7.9	396	0.0270	1.5
138.00	12814	0	12783	31	1770.5	1774.5	4.0	0.0	14.5	5.7	416	0.0253	1.8
136.50	12814	0	12789	25	1767.6	1771.8	4.2	0.0	12.3	4.3	386	0.0197	1.3
135.00	12814	0	12787	27	1765.1	1769.4	4.3	0.0	12.4	4.7	356	0.0157	1.3
133.50	12814	0	12785	29	1762.6	1767.0	4.4	0.0	12.7	4.4	354	0.0173	1.3
132.00	12814	0	12752	62	1759.8	1763.7	3.9	0.0	13.7	7.0	379	0.0207	1.5
130.50	12814	0	12773	41	1755.9	1760.8	4.9	1.3	12.7	5.6	418	0.0220	1.4
129.00	12814	0	12785	29	1751.5	1757.4	5.9	0.0	12.9	5.3	456	0.0243	1.5
127.50	12814	0	12806	8	1746.8	1753.0	6.2	0.1	13.9	4.5	443	0.0273	1.7
126.00	12814	1	12811	2	1743.6	1749.4	5.8	2.2	12.6	2.6	479	0.0273	1.5
124.50	12814	0	12806	8	1740.5	1745.1	4.6	1.5	13.2	4.5	505	0.0267	1.7
123.00	12814	0	12813	1	1736.2	1741.4	5.2	1.4	12.4	2.2	499	0.0267	1.5
121.50	12814	0	12814	0	1732.2	1737.1	4.9	0.1	13.2	0.1	494	0.0280	1.7
120.00	12814	0	12812	2	1727.7	1732.7	5.0	0.1	13.4	2.8	483	0.0290	1.7
118.50	12814	3	12804	7	1724.3	1728.3	4.0	3.1	13.4	3.8	478	0.0283	1.7
117.00	12814	0	12814	0	1720.3	1724.4	4.1	0.0	12.9	0.0	475	0.0260	1.6
115.50	12814	145	12667	2	1715.6	1720.6	5.0	8.0	13.2	2.5	424	0.0223	1.5
114.00	12814	34	12778	2	1712.4	1718.2	5.8	4.6	11.4	2.3	461	0.0200	1.3
112.50	12814	0	12814	0	1709.8	1714.7	4.9	0.0	12.9	0.0	447	0.0217	1.5
111.00	12814	0	12814	0	1706.6	1711.0	4.4	0.0	13.2	0.0	411	0.0237	1.5
109.50	12814	0	12814	0	1702.7	1707.3	4.6	0.0	13.6	0.0	402	0.0223	1.6
108.00	12814	0	12814	0	1698.7	1704.7	6.0	0.0	12.1	0.0	408	0.0197	1.3
106.50	12814	0	12814	0	1696.5	1701.9	5.4	0.0	12.6	0.0	387	0.0187	1.4
105.00	12814	0	12814	0	1693.9	1698.5	4.6	0.0	13.7	0.0	353	0.0203	1.5
103.50	12814	0	12814	0	1689.1	1695.3	6.2	0.0	13.8	0.0	350	0.0217	1.5
102.00	12814	0	12814	0	1686.7	1692.0	5.3	0.0	13.8	0.0	364	0.0237	1.5
100.50	12814	0	12814	0	1684.0	1687.5	3.5	0.0	15.3	0.0	333	0.0347	1.7
99.00	12814	0	12814	0	1675.8	1678.1	2.3	0.0	20.3	0.0	279	0.0520	2.4
98.50	12814	0	12814	0	1674.2	1677.0	2.8	0.0	17.1	0.0	276	0.0570	1.8
98.00	12814	0	12814	0	1672.6	1677.2	4.6	0.0	10.2	0.0	276	0.0340	0.8
97.50	12185	0	12185	0	1671.0	1673.8	2.8	0.0	16.6	0.0	269	0.0157	1.8

why reduced?

why reduced ft.

100-Yr Hydraulics

Section ID	Q (cfs) total	Q (cfs) left bank	Q (cfs) channel	Q (cfs) right bank	Elevation (ft) thalweg	Elevation (ft) water sfc	Depth (ft)	Velocity (f/s) left bank	Velocity (f/s) channel	Velocity (f/s) right bank	Topwidth (ft)	Energy Slope	Froude #
96.00	12185	0	12185	0	1669.5	1673.4	3.9	0.0	10.9	0.0	291	0.0133	1.0
94.50	12185	1	12184	0	1668.0	1672.3	4.3	1.5	10.3	0.0	366	0.0100	1.0
93.00	12185	11	12169	5	1666.0	1670.5	4.5	3.2	10.7	2.6	425	0.0153	1.1
91.50	12185	7	12173	5	1662.6	1666.2	3.6	4.1	14.3	3.6	421	0.0237	1.8
90.00	12185	3	12181	1	1658.5	1662.8	4.3	2.7	12.3	2.3	445	0.0230	1.5
88.50	12185	10	12172	3	1655.3	1660.6	5.3	3.2	11.0	2.8	439	0.0190	1.2
87.00	12185	1	12177	7	1652.1	1656.6	4.5	2.4	13.6	3.7	426	0.0227	1.6
85.50	12185	0	12172	13	1647.9	1652.9	5.0	0.0	13.0	4.7	423	0.0237	1.5
84.00	12185	0	12185	0	1645.0	1650.3	5.3	0.0	11.8	0.0	416	0.0173	1.3
82.50	12185	0	12185	0	1643.0	1648.9	5.9	0.0	10.1	0.0	400	0.0147	1.0
81.00	12185	0	12185	0	1641.0	1644.9	3.9	0.0	14.2	0.0	379	0.0210	1.7
79.50	12185	0	12185	0	1637.3	1641.5	4.2	0.0	13.1	0.0	400	0.0243	1.5
78.00	12185	0	12185	0	1633.9	1638.3	4.4	0.0	12.6	0.0	423	0.0223	1.5
76.50	12185	0	12185	0	1630.3	1634.9	4.6	0.0	12.6	0.0	441	0.0200	1.5
75.00	12185	0	12177	8	1627.5	1633.0	5.5	0.0	10.5	2.9	431	0.0180	1.1
73.50	12185	0	12103	82	1623.9	1628.9	5.0	0.0	14.4	7.2	351	0.0187	1.6
72.00	12185	2	12137	46	1620.4	1628.3	7.9	1.2	7.3	2.8	393	0.0123	0.6
70.50	12186	2	12111	73	1620.0	1626.7	6.7	1.8	10.4	4.8	378	0.0097	1.0
69.00	12185	0	12114	71	1618.2	1623.4	5.2	0.0	13.4	6.4	359	0.0183	1.5
67.50	12185	1	12125	59	1615.4	1619.8	4.4	2.3	14.0	6.2	362	0.0247	1.6
66.00	12185	2	12171	12	1611.8	1616.2	4.4	2.9	13.1	4.7	463	0.0260	1.6
64.50	12185	0	12167	18	1608.2	1613.0	4.8	0.0	11.6	4.3	510	0.0230	1.4
63.00	12185	10	12168	7	1604.2	1609.9	5.7	3.7	11.5	3.3	512	0.0223	1.4
61.50	12185	4	12163	18	1600.3	1605.7	5.4	3.2	13.0	5.6	476	0.0250	1.6
60.00	12185	0	12175	10	1597.0	1602.0	5.0	0.0	12.6	4.2	466	0.0227	1.5
58.50	12185	0	12182	3	1593.3	1599.8	6.5	0.0	10.8	2.4	452	0.0177	1.2
57.00	12185	0	12181	4	1589.3	1596.3	7.0	0.0	13.5	2.8	304	0.0163	1.4
55.50	12185	0	12176	9	1585.9	1593.7	7.8	0.0	13.6	3.7	286	0.0200	1.4
54.00	12185	0	12185	0	1583.7	1590.0	6.3	0.0	14.4	0.0	423	0.0217	1.8
52.50	12185	0	12185	0	1580.7	1588.3	7.6	0.0	10.8	1.3	371	0.0183	1.1
51.00	12185	0	12177	8	1577.5	1583.8	6.3	0.0	15.7	3.7	259	0.0217	1.6
49.50	12185	0	12185	0	1574.5	1579.5	5.0	0.0	16.3	0.0	290	0.0237	1.8
48.00	12185	0	12185	0	1571.2	1578.9	7.7	0.0	10.1	0.0	407	0.0210	1.0
46.50	13633	0	13633	0	1568.0	1571.6	3.6	0.0	19.2	0.0	272	0.0160	2.1
45.00	15265	101	15111	53	1566.1	1575.2	9.1	1.8	6.4	1.9	299	0.0068	0.4
44.50	15265	0	15265	0	1566.2	1575.0	8.8	0.0	7.2	0.0	253	0.0024	0.4
43.60	15265	0	15265	0	1565.8	1574.8	9.0	0.0	7.0	0.0	254	0.0035	0.4
42.00	15265	0	15265	0	1567.4	1572.6	5.2	0.0	11.9	0.0	294	0.0106	1.0
40.50	15265	0	15144	121	1563.2	1567.9	4.7	0.0	17.1	7.7	307	0.0197	1.8
39.00	15265	0	15265	0	1559.2	1566.1	6.9	0.0	13.6	0.0	326	0.0197	1.3
37.50	15265	0	15252	13	1558.0	1563.3	5.3	0.0	14.4	3.4	318	0.0157	1.4
36.00	15265	0	15265	0	1554.7	1561.7	7.0	0.0	12.9	0.0	296	0.0160	1.1
34.50	15265	0	15247	18	1552.7	1558.0	5.3	0.0	15.5	4.7	355	0.0220	1.6
33.00	15266	91	15150	25	1549.6	1554.7	5.1	8.0	13.7	5.1	502	0.0240	1.6
31.50	15265	0	15265	0	1547.3	1552.6	5.3	1.2	10.9	0.0	554	0.0173	1.2
30.00	15265	12	15246	7	1544.6	1550.5	5.9	3.5	11.0	3.3	521	0.0140	1.2
28.50	15265	21	15244	0	1542.6	1548.2	5.6	4.4	11.7	1.1	473	0.0127	1.2
27.00	15265	4	15260	1	1539.0	1546.8	7.8	2.2	10.7	1.4	433	0.0110	1.0
25.50	15265	4	15096	165	1536.2	1544.8	8.6	2.4	11.9	6.5	361	0.0093	1.1
24.00	15265	28	15091	146	1534.7	1543.7	9.0	4.0	11.8	6.3	330	0.0100	1.0
22.50	15265	5	15237	23	1533.0	1541.2	8.2	2.8	13.5	4.2	355	0.0130	1.3
21.00	15265	1237	14027	1	1531.4	1538.0	6.6	3.9	16.6	1.5	380	0.0140	1.2
19.50	15264	121	15143	0	1528.6	1534.3	5.7	3.5	18.9	1.4	218	0.0167	1.5
18.00	15265	0	15265	0	1525.8	1530.7	4.9	0.0	19.9	0.0	166	0.0207	1.6
16.50	15265	0	15265	0	1523.0	1527.7	4.7	0.0	19.4	0.0	179	0.0217	1.6
15.00	15265	0	15265	0	1520.2	1525.1	4.9	0.0	18.4	0.0	182	0.0193	1.5
13.50	15265	0	15265	0	1517.4	1523.3	5.9	0.0	17.1	0.0	168	0.0170	1.3
12.00	15265	0	15265	0	1514.6	1519.5	4.9	0.0	19.3	0.0	171	0.0190	1.6
10.50	15265	0	15265	0	1511.8	1516.5	4.7	0.0	19.0	0.0	187	0.0147	1.6
9.00	15265	0	15265	0	1510.9	1519.2	8.3	0.0	10.4	0.0	204	0.0057	0.7
7.50	15265	0	15265	0	1510.1	1518.6	8.5	0.0	10.7	0.0	197	0.0037	0.7
6.00	15265	0	15265	0	1509.5	1518.1	8.6	0.0	10.7	0.0	204	0.0047	0.7
4.50	15265	0	15265	0	1509.1	1516.0	6.9	0.0	14.0	0.0	184	0.0063	1.0
3.00	15265	0	15265	0	1508.0	1515.3	7.3	0.0	13.0	0.0	179	0.0063	0.9
1.50	15265	0	15265	0	1507.0	1514.5	7.5	0.0	12.8	0.0	177	0.0060	0.9
0.00	15265	0	15265	0	1506.0	1512.9	6.9	0.0	14.3	0.0	171	0.0067	1.0

50-Yr Hydraulics

Section ID	Q (cfs) total	Q (cfs) left bank	Q (cfs) channel	Q (cfs) right bank	Elevation (ft) thalweg	Elevation (ft) water sfc	Depth (ft)	Velocity (f/s) left bank	Velocity (f/s) channel	Velocity (f/s) right bank	Topwidth (ft)	Energy Slope	Froude #
316.50	4823	0	4823	0	2309.6	2313.0	3.4	0.0	7.3	0.0	425.2	0.0273	1.0
313.50	4823	0	4823	0	2300.1	2302.4	2.3	0.0	14.5	0.0	369.5	0.0292	2.7
310.50	4823	0	4823	0	2291.9	2295.4	3.5	0.0	8.1	0.0	352.6	0.0280	1.1
307.50	4823	0	4823	0	2282.5	2285.7	3.2	0.0	14.4	0.0	241.3	0.0318	2.2
304.50	4823	0	4823	0	2273.5	2275.8	2.3	0.0	9.8	0.0	361.1	0.0320	1.5
301.50	4823	0	4823	0	2262.9	2267.6	4.7	0.0	11.9	0.0	209.5	0.0255	1.5
298.50	4823	0	4823	0	2256.2	2259.6	3.4	0.0	12.3	0.0	218.0	0.0277	1.6
295.50	4823	0	4823	0	2247.4	2251.0	3.6	0.0	11.5	0.0	274.0	0.0282	1.6
292.50	4823	0	4823	0	2237.9	2243.2	5.3	0.0	11.3	0.0	231.2	0.0275	1.5
289.50	9324	0	9324	0	2228.6	2234.2	5.6	0.0	12.4	0.0	451.0	0.0335	1.7
288.00	9324	0	9324	0	2224.2	2227.3	3.1	0.0	15.0	0.0	365.6	0.0397	2.0
286.50	9324	0	9324	0	2217.7	2222.4	4.7	0.0	12.0	0.0	490.6	0.0352	1.7
284.15	9324	0	9324	0	2210.8	2215.9	5.1	0.0	11.0	0.0	528.4	0.0287	1.5
280.60	9324	143	9181	0	2200.8	2205.3	4.5	6.5	13.2	0.0	367.6	0.0233	1.7
277.45	9324	49	9275	0	2194.6	2198.9	4.3	4.5	14.0	0.0	180.3	0.0370	1.3
277.25	9324	0	9324	0	2188.6	2191.7	3.1	0.0	24.3	0.0	132.3	0.0498	2.5
275.70	9324	0	9324	0	2183.9	2188.3	4.4	0.0	19.0	0.0	127.9	0.0372	1.7
272.65	9324	0	9324	0	2174.2	2178.1	3.9	0.0	20.8	0.0	114.0	0.0449	1.8
272.25	9324	0	9324	0	2173.3	2178.5	5.2	0.0	15.8	0.0	114.0	0.0340	1.2
271.50	9324	0	9324	0	2171.5	2180.3	8.8	0.0	9.6	0.0	141.1	0.0070	0.6
270.00	9324	20	9118	186	2167.9	2177.6	9.7	1.4	14.7	3.9	136.4	0.0130	0.9
267.00	9324	145	9179	0	2162.0	2165.8	3.8	16.0	24.3	0.0	290.7	0.0433	3.8
265.50	9324	0	9324	0	2158.0	2162.4	4.4	0.0	12.6	0.0	375.5	0.0470	1.6
264.00	9324	0	9324	0	2153.8	2157.8	4.0	0.0	13.8	0.0	311.7	0.0257	1.7
262.50	9324	0	9324	0	2150.5	2154.2	3.7	0.0	13.7	0.0	249.6	0.0250	1.5
261.00	9325	76	9233	16	2144.9	2149.3	4.4	4.9	16.3	5.3	239.0	0.0243	1.8
259.50	9324	0	8729	595	2139.4	2144.9	5.5	0.0	18.5	5.5	154.5	0.0227	1.5
258.00	9324	0	9324	0	2133.9	2138.8	4.9	0.0	22.2	0.0	94.8	0.0273	1.9
256.50	9324	0	9324	0	2128.3	2133.0	4.7	0.0	23.6	0.0	93.7	0.0340	2.0
255.00	9324	0	9324	0	2122.8	2127.4	4.6	0.0	24.0	0.0	93.5	0.0363	2.1
253.50	9324	0	9324	0	2117.2	2121.8	4.6	0.0	24.1	0.0	93.3	0.0367	2.1
252.00	9324	0	9324	0	2111.7	2116.3	4.6	0.0	24.2	0.0	93.4	0.0367	2.1
250.50	9324	0	9324	0	2106.1	2110.7	4.6	0.0	24.2	0.0	93.3	0.0370	2.1
249.00	9324	0	9324	0	2100.5	2105.1	4.6	0.0	24.2	0.0	93.2	0.0370	2.1
247.50	9324	0	9324	0	2095.0	2099.6	4.6	0.0	24.1	0.0	93.4	0.0370	2.1
246.00	9324	0	9324	0	2089.5	2094.1	4.6	0.0	24.1	0.0	93.3	0.0370	2.1
244.50	9324	0	9324	0	2083.9	2088.5	4.6	0.0	24.2	0.0	93.3	0.0393	2.1
243.00	9324	0	9324	0	2078.4	2082.0	3.6	0.0	24.5	0.0	107.3	0.0419	2.3
240.80	9324	0	9324	0	2070.8	2075.0	4.2	0.0	21.3	0.0	108.4	0.0609	1.9
240.30	9324	0	9324	0	2069.2	2075.2	6.0	0.0	14.7	0.0	112.0	0.0500	1.1
240.00	9324	0	9324	0	2067.5	2072.2	4.7	0.0	19.0	0.0	109.4	0.0230	1.6
238.50	9324	0	9324	0	2062.5	2066.6	4.1	0.0	21.6	0.0	108.3	0.0293	1.9
237.00	9324	0	9324	0	2057.4	2061.5	4.1	0.0	22.0	0.0	108.1	0.0333	2.0
235.50	9324	0	9324	0	2052.3	2056.3	4.0	0.0	22.1	0.0	108.1	0.0337	2.0
234.00	9538	0	9538	0	2047.2	2051.4	4.2	0.0	22.1	0.0	108.3	0.0393	2.0
232.50	9538	0	9538	0	2040.5	2044.6	4.1	0.0	21.9	0.0	193.5	0.0403	2.6
231.00	9538	0	9538	0	2036.9	2042.4	5.5	0.0	16.8	0.0	129.6	0.0287	1.4
229.50	9538	0	9538	0	2032.5	2038.0	5.5	0.0	18.9	0.0	146.7	0.0257	1.8
228.00	9538	0	9538	0	2029.8	2034.5	4.7	0.0	17.3	0.0	173.3	0.0267	1.7
226.50	9538	0	9538	0	2025.8	2030.8	5.0	0.0	17.4	0.0	147.9	0.0223	1.6
225.00	9538	0	9538	0	2022.3	2028.4	6.1	0.0	16.1	0.0	150.9	0.0200	1.4
223.50	9538	0	9538	0	2018.2	2024.6	6.4	0.0	17.7	0.0	130.2	0.0200	1.5
222.00	9538	3	9535	0	2014.6	2020.9	6.3	2.5	18.8	0.0	120.8	0.0223	1.6
220.50	9538	0	9538	0	2011.2	2017.0	5.8	0.0	19.4	0.0	133.0	0.0253	1.8
219.00	9538	10	9519	9	2007.8	2013.2	5.4	3.6	19.0	2.0	150.5	0.0247	1.7
217.50	9538	1	9376	161	2004.4	2010.8	6.4	1.9	17.4	5.5	147.9	0.0220	1.5
216.00	9538	0	9509	29	2001.2	2006.7	5.5	1.1	18.7	3.6	143.6	0.0233	1.7
214.50	9539	281	9236	22	1997.0	2003.7	6.7	7.4	17.7	5.1	170.5	0.0270	1.6
213.00	9538	0	9479	59	1994.0	1999.6	5.6	0.0	17.0	5.6	225.6	0.0307	1.9
211.50	9538	0	9526	12	1990.0	1995.9	5.9	0.0	14.6	4.3	275.4	0.0337	1.7
210.00	9537	2	9512	23	1985.2	1990.1	4.9	2.4	15.8	6.1	324.2	0.0360	2.0
208.50	9538	0	9497	41	1980.2	1984.4	4.2	0.0	15.9	6.3	252.9	0.0383	1.8
207.00	9538	12	9482	44	1974.9	1978.4	3.5	3.8	16.5	7.3	312.6	0.0410	2.1
205.50	9538	95	9435	8	1967.8	1973.1	5.3	7.9	14.0	4.8	374.7	0.0407	1.8
204.00	9538	25	9513	0	1960.1	1965.1	5.0	5.5	18.4	0.0	200.0	0.0387	2.0
202.50	9538	1	9537	0	1950.1	1956.7	6.6	2.5	22.5	0.0	112.1	0.0463	2.0
201.00	9538	19	9519	0	1941.3	1946.3	5.0	7.5	25.4	0.0	161.6	0.0587	2.9
199.50	9538	0	9538	0	1937.4	1941.5	4.1	1.2	18.6	0.0	187.5	0.0443	2.0
198.00	9537	446	9087	4	1930.9	1941.3	10.4	7.6	10.8	1.8	279.3	0.0270	1.1
196.50	9538	0	9538	0	1925.5	1929.9	4.4	0.0	24.0	0.0	186.1	0.0427	2.9

50-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
195.00	9538	0	9538	0	1921.3	1925.4	4.1	0.0	17.6	0.0	188.7	0.0453	1.8
193.50	9538	0	9538	0	1916.6	1920.9	4.3	0.0	16.6	0.0	238.4	0.0353	1.9
192.00	9538	0	9534	4	1911.0	1915.5	4.5	0.0	16.5	3.4	258.8	0.0377	1.9
190.50	9538	0	9538	0	1905.0	1909.4	4.4	0.0	16.9	0.0	253.7	0.0377	2.0
189.00	9538	0	9475	63	1901.9	1904.9	3.0	0.0	15.1	6.8	266.6	0.0323	1.7
187.50	9538	1	9444	93	1897.5	1900.8	3.3	1.6	15.0	7.0	254.9	0.0297	1.7
186.00	9538	0	9510	28	1892.3	1895.3	3.0	0.0	16.3	5.5	267.5	0.0313	1.9
184.50	9538	0	9538	0	1887.8	1891.7	3.9	0.0	14.1	0.0	263.5	0.0253	1.6
183.00	9538	0	9538	0	1882.8	1888.3	5.5	0.5	15.2	0.0	167.8	0.0243	1.4
181.50	9538	0	9538	0	1879.1	1882.8	3.7	0.0	17.4	0.0	338.1	0.0320	2.4
180.00	9538	1	9537	0	1875.4	1880.1	4.7	0.6	11.8	0.0	355.6	0.0263	1.4
178.50	9538	26	9512	0	1872.2	1877.3	5.1	3.3	12.1	0.0	340.4	0.0190	1.4
177.00	9538	0	9538	0	1869.6	1874.4	4.8	0.0	11.8	0.0	376.0	0.0207	1.4
175.50	9538	17	9521	0	1866.1	1871.1	5.0	4.2	12.2	0.0	345.3	0.0193	1.4
174.00	9538	20	9518	0	1862.7	1868.2	5.5	2.5	12.8	0.0	265.0	0.0187	1.3
172.50	8751	192	8559	0	1857.5	1863.5	6.0	8.0	16.4	0.0	193.3	0.0203	1.8
171.00	10496	2	10494	0	1853.5	1863.0	9.5	1.2	10.3	0.0	353.7	0.0210	1.1
169.50	10496	63	9204	1229	1850.5	1858.0	7.5	3.9	16.1	9.7	371.0	0.0260	1.9
168.00	10496	80	10416	0	1846.7	1852.7	6.0	4.2	16.5	0.0	234.4	0.0293	1.8
166.50	10496	0	10496	0	1844.8	1852.3	7.5	0.0	5.4	0.4	487.1	0.0240	0.5
166.00	10496	0	10496	0	1843.3	1848.4	5.1	0.0	14.4	0.0	252.7	0.0290	1.5
165.50	10496	0	10496	0	1841.7	1848.7	7.0	0.0	8.6	0.0	295.5	0.0260	0.8
165.00	10496	0	10496	0	1840.2	1845.4	5.2	0.0	15.4	0.0	277.3	0.0207	1.7
163.50	10496	0	10496	0	1836.0	1842.2	6.2	0.0	13.3	0.0	330.9	0.0263	1.5
162.00	10496	0	10496	0	1832.4	1837.6	5.2	0.0	15.2	0.0	265.6	0.0253	1.7
160.50	10496	0	10496	0	1827.7	1834.5	6.8	0.0	13.6	0.0	298.2	0.0250	1.5
159.00	10496	1	10495	0	1825.4	1830.3	4.9	2.0	14.7	0.0	309.4	0.0243	1.7
157.50	10496	0	10496	0	1821.9	1827.7	5.8	0.0	12.4	0.8	322.4	0.0243	1.4
156.00	10496	0	10496	0	1818.8	1823.4	4.6	0.0	13.9	0.0	423.1	0.0260	1.8
154.50	10496	0	10496	0	1815.5	1819.7	4.2	0.0	12.9	0.0	326.9	0.0263	1.4
153.00	10496	0	10496	0	1811.7	1815.7	4.0	0.0	13.4	0.0	418.8	0.0313	1.7
151.50	10496	0	10496	0	1804.6	1810.0	5.4	0.0	13.5	0.0	526.2	0.0337	2.0
150.00	10496	0	10496	0	1801.0	1807.0	6.0	0.0	9.6	0.0	621.5	0.0260	1.3
148.50	10496	0	10496	0	1797.8	1802.9	5.1	0.0	11.9	0.0	486.1	0.0247	1.6
147.00	10496	0	10496	0	1793.1	1798.7	5.6	0.0	12.1	0.0	496.0	0.0280	1.6
145.50	10496	0	10496	0	1790.9	1794.5	3.6	0.0	12.0	0.0	493.4	0.0273	1.6
144.00	10496	0	10496	0	1786.6	1790.4	3.8	0.0	12.3	0.0	435.5	0.0253	1.5
142.50	10496	0	10496	0	1782.2	1786.2	4.0	0.0	13.5	0.0	322.6	0.0257	1.5
141.00	10496	0	10496	0	1777.7	1781.9	4.2	0.0	14.4	0.0	328.2	0.0267	1.7
139.50	10496	0	10399	97	1774.0	1778.7	4.7	0.0	12.4	7.5	384.2	0.0267	1.5
138.00	10496	0	10472	24	1770.5	1774.2	3.7	0.0	13.6	5.5	415.2	0.0253	1.8
136.50	10496	0	10477	19	1767.6	1771.6	4.0	0.0	11.3	3.9	383.1	0.0197	1.3
135.00	10496	0	10476	20	1765.1	1769.1	4.0	0.0	11.6	4.4	352.2	0.0157	1.3
133.50	10496	0	10475	21	1762.6	1766.6	4.0	0.0	11.9	4.0	334.4	0.0173	1.3
132.00	10496	0	10447	49	1759.8	1763.4	3.6	0.0	12.9	6.7	366.5	0.0203	1.5
130.50	10496	0	10464	32	1755.9	1760.5	4.6	0.0	11.9	5.2	389.8	0.0220	1.4
129.00	10496	0	10473	23	1751.5	1757.1	5.6	0.0	12.1	5.1	449.0	0.0247	1.5
127.50	10496	0	10492	4	1746.8	1752.7	5.9	0.0	13.1	3.7	416.5	0.0270	1.7
126.00	10496	0	10495	1	1743.6	1749.0	5.4	1.7	12.1	2.1	439.8	0.0267	1.5
124.50	10496	0	10490	6	1740.5	1744.9	4.4	0.1	12.4	4.1	489.9	0.0270	1.7
123.00	10496	0	10495	1	1736.2	1741.1	4.9	0.0	11.4	1.9	499.0	0.0270	1.5
121.50	10496	0	10496	0	1732.2	1736.9	4.7	0.0	12.3	0.0	484.9	0.0277	1.6
120.00	10496	0	10495	1	1727.7	1732.4	4.7	0.1	12.5	2.4	456.1	0.0290	1.6
118.50	10497	2	10490	5	1724.3	1728.0	3.7	2.8	12.6	3.5	467.3	0.0287	1.7
117.00	10496	0	10496	0	1720.3	1724.1	3.8	0.0	11.8	0.0	474.7	0.0263	1.5
115.50	10497	121	10375	1	1715.6	1720.3	4.7	7.6	12.3	2.0	417.5	0.0223	1.5
114.00	10495	24	10470	1	1712.4	1717.9	5.5	4.0	10.4	2.0	460.1	0.0197	1.2
112.50	10496	0	10496	0	1709.8	1714.3	4.5	0.0	12.3	0.0	428.0	0.0217	1.5
111.00	10496	0	10496	0	1706.6	1710.7	4.1	0.0	12.4	0.0	399.3	0.0240	1.5
109.50	10496	0	10496	0	1702.7	1707.0	4.3	0.0	12.7	0.0	390.8	0.0223	1.5
108.00	10496	0	10496	0	1698.7	1704.4	5.7	0.0	11.2	0.0	407.0	0.0193	1.3
106.50	10496	0	10496	0	1696.5	1701.6	5.1	0.0	11.7	0.0	385.8	0.0190	1.4
105.00	10496	0	10496	0	1693.9	1698.2	4.3	0.0	12.7	0.0	352.2	0.0207	1.5
103.50	10496	0	10496	0	1689.1	1695.0	5.9	0.0	12.7	0.0	349.2	0.0217	1.5
102.00	10496	0	10496	0	1686.7	1691.7	5.0	0.0	12.7	0.0	363.4	0.0240	1.5
100.50	10496	0	10496	0	1684.0	1687.2	3.2	0.0	14.3	0.0	332.2	0.0357	1.7
99.00	10496	0	10496	0	1675.8	1677.8	2.0	0.0	19.2	0.0	278.1	0.0537	2.4
98.50	10496	0	10496	0	1674.2	1676.7	2.5	0.0	15.6	0.0	275.3	0.0530	1.8
98.00	10496	0	10496	0	1672.6	1676.9	4.3	0.0	9.0	0.0	275.5	0.0300	0.8
97.50	9821	0	9821	0	1671.0	1673.3	2.3	0.0	16.2	0.0	267.7	0.0170	1.9

50-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
96.00	9821	0	9821	0	1669.5	1673.0	3.5	0.0	9.9	0.0	289.3	0.0133	0.9
94.50	9821	0	9821	0	1668.0	1671.6	3.6	0.0	10.1	0.0	303.5	0.0093	1.0
93.00	9821	8	9810	3	1666.0	1670.3	4.3	2.8	9.4	2.2	424.9	0.0150	1.1
91.50	9822	5	9814	3	1662.6	1665.8	3.2	3.9	13.8	3.4	418.2	0.0240	1.9
90.00	9822	2	9819	1	1658.5	1662.6	4.1	2.4	11.0	1.9	445.0	0.0230	1.4
88.50	9822	7	9813	2	1655.3	1660.2	4.9	3.0	10.2	2.4	437.8	0.0190	1.2
87.00	9820	0	9817	3	1652.1	1656.4	4.3	1.9	12.5	2.8	425.6	0.0230	1.6
85.50	9821	0	9812	9	1647.9	1652.6	4.7	0.0	12.2	4.2	392.2	0.0233	1.5
84.00	9821	0	9821	0	1645.0	1650.0	5.0	0.0	10.9	0.0	415.0	0.0170	1.3
82.50	9821	0	9821	0	1643.0	1648.5	5.5	0.0	9.3	0.0	399.0	0.0150	1.0
81.00	9821	0	9821	0	1641.0	1644.6	3.6	0.0	13.3	0.0	378.1	0.0213	1.7
79.50	9821	0	9821	0	1637.3	1641.3	4.0	0.0	11.8	0.0	399.6	0.0240	1.4
78.00	9821	0	9821	0	1633.9	1638.0	4.1	0.0	11.7	0.0	422.1	0.0223	1.5
76.50	9821	0	9821	0	1630.3	1634.7	4.4	0.0	11.5	0.0	440.8	0.0200	1.5
75.00	9821	0	9816	5	1627.5	1632.7	5.2	0.0	9.8	2.6	412.9	0.0177	1.1
73.50	9821	0	9759	62	1623.9	1628.5	4.6	0.0	13.7	6.8	345.5	0.0187	1.7
72.00	9821	1	9785	35	1620.4	1627.8	7.4	0.9	6.7	2.6	392.0	0.0123	0.6
70.50	9821	1	9765	55	1620.0	1626.3	6.3	1.4	9.5	4.4	377.2	0.0100	1.0
69.00	9821	0	9769	52	1618.2	1623.0	4.8	0.0	12.7	5.9	349.5	0.0190	1.5
67.50	9821	0	9772	49	1615.4	1619.5	4.1	1.8	12.8	5.9	361.2	0.0247	1.5
66.00	9821	1	9811	9	1611.8	1615.9	4.1	2.5	11.9	4.4	462.7	0.0250	1.6
64.50	9821	0	9807	14	1608.2	1612.7	4.5	0.0	10.7	4.0	502.5	0.0227	1.4
63.00	9821	6	9812	3	1604.2	1609.6	5.4	3.0	10.7	2.4	503.9	0.0227	1.4
61.50	9821	2	9806	13	1600.3	1605.4	5.1	2.8	12.2	5.1	456.2	0.0250	1.6
60.00	9821	0	9815	6	1597.0	1601.7	4.7	0.0	11.5	3.4	461.6	0.0227	1.5
58.50	9821	0	9820	1	1593.3	1599.4	6.1	0.0	9.9	1.8	439.9	0.0180	1.2
57.00	9821	0	9820	1	1589.3	1595.8	6.5	0.0	12.9	1.4	297.4	0.0170	1.4
55.50	9821	0	9815	6	1585.9	1593.4	7.5	0.0	12.3	3.2	282.4	0.0197	1.3
54.00	9821	0	9821	0	1583.7	1589.6	5.9	0.0	13.6	0.0	362.4	0.0210	1.7
52.50	9821	0	9821	0	1580.7	1587.9	7.2	0.0	10.1	0.0	370.1	0.0187	1.1
51.00	9821	0	9817	4	1577.5	1583.3	5.8	0.0	15.2	3.1	236.4	0.0223	1.6
49.50	9821	0	9821	0	1574.5	1579.1	4.6	0.0	15.2	0.0	277.8	0.0233	1.8
48.00	9821	0	9821	0	1571.2	1578.5	7.3	0.0	9.5	0.0	398.2	0.0210	1.0
46.50	10954	0	10954	0	1568.0	1571.1	3.1	0.0	18.6	0.0	259.2	0.0173	2.2
45.00	12231	55	12145	31	1566.1	1574.3	8.2	1.4	5.8	1.6	298.1	0.0075	0.4
44.50	12231	0	12231	0	1566.2	1574.1	7.9	0.0	6.5	0.0	250.8	0.0024	0.4
43.60	12231	0	12231	0	1565.8	1574.0	8.2	0.0	6.2	0.0	251.7	0.0032	0.4
42.00	12231	0	12231	0	1567.4	1572.0	4.6	0.0	11.1	0.0	293.3	0.0102	1.0
40.50	12231	0	12131	100	1563.2	1567.5	4.3	0.0	16.0	7.4	306.4	0.0197	1.8
39.00	12231	0	12231	0	1559.2	1565.7	6.5	0.0	12.2	0.0	325.3	0.0197	1.2
37.50	12231	0	12220	11	1558.0	1562.8	4.8	0.0	13.4	3.4	316.3	0.0157	1.4
36.00	12231	0	12231	0	1554.7	1561.2	6.5	0.0	11.8	0.0	294.3	0.0160	1.1
34.50	12231	0	12218	13	1552.7	1557.6	4.9	0.0	14.3	4.3	353.3	0.0217	1.6
33.00	12230	75	12136	19	1549.6	1554.4	4.8	7.5	12.3	4.7	497.4	0.0230	1.5
31.50	12231	0	12231	0	1547.3	1552.3	5.0	0.0	9.9	0.0	552.6	0.0167	1.2
30.00	12231	8	12219	4	1544.6	1550.2	5.6	3.3	10.2	2.9	520.0	0.0143	1.2
28.50	12231	14	12217	0	1542.6	1547.8	5.2	3.9	10.8	0.0	472.6	0.0133	1.2
27.00	12231	2	12229	0	1539.0	1546.3	7.3	1.8	9.9	0.0	410.6	0.0113	1.0
25.50	12231	2	12097	132	1536.2	1544.3	8.1	2.0	11.3	6.3	359.3	0.0097	1.1
24.00	12231	19	12094	118	1534.7	1543.1	8.4	3.7	11.0	6.1	328.5	0.0103	1.0
22.50	12232	3	12212	17	1533.0	1540.8	7.8	2.4	12.3	3.8	354.1	0.0130	1.3
21.00	12231	446	11785	0	1531.4	1537.3	5.9	2.7	15.7	0.0	378.8	0.0147	1.2
19.50	12231	0	12231	0	1528.6	1533.4	4.8	0.0	18.4	0.0	150.5	0.0183	1.5
18.00	12231	0	12231	0	1525.8	1530.1	4.3	0.0	18.7	0.0	163.6	0.0223	1.6
16.50	12231	0	12231	0	1523.0	1527.2	4.2	0.0	17.7	0.0	177.3	0.0220	1.6
15.00	12231	0	12231	0	1520.2	1524.5	4.3	0.0	16.9	0.0	179.7	0.0183	1.5
13.50	12231	0	12231	0	1517.4	1522.6	5.2	0.0	15.9	0.0	164.3	0.0167	1.3
12.00	12231	0	12231	0	1514.6	1518.8	4.2	0.0	18.0	0.0	168.7	0.0197	1.6
10.50	12231	0	12231	0	1511.8	1516.0	4.2	0.0	17.3	0.0	184.0	0.0143	1.6
9.00	12231	0	12231	0	1510.9	1518.2	7.3	0.0	9.7	0.0	197.7	0.0050	0.7
7.50	12231	0	12231	0	1510.1	1517.6	7.5	0.0	9.9	0.0	190.9	0.0033	0.7
6.00	12231	0	12231	0	1509.5	1517.1	7.6	0.0	9.9	0.0	194.0	0.0047	0.7
4.50	12231	0	12231	0	1509.1	1515.1	6.0	0.0	13.1	0.0	179.5	0.0067	1.0
3.00	12231	0	12231	0	1508.0	1514.4	6.4	0.0	12.1	0.0	174.1	0.0063	0.9
1.50	12231	0	12231	0	1507.0	1513.6	6.6	0.0	11.9	0.0	172.3	0.0060	0.9
0.01	12231	0	12231	0	1506.0	1512.0	6.0	0.0	13.4	0.0	166.1	0.0067	1.0

25-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
316.50	3803	0	3803	0	2309.6	2312.8	3.2	0.0	6.7	0.0	417.6	0.0280	1.0
313.50	3803	0	3803	0	2300.1	2302.3	2.2	0.0	13.4	0.0	368.5	0.0292	2.7
310.50	3803	0	3803	0	2291.9	2295.2	3.3	0.0	7.2	0.0	328.6	0.0278	1.0
307.50	3803	0	3803	0	2282.5	2285.4	2.9	0.0	13.9	0.0	225.3	0.0318	2.2
304.50	3803	0	3803	0	2273.5	2275.7	2.2	0.0	8.8	0.0	350.6	0.0320	1.4
301.50	3803	0	3803	0	2262.9	2267.2	4.3	0.0	11.2	0.0	204.4	0.0260	1.5
298.50	3803	0	3803	0	2256.2	2259.4	3.2	0.0	11.0	0.0	212.7	0.0277	1.5
295.50	3803	0	3803	0	2247.4	2250.7	3.3	0.0	10.9	0.0	256.9	0.0278	1.6
292.50	3803	0	3803	0	2237.9	2242.9	5.0	0.0	10.5	0.0	211.9	0.0275	1.4
289.50	7438	0	7438	0	2228.6	2233.8	5.2	0.0	12.1	0.0	381.6	0.0338	1.7
288.00	7438	0	7438	0	2224.2	2227.0	2.8	0.0	14.3	0.0	345.0	0.0400	2.1
286.50	7438	0	7438	0	2217.7	2222.2	4.5	0.0	10.9	0.0	473.9	0.0348	1.6
284.15	7438	0	7438	0	2210.8	2215.6	4.8	0.0	10.5	0.0	486.9	0.0287	1.5
280.60	7438	109	7329	0	2200.8	2205.0	4.2	6.0	12.1	0.0	365.5	0.0241	1.6
277.45	7438	31	7407	0	2194.6	2198.4	3.8	4.1	13.0	0.0	178.0	0.0398	1.3
277.25	7438	0	7438	0	2188.6	2191.1	2.5	0.0	23.7	0.0	129.7	0.0529	2.7
275.70	7438	0	7438	0	2183.9	2187.7	3.8	0.0	18.0	0.0	110.2	0.0380	1.6
272.65	7438	0	7438	0	2174.2	2177.5	3.3	0.0	19.7	0.0	114.0	0.0451	1.9
272.25	7438	0	7438	0	2173.3	2177.8	4.5	0.0	14.6	0.0	114.0	0.0347	1.2
271.50	7438	0	7438	0	2171.5	2179.0	7.5	0.0	9.5	0.0	131.0	0.0077	0.7
270.00	7438	0	7391	47	2167.9	2176.4	8.5	0.0	14.2	2.5	100.6	0.0137	1.0
267.00	7438	113	7325	0	2162.0	2165.6	3.6	13.6	22.1	0.0	245.1	0.0403	3.3
265.50	7438	0	7438	0	2158.0	2162.2	4.2	0.0	11.5	0.0	366.0	0.0433	1.5
264.00	7438	0	7438	0	2153.8	2157.4	3.6	0.0	13.1	0.0	290.8	0.0260	1.7
262.50	7438	0	7438	0	2150.5	2153.8	3.3	0.0	12.8	0.0	246.2	0.0257	1.5
261.00	7438	36	7392	10	2144.9	2148.9	4.0	3.9	15.1	4.7	236.2	0.0253	1.8
259.50	7438	0	7160	278	2139.4	2144.3	4.9	0.0	17.5	4.1	153.2	0.0243	1.5
258.00	7438	0	7438	0	2133.9	2138.1	4.2	0.0	21.3	0.0	91.8	0.0293	1.9
256.50	7438	0	7438	0	2128.3	2132.4	4.1	0.0	22.1	0.0	91.1	0.0353	2.0
255.00	7438	0	7438	0	2122.8	2126.8	4.0	0.0	22.3	0.0	91.1	0.0367	2.0
253.50	7438	0	7438	0	2117.2	2121.2	4.0	0.0	22.3	0.0	91.0	0.0370	2.1
252.00	7438	0	7438	0	2111.7	2115.7	4.0	0.0	22.3	0.0	91.1	0.0370	2.1
250.50	7438	0	7438	0	2106.1	2110.1	4.0	0.0	22.3	0.0	91.0	0.0370	2.1
249.00	7438	0	7438	0	2100.5	2104.6	4.1	0.0	22.3	0.0	90.9	0.0373	2.1
247.50	7438	0	7438	0	2095.0	2099.0	4.0	0.0	22.3	0.0	91.2	0.0370	2.1
246.00	7438	0	7438	0	2089.5	2093.5	4.0	0.0	22.3	0.0	91.0	0.0367	2.1
244.50	7438	0	7438	0	2083.9	2087.9	4.0	0.0	22.3	0.0	91.0	0.0393	2.1
243.00	7438	0	7438	0	2078.4	2081.6	3.2	0.0	22.5	0.0	106.4	0.0415	2.2
240.80	7438	0	7438	0	2070.8	2074.5	3.7	0.0	19.4	0.0	107.4	0.0549	1.8
240.30	7438	0	7438	0	2069.2	2074.7	5.5	0.0	12.9	0.0	110.9	0.0444	1.0
240.00	7438	0	7438	0	2067.5	2071.5	4.0	0.0	18.0	0.0	107.9	0.0243	1.6
238.50	7438	0	7438	0	2062.5	2066.0	3.5	0.0	20.1	0.0	107.1	0.0310	1.9
237.00	7438	0	7438	0	2057.4	2060.9	3.5	0.0	20.3	0.0	107.1	0.0337	1.9
235.50	7438	0	7438	0	2052.3	2055.8	3.5	0.0	20.3	0.0	107.1	0.0337	1.9
234.00	7644	0	7644	0	2047.2	2050.8	3.6	0.0	20.3	0.0	107.3	0.0387	1.9
232.50	7644	0	7644	0	2040.5	2044.3	3.8	0.0	20.0	0.0	184.6	0.0390	2.5
231.00	7644	0	7644	0	2036.9	2041.8	4.9	0.0	15.5	0.0	126.2	0.0277	1.4
229.50	7644	0	7644	0	2032.5	2037.5	5.0	0.0	17.5	0.0	144.6	0.0253	1.8
228.00	7644	0	7644	0	2029.8	2034.1	4.3	0.0	15.7	0.0	171.0	0.0263	1.6
226.50	7644	0	7644	0	2025.8	2030.3	4.5	0.0	16.2	0.0	145.0	0.0223	1.6
225.00	7644	0	7644	0	2022.3	2027.8	5.5	0.0	14.8	0.0	146.0	0.0200	1.4
223.50	7644	0	7644	0	2018.2	2024.0	5.8	0.0	16.7	0.0	125.9	0.0203	1.5
222.00	7644	0	7644	0	2014.6	2020.3	5.7	1.3	17.5	0.0	117.3	0.0230	1.6
220.50	7644	0	7644	0	2011.2	2016.5	5.3	0.0	17.9	0.0	129.6	0.0253	1.7
219.00	7644	3	7641	0	2007.8	2012.8	5.0	2.7	17.5	0.0	132.1	0.0247	1.7
217.50	7644	0	7552	92	2004.4	2010.3	5.9	0.0	15.7	4.3	146.5	0.0220	1.4
216.00	7644	0	7640	4	2001.2	2006.2	5.0	0.0	17.4	1.7	141.0	0.0230	1.7
214.50	7643	197	7434	12	1997.0	2003.3	6.3	6.6	16.0	4.1	167.8	0.0260	1.6
213.00	7644	0	7611	33	1994.0	1999.3	5.3	0.0	15.5	4.5	225.3	0.0297	1.8
211.50	7644	0	7636	8	1990.0	1995.6	5.6	0.0	13.2	3.8	274.7	0.0327	1.6
210.00	7643	0	7630	13	1985.2	1989.8	4.6	1.2	14.9	5.0	295.5	0.0350	2.0
208.50	7644	0	7617	27	1980.2	1983.9	3.7	0.0	15.7	5.6	203.5	0.0380	1.8
207.00	7643	2	7606	35	1974.9	1978.1	3.2	2.0	15.7	7.2	300.7	0.0413	2.2
205.50	7644	83	7556	5	1967.8	1972.9	5.1	7.4	12.7	4.2	361.0	0.0393	1.7
204.00	7644	18	7626	0	1960.1	1964.4	4.3	4.9	19.1	0.0	127.5	0.0380	1.9
202.50	7644	0	7644	0	1950.1	1955.8	5.7	2.3	22.9	0.0	107.3	0.0520	2.3
201.00	7644	15	7629	0	1941.3	1946.1	4.8	7.1	23.3	0.0	160.4	0.0617	2.9
199.50	7644	0	7644	0	1937.4	1941.2	3.8	0.1	16.7	0.0	186.7	0.0400	1.9
198.00	7644	345	7299	0	1930.9	1940.0	9.1	6.9	12.9	0.0	134.4	0.0230	1.1
196.50	7644	0	7644	0	1925.5	1929.4	3.9	0.0	24.3	0.0	160.7	0.0440	3.1

25-Yr Hydraulics

Section ID	Q (cfs)				Elevation (ft)		Depth (ft)	Velocity (f/s)			Topwidth (ft)	Energy Slope	Froude #
	total	left bank	channel	right bank	thalweg	water sfc		left bank	channel	right bank			
195.00	7644	0	7644	0	1921.3	1925.0	3.7	0.0	16.5	0.0	181.4	0.0483	1.8
193.50	7644	0	7644	0	1916.6	1920.6	4.0	0.0	15.1	0.0	236.1	0.0347	1.8
192.00	7644	0	7643	1	1911.0	1915.2	4.2	0.0	15.4	2.0	238.5	0.0370	1.9
190.50	7644	0	7644	0	1905.0	1909.1	4.1	0.0	15.9	0.0	247.2	0.0377	2.0
189.00	7644	0	7590	54	1901.9	1904.6	2.7	0.0	13.8	6.4	265.0	0.0320	1.7
187.50	7644	0	7567	77	1897.5	1900.4	2.9	0.0	13.8	6.7	253.0	0.0303	1.6
186.00	7644	0	7626	18	1892.3	1895.0	2.7	0.0	15.0	4.8	266.2	0.0317	1.9
184.50	7644	0	7644	0	1887.8	1891.4	3.6	0.0	12.9	0.0	258.8	0.0253	1.5
183.00	7644	0	7644	0	1882.8	1887.7	4.9	0.0	14.5	0.0	157.6	0.0243	1.4
181.50	7644	0	7644	0	1879.1	1882.6	3.5	0.0	16.0	0.0	299.9	0.0310	2.2
180.00	7644	0	7644	0	1875.4	1879.8	4.4	0.0	10.9	0.0	328.8	0.0257	1.3
178.50	7644	11	7633	0	1872.2	1876.9	4.7	2.3	11.3	0.0	319.5	0.0187	1.4
177.00	7644	0	7644	0	1869.6	1874.1	4.5	0.0	11.0	0.0	358.9	0.0203	1.4
175.50	7644	12	7632	0	1866.1	1870.8	4.7	3.9	11.5	0.0	334.3	0.0200	1.4
174.00	7644	3	7641	0	1862.7	1867.8	5.1	1.4	12.0	0.0	250.5	0.0197	1.3
172.50	6838	125	6713	0	1857.5	1863.0	5.5	7.2	15.7	0.0	178.8	0.0200	1.8
171.00	8028	0	8028	0	1853.5	1862.5	9.0	0.0	9.4	0.0	314.6	0.0200	1.0
169.50	8028	11	7086	931	1850.5	1857.6	7.1	2.5	15.3	9.4	331.2	0.0267	2.1
168.00	8028	13	8015	0	1846.7	1852.0	5.3	2.5	15.8	0.0	194.7	0.0293	1.7
166.50	8028	0	8028	0	1844.8	1851.7	6.9	0.0	4.8	0.0	478.3	0.0240	0.5
166.00	8028	0	8028	0	1843.3	1847.7	4.4	0.0	14.5	0.0	224.6	0.0310	1.6
165.50	8028	0	8028	0	1841.7	1848.0	6.3	0.0	7.8	0.0	283.0	0.0270	0.7
165.00	8028	0	8028	0	1840.2	1844.9	4.7	0.0	14.6	0.0	272.1	0.0210	1.8
163.50	8028	0	8028	0	1836.0	1841.9	5.9	0.0	11.6	0.0	322.4	0.0267	1.4
162.00	8028	0	8028	0	1832.4	1837.1	4.7	0.0	14.3	0.0	261.3	0.0253	1.7
160.50	8028	0	8028	0	1827.7	1834.2	6.5	0.0	12.0	0.0	293.0	0.0250	1.4
159.00	8028	0	8028	0	1825.4	1829.9	4.5	0.1	13.5	0.0	303.3	0.0240	1.7
157.50	8028	0	8028	0	1821.9	1827.3	5.4	0.0	11.1	0.0	309.8	0.0237	1.3
156.00	8028	0	8028	0	1818.8	1823.1	4.3	0.0	12.7	0.0	413.8	0.0260	1.8
154.50	8028	0	8028	0	1815.5	1819.3	3.8	0.0	11.7	0.0	320.4	0.0263	1.4
153.00	8028	0	8028	0	1811.7	1815.4	3.7	0.0	12.1	0.0	407.3	0.0307	1.7
151.50	8028	0	8028	0	1804.6	1809.7	5.1	0.0	12.8	0.0	445.1	0.0327	1.9
150.00	8028	0	8028	0	1801.0	1806.4	5.4	0.0	10.0	0.0	438.2	0.0257	1.3
148.50	8028	0	8028	0	1797.8	1802.5	4.7	0.0	11.4	0.0	440.1	0.0257	1.6
147.00	8028	0	8028	0	1793.1	1798.4	5.3	0.0	10.9	0.0	482.8	0.0283	1.6
145.50	8028	0	8028	0	1790.9	1794.2	3.3	0.0	11.0	0.0	476.3	0.0273	1.6
144.00	8028	0	8028	0	1786.6	1790.1	3.5	0.0	11.3	0.0	419.3	0.0260	1.5
142.50	8028	0	8028	0	1782.2	1785.8	3.6	0.0	12.6	0.0	305.7	0.0260	1.5
141.00	8028	0	8028	0	1777.7	1781.5	3.8	0.0	13.3	0.0	305.6	0.0263	1.7
139.50	8028	0	7950	78	1774.0	1778.4	4.4	0.0	11.3	7.1	365.8	0.0263	1.4
138.00	8028	0	8010	18	1770.5	1773.9	3.4	0.0	12.4	5.1	410.6	0.0253	1.7
136.50	8028	0	8015	13	1767.6	1771.2	3.6	0.0	10.1	3.5	379.8	0.0197	1.2
135.00	8028	0	8015	13	1765.1	1768.7	3.6	0.0	10.6	3.9	347.7	0.0157	1.3
133.50	8028	0	8014	14	1762.6	1766.2	3.6	0.0	10.8	3.7	324.9	0.0173	1.3
132.00	8028	0	7993	35	1759.8	1763.0	3.2	0.0	12.0	6.0	323.3	0.0203	1.5
130.50	8028	0	8006	22	1755.9	1760.0	4.1	0.0	11.3	4.8	343.5	0.0220	1.4
129.00	8028	0	8011	17	1751.5	1756.8	5.3	0.0	11.0	4.7	426.1	0.0243	1.5
127.50	8028	0	8026	2	1746.8	1752.4	5.6	0.0	12.0	2.6	408.8	0.0270	1.6
126.00	8028	0	8028	0	1743.6	1748.7	5.1	0.0	10.8	1.5	428.9	0.0270	1.4
124.50	8028	0	8025	3	1740.5	1744.6	4.1	0.0	11.4	3.4	466.4	0.0267	1.6
123.00	8028	0	8028	0	1736.2	1740.8	4.6	0.0	10.4	0.0	472.3	0.0267	1.4
121.50	8028	0	8028	0	1732.2	1736.5	4.3	0.0	11.4	0.0	468.8	0.0280	1.6
120.00	8028	0	8028	0	1727.7	1732.1	4.4	0.0	11.5	1.8	429.4	0.0293	1.6
118.50	8029	1	8025	3	1724.3	1727.7	3.4	2.2	11.5	3.1	447.0	0.0283	1.6
117.00	8028	0	8028	0	1720.3	1723.8	3.5	0.0	10.6	0.0	474.1	0.0260	1.5
115.50	8028	94	7934	0	1715.6	1720.0	4.4	7.0	11.2	1.4	404.7	0.0223	1.5
114.00	8028	14	8013	1	1712.4	1717.6	5.2	3.3	9.3	1.6	444.5	0.0197	1.2
112.50	8028	0	8028	0	1709.8	1714.0	4.2	0.0	11.4	0.0	418.4	0.0220	1.5
111.00	8028	0	8028	0	1706.6	1710.4	3.8	0.0	11.2	0.0	386.6	0.0243	1.4
109.50	8028	0	8028	0	1702.7	1706.7	4.0	0.0	11.6	0.0	376.8	0.0223	1.5
108.00	8028	0	8028	0	1698.7	1704.1	5.4	0.0	9.9	0.0	406.3	0.0193	1.2
106.50	8028	0	8028	0	1696.5	1701.2	4.7	0.0	10.7	0.0	385.1	0.0193	1.3
105.00	8028	0	8028	0	1693.9	1697.8	3.9	0.0	11.5	0.0	351.4	0.0210	1.4
103.50	8028	0	8028	0	1689.1	1694.6	5.5	0.0	11.4	0.0	348.6	0.0213	1.4
102.00	8028	0	8028	0	1686.7	1691.4	4.7	0.0	11.5	0.0	362.7	0.0240	1.5
100.50	8028	0	8028	0	1684.0	1686.8	2.8	0.0	13.0	0.0	331.6	0.0370	1.7
99.00	8028	0	8028	0	1675.8	1677.4	1.6	0.0	17.7	0.0	277.4	0.0537	2.4
98.50	8028	0	8028	0	1674.2	1676.3	2.1	0.0	13.7	0.0	274.7	0.0490	1.7
98.00	8028	0	8028	0	1672.6	1676.6	4.0	0.0	7.5	0.0	274.8	0.0270	0.7
97.50	7721	0	7721	0	1671.0	1672.9	1.9	0.0	15.7	0.0	266.8	0.0173	2.0

25-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
96.00	7721	0	7721	0	1669.5	1672.3	2.8	0.0	9.6	0.0	287.6	0.0133	1.0
94.50	7721	0	7721	0	1668.0	1671.2	3.2	0.0	9.1	0.0	272.0	0.0087	0.9
93.00	7721	6	7713	2	1666.0	1670.0	4.0	2.5	8.4	1.9	424.4	0.0143	1.0
91.50	7721	3	7717	1	1662.6	1665.5	2.9	3.6	13.1	3.0	407.0	0.0243	1.9
90.00	7721	1	7720	0	1658.5	1662.4	3.9	2.0	9.8	1.5	444.5	0.0233	1.3
88.50	7721	4	7716	1	1655.3	1659.9	4.6	2.8	9.5	1.8	437.2	0.0190	1.2
87.00	7721	0	7720	1	1652.1	1656.1	4.0	0.1	11.4	1.7	425.1	0.0233	1.6
85.50	7721	0	7716	5	1647.9	1652.3	4.4	0.0	11.4	3.6	363.4	0.0230	1.5
84.00	7721	0	7721	0	1645.0	1649.6	4.6	0.0	10.1	0.0	392.4	0.0167	1.3
82.50	7721	0	7721	0	1643.0	1648.1	5.1	0.0	8.7	0.0	398.1	0.0153	1.0
81.00	7721	0	7721	0	1641.0	1644.3	3.3	0.0	12.1	0.0	377.6	0.0217	1.6
79.50	7721	0	7721	0	1637.3	1641.0	3.7	0.0	10.6	0.0	399.1	0.0240	1.4
78.00	7721	0	7721	0	1633.9	1637.7	3.8	0.0	10.7	0.0	421.5	0.0223	1.4
76.50	7721	0	7721	0	1630.3	1634.4	4.1	0.0	10.4	0.0	440.3	0.0197	1.4
75.00	7721	0	7718	3	1627.5	1632.3	4.8	0.0	9.0	2.3	402.2	0.0177	1.1
73.50	7721	0	7675	46	1623.9	1628.2	4.3	0.0	12.8	6.4	342.2	0.0190	1.7
72.00	7721	0	7697	24	1620.4	1627.2	6.8	0.5	6.1	2.3	338.8	0.0123	0.6
70.50	7721	0	7681	40	1620.0	1625.8	5.8	1.0	9.0	4.2	376.0	0.0103	1.0
69.00	7721	0	7685	36	1618.2	1622.7	4.5	0.0	11.6	5.2	333.7	0.0190	1.4
67.50	7721	0	7683	38	1615.4	1619.1	3.7	0.0	12.1	5.5	327.8	0.0243	1.5
66.00	7721	1	7714	6	1611.8	1615.7	3.9	2.1	10.7	4.0	462.2	0.0247	1.5
64.50	7721	0	7710	11	1608.2	1612.5	4.3	0.0	9.7	3.8	495.1	0.0220	1.4
63.00	7721	2	7718	1	1604.2	1609.3	5.1	2.0	9.9	1.3	473.2	0.0227	1.4
61.50	7721	1	7712	8	1600.3	1605.2	4.9	2.5	11.3	4.6	444.9	0.0257	1.6
60.00	7721	0	7718	3	1597.0	1601.5	4.5	0.0	10.4	2.7	457.9	0.0227	1.4
58.50	7721	0	7721	0	1593.3	1599.1	5.8	0.0	9.4	0.0	409.3	0.0180	1.2
57.00	7721	0	7721	0	1589.3	1595.4	6.1	0.0	12.3	0.0	282.9	0.0180	1.5
55.50	7721	0	7718	3	1585.9	1593.0	7.1	0.0	11.2	2.7	275.3	0.0197	1.2
54.00	7721	0	7721	0	1583.7	1589.2	5.5	0.0	13.0	0.0	302.1	0.0203	1.6
52.50	7721	0	7721	0	1580.7	1587.5	6.8	0.0	9.4	0.0	357.6	0.0190	1.1
51.00	7721	0	7720	1	1577.5	1582.7	5.2	0.0	14.7	2.4	211.3	0.0230	1.6
49.50	7721	0	7721	0	1574.5	1578.8	4.3	0.0	14.0	0.0	256.7	0.0230	1.7
48.00	7721	0	7721	0	1571.2	1578.0	6.8	0.0	8.9	0.0	356.6	0.0203	1.0
46.50	8579	0	8579	0	1568.0	1570.7	2.7	0.0	18.2	0.0	246.2	0.0183	2.3
45.00	9546	21	9509	16	1566.1	1573.5	7.4	1.0	5.1	1.2	297.1	0.0085	0.3
44.50	9546	0	9546	0	1566.2	1573.3	7.1	0.0	5.7	0.0	248.3	0.0019	0.4
43.60	9546	0	9546	0	1565.8	1573.2	7.4	0.0	5.4	0.0	249.3	0.0027	0.4
42.00	9546	0	9546	0	1567.4	1571.4	4.0	0.0	10.2	0.0	292.6	0.0106	1.0
40.50	9546	0	9466	80	1563.2	1567.1	3.9	0.0	14.8	7.1	306.0	0.0197	1.8
39.00	9546	0	9546	0	1559.2	1565.3	6.1	0.0	10.8	0.0	324.3	0.0193	1.2
37.50	9546	0	9537	9	1558.0	1562.3	4.3	0.0	12.4	3.4	315.1	0.0157	1.4
36.00	9546	0	9546	0	1554.7	1560.7	6.0	0.0	10.6	0.0	292.7	0.0160	1.1
34.50	9546	0	9538	8	1552.7	1557.3	4.6	0.0	13.1	3.9	351.3	0.0213	1.6
33.00	9546	62	9470	14	1549.6	1554.2	4.6	6.9	10.9	4.2	490.1	0.0220	1.4
31.50	9546	0	9546	0	1547.3	1552.0	4.7	0.0	9.0	0.0	551.3	0.0160	1.1
30.00	9546	6	9538	2	1544.6	1549.8	5.2	3.0	9.2	2.4	519.3	0.0143	1.1
28.50	9546	9	9537	0	1542.6	1547.4	4.8	3.3	10.0	0.0	455.8	0.0133	1.2
27.00	9546	1	9545	0	1539.0	1545.8	6.8	1.4	9.5	0.0	395.8	0.0117	1.0
25.50	9545	1	9441	103	1536.2	1544.3	8.1	1.5	8.8	4.9	359.3	0.0103	0.9
24.00	9546	11	9440	95	1534.7	1542.6	7.9	3.4	10.2	5.9	327.4	0.0107	1.1
22.50	9546	1	9533	12	1533.0	1540.4	7.4	1.9	11.0	3.4	353.4	0.0137	1.2
21.00	9546	0	9546	0	1531.4	1536.5	5.1	0.0	15.1	0.0	140.2	0.0163	1.3
19.50	9546	0	9546	0	1528.6	1532.6	4.0	0.0	17.6	0.0	147.3	0.0203	1.6
18.00	9546	0	9546	0	1525.8	1529.5	3.7	0.0	16.8	0.0	161.5	0.0227	1.6
16.50	9546	0	9546	0	1523.0	1526.6	3.6	0.0	16.0	0.0	175.1	0.0210	1.5
15.00	9546	0	9546	0	1520.2	1523.9	3.7	0.0	15.3	0.0	177.4	0.0183	1.4
13.50	9546	0	9546	0	1517.4	1521.8	4.4	0.0	14.6	0.0	160.3	0.0170	1.3
12.00	9546	0	9546	0	1514.6	1518.2	3.6	0.0	16.6	0.0	166.8	0.0197	1.6
10.50	9546	0	9546	0	1511.8	1515.5	3.7	0.0	15.5	0.0	180.9	0.0137	1.5
9.00	9546	0	9546	0	1510.9	1517.2	6.3	0.0	9.0	0.0	191.8	0.0043	0.7
7.50	9546	0	9546	0	1510.1	1516.6	6.5	0.0	9.1	0.0	184.9	0.0033	0.7
6.00	9546	0	9546	0	1509.5	1516.1	6.6	0.0	9.1	0.0	188.0	0.0047	0.7
4.50	9546	0	9546	0	1509.1	1514.2	5.1	0.0	12.2	0.0	174.5	0.0067	1.0
3.00	9546	0	9546	0	1508.0	1513.5	5.5	0.0	11.1	0.0	169.6	0.0067	0.9
1.50	9546	0	9546	0	1507.0	1512.7	5.7	0.0	10.9	0.0	167.8	0.0063	0.8
0.01	9546	0	9546	0	1506.0	1511.1	5.1	0.0	12.4	0.0	161.8	0.0067	1.0

10-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
316.50	2684	0	2684	0	2309.6	2312.5	2.9	0.0	6.2	0.0	405.7	0.0300	1.0
313.50	2684	0	2684	0	2300.1	2302.1	2.0	0.0	11.4	0.0	366.9	0.0295	2.5
310.50	2684	0	2684	0	2291.9	2294.7	2.8	0.0	6.9	0.0	271.4	0.0272	1.0
307.50	2684	0	2684	0	2282.5	2285.1	2.6	0.0	13.2	0.0	186.1	0.0317	2.2
304.50	2684	0	2684	0	2273.5	2275.4	1.9	0.0	8.0	0.0	305.6	0.0322	1.4
301.50	2684	0	2684	0	2262.9	2266.9	4.0	0.0	10.3	0.0	193.1	0.0265	1.6
298.50	2684	0	2684	0	2256.2	2259.1	2.9	0.0	9.5	0.0	205.5	0.0275	1.4
295.50	2684	0	2684	0	2247.4	2250.4	3.0	0.0	10.3	0.0	211.3	0.0277	1.6
292.50	2684	0	2684	0	2237.9	2242.4	4.5	0.0	9.8	0.0	176.5	0.0278	1.4
289.50	5069	0	5069	0	2228.6	2233.4	4.8	0.0	11.1	0.0	330.3	0.0347	1.7
288.00	5069	0	5069	0	2224.2	2226.6	2.4	0.0	13.1	0.0	296.1	0.0400	2.0
286.50	5069	0	5069	0	2217.7	2221.9	4.2	0.0	9.6	0.0	425.3	0.0337	1.5
284.15	5069	0	5069	0	2210.8	2215.1	4.3	0.0	10.1	0.0	371.6	0.0287	1.5
280.60	5069	69	5000	0	2200.8	2204.6	3.8	5.3	10.6	0.0	362.4	0.0251	1.6
277.45	5069	14	5055	0	2194.6	2197.6	3.0	3.4	11.5	0.0	175.1	0.0430	1.3
277.25	5069	0	5069	0	2188.6	2190.4	1.8	0.0	22.7	0.0	126.1	0.0580	3.0
275.70	5069	0	5069	0	2183.9	2186.9	3.0	0.0	15.3	0.0	110.2	0.0404	1.6
272.65	5069	0	5069	0	2174.2	2176.8	2.6	0.0	17.3	0.0	114.0	0.0424	1.9
272.25	5069	0	5069	0	2173.3	2177.0	3.7	0.0	12.1	0.0	114.0	0.0328	1.1
271.50	5069	0	5069	0	2171.5	2177.0	5.5	0.0	9.3	0.0	115.4	0.0090	0.8
270.00	5069	0	5069	0	2167.9	2174.6	6.7	0.0	13.1	0.0	74.0	0.0145	1.0
267.00	5069	70	4999	0	2162.0	2165.3	3.3	10.2	18.9	0.0	186.5	0.0358	2.8
265.50	5069	0	5069	0	2158.0	2161.8	3.8	0.0	10.0	0.0	344.7	0.0390	1.4
264.00	5069	0	5069	0	2153.8	2156.9	3.1	0.0	11.8	0.0	276.4	0.0270	1.7
262.50	5069	0	5069	0	2150.5	2153.4	2.9	0.0	10.9	0.0	243.5	0.0263	1.4
261.00	5069	5	5060	4	2144.9	2148.4	3.5	2.5	13.3	3.4	228.8	0.0267	1.8
259.50	5069	0	5064	5	2139.4	2143.3	3.9	0.0	15.9	0.9	151.2	0.0273	1.5
258.00	5069	0	5069	0	2133.9	2137.1	3.2	0.0	19.6	0.0	87.8	0.0327	2.0
256.50	5069	0	5069	0	2128.3	2131.5	3.2	0.0	19.4	0.0	87.8	0.0370	2.0
255.00	5069	0	5069	0	2122.8	2126.0	3.2	0.0	19.4	0.0	87.9	0.0370	2.0
253.50	5069	0	5069	0	2117.2	2120.4	3.2	0.0	19.5	0.0	87.8	0.0373	2.0
252.00	5069	0	5069	0	2111.7	2114.9	3.2	0.0	19.4	0.0	87.8	0.0370	2.0
250.50	5069	0	5069	0	2106.1	2109.3	3.2	0.0	19.5	0.0	87.8	0.0370	2.0
249.00	5069	0	5069	0	2100.5	2103.7	3.2	0.0	19.5	0.0	87.7	0.0370	2.0
247.50	5069	0	5069	0	2095.0	2098.2	3.2	0.0	19.4	0.0	87.9	0.0370	2.0
246.00	5069	0	5069	0	2089.5	2092.7	3.2	0.0	19.4	0.0	87.8	0.0370	2.0
244.50	5069	0	5069	0	2083.9	2087.1	3.2	0.0	19.5	0.0	87.8	0.0390	2.0
243.00	5069	0	5069	0	2078.4	2080.9	2.5	0.0	19.4	0.0	105.1	0.0404	2.2
240.80	5069	0	5069	0	2070.8	2073.8	3.0	0.0	16.6	0.0	105.9	0.0476	1.7
240.30	5069	0	5069	0	2069.2	2073.9	4.7	0.0	10.3	0.0	109.4	0.0378	0.9
240.00	5069	0	5069	0	2067.5	2070.5	3.0	0.0	16.8	0.0	105.8	0.0260	1.8
238.50	5069	0	5069	0	2062.5	2065.3	2.8	0.0	17.6	0.0	105.6	0.0330	1.9
237.00	5069	0	5069	0	2057.4	2060.2	2.8	0.0	17.6	0.0	105.6	0.0340	1.9
235.50	5069	0	5069	0	2052.3	2055.1	2.8	0.0	17.6	0.0	105.6	0.0337	1.9
234.00	5227	0	5227	0	2047.2	2050.1	2.9	0.0	17.6	0.0	105.8	0.0380	1.8
232.50	5227	0	5227	0	2040.5	2043.9	3.4	0.0	17.2	0.0	170.8	0.0370	2.3
231.00	5227	0	5227	0	2036.9	2040.9	4.0	0.0	13.6	0.0	121.2	0.0267	1.3
229.50	5227	0	5227	0	2032.5	2036.8	4.3	0.0	15.3	0.0	141.6	0.0250	1.7
228.00	5227	0	5227	0	2029.8	2033.6	3.8	0.0	13.2	0.0	167.7	0.0260	1.5
226.50	5227	0	5227	0	2025.8	2029.5	3.7	0.0	14.3	0.0	140.6	0.0223	1.6
225.00	5227	0	5227	0	2022.3	2027.1	4.8	0.0	12.8	0.0	138.9	0.0200	1.3
223.50	5227	0	5227	0	2018.2	2023.1	4.9	0.0	15.1	0.0	119.7	0.0213	1.6
222.00	5227	0	5227	0	2014.6	2019.5	4.9	0.0	15.5	0.0	111.6	0.0240	1.6
220.50	5227	0	5227	0	2011.2	2015.8	4.6	0.0	15.5	0.0	124.6	0.0253	1.7
219.00	5227	0	5227	0	2007.8	2012.0	4.2	0.0	15.2	0.0	127.1	0.0240	1.6
217.50	5227	0	5206	21	2004.4	2009.6	5.2	0.0	13.4	2.4	144.1	0.0213	1.4
216.00	5227	0	5227	0	2001.2	2005.4	4.2	0.0	15.5	0.0	124.1	0.0230	1.7
214.50	5228	106	5118	4	1997.0	2002.7	5.7	5.4	13.4	2.7	163.6	0.0253	1.4
213.00	5227	0	5220	7	1994.0	1998.9	4.9	0.0	13.3	2.5	224.8	0.0273	1.8
211.50	5227	0	5224	3	1990.0	1995.1	5.1	0.0	11.4	3.1	258.6	0.0313	1.5
210.00	5227	0	5223	4	1985.2	1989.4	4.2	0.0	13.4	3.1	275.1	0.0357	2.0
208.50	5227	0	5213	14	1980.2	1983.3	3.1	0.0	14.4	4.8	176.0	0.0383	1.8
207.00	5227	0	5203	24	1974.9	1977.7	2.8	0.0	13.9	6.4	258.1	0.0400	2.0
205.50	5227	65	5160	2	1967.8	1972.4	4.6	6.9	11.5	3.0	316.6	0.0403	1.7
204.00	5227	14	5213	0	1960.1	1963.6	3.5	5.3	18.0	0.0	124.9	0.0433	2.1
202.50	5227	0	5227	0	1950.1	1955.1	5.0	0.0	20.3	0.0	102.0	0.0557	2.3
201.00	5227	10	5217	0	1941.3	1945.6	4.3	6.2	20.1	0.0	155.4	0.0590	2.7
199.50	5227	0	5227	0	1937.4	1940.8	3.4	0.1	13.9	0.0	185.5	0.0363	1.7
198.00	5227	228	4999	0	1930.9	1937.6	6.7	6.8	15.2	0.0	76.6	0.0240	1.3
196.50	5227	0	5227	0	1925.5	1928.8	3.3	0.0	22.3	0.0	136.0	0.0447	3.0

10-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
195.00	5227	0	5227	0	1921.3	1924.5	3.2	0.0	14.2	0.0	173.5	0.0460	1.7
193.50	5227	0	5227	0	1916.6	1920.2	3.6	0.0	12.9	0.0	232.4	0.0327	1.7
192.00	5227	0	5227	0	1911.0	1914.6	3.6	0.0	14.4	0.0	176.8	0.0367	1.8
190.50	5227	0	5227	0	1905.0	1908.6	3.6	0.0	14.5	0.0	238.2	0.0383	2.1
189.00	5227	0	5186	41	1901.9	1904.2	2.3	0.0	11.5	5.7	262.7	0.0320	1.5
187.50	5227	0	5172	55	1897.5	1900.0	2.5	0.0	12.1	6.1	248.8	0.0300	1.6
186.00	5227	0	5220	7	1892.3	1894.6	2.3	0.0	13.0	3.3	264.3	0.0313	1.9
184.50	5227	0	5227	0	1887.8	1890.9	3.1	0.0	11.1	0.0	251.9	0.0257	1.4
183.00	5227	0	5227	0	1882.8	1886.8	4.0	0.0	13.4	0.0	146.6	0.0253	1.4
181.50	5227	0	5227	0	1879.1	1882.3	3.2	0.0	13.6	0.0	270.8	0.0297	2.0
180.00	5227	0	5227	0	1875.4	1879.3	3.9	0.0	9.5	0.0	313.2	0.0240	1.3
178.50	5227	0	5227	0	1872.2	1876.4	4.2	0.0	10.2	0.0	280.2	0.0187	1.3
177.00	5227	0	5227	0	1869.6	1873.6	4.0	0.0	10.0	0.0	304.3	0.0203	1.3
175.50	5227	6	5221	0	1866.1	1870.3	4.2	3.2	10.4	0.0	301.9	0.0203	1.4
174.00	5227	0	5227	0	1862.7	1867.1	4.4	0.0	10.9	0.0	225.9	0.0210	1.3
172.50	5227	85	5142	0	1857.5	1862.6	5.1	6.3	14.0	0.0	168.4	0.0200	1.7
171.00	5666	0	5666	0	1853.5	1861.8	8.3	0.0	8.7	0.0	283.8	0.0187	1.0
169.50	5666	0	5025	641	1850.5	1857.2	6.7	0.1	13.9	8.6	286.8	0.0280	2.1
168.00	5666	0	5666	0	1846.7	1851.3	4.6	0.0	14.5	0.0	166.5	0.0283	1.7
166.50	5666	0	5666	0	1844.8	1851.2	6.4	0.0	3.9	0.0	469.3	0.0223	0.4
166.00	5666	0	5666	0	1843.3	1846.9	3.6	0.0	14.9	0.0	196.8	0.0350	1.9
165.50	5666	0	5666	0	1841.7	1847.3	5.6	0.0	6.8	0.0	268.6	0.0290	0.7
165.00	5666	0	5666	0	1840.2	1844.4	4.2	0.0	13.9	0.0	215.3	0.0203	1.8
163.50	5666	0	5666	0	1836.0	1841.5	5.5	0.0	10.2	0.0	315.9	0.0273	1.4
162.00	5666	0	5666	0	1832.4	1836.6	4.2	0.0	12.9	0.0	257.2	0.0257	1.7
160.50	5666	0	5666	0	1827.7	1833.8	6.1	0.0	10.2	0.0	287.0	0.0247	1.3
159.00	5666	0	5666	0	1825.4	1829.5	4.1	0.0	12.3	0.0	286.3	0.0237	1.7
157.50	5666	0	5666	0	1821.9	1826.8	4.9	0.0	9.7	0.0	295.7	0.0230	1.2
156.00	5666	0	5666	0	1818.8	1822.7	3.9	0.0	11.9	0.0	329.9	0.0257	1.7
154.50	5666	0	5666	0	1815.5	1818.9	3.4	0.0	10.5	0.0	314.0	0.0270	1.4
153.00	5666	0	5666	0	1811.7	1815.1	3.4	0.0	10.4	0.0	390.4	0.0300	1.6
151.50	5666	0	5666	0	1804.6	1809.3	4.7	0.0	12.1	0.0	356.2	0.0317	1.9
150.00	5666	0	5666	0	1801.0	1806.0	5.0	0.0	9.1	0.0	395.2	0.0257	1.3
148.50	5666	0	5666	0	1797.8	1802.1	4.3	0.0	10.6	0.0	356.4	0.0257	1.5
147.00	5666	0	5666	0	1793.1	1798.1	5.0	0.0	10.0	0.0	432.1	0.0283	1.5
145.50	5666	0	5666	0	1790.9	1793.8	2.9	0.0	10.0	0.0	424.1	0.0273	1.5
144.00	5666	0	5666	0	1786.6	1789.7	3.1	0.0	10.4	0.0	360.3	0.0267	1.5
142.50	5666	0	5666	0	1782.2	1785.3	3.1	0.0	11.4	0.0	296.9	0.0273	1.6
141.00	5666	0	5666	0	1777.7	1781.1	3.4	0.0	11.7	0.0	282.5	0.0263	1.6
139.50	5666	0	5607	59	1774.0	1777.9	3.9	0.0	10.0	6.5	340.4	0.0257	1.4
138.00	5666	0	5655	11	1770.5	1773.5	3.0	0.0	11.3	4.5	369.6	0.0250	1.7
136.50	5666	0	5658	8	1767.6	1770.8	3.2	0.0	8.8	3.1	373.8	0.0197	1.2
135.00	5666	0	5658	8	1765.1	1768.2	3.1	0.0	9.4	3.2	343.9	0.0160	1.2
133.50	5666	0	5657	9	1762.6	1765.7	3.1	0.0	9.5	3.2	312.6	0.0177	1.2
132.00	5666	0	5644	22	1759.8	1762.5	2.7	0.0	10.9	5.4	298.6	0.0200	1.4
130.50	5666	0	5655	11	1755.9	1759.3	3.4	0.0	11.0	4.1	257.2	0.0213	1.4
129.00	5666	0	5654	12	1751.5	1756.5	5.0	0.0	9.7	4.2	398.2	0.0247	1.4
127.50	5666	0	5666	0	1746.8	1752.0	5.2	0.0	10.7	0.1	399.9	0.0270	1.6
126.00	5666	0	5666	0	1743.6	1748.4	4.8	0.0	9.3	0.0	417.4	0.0263	1.4
124.50	5666	0	5665	1	1740.5	1744.2	3.7	0.0	10.3	2.7	432.9	0.0267	1.6
123.00	5666	0	5666	0	1736.2	1740.5	4.3	0.0	9.0	0.0	463.2	0.0270	1.4
121.50	5666	0	5666	0	1732.2	1736.2	4.0	0.0	10.1	0.0	452.4	0.0280	1.6
120.00	5666	0	5666	0	1727.7	1731.7	4.0	0.0	10.5	0.0	369.1	0.0293	1.5
118.50	5666	0	5665	1	1724.3	1727.3	3.0	1.5	10.5	2.5	412.0	0.0283	1.6
117.00	5666	0	5666	0	1720.3	1723.6	3.3	0.0	9.1	0.0	473.5	0.0260	1.4
115.50	5666	69	5597	0	1715.6	1719.6	4.0	6.4	10.1	0.0	393.5	0.0220	1.5
114.00	5666	6	5660	0	1712.4	1717.2	4.8	2.3	8.2	0.0	416.0	0.0197	1.1
112.50	5666	0	5666	0	1709.8	1713.6	3.8	0.0	10.4	0.0	406.0	0.0227	1.6
111.00	5666	0	5666	0	1706.6	1710.0	3.4	0.0	9.8	0.0	357.9	0.0243	1.4
109.50	5666	0	5666	0	1702.7	1706.2	3.5	0.0	10.7	0.0	339.9	0.0220	1.5
108.00	5666	0	5666	0	1698.7	1703.7	5.0	0.0	8.5	0.0	405.6	0.0193	1.2
106.50	5666	0	5666	0	1696.5	1700.8	4.3	0.0	9.5	0.0	384.3	0.0197	1.3
105.00	5666	0	5666	0	1693.9	1697.4	3.5	0.0	10.1	0.0	347.4	0.0213	1.4
103.50	5666	0	5666	0	1689.1	1694.2	5.1	0.0	9.9	0.0	344.4	0.0213	1.4
102.00	5666	0	5666	0	1686.7	1691.0	4.3	0.0	10.1	0.0	343.6	0.0243	1.4
100.50	5666	0	5666	0	1684.0	1686.5	2.5	0.0	11.6	0.0	330.9	0.0387	1.7
99.00	5666	0	5666	0	1675.8	1677.1	1.3	0.0	15.8	0.0	276.7	0.0520	2.5
98.50	5666	0	5666	0	1674.2	1675.9	1.7	0.0	12.5	0.0	273.7	0.0430	1.7
98.00	5666	0	5666	0	1672.6	1676.2	3.6	0.0	5.8	0.0	274.0	0.0230	0.5
97.50	5666	0	5666	0	1671.0	1672.4	1.4	0.0	15.3	0.0	265.8	0.0170	2.3

10-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
96.00	5666	0	5666	0	1669.5	1671.8	2.3	0.0	8.6	0.0	286.2	0.0143	1.0
94.50	5666	0	5666	0	1668.0	1670.8	2.8	0.0	7.6	0.0	269.8	0.0083	0.8
93.00	5666	3	5662	1	1666.0	1669.6	3.6	2.2	7.7	1.6	423.5	0.0143	1.0
91.50	5666	1	5664	1	1662.6	1665.3	2.7	3.1	11.7	2.4	397.2	0.0243	1.9
90.00	5666	0	5666	0	1658.5	1662.1	3.6	1.5	8.5	0.0	444.0	0.0223	1.2
88.50	5666	3	5663	0	1655.3	1659.6	4.3	2.5	8.5	1.1	436.5	0.0193	1.2
87.00	5666	0	5666	0	1652.1	1655.8	3.7	0.1	10.1	0.1	423.1	0.0237	1.6
85.50	5666	0	5663	3	1647.9	1651.9	4.0	0.0	10.2	3.1	351.2	0.0227	1.4
84.00	5666	0	5666	0	1645.0	1649.2	4.2	0.0	9.4	0.0	338.4	0.0167	1.2
82.50	5666	0	5666	0	1643.0	1647.6	4.6	0.0	7.9	0.0	397.3	0.0160	1.0
81.00	5666	0	5666	0	1641.0	1644.0	3.0	0.0	10.8	0.0	377.0	0.0220	1.6
79.50	5666	0	5666	0	1637.3	1640.7	3.4	0.0	9.3	0.0	398.1	0.0233	1.3
78.00	5666	0	5666	0	1633.9	1637.4	3.5	0.0	9.6	0.0	410.7	0.0220	1.4
76.50	5666	0	5666	0	1630.3	1634.1	3.8	0.0	9.2	0.0	434.2	0.0197	1.4
75.00	5666	0	5665	1	1627.5	1631.8	4.3	0.0	8.3	1.9	374.4	0.0183	1.1
73.50	5666	0	5635	31	1623.9	1627.8	3.9	0.0	11.6	5.7	339.1	0.0197	1.7
72.00	5666	0	5653	13	1620.4	1626.6	6.2	0.0	5.3	1.7	274.6	0.0117	0.5
70.50	5666	0	5640	26	1620.0	1625.4	5.4	0.0	8.1	3.8	368.3	0.0100	1.0
69.00	5666	0	5645	21	1618.2	1622.3	4.1	0.0	10.6	4.4	322.6	0.0197	1.5
67.50	5666	0	5638	28	1615.4	1618.7	3.3	0.0	10.8	5.1	306.2	0.0237	1.5
66.00	5666	0	5662	4	1611.8	1615.4	3.6	1.4	9.7	3.4	414.2	0.0237	1.4
64.50	5666	0	5659	7	1608.2	1612.1	3.9	0.0	8.9	3.5	466.7	0.0220	1.3
63.00	5666	0	5666	0	1604.2	1608.9	4.7	0.0	9.6	0.0	362.3	0.0230	1.3
61.50	5665	0	5661	4	1600.3	1604.8	4.5	2.0	10.5	3.9	433.4	0.0260	1.7
60.00	5666	0	5665	1	1597.0	1601.2	4.2	0.0	9.0	1.8	453.9	0.0223	1.3
58.50	5666	0	5666	0	1593.3	1598.1	4.8	0.0	10.4	0.0	240.9	0.0183	1.2
57.00	5666	0	5666	0	1589.3	1594.6	5.3	0.0	12.5	0.0	205.8	0.0187	1.5
55.50	5666	0	5666	0	1585.9	1592.2	6.3	0.0	11.2	1.2	203.9	0.0197	1.3
54.00	5666	0	5666	0	1583.7	1588.8	5.1	0.0	12.3	0.0	245.2	0.0203	1.6
52.50	5666	0	5666	0	1580.7	1586.9	6.2	0.0	8.8	0.0	319.2	0.0197	1.1
51.00	5666	0	5666	0	1577.5	1582.1	4.6	0.0	14.2	0.1	186.9	0.0243	1.7
49.50	5666	0	5666	0	1574.5	1578.4	3.9	0.0	12.5	0.0	233.4	0.0227	1.6
48.00	5666	0	5666	0	1571.2	1577.0	5.8	0.0	9.5	0.0	216.2	0.0197	1.0
46.50	6111	0	6111	0	1568.0	1570.2	2.2	0.0	17.5	0.0	232.1	0.0193	2.5
45.00	6613	1	6608	4	1566.1	1572.4	6.3	0.3	4.2	0.7	288.0	0.0077	0.3
44.50	6613	0	6613	0	1566.2	1572.3	6.1	0.0	4.6	0.0	245.2	0.0005	0.3
43.60	6613	0	6613	0	1565.8	1572.2	6.4	0.0	4.3	0.0	246.3	0.0021	0.3
42.00	6613	0	6613	0	1567.4	1570.6	3.2	0.0	9.2	0.0	272.1	0.0106	1.0
40.50	6613	0	6555	58	1563.2	1566.7	3.5	0.0	13.1	6.5	305.6	0.0197	1.8
39.00	6613	0	6613	0	1559.2	1564.9	5.7	0.0	8.9	0.0	322.9	0.0187	1.0
37.50	6613	0	6606	7	1558.0	1561.8	3.8	0.0	11.2	3.5	313.5	0.0157	1.4
36.00	6613	0	6613	0	1554.7	1560.1	5.4	0.0	9.2	0.0	290.5	0.0160	1.0
34.50	6613	0	6609	4	1552.7	1556.8	4.1	0.0	11.7	3.3	327.3	0.0207	1.6
33.00	6613	46	6558	9	1549.6	1553.9	4.3	6.1	9.4	3.6	458.8	0.0210	1.3
31.50	6613	0	6613	0	1547.3	1551.6	4.3	0.0	7.9	0.0	537.2	0.0160	1.1
30.00	6612	3	6609	0	1544.6	1549.4	4.8	2.6	8.0	1.4	518.5	0.0147	1.1
28.50	6613	4	6609	0	1542.6	1547.0	4.4	2.7	8.7	0.0	453.4	0.0137	1.2
27.00	6613	0	6613	0	1539.0	1545.3	6.3	0.0	8.1	0.0	383.5	0.0123	1.0
25.50	6613	0	6540	73	1536.2	1543.7	7.5	1.0	7.6	4.5	358.1	0.0103	0.9
24.00	6612	5	6537	70	1534.7	1541.9	7.2	2.9	9.1	5.7	326.1	0.0107	1.1
22.50	6613	0	6606	7	1533.0	1540.0	7.0	1.3	9.2	2.9	352.5	0.0153	1.1
21.00	6613	0	6613	0	1531.4	1535.1	3.7	0.0	15.1	0.0	135.0	0.0193	1.5
19.50	6613	0	6613	0	1528.6	1531.8	3.2	0.0	15.3	0.0	144.3	0.0217	1.6
18.00	6613	0	6613	0	1525.8	1528.8	3.0	0.0	14.5	0.0	158.7	0.0220	1.5
16.50	6613	0	6613	0	1523.0	1526.0	3.0	0.0	13.8	0.0	172.4	0.0203	1.5
15.00	6613	0	6613	0	1520.2	1523.2	3.0	0.0	13.3	0.0	174.5	0.0180	1.4
13.50	6613	0	6613	0	1517.4	1520.9	3.5	0.0	13.0	0.0	155.5	0.0173	1.3
12.00	6613	0	6613	0	1514.6	1517.5	2.9	0.0	14.6	0.0	164.6	0.0197	1.5
10.50	6613	0	6613	0	1511.8	1514.8	3.0	0.0	13.3	0.0	177.0	0.0130	1.4
9.00	6613	0	6613	0	1510.9	1515.9	5.0	0.0	8.0	0.0	184.4	0.0040	0.7
7.50	6613	0	6613	0	1510.1	1515.4	5.3	0.0	7.9	0.0	177.4	0.0033	0.6
6.00	6613	0	6613	0	1509.5	1514.9	5.4	0.0	8.0	0.0	180.2	0.0047	0.7
4.50	6613	0	6613	0	1509.1	1513.2	4.1	0.0	10.9	0.0	167.9	0.0067	1.0
3.00	6613	0	6613	0	1508.0	1512.4	4.4	0.0	9.8	0.0	164.1	0.0067	0.8
1.50	6613	0	6613	0	1507.0	1511.6	4.6	0.0	9.6	0.0	162.4	0.0067	0.8
0.01	6613	0	6613	0	1506.0	1510.0	4.0	0.0	11.1	0.0	156.8	0.0073	1.0

5-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
316.50	1896	0	1896	0	2309.6	2312.3	2.7	0.0	5.3	0.0	393.2	0.0277	1.0
313.50	1896	0	1896	0	2300.1	2301.7	1.6	0.0	13.2	0.0	166.6	0.0295	2.5
310.50	1896	0	1896	0	2291.9	2294.2	2.3	0.0	7.0	0.0	219.2	0.0290	1.1
307.50	1896	0	1896	0	2282.5	2284.8	2.3	0.0	11.8	0.0	163.6	0.0318	2.1
304.50	1896	0	1896	0	2273.5	2275.1	1.6	0.0	7.3	0.0	276.4	0.0318	1.3
301.50	1896	0	1896	0	2262.9	2266.5	3.6	0.0	9.5	0.0	170.7	0.0267	1.5
298.50	1896	0	1896	0	2256.2	2258.8	2.6	0.0	8.3	0.0	198.9	0.0273	1.4
295.50	1896	0	1896	0	2247.4	2250.0	2.6	0.0	10.1	0.0	159.3	0.0277	1.6
292.50	1896	0	1896	0	2237.9	2242.0	4.1	0.0	9.1	0.0	152.9	0.0277	1.4
289.50	3689	0	3689	0	2228.6	2233.0	4.4	0.0	11.2	0.0	227.8	0.0343	1.6
288.00	3689	0	3689	0	2224.2	2226.2	2.0	0.0	12.9	0.0	244.0	0.0403	2.1
286.50	3689	0	3689	0	2217.7	2221.6	3.9	0.0	8.6	0.0	389.9	0.0340	1.4
284.15	3689	0	3689	0	2210.8	2214.8	4.0	0.0	9.4	0.0	334.4	0.0288	1.5
280.60	3689	45	3644	0	2200.8	2204.4	3.6	4.6	9.4	0.0	337.8	0.0257	1.6
277.45	3689	7	3682	0	2194.6	2197.1	2.5	3.0	10.5	0.0	173.0	0.0435	1.3
277.25	3689	0	3689	0	2188.6	2190.0	1.4	0.0	22.0	0.0	123.9	0.0593	3.3
275.70	3689	0	3689	0	2183.9	2186.4	2.5	0.0	13.3	0.0	110.1	0.0417	1.5
272.65	3689	0	3689	0	2174.2	2176.3	2.1	0.0	15.6	0.0	114.0	0.0399	1.9
272.25	3689	0	3689	0	2173.3	2176.5	3.2	0.0	10.3	0.0	114.0	0.0317	1.0
271.50	3689	0	3689	0	2171.5	2174.6	3.1	0.0	12.6	0.0	94.1	0.0113	1.3
270.00	3689	0	3689	0	2167.9	2173.5	5.6	0.0	12.0	0.0	70.0	0.0152	1.0
267.00	3689	47	3642	0	2162.0	2165.0	3.0	8.4	16.8	0.0	158.6	0.0325	2.5
265.50	3689	0	3689	0	2158.0	2161.4	3.4	0.0	9.3	0.0	287.4	0.0363	1.4
264.00	3689	0	3689	0	2153.8	2156.6	2.8	0.0	11.0	0.0	260.8	0.0277	1.7
262.50	3689	0	3689	0	2150.5	2153.1	2.6	0.0	9.5	0.0	242.1	0.0273	1.3
261.00	3689	0	3688	1	2144.9	2148.0	3.1	1.5	12.1	2.1	222.2	0.0287	1.8
259.50	3689	0	3689	0	2139.4	2142.5	3.1	0.0	14.8	0.0	87.3	0.0300	1.5
258.00	3689	0	3689	0	2133.9	2136.5	2.6	0.0	17.7	0.0	85.4	0.0343	2.0
256.50	3689	0	3689	0	2128.3	2131.0	2.7	0.0	17.2	0.0	85.7	0.0373	1.9
255.00	3689	0	3689	0	2122.8	2125.4	2.6	0.0	17.3	0.0	85.7	0.0370	1.9
253.50	3689	0	3689	0	2117.2	2119.9	2.7	0.0	17.3	0.0	85.6	0.0370	1.9
252.00	3689	0	3689	0	2111.7	2114.3	2.6	0.0	17.3	0.0	85.6	0.0370	1.9
250.50	3689	0	3689	0	2106.1	2108.8	2.7	0.0	17.3	0.0	85.6	0.0370	1.9
249.00	3689	0	3689	0	2100.5	2103.2	2.7	0.0	17.3	0.0	85.5	0.0370	1.9
247.50	3689	0	3689	0	2095.0	2097.7	2.7	0.0	17.3	0.0	85.7	0.0370	1.9
246.00	3689	0	3689	0	2089.5	2092.1	2.6	0.0	17.3	0.0	85.6	0.0370	1.9
244.50	3689	0	3689	0	2083.9	2086.6	2.7	0.0	17.3	0.0	85.6	0.0393	1.9
243.00	3689	0	3689	0	2078.4	2080.5	2.1	0.0	17.1	0.0	104.2	0.0398	2.1
240.80	3689	0	3689	0	2070.8	2073.3	2.5	0.0	14.7	0.0	104.9	0.0424	1.7
240.30	3689	0	3689	0	2069.2	2073.4	4.2	0.0	8.5	0.0	108.4	0.0333	0.7
240.00	3689	0	3689	0	2067.5	2069.8	2.3	0.0	16.2	0.0	104.4	0.0277	1.9
238.50	3689	0	3689	0	2062.5	2064.8	2.3	0.0	15.3	0.0	104.7	0.0343	1.8
237.00	3689	0	3689	0	2057.4	2059.7	2.3	0.0	15.6	0.0	104.6	0.0337	1.8
235.50	3689	0	3689	0	2052.3	2054.6	2.3	0.0	15.5	0.0	104.6	0.0337	1.8
234.00	3827	0	3827	0	2047.2	2049.6	2.4	0.0	15.6	0.0	104.8	0.0377	1.8
232.50	3827	0	3827	0	2040.5	2043.6	3.1	0.0	15.1	0.0	165.9	0.0357	2.2
231.00	3827	0	3827	0	2036.9	2040.3	3.4	0.0	12.2	0.0	117.9	0.0260	1.3
229.50	3827	0	3827	0	2032.5	2036.4	3.9	0.0	13.7	0.0	139.7	0.0250	1.7
228.00	3827	0	3827	0	2029.8	2033.2	3.4	0.0	11.5	0.0	165.3	0.0253	1.4
226.50	3827	0	3827	0	2025.8	2029.0	3.2	0.0	13.1	0.0	137.6	0.0220	1.6
225.00	3827	0	3827	0	2022.3	2026.6	4.3	0.0	11.2	0.0	134.3	0.0207	1.2
223.50	3827	0	3827	0	2018.2	2022.5	4.3	0.0	14.0	0.0	115.5	0.0223	1.6
222.00	3827	0	3827	0	2014.6	2018.9	4.3	0.0	13.8	0.0	108.0	0.0240	1.5
220.50	3827	0	3827	0	2011.2	2015.3	4.1	0.0	13.8	0.0	121.2	0.0250	1.6
219.00	3827	0	3827	0	2007.8	2011.6	3.8	0.0	13.5	0.0	123.8	0.0237	1.6
217.50	3827	0	3827	0	2004.4	2009.1	4.7	0.0	11.8	0.4	134.0	0.0213	1.3
216.00	3827	0	3827	0	2001.2	2004.9	3.7	0.0	14.2	0.0	119.4	0.0227	1.7
214.50	3827	61	3765	1	1997.0	2002.3	5.3	4.4	11.5	2.0	158.4	0.0233	1.3
213.00	3827	0	3827	0	1994.0	1998.3	4.3	0.0	13.4	0.0	133.1	0.0263	1.6
211.50	3827	0	3826	1	1990.0	1994.7	4.7	0.0	10.8	2.6	244.3	0.0323	1.6
210.00	3827	0	3826	1	1985.2	1989.1	3.9	0.0	11.8	1.4	258.0	0.0363	1.9
208.50	3827	0	3818	9	1980.2	1982.8	2.6	0.0	13.3	4.4	166.5	0.0387	1.8
207.00	3827	0	3810	17	1974.9	1977.4	2.5	0.0	12.4	5.6	233.3	0.0393	1.9
205.50	3827	56	3771	0	1967.8	1972.2	4.4	6.7	10.4	1.8	309.4	0.0410	1.7
204.00	3827	12	3815	0	1960.1	1963.1	3.0	5.4	16.7	0.0	123.4	0.0467	2.2
202.50	3827	0	3827	0	1950.1	1954.6	4.5	0.0	18.2	0.0	98.3	0.0567	2.2
201.00	3827	6	3821	0	1941.3	1945.3	4.0	5.3	18.2	0.0	140.7	0.0570	2.6
199.50	3827	0	3827	0	1937.4	1940.4	3.0	0.1	12.2	0.0	184.6	0.0360	1.6
198.00	3827	166	3661	0	1930.9	1936.3	5.4	6.6	14.9	0.0	68.2	0.0263	1.4
196.50	3827	0	3827	0	1925.5	1928.5	3.0	0.0	20.2	0.0	123.1	0.0433	2.9

5-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
195.00	3827	0	3827	0	1921.3	1924.1	2.8	0.0	12.5	0.0	168.3	0.0430	1.6
193.50	3827	0	3827	0	1916.6	1919.9	3.3	0.0	11.4	0.0	229.9	0.0327	1.7
192.00	3827	0	3827	0	1911.0	1914.2	3.2	0.0	13.1	0.0	171.6	0.0367	1.8
190.50	3827	0	3827	0	1905.0	1908.3	3.3	0.0	12.7	0.0	229.5	0.0377	2.0
189.00	3827	0	3794	33	1901.9	1903.9	2.0	0.0	10.2	5.3	258.1	0.0317	1.5
187.50	3827	0	3786	41	1897.5	1899.6	2.1	0.0	10.8	5.6	246.1	0.0303	1.6
186.00	3827	0	3825	2	1892.3	1894.4	2.1	0.0	11.5	2.0	263.1	0.0310	1.8
184.50	3827	0	3827	0	1887.8	1890.6	2.8	0.0	9.8	0.0	245.7	0.0260	1.4
183.00	3827	0	3827	0	1882.8	1886.2	3.4	0.0	12.6	0.0	139.3	0.0263	1.5
181.50	3827	0	3827	0	1879.1	1882.1	3.0	0.0	11.6	0.0	252.5	0.0283	1.8
180.00	3827	0	3827	0	1875.4	1878.9	3.5	0.0	8.8	0.0	281.6	0.0227	1.3
178.50	3827	0	3827	0	1872.2	1876.0	3.8	0.0	9.6	0.0	235.6	0.0187	1.3
177.00	3827	0	3827	0	1869.6	1873.2	3.6	0.0	9.2	0.0	265.1	0.0200	1.3
175.50	3827	2	3825	0	1866.1	1869.9	3.8	2.3	9.8	0.0	265.8	0.0210	1.4
174.00	3827	0	3827	0	1862.7	1866.7	4.0	0.0	10.0	0.0	216.0	0.0223	1.3
172.50	3537	44	3493	0	1857.5	1862.0	4.5	5.8	13.1	0.0	151.8	0.0193	1.7
171.00	4222	0	4222	0	1853.5	1861.3	7.8	0.0	8.3	0.0	262.2	0.0180	1.1
169.50	4222	0	3818	404	1850.5	1856.8	6.3	0.0	13.1	7.1	225.6	0.0287	2.0
168.00	4222	0	4222	0	1846.7	1850.8	4.1	0.0	14.0	0.0	154.4	0.0267	1.8
166.50	4222	0	4222	0	1844.8	1851.1	6.3	0.0	3.0	0.0	467.1	0.0213	0.3
166.00	4222	0	4222	0	1843.3	1846.3	3.0	0.0	15.6	0.0	175.8	0.0390	2.2
165.50	4222	0	4222	0	1841.7	1846.8	5.1	0.0	6.1	0.0	252.0	0.0330	0.6
165.00	4222	0	4222	0	1840.2	1843.9	3.7	0.0	13.4	0.0	187.4	0.0210	1.8
163.50	4222	0	4222	0	1836.0	1841.2	5.2	0.0	8.8	0.0	311.8	0.0273	1.3
162.00	4222	0	4222	0	1832.4	1836.3	3.9	0.0	12.0	0.0	252.9	0.0257	1.8
160.50	4222	0	4222	0	1827.7	1833.5	5.8	0.0	9.1	0.0	260.7	0.0243	1.2
159.00	4222	0	4222	0	1825.4	1829.1	3.7	0.0	11.6	0.0	267.4	0.0237	1.8
157.50	4222	0	4222	0	1821.9	1826.5	4.6	0.0	8.6	0.0	282.7	0.0230	1.1
156.00	4222	0	4222	0	1818.8	1822.4	3.6	0.0	11.1	0.0	302.0	0.0257	1.7
154.50	4222	0	4222	0	1815.5	1818.6	3.1	0.0	9.3	0.0	310.6	0.0267	1.4
153.00	4222	0	4222	0	1811.7	1814.9	3.2	0.0	9.4	0.0	374.9	0.0297	1.5
151.50	4222	0	4222	0	1804.6	1809.0	4.4	0.0	11.8	0.0	271.4	0.0317	1.8
150.00	4222	0	4222	0	1801.0	1805.7	4.7	0.0	8.4	0.0	369.8	0.0257	1.3
148.50	4222	0	4222	0	1797.8	1801.6	3.8	0.0	10.7	0.0	244.3	0.0253	1.5
147.00	4222	0	4222	0	1793.1	1797.7	4.6	0.0	9.7	0.0	364.3	0.0283	1.6
145.50	4222	0	4222	0	1790.9	1793.6	2.7	0.0	8.9	0.0	408.6	0.0280	1.5
144.00	4222	0	4222	0	1786.6	1789.4	2.8	0.0	9.6	0.0	349.0	0.0273	1.5
142.50	4222	0	4222	0	1782.2	1785.0	2.8	0.0	10.2	0.0	292.8	0.0277	1.5
141.00	4222	0	4222	0	1777.7	1780.8	3.1	0.0	10.5	0.0	275.9	0.0260	1.5
139.50	4222	0	4174	48	1774.0	1777.7	3.7	0.0	8.9	6.1	330.6	0.0253	1.3
138.00	4222	0	4215	7	1770.5	1773.3	2.8	0.0	10.4	4.1	340.0	0.0250	1.7
136.50	4222	0	4217	5	1767.6	1770.5	2.9	0.0	7.8	2.8	366.5	0.0197	1.1
135.00	4222	0	4217	5	1765.1	1767.9	2.8	0.0	8.4	3.0	342.4	0.0163	1.2
133.50	4222	0	4217	5	1762.6	1765.4	2.8	0.0	8.6	2.9	298.4	0.0177	1.2
132.00	4222	0	4207	15	1759.8	1762.1	2.3	0.0	10.0	4.9	281.9	0.0200	1.4
130.50	4222	0	4215	7	1755.9	1758.9	3.0	0.0	10.0	3.7	243.4	0.0213	1.3
129.00	4222	0	4213	9	1751.5	1756.2	4.7	0.0	8.5	3.7	388.8	0.0240	1.3
127.50	4222	0	4222	0	1746.8	1751.8	5.0	0.0	10.0	0.0	370.2	0.0270	1.7
126.00	4222	0	4222	0	1743.6	1748.2	4.6	0.0	8.3	0.0	399.6	0.0263	1.3
124.50	4222	0	4221	1	1740.5	1744.0	3.5	0.0	9.6	2.2	396.9	0.0263	1.6
123.00	4222	0	4222	0	1736.2	1740.3	4.1	0.0	8.0	0.0	453.1	0.0270	1.3
121.50	4222	0	4222	0	1732.2	1736.0	3.8	0.0	9.2	0.0	441.0	0.0280	1.6
120.00	4222	0	4222	0	1727.7	1731.4	3.7	0.0	9.7	0.0	331.3	0.0293	1.5
118.50	4222	0	4221	1	1724.3	1727.1	2.8	0.1	9.6	2.1	382.3	0.0283	1.6
117.00	4222	0	4222	0	1720.3	1723.4	3.1	0.0	8.1	0.0	473.1	0.0263	1.4
115.50	4222	53	4169	0	1715.6	1719.3	3.7	5.9	9.2	0.0	380.1	0.0220	1.5
114.00	4222	2	4220	0	1712.4	1716.9	4.5	1.3	7.4	0.0	395.7	0.0193	1.1
112.50	4222	0	4222	0	1709.8	1713.3	3.5	0.0	9.6	0.0	380.6	0.0227	1.6
111.00	4222	0	4222	0	1706.6	1709.7	3.1	0.0	9.0	0.0	323.4	0.0243	1.3
109.50	4222	0	4222	0	1702.7	1705.9	3.2	0.0	10.1	0.0	297.8	0.0220	1.5
108.00	4222	0	4222	0	1698.7	1703.5	4.8	0.0	7.6	0.0	388.5	0.0193	1.1
106.50	4222	0	4222	0	1696.5	1700.5	4.0	0.0	8.6	0.0	383.7	0.0200	1.3
105.00	4222	0	4222	0	1693.9	1697.2	3.3	0.0	9.0	0.0	336.9	0.0217	1.3
103.50	4222	0	4222	0	1689.1	1694.0	4.9	0.0	9.0	0.0	337.2	0.0213	1.3
102.00	4222	0	4222	0	1686.7	1690.7	4.0	0.0	9.2	0.0	325.5	0.0243	1.4
100.50	4222	0	4222	0	1684.0	1686.2	2.2	0.0	10.5	0.0	330.4	0.0400	1.7
99.00	4222	0	4222	0	1675.8	1676.9	1.1	0.0	14.3	0.0	276.3	0.0423	2.4
98.50	4222	0	4222	0	1674.2	1675.3	1.1	0.0	14.2	0.0	272.5	0.0380	2.4
98.00	4222	0	4222	0	1672.6	1675.9	3.3	0.0	4.8	0.0	273.4	0.0280	0.5
97.50	3976	0	3976	0	1671.0	1672.0	1.0	0.0	15.3	0.0	264.9	0.0167	2.7

5-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
96.00	3976	0	3976	0	1669.5	1671.3	1.8	0.0	7.7	0.0	284.9	0.0147	1.0
94.50	3976	0	3976	0	1668.0	1670.5	2.5	0.0	6.2	0.0	268.0	0.0080	0.7
93.00	3976	2	3974	0	1666.0	1669.2	3.2	2.0	6.9	1.2	422.7	0.0147	1.0
91.50	3976	1	3975	0	1662.6	1665.0	2.4	2.5	10.3	0.1	388.2	0.0243	1.8
90.00	3976	0	3976	0	1658.5	1661.8	3.3	0.0	7.4	0.0	429.5	0.0220	1.2
88.50	3976	1	3975	0	1655.3	1659.3	4.0	2.1	7.5	0.0	435.7	0.0190	1.2
87.00	3976	0	3976	0	1652.1	1655.2	3.1	0.0	10.6	0.0	240.4	0.0240	1.5
85.50	3976	0	3975	1	1647.9	1651.6	3.7	0.0	9.3	2.4	341.4	0.0233	1.5
84.00	3976	0	3976	0	1645.0	1648.6	3.6	0.0	9.1	0.0	246.6	0.0163	1.2
82.50	3976	0	3976	0	1643.0	1647.2	4.2	0.0	7.1	0.0	396.5	0.0157	1.1
81.00	3976	0	3976	0	1641.0	1643.7	2.7	0.0	9.6	0.0	376.4	0.0220	1.6
79.50	3976	0	3976	0	1637.3	1640.4	3.1	0.0	8.2	0.0	365.6	0.0233	1.2
78.00	3976	0	3976	0	1633.9	1637.1	3.2	0.0	8.5	0.0	402.5	0.0220	1.4
76.50	3976	0	3976	0	1630.3	1633.9	3.6	0.0	7.9	0.0	425.3	0.0197	1.3
75.00	3976	0	3975	1	1627.5	1631.4	3.9	0.0	7.6	1.5	357.9	0.0190	1.1
73.50	3976	0	3958	18	1623.9	1627.5	3.6	0.0	10.1	4.7	337.0	0.0200	1.7
72.00	3976	0	3968	8	1620.4	1626.0	5.6	0.0	4.4	1.4	266.9	0.0110	0.4
70.50	3976	0	3960	16	1620.0	1624.9	4.9	0.0	7.4	3.4	356.1	0.0100	1.1
69.00	3976	0	3965	11	1618.2	1622.0	3.8	0.0	9.2	3.5	319.0	0.0200	1.4
67.50	3976	0	3956	20	1615.4	1618.3	2.9	0.0	9.8	4.7	284.6	0.0233	1.4
66.00	3976	0	3975	1	1611.8	1614.9	3.1	0.0	9.3	2.5	305.0	0.0233	1.4
64.50	3976	0	3971	5	1608.2	1611.8	3.6	0.0	8.1	3.1	432.5	0.0220	1.3
63.00	3976	0	3976	0	1604.2	1608.5	4.3	0.0	8.5	0.0	349.3	0.0230	1.3
61.50	3976	0	3974	2	1600.3	1604.6	4.3	0.1	9.1	3.0	419.6	0.0260	1.6
60.00	3976	0	3976	0	1597.0	1601.0	4.0	0.0	7.9	1.1	441.1	0.0227	1.3
58.50	3976	0	3976	0	1593.3	1597.5	4.2	0.0	9.9	0.0	211.8	0.0190	1.3
57.00	3976	0	3976	0	1589.3	1594.0	4.7	0.0	11.5	0.0	172.8	0.0193	1.4
55.50	3976	0	3976	0	1585.9	1591.4	5.5	0.0	11.0	0.0	152.0	0.0197	1.3
54.00	3976	0	3976	0	1583.7	1588.2	4.5	0.0	11.5	0.0	194.8	0.0193	1.5
52.50	3976	0	3976	0	1580.7	1586.5	5.8	0.0	7.9	0.0	297.9	0.0197	1.1
51.00	3976	0	3976	0	1577.5	1581.5	4.0	0.0	13.7	0.0	163.0	0.0253	1.8
49.50	3976	0	3976	0	1574.5	1578.0	3.5	0.0	10.8	0.0	209.6	0.0227	1.4
48.00	3976	0	3976	0	1571.2	1576.2	5.0	0.0	9.0	0.0	175.0	0.0200	1.0
46.50	4472	0	4472	0	1568.0	1569.9	1.9	0.0	15.9	0.0	223.7	0.0193	2.5
45.00	5031	0	5031	0	1566.1	1571.7	5.6	0.0	3.6	0.3	274.3	0.0085	0.3
44.50	5031	0	5031	0	1566.2	1571.6	5.4	0.0	4.0	0.0	243.2	0.0015	0.3
43.60	5031	0	5031	0	1565.8	1571.6	5.8	0.0	3.7	0.0	244.3	0.0016	0.3
42.00	5031	0	5031	0	1567.4	1570.1	2.7	0.0	8.6	0.0	262.4	0.0106	1.0
40.50	5031	0	4986	45	1563.2	1566.4	3.2	0.0	11.8	6.0	305.3	0.0193	1.8
39.00	5031	0	5031	0	1559.2	1564.5	5.3	0.0	8.0	0.0	321.9	0.0183	1.0
37.50	5031	0	5025	6	1558.0	1561.4	3.4	0.0	10.4	3.5	312.6	0.0157	1.5
36.00	5031	0	5031	0	1554.7	1559.7	5.0	0.0	8.3	0.0	289.0	0.0160	1.0
34.50	5031	0	5029	2	1552.7	1556.4	3.7	0.0	11.0	2.7	274.0	0.0203	1.5
33.00	5031	36	4989	6	1549.6	1553.5	3.9	5.8	8.8	3.3	406.9	0.0207	1.3
31.50	5031	0	5031	0	1547.3	1551.5	4.2	0.0	6.7	0.0	530.3	0.0157	1.0
30.00	5031	2	5029	0	1544.6	1549.2	4.6	2.4	7.3	0.0	517.6	0.0147	1.1
28.50	5031	2	5029	0	1542.6	1546.7	4.1	2.3	7.9	0.0	443.2	0.0143	1.2
27.00	5031	0	5031	0	1539.0	1544.7	5.7	0.0	8.0	0.0	333.0	0.0123	1.0
25.50	5031	0	4974	57	1536.2	1543.2	7.0	0.0	7.0	4.3	357.1	0.0103	0.9
24.00	5032	3	4974	55	1534.7	1541.5	6.8	2.3	8.1	5.2	311.1	0.0110	1.0
22.50	5031	0	5027	4	1533.0	1539.6	6.6	0.0	8.4	2.6	351.9	0.0163	1.1
21.00	5031	0	5031	0	1531.4	1534.4	3.0	0.0	14.7	0.0	132.1	0.0217	1.6
19.50	5031	0	5031	0	1528.6	1531.5	2.9	0.0	13.3	0.0	142.8	0.0220	1.4
18.00	5031	0	5031	0	1525.8	1528.4	2.6	0.0	13.2	0.0	156.8	0.0210	1.5
16.50	5031	0	5031	0	1523.0	1525.5	2.5	0.0	12.3	0.0	170.8	0.0203	1.4
15.00	5031	0	5031	0	1520.2	1522.8	2.6	0.0	12.1	0.0	172.6	0.0180	1.4
13.50	5031	0	5031	0	1517.4	1520.4	3.0	0.0	11.8	0.0	152.6	0.0173	1.2
12.00	5031	0	5031	0	1514.6	1517.0	2.4	0.0	13.2	0.0	163.3	0.0197	1.5
10.50	5031	0	5031	0	1511.8	1515.7	3.9	0.0	7.7	0.0	182.3	0.0127	0.7
9.00	5031	0	5031	0	1510.9	1515.2	4.3	0.0	7.3	0.0	179.8	0.0037	0.7
7.50	5031	0	5031	0	1510.1	1514.7	4.6	0.0	7.2	0.0	172.6	0.0033	0.6
6.00	5031	0	5031	0	1509.5	1514.2	4.7	0.0	7.2	0.0	175.3	0.0047	0.6
4.50	5031	0	5031	0	1509.1	1512.6	3.5	0.0	10.0	0.0	163.7	0.0070	1.0
3.00	5031	0	5031	0	1508.0	1511.7	3.7	0.0	8.9	0.0	160.7	0.0070	0.8
1.50	5031	0	5031	0	1507.0	1510.9	3.9	0.0	8.6	0.0	159.1	0.0063	0.8
0.01	5031	0	5031	0	1506.0	1509.3	3.3	0.0	10.2	0.0	154.2	0.0067	1.0

2-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
316.50	1022	0	1022	0	2309.6	2311.8	2.2	0.0	5.2	0.0	223.7	0.0293	1.0
313.50	1022	0	1022	0	2300.1	2301.4	1.3	0.0	11.4	0.0	145.3	0.0298	2.6
310.50	1022	0	1022	0	2291.9	2293.8	1.9	0.0	5.6	0.0	190.2	0.0288	1.0
307.50	1022	0	1022	0	2282.5	2284.4	1.9	0.0	10.4	0.0	140.5	0.0317	2.2
304.50	1022	0	1022	0	2273.5	2274.8	1.3	0.0	5.8	0.0	237.8	0.0305	1.2
301.50	1022	0	1022	0	2262.9	2265.4	2.5	0.0	12.3	0.0	47.5	0.0268	1.6
298.50	1022	0	1022	0	2256.2	2258.4	2.2	0.0	7.0	0.0	169.3	0.0287	1.3
295.50	1022	0	1022	0	2247.4	2249.5	2.1	0.0	8.4	0.0	133.0	0.0280	1.6
292.50	1022	0	1022	0	2237.9	2240.9	3.0	0.0	9.9	0.0	67.3	0.0280	1.4
289.50	2027	0	2027	0	2228.6	2232.4	3.8	0.0	9.5	0.0	197.2	0.0353	1.6
288.00	2027	0	2027	0	2224.2	2225.8	1.6	0.0	10.5	0.0	221.8	0.0393	2.0
286.50	2027	0	2027	0	2217.7	2221.2	3.5	0.0	7.3	0.0	295.8	0.0324	1.3
284.15	2027	0	2027	0	2210.8	2214.3	3.5	0.0	8.3	0.0	280.2	0.0288	1.6
280.60	2027	13	2014	0	2200.8	2203.9	3.1	3.0	8.3	0.0	237.6	0.0264	1.4
277.45	2027	1	2026	0	2194.6	2196.4	1.8	2.1	8.8	0.0	170.1	0.0491	1.3
277.25	2027	0	2027	0	2188.6	2189.4	0.8	0.0	20.7	0.0	121.1	0.0659	4.0
275.70	2027	0	2027	0	2183.9	2185.7	1.8	0.0	10.1	0.0	110.1	0.0433	1.3
272.65	2027	0	2027	0	2174.2	2175.6	1.4	0.0	13.0	0.0	114.0	0.0362	2.0
272.25	2027	0	2027	0	2173.3	2175.7	2.4	0.0	7.5	0.0	113.9	0.0279	0.9
271.50	2027	0	2027	0	2171.5	2173.3	1.8	0.0	11.7	0.0	94.0	0.0133	1.5
270.00	2027	0	2027	0	2167.9	2171.6	3.7	0.0	10.9	0.0	50.1	0.0163	1.0
267.00	2027	11	2016	0	2162.0	2164.3	2.3	4.5	14.9	0.0	86.0	0.0287	2.1
265.50	2027	0	2027	0	2158.0	2159.9	1.9	0.0	11.7	0.0	102.8	0.0347	1.6
264.00	2027	0	2027	0	2153.8	2156.2	2.4	0.0	8.5	0.0	243.5	0.0283	1.5
262.50	2027	0	2027	0	2150.5	2152.5	2.0	0.0	8.1	0.0	210.1	0.0263	1.3
261.00	2027	0	2027	0	2144.9	2146.9	2.0	0.0	12.6	0.0	96.7	0.0310	1.7
259.50	2027	0	2027	0	2139.4	2141.3	1.9	0.0	13.7	0.0	82.5	0.0357	1.8
258.00	2027	0	2027	0	2133.9	2135.7	1.8	0.0	13.9	0.0	82.4	0.0367	1.8
256.50	2027	0	2027	0	2128.3	2130.2	1.9	0.0	13.8	0.0	82.4	0.0370	1.8
255.00	2027	0	2027	0	2122.8	2124.6	1.8	0.0	13.9	0.0	82.5	0.0370	1.8
253.50	2027	0	2027	0	2117.2	2119.1	1.9	0.0	13.9	0.0	82.4	0.0370	1.8
252.00	2027	0	2027	0	2111.7	2113.5	1.8	0.0	13.8	0.0	82.4	0.0370	1.8
250.50	2027	0	2027	0	2106.1	2108.0	1.9	0.0	13.9	0.0	82.4	0.0370	1.8
249.00	2027	0	2027	0	2100.5	2102.4	1.9	0.0	13.9	0.0	82.3	0.0370	1.8
247.50	2027	0	2027	0	2095.0	2096.9	1.9	0.0	13.8	0.0	82.5	0.0370	1.8
246.00	2027	0	2027	0	2089.5	2091.3	1.8	0.0	13.9	0.0	82.4	0.0370	1.8
244.50	2027	0	2027	0	2083.9	2085.8	1.9	0.0	13.9	0.0	82.4	0.0390	1.8
243.00	2027	0	2027	0	2078.4	2079.9	1.5	0.0	13.4	0.0	102.9	0.0357	1.9
240.80	2027	0	2027	0	2070.8	2072.0	1.2	0.0	16.0	0.0	102.5	0.0472	2.5
240.30	2027	0	2027	0	2069.2	2072.6	3.4	0.0	5.7	0.0	106.8	0.0408	0.6
240.00	2027	0	2027	0	2067.5	2068.8	1.3	0.0	15.4	0.0	102.6	0.0296	2.4
238.50	2027	0	2027	0	2062.5	2064.3	1.8	0.0	11.2	0.0	103.6	0.0367	1.5
237.00	2027	0	2027	0	2057.4	2058.9	1.5	0.0	12.9	0.0	103.1	0.0333	1.8
235.50	2027	0	2027	0	2052.3	2054.0	1.7	0.0	12.0	0.0	103.3	0.0337	1.6
234.00	2162	0	2162	0	2047.2	2048.9	1.7	0.0	12.6	0.0	103.4	0.0363	1.7
232.50	2162	0	2162	0	2040.5	2043.2	2.7	0.0	11.9	0.0	158.0	0.0343	1.9
231.00	2162	0	2162	0	2036.9	2039.4	2.5	0.0	10.5	0.0	101.8	0.0253	1.3
229.50	2162	0	2162	0	2032.5	2035.8	3.3	0.0	10.9	0.0	137.2	0.0240	1.6
228.00	2162	0	2162	0	2029.8	2032.6	2.8	0.0	9.0	0.0	161.9	0.0247	1.3
226.50	2162	0	2162	0	2025.8	2028.2	2.4	0.0	11.4	0.0	119.6	0.0227	1.6
225.00	2162	0	2162	0	2022.3	2025.7	3.4	0.0	9.3	0.0	116.7	0.0213	1.2
223.50	2162	0	2162	0	2018.2	2021.7	3.5	0.0	12.1	0.0	109.7	0.0237	1.7
222.00	2162	0	2162	0	2014.6	2018.2	3.6	0.0	10.9	0.0	103.3	0.0247	1.4
220.50	2162	0	2162	0	2011.2	2014.6	3.4	0.0	11.2	0.0	116.3	0.0243	1.5
219.00	2162	0	2162	0	2007.8	2010.8	3.0	0.0	10.9	0.0	118.6	0.0227	1.5
217.50	2162	0	2162	0	2004.4	2008.3	3.9	0.0	9.4	0.0	119.5	0.0210	1.2
216.00	2162	0	2162	0	2001.2	2004.1	2.9	0.0	12.1	0.0	113.2	0.0227	1.7
214.50	2162	18	2144	0	1997.0	2001.7	4.7	2.8	8.7	0.0	147.7	0.0223	1.2
213.00	2162	0	2162	0	1994.0	1997.4	3.4	0.0	12.3	0.0	106.4	0.0250	1.7
211.50	2162	0	2162	0	1990.0	1994.4	4.4	0.0	8.0	1.6	232.6	0.0297	1.3
210.00	2162	0	2162	0	1985.2	1988.2	3.0	0.0	12.9	0.0	117.2	0.0373	1.9
208.50	2162	0	2158	4	1980.2	1982.2	2.0	0.0	11.3	3.8	163.2	0.0413	1.8
207.00	2162	0	2152	10	1974.9	1977.0	2.1	0.0	9.6	4.5	208.6	0.0370	1.6
205.50	2162	31	2131	0	1968.4	1971.4	3.0	5.6	10.5	0.0	177.2	0.0420	1.7
204.00	2162	7	2155	0	1960.1	1962.4	2.3	5.4	14.8	0.0	115.6	0.0527	2.3
202.50	2162	0	2162	0	1950.1	1954.0	3.9	0.0	14.6	0.0	94.4	0.0567	2.1
201.00	2162	0	2162	0	1941.3	1944.5	3.2	0.1	16.6	0.0	87.0	0.0530	2.4
199.50	2162	0	2162	0	1937.4	1939.9	2.5	0.0	10.0	0.0	178.3	0.0377	1.6
198.00	2162	78	2084	0	1930.9	1934.5	3.6	5.9	14.1	0.0	58.2	0.0310	1.6
196.50	2162	0	2162	0	1925.5	1928.0	2.5	0.0	16.3	0.0	101.1	0.0413	2.5

2-Yr Hydraulics

Section	Q (cfs)				Elevation (ft)		Depth	Velocity (f/s)			Topwidth	Energy	Froude
ID	total	left bank	channel	right bank	thalweg	water sfc	(ft)	left bank	channel	right bank	(ft)	Slope	#
195.00	2162	0	2162	0	1921.3	1923.6	2.3	0.0	9.9	0.0	160.4	0.0377	1.5
193.50	2162	0	2162	0	1916.6	1919.4	2.8	0.0	9.3	0.0	213.9	0.0320	1.6
192.00	2162	0	2162	0	1911.0	1913.6	2.6	0.0	11.0	0.0	164.3	0.0377	1.8
190.50	2162	0	2162	0	1905.0	1908.0	3.0	0.0	10.0	0.0	209.6	0.0363	1.7
189.00	2162	0	2142	20	1901.9	1903.4	1.5	0.0	8.7	4.6	222.7	0.0303	1.5
187.50	2162	0	2143	19	1897.5	1899.1	1.6	0.0	9.3	4.2	199.8	0.0307	1.5
186.00	2162	0	2162	0	1892.3	1894.0	1.7	0.0	9.5	0.0	245.1	0.0310	1.7
184.50	2162	0	2162	0	1887.8	1890.0	2.2	0.0	8.1	0.0	216.8	0.0270	1.3
183.00	2162	0	2162	0	1882.8	1885.4	2.6	0.0	11.2	0.0	129.3	0.0273	1.6
181.50	2162	0	2162	0	1879.1	1881.7	2.6	0.0	8.8	0.0	210.6	0.0267	1.4
180.00	2162	0	2162	0	1875.4	1878.2	2.8	0.0	8.5	0.0	209.5	0.0220	1.4
178.50	2162	0	2162	0	1872.2	1875.3	3.1	0.0	8.0	0.0	193.8	0.0190	1.2
177.00	2162	0	2162	0	1869.6	1872.4	2.8	0.0	8.9	0.0	167.3	0.0197	1.3
175.50	2162	0	2162	0	1866.1	1869.3	3.2	0.0	8.5	0.0	207.0	0.0213	1.4
174.00	2162	0	2162	0	1862.7	1866.0	3.3	0.0	8.6	0.0	187.1	0.0233	1.3
172.50	2044	13	2031	0	1857.5	1861.2	3.7	4.3	11.9	0.0	108.1	0.0193	1.7
171.00	2456	0	2456	0	1853.5	1859.9	6.4	0.0	9.8	0.0	91.9	0.0150	1.0
169.50	2456	0	2409	47	1850.5	1855.7	5.2	0.0	14.5	3.5	87.1	0.0273	1.9
168.00	2456	0	2456	0	1846.7	1849.8	3.1	0.0	14.7	0.0	130.1	0.0227	2.3
166.50	2456	0	2456	0	1844.8	1852.1	7.3	0.0	1.3	0.0	484.4	0.0197	0.1
166.00	2456	0	2456	0	1843.3	1845.5	2.2	0.0	18.1	0.0	155.9	0.0570	3.4
165.50	2456	0	2456	0	1841.7	1846.0	4.3	0.0	4.8	0.0	228.6	0.0470	0.6
165.00	2456	0	2456	0	1840.2	1843.1	2.9	0.0	13.1	0.0	131.8	0.0200	1.9
163.50	2456	0	2456	0	1836.0	1840.7	4.7	0.0	7.6	0.0	237.0	0.0270	1.1
162.00	2456	0	2456	0	1832.4	1835.7	3.3	0.0	11.3	0.0	203.5	0.0263	1.9
160.50	2456	0	2456	0	1827.7	1832.7	5.0	0.0	8.2	0.0	188.2	0.0250	1.1
159.00	2456	0	2456	0	1825.4	1828.6	3.2	0.0	10.2	0.0	231.4	0.0230	1.8
157.50	2456	0	2456	0	1821.9	1826.0	4.1	0.0	6.9	0.0	255.3	0.0227	1.0
156.00	2456	0	2456	0	1818.8	1821.9	3.1	0.0	9.8	0.0	262.3	0.0257	1.8
154.50	2456	0	2456	0	1815.5	1818.2	2.7	0.0	7.5	0.0	288.8	0.0263	1.3
153.00	2456	0	2456	0	1811.7	1814.4	2.7	0.0	8.4	0.0	290.0	0.0297	1.5
151.50	2456	0	2456	0	1804.6	1808.4	3.8	0.0	10.8	0.0	207.1	0.0317	1.8
150.00	2456	0	2456	0	1801.0	1805.1	4.1	0.0	7.7	0.0	257.4	0.0257	1.2
148.50	2456	0	2456	0	1797.8	1800.9	3.1	0.0	10.0	0.0	191.7	0.0257	1.5
147.00	2456	0	2456	0	1793.1	1797.3	4.2	0.0	8.0	0.0	283.9	0.0277	1.4
145.50	2456	0	2456	0	1790.9	1793.2	2.3	0.0	8.1	0.0	335.4	0.0280	1.5
144.00	2456	0	2456	0	1786.6	1789.0	2.4	0.0	7.7	0.0	327.4	0.0280	1.4
142.50	2456	0	2456	0	1782.2	1784.6	2.4	0.0	8.9	0.0	259.8	0.0280	1.5
141.00	2456	0	2456	0	1777.7	1780.4	2.7	0.0	8.5	0.0	268.2	0.0257	1.4
139.50	2456	0	2424	32	1774.0	1777.2	3.2	0.0	7.6	5.5	277.1	0.0243	1.2
138.00	2456	0	2454	2	1770.5	1772.7	2.2	0.0	9.6	3.2	244.6	0.0247	1.7
136.50	2456	0	2454	2	1767.6	1770.0	2.4	0.0	6.5	2.2	339.2	0.0200	1.1
135.00	2456	0	2454	2	1765.1	1767.4	2.3	0.0	7.3	2.4	297.2	0.0167	1.2
133.50	2456	0	2454	2	1762.6	1764.9	2.3	0.0	7.2	2.3	269.9	0.0180	1.1
132.00	2456	0	2448	8	1759.8	1761.6	1.8	0.0	8.4	4.0	256.4	0.0207	1.4
130.50	2456	0	2453	3	1755.9	1758.4	2.5	0.0	8.2	2.8	231.2	0.0207	1.3
129.00	2456	0	2452	4	1751.5	1755.8	4.3	0.0	7.0	3.0	322.9	0.0223	1.2
127.50	2456	0	2456	0	1746.8	1751.1	4.3	0.0	10.7	0.0	181.1	0.0270	1.7
126.00	2456	0	2456	0	1743.6	1747.6	4.0	0.0	7.8	0.0	280.7	0.0273	1.3
124.50	2456	0	2456	0	1740.5	1743.6	3.1	0.0	8.3	0.1	326.4	0.0263	1.5
123.00	2456	0	2456	0	1736.2	1739.9	3.7	0.0	6.7	0.0	413.8	0.0267	1.2
121.50	2456	0	2456	0	1732.2	1735.7	3.5	0.0	7.8	0.0	396.0	0.0283	1.5
120.00	2456	0	2456	0	1727.7	1730.9	3.2	0.0	8.7	0.0	251.6	0.0297	1.5
118.50	2456	0	2456	0	1724.3	1726.7	2.4	0.0	8.2	0.1	326.6	0.0280	1.5
117.00	2456	0	2456	0	1720.3	1723.0	2.7	0.0	6.6	0.0	449.7	0.0260	1.3
115.50	2456	31	2425	0	1715.6	1718.9	3.3	5.0	8.0	0.0	325.3	0.0223	1.5
114.00	2456	0	2456	0	1712.4	1716.4	4.0	0.0	6.6	0.0	316.5	0.0197	1.1
112.50	2456	0	2456	0	1709.8	1712.8	3.0	0.0	8.8	0.0	263.2	0.0230	1.5
111.00	2456	0	2456	0	1706.6	1709.2	2.6	0.0	7.6	0.0	306.7	0.0250	1.3
109.50	2456	0	2456	0	1702.7	1705.4	2.7	0.0	8.6	0.0	246.3	0.0217	1.4
108.00	2456	0	2456	0	1698.7	1702.9	4.2	0.0	6.7	0.0	296.9	0.0187	1.1
106.50	2456	0	2456	0	1696.5	1700.1	3.6	0.0	7.1	0.0	382.9	0.0200	1.3
105.00	2456	0	2456	0	1693.9	1696.7	2.8	0.0	7.4	0.0	319.7	0.0217	1.3
103.50	2456	0	2456	0	1689.1	1693.3	4.2	0.0	8.5	0.0	223.0	0.0213	1.3
102.00	2456	0	2456	0	1686.7	1690.2	3.5	0.0	7.9	0.0	277.6	0.0190	1.3
100.50	2456	0	2456	0	1684.0	1688.7	4.7	0.0	2.0	0.0	335.0	0.0083	0.2
99.00	2456	4	2419	33	1675.8	1688.7	12.9	0.2	0.6	0.3	327.1	0.0000	0.0
98.50	2457	22	2390	45	1674.2	1688.7	14.5	0.2	0.5	0.2	394.2	0.1320	0.0
98.00	2456	0	2456	0	1672.6	1675.4	2.8	0.0	3.3	0.0	272.3	0.1370	0.3
97.50	2338	0	2338	0	1671.0	1671.6	0.6	0.0	14.9	0.0	264.0	0.0167	3.4

2-Yr Hydraulics

Section ID	Q (cfs) total	Q (cfs) left bank	Q (cfs) channel	Q (cfs) right bank	Elevation (ft) thalweg	Elevation (ft) water sfc	Depth (ft)	Velocity (f/s) left bank	Velocity (f/s) channel	Velocity (f/s) right bank	Topwidth (ft)	Energy Slope	Froude #
96.00	2338	0	2338	0	1669.5	1670.8	1.3	0.0	6.5	0.0	283.4	0.0157	1.0
94.50	2338	0	2338	0	1668.0	1669.9	1.9	0.0	4.6	0.0	265.5	0.0070	0.6
93.00	2338	1	2337	0	1666.0	1668.8	2.8	1.6	5.8	0.0	413.8	0.0147	1.0
91.50	2338	0	2338	0	1662.6	1664.7	2.1	0.1	8.5	0.1	354.9	0.0243	1.7
90.00	2338	0	2338	0	1658.5	1661.3	2.8	0.0	6.6	0.0	333.8	0.0217	1.1
88.50	2338	0	2338	0	1655.3	1658.3	3.0	0.0	8.1	0.0	231.4	0.0203	1.3
87.00	2338	0	2338	0	1652.1	1654.6	2.5	0.0	9.1	0.0	211.5	0.0243	1.4
85.50	2338	0	2338	0	1647.9	1651.2	3.3	0.0	7.4	0.0	334.4	0.0230	1.3
84.00	2338	0	2338	0	1645.0	1648.0	3.0	0.0	7.8	0.0	231.9	0.0157	1.2
82.50	2338	0	2338	0	1643.0	1646.8	3.8	0.0	6.0	0.0	365.4	0.0157	1.0
81.00	2338	0	2338	0	1641.0	1643.3	2.3	0.0	8.2	0.0	305.5	0.0220	1.5
79.50	2338	0	2338	0	1637.3	1639.9	2.6	0.0	7.0	0.0	326.0	0.0227	1.2
78.00	2338	0	2338	0	1633.9	1636.8	2.9	0.0	6.9	0.0	387.0	0.0220	1.3
76.50	2338	0	2338	0	1630.3	1633.5	3.2	0.0	6.6	0.0	407.3	0.0197	1.2
75.00	2338	0	2338	0	1627.5	1631.0	3.5	0.0	6.3	0.0	353.4	0.0193	1.1
73.50	2338	0	2330	8	1623.9	1627.2	3.3	0.0	8.5	3.5	314.9	0.0203	1.6
72.00	2338	0	2335	3	1620.4	1625.3	4.9	0.0	3.2	1.0	263.4	0.0110	0.3
70.50	2338	0	2331	7	1620.0	1624.5	4.5	0.0	6.0	2.7	347.6	0.0103	1.0
69.00	2338	0	2335	3	1618.2	1621.6	3.4	0.0	7.6	2.1	314.5	0.0200	1.4
67.50	2338	0	2326	12	1615.4	1617.8	2.4	0.0	8.4	4.1	239.6	0.0233	1.4
66.00	2338	0	2338	0	1611.8	1614.4	2.6	0.0	8.5	1.3	222.9	0.0230	1.4
64.50	2338	0	2336	2	1608.2	1611.5	3.3	0.0	6.7	2.6	373.8	0.0213	1.2
63.00	2338	0	2338	0	1604.2	1607.7	3.5	0.0	9.1	0.0	182.4	0.0230	1.3
61.50	2338	0	2338	0	1600.3	1604.2	3.9	0.0	7.9	1.2	334.5	0.0257	1.5
60.00	2338	0	2338	0	1597.0	1600.3	3.3	0.0	8.1	0.0	256.2	0.0237	1.3
58.50	2338	0	2338	0	1593.3	1596.8	3.5	0.0	9.2	0.0	176.7	0.0213	1.3
57.00	2338	0	2338	0	1589.3	1593.3	4.0	0.0	10.2	0.0	131.9	0.0200	1.4
55.50	2338	0	2338	0	1585.9	1590.4	4.5	0.0	10.5	0.0	108.9	0.0193	1.3
54.00	2338	0	2338	0	1583.7	1587.6	3.9	0.0	10.1	0.0	143.8	0.0183	1.4
52.50	2338	0	2338	0	1580.7	1585.9	5.2	0.0	6.9	0.0	245.4	0.0190	1.0
51.00	2338	0	2338	0	1577.5	1580.7	3.2	0.0	12.9	0.0	124.0	0.0263	1.9
49.50	2338	0	2338	0	1574.5	1577.4	2.9	0.0	9.1	0.0	175.8	0.0237	1.3
48.00	2338	0	2338	0	1571.2	1575.1	3.9	0.0	8.8	0.0	136.2	0.0217	1.1
46.50	2680	0	2680	0	1568.0	1569.5	1.5	0.0	13.0	0.0	214.3	0.0187	2.3
45.00	3065	0	3065	0	1566.1	1570.7	4.6	0.0	2.7	0.0	259.0	0.0065	0.2
44.50	3065	0	3065	0	1566.2	1570.6	4.4	0.0	3.0	0.0	240.2	0.0015	0.3
43.60	3065	0	3065	0	1565.8	1570.6	4.8	0.0	2.7	0.0	241.4	0.0013	0.2
42.00	3065	0	3065	0	1567.4	1569.5	2.1	0.0	7.3	0.0	259.9	0.0106	1.0
40.50	3065	0	3037	28	1563.2	1566.0	2.8	0.0	9.7	5.1	304.9	0.0187	1.7
39.00	3065	0	3065	0	1559.2	1563.9	4.7	0.0	7.1	0.0	320.1	0.0180	1.1
37.50	3065	0	3061	4	1558.0	1561.1	3.1	0.0	8.3	2.9	295.5	0.0163	1.3
36.00	3065	0	3065	0	1554.7	1558.9	4.2	0.0	7.6	0.0	230.0	0.0157	1.0
34.50	3065	0	3065	0	1552.7	1555.8	3.1	0.0	9.9	1.7	211.5	0.0193	1.5
33.00	3065	23	3039	3	1549.6	1553.1	3.5	5.0	7.6	2.6	334.5	0.0197	1.2
31.50	3065	0	3065	0	1547.3	1551.0	3.7	0.0	6.1	0.0	467.4	0.0153	1.0
30.00	3065	1	3064	0	1544.6	1548.8	4.2	1.9	6.2	0.0	486.1	0.0150	1.1
28.50	3065	1	3064	0	1542.6	1546.3	3.7	1.8	6.7	0.0	429.2	0.0150	1.1
27.00	3065	0	3065	0	1539.0	1544.1	5.1	0.0	7.1	0.0	269.4	0.0127	1.0
25.50	3065	0	3029	36	1536.2	1542.6	6.4	0.0	6.2	3.9	326.7	0.0110	0.9
24.00	3065	0	3037	28	1534.7	1540.6	5.9	0.0	8.2	4.4	191.7	0.0110	1.0
22.50	3065	0	3064	1	1533.0	1539.0	6.0	0.0	7.6	1.9	251.3	0.0170	1.1
21.00	3065	0	3065	0	1531.4	1533.4	2.0	0.0	14.2	0.0	128.3	0.0247	1.9
19.50	3065	0	3065	0	1528.6	1530.9	2.3	0.0	10.1	0.0	140.6	0.0230	1.2
18.00	3065	0	3065	0	1525.8	1527.7	1.9	0.0	11.3	0.0	154.0	0.0200	1.5
16.50	3065	0	3065	0	1523.0	1525.0	2.0	0.0	9.7	0.0	168.5	0.0197	1.3
15.00	3065	0	3065	0	1520.2	1522.1	1.9	0.0	10.2	0.0	169.9	0.0180	1.3
13.50	3065	0	3065	0	1517.4	1519.6	2.2	0.0	9.8	0.0	148.6	0.0180	1.2
12.00	3065	0	3065	0	1514.6	1516.4	1.8	0.0	11.0	0.0	161.5	0.0193	1.5
10.50	3065	0	3065	0	1511.8	1514.7	2.9	0.0	6.5	0.0	176.0	0.0120	0.7
9.00	3065	0	3065	0	1510.9	1514.1	3.2	0.0	6.1	0.0	172.7	0.0040	0.6
7.50	3065	0	3065	0	1510.1	1513.6	3.5	0.0	5.9	0.0	166.3	0.0033	0.6
6.00	3065	0	3065	0	1509.5	1513.1	3.6	0.0	6.0	0.0	168.1	0.0043	0.6
4.50	3065	0	3065	0	1509.1	1511.7	2.6	0.0	8.4	0.0	156.6	0.0070	1.0
3.00	3065	0	3065	0	1508.0	1510.7	2.7	0.0	7.4	0.0	156.4	0.0070	0.8
1.50	3065	0	3065	0	1507.0	1509.9	2.9	0.0	7.1	0.0	154.3	0.0067	0.8
0.01	3065	0	3065	0	1506.0	1508.4	2.4	0.0	8.7	0.0	150.5	0.0073	1.0

Reach Definitions			
Reach Number	Upstream Station	Downstream Station	Reach Length (ft)
1	316.50	291.00	2550
2	291.00	279.03	1197
3	279.03	276.48	255
4	276.48	268.50	798
5	268.50	258.75	975
6	258.75	241.90	1685
7	241.90	231.75	1015
8	231.75	213.75	1800
9	213.75	203.25	1050
10	203.25	183.75	1950
11	183.75	171.75	1200
12	171.75	156.75	1500
13	156.75	143.25	1350
14	143.25	131.25	1200
15	131.25	111.75	1950
16	111.75	99.75	1200
17	99.75	95.25	450
18	95.25	74.25	2100
19	74.25	66.75	750
20	66.75	57.75	900
21	57.75	47.25	1050
22	47.25	42.78	447
23	42.78	33.75	903
24	33.75	21.75	1200
25	21.75	11.25	1050
26	11.25	3.75	750
27	3.75	0.00	375

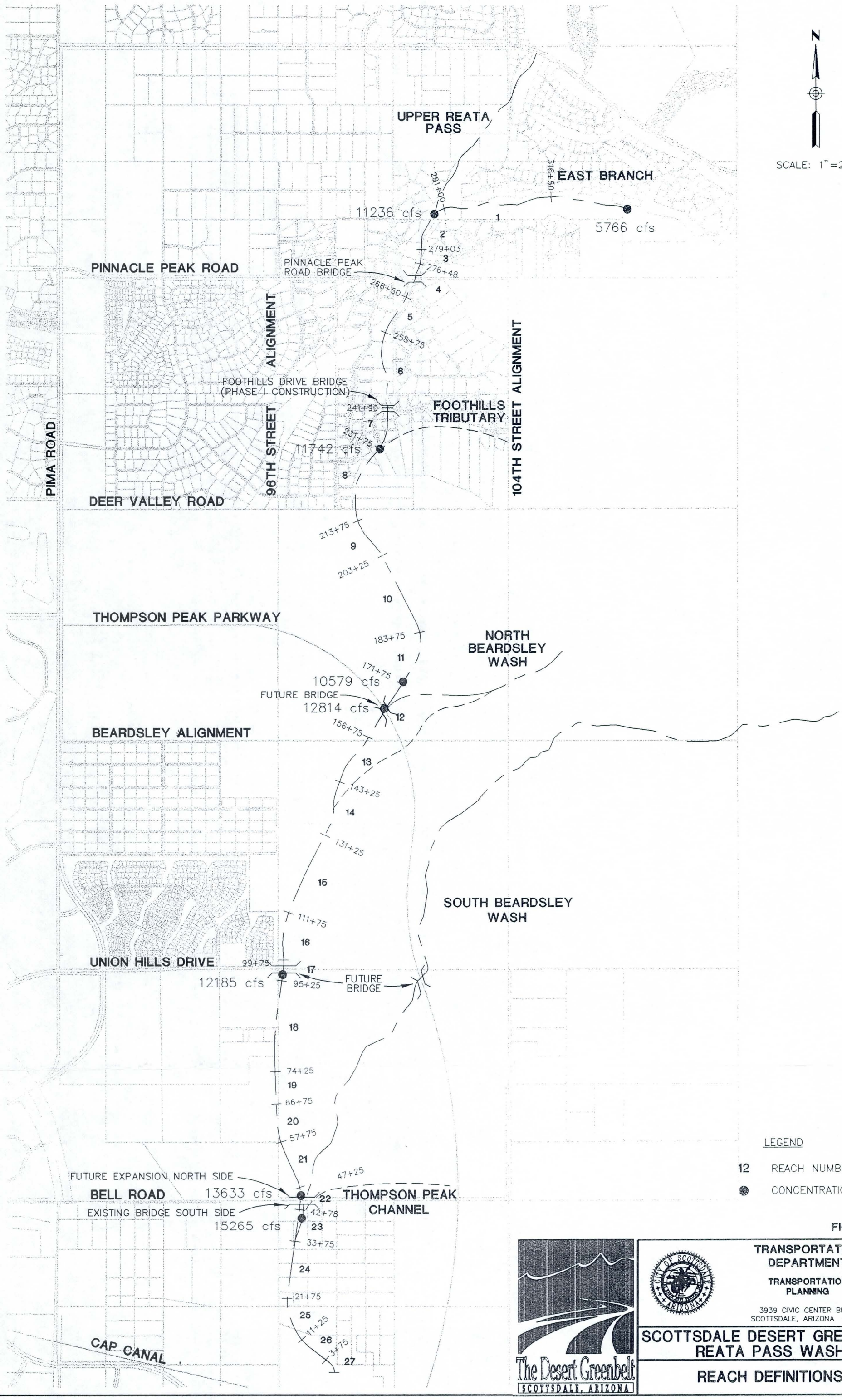


FIGURE 3.1

The Desert Greenbelt
SCOTTSDALE, ARIZONA

TRANSPORTATION DEPARTMENT

TRANSPORTATION PLANNING

3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251

SCOTTSDALE DESERT GREENBELT
REATA PASS WASH

REACH DEFINITIONS

100-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	5766	0.0286	11.6	3.5	154	0.0	0.0	0	0.0	0.0	0
2	11236	0.0267	12.8	4.4	159	2.2	0.5	6	0.0	0.0	0
3	11236	0.0247	15.3	4.9	147	3.1	0.7	9	0.0	0.0	0
4	11236	0.0272	17.0	5.7	130	2.5	0.6	10	0.8	0.4	2
5	11236	0.0307	19.5	5.8	114	2.3	0.5	10	1.3	0.6	5
6	11236	0.0344	22.5	5.3	101	0.9	0.2	5	0.6	0.3	4
7	11742	0.0321	21.8	5.3	102	0.7	0.1	2	0.6	0.2	2
8	11742	0.0311	19.6	5.6	110	1.8	0.4	3	2.8	0.7	4
9	11742	0.0355	18.7	5.4	124	2.5	0.9	3	3.7	0.9	3
10	11742	0.0323	17.4	5.2	140	2.3	0.9	5	2.0	0.6	2
11	10579-11742	0.0267	15.6	5.7	144	2.2	0.6	14	1.1	0.2	6
12	12814	0.0265	14.6	5.9	155	1.8	0.4	18	0.8	0.1	7
13	12814	0.0255	13.8	5.2	189	0.9	0.2	11	1.5	0.4	3
14	12814	0.0244	13.4	4.9	203	0.9	0.2	4	2.7	0.8	3
15	12814	0.0238	13.2	5.0	198	0.9	0.2	2	2.0	0.6	1
16	12814	0.0270	14.1	4.4	216	0.3	0.1	1	0.7	0.2	0
17	12185	0.0272	14.1	4.1	233	0.5	0.1	0	0.7	0.2	0
18	12185	0.0208	12.5	4.9	215	0.8	0.3	1	2.3	0.8	2
19	12185	0.0201	12.1	5.3	200	1.1	0.3	1	4.0	1.3	4
20	12185	0.0213	12.8	5.6	179	1.1	0.3	1	3.6	1.0	3
21	12185	0.0174	12.9	6.3	172	0.4	0.2	1	1.9	0.6	2
22	13633-15265	0.0146	12.6	6.5	191	0.2	0.1	1	1.3	0.6	1
23	15265	0.0149	12.5	6.5	198	1.1	0.4	1	2.2	1.0	2
24	15265	0.0158	14.1	6.3	183	1.9	0.6	19	2.3	0.9	2
25	15265	0.0140	15.3	6.4	167	1.1	0.3	24	1.1	0.4	1
26	15265	0.0096	14.2	6.9	165	0.4	0.1	8	0.4	0.1	0
27	15265	0.0065	13.3	7.2	160	0.0	0.0	0	0.0	0.0	0

Are these average values of the Reach or the peak values of the Reach?

50-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	4823	0.0286	11.2	3.3	143	0.0	0.0	0	0.0	0.0	0
2	9324	0.0270	12.1	4.2	148	2.1	0.5	5	0.0	0.0	0
3	9324	0.0252	14.4	4.6	140	2.8	0.6	7	0.0	0.0	0
4	9324	0.0274	16.1	5.1	126	2.1	0.4	7	0.6	0.3	2
5	9324	0.0308	18.4	5.2	112	1.8	0.3	7	1.0	0.4	5
6	9324	0.0346	21.2	4.7	100	0.6	0.1	2	0.5	0.2	3
7	9324	0.0321	20.4	4.8	100	0.5	0.1	1	0.5	0.1	2
8	9324	0.0309	18.2	5.2	105	1.4	0.3	2	2.4	0.5	3
9	9324	0.0353	17.4	5.0	118	2.2	0.8	3	3.3	0.8	3
10	9324	0.0322	16.3	4.9	132	1.8	0.8	3	1.8	0.5	2
11	8751-9538	0.0266	14.6	5.3	135	1.7	0.5	11	0.9	0.2	5
12	10496	0.0264	13.7	5.6	145	1.2	0.2	12	0.7	0.1	6
13	10496	0.0255	12.9	4.9	176	0.4	0.1	4	1.3	0.4	3
14	10496	0.0244	12.6	4.6	190	0.6	0.1	2	2.5	0.7	2
15	10496	0.0239	12.3	4.7	185	0.6	0.1	1	1.8	0.5	1
16	10496	0.0270	13.2	4.1	206	0.2	0.0	0	0.6	0.2	0
17	9821	0.0271	13.2	3.7	225	0.4	0.1	0	0.6	0.1	0
18	9821	0.0209	11.6	4.5	204	0.6	0.2	0	2.1	0.7	2
19	9821	0.0201	11.2	4.9	187	0.9	0.2	1	3.6	1.1	3
20	9821	0.0212	11.9	5.3	166	0.9	0.2	1	3.1	0.8	2
21	9821	0.0177	12.1	5.9	161	0.3	0.1	1	1.5	0.4	1
22	10954-12231	0.0149	11.8	5.9	182	0.1	0.1	1	1.1	0.5	1
23	12231	0.0150	11.6	6.0	187	1.0	0.3	1	2.0	0.8	2
24	12231	0.0160	13.1	5.8	173	1.5	0.5	12	1.9	0.7	2
25	12231	0.0142	14.2	5.7	162	0.7	0.2	15	0.8	0.3	1
26	12231	0.0097	13.2	6.1	162	0.3	0.1	5	0.3	0.1	0
27	12231	0.0067	12.3	6.3	157	0.0	0.0	0	0.0	0.0	0

25-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	3803	0.0287	10.5	3.1	131	0.0	0.0	0	0.0	0.0	0
2	7438	0.0274	11.3	3.9	135	2.0	0.4	5	0.0	0.0	0
3	7438	0.0259	13.6	4.1	131	2.6	0.5	6	0.0	0.0	0
4	7438	0.0277	15.2	4.5	120	1.7	0.3	3	0.5	0.1	2
5	7438	0.0310	17.2	4.6	107	1.4	0.2	2	0.7	0.2	5
6	7438	0.0347	19.7	4.1	98	0.5	0.1	1	0.4	0.1	3
7	7644	0.0319	18.9	4.3	97	0.3	0.0	0	0.3	0.1	2
8	7644	0.0306	16.9	4.7	100	1.0	0.2	2	1.9	0.4	3
9	7644	0.0350	16.3	4.6	110	1.7	0.6	2	2.8	0.6	3
10	7644	0.0322	15.3	4.5	124	1.4	0.6	2	1.4	0.4	1
11	6838-7644	0.0266	13.6	4.9	125	1.2	0.3	9	0.8	0.1	4
12	8208	0.0264	12.8	5.1	131	0.8	0.2	10	0.6	0.1	5
13	8208	0.0254	11.9	4.5	160	0.3	0.1	3	1.2	0.3	3
14	8208	0.0244	11.5	4.2	173	0.4	0.1	1	2.2	0.6	2
15	8208	0.0239	11.3	4.4	168	0.5	0.1	1	1.5	0.4	1
16	8208	0.0270	12.1	3.8	194	0.2	0.0	0	0.5	0.1	0
17	7721	0.0270	12.1	3.4	215	0.3	0.1	0	0.5	0.1	0
18	7721	0.0208	10.7	4.2	191	0.5	0.1	0	1.8	0.6	2
19	7721	0.0201	10.4	4.6	172	0.6	0.2	0	3.2	1.0	3
20	7721	0.0212	11.0	4.9	151	0.6	0.1	0	2.5	0.7	2
21	7721	0.0180	11.3	5.4	149	0.2	0.1	1	1.1	0.3	1
22	8579-9546	0.0152	11.0	5.4	171	0.1	0.1	1	1.0	0.4	1
23	9546	0.0150	10.6	5.5	176	0.8	0.3	1	1.8	0.7	1
24	9546	0.0162	12.0	5.3	164	1.2	0.4	1	1.7	0.6	1
25	9546	0.0143	13.0	5.1	157	0.5	0.2	0	0.7	0.3	1
26	9546	0.0097	12.1	5.3	158	0.2	0.1	0	0.2	0.1	0
27	9546	0.0068	11.4	5.4	154	0.0	0.0	0	0.0	0.0	0

10-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	2684	0.0288	9.7	2.7	114	0.0	0.0	0	0.0	0.0	0
2	5069	0.0280	10.2	3.6	116	1.8	0.3	4	0.0	0.0	0
3	5069	0.0269	12.1	3.5	117	2.3	0.4	6	0.0	0.0	0
4	5069	0.0283	13.5	3.7	111	1.4	0.2	3	0.2	0.0	0
5	5069	0.0312	15.2	3.8	99	1.1	0.2	1	0.2	0.0	2
6	5069	0.0348	17.3	3.3	94	0.4	0.1	0	0.1	0.0	3
7	5227	0.0317	16.5	3.5	93	0.1	0.0	0	0.1	0.0	1
8	5227	0.0302	14.8	4.1	91	0.6	0.2	1	1.3	0.3	2
9	5227	0.0347	14.5	4.0	99	1.3	0.4	2	2.1	0.4	2
10	5227	0.0320	13.7	3.8	110	1.0	0.4	1	1.1	0.3	1
11	4745-5227	0.0265	12.2	4.4	110	0.7	0.2	7	0.6	0.1	4
12	5666	0.0263	11.5	4.7	114	0.5	0.1	9	0.5	0.1	5
13	5666	0.0254	10.8	4.0	140	0.2	0.0	3	1.0	0.3	2
14	5666	0.0244	10.4	3.8	153	0.3	0.1	1	1.7	0.5	2
15	5666	0.0239	10.1	4.0	147	0.4	0.1	1	1.1	0.3	1
16	5666	0.0270	10.9	3.4	178	0.1	0.0	0	0.4	0.1	0
17	5319	0.0270	11.0	2.9	200	0.3	0.1	0	0.3	0.1	0
18	5319	0.0209	9.6	3.7	172	0.3	0.1	0	1.4	0.4	2
19	5319	0.0201	9.3	4.1	151	0.2	0.0	0	2.5	0.7	2
20	5319	0.0212	10.2	4.4	129	0.2	0.0	0	1.8	0.5	1
21	5319	0.0182	10.7	4.7	129	0.1	0.0	0	0.6	0.2	1
22	5927-6613	0.0154	10.2	4.7	155	0.0	0.0	0	0.8	0.3	1
23	6613	0.0150	9.4	4.9	158	0.7	0.2	1	1.6	0.6	1
24	6613	0.0164	10.6	4.7	149	0.9	0.3	1	1.4	0.5	1
25	6613	0.0145	11.5	4.3	149	0.4	0.1	0	0.6	0.2	1
26	6613	0.0097	10.6	4.3	153	0.1	0.0	0	0.2	0.1	0
27	6613	0.0070	10.1	4.4	151	0.0	0.0	0	0.0	0.0	0

5-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	1896	0.0289	9.0	2.4	98	0.0	0.0	0	0.0	0.0	0
2	3689	0.0284	9.5	3.2	100	1.5	0.3	4	0.0	0.0	0
3	3689	0.0277	11.3	3.1	106	2.0	0.4	5	0.0	0.0	0
4	3689	0.0287	12.6	3.1	104	1.1	0.2	2	0.1	0.0	0
5	3689	0.0313	13.9	3.2	93	0.9	0.1	1	0.1	0.0	0
6	3689	0.0348	15.5	2.7	92	0.3	0.0	0	0.0	0.0	0
7	3827	0.0315	14.8	3.0	90	0.1	0.0	0	0.0	0.0	0
8	3827	0.0302	13.3	3.6	85	0.6	0.2	1	0.9	0.2	1
9	3827	0.0347	13.1	3.6	90	1.2	0.4	1	1.5	0.3	1
10	3827	0.0321	12.4	3.4	100	0.9	0.3	1	0.8	0.2	1
11	3537-3827	0.0265	11.3	4.0	98	0.6	0.2	1	0.5	0.1	4
12	4222	0.0261	10.7	4.3	100	0.4	0.1	0	0.4	0.0	5
13	4222	0.0254	9.9	3.7	125	0.1	0.0	0	0.9	0.2	2
14	4222	0.0243	9.4	3.5	137	0.2	0.1	0	1.5	0.4	1
15	4222	0.0239	9.2	3.7	131	0.3	0.1	0	0.9	0.2	1
16	4222	0.0270	10.2	3.1	165	0.1	0.0	0	0.3	0.1	0
17	3976	0.0269	10.3	2.6	189	0.2	0.0	0	0.2	0.0	0
18	3976	0.0209	8.8	3.4	159	0.2	0.1	0	1.1	0.3	1
19	3976	0.0202	8.4	3.8	136	0.1	0.0	0	2.1	0.6	2
20	3976	0.0213	9.4	4.0	114	0.0	0.0	0	1.5	0.4	1
21	3976	0.0182	10.0	4.2	118	0.0	0.0	0	0.5	0.1	1
22	4472-5031	0.0153	9.4	4.2	146	0.0	0.0	0	0.7	0.2	1
23	5031	0.0150	8.6	4.5	146	0.5	0.1	0	1.4	0.5	1
24	5031	0.0165	9.7	4.3	138	0.7	0.2	1	1.2	0.4	1
25	5031	0.0147	10.1	3.8	144	0.2	0.1	0	0.5	0.2	0
26	5031	0.0097	9.3	3.8	150	0.1	0.0	0	0.2	0.1	0
27	5031	0.0070	9.2	3.7	149	0.0	0.0	0	0.0	0.0	0

2-YEAR HYDRAULIC SUMMARY (PER REACH)

For Sediment Transport Computations

Reach #	Discharge Range (cfs)	Slope (ft/ft)	Main Channel Velocity (fps)	Main Channel Depth (ft)	Main Channel Eff. Width (ft)	Left Bank Velocity (fps)	Left Bank Depth (ft)	Left Bank Eff. Width (ft)	Right Bank Velocity (fps)	Right Bank Depth (ft)	Right Bank Eff. Width (ft)
1	1022	0.0291	8.3	1.9	75	0.0	0.0	0	0.0	0.0	0
2	2027	0.0290	8.5	2.7	75	1.0	0.2	3	0.0	0.0	0
3	2027	0.0289	9.8	2.4	89	1.3	0.2	4	0.0	0.0	0
4	2027	0.0293	11.2	2.2	93	0.6	0.1	1	0.0	0.0	0
5	2027	0.0315	12.0	2.2	84	0.4	0.1	1	0.0	0.0	0
6	2027	0.0348	12.9	1.9	88	0.1	0.0	0	0.0	0.0	0
7	2162	0.0313	12.2	2.2	85	0.1	0.0	0	0.0	0.0	0
8	2162	0.0301	11.1	2.9	74	0.4	0.1	1	0.5	0.1	0
9	2162	0.0346	11.2	2.9	76	0.8	0.2	1	0.9	0.2	1
10	2162	0.0320	10.6	2.8	83	0.6	0.1	1	0.5	0.1	0
11	2044-2162	0.0265	10.1	3.3	79	0.3	0.1	0	0.3	0.0	3
12	2456	0.0261	9.9	3.6	78	0.3	0.0	0	0.2	0.0	4
13	2456	0.0253	8.8	3.1	99	0.1	0.0	0	0.7	0.2	2
14	2456	0.0243	8.2	3.0	109	0.2	0.0	0	1.2	0.3	1
15	2456	0.0235	8.0	3.2	102	0.2	0.0	0	0.6	0.2	1
16	2456	0.0277	7.3	3.9	157	0.1	0.4	1	0.2	0.5	2
17	2338	0.0284	6.8	3.9	188	0.1	0.5	2	0.1	0.7	3
18	2338	0.0214	6.7	3.5	143	0.1	0.2	1	0.7	0.4	2
19	2338	0.0205	7.1	3.5	113	0.0	0.1	0	1.4	0.4	2
20	2338	0.0215	8.3	3.5	91	0.0	0.0	0	1.0	0.3	1
21	2338	0.0183	8.8	3.6	100	0.0	0.0	0	0.3	0.1	0
22	2680-3065	0.0152	8.1	3.5	129	0.0	0.0	0	0.6	0.1	0
23	3065	0.0148	7.5	3.9	125	0.4	0.1	0	1.2	0.3	1
24	3065	0.0167	8.4	3.6	119	0.5	0.1	0	1.0	0.3	1
25	3065	0.0148	8.6	3.1	134	0.2	0.0	0	0.4	0.1	0
26	3065	0.0098	7.8	2.9	144	0.1	0.0	0	0.1	0.0	0
27	3065	0.0072	7.7	2.8	146	0.0	0.0	0	0.0	0.0	0

RMAL DEPTH CALCULATIONS

```
****************************
* VERSION  1.0 JULY  1985  *
* SIMONS, LI & ASSOC. INC. *
* TUCSON, ARIZONA          *
****************************
Date: 12/6/1996
Time: 14:6:11
```

FOOTHILLS TRIBUTARY HYDRAULICS
100-YR DISCHARGE

```
SEC NO--      1.00
WSEL= 2049.00  Q= 2058.0  DEPTH=  3.00  AREA=   211.7  HYD DEPTH=  2.04
FRIC SLOPE=0.0149873  CRWSEL= 2049.27  TOP WIDTH= 103.9  VEL HEAD=   1.47
FROUDE #= 1.2  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 2058.0    QROB=    0.0
VLOB=    0.0    VCH=    9.7    VROB=    0.0
ALOB=    0.0    ACH=  211.6    AROB=    0.0
```

$V = \frac{2058}{211.7} = 9.72 \frac{ft}{sec} \therefore \frac{V^2}{2g} = 1.47$

```
SEC NO--      1.00
WSEL= 2048.73  Q= 1682.0  DEPTH=  2.73  AREA=   184.3  HYD DEPTH=  1.85
FRIC SLOPE=0.0149998  CRWSEL= 2048.96  TOP WIDTH=  99.6  VEL HEAD=   1.29
FROUDE #= 1.2  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 1682.0    QROB=    0.0
VLOB=    0.0    VCH=    9.1    VROB=    0.0
ALOB=    0.0    ACH=  184.3    AROB=    0.0
```

$V = \frac{1682}{184.3} = 9.13 \frac{ft}{sec} \therefore \frac{V^2}{2g} = 1.29$

```
SEC NO--      1.00
WSEL= 2048.51  Q= 1399.0  DEPTH=  2.51  AREA=   162.7  HYD DEPTH=  1.69
FRIC SLOPE=0.0149994  CRWSEL= 2048.71  TOP WIDTH=  96.1  VEL HEAD=   1.15
FROUDE #= 1.2  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 1399.0    QROB=    0.0
VLOB=    0.0    VCH=    8.6    VROB=    0.0
ALOB=    0.0    ACH=  162.6    AROB=    0.0
```

$V = \frac{1399}{162.7} = 8.6 \, ft/sec \therefore \frac{V^2}{2g} = 1.15$

```
SEC NO--      1.00
WSEL= 2048.10  Q=  949.0  DEPTH=  2.10  AREA=   125.3  HYD DEPTH=  1.40
FRIC SLOPE=0.0149956  CRWSEL= 2048.23  TOP WIDTH=  89.7  VEL HEAD=   0.89
FROUDE #= 1.1  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH=  949.0    QROB=    0.0
VLOB=    0.0    VCH=    7.6    VROB=    0.0
ALOB=    0.0    ACH=  125.3    AROB=    0.0
```

$V = \frac{949}{125.3} = 7.57 \frac{ft}{sec} \therefore \frac{V^2}{2g} = 0.89$

```
SEC NO--      1.00
WSEL= 2047.80  Q=  659.0  DEPTH=  1.80  AREA=    98.5  HYD DEPTH=  1.16
FRIC SLOPE=0.0149785  CRWSEL= 2047.87  TOP WIDTH=  84.8  VEL HEAD=   0.70
FROUDE #= 1.1  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH=  659.0    QROB=    0.0
VLOB=    0.0    VCH=    6.7    VROB=    0.0
ALOB=    0.0    ACH=   98.5    AROB=    0.0
```

$V = \frac{659}{98.5} = 6.69 \frac{ft}{sec} \therefore \frac{V^2}{2g} = 0.70$

```
SEC NO--      1.00
WSEL= 2047.37  Q=  336.0  DEPTH=  1.37  AREA=    63.5  HYD DEPTH=  0.82
FRIC SLOPE=0.0149957  CRWSEL= 2047.38  TOP WIDTH=  77.9  VEL HEAD=   0.43
FROUDE #= 1.0  MIN ELEV= 2046.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH=  336.0    QROB=    0.0
VLOB=    0.0    VCH=    5.3    VROB=    0.0
ALOB=    0.0    ACH=   63.5    AROB=    0.0
```

$V = \frac{336}{63.5} = 5.29 \frac{ft}{sec} \therefore \frac{V^2}{2g} = 0.44$

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 10:59:37
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
2-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
**DIVIDED FLOW**
WSEL= 1817.36  Q=  885.0  DEPTH=  2.36  AREA=    85.4  HYD DEPTH=  1.02
FRIC SLOPE=0.0430353  CRWSEL= 1817.87  TOP WIDTH=  83.6  VEL HEAD=   1.67
FROUDE #= 1.8  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH=  885.0    QROB=    0.0
VLOB=    0.0    VCH=   10.4    VROB=    0.0
ALOB=    0.0    ACH=   85.4    AROB=    0.0
```

$V = \frac{885}{85.4} = 10.36 \frac{ft}{sec}$ $\therefore \frac{V^2}{2g} = 1.67$

```
SEC NO--      1.00
WSEL= 1577.75  Q=  880.0  DEPTH=  1.25  AREA=   111.4  HYD DEPTH=  1.20
FRIC SLOPE=0.0199977  CRWSEL= 1577.96  TOP WIDTH=  92.6  VEL HEAD=   0.97
FROUDE #= 1.3  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH=  880.0    QROB=    0.0
VLOB=    0.0    VCH=    7.9    VROB=    0.0
ALOB=    0.0    ACH=  111.4    AROB=    0.0
```

$V = \frac{880}{111.4} = 7.9 \frac{ft}{sec}$ $\therefore \frac{V^2}{2g} = 0.97$

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:0:24
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
5-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
WSEL= 1817.95  Q= 1831.0  DEPTH=  2.95  AREA=   139.4  HYD DEPTH=  1.46
FRIC SLOPE=0.0429991  CRWSEL= 1818.76  TOP WIDTH=  95.4  VEL HEAD=   2.68
FROUDE #= 1.9  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 1831.0    QROB=    0.0
VLOB=    0.0    VCH=   13.1    VROB=    0.0
ALOB=    0.0    ACH=  139.4    AROB=    0.0
```

$V = \frac{1831}{139.4} = 13.14 \frac{ft}{sec}$

```
SEC NO--      1.00
WSEL= 1578.44  Q= 1827.0  DEPTH=  1.94  AREA=   175.8  HYD DEPTH=  1.82
FRIC SLOPE=0.0199999  CRWSEL= 1578.87  TOP WIDTH=  96.7  VEL HEAD=   1.68
FROUDE #= 1.4  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 1827.0    QROB=    0.0
VLOB=    0.0    VCH=   10.4    VROB=    0.0
ALOB=    0.0    ACH=  175.8    AROB=    0.0
```

$V = \frac{1827}{175.8} = 10.39 \frac{ft}{sec}$

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:1:3
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
10-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
WSEL= 1818.27  Q= 2520.0  DEPTH=  3.27  AREA=   170.2  HYD DEPTH=  1.75
FRIC SLOPE=0.0429928  CRWSEL= 1819.29  TOP WIDTH=  97.2  VEL HEAD=   3.41
FROUDE #= 2.0  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 2520.0    QROB=    0.0
VLOB=    0.0    VCH=   14.8    VROB=    0.0
ALOB=    0.0    ACH=  170.2    AROB=    0.0
```

$V = \frac{2520}{170.2} = 14.8 \frac{ft}{sec}$

```
SEC NO--      1.00
WSEL= 1578.86  Q= 2548.0  DEPTH=  2.36  AREA=   217.0  HYD DEPTH=  2.19
FRIC SLOPE=0.0199996  CRWSEL= 1579.43  TOP WIDTH=  99.2  VEL HEAD=   2.14
FROUDE #= 1.4  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 2548.0    QROB=    0.0
VLOB=    0.0    VCH=   11.7    VROB=    0.0
ALOB=    0.0    ACH=  217.0    AROB=    0.0
```

$V = \frac{2548}{217} = 11.74 \frac{ft}{sec}$

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:2:5
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
25-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
WSEL= 1818.69  Q= 3573.0  DEPTH=  3.69  AREA=   212.0  HYD DEPTH=  2.13
FRIC SLOPE=0.0429955  CRWSEL= 1820.02  TOP WIDTH=  99.6  VEL HEAD=   4.41
FROUDE #= 2.0  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 3573.0    QROB=    0.0
VLOB=    0.0    VCH=   16.9    VROB=    0.0
ALOB=    0.0    ACH=  211.9    AROB=    0.0
```

$V = \frac{3573}{212} = 16.85$ ft/sec

```
SEC NO--      1.00
WSEL= 1579.42  Q= 3672.0  DEPTH=  2.92  AREA=   274.1  HYD DEPTH=  2.67
FRIC SLOPE=0.0199864  CRWSEL= 1580.20  TOP WIDTH= 102.6  VEL HEAD=   2.79
FROUDE #= 1.4  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 3672.0    QROB=    0.0
VLOB=    0.0    VCH=   13.4    VROB=    0.0
ALOB=    0.0    ACH=  274.1    AROB=    0.0
```

$V = \frac{3672}{274.1} = 13.4$ ft/sec

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:3:2
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
50-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
WSEL= 1819.05  Q= 4572.0  DEPTH=  4.05  AREA=   247.7  HYD DEPTH=  2.44
FRIC SLOPE=0.0430355  CRWSEL= 1820.73  TOP WIDTH= 101.5  VEL HEAD=   5.29
FROUDE #= 2.1  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 4572.0    QROB=    0.0
VLOB=    0.0    VCH=   18.5    VROB=    0.0
ALOB=    0.0    ACH=  247.7    AROB=    0.0
```

$V = \frac{4572}{247.7} = 18.5 \text{ ft/sec}$

```
SEC NO--      1.00
WSEL= 1579.80  Q= 4531.0  DEPTH=  3.30  AREA=   313.7  HYD DEPTH=  2.99
FRIC SLOPE=0.0200046  CRWSEL= 1580.74  TOP WIDTH= 104.9  VEL HEAD=   3.24
FROUDE #= 1.5  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 4531.0    QROB=    0.0
VLOB=    0.0    VCH=   14.4    VROB=    0.0
ALOB=    0.0    ACH=  313.7    AROB=    0.0
```

$V = \frac{4531}{313.7} = 14.44 \text{ ft/sec}$

ORMAL DEPTH CALCULATIONS

```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:3:59
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
100-YR DISCHARGE (SECTION LOOKING UPSTREAM)

```
SEC NO--      1.00
WSEL= 1819.33  Q= 5450.0  DEPTH=  4.33  AREA=   277.2  HYD DEPTH=  2.69
FRIC SLOPE=0.0429841  CRWSEL= 1821.26  TOP WIDTH= 103.1  VEL HEAD=   6.01
FROUDE #= 2.1  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 5450.0    QROB=    0.0
VLOB=    0.0    VCH=   19.7    VROB=    0.0
ALOB=    0.0    ACH=  277.1    AROB=    0.0
```

$V = \frac{5450}{277.2} = 19.66$ ft/sec $\therefore \frac{V^2}{2g} = 6.00$

```
SEC NO--      1.00
WSEL= 1580.20  Q= 5499.0  DEPTH=  3.70  AREA=   355.7  HYD DEPTH=  3.32
FRIC SLOPE=0.0199997  CRWSEL= 1581.46  TOP WIDTH= 107.3  VEL HEAD=   3.71
FROUDE #= 1.5  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 5499.0    QROB=    0.0
VLOB=    0.0    VCH=   15.5    VROB=    0.0
ALOB=    0.0    ACH=  355.7    AROB=    0.0
```

$V = \frac{5499}{355.7} = 15.46$ ft/sec $\therefore \frac{V^2}{2g} = 3.71$

ORMAL DEPTH CALCULATIONS

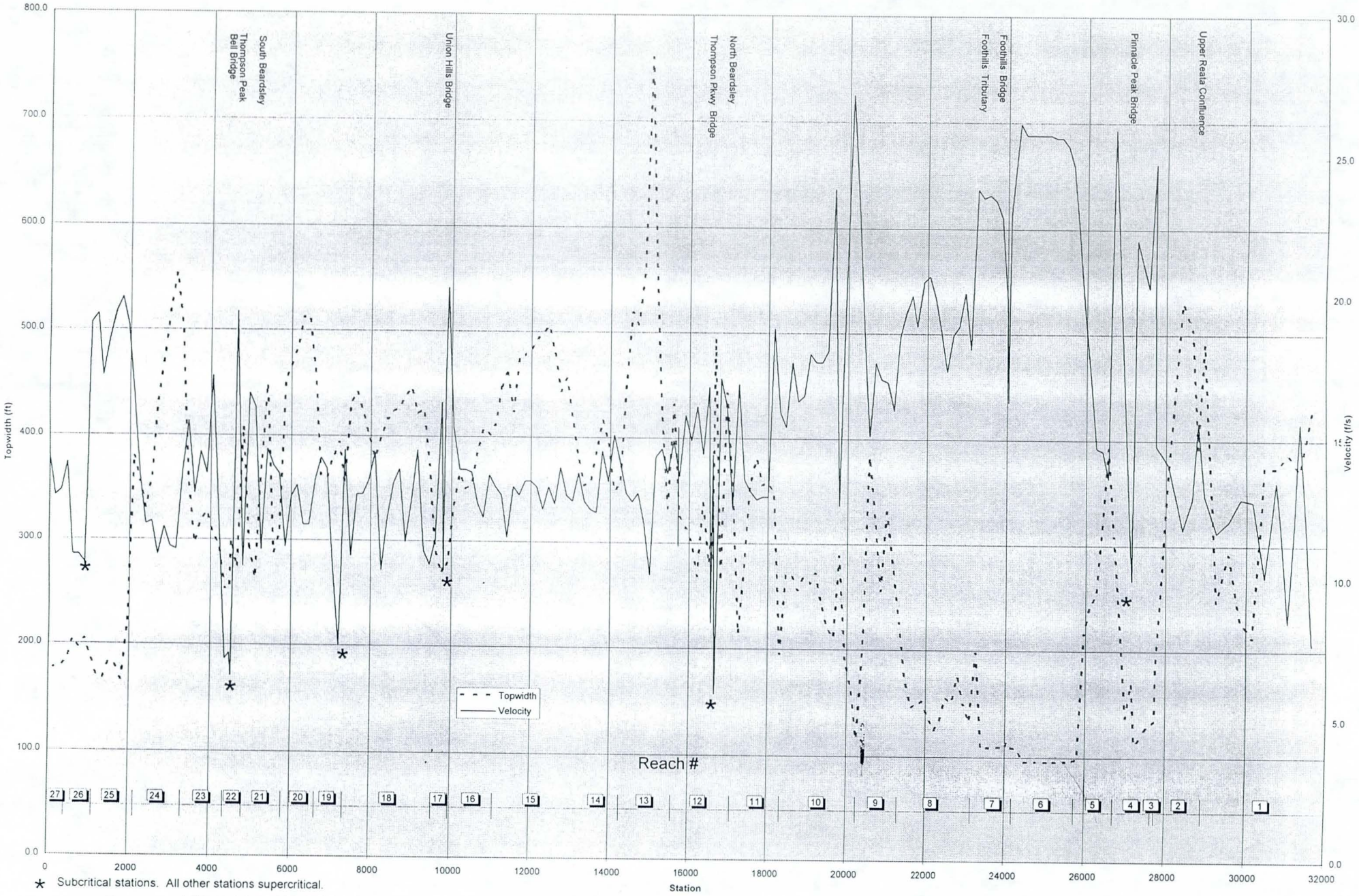
```
*****************************
* VERSION  1.0 JULY  1985   *
* SIMONS, LI & ASSOC. INC.  *
* TUCSON, ARIZONA           *
*****************************
Date: 11/1/1996
Time: 11:4:50
```

THOMPSON PEAK TRIBUTARY HYDRAULICS (2210B3, C2170A)
500-YR DISCHARGE (SECTION LOOKING UPSTREAM)

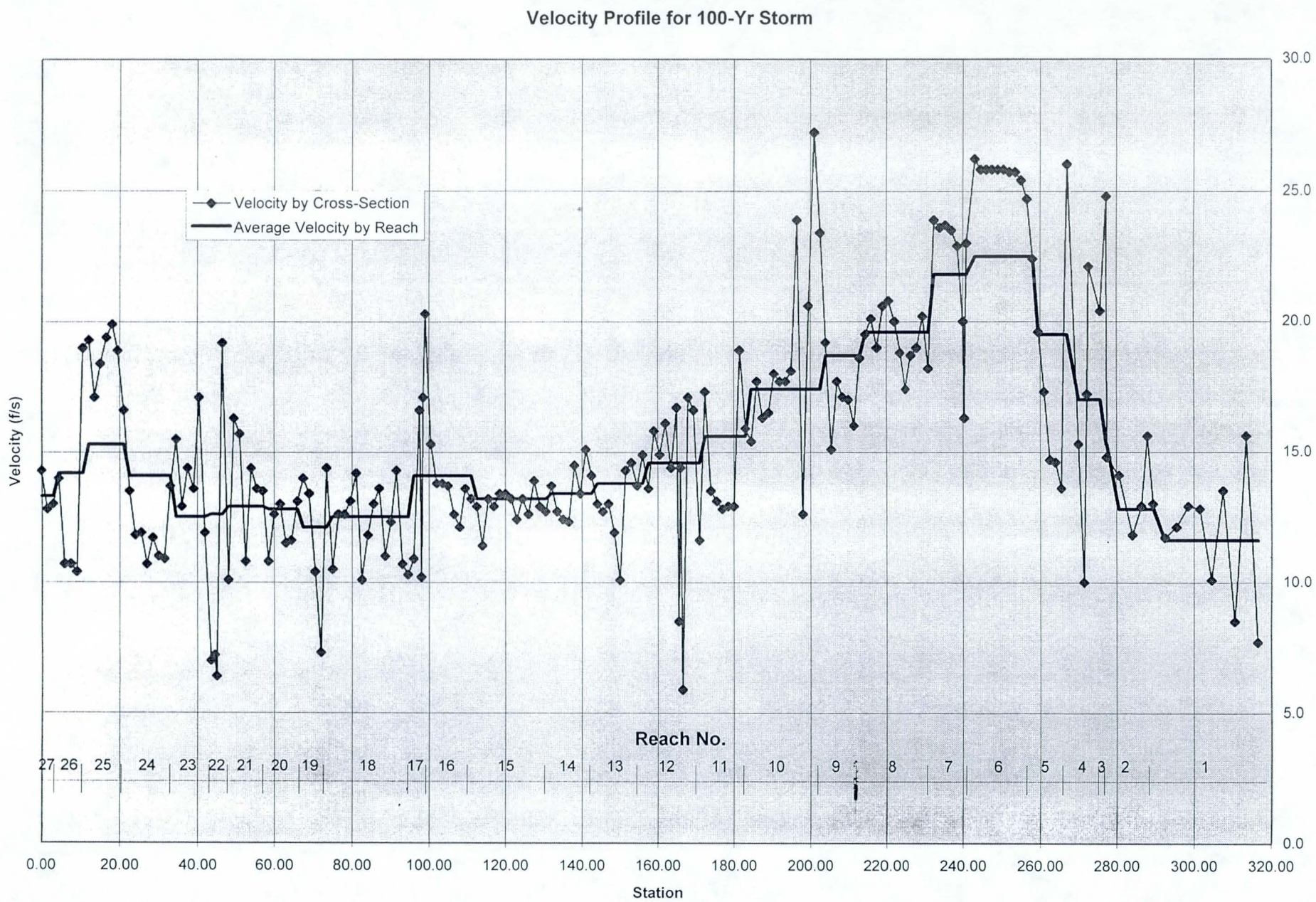
```
SEC NO--      1.00
WSEL= 1820.02  Q= 7783.0  DEPTH=  5.02  AREA=   348.8  HYD DEPTH=  3.25
FRIC SLOPE=0.0429915  CRWSEL= 1822.43  TOP WIDTH= 107.2  VEL HEAD=   7.73
FROUDE #= 2.2  MIN ELEV= 1815.00
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 7783.0    QROB=    0.0
VLOB=    0.0    VCH=   22.3    VROB=    0.0
ALOB=    0.0    ACH=  348.7    AROB=    0.0
```

```
SEC NO--      1.00
**DIVIDED FLOW**
WSEL= 1581.34  Q= 8091.0  DEPTH=  4.84  AREA=   487.2  HYD DEPTH=  3.70
FRIC SLOPE=0.0199941  CRWSEL= 1582.63  TOP WIDTH= 131.8  VEL HEAD=   4.28
FROUDE #= 1.5  MIN ELEV= 1576.50
NLOB=  0.030    NCH=  0.030    NROB=  0.030
QLOB=    0.0    QCH= 8091.0    QROB=    0.0
VLOB=    0.0    VCH=   16.6    VROB=    0.0
ALOB=    0.0    ACH=  487.2    AROB=    0.0
```

Velocity vs. Topwidth for Reach Breakdown



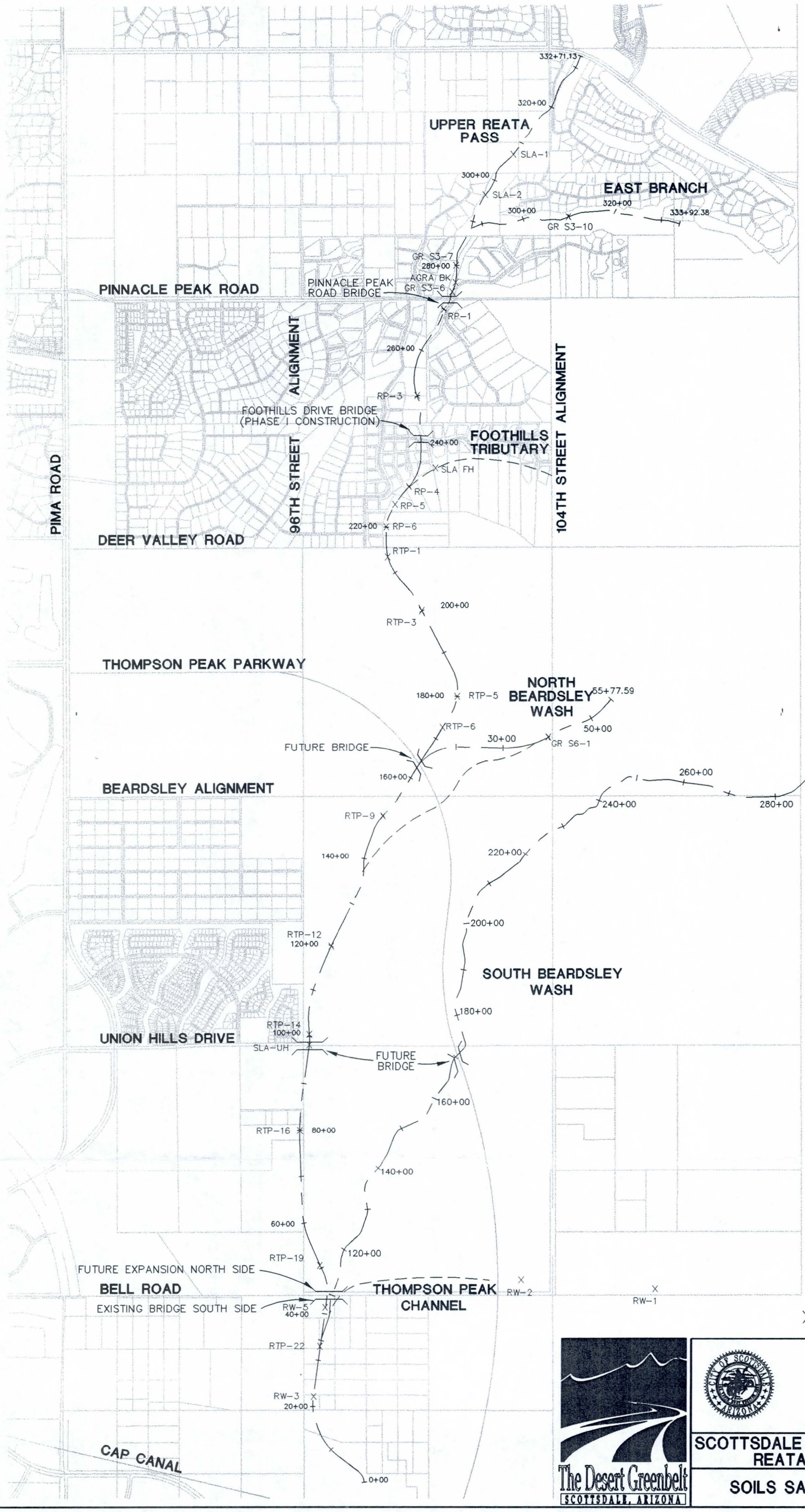
* Subcritical stations. All other stations supercritical.


Velocity Profile for 100-Yr Storm
Velocity by Cross-Section
Average Velocity by Reach
Velocity (f/s)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Reach No.
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00
Station

D: SOILS ANALYSIS

A soils analysis of the Reata Pass/Beardsley Wash channel was performed. The following additional information is enclosed:

1. Sampling Locations
2. Sieve Test Results
3. Soil Gradation Curves for Main Channel
   (one composite plot and one plot for each reach)
4. Soil Gradation Curves for Tributaries
   (one composite plot and one plot for each tributary)
5. Silt and Clay Content - Main Channel and Tributaries
6. Comparison of D_{16}, D_{50}, and D_{84} - Main Channel and Tributaries
7. Geologic Survey Map of McDowell Mountains


N
SCALE: 1"=2000'
UPPER REATA PASS
EAST BRANCH
PINNACLE PEAK ROAD
PINNACLE PEAK ROAD BRIDGE
ALIGNMENT
104TH STREET ALIGNMENT
FOOTHILLS DRIVE BRIDGE (PHASE I CONSTRUCTION)
FOOTHILLS TRIBUTARY
96TH STREET
PIMA ROAD
DEER VALLEY ROAD
THOMPSON PEAK PARKWAY
NORTH BEARDSLEY WASH
FUTURE BRIDGE
BEARDSLEY ALIGNMENT
SOUTH BEARDSLEY WASH
UNION HILLS DRIVE
FUTURE BRIDGE
FUTURE EXPANSION NORTH SIDE
BELL ROAD
EXISTING BRIDGE SOUTH SIDE
THOMPSON PEAK CHANNEL
CAP CANAL
332+71.13
320+00
SLA-1
300+00
SLA-2
320+00
300+00
GR S3-10
333+92.38
GR S3-7
280+00
AGRA BK
GR S3-6
RP-1
260+00
RP-3
240+00
SLA FH
RP-4
RP-5
220+00
RP-6
RTP-1
200+00
RTP-3
180+00
RTP-5
55+77.59
RTP-6
50+00
30+00
GR S6-1
160+00
260+00
310+36
300+00
GR S6-2
280+00
240+00
RTP-9
140+00
220+00
200+00
RTP-12
120+00
180+00
RTP-14
100+00
SLA-UH
160+00
RTP-16
80+00
140+00
60+00
120+00
RTP-19
RW-2
RW-1
RW-5
40+00
RTP-22
RW-3
20+00
0+00
LEGEND
SOIL SAMPLE LOCATION
The Desert Greenbelt
SCOTTSDALE, ARIZONA
TRANSPORTATION DEPARTMENT
TRANSPORTATION PLANNING
3939 CIVIC CENTER BLVD.
SCOTTSDALE, ARIZONA 85251
SCOTTSDALE DESERT GREENBELT
REATA PASS WASH
SOILS SAMPLE LOCATION

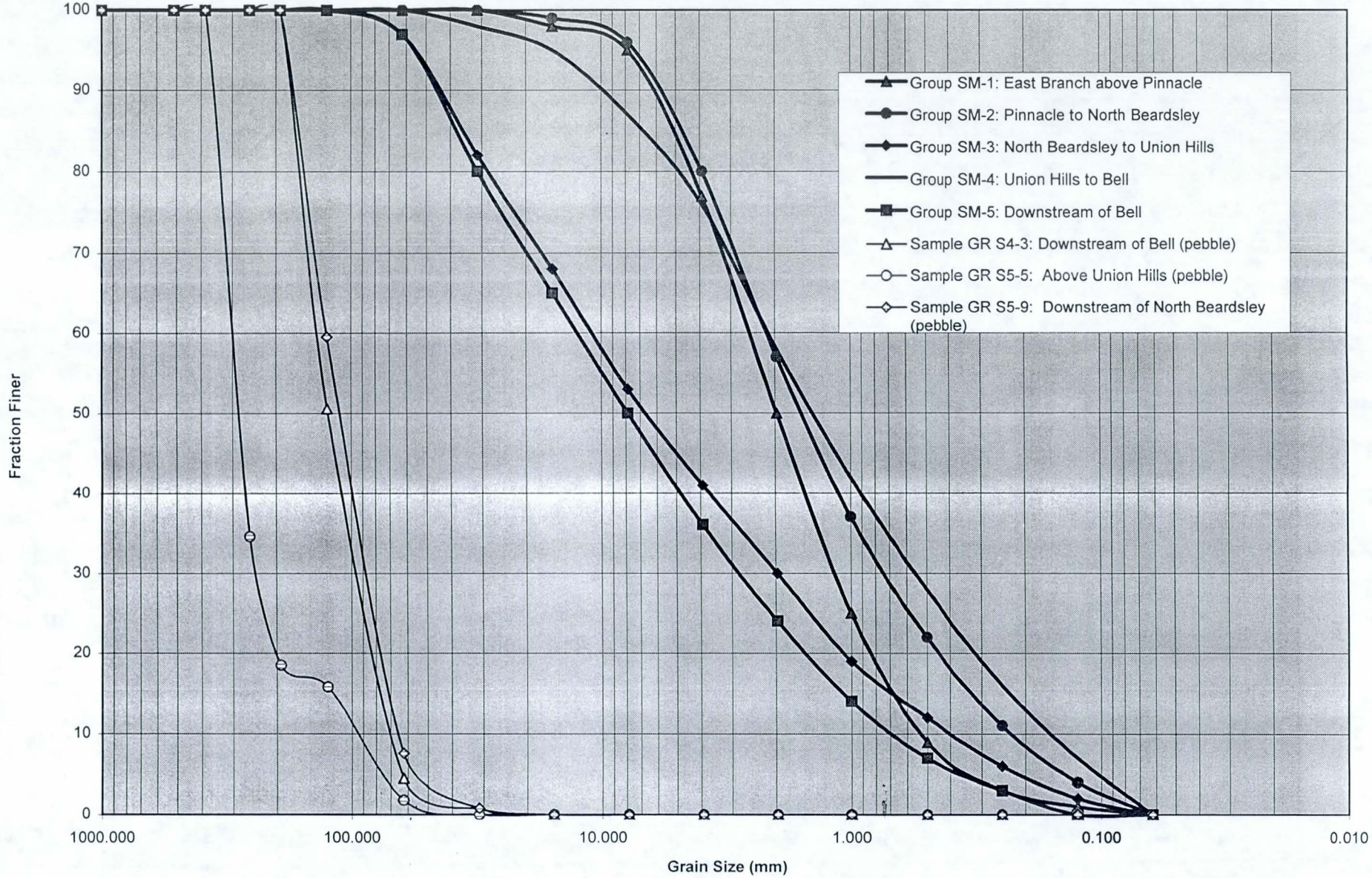
Is two samples adequate to represent sediment inflow coming in from upstream watershed.

Desert Greenbelt Project
Sediment Curves for QUASED model

		Group ST-1 Upper Reata			Group SM-1 East Branch				Group SM-2 Pinnacle to North Beardsley							Gp ST-2 Foothills	Gp ST-3 N. Beard.
Sieve	Size (mm)	SLA-1	SLA-2	AVE	S3-10	S3-7	S3-6	AGRAbkt	RP-1	RP-3	RP-4	RP-5	RP-6	RTP-1	RTP-3	SLA FH	GR S6-1
3.5	88.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3	76.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2.5	63.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2	50.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.9
1.5	38.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	86.7
1	25.4	100.0	100.0	100.0	100.0	100.0	100.0	99.5	100.0	100.0	100.0	100.0	100.0	100.0	98.9	94.8	72.4
0.75	19.05	100.0	100.0	100.0	100.0	100.0	100.0	98.5	100.0	100.0	100.0	100.0	100.0	100.0	98.9	90.6	64.3
0.5	12.7	98.8	97.2	98.1	97.9	100.0	99.0	96.9	100.0	98.8	100.0	100.0	100.0	98.0	96.8	82.2	51.0
0.375	9.525	96.4	95.8	96.1	96.9	99.0	96.9	94.4	96.1	97.6	96.3	98.6	100.0	98.0	94.7	77.0	44.9
0.25	6.35	83.1	91.7	87.1	91.8	95.9	90.7	84.2	90.8	90.4	93.8	95.9	93.7	92.8	82.1	68.6	35.7
4	4.75	68.7	84.7	76.1	84.5	89.8	82.5	74.5	82.9	83.1	90.1	91.9	86.1	87.7	71.6	63.4	30.6
8	2.36	39.8	59.7	49.0	56.7	60.2	56.7	50.9	61.8	65.1	72.8	79.7	62.0	65.3	49.5	44.5	17.3
10	2	36.1	54.2	44.5	50.5	52.0	49.5	43.8	55.3	59.0	67.9	75.7	54.4	58.1	43.2	40.3	15.3
16	1.18	28.9	38.9	33.5	30.9	32.7	27.8	25.4	40.8	44.6	53.1	60.8	36.7	37.7	29.5	28.8	10.2
30	0.6	21.7	25.0	23.2	12.4	14.3	11.3	10.6	26.3	27.7	34.6	39.2	21.5	20.3	15.8	16.2	4.1
40	0.425	18.1	18.1	18.1	7.2	9.2	7.2	6.0	19.7	21.7	27.2	29.7	15.2	14.2	11.6	9.9	2.0
50	0.3	14.5	13.9	14.2	4.1	5.1	4.1	3.4	14.5	15.7	18.5	21.6	11.4	9.1	8.4	5.8	1.0
100	0.15	6.0	5.6	5.8	1.0	2.0	1.0	0.9	5.3	6.0	7.4	8.1	3.8	1.9	3.2	1.6	0.0
200	0.075	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
With Silt																	
3.5	88.9	25	50	38	100	100	100	100	100	100	100	100	100	100	100	100	100
3	76.2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2.5	63.5	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2	50.8	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	96
1.5	38.1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	87
1	25.4	100	100	100	100	100	100	100	100	100	100	100	100	100	99	95	73
0.75	19.05	100	100	100	100	100	100	99	100	100	100	100	100	100	99	91	65
0.5	12.7	99	98	99	98	100	99	97	100	99	100	100	100	98	97	83	52
0.375	9.525	97	97	97	97	99	97	95	97	98	97	99	100	98	95	78	46
0.25	6.35	86	94	90	92	96	91	85	93	92	95	97	95	93	83	70	37
4	4.75	74	89	82	85	90	83	75	87	86	92	94	89	88	73	65	32
8	2.36	50	71	61	58	61	58	52	71	71	78	85	70	66	52	47	19
10	2	47	67	57	52	53	51	45	66	66	74	82	64	59	46	43	17
16	1.18	41	56	49	33	34	30	27	55	54	62	71	50	39	33	32	12
30	0.6	35	46	41	15	16	14	13	44	40	47	55	38	22	20	20	6
40	0.425	32	41	37	10	11	10	8	39	35	41	48	33	16	16	14	4
50	0.3	29	38	34	7	7	7	6	35	30	34	42	30	11	13	10	3
100	0.15	22	32	27	4	4	4	3	28	22	25	32	24	4	8	6	2
200	0.075	17	28	23	3	2	3	2	24	17	19	26	21	2.1	5	4.5	2

	Group SM-3 North Beardsley to Union Hills					Group SM-4 Union Hills to Bell					Gp ST-4 S. Beard.	Group ST-5 Thompson Peak			Group SM-5 Downstream of Bell			
Sieve	RTP-5	RTP-6	RTP-9	RTP-12	Composite	RTP-14	RTP-16	RTP-19	SLA UH	Composite	GR S6-2	RW-1	RW-2	Composite	RTP-22	RW-3	RW-5	Composite
3.5	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.9	100.0	100.0	99.3
3	100.0	95.7	100.0	86.7	100.0	100.0	100.0	100.0	100.0	100.0	87.7	100.0	100.0	100.0	91.6	100.0	100.0	97.2
2.5	100.0				94.0		100.0	100.0	100.0	100.0	81.5			96.0			100.0	94.0
2	100.0	88.2	95.8	72.3	89.1	93.8	100.0	100.0	100.0	98.5	74.3	96.0	87.0	91.5	89.5	84.9	100.0	91.5
1.5	95.3	76.3	92.7	68.2	83.1	91.4	100.0	97.3	100.0	97.2	67.1	90.0	81.0	85.5	83.3	80.9	90.9	85.0
1	87.1	69.9	85.5	57.9	75.1	90.1	98.7	96.0	97.3	95.5	62.0	80.0	72.0	76.0	74.9	73.9	75.9	74.9
0.75	81.2	64.5	79.2	53.8	69.7	90.1	98.7	94.7	96.0	94.9	57.9	75.0	67.0	71.0	69.7	69.9	67.8	69.1
0.5	72.9	54.8	70.9	46.7	61.3	86.4	96.1	92.0	93.3	92.0	52.7	67.0	54.0	60.5	61.3	59.8	55.7	59.0
0.375	68.2	49.4	64.7	42.6	56.2	84.0	93.5	89.3	90.7	89.4	49.6	60.0	45.0	52.5	56.1	52.8	49.7	52.9
0.25	60.0	40.8	55.3	35.4	47.9	77.8	87.0	81.3	86.7	83.2	43.5	51.0	34.0	42.5	47.7	42.8	41.6	44.0
4	54.1	36.5	50.2	32.3	43.3	74.1	83.1	76.0	81.3	78.6	39.4	43.0	27.0	35.0	41.4	35.7	36.6	37.9
8	43.5	26.8	36.7	23.1	32.5	58.0	68.8	57.3	68.0	63.0	25.0	29.9	16.0	23.0	29.9	21.7	24.5	25.4
10	38.8	23.6	33.5	21.0	29.2	53.1	63.6	53.3	62.7	58.2	21.9	26.9	14.0	20.5	26.8	19.7	21.5	22.7
16	29.4	17.1	24.2	14.9	21.4	42.0	50.6	40.0	48.0	45.2	12.6	17.9	7.0	12.5	19.5	12.7	12.5	14.9
30	18.8	10.7	13.8	7.7	12.7	28.4	36.4	26.7	33.3	31.2	4.4	7.9	2.0	5.0	11.1	5.6	5.4	7.4
40	14.1	7.4	9.7	5.6	9.2	22.2	28.6	22.7	26.7	25.0	2.4	4.9	1.0	3.0	7.9	3.6	2.4	4.7
50	10.6	5.3	6.5	3.6	6.5	17.3	22.1	17.3	20.0	19.2	1.3	2.9	0.0	1.5	5.9	1.6	1.4	3.0
100	4.7	2.0	2.4	1.5	2.7	7.4	10.4	8.0	9.3	8.8	0.3	0.9	0.0	0.5	1.7	0.6	0.4	0.9
200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
With Silt																		
3.5	100	100	100			100	100	100	100		100	100	100		98	100	100	
3	100	96	100	87		100	100	100	100		88	100	100		92	100	100	
2.5	100						100	100	100		82						100	
2	100	89	96	73		95	100	100	100		75	96	87		90	85	100	
1.5	96	78	93	69		93	100	98	100		68	90	81		84	81	91	
1	89	72	86	59		92	99	97	98		63	80	72		76	74	76	
0.75	84	67	80	55		92	99	96	97		59	75	67		71	70	68	
0.5	77	58	72	48		89	97	94	95		54	67	54		63	60	56	
0.375	73	53	66	44		87	95	92	93		51	60	45		58	53	50	
0.25	66	45	57	37		82	90	86	90		45	51	34		50	43	42	
4	61	41	52	34		79	87	82	86		41	43	27		44	36	37	
8	52	32	39	25		66	76	68	76		27	30	16		33	22	25	
10	48	29	36	23		62	72	65	72		24	27	14		30	20	22	
16	40	23	27	17		53	62	55	61		15	18	7		23	13	13	
30	31	17	17	10		42	51	45	50		7	8	2		15	6	6	
40	27	14	13	8		37	45	42	45		5	5	1		12	4	3	
50	24	12	10	6		33	40	38	40		4	3	0		10	2	2	
100	19	9	6	4		25	31	31	32		3	1	0		6	1	1	
200	15	7.1	3.7	2.5		19	23	25	25		2.7	0.08	0		4.4	0.4	0.6	

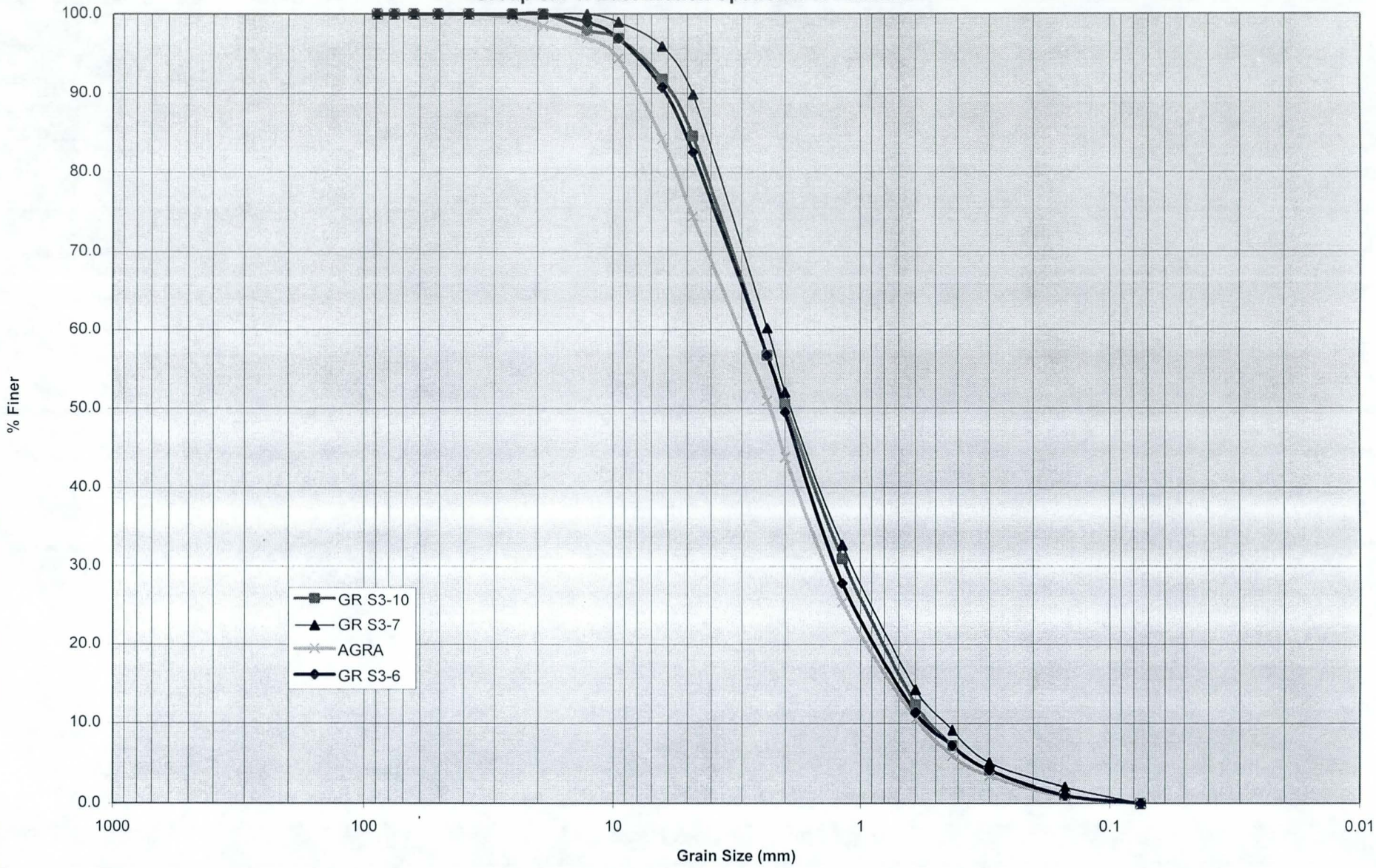
Soil Gradation Curves
Main Channel Soils Groups Compared with Pebble Counts



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

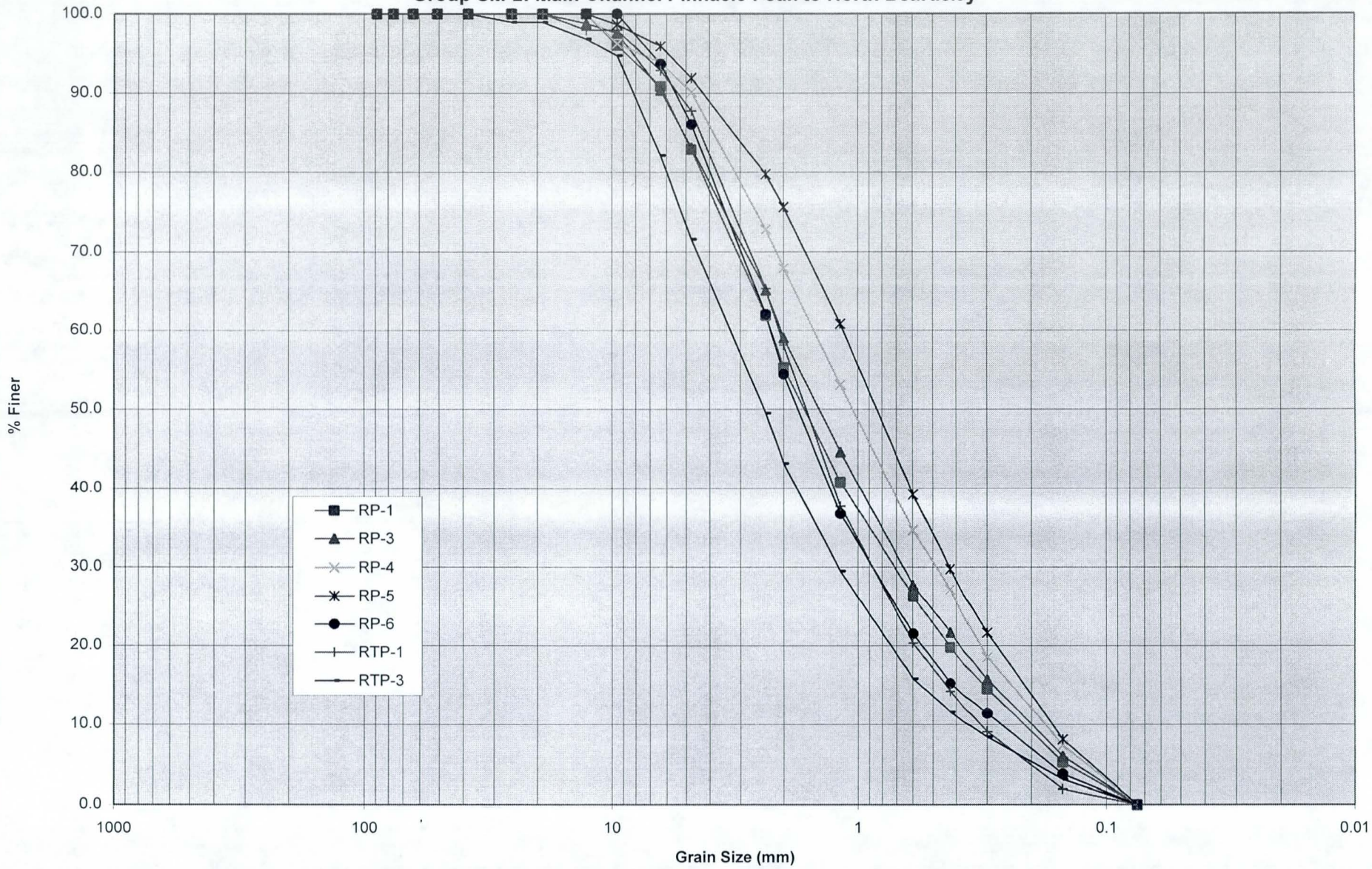
Soil Gradation Curves
Group SM-1: East Branch Upstream of Pinnacle



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

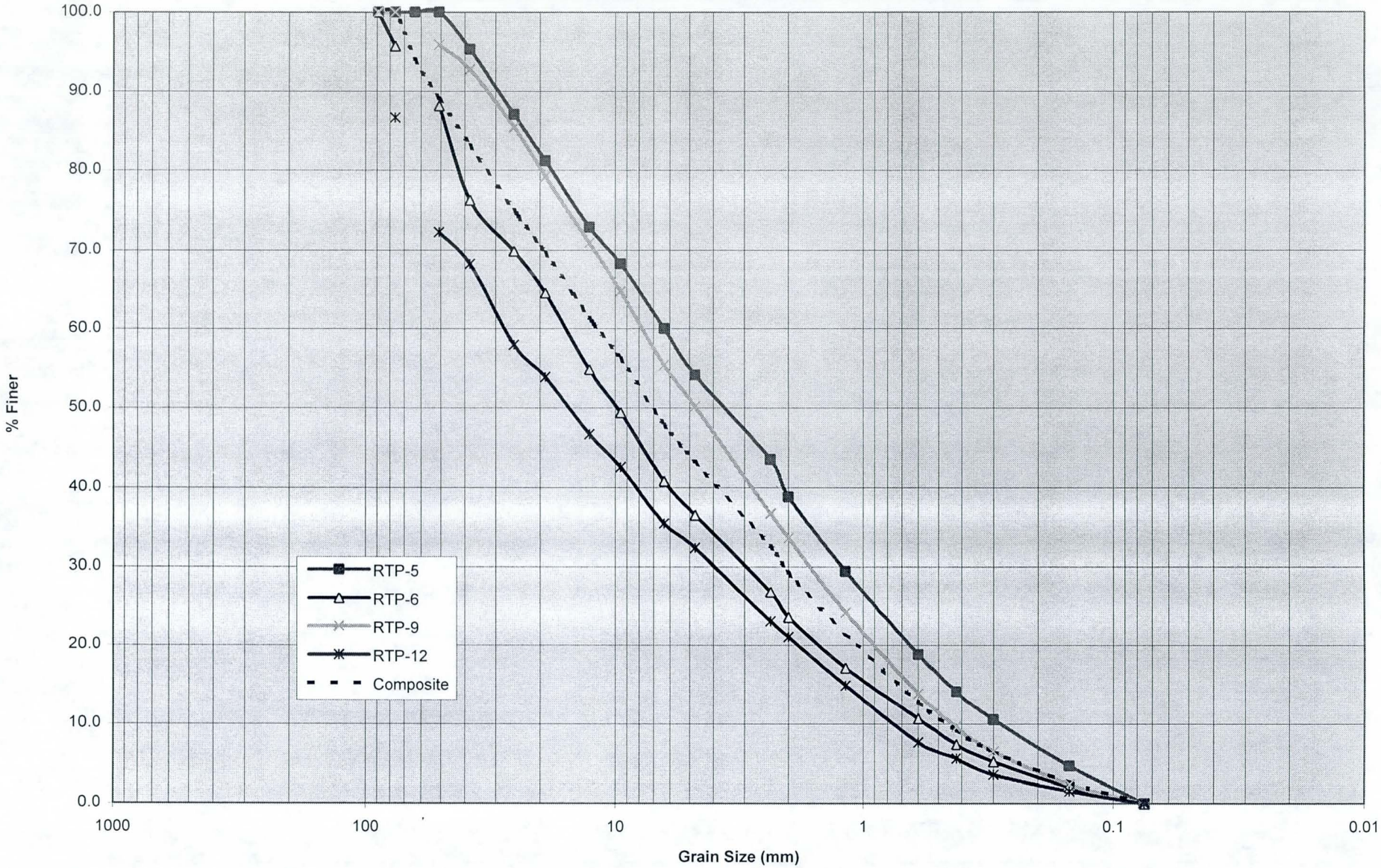
Soil Gradation Curves
Group SM-2: Main Channel Pinnacle Peak to North Beardsley



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves. Actual samples for this group included approximately 20% silt and clay.

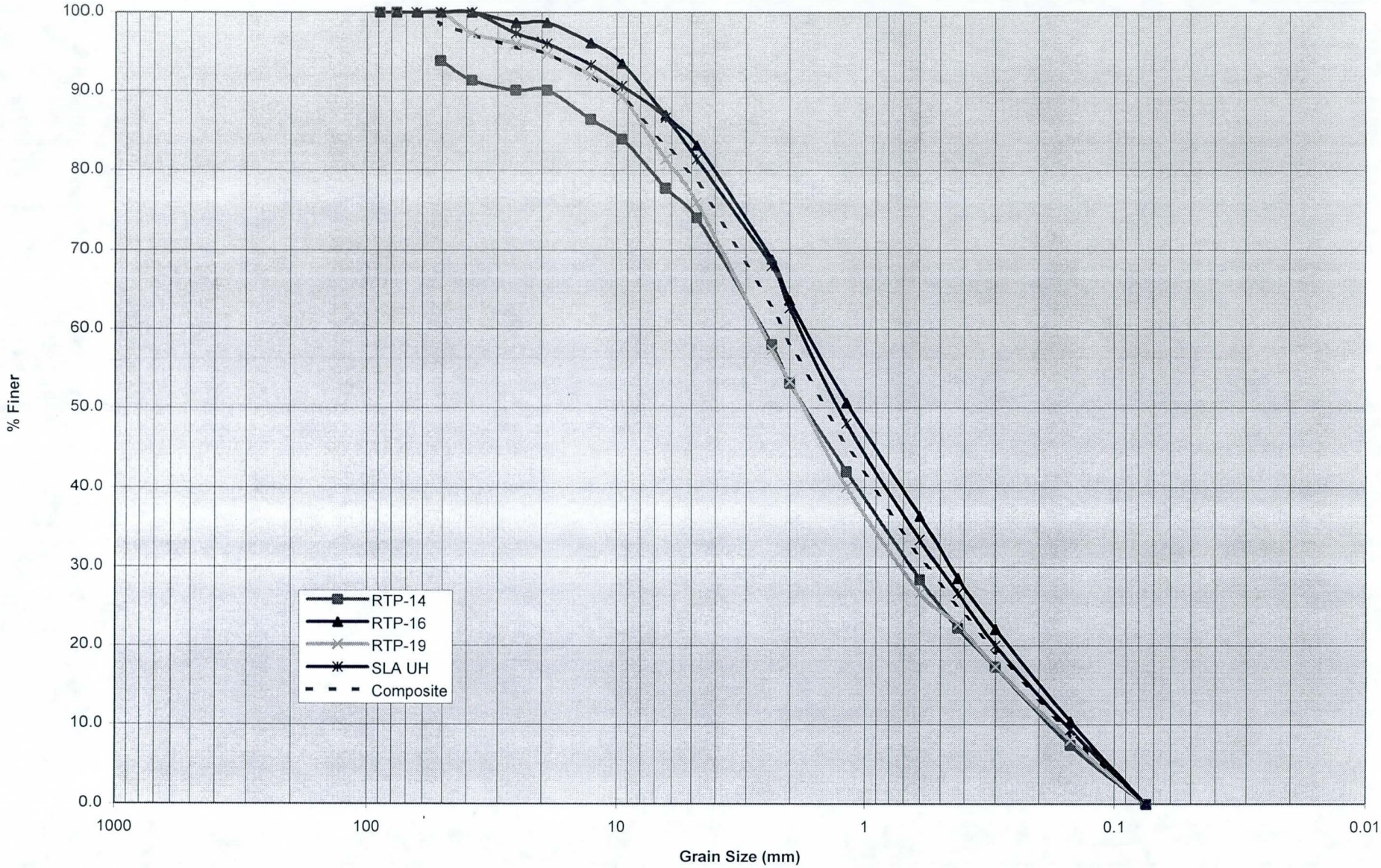
Soil Gradation Curves
Group SM-3: Main Channel North Beardsley to Union Hills



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

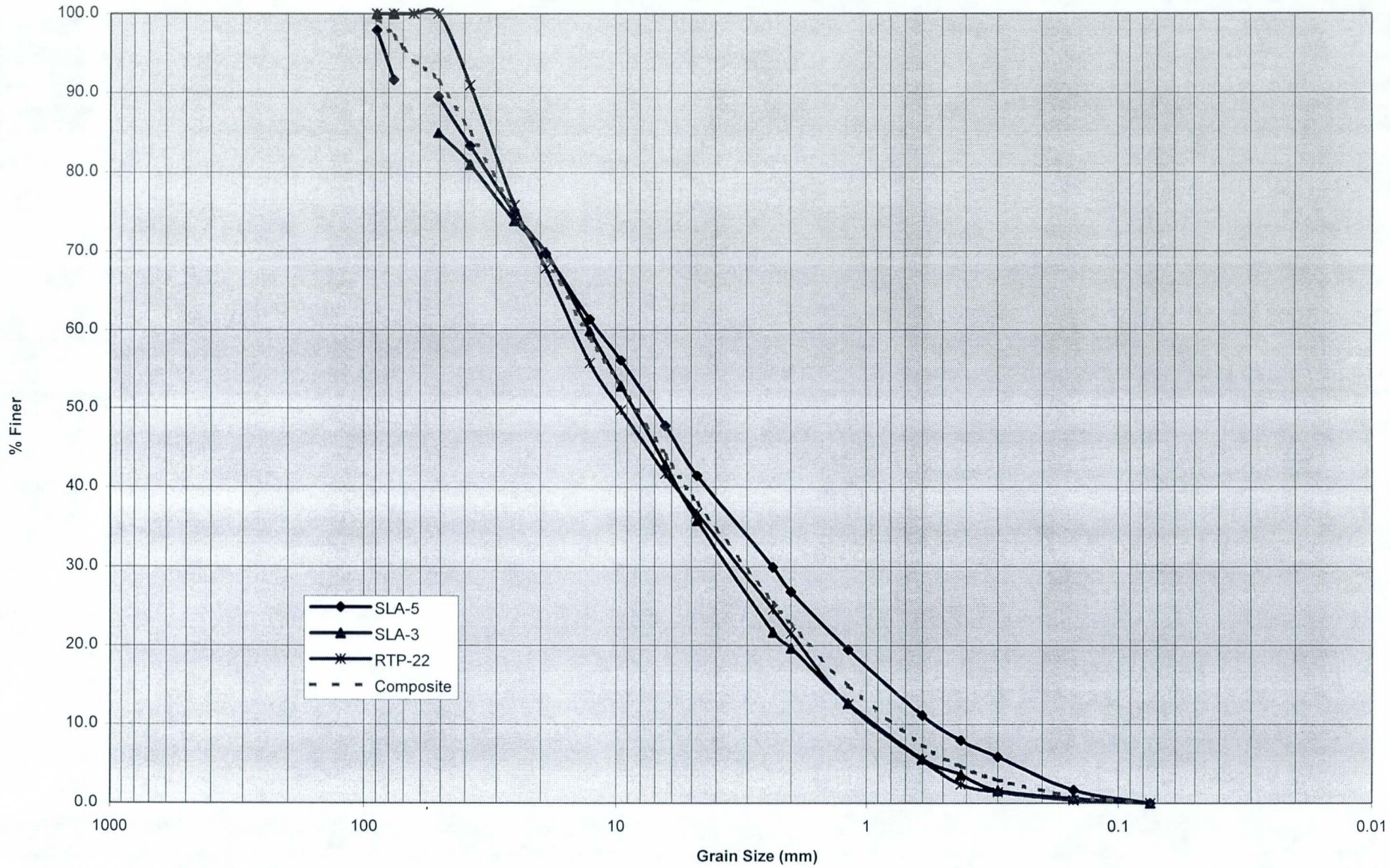
Soil Gradation Curves
Group SM-4: Main Channel Union Hills to Bell



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves. Actual samples for this group included approximately 20% silt and clay.

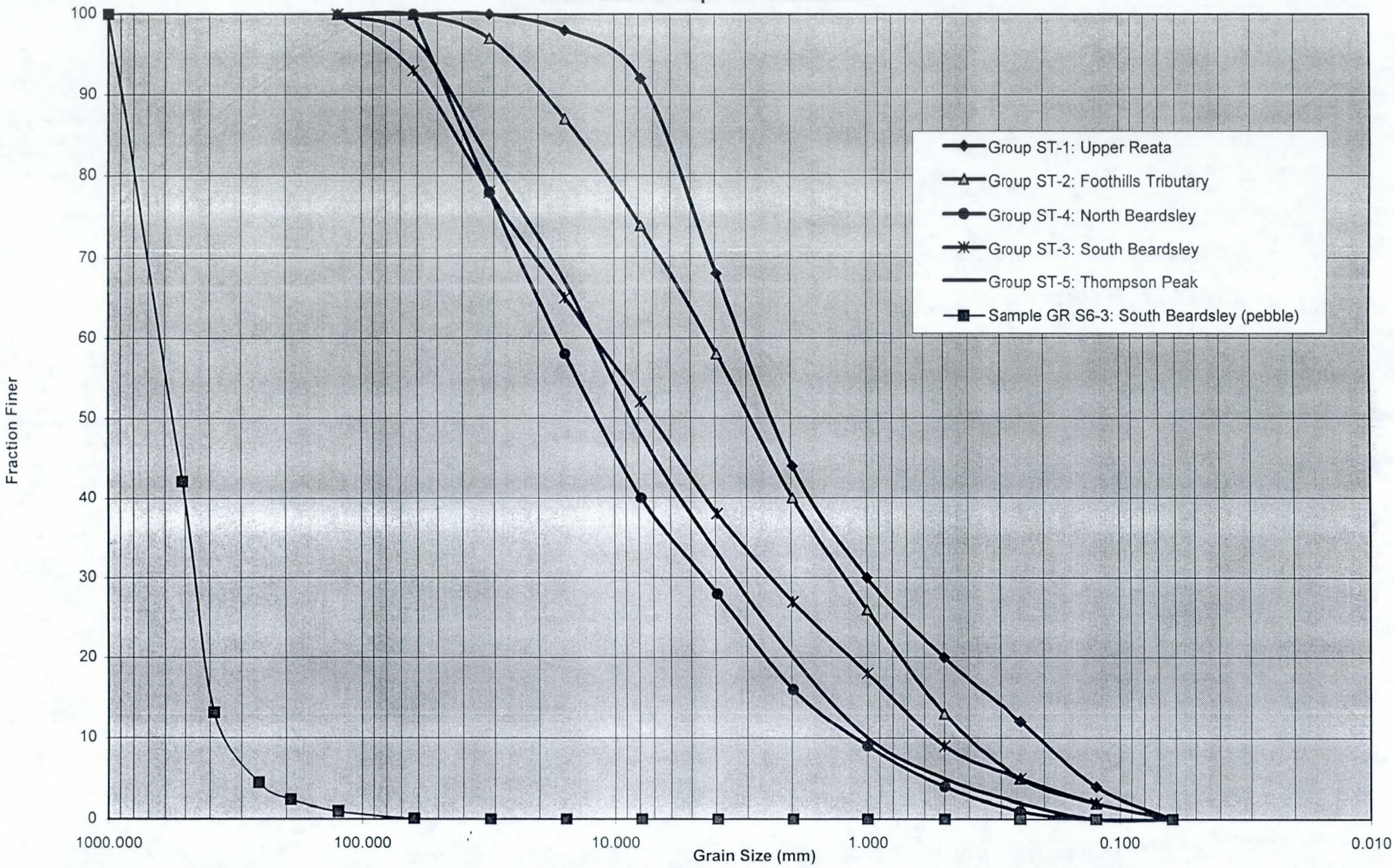
Soil Gradation Curves
Group SM-5: Main Channel Downstream of Bell



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

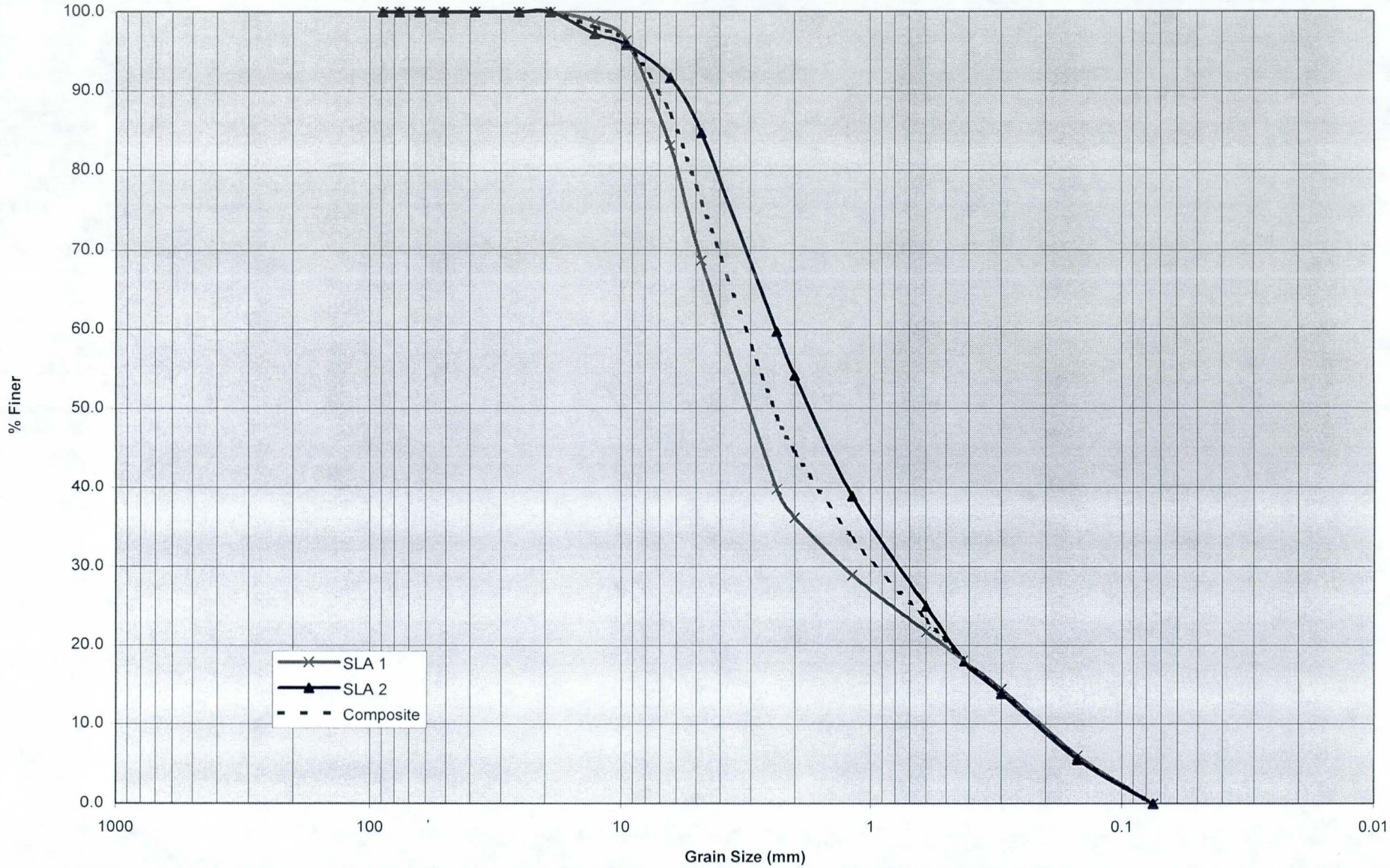
Sediment Gradation Curve
Final Soils Groups for Tributaries



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

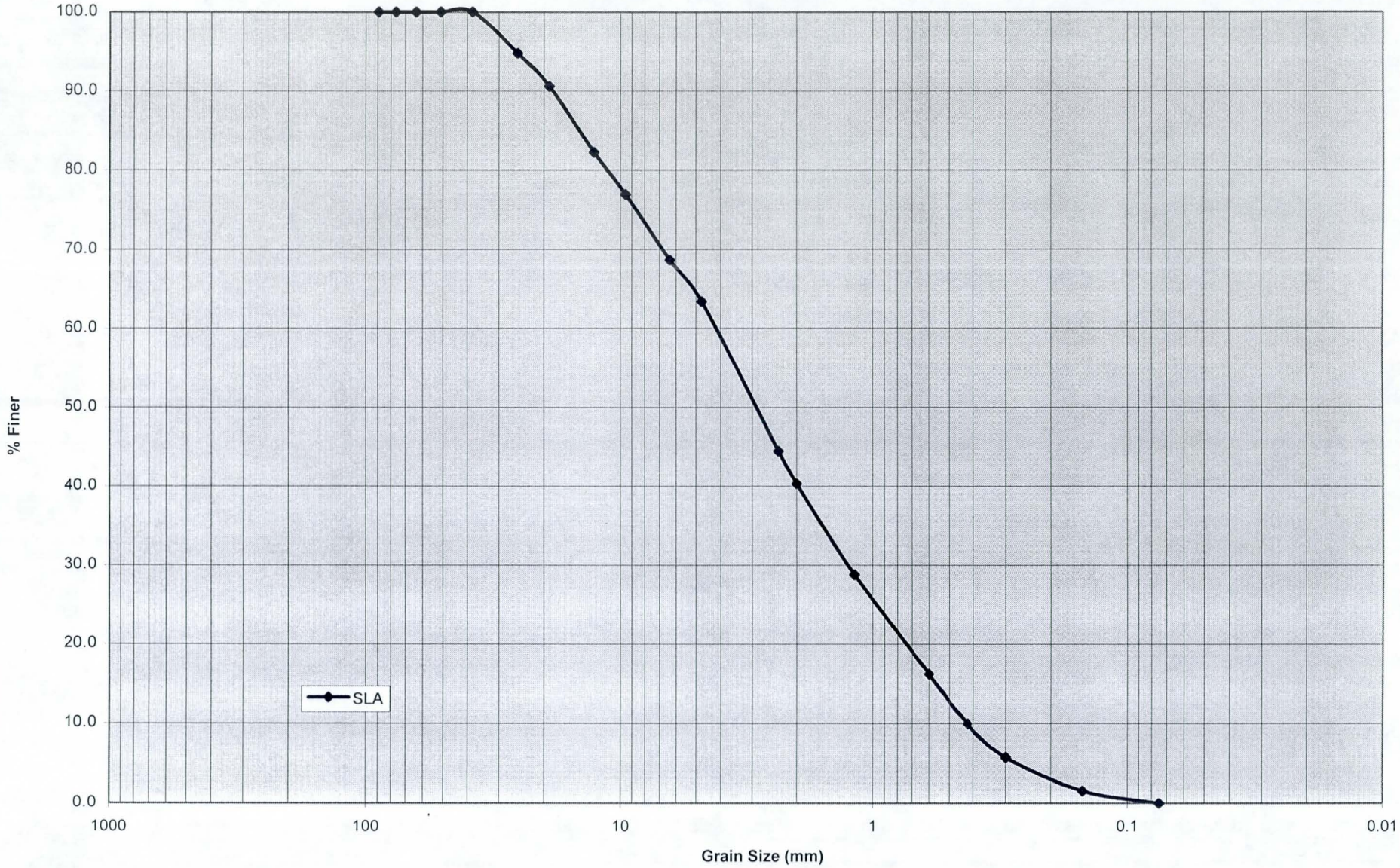
Soil Gradation Curves
Group ST-1: Upper Reata



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves. Actual samples for this group included approximately 20% sild and sand.

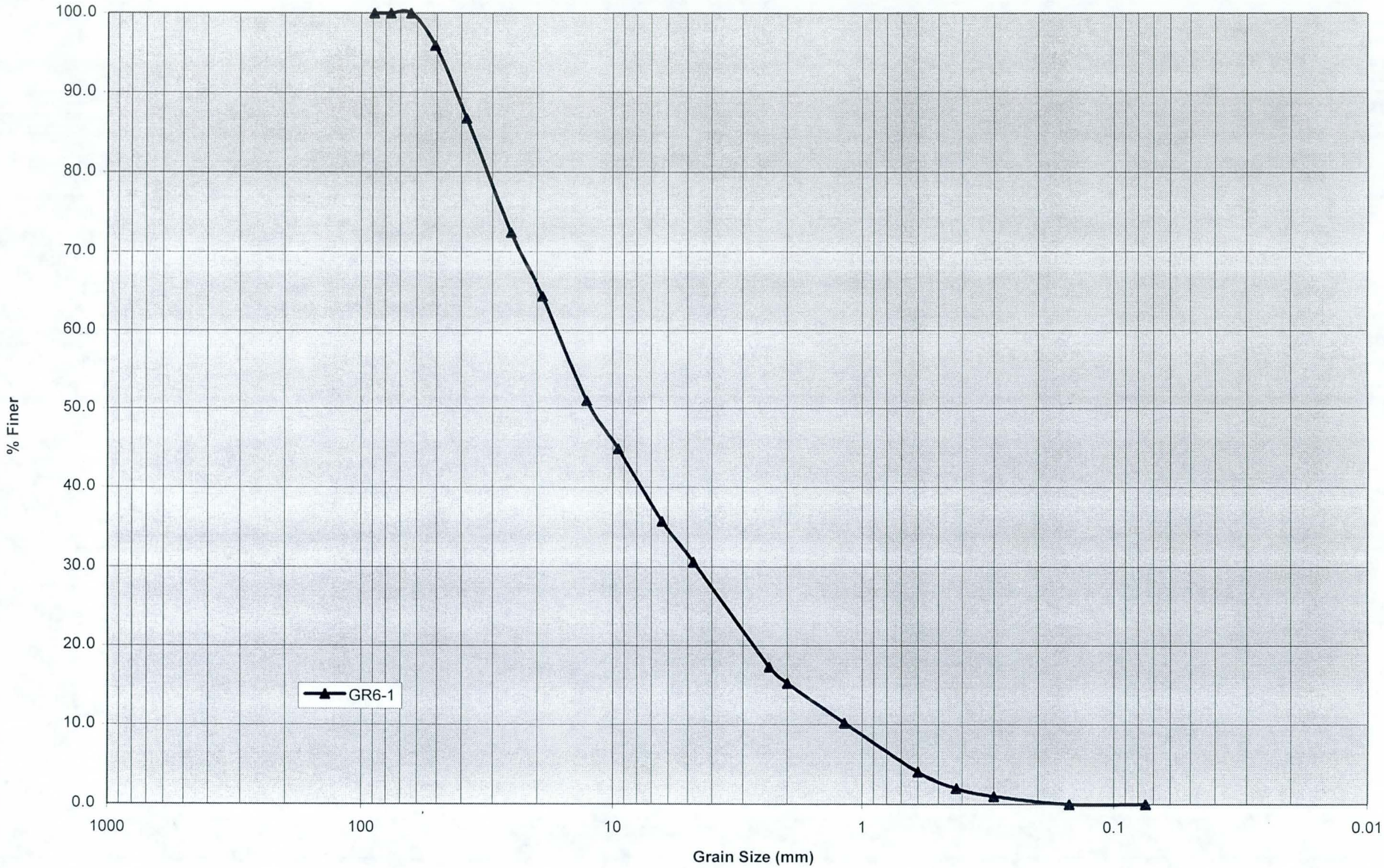
Soil Gradation Curve
Group ST-2: Foothills Tributary



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

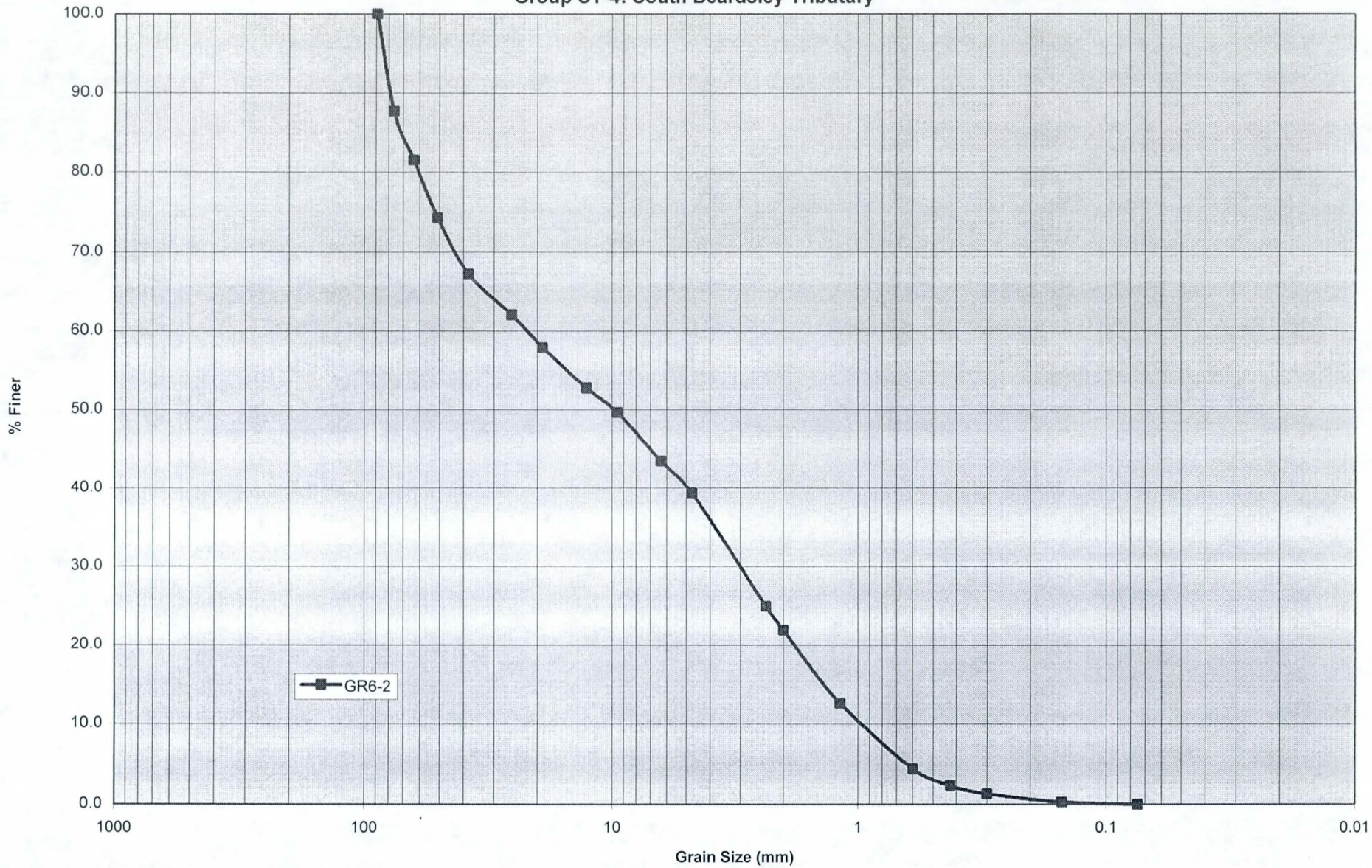
Soil Gradation Curve
Group ST-3: North Beardsley Tributary



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.

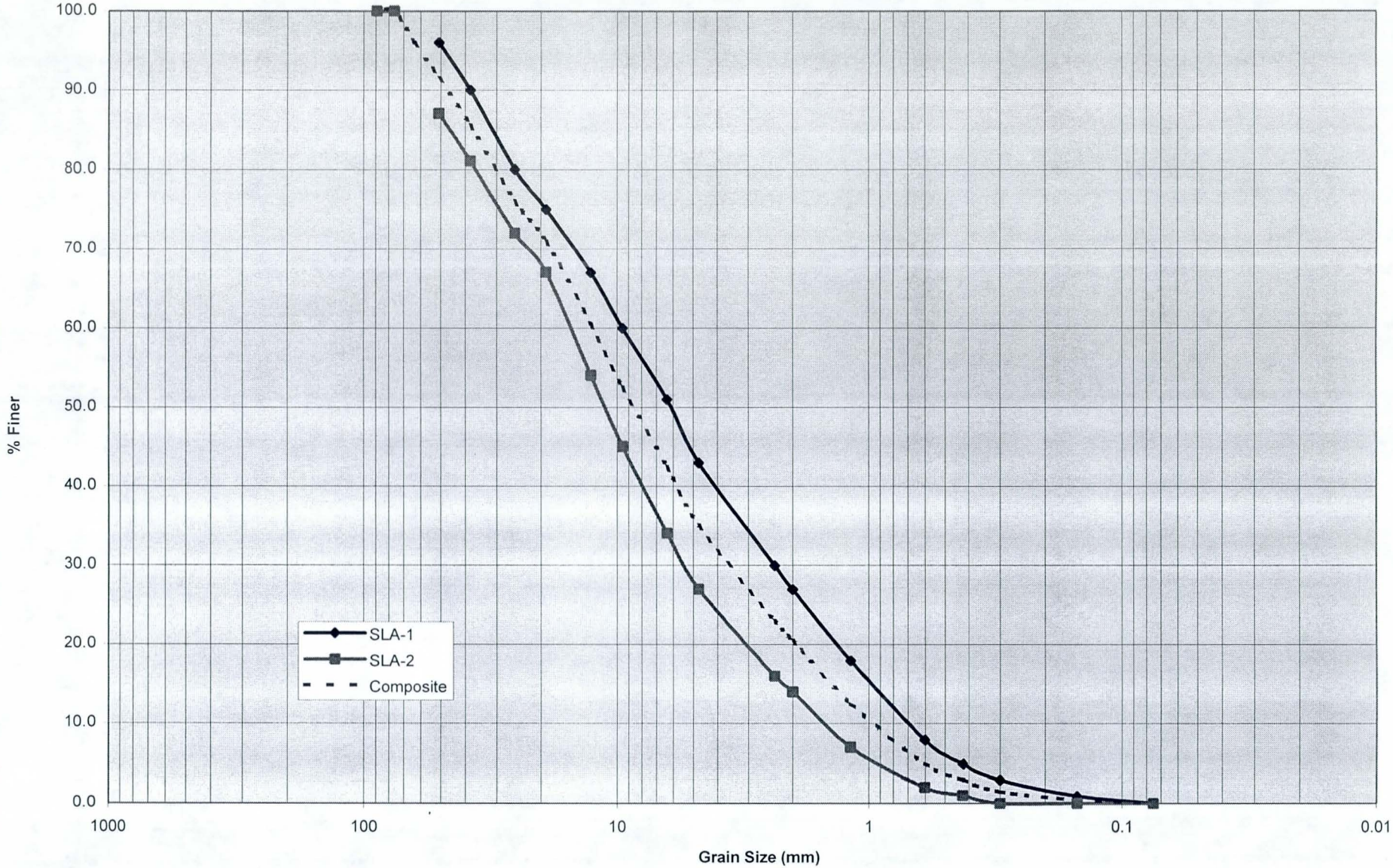
Soil Gradation Curve
Group ST-4: South Beardsley Tributary



BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

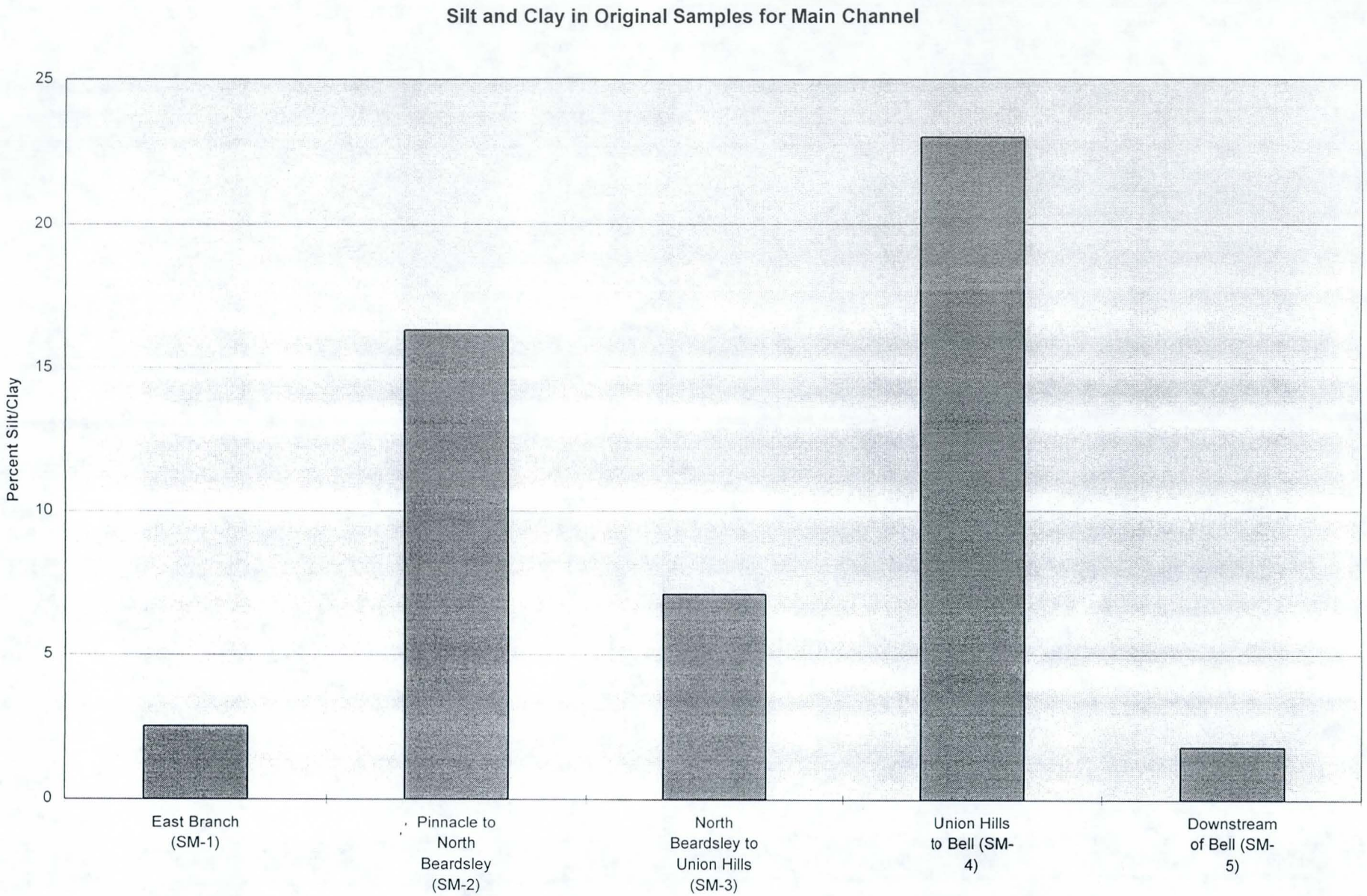
Note: Silt and clay have been removed from these curves.

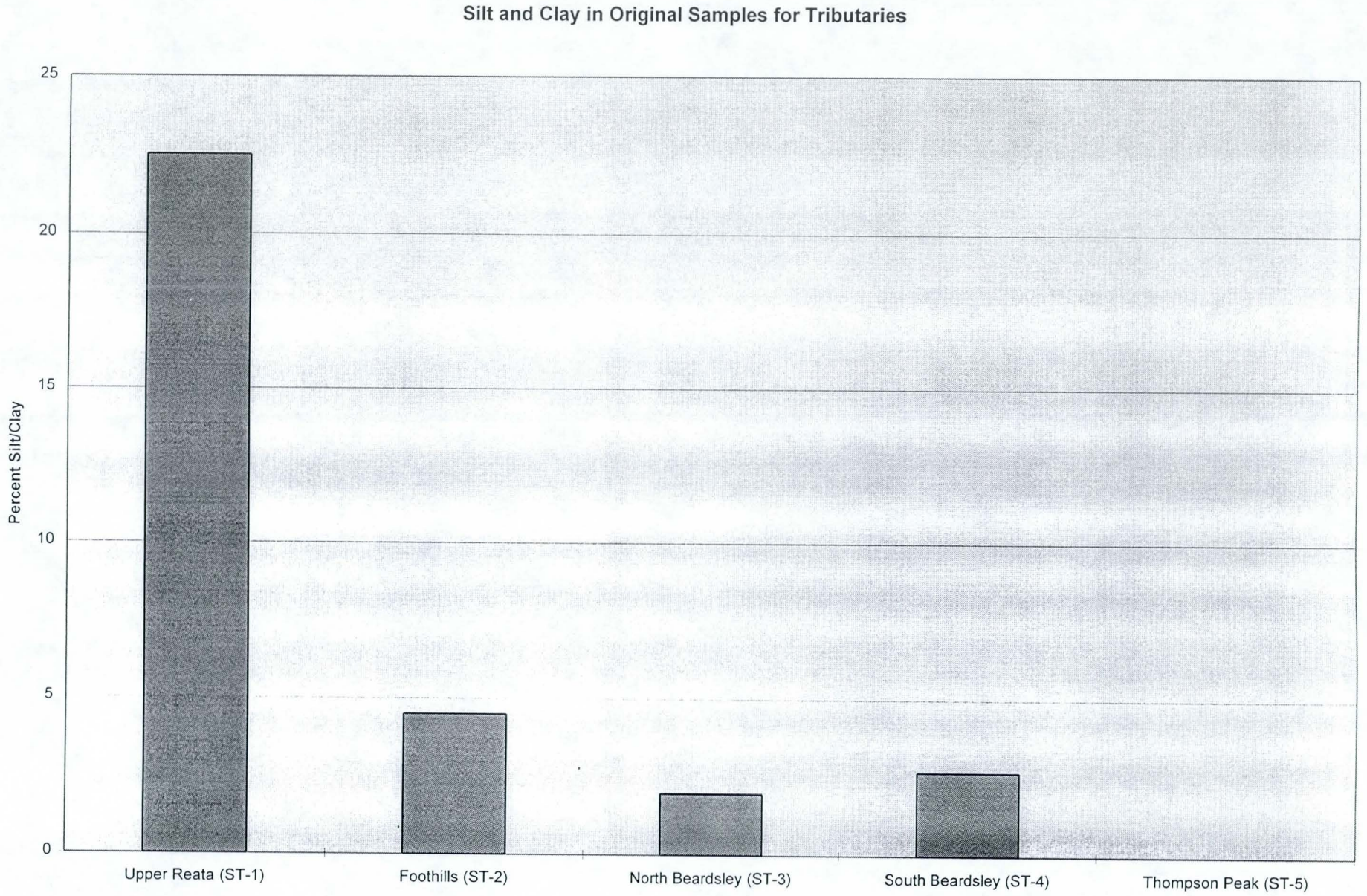
Soil Gradation Curves
Group ST-5: Thompson Peak Tributary

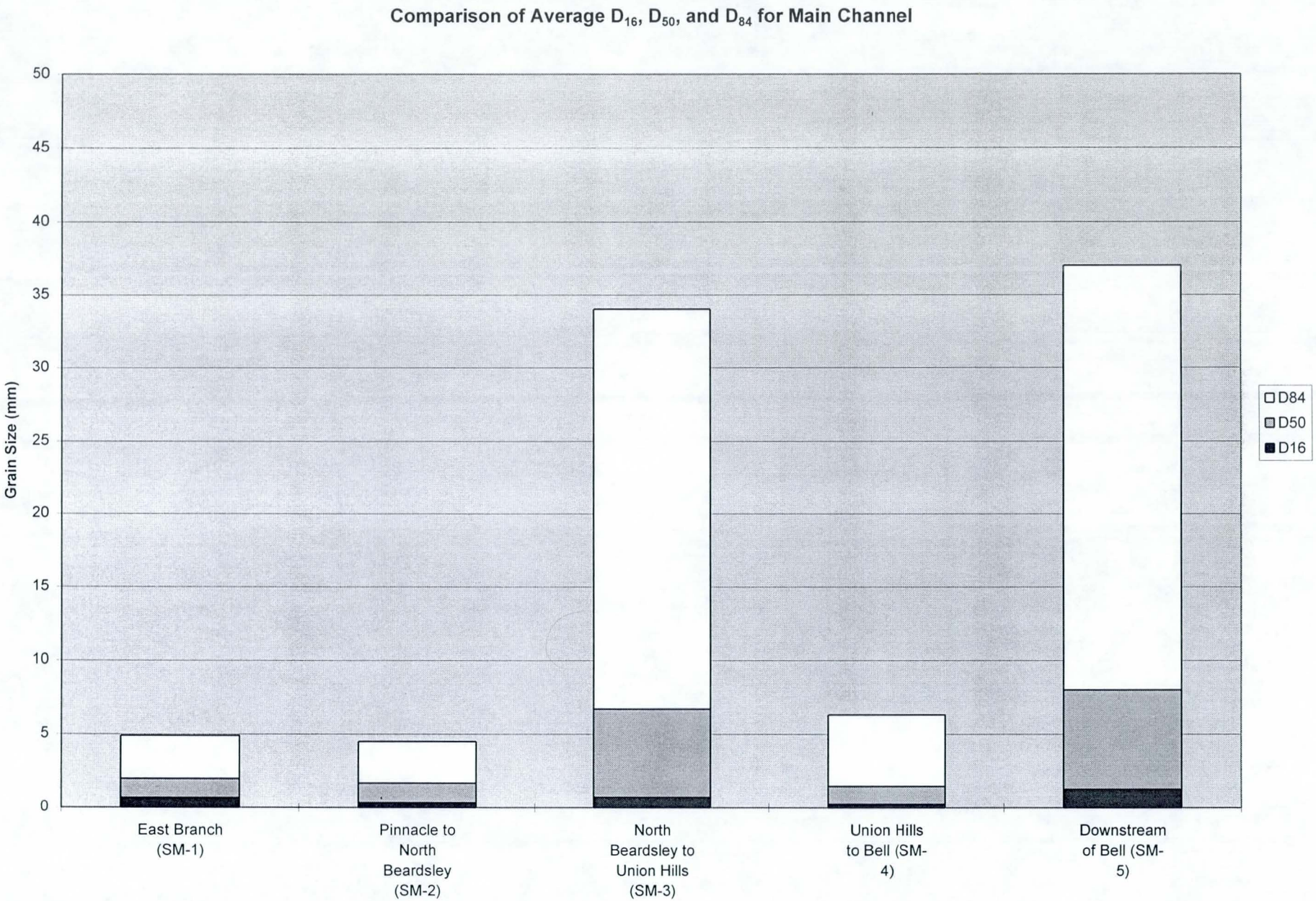


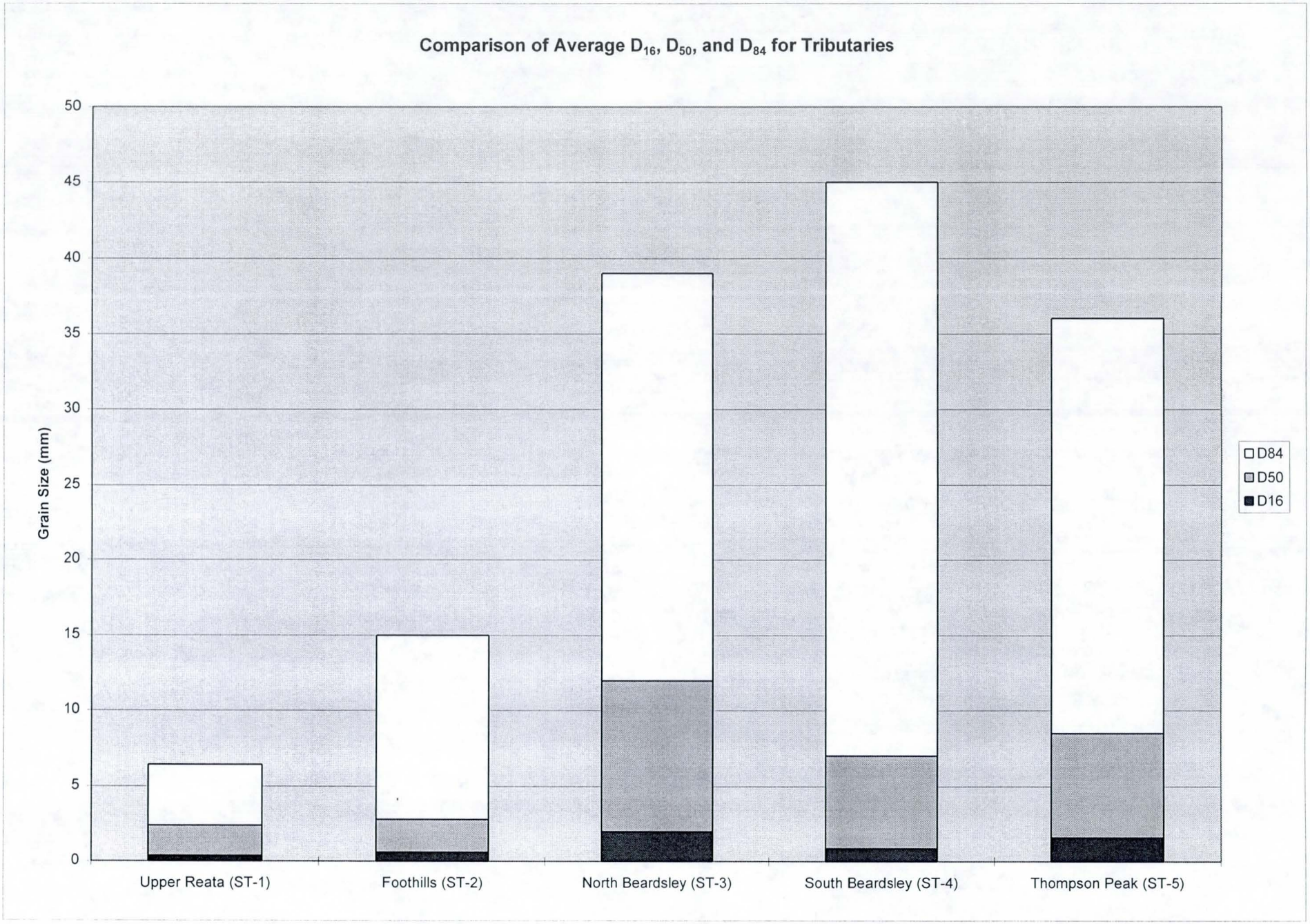
BOULDERS	large	small	v coarse	coarse	medium	fine	very fine	v coarse	coarse	medium	fine	very fine	coarse	medium	fine
	COBBLES		GRAVEL					SAND					CLAY		

Note: Silt and clay have been removed from these curves.


Silt and Clay in Original Samples for Main Channel
Percent Silt/Clay
25
20
15
10
5
0
East Branch (SM-1)
Pinnacle to North Beardsley (SM-2)
North Beardsley to Union Hills (SM-3)
Union Hills to Bell (SM-4)
Downstream of Bell (SM-5)


Silt and Clay in Original Samples for Tributaries
Percent Silt/Clay
25
20
15
10
5
0
Upper Reata (ST-1)
Foothills (ST-2)
North Beardsley (ST-3)
South Beardsley (ST-4)
Thompson Peak (ST-5)


Comparison of Average D_{16}, D_{50}, and D_{84} for Main Channel
Grain Size (mm)
50
45
40
35
30
25
20
15
10
5
0
D84
D50
D16
East Branch (SM-1)
Pinnacle to North Beardsley (SM-2)
North Beardsley to Union Hills (SM-3)
Union Hills to Bell (SM-4)
Downstream of Bell (SM-5)


Comparison of Average D_{16}, D_{50}, and D_{84} for Tributaries
Grain Size (mm)
0
5
10
15
20
25
30
35
40
45
50
Upper Reata (ST-1)
Foothills (ST-2)
North Beardsley (ST-3)
South Beardsley (ST-4)
Thompson Peak (ST-5)
D84
D50
D16

INTRODUCTORY STATEMENT

ıortheastern edge of the broad northwest-trending Paradise Valley basin in which the cities of Scottsdale and Paradise
:e McDowell Mountains reach elevations of 4,000 feet (1330 m) forming a picturesque northeastern border of the

.n the McDowell Mountains consists of Indian petroglyphs etched into coatings of desert varnish on boulders and rock
h brought the first white men into the area as suggested by numerous test pits and prospect trenches, and exploration
ıting into the early twentieth century. At present, no mines remain in operation and the area has been essentially

encroached into the area with the rapid expansion of the Phoenix metropolitan area. Several residential and commercial
mplete development of the alluvial slopes of the McDowell Mountains area can be forseen in the not-too-distant future.
ı such development, maps depicting envirnmental geologic conditions important to construction have been produced.
ı, waste disposal, and material resource development; delineate hazardous areas due to unstable slopes and flooding; and
: data are available.

GEOGRAPHIC SETTING

ıthcentral Arizona 10 miles (16 km) northeast of Scottsdale. The area mapped includes parts of the Curry's Corner,
ıwik Mountain quadrangles (U.S. Geological Survey Topographic map series, 1:24,000). The actual boundaries of the
orthern edge of the Salt River Indian Reservation to the south, the ridge crest and eastern edge of the Sawik Mountain
dale Corporate Boundary to the north. This includes parts of T3N R5E, T3N R6E, and T4N R5E, Gila and Salt River

CLIMATE

ırid subtropical climate with essentially two seasons: winter and summer. The average annual precipitation is 7.83 inches
ı May, and is characterized by mild temperatures, moderate-strong winds, and partly cloudy skies. The normal daily
to upper 60's and 70's (18–28°C) with winter nighttime temperatures dropping into the 30's or 40's (1–7°C). Winter
latitude storms that move eastward from the Pacific Ocean, though the storms usually pass to the north, producing only
:entle, continuous light precipitation when the storms move south of their normal route.
ıer and is characterized by hot daytime temperatures, heavy short-period thunderstorms, and light winds. The daytime
100°F (38°C) and regularly reach 110°F (43°C) or more during the end of June and the beginning weeks of July, with
16°C). Summer precipitation during July and August is associated with convective moist tropical air masses from the Gulf
ım the mountains, producing early-evening, heavy, short-period thunderstorms. These storms are commonly accom-
l by gusty winds blowing from the east. Heavy precipitation can occur when September-October tropical systems move

FLORA AND FAUNA

McDowell Mountains area represent a typical lower Sonoran Desert upland community. The vegetation is characterized
complex assemblage of smaller vegetation types. These include foothill palo verde, mesquite, ironwood, creosote bush,
any varieties of cacti such as cholla, prickly pear, barrel, and saguaro. This assemblage of flora flourishes in the coarse
rfaces and is perhaps the most scenic of all communities in the Sonoran Desert region, making it a very desirable area for
rner of the area near the floor of Paradise Valley, a creosote community characterized by creosote bush, white bursage,
soils of the more arid basin floor.
Varied species of lizards, snakes, and desert tortoise live on the alluvial fans and the foothill slopes. Mammalian fauna
e, javelina, and deer. Many species of birds, including cactus wren and roadrunner, also inhabit the area.

REGIONAL GEOLOGY

ılon Rim, generally is referred to as the Basin and Range Physiographic Province. As implied by the name, this province
ongate basins and long, narrow mountain ranges which generally trend in a northwesterly direction. This unique
lt of a period of extensive faulting which began about 15 million years ago when large blocks of the earth's crust were
to the northwest (Damon and others in press). The present mountain ranges, including the McDowell and Phoenix
They occur on the relatively upthrown sides of these large faults, whereas the basins (Paradise Valley, Phoenix Basin)
of the faults. Erosion and downwasting occurred continuously as these large masses of rock were relatively elevated, and
ther sediments accumulated in the adjoining basins.

GEOLOGIC HISTORY

posed principally of rocks of Precambrian age. Two distinct ages of Precambrian rocks are present. The earlier
s, greenschists, and metavolcanic rocks of various types. These rocks form the high peaks of the McDowell Mountains
type being a northeast trending, southerly dipping foliated metarhyolite and metatuff unit. This unit is underlain by
rocks of dacite and andesite composition) and greenschists (metabasalts), which are in turn underlain by units of quartzite
rom being massive and structureless to being intricately cross-bedded and ripple-marked. A phyllite-argillite of extreme
uartzites and all are interpreted to represent metasedimentary rocks. This entire sequence of sediments and volcanics has
rphism and folding which has resulted in the formation of a series of folds with axes trending northeast, parallel to the
: a gentle, broad syncline in the northern section and a very steep isoclinal anticline in the central section (see geologic

ed in later Precambrian time, their compositions ranging from diorite to granite. Altered metamorphic rocks occurring
the consistent northeast strike and southerly dip common to other metamorphic rocks in the area. Contact relationships
anitic intrusions.
ısts between the Precambrian rocks and the Tertiary fanglomerates. No known record of Paleozoic and Mesozoic history
nglomerates crop out on the southeast side of the mountains and contain rock types found presently in the northern part of
ea do not contain such rock types, indicating that a significant change in topography and drainage has occurred since
glomerates include a coarse red unit overlain by a coarse gray unit, which is in turn overlain by Tertiary basalt flows.
caniclastic) rocks. These Tertiary units subsequently were cut by northwest trending normal faults resulting in three
tern part. The southwest sides of these faults were relatively uplifted and tilted, and thus the originally horizontal basalt
to the southwest 18–29°. Considerable erosion of the fault blocks has occurred, and surfaces of erosion cut on the
ent levels of the Verde River, occur on the extreme eastern portion of the map. Erosion of these fanglomerates and
ns of the McDowell Mountains, has continued to the present so that modern alluvial fans composed of sediment derived
alley to the west and south.

ENVIRONMENTAL GEOLOGY

tive environmental geology maps have been constructed. Data used to supplement the geologic map in constructing these
: tests of consolidated rocks for crushing strength and resistance to abrasion, (2) tests on unconsolidated material to
terberg Limits, (3) numerous field observations of caliche development, rock-jointing fracture patterns, and stream
nmental considerations.
ınd slopes, (3) distribution and development of caliche, and (4) ground-water depth, distribution, quality, and recharge.
ese base maps the geologic map and supplemental data interpretive maps depicting: (5) geologic hazards, (6) material
compiled. This folio can be utilized by planners, engineers, public officials, or anyone interested or involved in land use.
of the area for development.

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EXPLANATION

IOCKS[1]

ı

ıately stratified, weakly
led gravel with clasts gen-
ınd, and 65% silt and clay.

Tfg / Tfgb

Fanglomerate

Gray to tan, poorly sorted, moderately stratified, moderately consolidated, locally very strongly calichified medium- to coarse-grained alluvium averaging 40% angular gravel, 50% sand, and 10% silt and clay, locally containing boulders up to 5 feet (152 cm). Tfg, *composed of grus and clasts of granite and metamorphic rocks.* Tfgb, *cut and fill channels composed of grus and clasts of granite, basalt, and metamorphic rocks.*

Twt

Welded Tuff

Brown to purple, coarse-grained, massive quartz latite(?) welded ash-flow tuff, locally with basalt inclusions and cut by basalt dikes.

Intrusive rocks

pCg

Granite

Yellow to reddish brown, coarse-grained, massive granite, locally fine- to medium-grained, characteristically weathers spheroidally.

pCgd

Granodiorite

Dark green to dark gray, coarse-grained, massive granodiorite, characteristically weathers spheroidally.

pCd

Diorite

Dark grey to black, fine- to coarse-grained, blocky diorite, locally highly fractured and highly sheared.

Metamorphic rocks

pCvr

Taliesin Quartzite[2]

Light green to black, very fine-grained, platy to blocky, foliated quartzite, probably metamorphosed rhyolite and dacite flows and tuffs, locally cut by greenstone dikes. Weathers orange to grayish red. Highly fractured and weathers to a sugary texture near intrusive rocks.

pCva

Quartz-mica Schist

Gray to dark green, fine-grained, platy and locally fissile, moderately to highly foliated quartz-mica schist, probably metamorphosed dacite and andesite flows and tuffs.

pCgs

Greenschist

Gray to dark green, fine-grained, platy to fissile to massive, moderately to highly foliated, chlorite-rich greenstones and greenschists, probably metamorphosed basalt flows and mafic pyroclastics.

pCmq

Micaceous Quartzite

Silver to gray, fine- to medium-grained, platy, micaceous metamorphosed argillaceous sandstone, locally jointed to form thick rectangular blocks.

pCrq

Red Quartzite

Red to white, medium- to coarse-grained, massive metamorphosed orthoquartzite, with minor interbedded silver mica schists, green quartzites, and greenstone.

pCbq

Blue Quartzite

Blue to black, medium- to coarse-grained, locally cross-bedded and conglomeratic, massive metamorphosed orthoquartzite with minor interbedded silver mica schist, green quartzites, and greenstone.

pCap

Argillite-Phyllite

Red-brown to black, fine-grained, slaty to massive (locally fissile) argillite and phyllite, probably metamorphosed shales and siltstones.
1) Classification of unconsolidated units is based on the Unified Soil Classification system: gravel–greater than 4.76mm, sand–4.76 to .074mm, silt and clay–less than .074mm
2) Papago Buttes deposits and Taliesin quartzite are informal rock names, named for localities where similar rocks are found (Papago Buttes) or for localities where excellent examples of the particular rock type crops out (Taliesin West).

MAP SYMBOLS

Contact, dashed where gradational.

U / D *Fault, dashed where inferred, dotted where buried.*

68 *Dip and strike of beds.*

35 *Dip and strike of foliation.*

Veins of milky quartz, generally less than 5 feet (1.5 m) wide.

State of Arizona
Bureau of Geology and Mineral Technology

A

Deer Valley Rd Align.

Union Hills

Bell Rd.

align 1st St

Source:
Department of Geology
Arizona State University, 1978

GEOI
MC DOWELL MC
MARICOPA COU

Gary E. Christenson, Dennis
Department of Geology,

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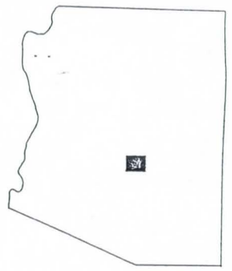
Prepared in coo
City of Scottsdale an
Arizona Sta



E: SEDIMENT TRANSPORT EQUATIONS AND FIELD DATA VERIFICATION

The background theory and equations used in the SLA sediment transport procedure are outlined in this section. Computed results from previous studies are compared to measured data to verify the sediment transport procedure.

1. SLA Sediment Transport Procedure
2. Sediment Transport Verification

SLA SEDIMENT TRANSPORT PROCEDURE

Introduction

The Simons, Li & Associates, Inc,. (SLA) bed material transport calculation procedure is a combination of the Meyer-Peter, Muller procedure for estimation of bedload, Dr. Ruh-Ming Li's procedure for estimation of sand wave celerity, and a modification of Einstein's procedure for estimation of the suspended bed material load. The following paragraphs describe the general mechanisms of sediment transport, and identify the equations used and assumptions applied in the SLA procedure.

General

Transport of the bed material load in a river channel is divided into two zones. The sediment moving in a layer close to the bed is referred to as the bed load. The sediment carried in the remaining upper region of the flow is referred to as suspended bed material load. The turbulent mixing process and the action of gravity on the sediment particles cause a continual transfer between the two zones. Although there is no distinct line between the zones, the definitions are made in order to aid in the mathematical description of the process. Wash load occupies the entire depth of flow but consists of fine particles that are not present in the bed in appreciable quantities, and will not easily settle out. Wash load is primarily controlled by the supply of fine silts and clays from the watershed, while bed load and suspended bed material load are primarily controlled by the transport capacity of the river and availability of material in the channel bed and banks.

Sediments of different sizes will experience different rates of transport. Therefore, the transport capacities for a range of sediment sizes are determined and totalled to produce an estimation of total transport capacity. The total bed material transport capacity for a channel section is

$$Q_s = T \sum [P_i (q_{bi} + q_{si})] \tag{1}$$

In Equation (1), T is the top width of the channel, P_i is the decimal fraction of one sediment size, q_{bi} is the bed load transport rate per unit width for the ith size, and q_{si} is the suspended load transport rate for the ith size.

Bed Load Transport Capacity

The Meyer-Peter, Muller (MPM) formula gives good results for bed load tranport over a wide range of sediment sizes. The MPM formula is well suited to model the dynamics of channel armoring processes as well as transport of sand sizes with little armoring potential. The MPM formula is

$$q_{bi} = \frac{12.85}{\sqrt{\rho}\ \gamma_s} (\tau_o - \tau_c)^{1.5} \tag{2}$$

in which

$$\tau_c = F_* (\gamma_s - \gamma)\ d_{si} \tag{3}$$

In Equations (2) and (3), q_{bi} is the bed load transport rate in solid volume per unit width for a specific size of sediment, τ_c is the critical tractive force necessary to initiate particle motion, ρ is the density of water, γ_s is the specific weight of sediment, γ is the specific weight of water, d_{si} is the sediment size and F_* is the Shield's parameter which ranges between 0.030 and 0.060 inclusive.

The boundary shear stress acting on the grain is

$$\tau_o = \frac{f}{8} \rho V^2 = \frac{n^2 \cancel{8} \cdot g}{1.49^2 R^{1/3}} \times \frac{\rho V^2}{\cancel{8}} = \frac{n^2 * 14.5}{R^{1/3}} * 62.4 * V^2 \tag{4}$$

where ρ is the density of flowing water, f is the Darcy-Weisbach friction factor, and V is the mean velocity of the flow.

The Darcy-Weisbach friction factor is related to Manning's n by:

$$f = n^2 \frac{8\ g}{1.49^2\ R^{1/3}} \tag{5}$$

where g is the acceleration due to gravity and R is hydraulic radius. Assuming the wide channel approximation is valid then the hydraulic radius R is equal to depth.

For sediment transport calculations, Manning's n in Equation 5 represents the skin resistance only, which is typically 0.6 to 0.9 times the total manning's n for the channel, depending on the vegetation characteristics and the preponderance and type of bed forms.

Suspended Bed Material Transport Capacity

The suspended bed material transport capacity is determined by using a solution developed by Einstein. This method relies upon integration of the sediment concentration profile as a function of depth. The nature of the profile is determined using turbulent transport theory. The sediment profile is assumed to be in equilibrium, and therefore the rate at which sediment is transported upward due to turbulence and the concentration gradient is exactly equal to the rate at which gravity is transporting sediment downward. The resulting concentration profile is given by:

$$\frac{C}{C_a} = \left[\frac{Y - y}{y} \; \frac{a_{blt}}{Y - a_{blt}}\right]^z \tag{6}$$

where C is the concentration at a point y, C_a is the concentration at point a_{blt} generally considered to be the bed layer thickness, Y is the depth and z is given by:

$$z = \frac{\omega}{\kappa \, U_*} \tag{7}$$

where ω is the fall velocity for a given size sediment, U_* is the shear velocity, and κ is the von Karman constant (0.4). The shear velocity U_* is defined as $\sqrt{(\tau/\rho)}$ where τ is the shear stress on the bed and ρ is the density of the fluid. (Note: τ should be the total shear stress on the bed and not the grain-associated shear stress. The shear velocity U_* characterizes both the turbulence and grain resistance, and the fall velocity, ω, characterizes the sediment properties.)

A logarithmic velocity profile is used to describe the velocity distribution in turbulent flows. The equation utilized is

$$\frac{u_\xi}{U_*} = B + 2.5 \ln\left[\frac{\xi}{\eta_s}\right] \tag{8}$$

in which u_ξ is the point mean velocity at the distance ξ from the bed, B is a constant dependent on roughness, and η_s is the roughness height.

The integral of suspended load above the bed layer is obtained by combining Equations 6 and 8, or

$$q_{si} = \int_{a_{blt}}^{Y} u_\xi C_\xi d\xi = C_a \, U_* \int_{a_{blt}}^{Y} \left[B + 2.5 \ln\left(\frac{\xi}{\eta_s}\right)\right]\left(\frac{Y - \xi}{\xi} \; \frac{a_{blt}}{Y - a_{blt}}\right)^z d_\xi \tag{9}$$

Integration of Equation 9 yields

$$q_{si} = C_a U_* a_{blt} \frac{G^{z-1}}{(1-G)^z}\left\{\left[B + 2.5 \ln\left(\frac{Y}{\eta_s}\right)\right]\int_G^1 \left(\frac{1-\sigma}{\sigma}\right)^z d\sigma + 2.5 \int_G^1 \left(\frac{1-\sigma}{\sigma}\right)^z \ln\sigma \, d\sigma\right\} \tag{10}$$

with

$$\sigma = \frac{\xi}{Y}$$

and

$$G = \frac{a_{blt}}{Y}$$

The average flow velocity V is defined by the equation

$$V = \frac{\int_0^Y u_\xi d\xi}{\int_0^Y d\xi} \tag{11}$$

Substituting Equation 8 into equation 11 and integrating yields

$$\frac{V}{U_*} = B + 2.5 \ln\left(\frac{Y}{\eta_s}\right) - 2.5 \tag{12}$$

The two integrals in Equation 10 can be defined as

$$J_1 = \int_G^1 \left(\frac{1-\sigma}{\sigma}\right)^z d\sigma \tag{13}$$

and

$$J_2 = \int_G^1 \left(\frac{1-\sigma}{\sigma}\right)^z \ln\sigma \, d\sigma \tag{14}$$

Substituting Equations 12, 13 and 14 reduces Equation 10 to

$$q_{si} = C_a \, U_* \, a_{blt} \, \frac{G^{z-1}}{(1-G)^z} \left[\left(\frac{V}{U_*} + 2.5 \right) J_1 + 2.5 \, J_2 \right] \tag{15}$$

According to Einstein, the concentration at the upper level of the bed layer is related to the total transport in the bed layer by the following relation

$$q_{bi} = 11.6 \, C_a \, U_* \, a_{blt}$$

The above relation was developed assuming that the bed layer thickness is constant and equal to twice the diameter of the sediment particle being transported. It is this assumption and the resulting value for C_a that is modified under the SLA procedure, through use of the concept of sand wave celerity.

Sand Wave Celerity

The bed load sediment continuity equation can be approximated as

$$\frac{\partial q_b}{\partial x} + (1 - \lambda) \frac{\partial z}{\partial t} = 0 \tag{16}$$

$$\frac{\partial q_b}{\partial x} = -\frac{\partial z}{\partial t}(1-\lambda)$$

$$\frac{\partial q_b}{\partial z} \times \frac{1}{(1-\lambda)} = \frac{\partial x}{\partial t}$$

where q_b is the bed load transport rate, z is the bed elevation, λ is the porosity, x is the downslope distance and t is the time. The theoretical celerity of the sand wave Vs_t can be derived from Equation 16 as

$$Vs_t = \left| \frac{\partial x}{\partial t} \right| = \frac{1}{(1 - \lambda)} \frac{\partial q_b}{\partial z} \tag{17}$$

The bed load discharge can be related to the flow velocity by a power function:

$$q_b = a\ V^b = a \left(\frac{q}{Y} \right)^b$$
$$= a\ q^b\ Y^{-b} \tag{18}$$
$$= a\ q^b\ (h - z)^{-b}$$

where q is the unit width water discharge and h is the stage. Taking a derivitive of q_b with respect to z yields

$$\frac{\partial q_b}{\partial z} = a\ b\ q^b\ (h - z)^{(-b-1)}$$
$$= a\ b\ \frac{V^b}{Y} \tag{19}$$

Results of numerical tests using a unit width channel indicate that the numerical sand wave celerity Vs_n is related to the theoretical celerity Vs_t as follows:

$$Vs_n = 2.33\ [\ (1 - \lambda)\ Vs_t\ ]^{0.96} \tag{20}$$

Substituting Equations 17 and 19 into Equation 20 yields

$$Vs_n = 2.33 \left[a\ b\ \frac{V^b}{Y} \right]^{0.96} \tag{21}$$

which, after substituting $q_b = aV^b$, becomes

$$Vs_n = 2.33 \left[b\ \frac{q_b}{Y} \right]^{0.96} \tag{22}$$

The bed layer thickness a_{blt} is the unit width bedload (bulked for voids) divided by the sand wave celerity, or

$$a_{blt} = \frac{q_b}{Vs\ (1 - \lambda)} \tag{23}$$

Substitution of Equation 22 into 23 (using the Vs_n for Vs) yields

$$a_{blt} = \frac{1}{2.33\ (1 - \lambda)}\ q_b^{0.04} \left(\frac{Y}{b} \right)^{0.96} \tag{24}$$

Note that if the theoretical sand wave celerity is used for Vs, Equation 23 is reduced to:

$$a_{blt} = \frac{Y}{b} \tag{25}$$

The average velocity of the flow within the bed layer V_a may be determined using Equation 8 and Equation 11 (with the upper limit of integration changed to a_{blt}), yielding:

$$\frac{V_a}{U_*} = B + 2.5\ \ln \left(\frac{a_{blt}}{\eta_s} \right) - 2.5 \tag{26}$$

It is assumed that the fluid within the bed layer flows across an average unit area equal to ($\lambda\ a_{blt}$), and that the concentration at the distance $y = a_{blt}$ is equal to the average concentration in the bed layer. Under these conditions:

$$C_a = \frac{q_b}{q_b + q_{wa}} = \frac{q_b}{q_b + \lambda\ a_{blt}\ V_a} \tag{27}$$

with q_{wa} representing the fluid flow within the bed layer.

Summary

The SLA procedure may be summarized as follows:

1. The hydraulic characteristics of a channel reach are computed over a range of flow conditions.

2. For each flow condition considered, bedload is computed using the MPM formula (Equation 2) for each particle size. The total bedload is the summation of the individual particle transport rates multiplied by each size's fractional representation in the bed.

3. A best fit equation of the form $q_b = aV^b$ is developed relating the total bedload to the average velocity in the channel reach.

For each flow condition:

4. The bed layer thickness is computed using Equation 23.

5. The average concentration of each particle size in the bed layer is computed using Equations 26 and 27.

6. Einstein's J1 and J2 integrals are evaluated for each particle size using numerical procedures which approximate Equations 13 and 14.

7. The suspended transport rate for each particle size is computed using Equation 15.

8. The total bed material transport capacity for the channel reach is computed using Equation 1.

SEDIMENT TRANSPORT VERIFICATION

In this study, bed material transport capacity was computed through use of a procedure developed by SLA which utilizes the Meyer-Peter, Mueller equation for estimation of the bed load, and Einstein's procedure for calculation of the suspended load. These two quantities together represent the total bed material transport capacity of the channel reach, assuming minor concentrations of fines (wash load) in the flowing water.

As a verification of the suitability of these procedures, sediment transport capacities computed using this method were compared to measured suspended bed material data from several watercourses located within Arizona and southern California. The measured data used in the comparison was data collected by the USGS. The computed bed material transport capacities were based on hydraulic information and the bed material characteristics obtained from studies conducted by SLA on these watercourses or, in the case of the Colorado River, from USGS hydraulic data and bed material characteristics. Hydraulic data used for the computations and results of the sediment discharge computations are provided in Tables 1 through 5.

The computed sediment transport results for each of the watercourses follows the trend of the USGS measured data. The results of the comparison are shown graphically in Figures 1 through 5. The figures correspond to the following watercourses and USGS gaging station locations:

Figure 1. Salt River at 24th Street

Figure 2. Colorado River above Little Colorado River

Figure 3. Rillito Creek Basin, Alamo Wash at Glenn Street

Figure 4. Callequas Creek at Camirillo State Hospital Access Road

Figure 5. Santa Clara River at Montalvo

Additional information regarding each of these locations is provided in the following paragraphs.

1. Salt River at 24th Street

The measured data for this site was collected manually by the USGS from January 9 to March 26, 1992. The data was collected at 24th Street near the streamflow-gaging station (095121900). The sediment concentrations ranged from 2 to 617 mg/L. The information is contained in USGS report WRI 95-4059, "Channel Change and Sediment Transport in Two Desert Streams in Central Arizona, 1991-92". Figure 19A of the report provides a plot of the measured suspended-sediment concentration to flow discharge.

The bed material transport capacity was computed using hydraulic information and the bed material characteristics obtained from data included in a March 1994 SLA report which included this reach of the Salt River. The report is titled "Preliminary Design Report, Salt River Bank Protection Reconstruction at Sky Harbor International Airport, Phoenix, Arizona".

2. Colorado River above Little Colorado River

The measured data for this site is based on information contained in the USGS Open File Report 93-174, Streamflow and Sediment-Transport Data, Colorado River and Three Tributaries in Grand Canyon, Arizona 1983 and 1985-86", dated November 1993. The data was collected at a streamflow-gaging station (09383100) located above the confluence with the Little Colorado River. The sampling period at this site was July 12 to December 13, 1983. The measured data was obtained from Table 2 of the report. The measured data utilized for this analysis was that data for which there was a measured discharge within approximately 2 hours of the measured sediment concentration.

The bed material transport capacity was computed using hydraulic data and bed material characteristics also obtained from USGS Open File Report 93-174. Table 19 contains the hydraulic and physical characteristics of the cross section during discharge measurements in 1983, and Table 12 provides the grain-size distribution of bed material at this gaging station.

3. Rillito Creek Basin, Tucson

The measured data for this site was obtained from USGS Water Resources Investigations Report 94-4114, Quality of Water and Chemistry of Bottom Sediment in the Rillito Creek Basin, Tucson, Arizona, 1986-92, 1994.

The bed material transport capacity was computed using the average hydraulic data for Alamo Wash provided by the USGS, and the bed material characteristics included in a report prepared by SLA for Pima County. The SLA report is titled "Hydraulic and Geomorphic Analysis of Tanque Verde Road Bridge in the Rillito-Tanque Verde River System, Pima County, Arizona", 1981.

4. Callequas Creek @ Camirillo State Hospital Access Road

The measured data for this site was from a USGS gaging station on Callequas Creek at Camirillo State Hospital (USGS Gage No. 11106550). The data was for the period of 1969 through 1978.

The bed material transport capacity was computed using the average hydraulic data and the bed material characteristics included in a report prepared by SLA for the County of Ventura in December 1989. The report is titled "Development of Interim Sedimentation Control Measures for Calleguas Creek". The average hydraulic parameters for Reach 3, which is the reach upstream of the Camirillo State Hospital gage) were used in the analysis. The bed material characteristics were obtained from the gradation curve used in the study. This gradation curve was based on USGS bed material samples collected in 1975, 1976, and 1978. Computations were made for hydraulic conditions corresponding to the peak discharges of the 2-, 5-, 10-, and 25-year flows.

5. Santa Clara River at Montalvo

The measured data for this site was from a USGS gaging station on the Santa Clara River near Montalvo (USGS Gage No. 11114000). The data is from USGS Water Resources Investigations Report 79-78, Sediment Discharge in the Santa Clara River Basin, Ventura and Los Angeles Counties, California", August 1979.

The bed material transport capacity was computed using the average hydraulic data and the bed material characteristics included in a report prepared by SLA for the Ventura County in September 1983. The report is titled "Hydraulic, Erosion and Sedimentation Study of the Santa Clara River, Ventura County, California". The average hydraulic parameters for Reach 1 were used in the analysis. The bed material characteristics were obtained from the gradation curve used in the study.

TABLE 1. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE FOR THE SALT RIVER

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
1,060	1.71	4.30	292	49
6,355	3.38	6.43	584	2,577
10,595	4.30	6.66	738	9,737

TABLE 2. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE FOR LITTLE COLORADO

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
18,400	14.39	3.74	342	2,200
23,400	15.80	4.32	343	3,888
24,500	16.35	4.33	346	6,500
35,100	18.74	5.51	340	14,256

TABLE 3. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE FOR ALAMO WASH

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
33	0.71	2.30	20.5	5
59	0.59	1.94	51	10
325	1.31	3.51	71	77

TABLE 4. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE CALLEGUAS CREEK

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
2,500	3.80	5.16	129	15,800
7,140	6.40	7.62	147	159,000
11,810	8.20	9.14	160	600,000
19,310	10.00	10.76	183	3,200,000

TABLE 5. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE SANTA CLARA RIVER

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
18,500	4.26	6.87	808	540,000
44,000	5.80	8.50	892	2,200,000

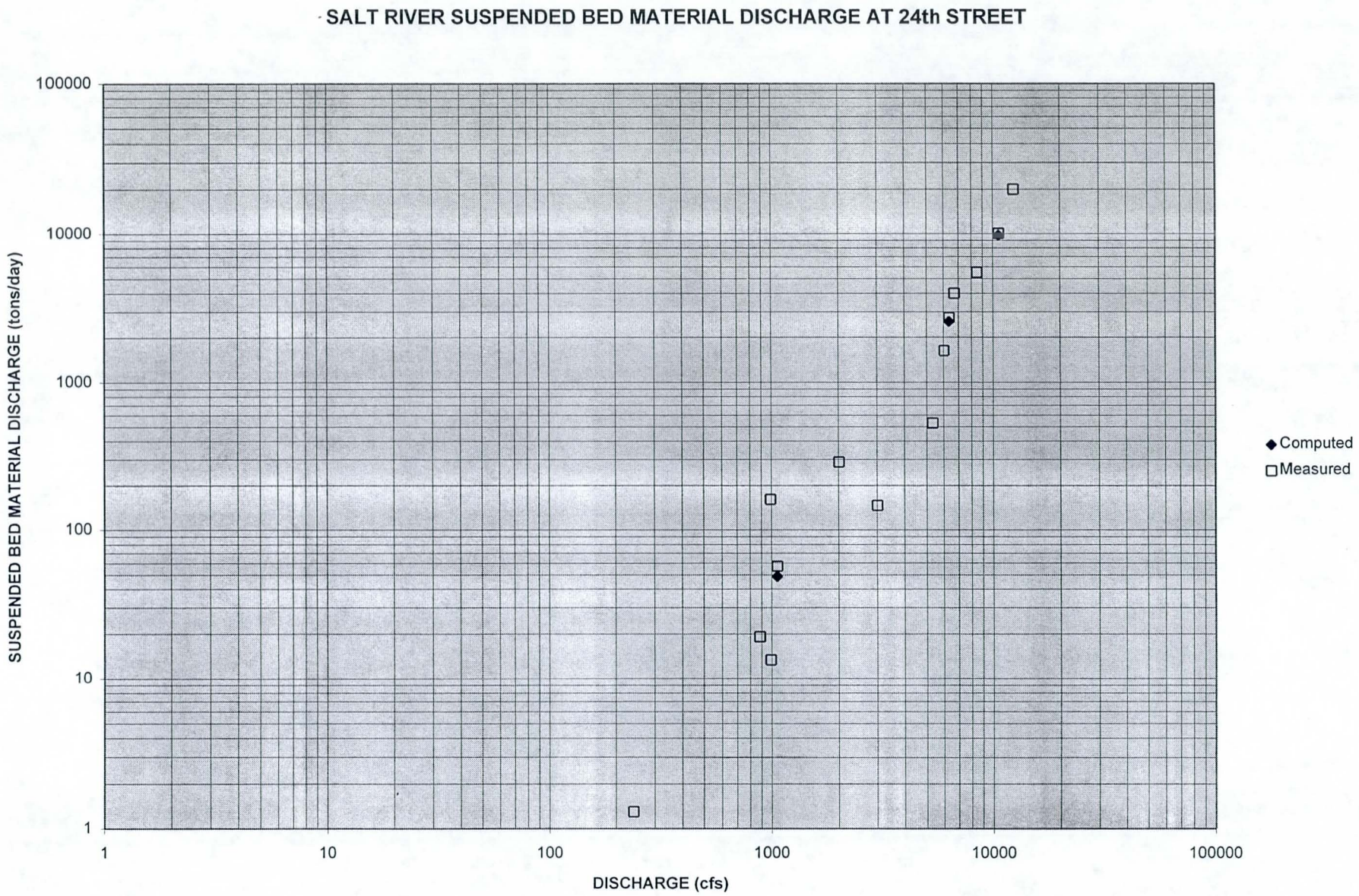
6. Colorado River at Lees Ferry

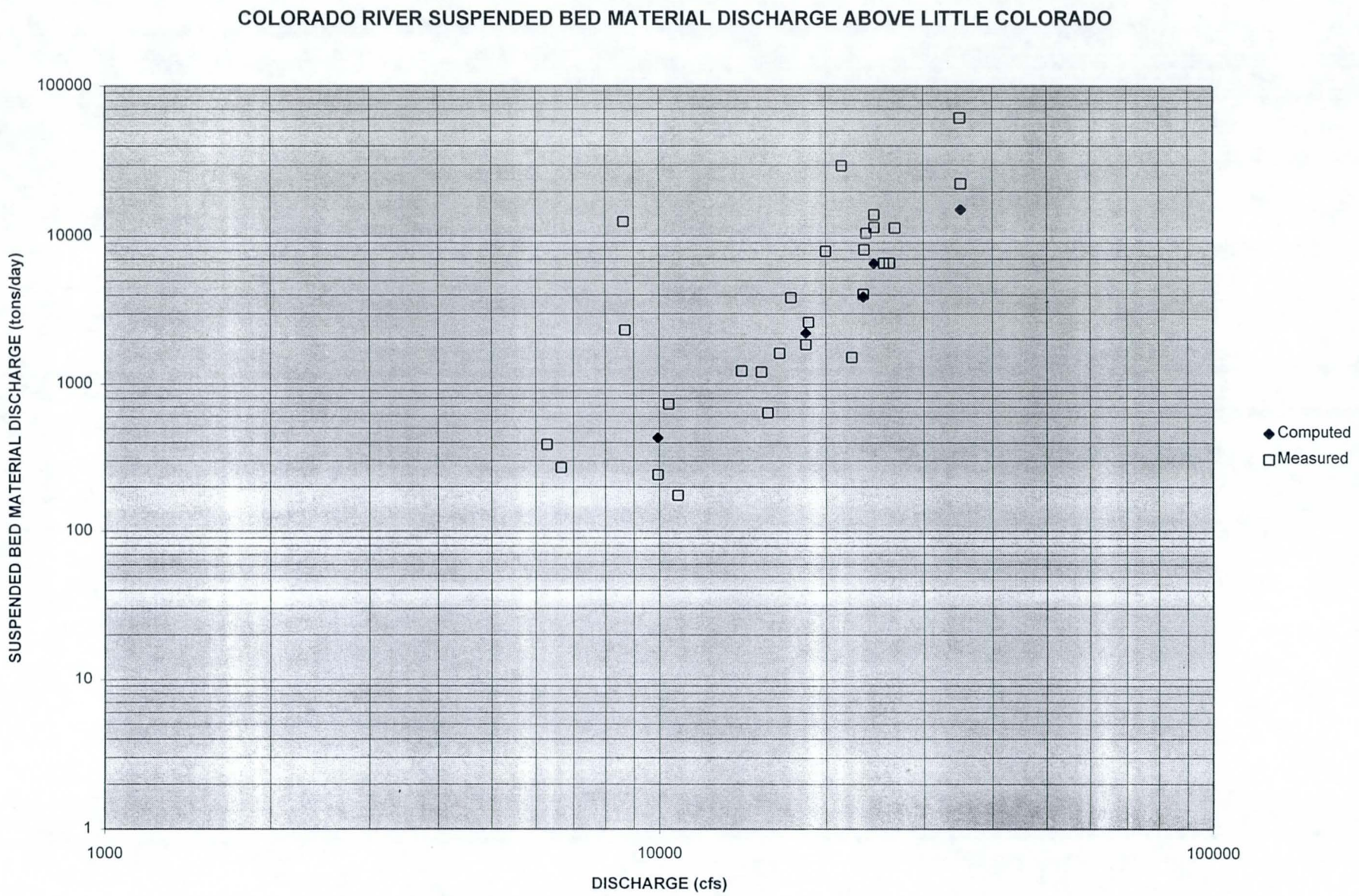
The measured data for this site is based on information contained in the USGS Open File Report 93-174, Streamflow and Sediment-Transport Data, Colorado River and Three Tributaries in Grand Canyon, Arizona 1983 and 1985-86", dated November 1993. The data was collected at a streamflow-gaging station (09380000) located above the confluence with the Little Colorado River. The sampling period at this site was June 29 to December 11, 1983. The measured data was obtained from Table 1 of the report. The measured data utilized for this analysis was that data for which there was a measured discharge within approximately 2 hours of the measured sediment concentration.

The bed material transport capacity was computed using hydraulic data and bed material characteristics also obtained from USGS Open File Report 93-174. Table 18 contains the hydraulic and physical characteristics of the cross section during discharge measurements in 1983, and Table 11 provides the grain-size distribution of bed material at this gaging station.

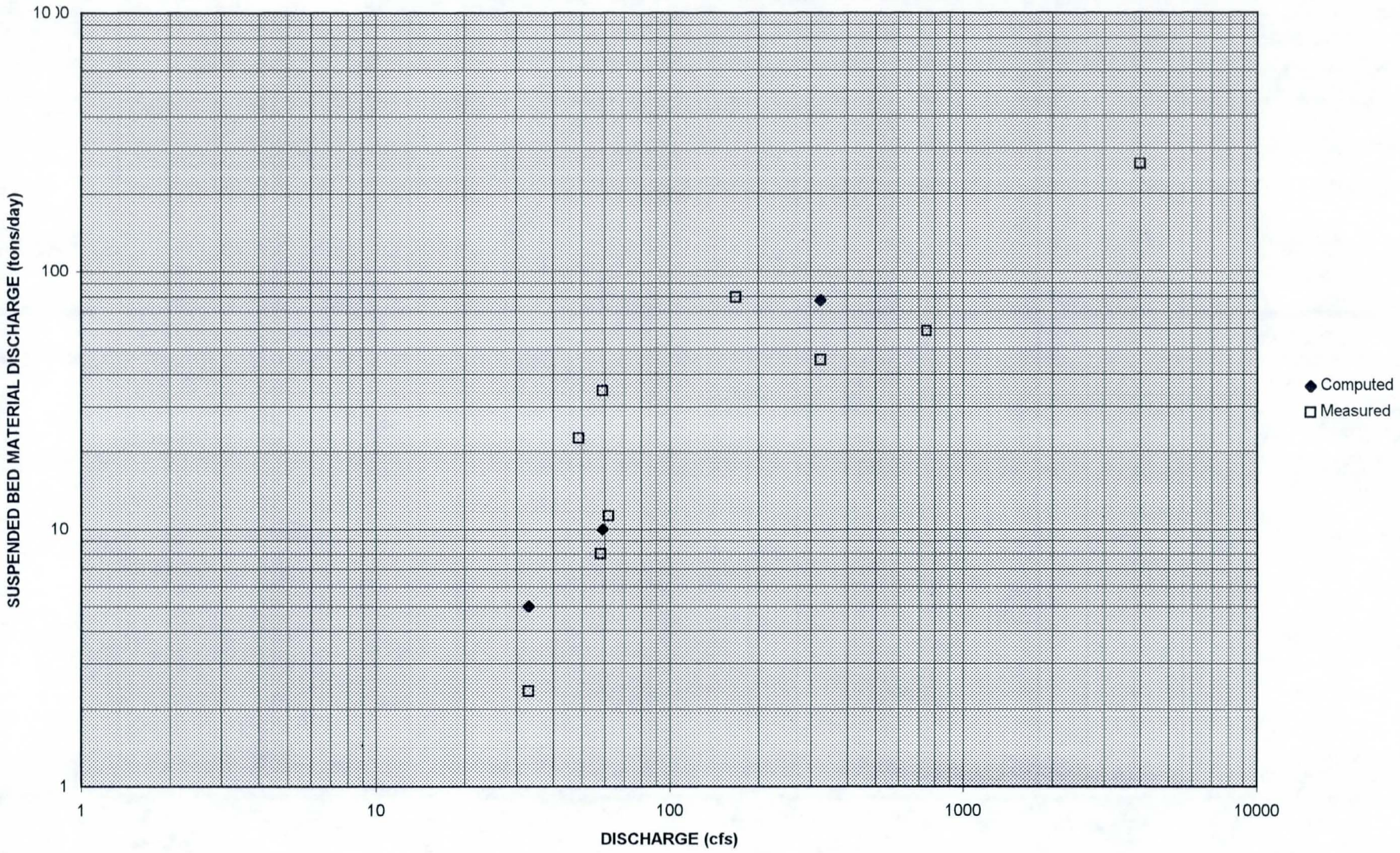
TABLE 6. HYDRAULICS AND COMPUTED SUSPENDED BED MATERIAL DISCHARGE FOR LEES FERRY

Discharge (cfs)	Depth (ft)	Velocity (fps)	Width (ft)	Sediment Discharge (tons/day)
22,220	20.14	2.68	411	1,145
23,700	19.87	2.90	411	2,173
26,700	21.26	3.05	412	5,616

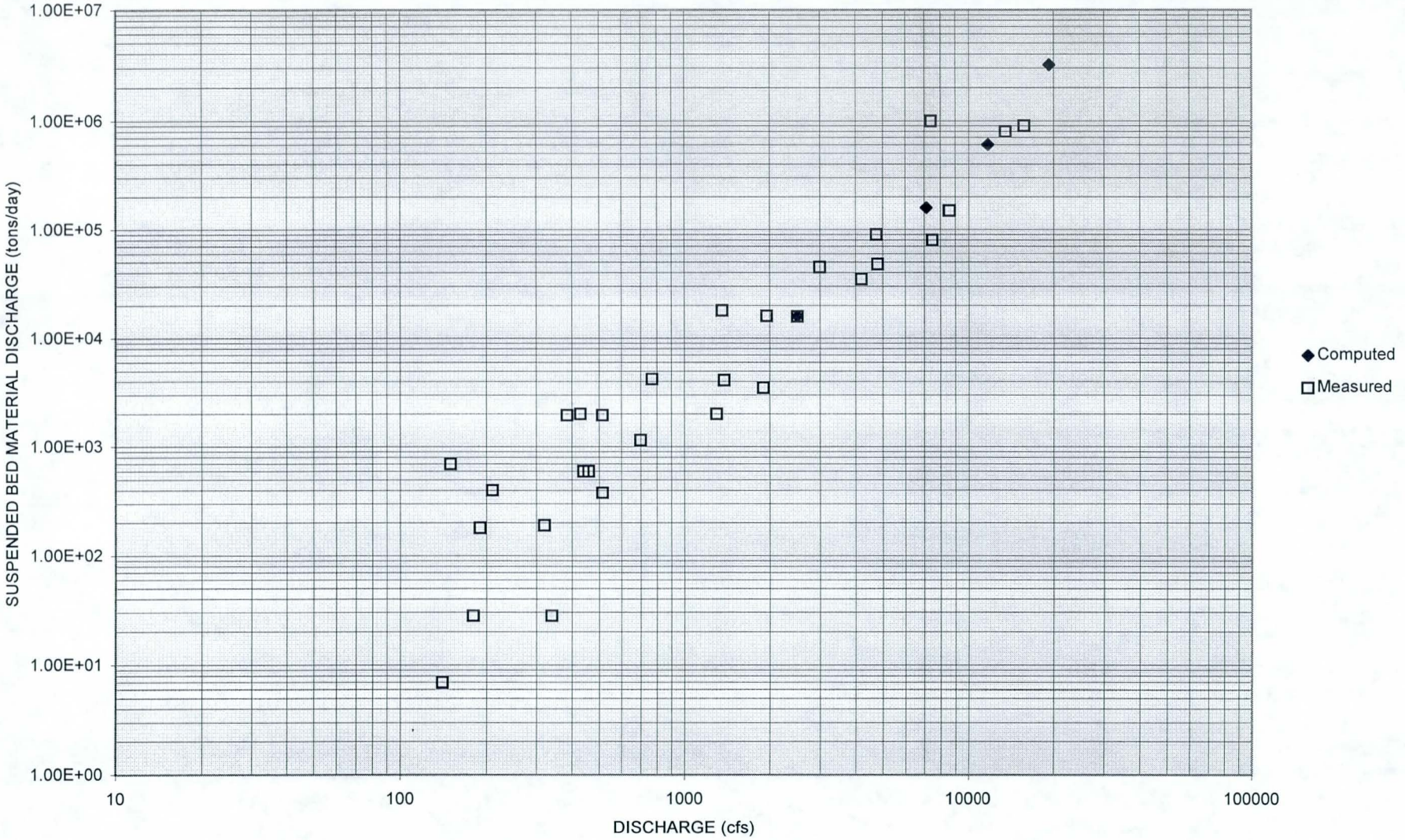

SALT RIVER SUSPENDED BED MATERIAL DISCHARGE AT 24th STREET
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1
10
100
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured

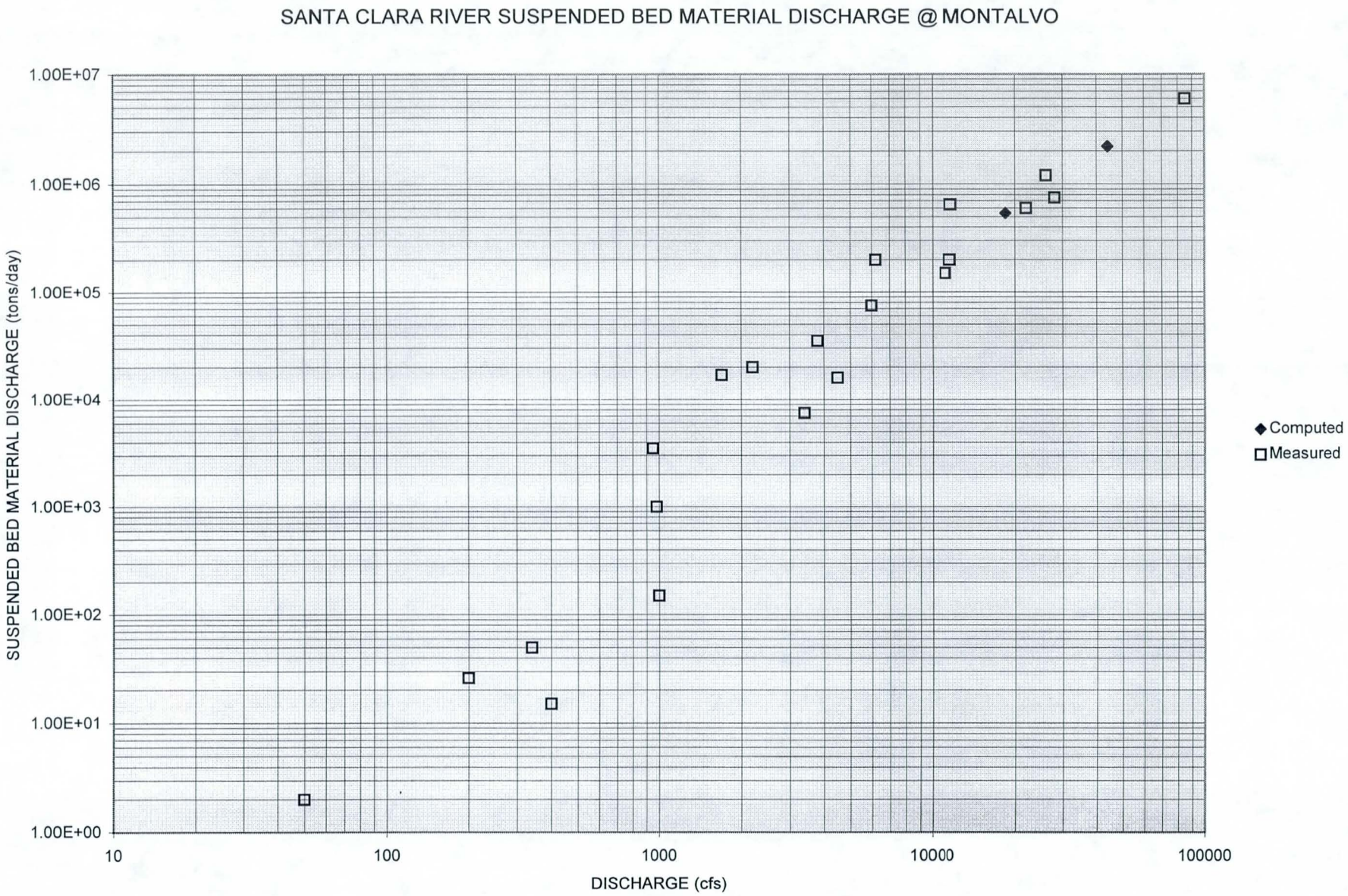

COLORADO RIVER SUSPENDED BED MATERIAL DISCHARGE ABOVE LITTLE COLORADO
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured

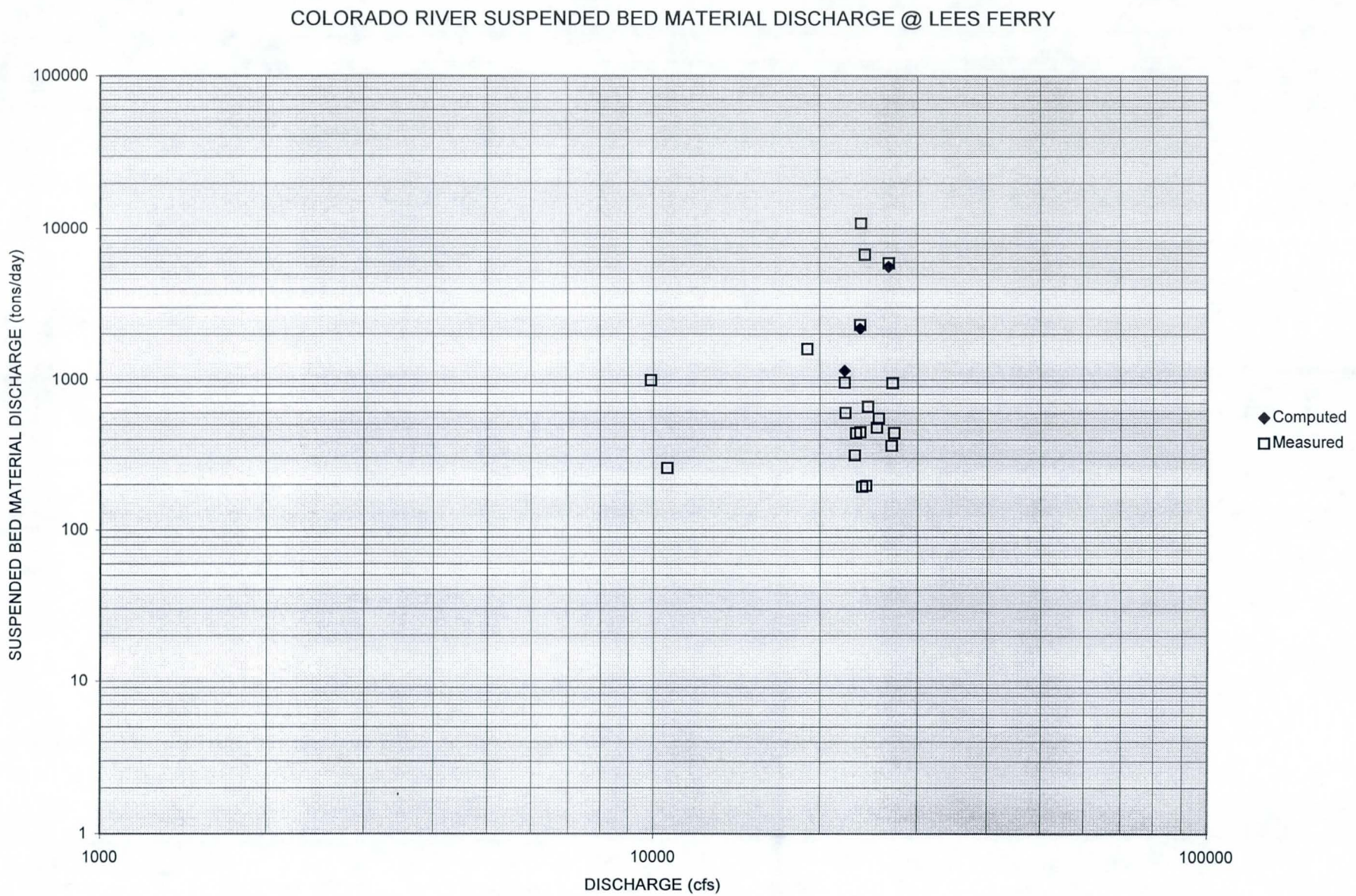
ALAMO WASH SUSPENDED BED MATERIAL DISCHARGE AT GLENN STREET

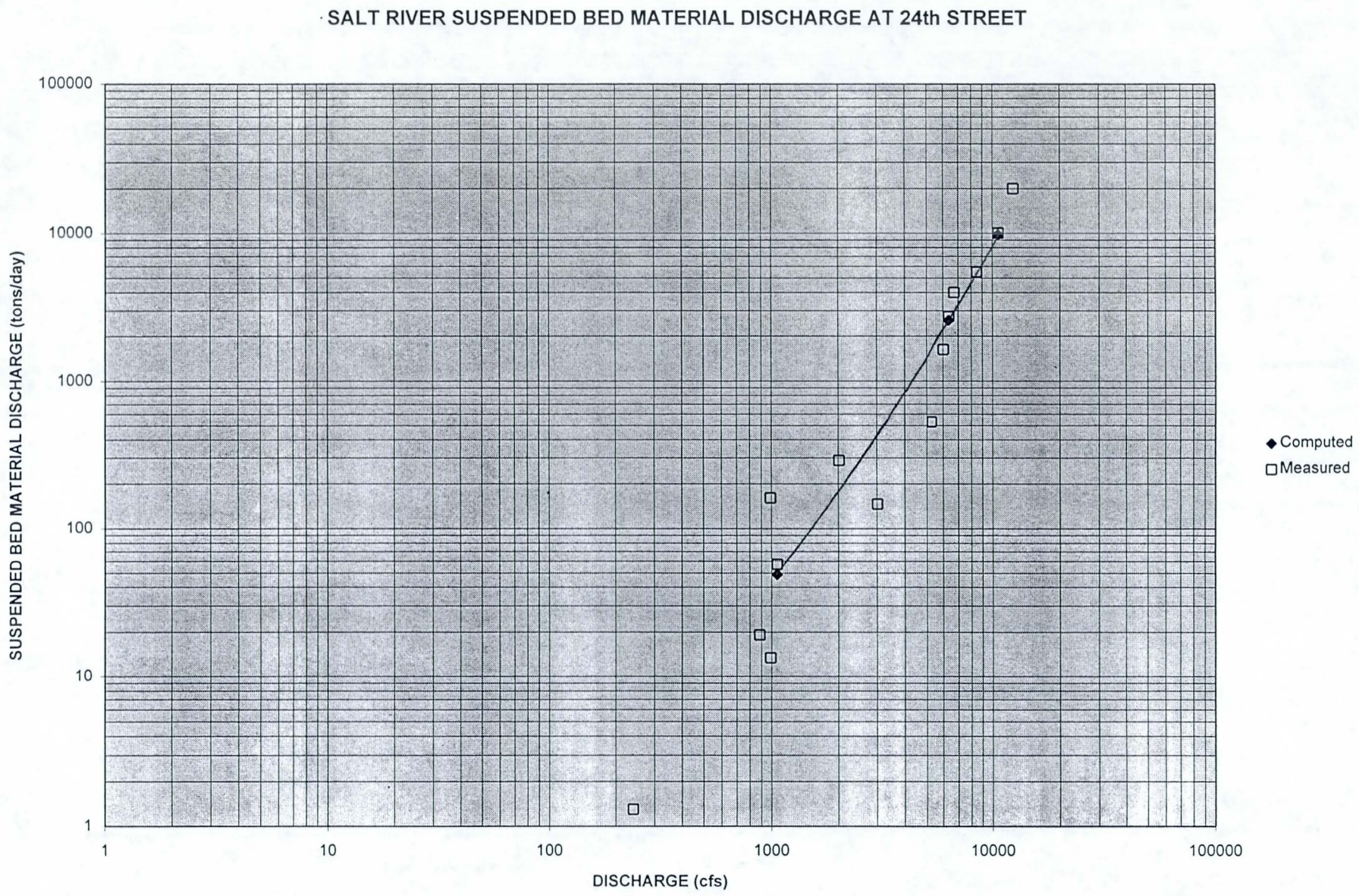


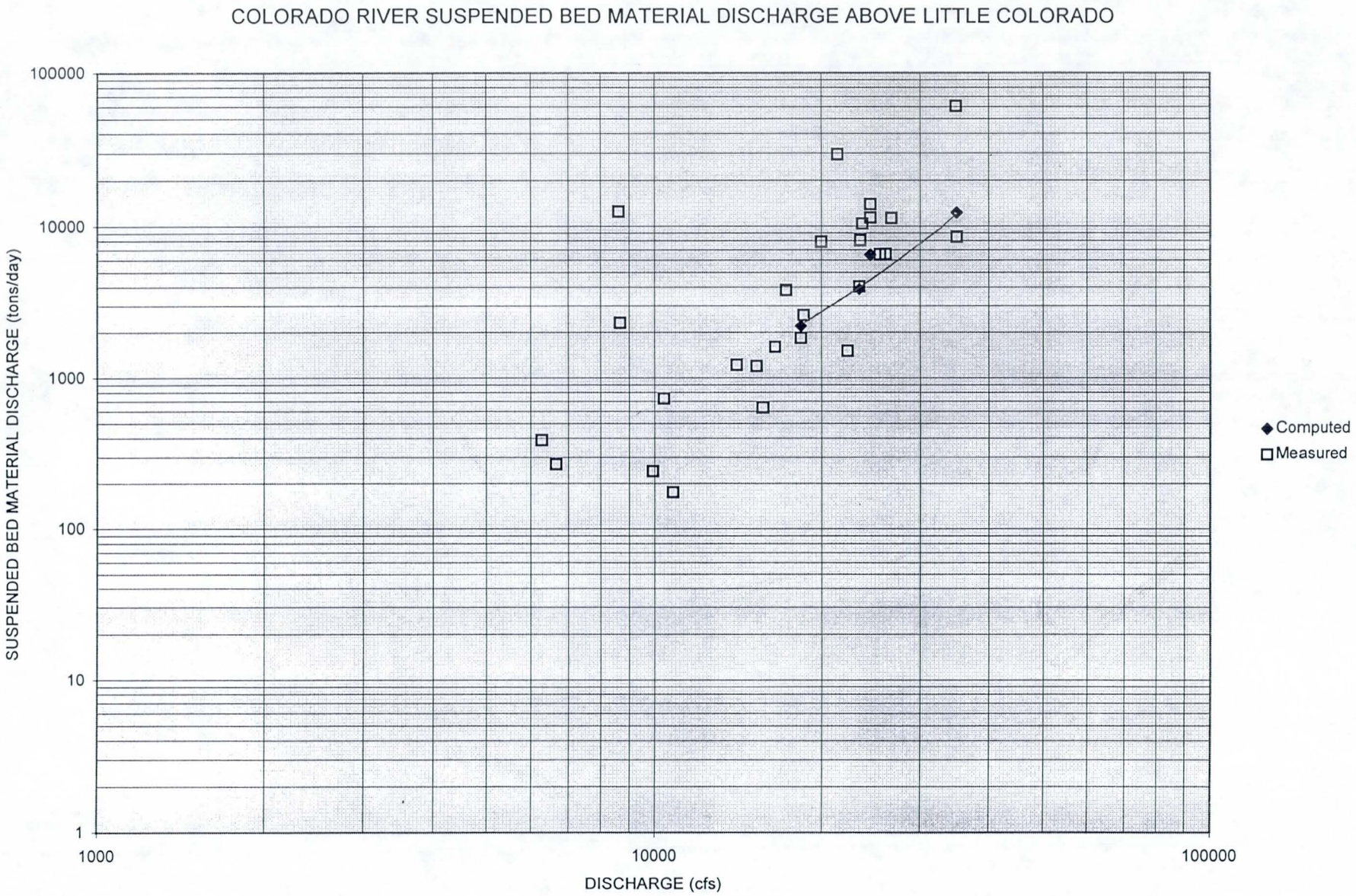
CALLEGUAS CREEK SUSPENDED BED MATERIAL DISCHARGE @
CAMIRILLO STATE HOSPITAL ACCESS ROAD



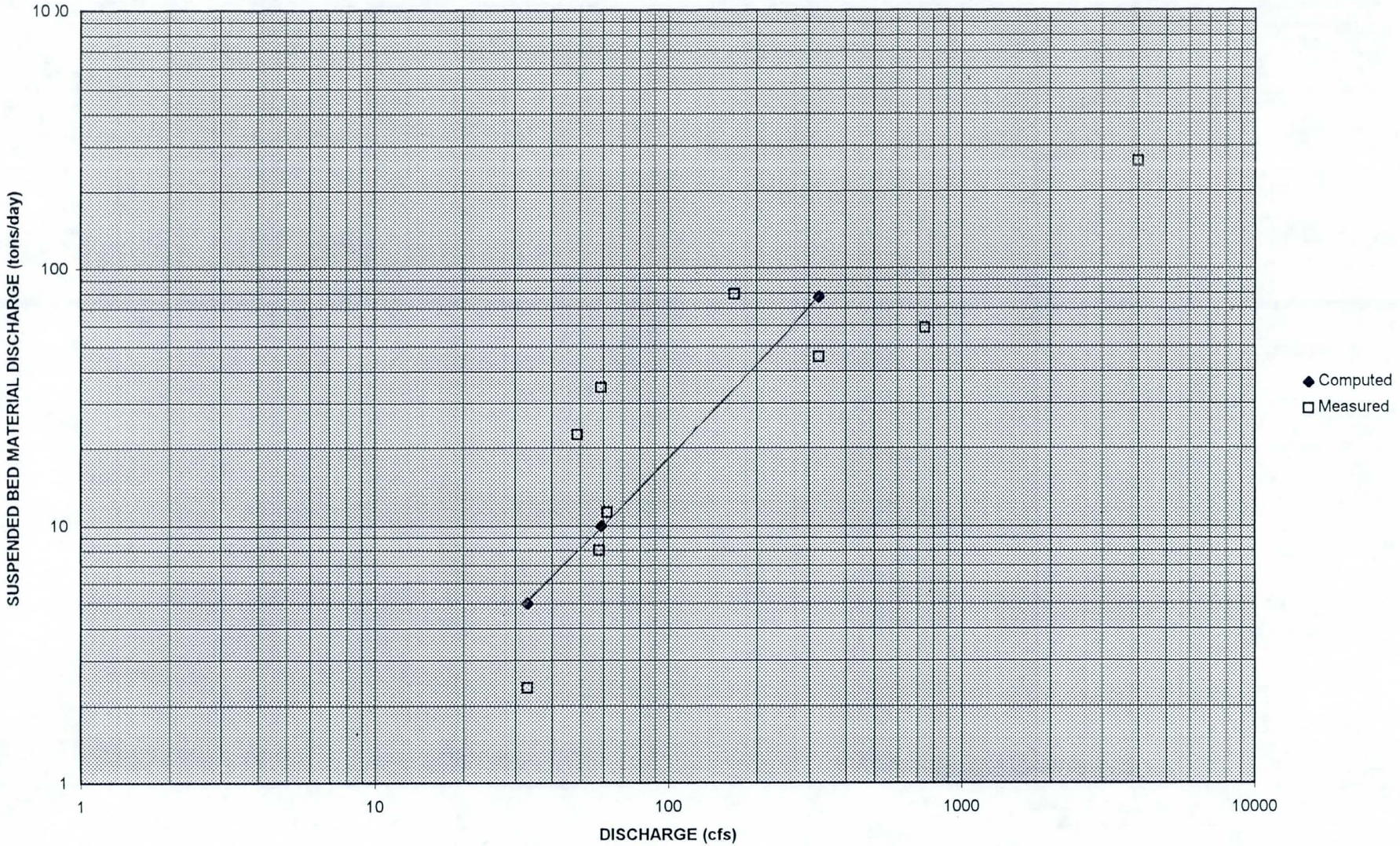

SANTA CLARA RIVER SUSPENDED BED MATERIAL DISCHARGE @ MONTALVO
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
1.00E+07
1.00E+06
1.00E+05
1.00E+04
1.00E+03
1.00E+02
1.00E+01
1.00E+00
10
100
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured


COLORADO RIVER SUSPENDED BED MATERIAL DISCHARGE @ LEES FERRY
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured

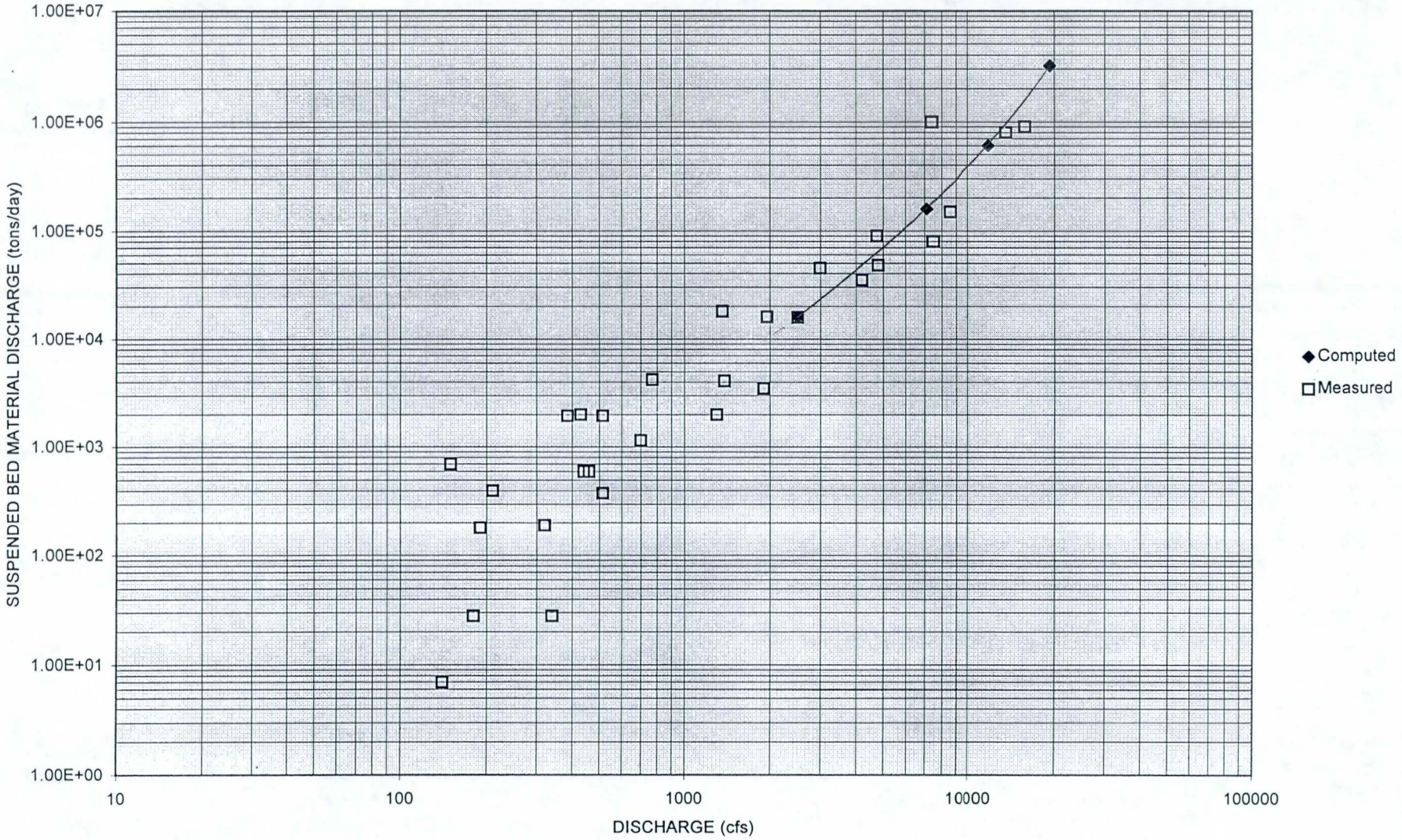

SALT RIVER SUSPENDED BED MATERIAL DISCHARGE AT 24th STREET
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1
10
100
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured


COLORADO RIVER SUSPENDED BED MATERIAL DISCHARGE ABOVE LITTLE COLORADO
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured

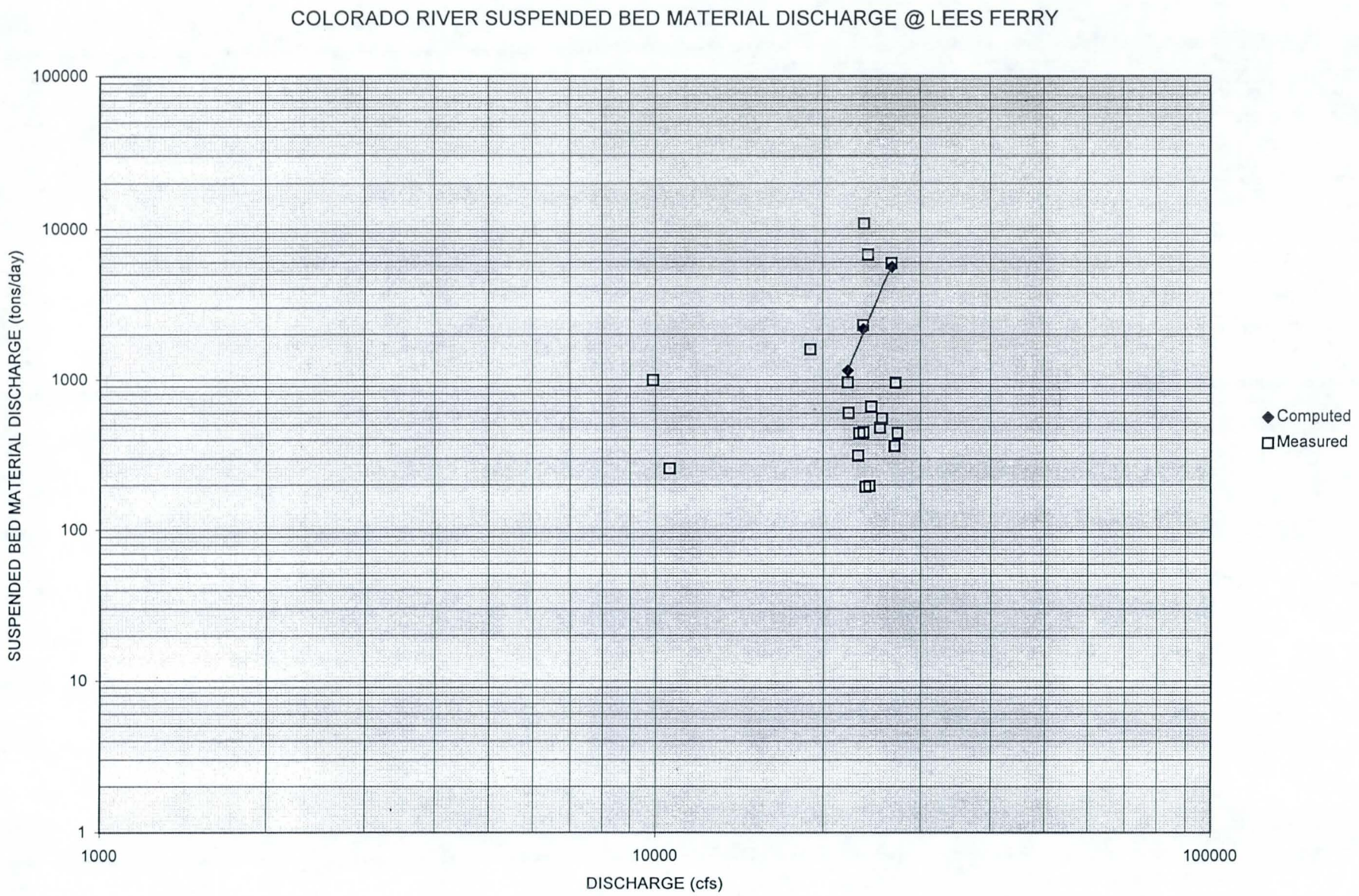
ALAMO WASH SUSPENDED BED MATERIAL DISCHARGE AT GLENN STREET



CALLEGUAS CREEK SUSPENDED BED MATERIAL DISCHARGE @
CAMIRILLO STATE HOSPITAL ACCESS ROAD



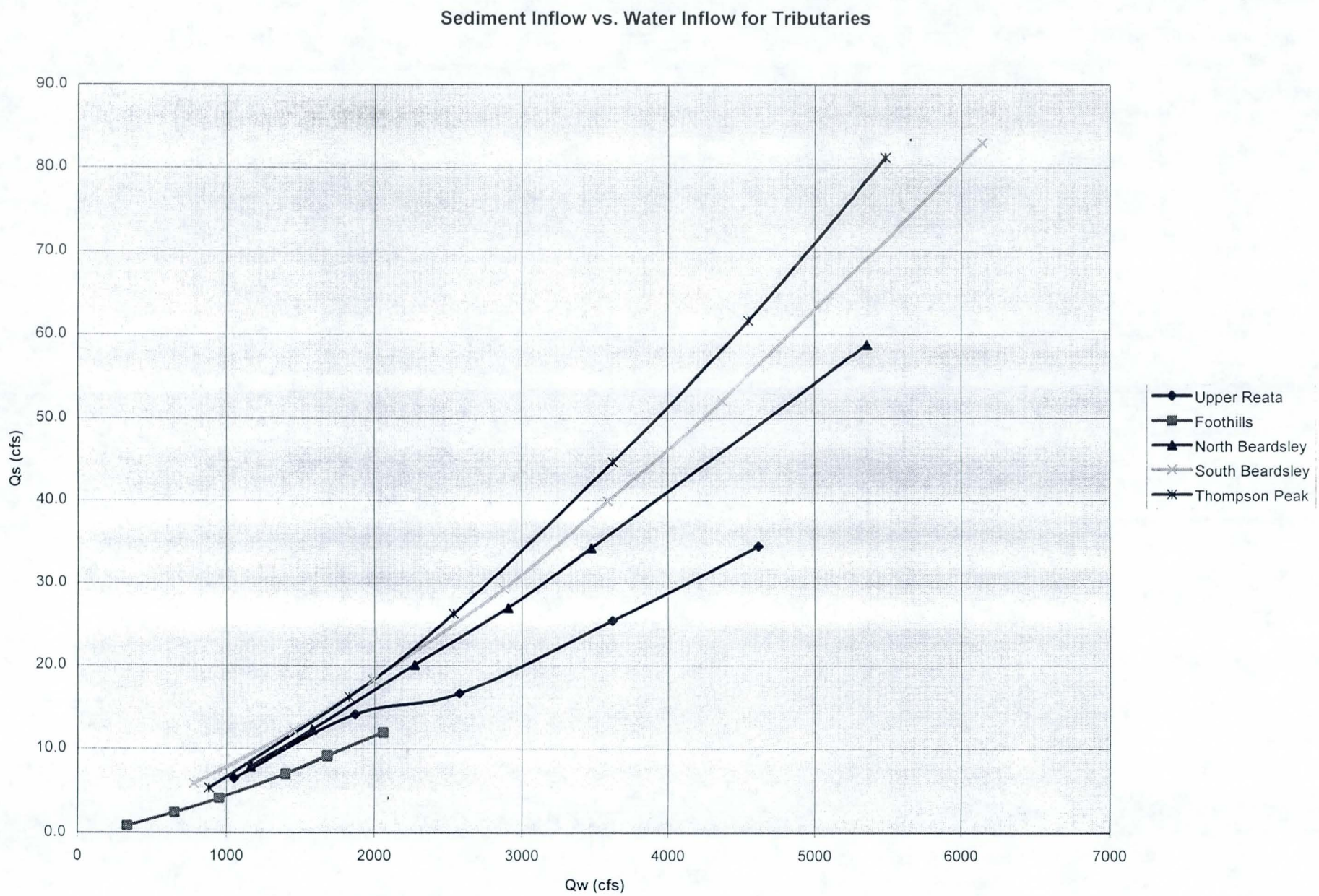
SANTA CLARA RIVER SUSPENDED BED MATERIAL DISCHARGE @ MONTALVO
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
1.00E+07
1.00E+06
1.00E+05
1.00E+04
1.00E+03
1.00E+02
1.00E+01
1.00E+00
10
100
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured


COLORADO RIVER SUSPENDED BED MATERIAL DISCHARGE @ LEES FERRY
SUSPENDED BED MATERIAL DISCHARGE (tons/day)
100000
10000
1000
100
10
1
1000
10000
100000
DISCHARGE (cfs)
Computed
Measured

F: TRIBUTARY SEDIMENT INFLOW ANALYSIS

A level II analysis was performed to determine the tributary sediment inflow. The results of the analysis are enclosed. The model computes a sediment discharge (Q_s) for a given hydraulic discharge (Q_w). Values for Q_s and Q_w were computed for each tributary. An exponential regression analysis was performed on the curves using the relationship $Q_s=a*Q_w^b$ to obtain values for a and b. These values are required for input into the HEC2-SR model. Also enclosed is a table which summarizes the hydraulic characteristics and the grain size distribution of the sediment transported by each tributary.

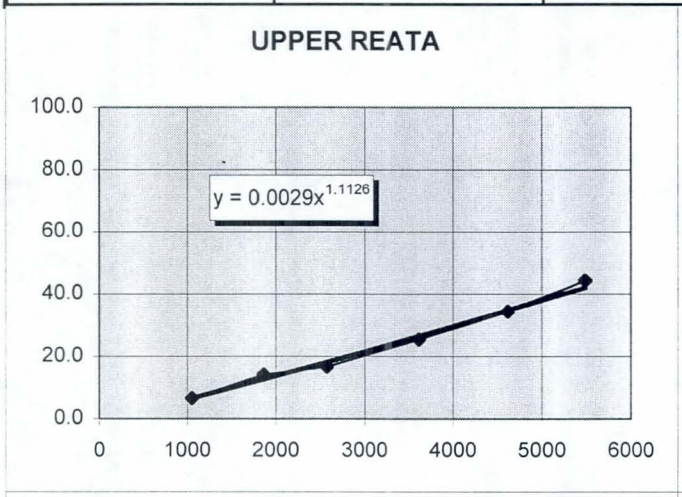
1. Relationship between Tributary Sediment Inflow and Water Inflow
2. Sediment Inflow Hydrograph
3. Sediment Inflow Distribution

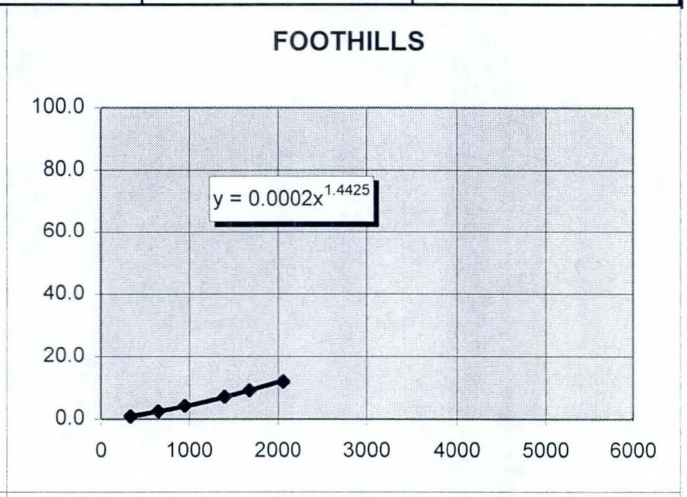

Sediment Inflow vs. Water Inflow for Tributaries
Qs (cfs)
Qw (cfs)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
1000
2000
3000
4000
5000
6000
7000
Upper Reata
Foothills
North Beardsley
South Beardsley
Thompson Peak

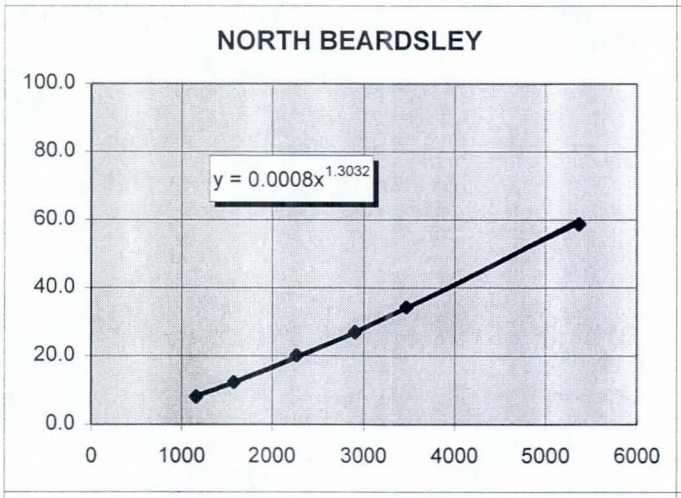
Regression Analysis for Tributary Sediment Inflow Relationships

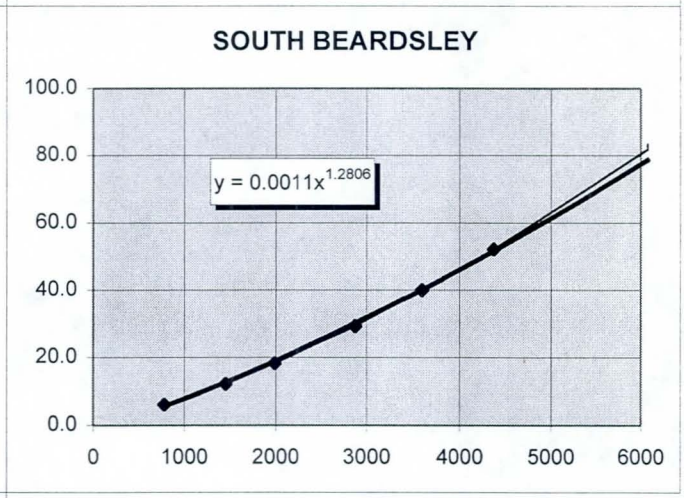
(Qw and Qs in cfs)

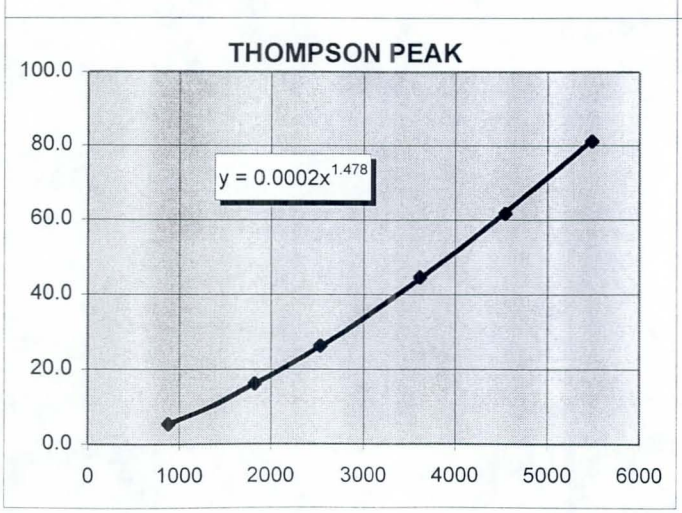
Upper Reata		Foothills		North Beardsley		South Beardsley		Thompson Peak	
Qw	Qs	Qw	Qs	Qw	Qs	Qw	Qs	Qw	Qs
5479	44.3	2058	11.9	5356	58.7	6142	82.9	5475	81.2
4621	34.4	1682	9.2	3476	34.2	4373	52.1	4551	61.6
3620	25.4	1399	7.1	2905	27.0	3589	39.9	3623	44.6
2573	16.6	949	4.2	2270	20.1	2876	29.3	2534	26.3
1869	14.1	654	2.5	1581	12.3	1990	18.2	1829	16.2
1052	6.6	336	0.9	1163	8.0	1453	12.1	883	5.5
						781	6.0		







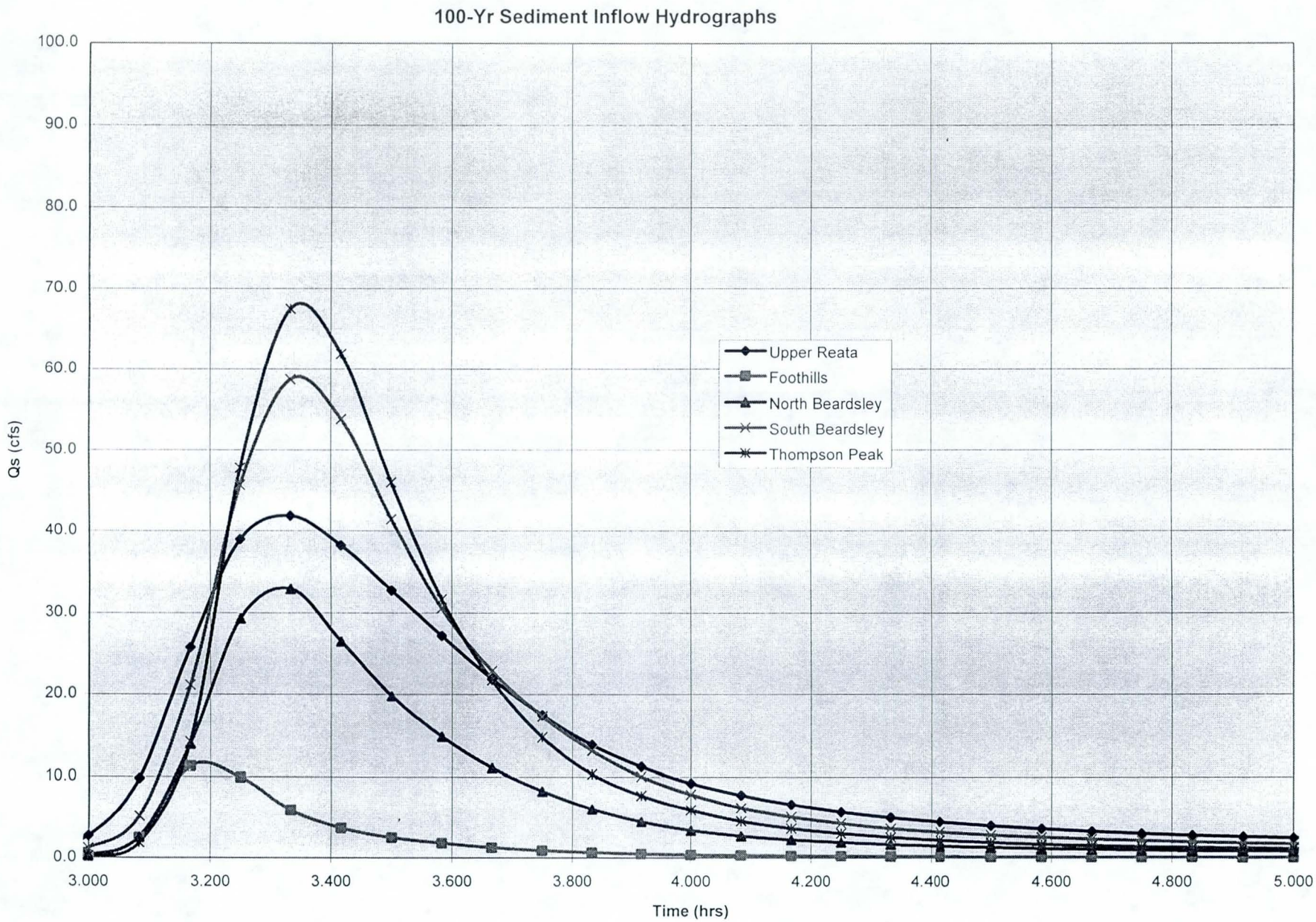




Reference!!!

$$Q_s = a * Q_w^{\,b}$$

flow coeff. "a" and "b" derived


100-Yr Sediment Inflow Hydrographs
Qs (cfs)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
3.000
3.200
3.400
3.600
3.800
4.000
4.200
4.400
4.600
4.800
5.000
Time (hrs)
Upper Reata
Foothills
North Beardsley
South Beardsley
Thompson Peak

only 2.4% Sediment

Hydraulics and Sediment Distribution for Tributaries

Q (cfs)	Slope (ft/ft)	Dmax (ft)	Dave (ft)	Velocity (ft/s)	Top Wid (ft)	Eff Width (ft)	Qs total (cfs)	Bed Load (%)	Susp Ld (cfs)	Sediment Flow by Interval (cfs) VFS	FS	MS	CS	VCS	VFG	FG	MG	CG	VCG	SC
Upper Reata																				
5479	0.0337	3.7	1.4	11.0	391	134	128.81	21.54	101.06	13.09	22.04	17.13	16.44	17.55	22.45	16.56	2.95	0.61	0.00	0.00
4621	0.0328	3.6	1.3	10.6	365	121	104.15	23.15	80.04	10.49	17.66	13.73	13.22	14.20	18.30	13.62	2.44	0.51	0.00	0.00
3620	0.0337	3.3	1.2	10.0	335	109	77.71	24.58	58.60	7.69	12.99	10.15	9.84	10.65	13.83	10.34	1.84	0.37	0.00	0.00
2573	0.0350	3.0	1.1	9.3	296	92	53.34	26.16	39.38	5.18	8.77	6.91	6.75	7.36	9.64	7.22	1.27	0.24	0.00	0.00
1869	0.0382	2.6	1.1	9.2	259	78	46.80	25.56	34.84	4.49	7.65	6.06	5.95	6.50	8.50	6.35	1.11	0.21	0.00	0.00
1052	0.0342	2.2	1.0	8.1	209	59	23.25	28.20	16.70	2.26	3.82	3.01	2.95	3.23	4.23	3.14	0.53	0.08	0.00	0.00
Foothills Tributary																				
2058	0.0150	3.0	2.0	9.7	104	71	17.53	21.29	13.80	1.44	1.69	3.14	3.55	2.69	2.41	1.49	0.79	0.32	0.01	0.00
1682	0.0150	2.7	1.9	9.1	100	68	13.57	21.95	10.59	1.12	1.31	2.43	2.76	2.09	1.88	1.16	0.60	0.22	0.00	0.00
1399	0.0150	2.5	1.7	8.6	96	65	10.57	23.80	8.05	0.85	1.00	1.87	2.14	1.64	1.50	0.93	0.48	0.17	0.00	0.00
949	0.0150	2.1	1.4	7.6	90	59	6.35	27.20	4.62	0.50	0.58	1.10	1.28	1.00	0.93	0.58	0.29	0.08	0.00	0.00
659	0.0150	1.8	1.2	6.7	85	55	3.84	29.92	2.69	0.29	0.35	0.66	0.78	0.62	0.58	0.36	0.17	0.03	0.00	0.00
336	0.0150	1.4	0.8	5.3	78	46	1.46	39.81	0.88	0.10	0.12	0.24	0.30	0.25	0.24	0.15	0.05	0.00	0.00	0.00
North Beardsley																				
5356	0.0314	4.4	3.0	17.0	132	72	107.16	19.07	86.73	0.00	5.51	12.59	15.53	15.67	18.60	12.48	12.36	8.85	5.59	0.00
3476	0.0310	3.6	2.5	15.1	112	64	59.84	21.60	46.91	0.00	3.02	6.88	8.50	8.64	10.38	7.10	7.16	5.13	3.05	0.00
2905	0.0314	3.3	2.2	14.3	108	62	47.14	23.43	36.09	0.00	2.31	5.28	6.55	6.72	8.18	5.69	5.82	4.18	2.42	0.00
2270	0.0319	2.9	2.0	13.3	100	59	34.04	24.63	25.66	0.00	1.65	3.77	4.70	4.85	5.94	4.17	4.29	3.04	1.64	0.00
1581	0.0326	2.5	1.6	11.9	89	53	20.51	28.05	14.76	0.00	0.95	2.18	2.75	2.88	3.61	2.60	2.72	1.90	0.91	0.00
1163	0.0332	2.2	1.4	10.8	84	49	13.67	29.87	9.59	0.00	0.62	1.44	1.83	1.94	2.46	1.79	1.86	1.26	0.49	0.00
South Beardsley																				
6142	0.0383	4.7	2.5	16.8	226	78	202.11	15.57	170.64	0.00	29.24	28.45	38.74	28.70	24.99	21.92	13.80	9.06	6.12	1.09
4373	0.0389	4.1	2.1	15.2	206	70	130.55	17.61	107.56	0.00	18.52	18.05	24.69	18.45	16.29	14.56	9.32	6.14	3.98	0.55
3589	0.0394	3.9	2.0	14.4	194	64	104.47	18.05	85.62	0.00	14.79	14.43	19.77	14.81	13.12	11.75	7.53	4.91	3.06	0.33
2876	0.0401	3.6	1.8	13.5	181	59	79.21	19.30	63.92	0.00	11.06	10.83	14.90	11.23	10.04	9.09	5.86	3.80	2.25	0.16
1990	0.0412	3.1	1.5	12.3	158	52	50.22	21.77	39.29	0.00	6.82	6.71	9.33	7.13	6.47	5.98	3.90	2.50	1.36	0.02
1453	0.0428	2.8	1.3	11.4	135	46	34.17	23.80	26.04	0.00	4.52	4.48	6.29	4.86	4.47	4.19	2.75	1.74	0.86	0.00
781	0.0431	2.2	1.1	10.0	98	35	16.28	26.45	11.98	0.00	2.12	2.12	3.00	2.34	2.18	2.07	1.35	0.81	0.30	0.00
Thompson Peak																				
5475	0.0315	4.0	3.0	17.6	105	78	109.58	17.23	90.70	0.00	9.88	11.32	13.98	20.16	18.19	14.13	11.89	6.12	3.62	0.30
4551	0.0315	3.7	2.7	16.5	103	75	85.16	18.60	69.32	0.00	7.58	8.67	10.73	15.55	14.14	11.11	9.46	4.88	2.82	0.20
3623	0.0315	3.3	2.4	15.2	101	72	62.42	20.15	49.84	0.00	5.49	6.28	7.78	11.33	10.40	8.27	7.11	3.66	2.02	0.11
2534	0.0315	2.8	2.0	13.3	98	68	37.82	22.64	29.25	0.00	3.26	3.73	4.65	6.83	6.35	5.14	4.47	2.26	1.11	0.02
1829	0.0315	2.4	1.6	11.8	96	65	24.03	26.16	17.74	0.00	1.99	2.29	2.88	4.30	4.08	3.39	2.99	1.48	0.64	0.00
883	0.0315	1.8	1.1	9.2	88	53	9.03	32.58	6.09	0.00	0.71	0.82	1.06	1.63	1.60	1.37	1.20	0.53	0.10	0.00

less from 1% sediment

2% sediment

3.3% Sediment

only 2.0% Sediment

only about 1-3% of the flow is considerd as sediment flowing in the water

G: LEVEL II ANALYSIS RESULTS

Results of the Level II analysis, which include several scenarios, are presented. A Sediment Transport Analysis for each scenario is enclosed.

1. Sediment Transport and Aggradation/Degradation Rates (100-Yr storm only)
2. Sediment Transport and Aggradation/Degradation Rates (comparison of six return periods)
3. Comparison of Sediment Transport and Aggradation/Degradation for 3 Scenarios (100-Yr storm)

~~Even for 2 yr flow we are getting scour ranging from 2' to 10'!!!~~ ~~What are these results?~~ OK

Reach	Sediment Transport Rate at Peak Discharge (cfs)						Aggradation/Degradation Rate at Peak Discharge (cfs)					
	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
1	3.3	5.6	8.1	12.3	17.3	21.0	0.0	0.0	0.0	0.0	0.0	0.0
2	3.5	6.6	10.1	17.2	24.5	32.1	6.1	10.9	14.3	21.1	25.7	29.8
3	3.5	6.6	10.1	17.2	24.5	32.1	0.0	0.0	0.0	0.0	0.0	0.0
4	3.5	6.6	10.1	17.2	24.5	32.1	0.0	0.0	0.0	0.0	0.0	0.0
5	13.5	23.6	34.3	55.5	72.4	90.5	-10.1	-17.0	-24.2	-38.3	-47.9	-58.4
6	19.1	37.3	55.6	90.1	118.0	148.0	-5.6	-13.7	-21.3	-34.6	-45.6	-57.5
7	15.0	31.9	49.4	84.0	114.0	148.0	4.3	5.6	6.5	6.6	5.0	2.0
8	9.0	19.7	31.6	57.4	81.2	113.0	6.0	12.2	17.8	26.6	32.8	35.0
9	9.1	19.1	30.2	52.8	72.6	102.0	-0.1	0.6	1.4	4.6	8.6	11.0
10	8.4	17.7	27.9	47.0	63.2	87.3	0.7	1.4	2.3	5.8	9.4	14.7
11	6.6	12.0	18.5	31.6	44.3	61.7	1.8	5.7	9.4	15.4	18.9	25.6
12	4.2	7.2	10.8	18.6	27.4	38.3	4.4	8.7	13.4	22.6	30.0	41.5
13	3.4	6.7	10.1	17.0	25.2	34.5	0.8	0.5	0.7	1.6	2.2	3.8
14	2.9	6.1	9.6	16.3	24.6	33.7	0.5	0.6	0.5	0.7	0.6	0.8
15	2.4	5.1	8.2	14.3	22.3	30.9	0.5	1.0	1.4	2.0	2.3	2.8
16	2.4	9.9	13.9	22.0	32.5	43.2	0.0	-4.8	-5.8	-7.7	-10.2	-12.3
17	4.1	19.4	25.7	38.7	53.8	69.4	-1.6	-9.5	-11.8	-16.7	-21.3	-26.2
18	3.1	9.5	14.2	24.0	34.9	47.9	1.0	9.9	11.5	14.7	18.9	21.5
19	2.9	6.9	11.0	19.0	28.1	39.8	0.2	2.6	3.2	5.0	6.8	8.1
20	4.4	8.5	12.8	20.4	29.7	42.1	-1.4	-1.6	-1.8	-1.4	-1.6	-2.3
21	6.1	11.3	15.9	22.5	31.1	42.5	-1.7	-2.8	-3.1	-2.1	-1.4	-0.4
22	2.9	5.9	8.7	13.3	19.4	28.1	6.5	10.8	14.4	20.7	28.5	38.0
23	1.8	3.7	5.6	9.6	14.6	21.2	1.1	2.2	3.1	3.7	4.8	6.9
24	2.8	5.4	8.2	14.3	21.4	30.0	-1.0	-1.8	-2.6	-4.7	-6.8	-8.8
25	3.7	7.1	11.6	19.5	27.7	37.5	-1.0	-1.6	-3.5	-5.2	-6.3	-7.5
26	2.8	5.3	9.0	15.0	21.3	28.9	1.0	1.8	2.6	4.5	6.4	8.6
27	2.7	5.1	7.3	11.7	16.1	21.7	0.1	0.2	1.8	3.3	5.2	7.2

deg.

?

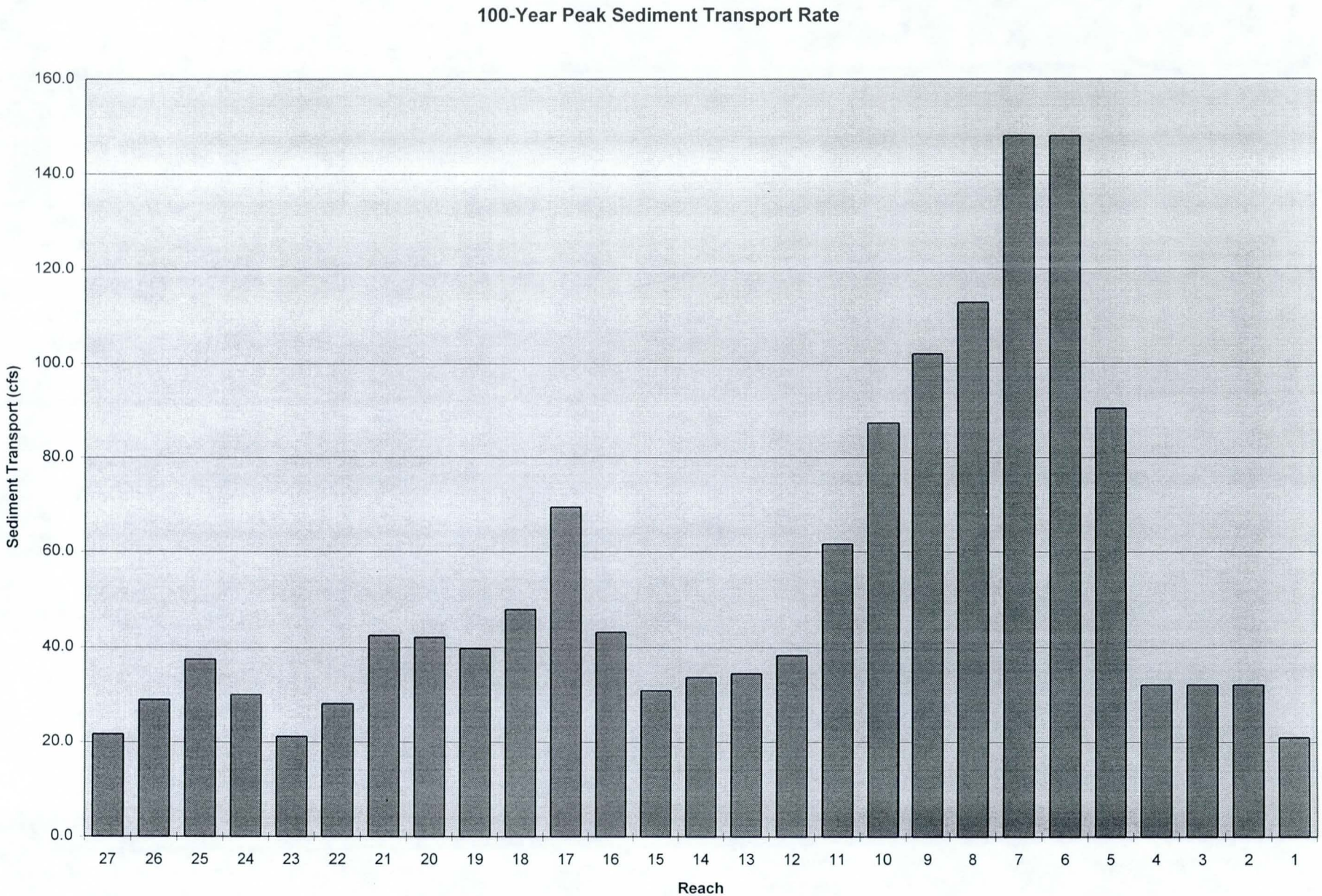
agg.

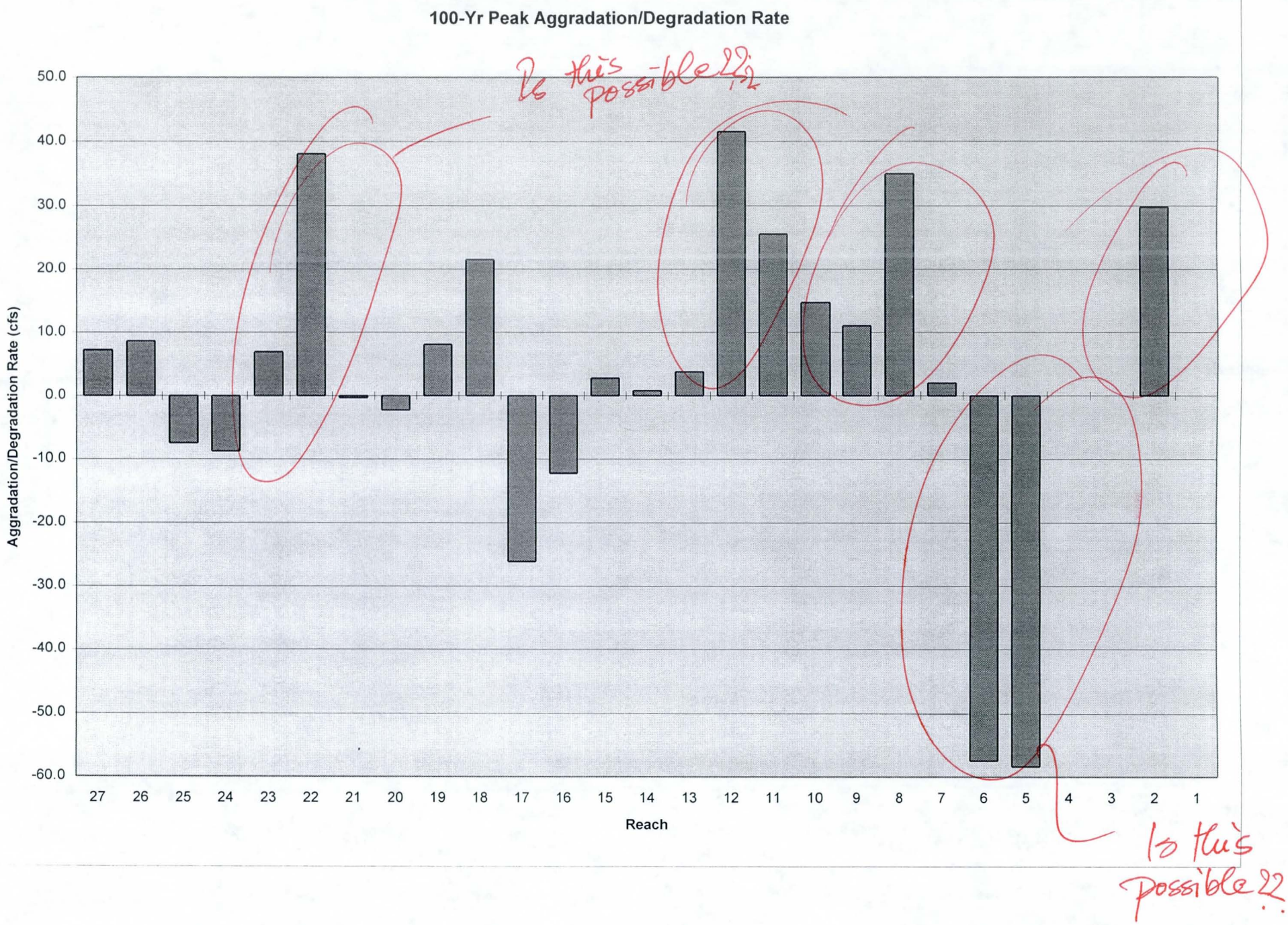
deg

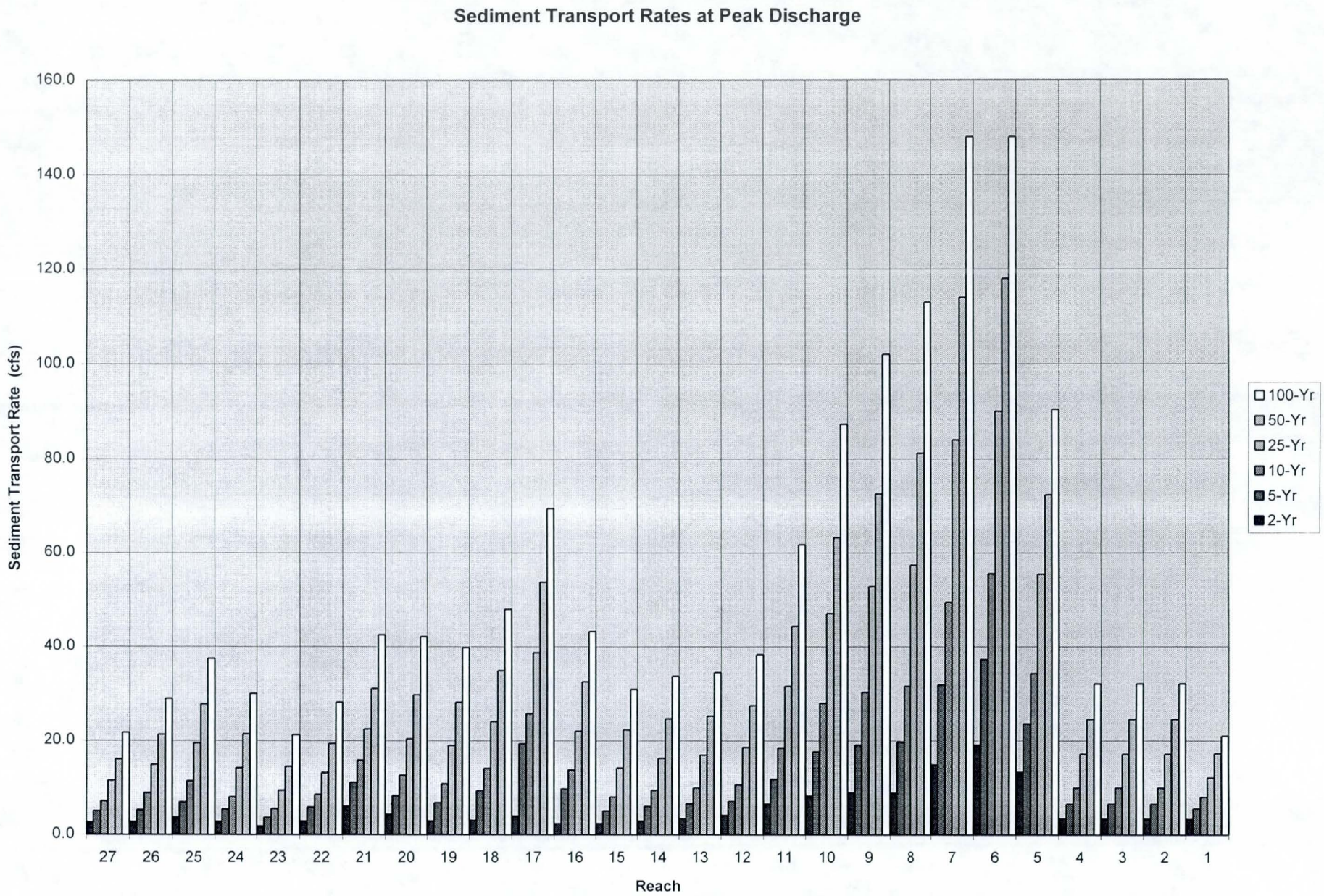
agg.

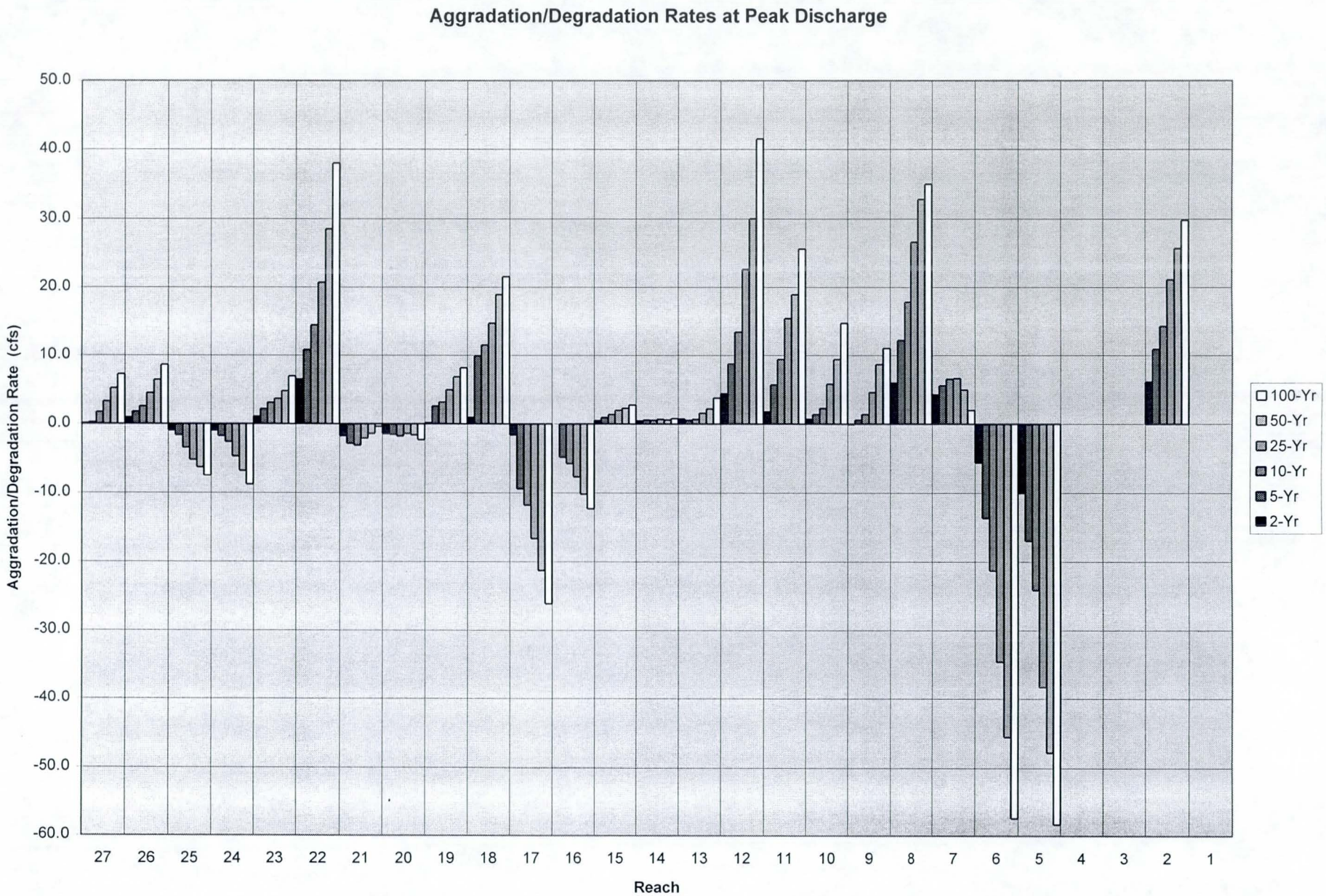
agg.

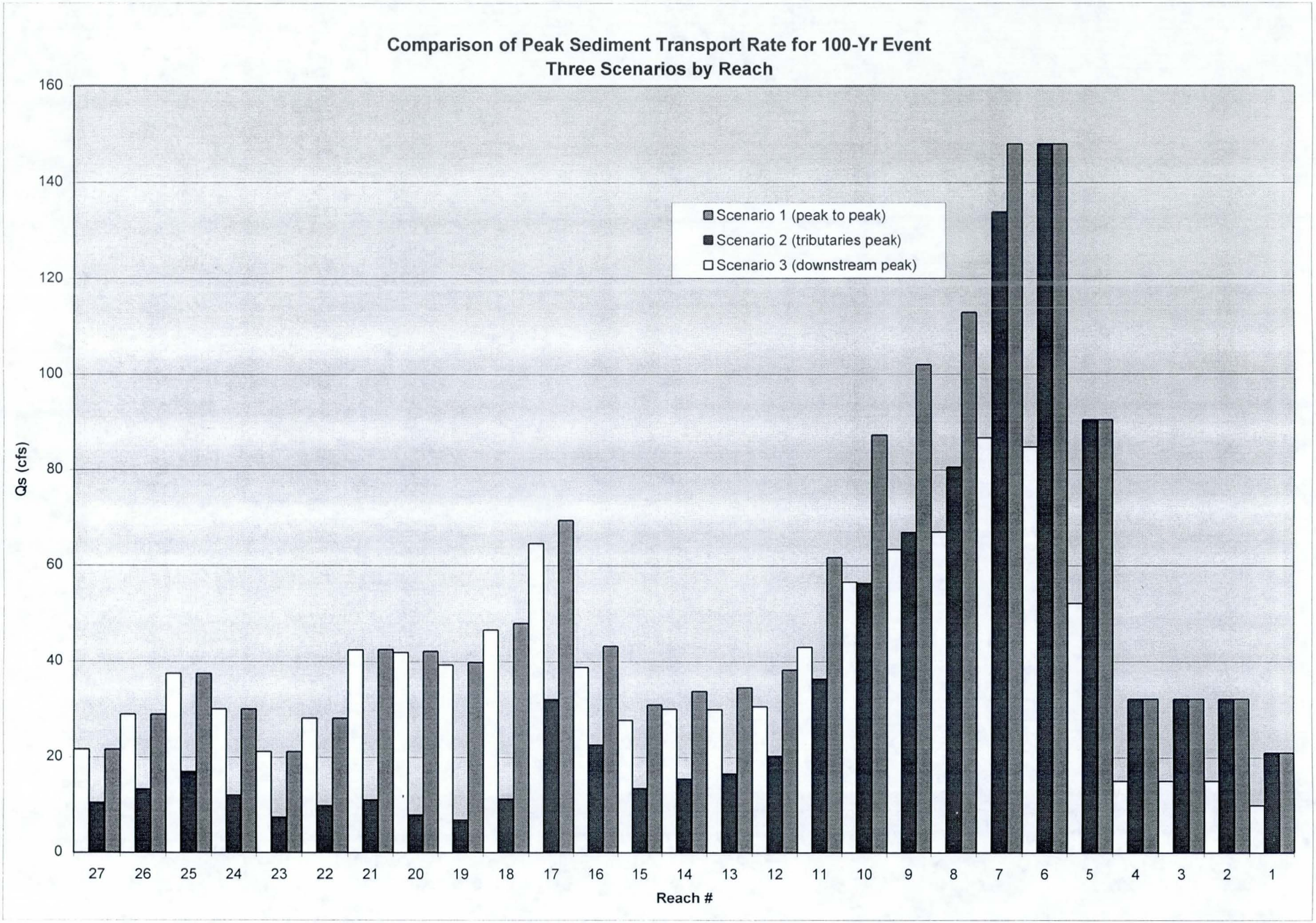
~~How are these results used in calculating general scour for final be-down calcs!!!~~


100-Year Peak Sediment Transport Rate
Sediment Transport (cfs)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Reach

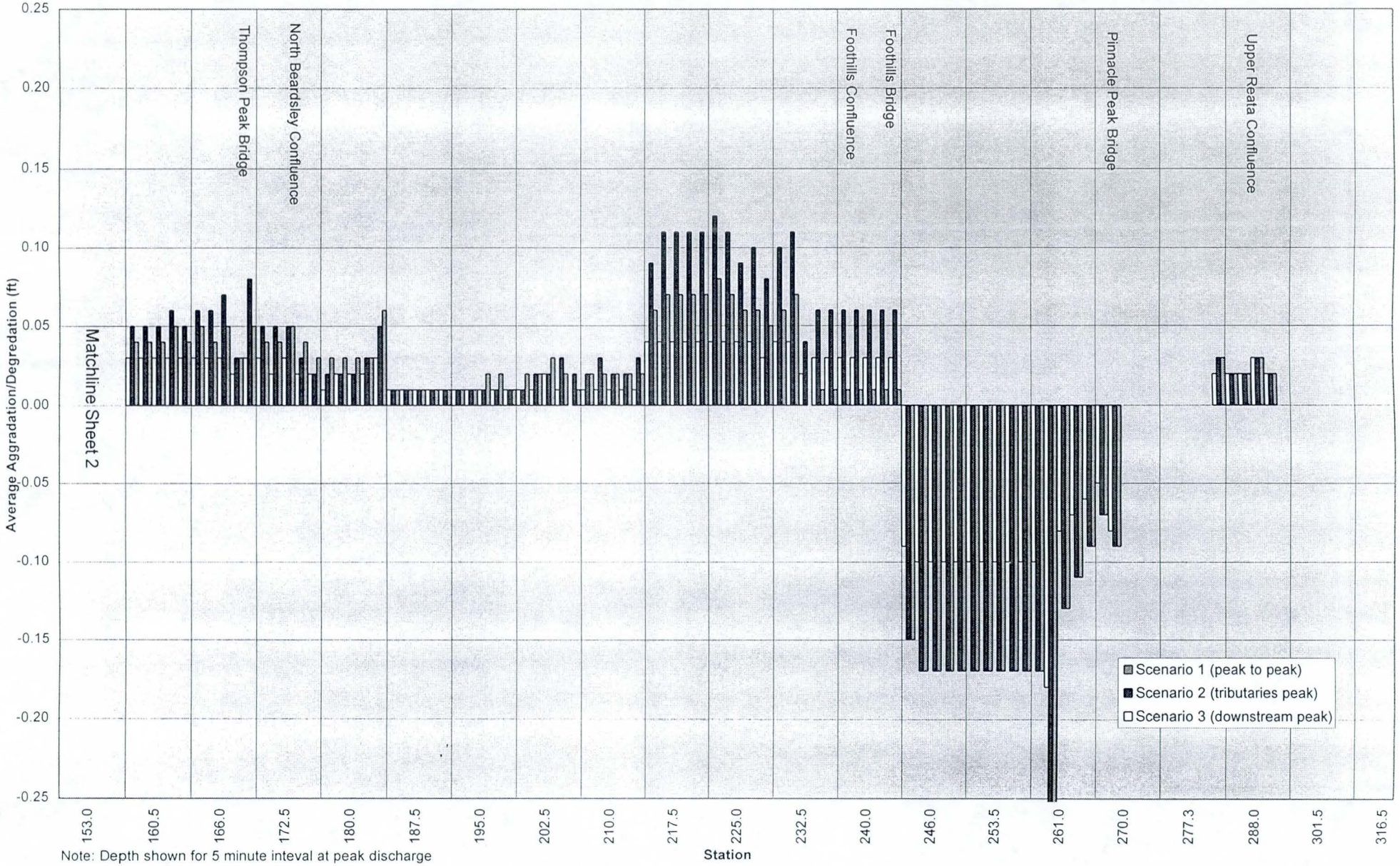

100-Yr Peak Aggradation/Degradation Rate
Aggradation/Degradation Rate (cfs)
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Reach
Is this possible??
Is this possible??


Sediment Transport Rates at Peak Discharge
Sediment Transport Rate (cfs)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Reach
100-Yr
50-Yr
25-Yr
10-Yr
5-Yr
2-Yr


Aggradation/Degradation Rates at Peak Discharge
Aggradation/Degradation Rate (cfs)
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Reach
100-Yr
50-Yr
25-Yr
10-Yr
5-Yr
2-Yr

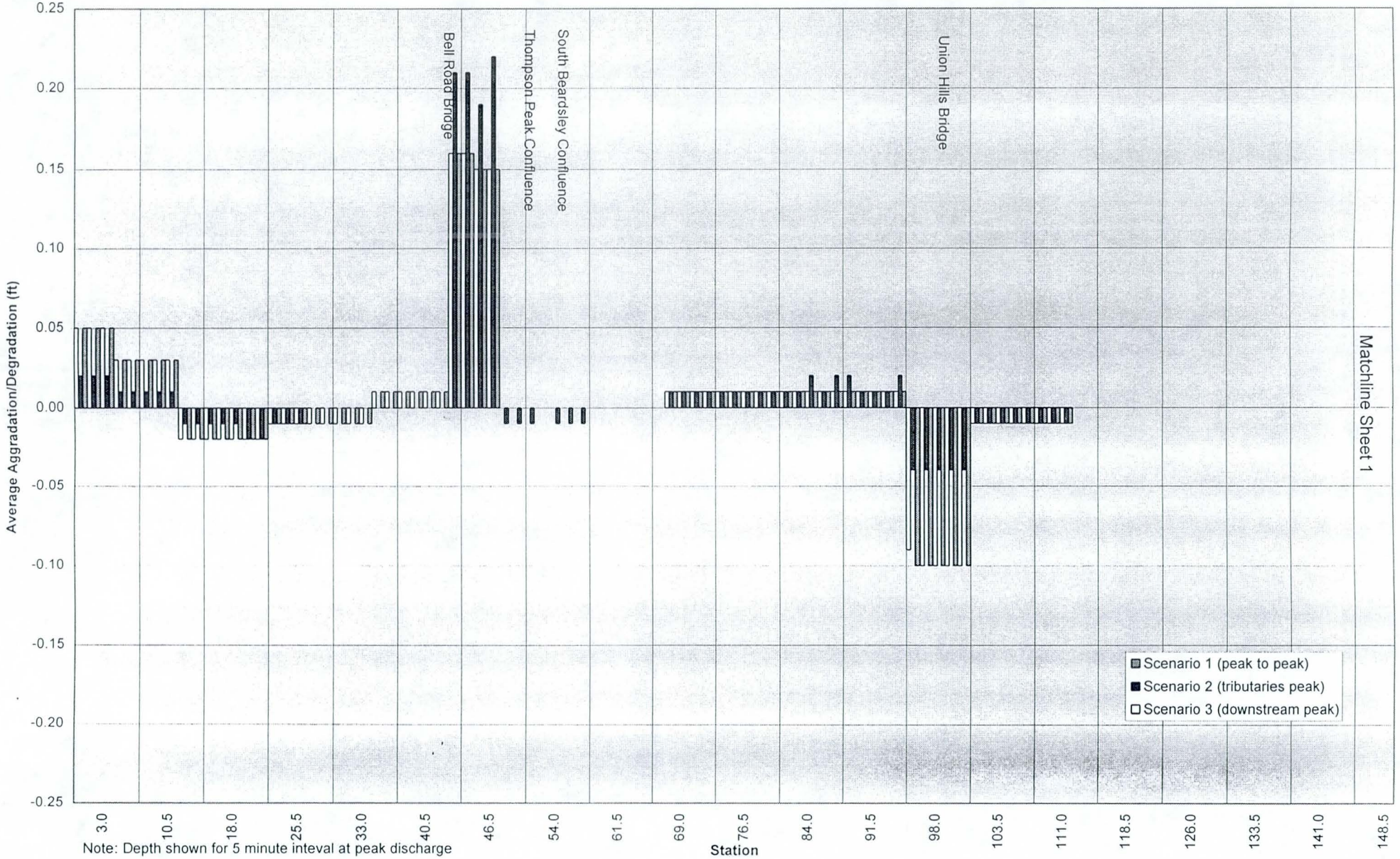

Comparison of Peak Sediment Transport Rate for 100-Yr Event
Three Scenarios by Reach
Scenario 1 (peak to peak)
Scenario 2 (tributaries peak)
Scenario 3 (downstream peak)
Qs (cfs)
0
20
40
60
80
100
120
140
160
27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Reach #

Potential Aggradation/Degradation Trend for 100-Yr return period
Sheet 1



Note: Depth shown for 5 minute inteval at peak discharge

Potential Aggradation/Degradation Trend for 100-yr return period
Sheet 2



Note: Depth shown for 5 minute inteval at peak discharge

H: LEVEL III ANALYSIS RESULTS

Results of the Level III analysis are enclosed in this section. Level III analysis was performed for the 100-Year and 10-Year flood events. The thalweg profiles before and after the 100-yr and 10-yr storms are enclosed. Selected cross-sections before and after the 100-yr storm are shown.

1. Maximum Aggradation/Degradation Depth from Thalweg
2. Selected Cross-Sections Showing Changes after Flood
3. Tables Showing Thalweg Elevations at Each Time Step (100-Yr storm by reach, 100-Yr storm by cross-section, and 10-Yr storm by reach)

Does this consider plating the bottom of the channel?

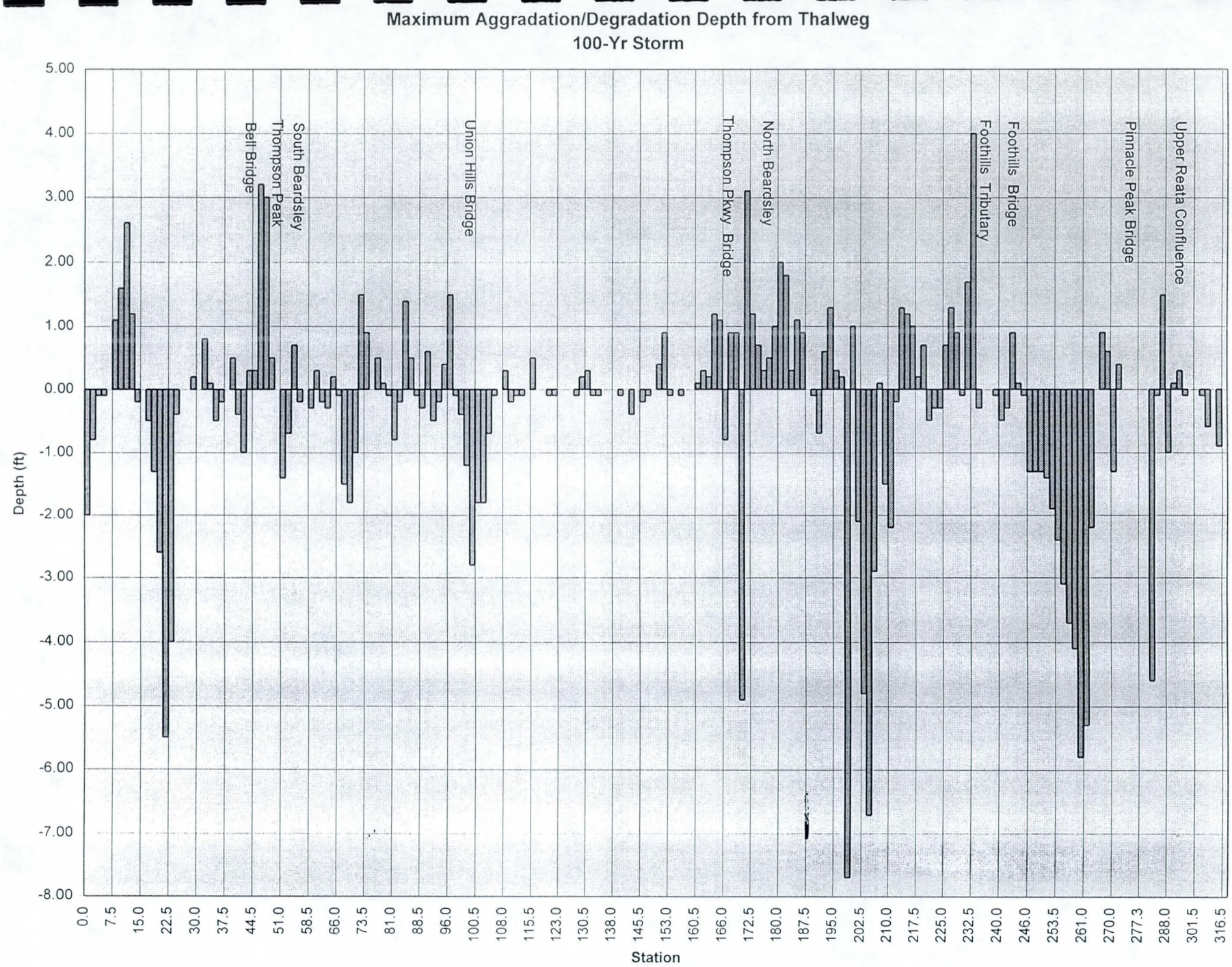
Maximum Aggradation/Degradation Depth from Thalweg

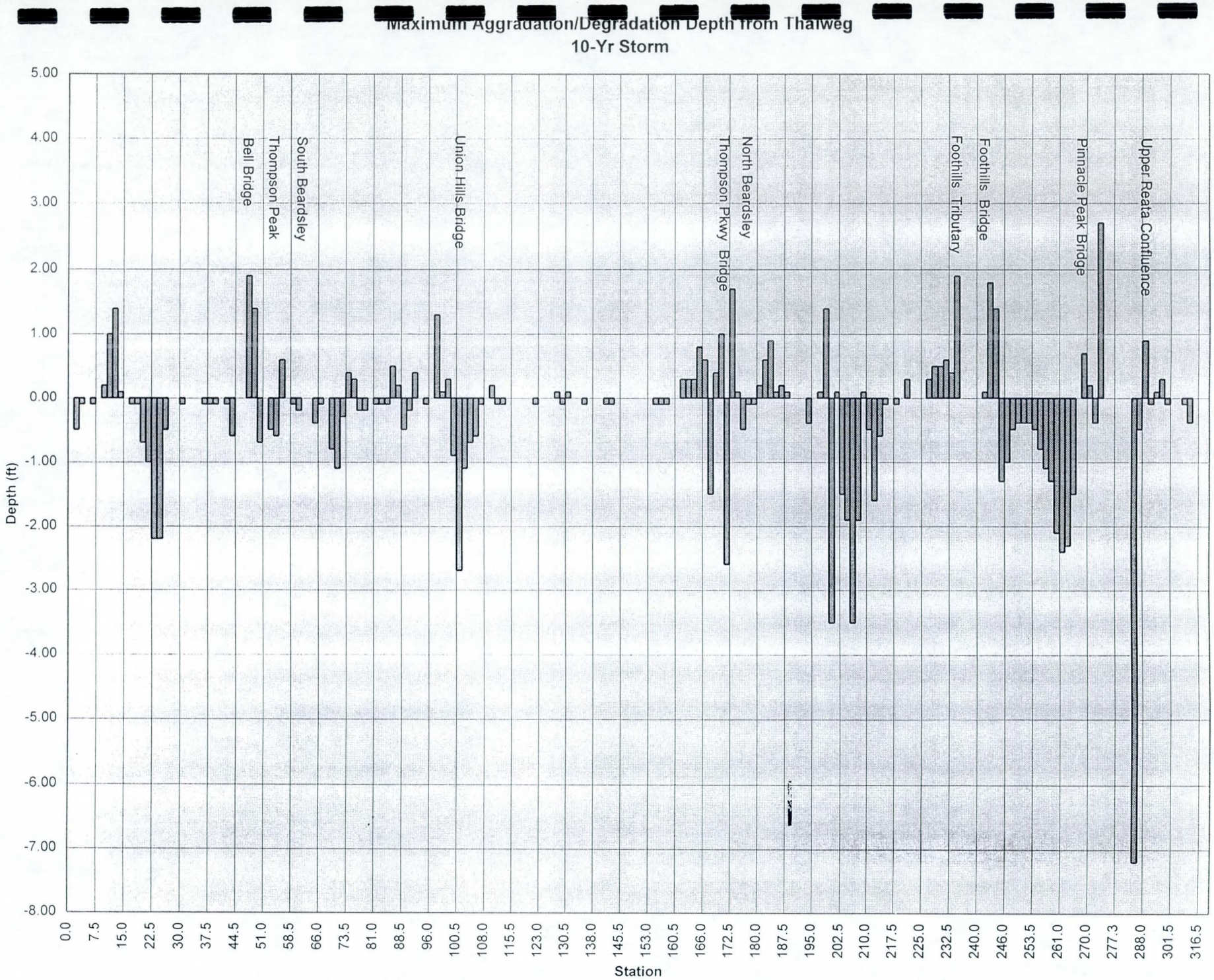
Station	100-Yr	10-Yr	Station	100-Yr	10-Yr	Station	100-Yr	10-Yr	Station	100-Yr	10-Yr
0.0	-2.00	-0.50	76.5	0.50	-0.20	151.5	0.90	0.00	225.0	0.70	0.30
1.5	-0.80	-0.10	78.0	0.10	0.00	153.0	-0.10	-0.10	226.5	1.30	0.50
3.0	-0.10	0.00	79.5	-0.10	-0.10	154.5	0.00	-0.10	228.0	0.90	0.50
4.5	-0.10	-0.10	81.0	-0.80	-0.10	156.0	-0.10	-0.10	229.5	-0.10	0.60
6.0	0.00	0.00	82.5	-0.20	-0.10	157.5	0.00	0.00	231.0	1.70	0.40
7.5	1.10	0.20	84.0	1.40	0.50	159.0	0.00	0.00	232.5	4.00	1.90
9.0	1.60	1.00	85.5	0.50	0.20	160.5	0.10	0.30	234.0	-0.30	0.00
10.5	2.60	1.40	87.0	-0.10	-0.50	162.0	0.30	0.30	235.5	0.00	0.00
12.0	1.20	0.10	88.5	-0.30	-0.20	163.5	0.20	0.30	237.0	0.00	0.00
13.5	-0.20	0.00	90.0	0.60	0.40	165.0	1.20	0.80	238.5	-0.10	0.00
15.0	0.00	-0.10	91.5	-0.50	0.00	165.5	1.10	0.60	240.0	-0.50	0.10
16.5	-0.50	-0.10	93.0	-0.20	-0.10	166.0	-0.80	-1.50	240.3	-0.30	1.80
18.0	-1.30	-0.70	94.5	0.40	0.00	166.5	0.90	0.40	240.8	0.90	1.40
19.5	-2.60	-1.00	96.0	1.50	1.30	168.0	0.90	1.00	243.0	0.10	-1.30
21.0	-5.50	-2.20	97.5	-0.10	0.10	169.5	-4.90	-2.60	244.5	-0.10	-1.00
22.5	-4.00	-2.20	98.0	-0.40	0.30	171.0	3.10	1.70	246.0	-1.30	-0.50
24.0	-0.40	-0.50	98.5	-1.20	-0.90	172.5	1.20	0.10	247.5	-1.30	-0.40
25.5	0.00	0.00	99.0	-2.80	-2.70	174.0	0.70	-0.50	249.0	-1.30	-0.40
27.0	0.00	0.00	100.5	-1.80	-1.10	175.5	0.30	-0.10	250.5	-1.40	-0.40
28.5	0.20	-0.10	102.0	-1.80	-0.70	177.0	0.50	-0.10	252.0	-1.90	-0.50
30.0	0.00	0.00	103.5	-0.70	-0.60	178.5	1.00	0.20	253.5	-2.40	-0.80
31.5	0.80	0.00	105.0	-0.10	-0.10	180.0	2.00	0.60	255.0	-3.10	-1.10
33.0	0.10	0.00	106.5	0.00	0.00	181.5	1.80	0.90	256.5	-3.70	-1.30
34.5	-0.50	-0.10	108.0	0.30	0.20	183.0	0.30	0.10	258.0	-4.10	-2.10
36.0	-0.20	-0.10	109.5	-0.20	-0.10	184.5	1.10	0.20	259.5	-5.80	-2.40
37.5	0.00	-0.10	111.0	-0.10	-0.10	186.0	0.90	0.10	261.0	-5.30	-2.30
39.0	0.50	0.00	112.5	-0.10	0.00	187.5	0.00	0.00	262.5	-2.20	-1.50
40.5	-0.40	-0.10	114.0	0.00	0.00	189.0	-0.10	0.00	264.0	0.00	0.00
42.0	-1.00	-0.60	115.5	0.50	0.00	190.5	-0.70	0.00	265.5	0.90	0.70
43.6	0.30	0.00	117.0	0.00	0.00	192.0	0.60	-0.40	267.0	0.60	0.20
44.5	0.30	0.00	118.5	0.00	0.00	193.5	1.30	0.00	270.0	-1.30	-0.40
45.0	3.20	1.90	120.0	-0.10	-0.10	195.0	0.30	0.10	271.5	0.40	2.70
46.5	3.00	1.40	121.5	-0.10	0.00	196.5	0.20	1.40	272.3	0.00	0.00
48.0	0.50	-0.70	123.0	0.00	0.00	198.0	-7.70	-3.50	272.7	0.00	0.00
49.5	0.00	0.00	124.5	0.00	0.00	199.5	1.00	0.10	275.7	0.00	0.00
51.0	-1.40	-0.50	126.0	0.00	0.10	201.0	-2.10	-1.50	277.3	0.00	0.00
52.5	-0.70	-0.60	127.5	-0.10	-0.10	202.5	-4.80	-1.90	277.5	0.00	0.00
54.0	0.70	0.60	129.0	0.20	0.10	204.0	-6.70	-3.50	280.6	-4.60	-7.20
55.5	-0.20	0.00	130.5	0.30	0.00	205.5	-2.90	-1.90	284.2	-0.10	-0.50
57.0	0.00	-0.10	132.0	-0.10	0.00	207.0	0.10	0.10	286.5	1.50	0.90
58.5	-0.30	-0.20	133.5	-0.10	-0.10	208.5	-1.50	-0.50	288.0	-1.00	-0.10
60.0	0.30	0.00	135.0	0.00	0.00	210.0	-2.20	-1.60	289.5	0.10	0.10
61.5	-0.20	0.00	136.5	0.00	0.00	211.5	-0.20	-0.60	292.5	0.30	0.30
63.0	-0.30	-0.40	138.0	0.00	0.00	213.0	1.30	-0.10	295.5	-0.10	-0.10
64.5	0.20	-0.10	139.5	-0.10	-0.10	214.5	1.20	0.00	298.5	0.00	0.00
66.0	-0.10	0.00	141.0	0.00	-0.10	216.0	1.00	-0.10	301.5	0.00	0.00
67.5	-1.50	-0.80	142.5	-0.40	0.00	217.5	0.20	0.00	304.5	-0.10	-0.10
69.0	-1.80	-1.10	144.0	0.00	0.00	219.0	0.70	0.30	307.5	-0.60	-0.40
70.5	-1.00	-0.30	145.5	-0.20	0.00	220.5	-0.50	0.00	310.5	0.00	0.00
72.0	1.50	0.40	147.0	-0.10	0.00	222.0	-0.30	0.00	313.5	-0.90	0.00
73.5	0.90	0.30	148.5	0.00	0.00	223.5	-0.30	0.00	316.5	0.00	0.00
75.0	0.00	-0.20	150.0	0.40	0.00						

#5

#6

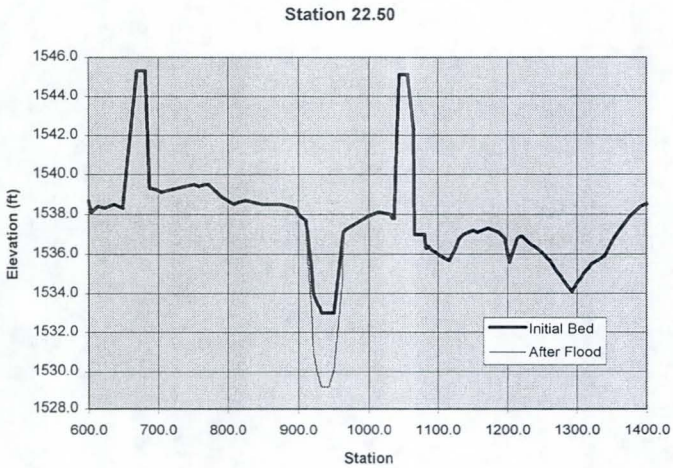
MAX.

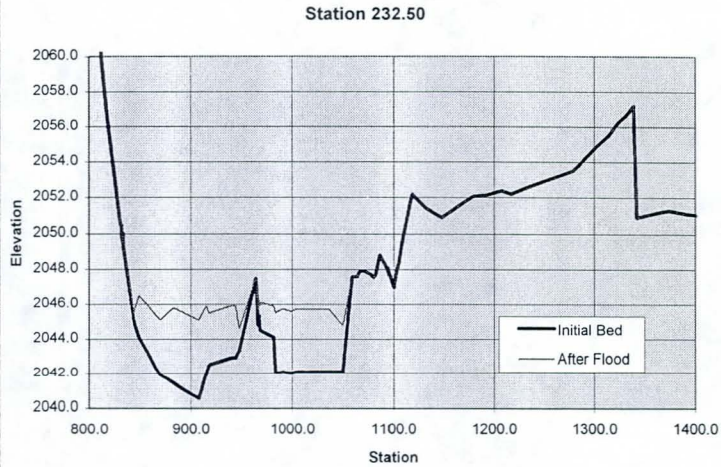

Maximum Aggradation/Degradation Depth from Thalweg
100-Yr Storm
Depth (ft)
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00
-7.00
-8.00
Bell Bridge
Thompson Peak
South Beardsley
Union Hills Bridge
Thompson Pkwy. Bridge
North Beardsley
Foothills Tributary
Foothills Bridge
Pinnacle Peak Bridge
Upper Reata Confluence
0.0
7.5
15.0
22.5
30.0
37.5
44.5
51.0
58.5
66.0
73.5
81.0
88.5
96.0
100.5
108.0
115.5
123.0
130.5
138.0
145.5
153.0
160.5
166.0
172.5
180.0
187.5
195.0
202.5
210.0
217.5
225.0
232.5
240.0
246.0
253.5
261.0
270.0
277.3
288.0
301.5
316.5
Station

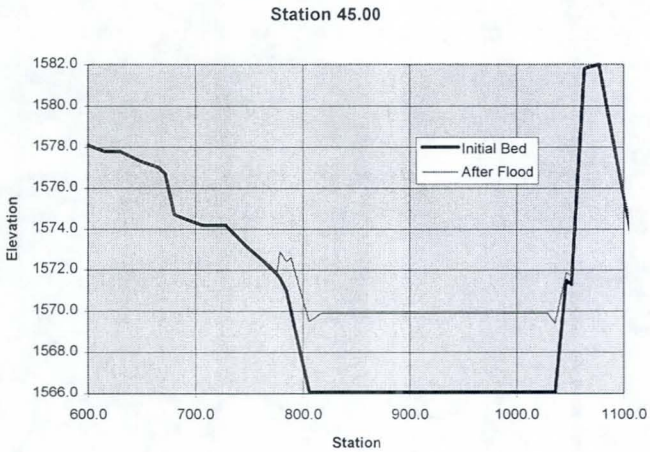

Maximum Aggradation/Degradation Depth from Thalweg
10-Yr Storm
Depth (ft)
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00
-7.00
-8.00
Station
0.0
7.5
15.0
22.5
30.0
37.5
44.5
51.0
58.5
66.0
73.5
81.0
88.5
96.0
100.5
108.0
115.5
123.0
130.5
138.0
145.5
153.0
160.5
166.0
172.5
180.0
187.5
195.0
202.5
210.0
217.5
225.0
232.5
240.0
246.0
253.5
261.0
270.0
277.3
288.0
301.5
316.5
Bell Bridge
Thompson Peak
South Beardsley
Union Hills Bridge
Thompson Pkwy Bridge
North Beardsley
Foothills Tributary
Foothills Bridge
Pinnacle Peak Bridge
Upper Reata Confluence

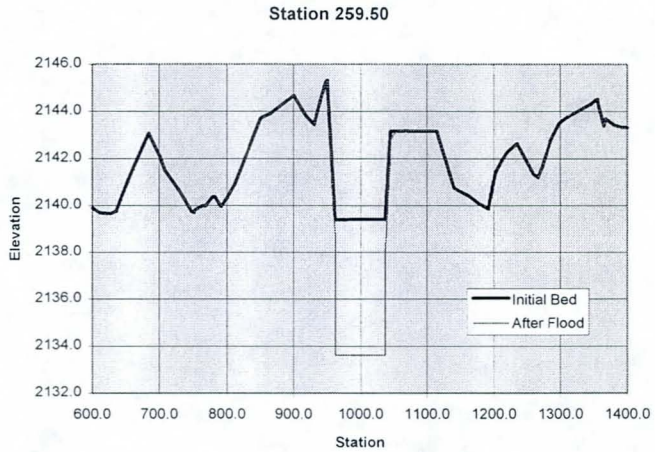
Selected Channel Cross-Sections Before and After 100-Yr Flood

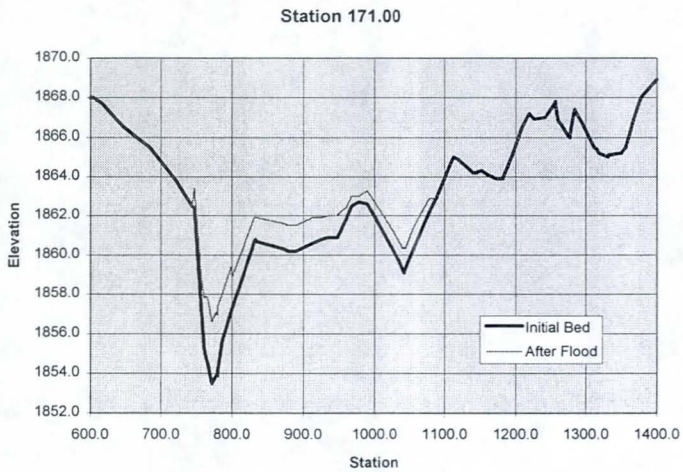
(See Channel Profile for Locations)

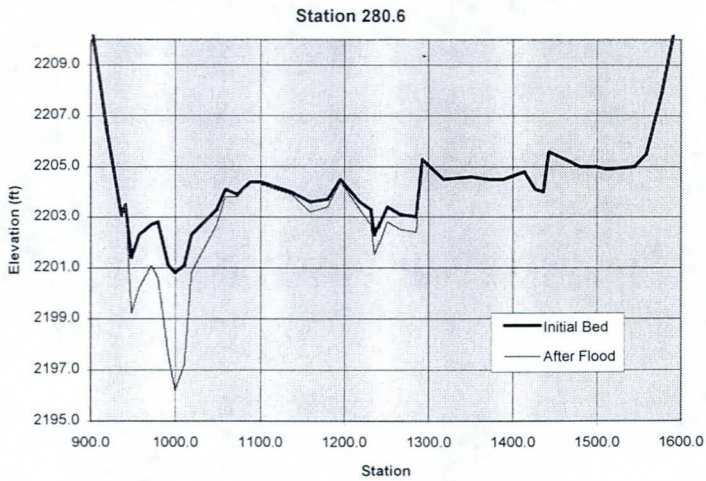


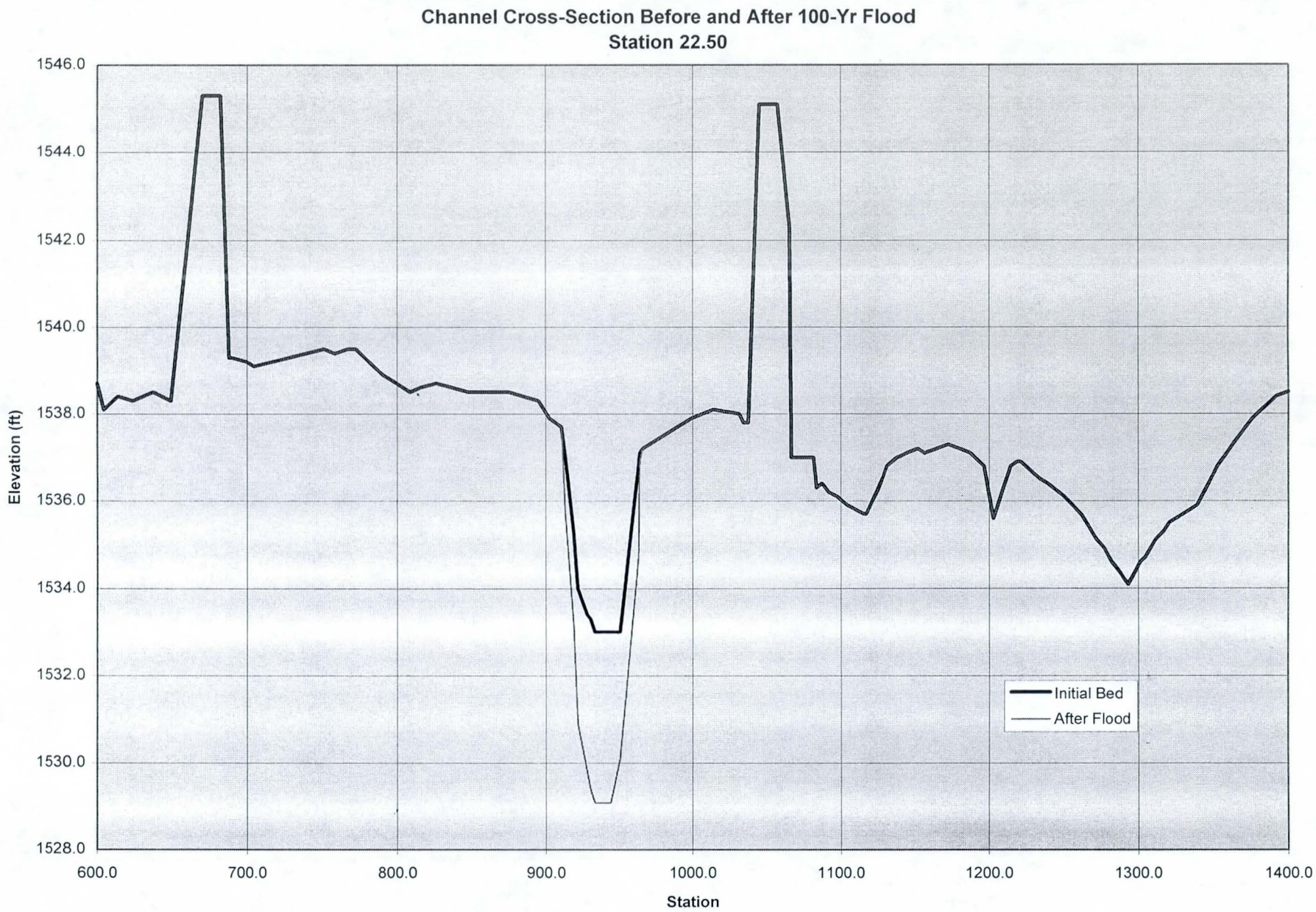


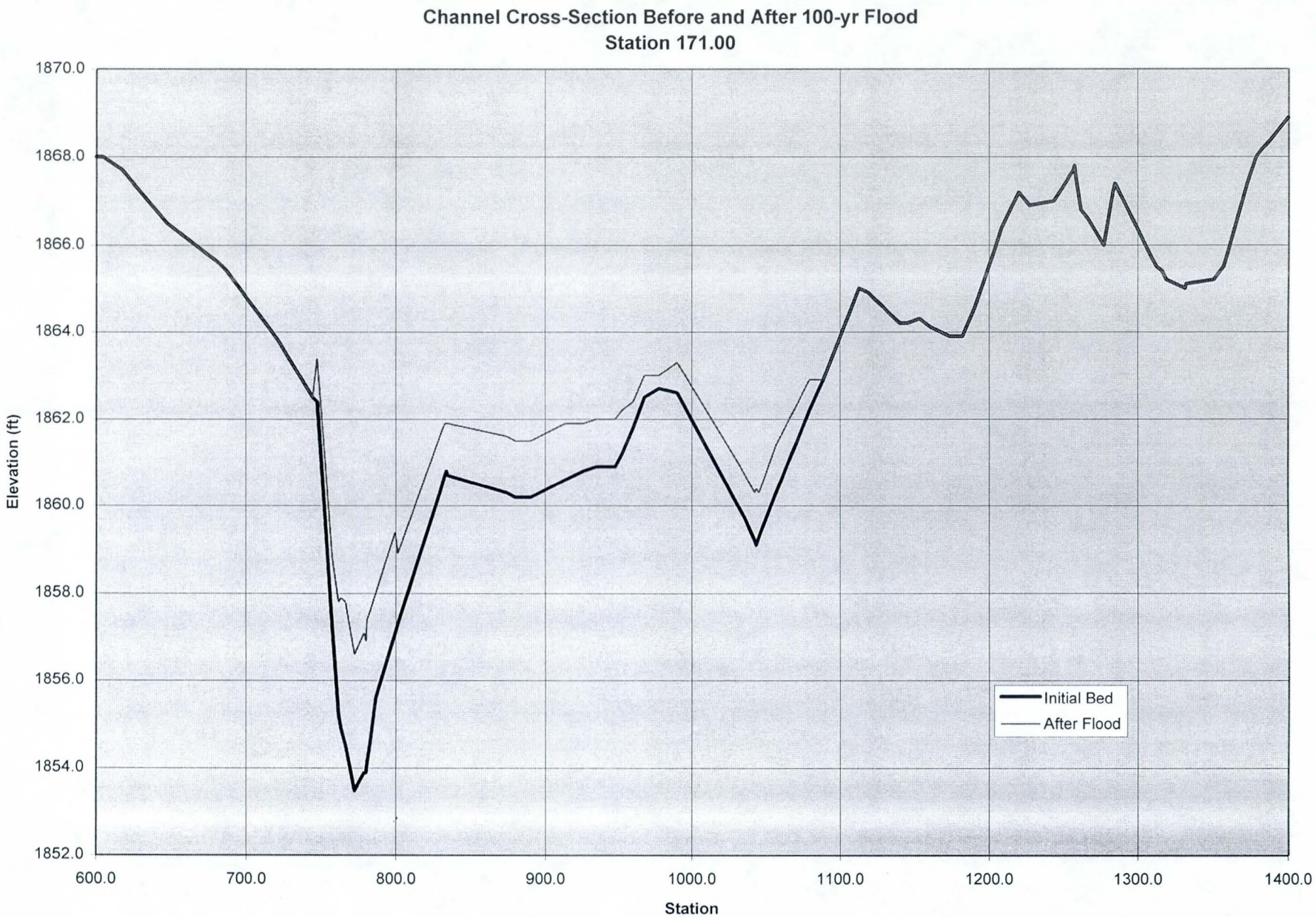


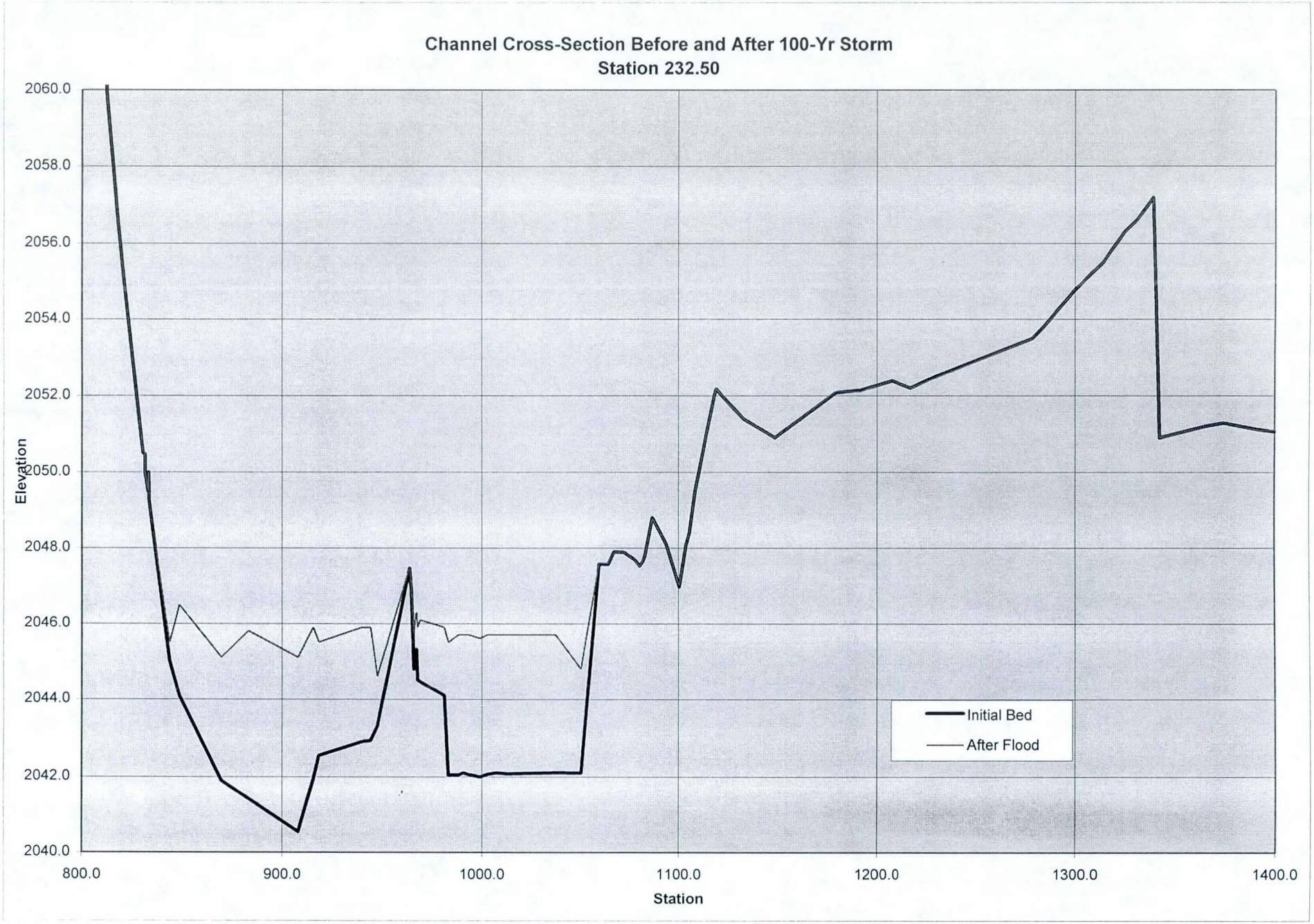


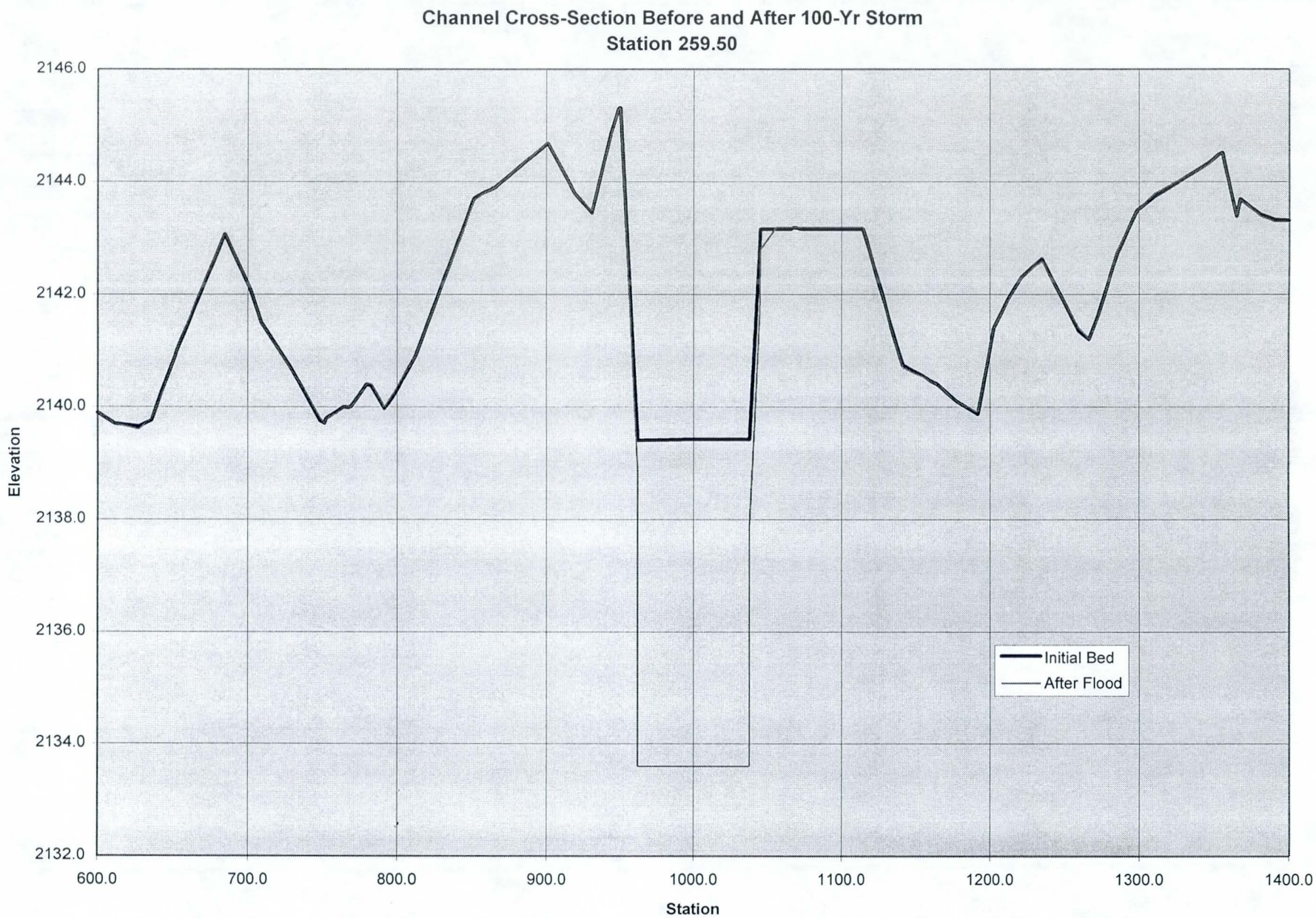


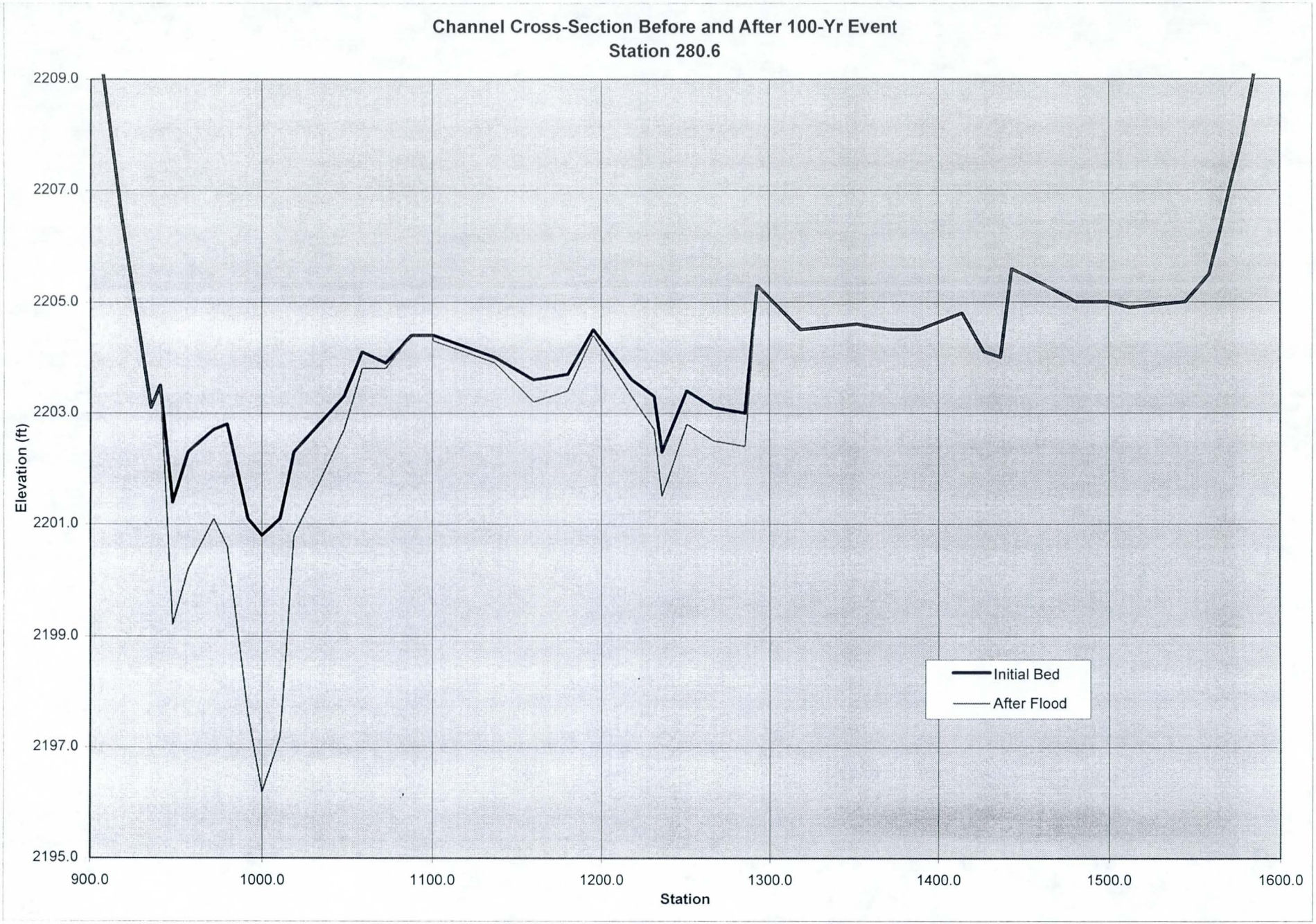


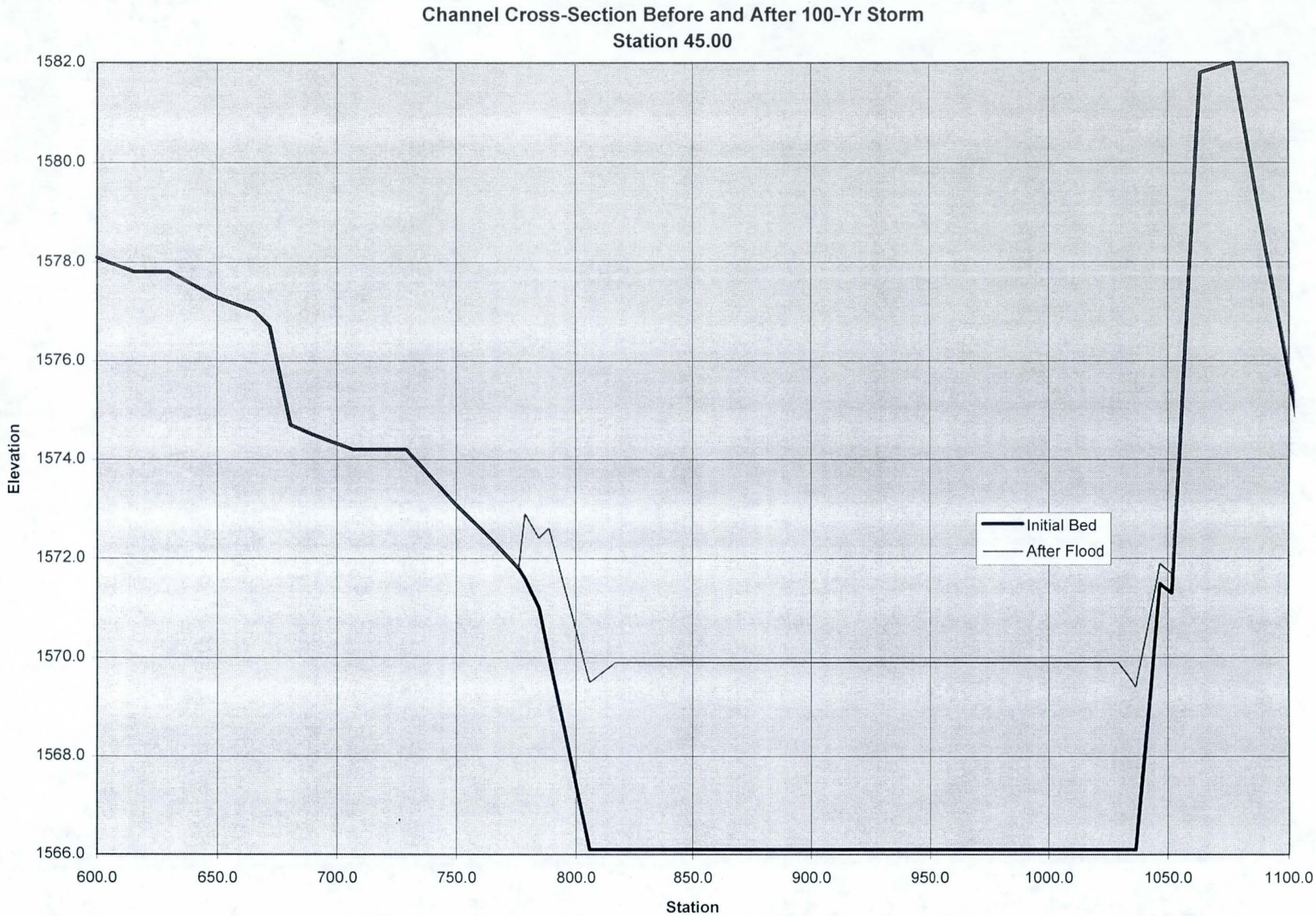

Channel Cross-Section Before and After 100-Yr Flood
Station 22.50
Elevation (ft)
1546.0
1544.0
1542.0
1540.0
1538.0
1536.0
1534.0
1532.0
1530.0
1528.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
Station
Initial Bed
After Flood


Channel Cross-Section Before and After 100-yr Flood
Station 171.00
Elevation (ft)
1870.0
1868.0
1866.0
1864.0
1862.0
1860.0
1858.0
1856.0
1854.0
1852.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
Station
Initial Bed
After Flood


Channel Cross-Section Before and After 100-Yr Storm
Station 232.50
Elevation
2060.0
2058.0
2056.0
2054.0
2052.0
2050.0
2048.0
2046.0
2044.0
2042.0
2040.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
Station
Initial Bed
After Flood


Channel Cross-Section Before and After 100-Yr Storm
Station 259.50
Elevation
2146.0
2144.0
2142.0
2140.0
2138.0
2136.0
2134.0
2132.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
Station
Initial Bed
After Flood


Channel Cross-Section Before and After 100-Yr Event
Station 280.6
Elevation (ft)
2209.0
2207.0
2205.0
2203.0
2201.0
2199.0
2197.0
2195.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
Station
Initial Bed
After Flood


Channel Cross-Section Before and After 100-Yr Storm
Station 45.00
Elevation
1582.0
1580.0
1578.0
1576.0
1574.0
1572.0
1570.0
1568.0
1566.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1000.0
1050.0
1100.0
Station
Initial Bed
After Flood

SEDIMENT TRANSPORT ANALYSIS - THALWEG ADJUSTMENT AFTER A 100-YEAR FLOOD EVENT (20 TIME STEPS) BY REACH

After	Time Step: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Max Agg/Deg Total
1	316.50	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	.0
1	313.50	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	.0
1	310.50	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	.0
1	307.50	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	.0
1	304.50	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	.0
1	301.50	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	.0
1	298.50	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	.0
1	295.50	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	.0
1	292.50	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	.0
2	289.50	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	.0
2	288.00	2224.2	2224.2	2224.2	2224.2	2224.2	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	2224.3	.1
2	286.50	2217.7	2217.7	2217.7	2217.7	2217.7	2217.8	2217.9	2218.0	2218.0	2218.0	2218.0	2218.0	2218.0	2218.0	2218.0	2218.0	2218.1	2218.1	2218.1	2218.1	.5
2	284.15	2210.8	2210.8	2210.8	2210.8	2210.8	2210.9	2211.0	2211.0	2211.0	2211.0	2211.0	2211.0	2211.0	2211.0	2211.0	2211.0	2211.1	2211.1	2211.1	2211.1	.4
2	280.60	2200.8	2200.8	2200.8	2200.8	2200.9	2201.0	2201.1	2201.2	2201.3	2201.3	2201.3	2201.3	2201.3	2201.3	2201.3	2201.3	2201.4	2201.4	2201.4	2201.4	.6
3	277.45	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	.0
3	277.25	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	.0
4	275.70	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	.0
4	272.65	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	.0
4	272.25	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	.0
4	271.50	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	.0
4	270.00	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	.0
5	267.00	2162.0	2161.9	2161.7	2161.5	2161.3	2161.0	2160.8	2160.7	2160.5	2160.3	2160.2	2160.1	2160.1	2160.0	2159.9	2159.7	2159.7	2159.6	2159.5	2159.4	2159.3	-2.7
5	265.50	2158.0	2158.0	2157.9	2157.7	2157.6	2157.5	2157.4	2157.4	2157.3	2157.2	2157.1	2157.0	2156.9	2156.8	2156.8	2156.8	2156.7	2156.7	2156.7	2156.7	-1.3
5	264.00	2153.8	2153.8	2153.7	2153.5	2153.4	2153.3	2153.2	2153.2	2153.1	2153.0	2152.9	2152.8	2152.7	2152.6	2152.6	2152.6	2152.5	2152.4	2152.3	2152.2	2152.1	-1.7
5	262.50	2150.5	2150.5	2150.4	2150.2	2150.1	2150.0	2150.0	2149.9	2149.8	2149.7	2149.6	2149.5	2149.5	2149.5	2149.5	2149.5	2149.4	2149.4	2149.4	2149.4	2149.4	-1.1
5	261.00	2144.9	2144.9	2144.8	2144.6	2144.5	2144.3	2144.1	2144.0	2144.0	2143.9	2143.8	2143.7	2143.6	2143.5	2143.4	2143.4	2143.3	2143.2	2143.2	2143.2	2143.1	-1.8
5	259.50	2139.4	2139.4	2139.2	2139.1	2138.8	2138.5	2138.4	2138.2	2138.0	2137.9	2137.9	2137.8	2137.7	2137.6	2137.5	2137.5	2137.4	2137.3	2137.3	2137.3	2137.2	-2.2
6	258.00	2133.9	2133.9	2133.8	2133.6	2133.5	2133.3	2133.1	2132.9	2132.9	2132.8	2132.7	2132.6	2132.6	2132.6	2132.6	2132.6	2132.6	2132.6	2132.6	2132.6	2132.6	-1.3
6	256.50	2128.3	2128.3	2128.2	2128.0	2127.9	2127.7	2127.5	2127.3	2127.2	2127.2	2127.1	2127.0	2127.0	2127.0	2127.0	2127.0	2127.0	2127.0	2127.0	2127.0	2127.0	-1.3
6	255.00	2122.8	2122.8	2122.7	2122.5	2122.4	2122.2	2122.0	2121.8	2121.7	2121.7	2121.6	2121.5	2121.5	2121.5	2121.5	2121.5	2121.5	2121.5	2121.5	2121.5	2121.5	-1.3
6	253.50	2117.2	2117.2	2117.1	2116.9	2116.7	2116.6	2116.4	2116.2	2116.1	2116.1	2116.0	2115.9	2115.9	2115.9	2115.9	2115.9	2115.9	2115.9	2115.9	2115.9	2115.9	-1.3
6	252.00	2111.7	2111.7	2111.6	2111.4	2111.3	2111.1	2110.9	2110.7	2110.6	2110.6	2110.5	2110.4	2110.4	2110.4	2110.4	2110.4	2110.4	2110.4	2110.4	2110.4	2110.4	-1.3
6	250.50	2106.1	2106.1	2106.0	2105.8	2105.6	2105.5	2105.3	2105.1	2105.0	2105.0	2104.9	2104.8	2104.8	2104.8	2104.8	2104.8	2104.8	2104.8	2104.8	2104.8	2104.8	-1.3
6	249.00	2100.5	2100.5	2100.4	2100.2	2100.0	2099.9	2099.7	2099.5	2099.4	2099.4	2099.3	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	-1.3
6	247.50	2095.0	2095.0	2094.9	2094.7	2094.5	2094.4	2094.2	2094.0	2093.9	2093.9	2093.8	2093.7	2093.7	2093.7	2093.7	2093.7	2093.7	2093.7	2093.7	2093.7	2093.7	-1.3
6	246.00	2089.5	2089.5	2089.4	2089.2	2089.0	2088.9	2088.7	2088.5	2088.4	2088.4	2088.3	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	-1.3
6	244.50	2083.9	2083.9	2083.8	2083.6	2083.5	2083.3	2083.1	2082.9	2082.9	2082.8	2082.7	2082.6	2082.6	2082.6	2082.6	2082.6	2082.6	2082.6	2082.6	2082.6	2082.6	-1.3
6	243.00	2078.4	2078.4	2078.3	2078.3	2078.1	2077.9	2077.7	2077.7	2077.6	2077.5	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	2077.4	-1.0
7	240.80	2070.8	2070.8	2070.8	2070.8	2070.9	2070.8	2070.8	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	.1
7	240.30	2069.2	2069.2	2069.2	2069.2	2069.2	2069.1	2069.1	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	.0
7	240.00	2067.5	2067.5	2067.5	2067.5	2067.6	2067.5	2067.5	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	.1
7	238.50	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	.0
7	237.00	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	.0
7	235.50	2052.3	2052.3	2052.3	2052.3	2052.3	2052.2	2052.2	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	.0
7	234.00	2047.2	2047.2	2047.2	2047.2	2047.2	2047.1	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	.0
7	232.50	2040.5	2040.5	2040.5	2040.5	2040.6	2040.5	2040.5	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	.1
8	231.00	2036.9	2036.9	2036.9	2036.9	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	.1
8	229.50	2032.5	2032.5	2032.5	2032.6	2032.7	2032.7	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	2032.8	.3
8	228.00	2029.8	2029.8	2029.8	2029.8	2030.0	2030.0	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	2030.1	.3
8	226.50	2025.8	2025.8	2025.8	2025.8	2025.9	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	2026.0	.2
8	225.00	2022.3	2022.3	2022.3	2022.3	2022.5	2022.5	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	2022.6	.3
8	223.50	2018.2	2018.2	2018.2	2018.2	2018.4	2018.4	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	2018.5	.3
8	222.00	2014.6	2014.6	2014.6	2014.8	2014.9	2015.0	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	2015.1	.5
8	220.50	2011.2	2011.2	2011.2	2011.2	2011.3	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	2011.4	.2

8	219.00	2007.8	2007.8	2007.8	2007.9	2008.0	2008.0	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	2008.1	.3
8	217.50	2004.4	2004.4	2004.4	2004.5	2004.6	2004.6	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	2004.7	.3
8	216.00	2001.2	2001.2	2001.2	2001.2	2001.4	2001.4	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	2001.5	.3
8	214.50	1997.0	1997.0	1997.0	1997.2	1997.3	1997.4	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	1997.5	.5
9	213.00	1994.0	1994.0	1994.0	1994.0	1994.0	1994.1	1994.1	1994.1	1994.1	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	.0
9	211.50	1990.0	1990.0	1990.0	1990.0	1990.0	1990.1	1990.1	1990.1	1990.1	1990.1	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	.0
9	210.00	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	1985.1	-.1
9	208.50	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.1	1980.1	1980.1	1980.2	1980.2	1980.1	1980.1	1980.1	1980.1	1980.1	1980.1	1980.1	-.1
9	207.00	1974.9	1975.2	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.8	1974.9	1974.9	1974.9	1974.8	1974.8	1974.8	1974.8	1974.8	1974.8	1974.8	-.1
9	205.50	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.3	1968.4	1968.4	1968.4	1968.3	1968.3	1968.3	1968.3	1968.3	1968.3	1968.3	-.1
9	204.00	1960.1	1960.1	1960.1	1960.1	1960.1	1960.2	1960.2	1960.2	1960.2	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	.0
10	202.50	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	1950.2	.1
10	201.00	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	.0
10	199.50	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	.0
10	198.00	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	.0
10	196.50	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	.0
10	195.00	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	.0
10	193.50	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	.0
10	192.00	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	.0
10	190.50	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	.0
10	189.00	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	.0
10	187.50	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	.0
10	186.00	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	.0
10	184.50	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	.0
11	183.00	1882.8	1882.8	1882.8	1882.8	1882.9	1883.1	1883.1	1883.2	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	1883.3	.5
11	181.50	1879.1	1879.1	1879.1	1879.1	1879.1	1879.2	1879.3	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	1879.4	.3
11	180.00	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	1875.5	.1
11	178.50	1872.2	1872.2	1872.2	1872.2	1872.2	1872.3	1872.4	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	1872.5	.3
11	177.00	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.7	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	1869.8	.2
11	175.50	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.2	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	.2
11	174.00	1862.7	1862.7	1862.7	1862.7	1862.7	1862.8	1862.9	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	1863.0	.3
11	172.50	1857.5	1857.5	1857.5	1857.7	1857.8	1857.9	1857.9	1858.0	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	1858.1	.6
12	171.00	1853.5	1853.5	1853.6	1853.7	1853.8	1854.0	1854.2	1854.2	1854.3	1854.4	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.5	1854.6	1.1
12	169.50	1850.5	1850.6	1850.6	1850.7	1851.0	1851.1	1851.3	1851.4	1851.5	1851.6	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.7	1851.8	1.3
12	168.00	1846.7	1846.7	1846.7	1846.9	1847.0	1847.1	1847.2	1847.2	1847.3	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	1847.4	.7
12	166.50	1844.8	1844.8	1844.8	1844.8	1844.8	1844.9	1845.0	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	1845.1	.3
12	166.00	1843.3	1843.3	1843.3	1843.5	1843.6	1843.7	1843.8	1843.8	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	1843.9	.6
12	165.50	1841.7	1841.7	1841.7	1841.7	1841.8	1842.0	1842.0	1842.1	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	1842.2	.5
12	165.00	1840.2	1840.2	1840.2	1840.4	1840.5	1840.6	1840.7	1840.7	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	1840.8	.6
12	163.50	1836.0	1836.0	1836.0	1836.2	1836.3	1836.4	1836.5	1836.5	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	1836.6	.6
12	162.00	1832.4	1832.4	1832.4	1832.6	1832.7	1832.8	1832.9	1832.9	1833.0	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	1833.1	.7
12	160.50	1827.7	1827.7	1827.7	1827.9	1828.0	1828.1	1828.2	1828.2	1828.3	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	1828.4	.7
12	159.00	1825.4	1825.4	1825.4	1825.4	1825.5	1825.7	1825.7	1825.8	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	1825.9	.5
12	157.50	1821.9	1821.9	1821.9	1821.9	1822.1	1822.2	1822.2	1822.3	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	1822.4	.5
13	156.00	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	.0
13	154.50	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	.0
13	153.00	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	.0
13	151.50	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	.0
13	150.00	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	.0
13	148.50	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	.0
13	147.00	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	.0
13	145.50	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	.0
13	144.00	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	.0
14	142.50	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	.0
14	141.00	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	.0
14	139.50	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	.0

14	138.00	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	.0
14	136.50	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	.0
14	135.00	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	.0
14	133.50	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	.0
14	132.00	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	.0
15	130.50	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	.0
15	129.00	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	.0
15	127.50	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	.0
15	126.00	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	.0
15	124.50	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	.0
15	123.00	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	.0
15	121.50	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	.0
15	120.00	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	.0
15	118.50	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	.0
15	117.00	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	.0
15	115.50	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	.0
15	114.00	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	.0
15	112.50	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	.0
16	111.00	1706.6	1706.6	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	-.1
16	109.50	1702.7	1702.7	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	-.1
16	108.00	1698.7	1698.7	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	-.1
16	106.50	1696.5	1696.5	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	-.1
16	105.00	1693.9	1693.9	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	-.1
16	103.50	1689.1	1689.1	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	-.1
16	102.00	1686.7	1686.7	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	-.1
16	100.50	1684.0	1684.0	1684.0	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	-.1
17	99.00	1675.8	1675.8	1675.7	1675.7	1675.7	1675.7	1675.7	1675.6	1675.5	1675.4	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	1675.3	-.5
17	98.50	1674.2	1674.2	1674.1	1674.1	1674.1	1674.1	1674.1	1674.0	1673.9	1673.8	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	1673.7	-.5
17	98.00	1672.6	1672.6	1672.5	1672.5	1672.5	1672.5	1672.5	1672.4	1672.3	1672.2	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	1672.1	-.5
17	97.50	1671.0	1671.0	1670.9	1670.9	1670.9	1670.9	1670.9	1670.8	1670.7	1670.6	1670.5	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	1670.4	-.6
17	96.00	1669.5	1669.5	1669.4	1669.4	1669.4	1669.4	1669.4	1669.3	1669.2	1669.1	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	-.5
18	94.50	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	.0
18	93.00	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	.0
18	91.50	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	.0
18	90.00	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	.0
18	88.50	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	.0
18	87.00	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	.0
18	85.50	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	.0
18	84.00	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	.0
18	82.50	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	.0
18	81.00	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	.0
18	79.50	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	.0
18	78.00	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	.0
18	76.50	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	.0
18	75.00	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	.0
19	73.50	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	.0
19	72.00	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	.0
19	70.50	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	.0
19	69.00	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	.0
19	67.50	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	.0
20	66.00	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.7	1611.8	1611.8	1611.8	1611.7	1611.7	1611.7	1611.7	1611.7	1611.7	1611.7	1611.7	-.1
20	64.50	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.1	1608.1	1608.1	1608.2	1608.2	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	-.1
20	63.00	1604.2	1604.2	1604.2	1604.1	1604.1	1604.2	1604.2	1604.2	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	-.1
20	61.50	1600.3	1600.3	1600.3	1600.2	1600.3	1600.3	1600.3	1600.3	1600.3	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	-.1
20	60.00	1597.0	1597.0	1597.0	1596.9	1597.0	1597.0	1597.0	1597.0	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	-.1
20	58.50	1593.3	1593.3	1593.3	1593.2	1593.3	1593.3	1593.3	1593.3	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	-.1

21	57.00	1589.3	1589.3	1589.2	1589.2	1589.2	1589.2	1589.2	1589.3	1589.3	1589.3	1589.3	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	-.1
21	55.50	1585.9	1585.9	1585.8	1585.8	1585.8	1585.8	1585.8	1585.9	1585.9	1585.9	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	-.1
21	54.00	1583.7	1583.7	1583.6	1583.6	1583.6	1583.6	1583.6	1583.7	1583.7	1583.7	1583.7	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	-.1
21	52.50	1580.7	1580.7	1580.6	1580.6	1580.6	1580.6	1580.6	1580.7	1580.7	1580.7	1580.7	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	-.1
21	51.00	1577.5	1577.5	1577.5	1577.5	1577.4	1577.4	1577.5	1577.5	1577.5	1577.5	1577.5	1577.5	1577.5	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	-.1
21	49.50	1574.5	1574.5	1574.5	1574.5	1574.4	1574.4	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.4	1574.4	1574.4	1574.4	1574.4	1574.4	1574.4	1574.5	.0
21	48.00	1571.2	1571.2	1571.2	1571.2	1571.1	1571.1	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	-.1
22	46.50	1568.0	1568.0	1568.0	1568.1	1568.3	1568.6	1568.9	1569.0	1569.1	1569.2	1569.3	1569.5	1569.7	1569.8	1569.9	1570.1	1570.2	1570.3	1570.3	1570.3	1570.3	1570.3	2.3
22	45.00	1566.1	1566.1	1566.1	1566.1	1566.3	1566.5	1566.7	1566.9	1567.0	1567.1	1567.2	1567.3	1567.4	1567.5	1567.5	1567.7	1567.8	1567.8	1567.9	1567.9	1567.9	1567.9	1.8
22	44.50	1566.2	1566.2	1566.2	1566.3	1566.5	1566.7	1566.8	1567.0	1567.1	1567.2	1567.3	1567.4	1567.5	1567.6	1567.7	1567.8	1568.0	1568.1	1568.1	1568.2	1568.2	1568.2	2.0
22	43.60	1565.8	1565.8	1565.8	1565.9	1566.1	1566.3	1566.4	1566.6	1566.7	1566.8	1566.9	1567.0	1567.1	1567.2	1567.3	1567.4	1567.6	1567.7	1567.7	1567.8	1567.8	1567.8	2.0
23	42.00	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	.0
23	40.50	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	.0
23	39.00	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	.0
23	37.50	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	.0
23	36.00	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	.0
23	34.50	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	.0
24	33.00	1549.6	1549.6	1549.6	1549.6	1549.5	1549.5	1549.5	1549.5	1549.5	1549.5	1549.5	1549.5	1549.5	1549.5	1549.6	1549.5	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	.0
24	31.50	1547.3	1547.3	1547.3	1547.3	1547.2	1547.2	1547.2	1547.2	1547.2	1547.2	1547.2	1547.2	1547.2	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	.0
24	30.00	1544.6	1544.6	1544.6	1544.6	1544.5	1544.5	1544.5	1544.5	1544.5	1544.5	1544.5	1544.5	1544.5	1544.5	1544.6	1544.5	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	.0
24	28.50	1542.6	1542.6	1542.6	1542.6	1542.5	1542.5	1542.5	1542.5	1542.5	1542.5	1542.5	1542.5	1542.5	1542.5	1542.6	1542.5	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	.0
24	27.00	1539.0	1539.0	1539.0	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1538.9	1539.0	1538.9	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	.0
24	25.50	1536.2	1536.2	1536.2	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.2	1536.2	1536.2	1536.2	.0
24	24.00	1534.7	1534.7	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.7	1534.7	1534.7	1534.7	.0
24	22.50	1533.0	1533.0	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1533.0	1533.0	1532.9	-.1
25	21.00	1531.4	1531.4	1531.4	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	-.1
25	19.50	1528.6	1528.6	1528.6	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	-.1
25	18.00	1525.8	1525.8	1525.8	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.8	1525.8	1525.8	.0
25	16.50	1523.0	1523.0	1523.0	1523.0	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1523.0	1523.0	1523.0	.0
25	15.00	1520.2	1520.2	1520.2	1520.2	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.2	1520.2	1520.2	.0
25	13.50	1517.4	1517.4	1517.4	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.4	1517.3	-.1
25	12.00	1514.6	1514.6	1514.6	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.6	1514.6	1514.6	.0
26	10.50	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	.0
26	9.00	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	.0
26	7.50	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	.0
26	6.00	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	.0
26	4.50	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	.0
27	3.00	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	.0
27	1.50	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	.0
27	.01	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	.0

SEDIMENT TRANPSORT ANALYSIS- THALWEG ADJUSTMENT AFTER 100-YEAR FLOOD (BY CROSS-SECTION, 20 TIME STEPS) BY CROSS-SECTION

AFTER	TIME STEP 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MAX AGG/DEG TOTAL
1	316.50	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	.0
2	313.50	2300.1	2300.1	2300.0	2300.0	2299.9	2299.8	2299.7	2299.6	2299.5	2299.4	2299.3	2299.2	2299.2	2299.2	2299.2	2299.2	2299.2	2299.2	2299.2	2299.2	-.9
3	310.50	2291.9	2291.9	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.8	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	.0
4	307.50	2282.5	2282.5	2282.4	2282.4	2282.3	2282.2	2282.1	2282.0	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	2281.9	-.6
5	304.50	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.4	2273.4	2273.4	2273.4	2273.4	2273.4	-.1
6	301.50	2262.9	2262.9	2262.9	2262.9	2262.8	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	.0
7	298.50	2256.2	2256.2	2256.2	2256.2	2256.1	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	.0
8	295.50	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.3	2247.3	2247.4	2247.4	2247.4	2247.4	2247.3	2247.3	2247.3	-.1
9	292.50	2237.9	2237.9	2237.8	2237.8	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2238.1	2238.2	.3
10	289.50	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.7	.1
11	288.00	2224.2	2224.2	2224.1	2224.1	2224.1	2224.0	2223.9	2223.8	2223.7	2223.6	2223.5	2223.4	2223.3	2223.3	2223.3	2223.3	2223.3	2223.3	2223.3	2223.2	-1.0
12	286.50	2217.7	2217.7	2217.8	2217.9	2218.0	2218.1	2218.2	2218.3	2218.3	2218.4	2218.5	2218.6	2218.7	2218.7	2218.7	2218.7	2218.8	2218.9	2219.0	2219.1	1.5
13	284.15	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.7	2210.7	2210.7	2210.7	2210.7	-.1
14	280.60	2200.8	2200.6	2200.4	2200.1	2199.9	2199.8	2199.6	2199.4	2199.3	2199.2	2199.1	2199.0	2198.9	2198.8	2198.7	2198.5	2198.3	2198.0	2197.7	2197.0	2196.2	-4.6
15	277.45	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	.0
15	277.25	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	.0
16	275.70	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	.0
17	272.65	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	.0
17	272.25	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	.0
18	271.50	2171.5	2171.6	2171.8	2172.5	2173.3	2173.8	2174.0	2174.1	2174.0	2173.8	2173.7	2173.6	2173.4	2173.2	2173.0	2172.7	2172.5	2172.3	2172.1	2172.0	2171.9	.4
19	270.00	2167.9	2167.9	2167.8	2167.4	2167.1	2166.8	2166.6	2166.4	2166.2	2166.2	2166.1	2166.0	2165.9	2165.9	2166.0	2166.0	2166.0	2166.0	2166.1	2166.3	2166.6	-1.3
20	267.00	2162.0	2161.9	2161.8	2161.4	2160.8	2160.6	2160.4	2160.5	2160.5	2160.7	2160.8	2160.9	2161.1	2161.3	2161.5	2161.8	2162.0	2162.2	2162.3	2162.4	2162.6	.6
21	265.50	2158.0	2158.1	2158.2	2158.3	2158.3	2158.4	2158.6	2158.6	2158.7	2158.8	2158.9	2158.9	2158.9	2158.9	2158.9	2158.9	2158.9	2158.9	2158.9	2158.9	.9
22	264.00	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	2153.8	.0
23	262.50	2150.5	2150.5	2150.4	2150.4	2150.4	2150.4	2150.3	2150.2	2150.1	2150.1	2150.1	2150.0	2149.8	2149.7	2149.6	2149.5	2149.3	2149.1	2148.9	2148.5	2148.3	-2.2
24	261.00	2144.9	2144.8	2144.6	2144.5	2144.4	2144.3	2144.2	2144.1	2143.9	2143.7	2143.2	2142.9	2142.5	2142.1	2141.9	2141.2	2140.8	2140.5	2140.3	2139.9	2139.6	-5.3
25	259.50	2139.4	2139.3	2138.9	2138.5	2138.3	2137.8	2137.3	2136.8	2136.2	2135.6	2135.0	2134.6	2134.3	2134.1	2133.9	2133.8	2133.7	2133.6	2133.6	2133.6	2133.6	-5.8
26	258.00	2133.9	2133.9	2133.3	2132.8	2132.2	2131.6	2131.0	2130.3	2129.7	2129.3	2129.1	2129.1	2129.1	2129.1	2129.1	2129.3	2129.3	2129.4	2129.6	2129.7	2129.8	-4.1
27	256.50	2128.3	2128.3	2128.0	2127.4	2126.8	2126.2	2125.6	2125.1	2124.8	2124.6	2124.6	2124.6	2124.6	2124.6	2124.6	2124.6	2124.7	2124.6	2124.7	2124.7	2124.6	-3.7
28	255.00	2122.8	2122.8	2122.6	2122.1	2121.6	2121.0	2120.5	2120.1	2119.9	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	2119.7	-3.1
29	253.50	2117.2	2117.2	2117.0	2116.7	2116.2	2115.7	2115.3	2115.1	2115.0	2114.9	2114.8	2114.8	2114.8	2114.8	2114.8	2114.9	2114.8	2114.8	2114.8	2114.8	2114.8	-2.4
30	252.00	2111.7	2111.7	2111.6	2111.3	2110.9	2110.5	2110.2	2110.0	2110.0	2109.9	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	2109.8	-1.9
31	250.50	2106.1	2106.1	2106.0	2105.8	2105.5	2105.2	2105.0	2104.9	2104.8	2104.7	2104.6	2104.6	2104.7	2104.7	2104.7	2104.7	2104.7	2104.7	2104.7	2104.7	2104.7	-1.4
32	249.00	2100.5	2100.5	2100.4	2100.3	2099.9	2099.8	2099.6	2099.5	2099.4	2099.3	2099.2	2099.2	2099.2	2099.2	2099.2	2099.2	2099.3	2099.3	2099.3	2099.3	2099.2	-1.3
33	247.50	2095.0	2095.0	2094.9	2094.8	2094.5	2094.3	2094.1	2094.1	2094.0	2093.9	2093.8	2093.8	2093.8	2093.8	2093.8	2093.8	2093.8	2093.8	2093.8	2093.8	2093.7	-1.3
34	246.00	2089.5	2089.5	2089.5	2089.4	2089.1	2088.9	2088.7	2088.6	2088.5	2088.5	2088.4	2088.3	2088.2	2088.1	2088.1	2088.1	2088.0	2088.1	2088.1	2088.1	2088.2	-1.3
35	244.50	2083.9	2083.9	2083.9	2083.8	2083.4	2083.0	2082.7	2082.4	2082.2	2082.0	2082.0	2081.9	2082.0	2082.2	2082.3	2082.5	2083.1	2083.6	2083.8	2083.8	2083.8	-.1
36	243.00	2078.4	2078.2	2078.1	2078.1	2077.8	2077.7	2077.7	2077.8	2077.7	2077.6	2078.3	2078.4	2078.4	2078.4	2078.4	2078.4	2078.4	2078.4	2078.5	2078.5	2078.5	.1
37	240.80	2070.8	2070.2	2070.4	2070.8	2071.1	2071.6	2072.3	2073.2	2073.5	2073.6	2074.2	2074.5	2074.5	2074.4	2074.2	2074.0	2073.9	2072.9	2072.5	2072.0	2071.7	.9
38	240.30	2069.2	2069.3	2069.3	2069.6	2069.8	2070.0	2070.1	2070.2	2070.2	2070.3	2070.0	2069.9	2069.7	2069.5	2069.4	2069.3	2069.0	2069.1	2069.0	2069.0	2068.9	-.3
38	240.00	2067.5	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.4	2067.4	2067.3	2067.2	2067.0	-.5
39	238.50	2062.5	2062.5	2062.5	2062.5	2062.5	2062.3	2062.0	2061.7	2061.5	2061.3	2061.0	2060.9	2060.8	2060.9	2060.9	2060.9	2060.9	2061.2	2061.6	2062.0	2062.4	-.1
40	237.00	2057.4	2057.4	2057.4	2057.4	2057.2	2056.9	2056.7	2056.6	2056.5	2056.6	2056.6	2056.6	2056.7	2056.9	2057.0	2057.2	2057.2	2057.4	2057.4	2057.4	2057.4	.0
41	235.50	2052.3	2052.3	2052.3	2052.3	2052.2	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	.0
42	234.00	2047.2	2047.2	2047.2	2047.2	2047.2	2047.1	2047.0	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	2046.9	-.3
43	232.50	2040.5	2040.7	2041.1	2041.7	2042.5	2042.9	2043.2	2043.6	2044.0	2044.2	2044.4	2044.4	2044.5	2044.6	2044.6	2044.6	2044.6	2044.6	2044.5	2044.5	2044.5	4.0
44	231.00	2036.9	2036.9	2037.0	2037.1	2037.5	2038.1	2038.6	2039.0	2039.1	2039.1	2039.0	2038.8	2038.8	2038.7	2038.6	2038.6	2038.6	2038.6	2038.6	2038.6	2038.6	1.7
45	229.50	2032.5	2032.6	2032.7	2033.1	2033.4	2033.5	2033.3	2033.0	2032.6	2032.3	2031.9	2031.8	2031.6	2031.6	2031.7	2031.7	2031.7	2031.9	2032.0	2032.1	2032.4	-.1
46	228.00	2029.8	2029.8	2029.8	2029.9	2030.2	2030.2	2030.2	2030.2	2030.3	2030.4	2030.5	2030.6	2030.7	2030.7	2030.7	2030.7	2030.7	2030.7	2030.7	2030.7	2030.7	.9
47	226.50	2025.8	2025.8	2025.8	2025.9	2026.1	2026.4	2026.5	2026.7	2026.9	2027.1	2027.1	2027.2	2027.2	2027.1	2027.1	2027.1	2027.1	2027.1	2027.1	2027.1	2027.1	1.3
48	225.00	2022.3	2022.3	2022.3	2022.4	2022.6	2022.9	2023.0	2023.0	2023.1	2023.0	2023.0	2023.0	2023.0	2023.0	2023.1	2023.0	2023.0	2023.0	2023.0	2023.0	2023.0	.7
49	223.50	2018.2	2018.2	2018.1	2018.1	2018.2	2018.3	2018.3	2018.3	2018.2	2018.1	2018.0	2017.9	2017.9	2017.9	2017.9	2017.9	2017.8	2017.8	2017.9	2017.9	2017.9	-.3
50	222.00	2014.6	2014.6	2014.5	2014.5	2014.4	2014.3	2014.1	2014.0	2013.9	2013.9	2013.8	2013.7	2013.7	2013.8	2013.8	2013.8	2013.8	2013.9	2014.0	2014.2	2014.3	-.3
51	220.50	2011.2	2011.2	2011.1	2011.1	2011.0	2010.9	2010.8	2010.7	2010.6	2010.6	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	2010.7	-.5

52	219.00	2007.8	2007.8	2007.8	2007.8	2007.8	2007.8	2007.8	2007.8	2007.8	2008.0	2008.1	2008.1	2008.2	2008.3	2008.4	2008.4	2008.5	2008.5	2008.5	2008.5	2008.5	.7	
53	217.50	2004.4	2004.4	2004.4	2004.4	2004.4	2004.5	2004.6	2004.7	2004.7	2004.7	2004.7	2004.6	2004.6	2004.6	2004.6	2004.6	2004.6	2004.6	2004.6	2004.6	2004.6	.2	
54	216.00	2001.2	2001.2	2001.2	2001.2	2001.3	2001.4	2001.5	2001.6	2001.7	2001.8	2001.9	2002.0	2002.0	2002.1	2002.1	2002.1	2002.2	2002.3	2002.3	2002.2	2002.2	1.0	
55	214.50	1997.0	1996.9	1996.9	1997.1	1997.3	1997.5	1997.6	1997.7	1997.8	1998.0	1998.2	1998.3	1998.3	1998.4	1998.5	1998.6	1998.5	1998.5	1998.5	1998.3	1998.2	1.2	
56	213.00	1994.0	1994.0	1994.0	1994.1	1994.3	1994.5	1994.7	1994.9	1995.0	1995.1	1995.1	1995.2	1995.3	1995.4	1995.4	1995.4	1995.4	1995.4	1995.4	1995.5	1995.3	1.3	
57	211.50	1990.0	1990.0	1990.0	1990.0	1990.2	1990.4	1990.5	1990.6	1990.6	1990.6	1990.6	1990.6	1990.6	1990.5	1990.5	1990.5	1990.4	1990.3	1990.3	1990.0	1989.8	-.2	
58	210.00	1985.2	1985.2	1984.9	1984.7	1984.7	1984.7	1984.7	1984.6	1984.5	1984.4	1984.3	1984.2	1984.1	1983.9	1983.7	1983.6	1983.4	1983.3	1983.3	1983.1	1983.0	-2.2	
59	208.50	1980.2	1980.2	1980.1	1979.8	1979.7	1979.6	1979.5	1979.3	1979.1	1978.9	1978.7	1978.6	1978.6	1978.5	1978.4	1978.4	1978.5	1978.5	1978.5	1978.5	1978.7	-1.5	
60	207.00	1974.9	1975.2	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1975.0	1975.0	1975.0	1975.0	1975.0	1975.0	1975.0	1975.0	.1	
61	205.50	1968.4	1968.3	1968.3	1968.2	1968.2	1968.3	1968.3	1968.2	1968.2	1968.2	1968.1	1968.0	1967.9	1967.7	1967.5	1967.2	1967.0	1966.8	1966.6	1966.1	1965.5	-2.9	
62	204.00	1960.1	1960.0	1959.7	1959.2	1958.9	1958.7	1958.5	1957.9	1957.5	1957.1	1956.8	1956.5	1956.4	1956.1	1955.8	1955.2	1954.7	1954.4	1954.1	1953.6	1953.4	-6.7	
63	202.50	1950.1	1950.1	1949.9	1949.5	1949.0	1948.3	1947.6	1946.9	1946.4	1945.9	1945.6	1945.3	1945.1	1945.0	1945.1	1945.0	1945.0	1944.9	1945.0	1945.1	1945.3	-4.8	
64	201.00	1941.3	1941.3	1941.3	1941.0	1940.6	1939.9	1939.3	1938.9	1938.6	1938.5	1938.5	1938.3	1938.3	1938.3	1938.5	1938.6	1938.6	1938.6	1938.7	1939.0	1939.2	-2.1	
65	199.50	1937.4	1937.4	1937.4	1937.7	1938.2	1938.5	1939.0	1939.5	1939.9	1940.1	1940.1	1940.1	1940.1	1940.0	1940.0	1939.8	1939.5	1939.3	1939.1	1938.8	1938.4	1.0	
66	198.00	1930.9	1930.8	1930.5	1930.3	1930.7	1931.2	1931.5	1931.8	1931.6	1931.1	1930.3	1929.7	1929.2	1928.5	1927.9	1927.1	1926.5	1926.0	1925.5	1924.4	1923.2	-7.7	
67	196.50	1925.5	1925.6	1925.4	1925.0	1924.6	1924.3	1924.1	1923.7	1923.0	1922.5	1921.9	1921.5	1921.2	1921.2	1921.4	1921.7	1922.2	1922.9	1923.7	1924.8	1925.7	.2	
68	195.00	1921.3	1921.4	1921.4	1921.4	1921.3	1921.3	1921.3	1921.3	1921.4	1921.4	1921.4	1921.4	1921.4	1921.4	1921.4	1921.4	1921.5	1921.5	1921.5	1921.5	1921.6	.3	
69	193.50	1916.6	1916.6	1916.7	1916.9	1916.9	1916.8	1916.9	1916.9	1917.2	1917.4	1917.6	1917.8	1917.9	1917.9	1918.0	1918.0	1918.0	1917.9	1917.9	1918.0	1917.9	1.3	
70	192.00	1911.0	1911.0	1911.0	1911.1	1911.1	1911.0	1911.1	1911.1	1911.3	1911.4	1911.4	1911.5	1911.6	1911.6	1911.6	1911.6	1911.7	1911.7	1911.6	1911.6	1911.6	.6	
71	190.50	1905.0	1905.0	1904.9	1905.0	1904.9	1904.9	1904.8	1904.7	1904.8	1904.8	1904.8	1904.8	1904.8	1904.8	1904.7	1904.7	1904.7	1904.7	1904.6	1904.4	1904.3	-.7	
72	189.00	1901.9	1901.9	1901.8	1901.9	1901.8	1901.8	1901.8	1901.8	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.8	1901.8	1901.8	1901.8	1901.9	1901.8	1901.8	-.1	
73	187.50	1897.5	1897.5	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.4	1897.5	1897.5	.0	
74	186.00	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.4	1892.5	1892.6	1892.7	1892.8	1892.9	1892.9	1893.0	1893.1	1893.2	1893.2	1893.2	1893.2	1893.2	.9	
75	184.50	1887.8	1887.8	1887.8	1887.9	1888.1	1888.3	1888.6	1888.8	1889.0	1889.0	1889.1	1889.1	1889.0	1889.0	1889.0	1889.0	1889.0	1889.0	1889.0	1889.0	1888.9	1.1	
76	183.00	1882.8	1882.8	1882.8	1882.7	1882.8	1882.8	1882.7	1882.7	1882.6	1882.5	1882.5	1882.6	1882.6	1882.6	1882.6	1882.6	1882.7	1882.8	1882.9	1883.0	1883.1	.3	
77	181.50	1879.1	1879.1	1879.1	1879.2	1879.3	1879.4	1879.4	1879.4	1879.6	1879.7	1879.9	1880.1	1880.2	1880.3	1880.3	1880.5	1880.6	1880.6	1880.7	1880.8	1880.9	1.8	
78	180.00	1875.4	1875.4	1875.4	1875.6	1875.9	1876.3	1876.6	1876.8	1877.1	1877.2	1877.2	1877.3	1877.4	1877.4	1877.4	1877.4	1877.4	1877.4	1877.4	1877.4	1877.4	2.0	
79	178.50	1872.2	1872.2	1872.2	1872.2	1872.4	1872.7	1872.8	1873.0	1873.1	1873.1	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1873.2	1.0	
80	177.00	1869.6	1869.6	1869.6	1869.6	1869.6	1869.8	1869.9	1869.9	1870.0	1870.1	1870.2	1870.2	1870.2	1870.2	1870.2	1870.2	1870.1	1870.1	1870.1	1870.1	1870.1	.5	
81	175.50	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.2	1866.3	1866.3	1866.3	1866.2	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.3	1866.4	.3	
82	174.00	1862.7	1862.6	1862.4	1862.3	1862.3	1862.2	1862.1	1862.1	1862.1	1862.1	1862.3	1862.4	1862.4	1862.5	1862.6	1862.8	1862.9	1863.0	1863.0	1863.2	1863.4	.7	
83	172.50	1857.5	1857.5	1857.5	1857.7	1857.8	1857.9	1858.0	1858.1	1858.2	1858.2	1858.2	1858.3	1858.4	1858.5	1858.5	1858.5	1858.6	1858.6	1858.6	1858.6	1858.7	1.2	
84	171.00	1853.5	1853.9	1854.7	1855.8	1856.7	1857.4	1858.0	1858.2	1858.3	1858.3	1858.3	1858.3	1858.3	1858.3	1858.3	1858.1	1858.0	1857.8	1857.6	1857.2	1856.6	3.1	4.8' Aggd.
85	169.50	1850.5	1850.5	1850.4	1850.5	1850.4	1850.4	1850.2	1850.1	1849.9	1849.7	1849.4	1849.2	1849.0	1848.8	1848.6	1848.0	1847.7	1847.3	1847.0	1846.4	1845.6	-4.9	
86	168.00	1846.7	1846.7	1846.7	1846.8	1846.8	1846.9	1846.8	1847.1	1847.1	1847.3	1847.3	1847.2	1847.1	1847.0	1846.9	1846.9	1846.9	1846.9	1847.1	1847.3	1847.6	.9	
87	166.50	1844.8	1844.8	1844.7	1844.8	1844.8	1845.0	1845.1	1845.3	1845.3	1845.5	1845.4	1845.5	1845.5	1845.5	1845.6	1845.7	1845.7	1845.7	1845.7	1845.7	1845.7	.9	
88	166.00	1843.3	1843.2	1842.8	1842.7	1842.7	1842.8	1843.0	1842.8	1842.9	1842.8	1842.9	1842.9	1842.8	1842.8	1842.9	1842.8	1842.8	1842.7	1842.6	1842.6	1842.5	-.8	
89	165.50	1841.7	1841.7	1841.9	1841.9	1841.9	1842.0	1842.0	1841.8	1841.9	1841.9	1841.9	1842.0	1842.1	1842.2	1842.3	1842.5	1842.6	1842.7	1842.8	1842.8	1842.8	1.1	
89	165.00	1840.2	1840.2	1840.5	1840.5	1840.5	1840.6	1840.6	1840.4	1840.5	1840.5	1840.5	1840.6	1840.7	1840.8	1841.0	1841.1	1841.2	1841.3	1841.4	1841.4	1841.4	1.2	
90	163.50	1836.0	1836.0	1836.1	1836.1	1836.0	1836.0	1836.0	1836.0	1835.9	1835.9	1835.9	1835.9	1835.9	1835.9	1835.9	1835.9	1836.0	1836.1	1836.2	1836.2	1836.2	.2	
91	162.00	1832.4	1832.4	1832.4	1832.4	1832.4	1832.4	1832.3	1832.3	1832.4	1832.3	1832.4	1832.4	1832.4	1832.4	1832.4	1832.4	1832.5	1832.5	1832.5	1832.6	1832.7	.3	
92	160.50	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.6	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.7	1827.8	.1	
93	159.00	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	.0	
94	157.50	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	.0	
95	156.00	1818.8	1818.8	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	1818.7	-.1	
96	154.50	1815.5	1815.5	1815.5	1815.5	1815.4	1815.4	1815.4	1815.4	1815.4	1815.4	1815.4	1815.4	1815.4	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	.0	
97	153.00	1811.7	1811.7	1811.6	1811.6	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.6	1811.6	1811.6	1811.6	1811.6	-.1	
98	151.50	1804.6	1804.6	1804.6	1804.6	1804.6	1804.8	1804.9	1805.1	1805.2	1805.3	1805.3	1805.4	1805.5	1805.5	1805.5	1805.5	1805.5	1805.5	1805.5	1805.5	1805.5	.9	
99	150.00	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.2	1801.3	1801.3	1801.4	1801.5	1801.5	1801.5	1801.5	1801.5	1801.4	1801.4	1801.4	1801.4	1801.4	1801.4	.4	
100	148.50	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.7	1797.7	1797.8	1797.8	1797.8	1797.8	.0	
101	147.00	1793.1	1793.1	1793.1	1793.0	1793.0	1793.0	1793.0	1792.9	1792.9	1792.9	1792.9	1793.0	1793.0	1793.0	1793.0	1793.0	1793.0	1793.0	1793.0	1793.0	1793.0	-.1	
102	145.50	1790.9	1790.9	1790.8	1790.8	1790.8	1790.8	1790.8	1790.7	1790.6	1790.6	1790.6	1790.6	1790.6	1790.6	1790.6	1790.6	1790.7	1790.7	1790.7	1790.7	1790.7	-.2	
103	144.00	1786.6	1786.6	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.5	1786.6	1786.6	.0	
104	142.50	1782.2	1782.2	1782.1	1782.1	1782.1	1782.1	1782.0	1781.9	1781.8	1781.8	1781.7	1781.7	1781.7	1781.7	1781.7	1781.7	1781.7	1781.7	1781.8	1781.8	1781.8	-.4	
105	141.00	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.6	1777.6	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	.0	
106	139.50	1774.0	1774.0	1773.9	1774.0	1774.0	1774.0	1773.9	1773.9	1773.9	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1773.9	1773.9	1773.9	1773.9	1773.9	-.1	

107	138.00	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.4	1770.4	1770.4	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.4	1770.4	1770.5	1770.5	1770.5	.0
108	136.50	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	.0
109	135.00	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	.0
110	133.50	1762.6	1762.6	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	1762.5	-.1
111	132.00	1759.8	1759.8	1759.7	1759.7	1759.7	1759.8	1759.8	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	1759.7	-.1
112	130.50	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1756.0	1756.1	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	1756.2	.3
113	129.00	1751.5	1751.5	1751.5	1751.5	1751.6	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.7	1751.8	1751.8	1751.8	1751.7	1751.7	.2
114	127.50	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.7	1746.8	1746.7	1746.7	-.1
115	126.00	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.5	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	.0
116	124.50	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.4	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	.0
117	123.00	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	.0
118	121.50	1732.2	1732.2	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	1732.1	-.1
119	120.00	1727.7	1727.7	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	1727.6	-.1
120	118.50	1724.3	1724.3	1724.3	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.2	1724.3	1724.2	1724.3	1724.3	1724.3	1724.3	.0
121	117.00	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	.0
122	115.50	1715.6	1715.6	1715.6	1715.6	1715.6	1715.7	1715.8	1715.9	1716.0	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	1716.1	.5
123	114.00	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	.0
124	112.50	1709.8	1709.8	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	1709.7	-.1
125	111.00	1706.6	1706.6	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	-.1
126	109.50	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.7	1702.6	-.2
127	108.00	1698.7	1698.7	1698.7	1698.7	1698.7	1698.7	1698.7	1698.8	1698.8	1698.8	1698.8	1698.8	1698.8	1698.8	1698.8	1698.8	1698.8	1698.9	1698.9	1698.9	1699.0	.3
128	106.50	1696.5	1696.5	1696.5	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.5	1696.5	1696.5	1696.5	.0
129	105.00	1693.9	1693.9	1693.8	1693.9	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.9	1693.9	1693.9	1693.9	1693.8	1693.8	1693.8	1693.8	-.1
130	103.50	1689.1	1689.1	1689.0	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.1	1689.0	1689.0	1688.8	1688.6	-.7
131	102.00	1686.7	1686.7	1686.6	1686.6	1686.5	1686.4	1686.2	1686.1	1686.0	1686.0	1685.9	1685.8	1685.7	1685.6	1685.5	1685.4	1685.3	1685.2	1685.1	1685.0	1684.9	-1.8
132	100.50	1684.0	1684.0	1683.9	1683.7	1683.4	1683.2	1683.0	1682.8	1682.6	1682.5	1682.3	1682.1	1681.9	1682.0	1682.0	1682.0	1682.0	1682.0	1682.0	1682.1	1682.2	-1.8
133	99.00	1675.8	1675.8	1675.6	1675.2	1674.8	1674.2	1673.7	1673.6	1673.5	1673.4	1673.3	1673.2	1673.0	1673.0	1673.0	1673.0	1672.9	1673.0	1672.9	1672.9	1673.0	-2.8
134	98.50	1674.2	1674.2	1674.0	1673.8	1673.6	1673.4	1673.4	1673.5	1673.7	1673.9	1674.0	1674.0	1674.1	1674.1	1674.0	1673.8	1673.7	1673.6	1673.5	1673.1	1673.0	-1.2
135	98.00	1672.6	1672.6	1672.6	1672.7	1672.8	1672.9	1673.0	1673.0	1673.0	1673.0	1673.0	1673.0	1673.0	1672.9	1672.8	1672.7	1672.6	1672.5	1672.4	1672.3	1672.2	-.4
135	97.50	1671.0	1671.0	1671.0	1671.0	1671.1	1671.3	1671.3	1671.4	1671.4	1671.4	1671.4	1671.4	1671.4	1671.3	1671.2	1671.2	1671.1	1671.1	1671.0	1671.0	1670.9	-.1
136	96.00	1669.5	1669.6	1669.7	1670.1	1670.5	1670.9	1671.1	1671.1	1671.0	1670.9	1670.8	1670.7	1670.7	1670.7	1670.6	1670.6	1670.7	1670.7	1670.7	1670.9	1671.0	1.5
137	94.50	1668.0	1668.0	1668.0	1668.0	1668.0	1668.1	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.3	1668.4	.4
138	93.00	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.1	1666.2	1666.1	1666.1	1666.0	1665.9	1665.8	1665.8	1665.8	1665.8	1665.8	1665.8	1665.8	1665.8	1665.8	-.2
139	91.50	1662.6	1662.6	1662.6	1662.5	1662.5	1662.6	1662.6	1662.5	1662.5	1662.4	1662.3	1662.2	1662.1	1662.1	1662.1	1662.1	1662.1	1662.1	1662.1	1662.1	1662.1	-.5
140	90.00	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.7	1658.8	1658.8	1658.9	1659.0	1659.1	1659.1	1659.1	1659.1	1659.1	1659.2	1659.1	1659.1	1659.1	1659.1	.6
141	88.50	1655.3	1655.3	1655.2	1655.2	1655.2	1655.2	1655.2	1655.3	1655.4	1655.5	1655.5	1655.5	1655.5	1655.5	1655.5	1655.5	1655.3	1655.3	1655.2	1655.1	1655.0	-.3
142	87.00	1652.1	1652.1	1652.0	1652.1	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.0	1652.1	1652.1	1652.0	1652.0	-.1
143	85.50	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1648.0	1648.1	1648.1	1648.1	1648.1	1648.1	1648.1	1648.2	1648.2	1648.3	1648.4	1648.4	.5
144	84.00	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.1	1645.3	1645.4	1645.5	1645.6	1645.6	1645.7	1645.8	1645.9	1645.9	1646.1	1646.1	1646.2	1646.4	1646.4	1.4
145	82.50	1643.0	1643.0	1642.9	1643.0	1643.0	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.9	1642.8	1642.8	1642.8	1642.8	1642.8	-.2
146	81.00	1641.0	1641.0	1640.9	1640.9	1640.9	1640.9	1640.8	1640.6	1640.5	1640.5	1640.4	1640.3	1640.2	1640.2	1640.2	1640.2	1640.2	1640.2	1640.2	1640.2	1640.2	-.8
147	79.50	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.2	1637.2	1637.2	1637.1	1637.1	1637.1	1637.1	1637.1	1637.1	1637.1	1637.2	1637.2	1637.2	1637.2	1637.2	-.1
148	78.00	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1634.0	.1
149	76.50	1630.3	1630.3	1630.2	1630.3	1630.3	1630.3	1630.3	1630.4	1630.5	1630.6	1630.7	1630.8	1630.8	1630.8	1630.8	1630.8	1630.8	1630.8	1630.8	1630.8	1630.8	.5
150	75.00	1627.5	1627.5	1627.4	1627.4	1627.4	1627.4	1627.4	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.4	1627.4	1627.4	1627.4	1627.4	1627.4	1627.4	1627.5	.0
151	73.50	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1624.0	1624.2	1624.3	1624.4	1624.5	1624.6	1624.6	1624.7	1624.8	1624.8	1624.8	1624.8	1624.8	1624.8	1624.8	.9
152	72.00	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.6	1620.7	1620.9	1621.1	1621.3	1621.4	1621.5	1621.5	1621.6	1621.8	1621.8	1621.9	1621.9	1621.9	1621.9	1.5
153	70.50	1620.0	1620.0	1619.9	1619.9	1619.9	1619.9	1619.9	1619.8	1619.7	1619.6	1619.5	1619.4	1619.3	1619.2	1619.2	1619.2	1619.2	1619.2	1619.2	1619.1	1619.0	-1.0
154	69.00	1618.2	1618.2	1618.1	1618.1	1618.1	1617.9	1617.8	1617.7	1617.5	1617.3	1617.2	1617.1	1617.1	1617.0	1616.9	1616.8	1616.7	1616.7	1616.7	1616.5	1616.4	-1.8
155	67.50	1615.4	1615.4	1615.3	1615.3	1615.3	1615.2	1615.1	1614.9	1614.8	1614.7	1614.7	1614.6	1614.5	1614.4	1614.3	1614.3	1614.2	1614.1	1614.0	1614.0	1613.9	-1.5
156	66.00	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.7	1611.7	1611.7	1611.7	1611.7	1611.7	1611.8	1611.8	1611.7	1611.7	1611.7	1611.7	1611.7	1611.7	-.1
157	64.50	1608.2	1608.2	1608.1	1608.2	1608.2	1608.2	1608.2	1608.3	1608.4	1608.5	1608.5	1608.5	1608.5	1608.5	1608.5	1608.5	1608.5	1608.5	1608.4	1608.4	1608.4	.2
158	63.00	1604.2	1604.2	1604.1	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.2	1604.1	1604.2	1604.2	1604.2	1604.2	1604.0	1603.9	-.3
159	61.50	1600.3	1600.3	1600.3	1600.3	1600.3	1600.3	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.3	1600.3	1600.3	1600.3	1600.2	1600.1	-.2
160	60.00	1597.0	1597.0	1597.0	1596.9	1596.9	1597.0	1597.0	1597.0	1597.1	1597.2	1597.3	1597.3	1597.3	1597.3	1597.3	1597.2	1597.2	1597.2	1597.2	1597.2	1597.3	.3
161	58.50	1593.3	1593.3	1593.3	1593.2	1593.2	1593.1	1593.2	1593.2	1593.2	1593.3	1593.4	1593.4	1593.4	1593.4	1593.3	1593.3	1593.2	1593.1	1593.0	1593.0	1593.0	-.3

162	57.00	1589.3	1589.3	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.3	1589.3	.0
163	55.50	1585.9	1585.9	1585.9	1585.8	1585.8	1585.8	1585.8	1585.8	1585.7	1585.6	1585.5	1585.5	1585.5	1585.5	1585.5	1585.5	1585.5	1585.5	1585.5	1585.6	1585.7	-.2
164	54.00	1583.7	1583.7	1583.7	1583.7	1583.8	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1583.9	1584.1	1584.2	1584.3	1584.4	1584.4	.7
165	52.50	1580.7	1580.7	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.5	1580.4	1580.3	1580.1	1580.0	-.7
166	51.00	1577.5	1577.5	1577.4	1577.4	1577.4	1577.3	1577.1	1577.0	1576.9	1576.9	1576.8	1576.7	1576.6	1576.5	1576.4	1576.4	1576.3	1576.2	1576.1	1576.1	1576.1	-1.4
167	49.50	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.4	1574.4	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	.0
168	48.00	1571.2	1571.2	1571.2	1571.1	1571.1	1571.0	1570.9	1570.8	1570.7	1570.7	1570.9	1571.1	1571.3	1571.2	1571.1	1571.2	1571.4	1571.4	1571.5	1571.6	1571.7	.5
169	46.50	1568.0	1568.0	1568.0	1568.3	1568.6	1569.0	1569.2	1569.3	1569.3	1569.4	1569.6	1569.9	1570.1	1570.1	1570.0	1570.4	1570.6	1570.8	1570.8	1570.9	1571.0	3.0
170	45.00	1566.1	1566.1	1566.1	1566.2	1566.5	1566.9	1567.4	1567.8	1568.2	1568.6	1568.7	1568.8	1568.9	1569.1	1569.3	1569.3	1569.4	1569.4	1569.3	1569.3	1569.3	3.2
171	44.50	1566.2	1566.2	1566.2	1566.2	1566.2	1566.2	1566.2	1566.3	1566.5	1566.6	1566.6	1566.6	1566.6	1566.6	1566.7	1566.7	1566.6	1566.5	1566.5	1566.5	1566.5	.3
171	43.60	1565.8	1565.8	1565.8	1565.8	1565.8	1565.8	1565.8	1565.9	1566.1	1566.2	1566.2	1566.2	1566.2	1566.2	1566.3	1566.3	1566.2	1566.1	1566.1	1566.1	1566.1	.3
172	42.00	1567.4	1567.4	1567.3	1567.3	1567.2	1567.1	1567.0	1566.9	1566.8	1566.7	1566.6	1566.5	1566.4	1566.4	1566.4	1566.3	1566.4	1566.4	1566.4	1566.4	1566.4	-1.0
173	40.50	1563.2	1563.2	1563.2	1563.1	1563.1	1563.0	1562.8	1562.8	1562.7	1562.6	1562.5	1562.4	1562.3	1562.3	1562.4	1562.5	1562.5	1562.6	1562.6	1562.7	1562.8	-.4
174	39.00	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.1	1559.1	1559.1	1559.2	1559.1	1559.1	1559.1	1559.2	1559.3	1559.4	1559.5	1559.6	1559.6	1559.6	1559.7	.5
175	37.50	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1557.9	1557.9	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	.0
176	36.00	1554.7	1554.7	1554.6	1554.7	1554.7	1554.7	1554.6	1554.6	1554.6	1554.6	1554.6	1554.6	1554.6	1554.7	1554.7	1554.7	1554.7	1554.7	1554.6	1554.6	1554.5	-.2
177	34.50	1552.7	1552.7	1552.6	1552.6	1552.6	1552.6	1552.6	1552.6	1552.5	1552.4	1552.3	1552.2	1552.2	1552.2	1552.2	1552.3	1552.3	1552.2	1552.2	1552.2	1552.2	-.5
178	33.00	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.7	1549.7	1549.7	1549.7	1549.7	.1
179	31.50	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.4	1547.5	1547.6	1547.7	1547.8	1547.9	1548.0	1548.0	1548.0	1548.0	1548.0	1548.0	1548.0	1548.0	1548.1	.8
180	30.00	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	.0
181	28.50	1542.6	1542.6	1542.5	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.7	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	1542.8	.2
182	27.00	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	.0
183	25.50	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	1536.2	.0
184	24.00	1534.7	1534.7	1534.7	1534.7	1534.6	1534.7	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.7	1534.7	1534.7	1534.7	1534.7	1534.6	1534.6	1534.5	1534.3	-.4
185	22.50	1533.0	1532.9	1532.8	1532.7	1532.6	1532.5	1532.4	1532.3	1532.2	1532.1	1532.0	1531.9	1531.8	1531.7	1531.6	1531.4	1531.3	1531.2	1531.0	1530.0	1529.0	-4.0
186	21.00	1531.4	1531.4	1531.3	1531.1	1530.8	1530.6	1530.4	1530.3	1530.1	1529.8	1529.6	1529.3	1529.0	1528.7	1528.4	1527.8	1527.3	1527.0	1526.7	1526.3	1525.9	-5.5
187	19.50	1528.6	1528.6	1528.5	1528.4	1528.2	1527.9	1527.6	1527.3	1526.9	1526.6	1526.4	1526.1	1526.0	1525.8	1525.8	1525.6	1525.6	1525.7	1525.7	1525.8	1526.0	-2.6
188	18.00	1525.8	1525.8	1525.7	1525.7	1525.5	1525.2	1525.0	1524.9	1524.7	1524.5	1524.4	1524.4	1524.3	1524.3	1524.4	1524.4	1524.4	1524.4	1524.4	1524.4	1524.5	-1.3
189	16.50	1523.0	1523.0	1523.0	1523.0	1522.9	1522.9	1522.7	1522.7	1522.6	1522.5	1522.4	1522.4	1522.4	1522.4	1522.4	1522.4	1522.4	1522.4	1522.4	1522.5	1522.5	-.5
190	15.00	1520.2	1520.2	1520.2	1520.2	1520.2	1520.2	1520.2	1520.1	1520.1	1520.1	1520.2	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.1	1520.2	1520.2	.0
191	13.50	1517.4	1517.4	1517.3	1517.3	1517.4	1517.3	1517.3	1517.3	1517.2	1517.1	1517.0	1516.9	1516.9	1516.9	1516.9	1516.9	1517.1	1517.1	1517.2	1517.2	1517.2	-.2
192	12.00	1514.6	1514.6	1514.6	1514.6	1514.6	1514.5	1514.4	1514.3	1514.4	1514.6	1514.8	1514.9	1514.9	1515.0	1515.1	1515.3	1515.4	1515.6	1515.6	1515.7	1515.8	1.2
193	10.50	1511.8	1511.8	1511.8	1511.9	1512.1	1512.3	1512.6	1512.9	1513.2	1513.4	1513.7	1513.8	1514.0	1514.2	1514.2	1514.4	1514.4	1514.4	1514.4	1514.4	1514.4	2.6
194	9.00	1510.9	1510.9	1510.9	1510.9	1511.1	1511.5	1511.9	1512.1	1512.2	1512.2	1512.3	1512.4	1512.5	1512.6	1512.6	1512.6	1512.5	1512.5	1512.6	1512.5	1512.5	1.6
195	7.50	1510.1	1510.1	1510.1	1510.1	1510.2	1510.3	1510.5	1510.6	1510.6	1510.7	1510.8	1510.9	1511.0	1511.1	1511.1	1511.1	1511.2	1511.2	1511.2	1511.2	1511.2	1.1
196	6.00	1509.5	1509.5	1509.5	1509.4	1509.4	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	.0
197	4.50	1509.1	1509.1	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	1509.0	-.1
198	3.00	1508.0	1508.0	1508.0	1508.0	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	1507.9	-.1
199	1.50	1507.0	1507.0	1506.9	1506.9	1506.9	1506.9	1506.9	1506.9	1506.9	1506.8	1506.7	1506.7	1506.6	1506.6	1506.5	1506.5	1506.4	1506.3	1506.2	1506.2	1506.2	-.8
200	.01	1506.0	1506.0	1505.9	1505.9	1505.8	1505.7	1505.7	1505.7	1505.6	1505.5	1505.4	1505.2	1505.1	1505.0	1504.9	1504.7	1504.5	1504.4	1504.2	1504.1	1504.0	-2.0

SEDIMENT TRANSPORT ANALYSIS - THALWEG ADJUSTMENT AFTER 10-YEAR FLOOD EVENT (20 TIME STEPS) BY REACH

AFTER	TIME STEP: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	MAX AGG/DEG TOTAL
1	316.50	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	2309.6	.0
1	313.50	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	2300.1	.0
1	310.50	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	2291.9	.0
1	307.50	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	2282.5	.0
1	304.50	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	2273.5	.0
1	301.50	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	2262.9	.0
1	298.50	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	2256.2	.0
1	295.50	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	2247.4	.0
1	292.50	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	2237.9	.0
2	289.50	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	2228.6	.0
2	288.00	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	2224.2	.0
2	286.50	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	2217.7	.0
2	284.15	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.8	2210.9	.1
2	280.60	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.8	2200.9	.1
3	277.45	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	2194.6	.0
3	277.25	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	2188.6	.0
4	275.70	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	2183.9	.0
4	272.60	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	2174.2	.0
4	272.25	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	2173.3	.0
4	271.50	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	2171.5	.0
4	270.00	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	2167.9	.0
5	267.00	2162.0	2162.0	2161.9	2161.7	2161.6	2161.4	2161.2	2161.1	2160.9	2160.8	2160.8	2160.7	2160.6	2160.5	2160.5	2160.5	2160.4	2160.3	2160.3	2160.2	-1.8
5	265.50	2158.0	2158.0	2157.9	2157.9	2157.8	2157.7	2157.6	2157.5	2157.4	2157.3	2157.2	2157.2	2157.2	2157.2	2157.2	2157.2	2157.2	2157.2	2157.2	2157.2	-.8
5	264.00	2153.8	2153.8	2153.7	2153.7	2153.6	2153.5	2153.4	2153.3	2153.2	2153.1	2153.0	2153.0	2153.0	2153.0	2153.0	2152.9	2152.8	2152.7	2152.6	2152.5	-1.3
5	262.50	2150.5	2150.5	2150.4	2150.4	2150.3	2150.2	2150.1	2150.0	2149.9	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	2149.8	-.7
5	261.00	2144.9	2144.9	2144.8	2144.7	2144.5	2144.5	2144.4	2144.3	2144.2	2144.1	2144.0	2143.9	2143.9	2143.9	2143.9	2143.9	2143.9	2143.9	2143.9	2143.9	-1.0
5	259.50	2139.4	2139.4	2139.3	2139.2	2139.0	2138.9	2138.8	2138.7	2138.7	2138.6	2138.5	2138.4	2138.4	2138.4	2138.4	2138.4	2138.4	2138.4	2138.4	2138.4	-1.0
6	258.00	2133.9	2133.9	2133.8	2133.8	2133.8	2133.7	2133.6	2133.5	2133.4	2133.4	2133.4	2133.4	2133.4	2133.5	2133.4	2133.4	2133.4	2133.4	2133.4	2133.4	-.5
6	256.50	2128.3	2128.3	2128.2	2128.2	2128.2	2128.1	2128.0	2127.9	2127.8	2127.8	2127.8	2127.8	2127.8	2127.9	2127.8	2127.8	2127.8	2127.8	2127.8	2127.8	-.5
6	255.00	2122.8	2122.8	2122.7	2122.7	2122.7	2122.6	2122.5	2122.4	2122.3	2122.3	2122.3	2122.3	2122.3	2122.4	2122.3	2122.3	2122.3	2122.3	2122.3	2122.3	-.5
6	253.50	2117.2	2117.2	2117.1	2117.1	2117.1	2117.0	2116.9	2116.8	2116.7	2116.7	2116.7	2116.7	2116.7	2116.8	2116.7	2116.7	2116.7	2116.7	2116.7	2116.7	-.5
6	252.00	2111.7	2111.7	2111.6	2111.6	2111.6	2111.5	2111.4	2111.3	2111.2	2111.2	2111.2	2111.2	2111.2	2111.3	2111.2	2111.2	2111.2	2111.2	2111.2	2111.2	-.5
6	250.50	2106.1	2106.1	2106.0	2106.0	2106.0	2105.9	2105.8	2105.7	2105.6	2105.6	2105.6	2105.6	2105.6	2105.7	2105.6	2105.6	2105.6	2105.6	2105.6	2105.6	-.5
6	249.00	2100.5	2100.5	2100.4	2100.4	2100.4	2100.3	2100.2	2100.1	2100.0	2100.0	2100.0	2100.0	2100.0	2100.1	2100.0	2100.0	2100.0	2100.0	2100.0	2100.0	-.5
6	247.50	2095.0	2095.0	2094.9	2094.9	2094.9	2094.8	2094.7	2094.6	2094.5	2094.5	2094.5	2094.5	2094.5	2094.6	2094.5	2094.5	2094.5	2094.5	2094.5	2094.5	-.5
6	246.00	2089.5	2089.5	2089.4	2089.4	2089.4	2089.3	2089.2	2089.1	2089.0	2089.0	2089.0	2089.0	2089.0	2089.1	2089.0	2089.0	2089.0	2089.0	2089.0	2089.0	-.5
6	244.50	2083.9	2083.9	2083.8	2083.8	2083.8	2083.7	2083.6	2083.5	2083.4	2083.4	2083.4	2083.4	2083.4	2083.5	2083.4	2083.4	2083.4	2083.4	2083.4	2083.4	-.5
6	243.00	2078.4	2078.4	2078.3	2078.3	2078.3	2078.2	2078.1	2078.0	2078.0	2078.0	2078.0	2078.0	2078.0	2078.1	2078.0	2078.0	2078.0	2078.0	2078.1	2078.0	-.4
7	240.80	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	2070.8	.0
7	240.30	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	2069.2	.0
7	240.00	2067.5	2067.5	2067.5	2067.5	2067.5	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	2067.6	.1
7	238.50	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	2062.5	.0
7	237.00	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	2057.4	.0
7	235.50	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	2052.3	.0
7	234.00	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	2047.2	.0
7	232.50	2040.5	2040.5	2040.5	2040.5	2040.5	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	2040.6	.1
8	231.00	2036.9	2036.9	2036.9	2036.9	2036.9	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	2037.0	.1
8	229.50	2032.5	2032.5	2032.5	2032.5	2032.5	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	2032.6	.1
8	228.00	2029.8	2029.8	2029.8	2029.8	2029.8	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	2029.9	.1
8	226.50	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	2025.8	.0
8	225.00	2022.3	2022.3	2022.3	2022.3	2022.3	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	2022.4	.1
8	223.50	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	2018.2	.0
8	222.00	2014.6	2014.6	2014.6	2014.6	2014.6	2014.7	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	2014.8	.2
8	220.50	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	2011.2	.0

8	219.00	2007.8	2007.8	2007.8	2007.8	2007.8	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	2007.9	.1
8	217.50	2004.4	2004.4	2004.4	2004.4	2004.4	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	2004.5	.1
8	216.00	2001.2	2001.2	2001.2	2001.2	2001.2	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	2001.3	.1
8	214.50	1997.0	1997.0	1997.0	1997.0	1997.1	1997.2	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	1997.3	.3
9	213.00	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1994.0	1993.9	1993.9	1994.0	1993.9	1993.9	1993.9	1993.9	1993.9	1993.9	-.1
9	211.50	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1990.0	1989.9	1990.0	1989.9	1989.9	1989.9	1989.9	1989.9	1989.9	-.1
9	210.00	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.2	1985.1	1985.2	1985.1	1985.1	1985.1	1985.2	1985.1	1985.1	-.1
9	208.50	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.2	1980.1	1980.1	-.1
9	207.00	1974.9	1975.2	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.9	1974.8	1974.8	-.1
9	205.50	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.4	1968.3	1968.3	-.1
9	204.00	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.1	1960.0	1960.0	1960.1	1960.0	1960.0	1960.0	1960.0	1960.0	1960.0	-.1
10	202.50	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	1950.1	.0
10	201.00	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	1941.3	.0
10	199.50	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	1937.4	.0
10	198.00	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	1930.9	.0
10	196.50	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	1925.5	.0
10	195.00	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	1921.3	.0
10	193.50	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	1916.6	.0
10	192.00	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	1911.0	.0
10	190.50	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	1905.0	.0
10	189.00	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	1901.9	.0
10	187.50	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	1897.5	.0
10	186.00	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	1892.3	.0
10	184.50	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	1887.8	.0
11	183.00	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	1882.8	.0
11	181.50	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	1879.1	.0
11	180.00	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	1875.4	.0
11	178.50	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	1872.2	.0
11	177.00	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	1869.6	.0
11	175.50	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	1866.1	.0
11	174.00	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	1862.7	.0
11	172.50	1857.5	1857.5	1857.5	1857.5	1857.5	1857.6	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	1857.7	.2
12	171.00	1853.5	1853.5	1853.5	1853.6	1853.7	1853.8	1853.9	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	1854.0	.5
12	169.50	1850.5	1850.5	1850.5	1850.7	1850.8	1850.9	1850.9	1851.0	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	1851.1	.6
12	168.00	1846.7	1846.7	1846.7	1846.7	1846.8	1846.9	1847.0	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	1847.1	.4
12	166.50	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	1844.8	.0
12	166.00	1843.3	1843.3	1843.3	1843.3	1843.4	1843.5	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	1843.6	.3
12	165.50	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	1841.7	.0
12	165.00	1840.2	1840.2	1840.2	1840.2	1840.3	1840.4	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	1840.5	.3
12	163.50	1836.0	1836.0	1836.0	1836.0	1836.1	1836.2	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	1836.3	.3
12	162.00	1832.4	1832.4	1832.4	1832.4	1832.5	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	1832.6	.2
12	160.50	1827.7	1827.7	1827.7	1827.7	1827.8	1827.9	1828.0	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	1828.1	.4
12	159.00	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	1825.4	.0
12	157.50	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	1821.9	.0
13	156.00	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	1818.8	.0
13	154.50	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	1815.5	.0
13	153.00	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	1811.7	.0
13	151.50	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	1804.6	.0
13	150.00	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	1801.0	.0
13	148.50	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	1797.8	.0
13	147.00	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	1793.1	.0
13	145.50	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	1790.9	.0
13	144.00	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	1786.6	.0
14	142.50	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	1782.2	.0
14	141.00	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	1777.7	.0
14	139.50	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	1774.0	.0

14	138.00	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	1770.5	.0
14	136.50	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	1767.6	.0
14	135.00	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	1765.1	.0
14	133.50	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	1762.6	.0
14	132.00	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	1759.8	.0
15	130.50	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	1755.9	.0
15	129.00	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	1751.5	.0
15	127.50	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	1746.8	.0
15	126.00	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	1743.6	.0
15	124.50	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	1740.5	.0
15	123.00	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	1736.2	.0
15	121.50	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	1732.2	.0
15	120.00	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	1727.7	.0
15	118.50	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	1724.3	.0
15	117.00	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	1720.3	.0
15	115.50	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	1715.6	.0
15	114.00	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	1712.4	.0
15	112.50	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	1709.8	.0
16	111.00	1706.6	1706.6	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.6	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	1706.5	-.1
16	109.50	1702.7	1702.7	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.7	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	1702.6	-.1
16	108.00	1698.7	1698.7	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.7	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	1698.6	-.1
16	106.50	1696.5	1696.5	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.5	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	1696.4	-.1
16	105.00	1693.9	1693.9	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.9	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	1693.8	-.1
16	103.50	1689.1	1689.1	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.1	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	1689.0	-.1
16	102.00	1686.7	1686.7	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.7	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	1686.6	-.1
16	100.50	1684.0	1684.0	1684.0	1684.0	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1683.9	1684.0	1684.0	1684.0	1684.0	1683.9	1683.9	1683.9	1684.0	1683.9	1683.9	-.1
17	99.00	1675.8	1675.8	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	1675.7	-.1
17	98.50	1674.2	1674.2	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	1674.1	-.1
17	98.00	1672.6	1672.6	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	1672.5	-.1
17	97.50	1671.0	1671.0	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	-.1
17	96.00	1669.5	1669.5	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	1669.4	-.1
18	94.50	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	1668.0	.0
18	93.00	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	1666.0	.0
18	91.50	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	1662.6	.0
18	90.00	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	1658.5	.0
18	88.50	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	1655.3	.0
18	87.00	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	1652.1	.0
18	85.50	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	1647.9	.0
18	84.00	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	1645.0	.0
18	82.50	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	1643.0	.0
18	81.00	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	1641.0	.0
18	79.50	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	1637.3	.0
18	78.00	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	1633.9	.0
18	76.50	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	1630.3	.0
18	75.00	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	1627.5	.0
19	73.50	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	1623.9	.0
19	72.00	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	1620.4	.0
19	70.50	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	1620.0	.0
19	69.00	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	1618.2	.0
19	67.50	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	1615.4	.0
20	66.00	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.8	1611.7	1611.7	1611.7	1611.7	1611.8	1611.8	.0
20	64.50	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.2	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.1	1608.2	.0
20	63.00	1604.2	1604.2	1604.2	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	1604.1	-.1
20	61.50	1600.3	1600.3	1600.3	1600.3	1600.2	1600.2	1600.3	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.2	1600.3	.0
20	60.00	1597.0	1597.0	1597.0	1597.0	1596.9	1596.9	1597.0	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	1596.9	-.1
20	58.50	1593.3	1593.3	1593.3	1593.3	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.2	1593.3	.0

21	57.00	1589.3	1589.3	1589.3	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	1589.2	-.1
21	55.50	1585.9	1585.9	1585.9	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	1585.8	-.1
21	54.00	1583.7	1583.7	1583.7	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	1583.6	-.1
21	52.50	1580.7	1580.7	1580.7	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	1580.6	-.1
21	51.00	1577.5	1577.5	1577.5	1577.5	1577.5	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.4	1577.5	1577.5	1577.5	.0
21	49.50	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.5	1574.4	1574.4	1574.4	1574.4	1574.4	1574.4	1574.4	1574.5	1574.5	1574.4	1574.4	1574.5	1574.5	1574.5	1574.5	.0
21	48.00	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.1	1571.2	1571.2	1571.2	1571.2	.0
22	46.50	1568.0	1568.0	1568.0	1568.0	1568.0	1568.2	1568.2	1568.3	1568.4	1568.5	1568.6	1568.7	1568.8	1568.9	1569.0	1569.0	1569.0	1569.0	1569.0	1569.0	1569.0	1569.0	1.0
22	45.00	1566.1	1566.1	1566.1	1566.1	1566.1	1566.1	1566.2	1566.3	1566.3	1566.3	1566.3	1566.3	1566.3	1566.3	1566.3	1566.3	1566.4	1566.4	1566.4	1566.4	1566.4	1566.4	.3
22	44.50	1566.2	1566.2	1566.2	1566.2	1566.2	1566.3	1566.4	1566.5	1566.6	1566.7	1566.8	1566.9	1567.0	1567.1	1567.1	1567.1	1567.2	1567.3	1567.3	1567.3	1567.3	1567.3	1.1
22	43.60	1565.8	1565.8	1565.8	1565.8	1565.8	1565.9	1566.0	1566.1	1566.2	1566.3	1566.4	1566.5	1566.6	1566.7	1566.7	1566.7	1566.8	1566.9	1566.9	1566.9	1566.9	1566.9	1.1
23	42.00	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	1567.4	.0
23	40.50	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	1563.2	.0
23	39.00	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	1559.2	.0
23	37.50	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	1558.0	.0
23	36.00	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	1554.7	.0
23	34.50	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	1552.7	.0
24	33.00	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	1549.6	.0
24	31.50	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	1547.3	.0
24	30.00	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.6	1544.5	-.1
24	28.50	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	1542.6	.0
24	27.00	1539.0	1539.0	1539.0	1539.0	1539.0	1538.9	1538.9	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	1539.0	.0
24	25.50	1536.2	1536.2	1536.2	1536.2	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.1	1536.2	1536.2	1536.2	1536.2	1536.1	1536.2	1536.2	1536.1	1536.1	1536.1	-.1
24	24.00	1534.7	1534.7	1534.7	1534.7	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.6	1534.7	1534.7	1534.7	1534.6	1534.6	1534.7	1534.6	1534.6	1534.6	-.1
24	22.50	1533.0	1533.0	1533.0	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	1533.0	1533.0	1532.9	1532.9	1532.9	1532.9	1532.9	1532.9	-.1
25	21.00	1531.4	1531.4	1531.4	1531.4	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.3	1531.4	1531.3	1531.3	1531.4	1531.4	1531.4	1531.4	.0
25	19.50	1528.6	1528.6	1528.6	1528.6	1528.6	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.5	1528.6	1528.6	1528.5	1528.5	1528.6	1528.6	1528.6	1528.6	.0
25	18.00	1525.8	1525.8	1525.8	1525.8	1525.8	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.7	1525.8	1525.8	1525.8	1525.7	1525.8	1525.8	1525.8	1525.8	1525.8	.0
25	16.50	1523.0	1523.0	1523.0	1523.0	1523.0	1522.9	1522.9	1522.9	1522.9	1522.9	1522.9	1523.0	1523.0	1523.0	1523.0	1522.9	1523.0	1523.0	1523.0	1523.0	1523.0	.0
25	15.00	1520.2	1520.2	1520.2	1520.2	1520.2	1520.2	1520.1	1520.1	1520.1	1520.1	1520.1	1520.2	1520.2	1520.2	1520.2	1520.1	1520.2	1520.2	1520.2	1520.2	1520.2	.0
25	13.50	1517.4	1517.4	1517.4	1517.4	1517.4	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.3	1517.4	1517.4	1517.3	1517.4	1517.4	1517.4	1517.4	1517.4	.0
25	12.00	1514.6	1514.6	1514.6	1514.6	1514.6	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.5	1514.6	1514.6	1514.6	1514.5	1514.6	1514.6	1514.6	1514.6	1514.6	.0
26	10.50	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	1511.8	.0
26	9.00	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	1510.9	.0
26	7.50	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	1510.1	.0
26	6.00	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	1509.5	.0
26	4.50	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	1509.1	.0
27	3.00	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	1508.0	.0
27	1.50	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	1507.0	.0
27	.01	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	1506.0	.0

I: COMPUTATIONS FOR SUPERELEVATION, LOCAL SCOUR, AND LONG-TERM SCOUR

Tables used for computation of superelevation, bend scour and contraction scour are included in this section. Depths for antidune scour and low-flow incisement are shown with the hydraulic data and total scour depths. Scour results are also shown for a long-term scour analysis. Short-term scour tables are included for comparison.

1. Equations and Assumptions
2. Computation of Superelevation
3. Computation of Bend Scour
4. Computation of Contraction Scour
5. Total Scour Depth (including antidune scour and low-flow incisement)
6. Long-Term Scour Analysis

SCOUR CALCULATIONS

- General Scour ⇒ From HEC-2 SR
- Low-Flow Thalweg ⇒ assume 3 ft

from where? this is probably the main scour component.

- Antidune Scour ⇒ greater of:

for salt River which is subcritical channel, the low flow increment was ~~calculated~~ assumed to be 3'!

1) ½ max depth
2) $0.0137 \cdot (Vel.)^2$

(from Arizona Manual 6.0

Please clarify your assumption !!

- Contraction Scour ⇒ from HEC-18 pg 33

$$y_s = y_2 - y_1$$

where $y_2 = y_1 \cdot \left(\frac{Q_s}{Q_1}\right)^{6/7} \left(\frac{W_1}{W_2}\right)^{k_1}$

$k_1 = 0.64$ for 20% susp. load

- Bend scour ⇒ from Arizona manual pg 6.11

$$y_s = \frac{.685\, D_{max}\, V_{avg}^{0.8}}{D_{hyd}^{0.4} \cdot S_e^{0.3}} \cdot \left(2.1 \cdot \left(\frac{\sin^2(\alpha/2)}{\cos\alpha}\right)^{.2} - 1\right)$$

ignore for $r/T > 10$ or $\alpha < 17.8°$

- Long-term scour ⇒ from HEC-2 SR

SUPERELEVATION: ⇒ from Arizona (Tuscon) manual - Pg 8.22

$$\Delta Y = \frac{1.5\, C\, V^2 T}{g r_c}$$

C = 1 for trap. rapid

$$\Delta Y = \frac{1.5\,C\,V^2\,T}{g\,r_c} \qquad C = 1.0$$

$$= \frac{(1.5 \times 1.0)(11.7)^2}{32.2} \times .4$$

$$\approx 2.55'$$

Computation of Superelevation							
Station upstream of curve	Station dnstream of curve	Radius (ft)	Ave. u/s Topwidth (ft)	T/rc	Vch upstream (ft/s)	Superelevation East (ft)	Superelevation West (ft)
292.50	286.50	700	256	0.4	11.7		**2.33**
238.50	231.00	1440	111	0.1	22.9	**1.88**	
226.50	211.50	2200	159	0.1	18.7		**1.17**
186.00	175.50	1200	260	0.2	17.7	**3.16**	
19.50	13.50	1080	216	0.2	18.9		**3.33**

* Do we also need to consider translatory waves taking place in the channel?

$$= \frac{.0685 * 4.7 * 22.9^{0.8}}{4.49^{0.4} * .0287^{0.3}} \left[2.1\left(\frac{111}{4*1440}\right)^{0.2} - 1\right]$$

$$= 6.272(0.953-1)$$

$$= \cancel{0}$$

$$= \frac{.0685 * 5.7 * 18.9^{0.8}}{5.39^{0.4} * .0167^{0.3}} \left[2.1\left(\frac{216}{4*1080}\right)^{0.2} - 1\right]$$

$$= 7.133(0.153) = 1.095 \text{ ft}$$

$$\Delta z_b = \frac{.0685\, Y\, V^{0.8}}{Y_n^{.4}\, S_e^{.3}} \left(2.1\left(\frac{w}{4r_c}\right)^{0.2} - 1\right)$$

$$= \frac{.0685 * 4.7 * 22.9^{0.8}}{(4.49)^{.4}(.0287)^{.3}} \left(2.1\left(\frac{111}{4*1440}\right)^{0.2} - 1\right)$$

$$= 6.272 * (2.1(.4539) - 1)$$

$$= 6.272 * (-.047) = -0.294$$

Computation of Bend Scour

Station upstream of curve	Station dnstream of curve	Radius (ft)	Ave. u/s Topwidth (ft)	r/T	Vch upstream (ft/s)	Maximum Depth (ft)	Length of Impact (ft)	alpha (degs)	Hydraulic Depth (ft)	Energy Slope (ft/ft)	Scour East (ft)	Scour West (ft)
238.50	231.00	1440	111	**13.0**	22.9	4.7	122	18	4.49	0.0287	0.00	0.00
226.50	211.50	2200	159	**13.9**	18.7	5.5	147	25	4.17	0.0227	0.00	0.00
186.00	175.50	1200	260	4.6	17.7	3.3	81	30	2.54	0.0317	**1.13**	0.00
19.50	13.50	1080	216	5.0	18.9	5.7	153	23	5.39	0.0167	0.00	**0.78**

0.75

1.095'

$$= \frac{.0685 \times 3.3 * 17.7^{0.8}}{2.54^{0.4} * .0317^{0.3}} * \left[2.1 * \left(\frac{260}{4*1200}\right)^{.2} - 1\right]$$

$$= \frac{2.252}{0.516} * (.172)$$

$$= 0.751$$

$$\Delta z_b = \frac{.0685 * 3.3 * 17.7^{0.8}}{(2.54)^{.4} * (.0317)^{.3}} \left[2.1\left(\frac{\sin^2 15^\circ}{\cos 30^\circ}\right)^{0.2} - 1\right]$$

$$= 4.368 (0.8$$

$$\left[2.1\left(\frac{260}{4*1200}\right)^{0.2} - 1\right] =$$

$$.0685 * \quad (.172)$$

$$Y_2 = Y_1 \left(\frac{Q_2}{Q_1}\right)^{6/7} \left(\frac{W_1}{W_2}\right)^{K_1}, \quad K_1 = 0.64$$

$$= 4.9 \left(\frac{11236}{11236}\right)^{6/7} \left(\frac{130}{114}\right)^{0.64}$$

$$= 5.33$$

$$Y_s = Y_2 - Y_1 = 5.33 - 4.99 = 0.43'$$

Computation of Contraction Scour								
Station		Width (ft)		Flow (cfs)		Depth (ft)		Scour
Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Depth (ft)
275.70	272.65	130	114	11236	11236	4.9	5.3	0.4
261.00	258.00	243	98	11086	11236	4.7	8.5	3.8
48.00	45.00	407	299	12185	15265	7.7	11.4	3.7
31.50	24.00	554	330	15265	15265	5.3	7.4	2.1
21.00	19.50	380	218	14027	15265	6.6	10.1	3.5

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	Water Surface (ft)	Subcritical WSEL (ft)	Dmax (ft)	Q total (cfs)	Velocity channel (ft/s)	Froude #	Energy Slope(av) (ft/ft)	Eff. Top Width (ft)	X-Sec Area (ft^2)	Hydraulic Depth (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
271.50	2171.5	2181.4	2181.4	9.9	11236	10.0	0.6	0.0067	142.0	1143	6.72	0.0	3.0	1.37	0	0	0	5.68	5.68	0.00	5.68	5.68	**2165.8**	**2165.8**
270.00	2167.9	2178.7	2178.7	10.8	11236	15.3	0.9	0.0125	77.5	824	5.97	1.3	3.0	3.21	0	0	0	9.76	9.76	0.00	9.76	9.76	**2158.1**	**2158.1**
267.00	2162.0	2165.9	2168.0	3.9	11236	26.0	3.8	0.0458	299.8	436	1.41	0.0	3.0	1.95	0	0	0	6.44	6.44	0.90	7.34	7.34	**2154.7**	**2154.7**
265.50	2158.0	2162.6	2163.5	4.6	11236	13.6	1.7	0.0497	388.1	825	2.11	0.0	3.0	2.30	0	0	0	6.89	6.89	0.90	7.79	7.79	**2150.2**	**2150.2**
264.00	2153.8	2158.1	2159.1	4.3	11236	14.6	1.6	0.0253	313.8	771	2.46	0.0	3.0	2.15	0	0	0	6.69	6.69	0.90	7.59	7.59	**2146.2**	**2146.2**
262.50	2150.5	2154.6	2155.5	4.1	11236	14.7	1.5	0.0240	252.8	764	3.03	2.2	3.0	2.05	0	0	0	9.42	9.42	0.90	10.32	10.32	**2140.2**	**2140.2**
261.00	2144.9	2149.6	2151.0	4.7	11236	17.3	1.8	0.0237	217.5	667	2.74	5.3	3.0	2.35	0	0	0	13.84	13.84	0.90	14.74	14.74	**2130.2**	**2130.2**
259.50	2139.4	2145.4	2147.1	6.0	11236	19.6	1.5	0.0223	95.6	716	3.31	5.8	3.0	3.00	3.8	0	0	20.28	20.28	0.90	21.18	21.18	**2118.2**	**2118.2**
258.00	2133.9	2139.7	2142.3	5.8	11236	22.4	1.8	0.0257	98.3	501	5.10	4.1	3.0	2.90	3.8	0	0	17.94	17.94	2.55	20.49	20.49	**2113.4**	**2113.4**
256.50	2128.3	2133.6	2137.1	5.3	11236	24.7	2.0	0.0317	96.0	454	4.72	3.7	3.0	2.65	0	0	0	12.15	12.15	2.55	14.70	14.70	**2113.6**	**2113.6**
255.00	2122.8	2128.0	2131.6	5.2	11236	25.4	2.1	0.0350	95.8	442	4.61	3.1	3.0	2.60	0	0	0	11.31	11.31	2.55	13.86	13.86	**2108.9**	**2108.9**
253.50	2117.2	2122.4	2125.6	5.2	11236	25.7	2.1	0.0363	95.5	438	4.59	2.4	3.0	2.60	0	0	0	10.40	10.40	2.55	12.95	12.95	**2104.3**	**2104.3**
252.00	2111.7	2116.8	2120.0	5.1	11236	25.7	2.1	0.0370	95.6	437	4.58	1.9	3.0	2.55	0	0	0	9.69	9.69	2.55	12.24	12.24	**2099.5**	**2099.5**
250.50	2106.1	2111.2	2114.4	5.1	11236	25.8	2.1	0.0370	95.4	436	4.57	1.4	3.0	2.55	0	0	0	9.03	9.03	2.55	11.58	11.58	**2094.5**	**2094.5**
249.00	2100.5	2105.7	2108.8	5.2	11236	25.8	2.1	0.0370	95.4	436	4.57	1.3	3.0	2.60	0	0	0	8.97	8.97	2.55	11.52	11.52	**2089.0**	**2089.0**
247.50	2095.0	2100.1	2103.2	5.1	11236	25.8	2.1	0.0370	95.5	436	4.57	1.3	3.0	2.55	0	0	0	8.90	8.90	2.55	11.45	11.45	**2083.5**	**2083.5**
246.00	2089.5	2094.6	2097.7	5.1	11236	25.8	2.1	0.0367	95.5	436	4.57	1.3	3.0	2.55	0	0	0	8.90	8.90	2.55	11.45	11.45	**2078.0**	**2078.0**
244.50	2083.9	2089.0	2092.2	5.1	11236	25.8	2.1	0.0393	95.4	436	4.57	0.1	3.0	2.55	0	0	0	7.34	7.34	2.55	9.89	9.89	**2074.0**	**2074.0**
243.00	2078.4	2082.5	2085.5	4.1	11236	26.2	2.3	0.0424	108.3	429	3.96	0.0	3.0	2.05	0	0	0	6.56	6.56	2.55	9.11	9.11	**2069.3**	**2069.3**
240.80	2070.8	2075.5	2080.0	4.7	11236	23.0	1.9	0.0647	109.3	488	4.46	0.0	3.0	2.35	0	0	0	6.95	6.95	3.31	10.26	10.26	**2060.5**	**2060.5**
240.30	2069.2	2075.7	2076.3	6.5	11236	16.3	1.2	0.0533	112.9	690	6.11	0.3	3.0	3.25	0	0	0	8.52	8.52	3.31	11.83	11.83	**2057.4**	**2057.4**
240.00	2067.5	2072.9	2074.7	5.4	11236	20.0	1.6	0.0227	110.7	561	5.07	0.5	3.0	2.70	0	0	0	8.06	8.06	3.31	11.37	11.37	**2056.1**	**2056.1**
238.50	2062.5	2067.2	2069.6	4.7	11236	22.9	1.9	0.0287	109.4	491	4.49	0.1	3.0	2.35	0	0	0	7.08	7.08	3.31	10.39	10.39	**2052.1**	**2052.1**
237.00	2057.4	2062.0	2064.5	4.6	11236	23.5	2.0	0.0327	109.2	478	4.38	0.0	3.0	2.30	0	0	0	6.89	6.89	3.31	10.20	10.20	**2047.2**	**2047.2**
235.50	2052.3	2056.8	2059.4	4.5	11236	23.7	2.0	0.0330	109.1	475	4.35	0.0	3.0	2.25	0	0	0	6.83	6.83	3.31	10.14	10.14	**2042.2**	**2042.2**
234.00	2047.2	2052.0	2054.7	4.8	11742	23.6	2.0	0.0390	109.5	497	4.54	0.3	3.0	2.40	0	0	0	7.41	7.41	3.31	10.72	10.72	**2036.5**	**2036.5**
232.50	2040.5	2044.9	2047.2	4.4	11742	23.9	2.7	0.0417	197.3	491	2.49	0.0	3.0	2.20	0	0	0	6.76	6.76	3.31	10.07	10.07	**2030.4**	**2030.4**
231.00	2036.9	2043.0	2045.0	6.1	11742	18.2	1.5	0.0300	132.9	645	4.86	0.0	3.0	3.05	0	0	0	7.86	7.86	1.17	9.03	9.03	**2027.9**	**2027.9**
229.50	2032.5	2038.5	2040.4	6.0	11742	20.2	1.8	0.0257	149.0	580	3.89	0.1	3.0	3.00	0	0	0	7.93	7.93	1.17	9.10	9.10	**2023.4**	**2023.4**
228.00	2029.8	2034.9	2036.6	5.1	11742	19.0	1.8	0.0270	175.6	619	3.53	0.0	3.0	2.55	0	0	0	7.22	7.22	1.17	8.39	8.39	**2021.4**	**2021.4**
226.50	2025.8	2031.3	2033.0	5.5	11742	18.7	1.6	0.0227	151.0	629	4.17	0.0	3.0	2.75	0	0	0	7.48	7.48	1.17	8.65	8.65	**2017.2**	**2017.2**
225.00	2022.3	2028.9	2030.3	6.6	11742	17.4	1.5	0.0197	155.8	674	4.33	0.0	3.0	3.30	0	0	0	8.19	8.19	1.17	9.36	9.36	**2012.9**	**2012.9**
223.50	2018.2	2025.3	2027.0	7.1	11742	18.8	1.5	0.0193	134.9	625	4.64	0.3	3.0	3.55	0	0	0	8.90	8.90	1.17	10.07	10.07	**2008.1**	**2008.1**
222.00	2014.6	2021.6	2023.5	7.0	11742	20.0	1.6	0.0217	121.7	591	4.74	0.3	3.0	3.50	0	0	0	8.84	8.84	1.17	10.01	10.01	**2004.6**	**2004.6**
220.50	2011.2	2017.5	2019.6	6.3	11742	20.8	1.8	0.0250	136.8	564	4.13	0.5	3.0	3.15	0	0	0	8.64	8.64	1.17	9.81	9.81	**2001.4**	**2001.4**
219.00	2007.8	2013.7	2015.7	5.9	11743	20.6	1.7	0.0250	130.5	584	3.84	0.0	3.0	2.95	0	0	0	7.74	7.74	1.17	8.91	8.91	**1998.9**	**1998.9**
217.50	2004.4	2011.3	2012.9	6.9	11742	19.0	1.5	0.0223	128.2	645	4.31	0.0	3.0	3.45	0	0	0	8.38	8.38	1.17	9.55	9.55	**1994.8**	**1994.8**
216.00	2001.2	2007.3	2009.2	6.1	11742	20.1	1.7	0.0233	131.8	595	4.07	0.0	3.0	3.05	0	0	0	7.86	7.86	1.17	9.03	9.03	**1992.2**	**1992.2**
214.50	1997.0	2004.1	2005.8	7.1	11742	19.5	1.7	0.0277	144.9	634	3.66	0.0	3.0	3.55	0	0	0	8.51	8.51	1.17	9.68	9.68	**1987.3**	**1987.3**
213.00	1994.0	2000.0	2001.6	6.0	11742	18.6	1.9	0.0320	220.2	639	2.83	0.0	3.0	3.00	0	0	0	7.80	7.80	0.96	8.76	8.76	**1985.2**	**1985.2**
211.50	1990.0	1996.2	1997.4	6.2	11742	16.0	1.7	0.0347	275.7	735	2.67	0.2	3.0	3.10	0	0	0	8.19	8.19	0.96	9.15	9.15	**1980.9**	**1980.9**
210.00	1985.2	1990.4	1991.7	5.2	11742	17.0	2.0	0.0363	320.4	695	2.10	2.2	3.0	2.60	0	0	0	10.14	10.14	0.96	11.10	11.10	**1974.1**	**1974.1**
208.50	1980.2	1984.8	1986.1	4.6	11742	17.1	1.9	0.0380	256.4	690	2.69	1.5	3.0	2.30	0	0	0	8.84	8.84	0.96	9.80	9.80	**1970.4**	**1970.4**
207.00	1974.9	1978.6	1980.1	3.7	11742	17.7	2.2	0.0413	323.9	669	2.07	0.0	3.0	1.85	0	0	0	6.30	6.30	0.96	7.26	7.26	**1967.6**	**1967.6**
205.50	1967.8	1973.3	1974.4	5.5	11742	15.1	1.9	0.0407	382.6	784	2.05	2.9	3.0	2.75	0	0	0	11.25	11.25	0.96	12.21	12.21	**1955.6**	**1955.6**
204.00	1960.1	1965.6	1967.7	5.5	11742	19.2	2.0	0.0370	210.9	617	2.93	6.7	3.0	2.75	0	0	0	16.19	16.19	0.96	17.15	17.15	**1943.0**	**1943.0**
202.50	1950.1	1957.3	1960.4	7.2	11742	23.4	2.0	0.0437	116.2	502	4.32	4.8	3.0	3.60	0	0	0	14.82	14.82	0.54	15.36	15.36	**1934.7**	**1934.7**
201.00	1941.3	1946.7	1949.5	5.4	11742	27.2	3.0	0.0580	163.0	434	2.66	2.1	3.0	2.70	0	0	0	10.14	10.14	0.54	10.68	10.68	**1930.6**	**1930.6**
199.50	1937.4	1941.8	1943.8	4.4	11742	20.6	2.1	0.0477	188.3	570	3.03	0.0	3.0	2.20	0	0	0	6.76	6.76	0.54	7.30	7.30	**1930.1**	**1930.1**
198.00	1930.9	1941.5	1942.0	10.6	11742	12.6	1.3	0.0307	288.7	954	3.30	7.7	3.0	2.18	0	0	0	16.74	16.74	0.54	17.28	17.28	**1913.6**	**1913.6**
196.50	1925.5	1930.3	1932.6	4.8	11742	23.9	2.8	0.0427	211.2	491	2.33	0.0	3.0	2.40	0	0	0	7.02	7.02	0.54	7.56	7.56	**1917.9**	**1917.9**
195.00	1921.3	1926.0	1927.8	4.7	11742	18.1	1.9	0.0437	220.3	649	2.96	0.0	3.0	2.35	0	0	0	6.96	6.96	0.54	7.50	7.50	**1913.8**	**1913.8**
193.50	1916.6	1921.3	1922.7	4.7	11742	17.7	1.9	0.0347	241.5	663	2.75	0.0	3.0	2.35	0	0	0	6.96	6.96	0.54	7.50	7.50	**1909.1**	**1909.1**
192.00	1911.0	1915.8	1917.3	4.8	11742	17.7	2.0	0.0377	271.9	663	2.44	0.0	3.0	2.40	0	0	0	7.02	7.02	0.54	7.56	7.56	**1903.4**	**1903.4**
190.50	1905.0	1909.8	1911.3	4.8	11742	18.0	2.0	0.0377	263.3	651	2.47	0.7	3.0	2.40	0	0	0	7.93	7.93	0.54	8.47	8.47	**1896.5**	**1896.5**
189.00	1901.9	1905.2	1906.5	3.3	11742	16.5	1.8	0.0320	268.3	718	2.68	0.1	3.0	1.65	0	0	0	6.17	6.17	0.54	6.71	6.71	**1895.2**	**1895.2**
187.50	1897.5	1901.1	1902.3	3.6	11742	16.3	1.7	0.0297	247.7	732	2.85	0.0	3.0	1.80	0	0	0	6.24	6.24	0.54	6.78	6.78	**1890.7**	**1890.7**
186.00	1892.3	1895.6	1897.1	3.3	11742	17.7	2.0	0.0317	263.4	669	2.48	0.0	3.0	1.65	0	0	0	6.04	6.04	0.54	6.58	6.58	**1885.7**	**1885.7**
184.50	1887.8	1892.0	1893.1	4.2	11742	15.4	1.6	0.0253	269.1	764	2.83	0.0	3.0	2.10	0	1.13	0	8.10	6.63	0.54	8.64	7.17	**1879.2**	**1880.6**
183.00	1882.8	1889.0	1890.1	6.2	11742	15.9	1.4	0.0237	180.1	747	3.82	0.0	3.0	3.10	0	1.13	0	9.40	7.93	0.45	9.85	8.38	**1873.0**	**1874.4**
181.50	1879.1	1883.0	1884.6	3.9	11742	18.9	2.5	0.0330	346.9	620	1.79	0.0	3.0	1.95	0	1.13	0	7.90	6.44	0.45	8.35	6.89	**1870.7**	**1872.2**
180.00	1875.4	1880.4	1881.1	5.0	11742	12.9	1.4	0.0280	345.5	915	2.56	0.0	3.0	2.28	0	1.13	0	8.33	6.86	0.45	8.78	7.31	**1866.6**	**1868.1**
178.50	1872.2	1877.6	1878.3	5.4	11742	12.9	1.4	0.0193	354.8	917	2.58	0.0	3.0	2.28	0	1.13	0	8.33	6.86	0.45	8.78	7.31	**1863.4**	**1864.9**
177.00	1869.6	1874.7	1875.4	5.1	11742	12.8	1.5	0.0203	380.1	914	2.40	0.0	3.0	2.24	0	1.13	0	8.29	6.82	0.45	8.74	7.27	**1860.9**	**1862.3**
175.50	1866.1	1871.5	1872.3	5.4	11742	13.1	1.5	0.0190	355.7	899	2.52	0.0	3.0	2.35	0	1.13	0	8.43	6.96	0.45	8.88	7.41	**1857.2**	**1858.7**
174.00	1862.7	1868.7	1869.5	6.0	11742	13.5	1.3	0.0187	279.2	886	3.17	0.0	3.0	2.50	0	1.13	0	8.61	7.15	0.45	9.06	7.60	**1853.6**	**1855.1**
172.50	1857.5	1863.9	1865.4	6.4	10579	17.3	1.8	0.0207	203.8	625	3.07	0.0	3.0	3.20	0	0	0	8.06	8.06	0.45	8.51	8.51	**1849.0**	**1849.0**
171.00	1853.5	1863.2	1863.6	9.7	12814	11.6	1.1	0.0207	344.2	1112	3.11	0.0	3.0	1.84	0	0	0	6.30	6.30	0.15	6.45	6.45	**1847.1**	**1847.1**
169.50	1850.5	1858.4	1859.8	7.9	12814	16.6	1.9	0.0257	271.2	860	2.00	4.9	3.0	3.78	0	0	0	15.18	15.18	0.15	15.33	15.33	**1835.2**	**1835.2**

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	Water Surface (ft)	Subcritical WSEL (ft)	Dmax (ft)	Q total (cfs)	Velocity channel (ft/s)	Froude #	Energy Slope(av) (ft/ft)	Eff. Top Width (ft)	X-Sec Area (ft^2)	Hydraulic Depth (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
168.00	1846.7	1853.1	1854.9	6.4	12814	17.1	1.8	0.0300	264.5	773	2.92	0.0	3.0	3.20	0	0	0	8.06	8.06	0.15	8.21	8.21	**1838.5**	**1838.5**
166.50	1844.8	1852.7	1851.9	7.9	12814	5.9	0.5	0.0253	494.1	2167	4.39	0.0	3.0	0.48	0	0	0	4.52	4.52	0.15	4.67	4.67	**1840.1**	**1840.1**
166.00	1843.3	1849.0	1851.8	5.7	12814	14.4	1.4	0.0250	282.1	890	3.15	0.8	3.0	2.84	0	0	0	8.63	8.63	0.15	8.78	8.78	**1834.5**	**1834.5**
165.50	1841.7	1849.6	1848.4	7.9	12814	8.5	0.7	0.0220	308.8	1507	4.88	0.0	3.0	0.99	0	0	0	5.19	5.19	0.15	5.34	5.34	**1836.4**	**1836.4**
165.00	1840.2	1845.7	1847.1	5.5	12814	16.7	1.8	0.0220	280.7	768	2.74	0.0	3.0	2.75	0	0	0	7.48	7.48	0.15	7.63	7.63	**1832.6**	**1832.6**
163.50	1836.0	1842.5	1843.4	6.5	12814	14.4	1.6	0.0267	338.1	888	2.63	0.0	3.0	2.84	0	0	0	7.59	7.59	0.15	7.74	7.74	**1828.3**	**1828.3**
162.00	1832.4	1838.0	1839.2	5.6	12814	16.1	1.7	0.0250	269.1	795	2.95	0.0	3.0	2.80	0	0	0	7.54	7.54	0.15	7.69	7.69	**1824.7**	**1824.7**
160.50	1827.7	1834.8	1835.8	7.1	12814	14.9	1.6	0.0250	302.6	861	2.85	0.0	3.0	3.04	0	0	0	7.85	7.85	0.15	8.00	8.00	**1819.7**	**1819.7**
159.00	1825.4	1830.6	1831.8	5.2	12814	15.8	1.7	0.0250	314.6	814	2.59	0.0	3.0	2.60	0	0	0	7.28	7.28	0.15	7.43	7.43	**1818.0**	**1818.0**
157.50	1821.9	1828.0	1828.7	6.1	12814	13.6	1.4	0.0247	324.7	946	2.91	0.0	3.0	2.53	0	0	0	7.19	7.19	0.15	7.34	7.34	**1814.6**	**1814.6**
156.00	1818.8	1823.6	1824.7	4.8	12814	14.9	1.9	0.0260	431.2	860	1.99	0.1	3.0	2.40	0	0	0	7.15	7.15	0.07	7.22	7.22	**1811.6**	**1811.6**
154.50	1815.5	1820.1	1821.0	4.6	12814	13.7	1.4	0.0263	332.8	934	2.81	0.0	3.0	2.30	0	0	0	6.89	6.89	0.07	6.96	6.96	**1808.5**	**1808.5**
153.00	1811.7	1815.9	1816.9	4.2	12814	14.6	1.8	0.0320	420.4	878	2.09	0.1	3.0	2.10	0	0	0	6.76	6.76	0.07	6.83	6.83	**1804.9**	**1804.9**
151.50	1804.6	1810.2	1811.2	5.6	12814	14.3	2.0	0.0350	567.0	894	1.58	0.0	3.0	2.80	0	0	0	7.54	7.54	0.07	7.61	7.61	**1797.0**	**1797.0**
150.00	1801.0	1807.2	1807.6	6.2	12814	10.1	1.4	0.0263	747.3	1318	1.73	0.0	3.0	1.40	0	0	0	5.72	5.72	0.07	5.79	5.79	**1795.2**	**1795.2**
148.50	1797.8	1803.3	1804.0	5.5	12814	11.9	1.5	0.0240	555.6	1079	1.94	0.0	3.0	1.94	0	0	0	6.42	6.42	0.07	6.49	6.49	**1791.3**	**1791.3**
147.00	1793.1	1798.9	1799.7	5.8	12814	13.0	1.6	0.0273	507.2	985	1.94	0.1	3.0	2.32	0	0	0	7.04	7.04	0.07	7.11	7.11	**1786.0**	**1786.0**
145.50	1790.9	1794.8	1795.6	3.9	12814	12.7	1.6	0.0270	518.4	1006	1.94	0.2	3.0	1.95	0	0	0	6.69	6.69	0.07	6.76	6.76	**1784.1**	**1784.1**
144.00	1786.6	1790.7	1791.5	4.1	12814	13.0	1.6	0.0253	450.1	982	2.18	0.0	3.0	2.05	0	0	0	6.57	6.57	0.07	6.64	6.64	**1780.0**	**1780.0**
142.50	1782.2	1786.6	1787.6	4.4	12814	14.1	1.6	0.0253	356.0	909	2.55	0.4	3.0	2.20	0	0	0	7.28	7.28	0.08	7.36	7.36	**1774.8**	**1774.8**
141.00	1777.7	1782.3	1783.4	4.6	12814	15.1	1.7	0.0263	348.6	849	2.44	0.0	3.0	2.30	0	0	0	6.89	6.89	0.08	6.97	6.97	**1770.7**	**1770.7**
139.50	1774.0	1779.0	1779.8	5.0	12814	13.4	1.5	0.0270	396.0	963	2.43	0.1	3.0	2.46	0	0	0	7.23	7.23	0.08	7.31	7.31	**1766.7**	**1766.7**
138.00	1770.5	1774.5	1775.4	4.0	12814	14.5	1.8	0.0253	416.1	885	2.13	0.0	3.0	2.00	0	0	0	6.50	6.50	0.08	6.58	6.58	**1763.9**	**1763.9**
136.50	1767.6	1771.8	1772.4	4.2	12814	12.3	1.3	0.0197	385.6	1048	2.72	0.0	3.0	2.07	0	0	0	6.59	6.59	0.08	6.67	6.67	**1760.9**	**1760.9**
135.00	1765.1	1769.4	1770.0	4.3	12814	12.4	1.3	0.0157	356.2	1037	2.91	0.0	3.0	2.11	0	0	0	6.64	6.64	0.08	6.72	6.72	**1758.4**	**1758.4**
133.50	1762.6	1767.0	1767.7	4.4	12814	12.7	1.3	0.0173	353.8	1015	2.87	0.1	3.0	2.20	0	0	0	6.89	6.89	0.08	6.97	6.97	**1755.6**	**1755.6**
132.00	1759.8	1763.7	1764.6	3.9	12814	13.7	1.5	0.0207	379.1	940	2.48	0.1	3.0	1.95	0	0	0	6.57	6.57	0.08	6.65	6.65	**1753.2**	**1753.2**
130.50	1755.9	1760.8	1761.5	4.9	12814	12.7	1.4	0.0220	417.8	1014	2.43	0.0	3.0	2.21	0	0	0	6.77	6.77	0.02	6.79	6.79	**1749.1**	**1749.1**
129.00	1751.5	1757.4	1758.1	5.9	12814	12.9	1.5	0.0243	451.8	996	2.19	0.0	3.0	2.28	0	0	0	6.86	6.86	0.02	6.88	6.88	**1744.6**	**1744.6**
127.50	1746.8	1753.0	1753.9	6.2	12814	13.9	1.7	0.0273	443.0	924	2.09	0.1	3.0	2.65	0	0	0	7.47	7.47	0.02	7.49	7.49	**1739.3**	**1739.3**
126.00	1743.6	1749.4	1750.1	5.8	12814	12.6	1.5	0.0273	479.0	1015	2.12	0.0	3.0	2.18	0	0	0	6.73	6.73	0.02	6.75	6.75	**1736.9**	**1736.9**
124.50	1740.5	1745.1	1745.9	4.6	12814	13.2	1.7	0.0267	502.9	972	1.92	0.0	3.0	2.30	0	0	0	6.89	6.89	0.02	6.91	6.91	**1733.6**	**1733.6**
123.00	1736.2	1741.4	1742.1	5.2	12814	12.4	1.5	0.0267	498.0	1035	2.07	0.0	3.0	2.11	0	0	0	6.64	6.64	0.02	6.66	6.66	**1729.5**	**1729.5**
121.50	1732.2	1737.1	1737.9	4.9	12814	13.2	1.7	0.0280	493.4	970	1.97	0.1	3.0	2.39	0	0	0	7.13	7.13	0.02	7.15	7.15	**1725.0**	**1725.0**
120.00	1727.7	1732.7	1733.5	5.0	12814	13.4	1.7	0.0290	481.6	960	1.99	0.1	3.0	2.46	0	0	0	7.23	7.23	0.02	7.25	7.25	**1720.5**	**1720.5**
118.50	1724.3	1728.3	1729.1	4.0	12814	13.4	1.7	0.0283	474.6	956	2.00	0.0	3.0	2.00	0	0	0	6.50	6.50	0.02	6.52	6.52	**1717.8**	**1717.8**
117.00	1720.3	1724.4	1725.1	4.1	12814	12.9	1.6	0.0260	475.2	996	2.10	0.0	3.0	2.05	0	0	0	6.57	6.57	0.02	6.59	6.59	**1713.7**	**1713.7**
115.50	1715.6	1720.6	1721.4	5.0	12814	13.2	1.5	0.0223	423.9	979	2.31	0.0	3.0	2.39	0	0	0	7.00	7.00	0.02	7.02	7.02	**1708.6**	**1708.6**
114.00	1712.4	1718.2	1718.6	5.8	12814	11.4	1.3	0.0200	453.6	1128	2.45	0.0	3.0	1.78	0	0	0	6.21	6.21	0.02	6.23	6.23	**1706.2**	**1706.2**
112.50	1709.8	1714.7	1715.4	4.9	12814	12.9	1.5	0.0217	447.0	991	2.22	0.1	3.0	2.28	0	0	0	6.99	6.99	0.02	7.01	7.01	**1702.8**	**1702.8**
111.00	1706.6	1711.0	1711.8	4.4	12814	13.2	1.5	0.0237	411.0	969	2.36	0.1	3.0	2.20	0	0	0	6.89	6.89	0.18	7.07	7.07	**1699.5**	**1699.5**
109.50	1702.7	1707.3	1708.2	4.6	12814	13.6	1.6	0.0223	402.3	942	2.34	0.2	3.0	2.30	0	0	0	7.15	7.15	0.18	7.33	7.33	**1695.4**	**1695.4**
108.00	1698.7	1704.7	1705.2	6.0	12814	12.1	1.3	0.0197	407.5	1056	2.59	0.0	3.0	2.01	0	0	0	6.51	6.51	0.18	6.69	6.69	**1692.0**	**1692.0**
106.50	1696.5	1701.9	1702.5	5.4	12814	12.6	1.4	0.0187	386.5	1018	2.63	0.0	3.0	2.18	0	0	0	6.73	6.73	0.18	6.91	6.91	**1689.6**	**1689.6**
105.00	1693.9	1698.5	1699.3	4.6	12814	13.7	1.5	0.0203	352.8	936	2.65	0.1	3.0	2.30	0	0	0	7.02	7.02	0.18	7.20	7.20	**1686.7**	**1686.7**
103.50	1689.1	1695.3	1696.1	6.2	12814	13.8	1.5	0.0217	349.8	931	2.66	0.7	3.0	2.61	0	0	0	8.20	8.20	0.18	8.38	8.38	**1680.7**	**1680.7**
102.00	1686.7	1692.0	1692.8	5.3	12814	13.8	1.5	0.0237	364.0	929	2.55	1.8	3.0	2.61	0	0	0	9.63	9.63	0.18	9.81	9.81	**1676.9**	**1676.9**
100.50	1684.0	1687.5	1688.6	3.5	12814	15.3	1.7	0.0347	332.8	839	2.52	1.8	3.0	1.75	0	0	0	8.52	8.52	0.18	8.70	8.70	**1675.3**	**1675.3**
99.00	1675.8	1678.1	1679.9	2.3	12814	20.3	2.4	0.0520	278.7	632	2.27	2.8	3.0	1.15	0	0	0	9.03	9.03	1.34	10.38	10.38	**1665.4**	**1665.4**
98.50	1674.2	1677.0	1680.0	2.8	12814	17.1	1.8	0.0570	275.9	751	2.72	1.2	3.0	1.40	0	0	0	7.28	7.28	1.34	8.62	8.62	**1665.6**	**1665.6**
98.00	1672.6	1677.2	1676.7	4.6	12814	10.2	0.8	0.0350	276.2	1251	4.53	0.4	3.0	1.43	0	0	0	6.27	6.27	1.34	7.61	7.61	**1665.0**	**1665.0**
97.50	1671.0	1673.8	1675.0	2.8	12185	16.6	1.8	0.0170	268.8	736	2.74	0.1	3.0	1.40	0	0	0	5.85	5.85	1.34	7.19	7.19	**1663.8**	**1663.8**
96.00	1669.5	1673.4	1673.4	3.9	12185	10.9	1.0	0.0137	290.5	1115	3.84	0.0	3.0	1.63	0	0	0	6.02	6.02	1.34	7.36	7.36	**1662.1**	**1662.1**
94.50	1668.0	1672.3	1672.3	4.3	12185	10.3	1.0	0.0100	366.3	1187	3.24	0.0	3.0	1.45	0	0	0	5.79	5.79	0.11	5.90	5.90	**1662.1**	**1662.1**
93.00	1666.0	1670.5	1670.8	4.5	12185	10.7	1.1	0.0153	420.8	1143	2.69	0.2	3.0	1.57	0	0	0	6.20	6.20	0.11	6.31	6.31	**1659.7**	**1659.7**
91.50	1662.6	1666.2	1667.1	3.6	12185	14.3	1.8	0.0237	417.4	855	2.03	0.5	3.0	1.80	0	0	0	6.89	6.89	0.11	7.00	7.00	**1655.6**	**1655.6**
90.00	1658.5	1662.8	1663.5	4.3	12185	12.3	1.5	0.0227	442.9	988	2.22	0.0	3.0	2.07	0	0	0	6.59	6.59	0.11	6.70	6.70	**1651.8**	**1651.8**
88.50	1655.3	1660.6	1660.9	5.3	12185	11.0	1.2	0.0190	434.5	1112	2.54	0.3	3.0	1.66	0	0	0	6.45	6.45	0.11	6.56	6.56	**1648.7**	**1648.7**
87.00	1652.1	1656.6	1657.5	4.5	12185	13.6	1.6	0.0230	422.3	900	2.11	0.1	3.0	2.25	0	0	0	6.96	6.96	0.11	7.07	7.07	**1645.0**	**1645.0**
85.50	1647.9	1652.9	1653.7	5.0	12185	13.0	1.5	0.0237	420.1	937	2.22	0.0	3.0	2.32	0	0	0	6.91	6.91	0.11	7.02	7.02	**1640.9**	**1640.9**
84.00	1645.0	1650.3	1650.8	5.3	12185	11.8	1.3	0.0170	415.7	1034	2.49	0.0	3.0	1.91	0	0	0	6.38	6.38	0.11	6.49	6.49	**1638.5**	**1638.5**
82.50	1643.0	1648.9	1648.9	5.9	12185	10.1	1.0	0.0147	399.7	1209	3.02	0.2	3.0	1.40	0	0	0	5.98	5.98	0.11	6.09	6.09	**1636.9**	**1636.9**
81.00	1641.0	1644.9	1645.8	3.9	12185	14.2	1.7	0.0210	378.8	860	2.27	0.8	3.0	1.95	0	0	0	7.48	7.48	0.11	7.59	7.59	**1633.4**	**1633.4**
79.50	1637.3	1641.5	1642.2	4.2	12185	13.1	1.5	0.0240	400.1	933	2.33	0.1	3.0	2.10	0	0	0	6.76	6.76	0.11	6.87	6.87	**1630.4**	**1630.4**
78.00	1633.9	1638.3	1639.0	4.4	12185	12.6	1.5	0.0227	422.7	963	2.28	0.0	3.0	2.18	0	0	0	6.73	6.73	0.11	6.84	6.84	**1627.1**	**1627.1**
76.50	1630.3	1634.9	1635.6	4.6	12185	12.6	1.5	0.0203	441.3	965	2.19	0.0	3.0	2.18	0	0	0	6.73	6.73	0.11	6.84	6.84	**1623.5**	**1623.5**
75.00	1627.5	1633.0	1633.3	5.5	12185	10.5	1.1	0.0177	428.4	1160	2.69	0.0	3.0	1.51	0	0	0	5.86	5.86	0.11	5.97	5.97	**1621.5**	**1621.5**
73.50	1623.9	1628.9	1629.9	5.0	12185	14.4	1.6	0.0187	351.2	854	2.43	0.0	3.0	2.50	0	0	0	7.15	7.15	0.25	7.40	7.40	**1616.5**	**1616.5**
72.00	1620.4	1628.3	1628.3	7.9	12185	7.3	0.6	0.0127	385.3	1670	4.25	0.0	3.0	0.73	0	0	0	4.85	4.85	0.25	5.10	5.10	**1615.3**	**1615.3**
70.50	1620.0	1626.7	1626.7	6.7	12186	10.4	1.0	0.0097	369.3	1184	3.13	1.0	3.0	1.48	0	0	0	7.13	7.13	0.25	7.38	7.38	**1612.6**	**1612.6**

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	Water Surface (ft)	Subcritical WSEL (ft)	Dmax (ft)	Q total (cfs)	Velocity channel (ft/s)	Froude #	Energy Slope(av) (ft/ft)	Eff. Top Width (ft)	X-Sec Area (ft^2)	Hydraulic Depth (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
69.00	1618.2	1623.4	1624.2	5.2	12185	13.4	1.5	0.0183	352.7	914	2.54	1.8	3.0	2.46	0	0	0	9.44	9.44	0.25	9.69	9.69	**1608.5**	**1608.5**
67.50	1615.4	1619.8	1620.6	4.4	12185	14.0	1.6	0.0247	356.4	879	2.43	1.5	3.0	2.20	0	0	0	8.71	8.71	0.25	8.96	8.96	**1606.4**	**1606.4**
66.00	1611.8	1616.2	1616.9	4.4	12185	13.1	1.6	0.0257	459.6	934	2.02	0.1	3.0	2.20	0	0	0	6.89	6.89	0.20	7.09	7.09	**1604.7**	**1604.7**
64.50	1608.2	1613.0	1613.6	4.8	12185	11.6	1.4	0.0227	510.0	1051	2.06	0.0	3.0	1.84	0	0	0	6.30	6.30	0.20	6.50	6.50	**1601.7**	**1601.7**
63.00	1604.2	1609.9	1610.4	5.7	12185	11.5	1.4	0.0227	505.2	1059	2.07	0.3	3.0	1.81	0	0	0	6.65	6.65	0.20	6.85	6.85	**1597.4**	**1597.4**
61.50	1600.3	1605.7	1606.5	5.4	12185	13.0	1.6	0.0253	475.6	940	1.98	0.2	3.0	2.32	0	0	0	7.17	7.17	0.20	7.37	7.37	**1592.9**	**1592.9**
60.00	1597.0	1602.0	1602.7	5.0	12185	12.6	1.5	0.0223	465.6	972	2.09	0.0	3.0	2.18	0	0	0	6.73	6.73	0.20	6.93	6.93	**1590.1**	**1590.1**
58.50	1593.3	1599.8	1600.1	6.5	12185	10.8	1.2	0.0177	451.9	1134	2.51	0.3	3.0	1.60	0	0	0	6.37	6.37	0.20	6.57	6.57	**1586.7**	**1586.7**
57.00	1589.3	1596.3	1597.1	7.0	12185	13.5	1.4	0.0167	303.7	902	2.97	0.0	3.0	2.50	0	0	0	7.15	7.15	0.32	7.47	7.47	**1581.8**	**1581.8**
55.50	1585.9	1593.7	1594.5	7.8	12185	13.6	1.4	0.0197	286.4	898	3.14	0.2	3.0	2.53	0	0	0	7.45	7.45	0.32	7.77	7.77	**1578.1**	**1578.1**
54.00	1583.7	1590.0	1591.0	6.3	12185	14.4	1.8	0.0217	422.7	847	2.00	0.0	3.0	2.84	0	0	0	7.59	7.59	0.32	7.91	7.91	**1575.8**	**1575.8**
52.50	1580.7	1588.3	1588.5	7.6	12185	10.8	1.1	0.0187	370.2	1131	3.05	0.7	3.0	1.60	0	0	0	6.89	6.89	0.32	7.21	7.21	**1573.5**	**1573.5**
51.00	1577.5	1583.8	1585.0	6.3	12185	15.7	1.6	0.0217	259.2	776	2.99	1.4	3.0	3.15	0	0	0	9.81	9.81	0.32	10.14	10.14	**1567.4**	**1567.4**
49.50	1574.5	1579.5	1580.9	5.0	12185	16.3	1.8	0.0237	290.1	749	2.58	0.0	3.0	2.50	0	0	0	7.15	7.15	0.32	7.47	7.47	**1567.0**	**1567.0**
48.00	1571.2	1578.9	1579.0	7.7	12185	10.1	1.0	0.0210	407.1	1201	2.95	0.0	3.0	1.40	0	0	0	5.72	5.72	0.32	6.04	6.04	**1565.2**	**1565.2**
46.50	1568.0	1571.6	1575.3	3.6	13633	19.2	2.1	0.0153	271.8	710	2.61	0.0	3.0	1.80	3.7	0	0	11.05	11.05	0.28	11.33	11.33	**1556.7**	**1556.7**
45.00	1566.1	1575.2	1575.3	9.1	15265	6.4	0.4	0.0061	270.6	2434	8.14	0.0	3.0	0.56	3.7	0	0	9.44	9.44	0.28	9.72	9.72	**1556.4**	**1556.4**
44.50	1566.2	1575.0	1575.0	8.8	15265	7.2	0.4	0.0024	253.3	2107	8.32	0.0	3.0	0.71	3.7	0	0	9.63	9.63	0.28	9.91	9.91	**1556.3**	**1556.3**
43.60	1565.8	1574.8	1574.8	9.0	15265	7.0	0.4	0.0035	254.1	2176	8.56	0.0	3.0	0.67	0	0	0	4.77	4.77	0.28	5.05	5.05	**1560.7**	**1560.7**
42.00	1567.4	1572.6	1572.6	5.2	15265	11.9	1.0	0.0106	293.9	1283	4.37	1.0	3.0	1.94	0	0	0	7.72	7.72	0.00	7.72	7.72	**1559.7**	**1559.7**
40.50	1563.2	1567.9	1569.3	4.7	15265	17.1	1.8	0.0197	306.0	901	2.94	0.4	3.0	2.35	0	0	0	7.48	7.48	0.00	7.48	7.48	**1555.7**	**1555.7**
39.00	1559.2	1566.1	1566.7	6.9	15265	13.6	1.3	0.0197	326.4	1120	3.43	0.0	3.0	2.53	0	0	0	7.19	7.19	0.00	7.19	7.19	**1552.0**	**1552.0**
37.50	1558.0	1563.3	1564.1	5.3	15265	14.4	1.4	0.0157	317.6	1060	3.34	0.0	3.0	2.65	0	0	0	7.34	7.34	0.00	7.34	7.34	**1550.7**	**1550.7**
36.00	1554.7	1561.7	1562.0	7.0	15265	12.9	1.1	0.0160	296.2	1184	4.00	0.2	3.0	2.28	0	0	0	7.12	7.12	0.00	7.12	7.12	**1547.6**	**1547.6**
34.50	1552.7	1558.0	1559.1	5.3	15265	15.5	1.6	0.0220	355.3	986	2.78	0.5	3.0	2.65	0	0	0	7.99	7.99	0.00	7.99	7.99	**1544.7**	**1544.7**
33.00	1549.6	1554.7	1555.6	5.1	15266	13.7	1.6	0.0240	502.1	1121	2.23	0.0	3.0	2.55	0	0	0	7.22	7.22	0.00	7.22	7.22	**1542.4**	**1542.4**
31.50	1547.3	1552.6	1553.0	5.3	15265	10.9	1.2	0.0173	553.8	1402	2.53	0.0	3.0	1.63	0	0	0	6.02	6.02	0.00	6.02	6.02	**1541.3**	**1541.3**
30.00	1544.6	1550.5	1550.9	5.9	15265	11.0	1.2	0.0140	515.9	1388	2.67	0.0	3.0	1.66	2.1	0	0	8.79	8.79	0.00	8.79	8.79	**1535.8**	**1535.8**
28.50	1542.6	1548.2	1548.6	5.6	15265	11.7	1.2	0.0127	469.6	1304	2.76	0.0	3.0	1.88	2.1	0	0	9.07	9.07	0.00	9.07	9.07	**1533.5**	**1533.5**
27.00	1539.0	1546.8	1546.9	7.8	15265	10.7	1.0	0.0110	428.1	1429	3.30	0.0	3.0	1.57	2.1	0	0	8.67	8.67	0.00	8.67	8.67	**1530.3**	**1530.3**
25.50	1536.2	1544.8	1545.2	8.6	15265	11.9	1.1	0.0093	350.1	1294	3.59	0.0	3.0	1.94	2.1	0	0	9.15	9.15	0.00	9.15	9.15	**1527.0**	**1527.0**
24.00	1534.7	1543.7	1543.8	9.0	15265	11.8	1.0	0.0100	318.8	1313	3.98	0.4	3.0	1.91	2.1	0	0	9.63	9.63	0.00	9.63	9.63	**1525.1**	**1525.1**
22.50	1533.0	1541.2	1541.8	8.2	15265	13.5	1.3	0.0130	349.7	1134	3.20	4.0	3.0	2.50	0	0	0	12.35	12.35	0.00	12.35	12.35	**1520.7**	**1520.7**
21.00	1531.4	1538.0	1539.2	6.6	15265	16.6	1.2	0.0140	143.0	1165	3.06	5.5	3.0	3.30	0	0	0	15.34	15.34	0.23	15.57	15.57	**1515.8**	**1515.8**
19.50	1528.6	1534.3	1536.4	5.7	15264	18.9	1.5	0.0167	155.3	837	3.84	2.6	3.0	2.85	3.5	0	0	15.54	15.54	0.23	15.77	15.77	**1512.8**	**1512.8**
18.00	1525.8	1530.7	1533.0	4.9	15265	19.9	1.6	0.0207	166.4	766	4.60	1.3	3.0	2.45	3.5	0	0.78	13.33	14.34	0.23	13.56	14.57	**1512.2**	**1511.2**
16.50	1523.0	1527.7	1529.4	4.7	15265	19.4	1.6	0.0217	179.4	786	4.38	0.5	3.0	2.35	3.5	0	0.78	12.16	13.17	0.23	12.39	13.40	**1510.6**	**1509.6**
15.00	1520.2	1525.1	1526.6	4.9	15265	18.4	1.5	0.0193	182.0	830	4.56	0.0	3.0	2.45	0	0	0.78	7.08	8.10	0.23	7.31	8.33	**1512.9**	**1511.9**
13.50	1517.4	1523.3	1524.4	5.9	15265	17.1	1.3	0.0170	168.2	894	5.32	0.2	3.0	2.95	0	0	0.78	7.99	9.01	0.23	8.22	9.24	**1509.2**	**1508.2**
12.00	1514.6	1519.5	1521.2	4.9	15265	19.3	1.6	0.0190	170.6	791	4.64	0.0	3.0	2.45	0	0	0.78	7.09	8.10	0.23	7.32	8.33	**1507.3**	**1506.3**
10.50	1511.8	1516.5	1519.6	4.7	15265	19.0	1.6	0.0147	187.4	804	4.29	0.0	3.0	2.35	0	0	0	6.96	6.96	0.00	6.96	6.96	**1504.8**	**1504.8**
9.00	1510.9	1519.2	1519.2	8.3	15265	10.4	0.7	0.0057	204.2	1462	7.16	0.0	3.0	1.48	0	0	0	5.83	5.83	0.00	5.83	5.83	**1505.1**	**1505.1**
7.50	1510.1	1518.6	1518.6	8.5	15265	10.7	0.7	0.0037	197.2	1421	7.21	0.0	3.0	1.57	0	0	0	5.94	5.94	0.00	5.94	5.94	**1504.2**	**1504.2**
6.00	1509.5	1518.1	1518.1	8.6	15265	10.7	0.7	0.0047	204.2	1430	7.00	0.0	3.0	1.57	0	0	0	5.94	5.94	0.00	5.94	5.94	**1503.6**	**1503.6**
4.50	1509.1	1516.0	1516.0	6.9	15265	14.0	1.0	0.0063	184.3	1094	5.94	0.1	3.0	2.69	0	0	0	7.52	7.52	0.00	7.52	7.52	**1501.6**	**1501.6**
3.00	1508.0	1515.3	1515.3	7.3	15265	13.0	0.9	0.0063	178.7	1176	6.58	0.1	3.0	2.32	0	0	0	7.04	7.04	0.00	7.04	7.04	**1501.0**	**1501.0**
1.50	1507.0	1514.5	1514.4	7.5	15265	12.8	0.9	0.0060	176.9	1193	6.74	0.8	3.0	2.24	0	0	0	7.86	7.86	0.00	7.86	7.86	**1499.1**	**1499.1**
0.00	1506.0	1512.9	1513.7	6.9	15265	14.3	1.0	0.0067	170.5	1069	6.27	2.0	3.0	2.80	0	0	0	10.14	10.14	0.00	10.14	10.14	**1495.9**	**1495.9**
max				10.8	15266	27.2	3.8	0.0647	747.3	2434.0	8.6	7.7	3.0	3.8	3.8	1.1	0.8	20.3	20.3	3.3	21.2	21.2		
min				2.3	5766	5.9	0.4	0.0024	77.5	370.0	1.0	0.0	3.0	0.5	0.0	0.0	0.0	4.5	4.5	0.0	4.7	4.7		
avg				5.4	12295	15.4	1.6	0.0254	303.4	876.8	3.2	0.6	3.0	2.2	0.2	0.0	0.0	7.9	7.9	0.5	8.4	8.4		

Short Term Conditions 100-year Flood Event Ultimate Channel Conditions Aggradation/Degradation Analysis						
Reach No.	Volume in (CY)	Volume out (CY)	Volume Change (CY)	Reach Length (ft)	Average Width (ft)	Average Aggradation/ Degradation Depth (ft)
1	2,922	2,922	0	2,550	323	0.00
2	9,578	4,315	5263	1,197	454	0.26
*3	4,315	4,315	0	255	155	0.00
*4	4,315	4,315	0	798	116	0.00
5	4,315	10,890	-6575	975	261	-0.70
6	10,890	17,840	-6950	1,685	97	-1.15
7	19,110	17,770	1340	1,015	121	0.29
8	17,770	13,716	4054	1,800	141	0.43
9	13,716	13,282	434	1,050	284	0.04
10	13,282	11,830	1452	1,950	232	0.09
11	11,830	8,790	3040	1,200	306	0.22
12	12,874	6,344	6529	1,500	316	0.37
13	6,344	5,441	903	1,350	503	0.04
14	5,441	5,042	399	1,200	374	0.02
15	5,042	4,473	570	1,950	465	0.02
16	4,473	6,731	-2259	1,200	376	-0.14
17	6,731	9,953	-3221	450	278	-0.70
18	9,953	7,362	2590	2,100	415	0.08
19	7,362	6,236	1126	750	363	0.11
20	6,236	6,921	-684	900	478	-0.04
21	6,921	7,845	-925	1,050	334	-0.07
22	17,351	7,305	10046	447	262	2.32
23	7,305	5,099	2206	903	316	0.21
24	5,099	6,177	-1079	1,200	436	-0.06
25	6,177	7,588	-1411	1,050	166	-0.22
26	7,588	6,012	1576	750	195	0.29
27	6,012	4,678	1334	375	175	0.55

5263 cf

L x W * d

1197 * 454 * d = 5263

$d = \frac{5263 * 27}{1197 * 454} = 0.26$ Avg

looks very skimpy

* Grade Control (Vol in = Vol out)

Note: + Aggradation

- Degradation

Short Term Conditions 100-year Flood Event Reduced Sediment Supply for Downstream Tributaries Ultimate Channel Conditions Aggradation/Degradation Analysis									
Reach No.	Volume in A (CY)	Volume out B (CY)	Tributary Volume in C (CY)	Volume in (Tributary only) D (CY)	Adjusted Vol out (GradeControl) E (CY)	Volume Change (D-E) (CY)	Reach Length (ft)	Average Width (ft)	Average Aggradation/ Degradation Depth (ft)
1	2,922	2,922	2,922	2,922	2,922	0	2,550	323	0.00
2	9,578	4,315	6,656	9,578	4,315	5263	1,197	454	0.26
*3	4,315	4,315	0	4,315	4,315	0	255	155	0.00
*4	4,315	4,315	0	4,315	4,315	0	798	116	0.00
5	4,315	10,890	0	4,315	10,890	-6575	975	261	-0.70
6	10,890	17,840	0	10,890	17,840	-6950	1,685	97	-1.15
7	19,110	17,770	1,270	19,110	17,770	1340	1,015	121	0.29
8	17,770	13,716	0	17,770	13,716	4054	1,800	141	0.43
9	13,716	13,282	0	13,716	13,282	434	1,050	284	0.04
10	13,282	11,830	0	13,282	11,830	1452	1,950	232	0.09
11	11,830	8,790	0	11,830	8,790	3040	1,200	306	0.22
12	12,874	6,344	2,042	10,832	6,344	4488	1,500	316	0.26
13	6,344	5,441	0	6,344	5,441	903	1,350	503	0.04
14	5,441	5,042	0	5,441	5,042	399	1,200	374	0.02
15	5,042	4,473	0	5,042	4,473	570	1,950	465	0.02
16	4,473	6,731	0	4,473	6,731	-2259	1,200	376	-0.14
17	6,731	9,953	0	6,731	9,953	-3221	450	278	-0.70
18	9,953	7,362	0	9,953	7,362	2590	2,100	415	0.08
19	7,362	6,236	0	7,362	6,236	1126	750	363	0.11
20	6,236	6,921	0	6,236	6,921	-684	900	478	-0.04
21	6,921	7,845	0	6,921	7,845	-925	1,050	334	-0.07
22	17,351	7,305	4,753	12,598	7,305	5293	447	262	1.22
23	7,305	5,099	0	7,305	5,099	2206	903	316	0.21
24	5,099	6,177	0	5,099	6,177	-1079	1,200	436	-0.06
25	6,177	7,588	0	6,177	7,588	-1411	1,050	166	-0.22
26	7,588	6,012	0	7,588	6,012	1576	750	195	0.29
27	6,012	4,678	0	6,012	4,678	1334	375	175	0.55

* Grade Control (Vol in = Vol out)
Note: + Aggradation
- Degradation

Long Term Conditions 100-Year Flood Event Ultimate Channel Conditions Aggradation/Degradation Analysis									
Reach No.	Volume in A (CY)	Volume out B (CY)	Tributary Volume in C (CY)	Volume in (Tributary only) D (CY)	Adjusted Vol out (GradeControl) E (CY)	Volume Change (D-E) (CY)	Reach Length (ft)	Average Width (ft)	Average Aggradation/ Degradation Depth (ft)
1	2,922	2,922	2,922	2,922	2,922	0	2,550	323	0.00
2	9,578	4,315	6,656	9,578	4,315	5263	1,197	454	0.26
*3	4,315	4,315	0	9,578	9,578	0	255	155	0.00
*4	4,315	4,315	0	9,578	9,578	0	798	116	0.00
5	4,315	10,890	0	9,578	10,890	-1312	975	261	-0.14
6	10,890	17,840	0	9,578	17,840	-8262	1,685	97	-1.36
7	19,110	17,770	1,270	10,848	17,770	-6922	1,015	121	-1.52
8	17,770	13,716	0	10,848	13,716	-2868	1,800	141	-0.31
9	13,716	13,282	0	10,848	13,282	-2434	1,050	284	-0.22
10	13,282	11,830	0	10,848	11,830	-982	1,950	232	-0.06
11	11,830	8,790	0	10,848	8,790	2058	1,200	306	0.15
12	12,874	6,344	4,084	14,932	6,344	8587	1,500	316	0.49
13	6,344	5,441	0	14,932	5,441	9490	1,350	503	0.38
14	5,441	5,042	0	14,932	5,042	9889	1,200	374	0.59
15	5,042	4,473	0	14,932	4,473	10459	1,950	465	0.31
16	4,473	6,731	0	14,932	6,731	8200	1,200	376	0.49
17	6,731	9,953	0	14,932	9,953	4979	450	278	1.07
18	9,953	7,362	0	14,932	7,362	7570	2,100	415	0.23
19	7,362	6,236	0	14,932	6,236	8695	750	363	0.86
20	6,236	6,921	0	14,932	6,921	8011	900	478	0.50
21	6,921	7,845	0	14,932	7,845	7087	1,050	334	0.55
22	17,351	7,305	9,506	24,437	7,305	17133	447	262	3.95
23	7,305	5,099	0	24,437	5,099	19339	903	316	1.83
24	5,099	6,177	0	24,437	6,177	18260	1,200	436	0.94
25	6,177	7,588	0	24,437	7,588	16849	1,050	166	2.61
26	7,588	6,012	0	24,437	6,012	18425	750	195	3.40
27	6,012	4,678	0	24,437	4,678	19760	375	175	8.13

* Grade Control (Vol in = Vol out)
Note: + Aggradation
- Degradation

Long Term Conditions 100-Year Flood Event Reduced Sediment Supply from N. Beardsley, S. Beardsley, and Thompson Peak Ultimate Channel Conditions Aggradation/Degradation Analysis									
Reach No.	Volume in A (CY)	Volume out B (CY)	Tributary Volume in C (CY)	Volume in (Tributary only) D (CY)	Adjusted Vol out (GradeControl) E (CY)	Volume Change (D-E) (CY)	Reach Length (ft)	Average Width (ft)	Average Aggradation/ Degradation Depth (ft)
1	2,922	2,922	2,922	2,922	2,922	0	2,550	323	0.00
2	9,578	4,315	6,656	9,578	4,315	5263	1,197	454	0.26
*3	4,315	4,315	0	9,578	9,578	0	255	155	0.00
*4	4,315	4,315	0	9,578	9,578	0	798	116	0.00
5	4,315	10,890	0	9,578	10,890	-1312	975	261	-0.14
6	10,890	17,840	0	9,578	17,840	-8262	1,685	97	-1.36
7	19,110	17,770	1,270	10,848	17,770	-6922	1,015	121	-1.52
8	17,770	13,716	0	10,848	13,716	-2868	1,800	141	-0.31
9	13,716	13,282	0	10,848	13,282	-2434	1,050	284	-0.22
10	13,282	11,830	0	10,848	11,830	-982	1,950	232	-0.06
11	11,830	8,790	0	10,848	8,790	2058	1,200	306	0.15
12	12,874	6,344	2,042	12,890	6,344	6545	1,500	316	0.37
13	6,344	5,441	0	12,890	5,441	7448	1,350	503	0.30
14	5,441	5,042	0	12,890	5,042	7848	1,200	374	0.47
15	5,042	4,473	0	12,890	4,473	8417	1,950	465	0.25
16	4,473	6,731	0	12,890	6,731	6159	1,200	376	0.37
17	6,731	9,953	0	12,890	9,953	2937	450	278	0.63
18	9,953	7,362	0	12,890	7,362	5528	2,100	415	0.17
19	7,362	6,236	0	12,890	6,236	6654	750	363	0.66
20	6,236	6,921	0	12,890	6,921	5969	900	478	0.37
21	6,921	7,845	0	12,890	7,845	5045	1,050	334	0.39
22	17,351	7,305	4,753	17,643	7,305	10338	447	262	2.38
23	7,305	5,099	0	17,643	5,099	12544	903	316	1.19
24	5,099	6,177	0	17,643	6,177	11465	1,200	436	0.59
25	6,177	7,588	0	17,643	7,588	10054	1,050	166	1.56
26	7,588	6,012	0	17,643	6,012	11631	750	195	2.15
27	6,012	4,678	0	17,643	4,678	12965	375	175	5.33

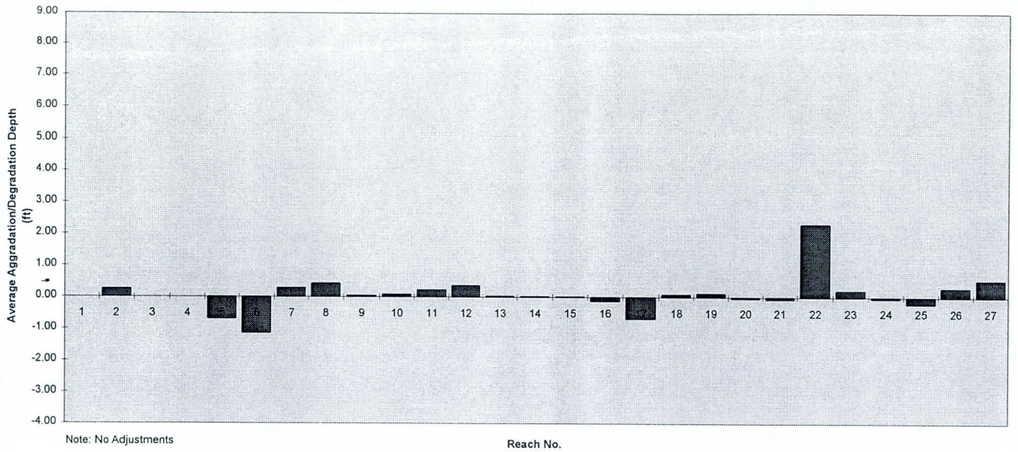
* Grade Control (Vol in = Vol out)
Note: + Aggradation
- Degradation

Long Term Conditions 100-Year Flood Event
Reduction of Upstream Sediment Supply
Ultimate Channel Conditions Aggradation/Degradation Analysis

Reach No.	Volume in (CY)	Volume out (CY)	Tributary Volume in (CY)	Tributary Vin (Reduce 50%)	Volume in (Tributary only) (CY)	Adjusted Vol out (CY)	Volume Change (CY)	Reach Length (ft)	Average Width (ft)	Average Aggradation/ Degradation Depth (ft)
1	2922	2922	1461	731	731	2922	-2192	2550	323	-0.07
2	9578	4315	3328	1664	2395	4315	-1920	1197	454	-0.10
*3	4315	4315	0	0	2395	2395	0	255	155	0.00
*4	4315	4315	0	0	2395	2395	0	798	116	0.00
5	4315	10890	0	0	2395	10890	-8496	975	261	-0.90
6	10890	17840	0	0	2395	17840	-15446	1685	97	-2.55
7	19110	17770	635	318	2712	17770	-15058	1015	121	-3.31
8	17770	13716	0	0	2712	13716	-11004	1800	141	-1.17
9	13716	13282	0	0	2712	13282	-10570	1050	284	-0.96
10	13282	11830	0	0	2712	11830	-9118	1950	232	-0.54
11	11830	8790	0	0	2712	8790	-6078	1200	306	-0.45
12	12874	6344	2042	1021	3733	6344	-2612	1500	316	-0.15
13	6344	5441	0	0	3733	5441	-1709	1350	503	-0.07
14	5441	5042	0	0	3733	5042	-1309	1200	374	-0.08
15	5042	4473	0	0	3733	4473	-740	1950	465	-0.02
16	4473	6731	0	0	3733	6731	-2998	1200	376	-0.18
17	6731	9953	0	0	3733	9953	-6220	450	278	-1.34
18	9953	7362	0	0	3733	7362	-3629	2100	415	-0.11
19	7362	6236	0	0	3733	6236	-2503	750	363	-0.25
20	6236	6921	0	0	3733	6921	-3188	900	478	-0.20
21	6921	7845	0	0	3733	7845	-4112	1050	334	-0.32
22	17351	7305	4753	2376	6109	7305	-1195	447	262	-0.28
23	7305	5099	0	0	6109	5099	1011	903	316	0.10
24	5099	6177	0	0	6109	6177	-68	1200	436	0.00
25	6177	7588	0	0	6109	7588	-1479	1050	166	-0.23
26	7588	6012	0	0	6109	6012	97	750	195	0.02
27	6012	4678	0	0	6109	4678	1432	375	175	0.59

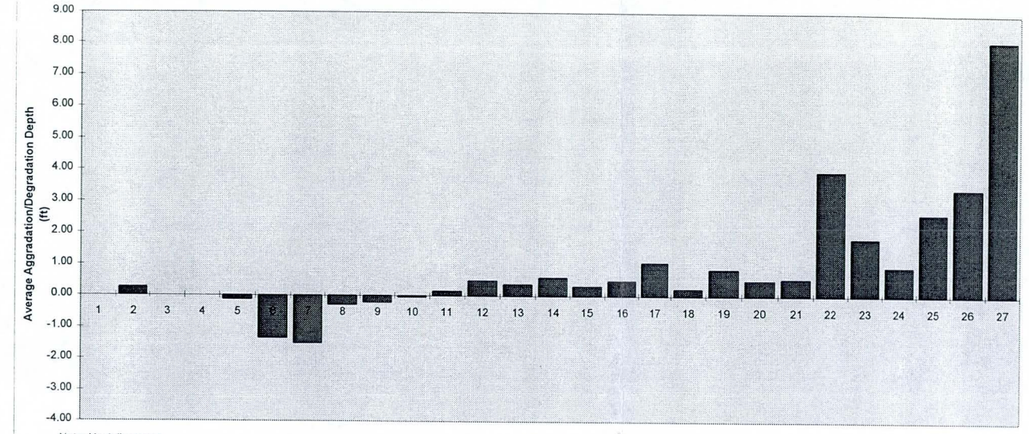
* Grade Control (Vol in = Vol out)
Note: + Aggradation
- Degradation

Short Term Conditions 100-Yr Flood



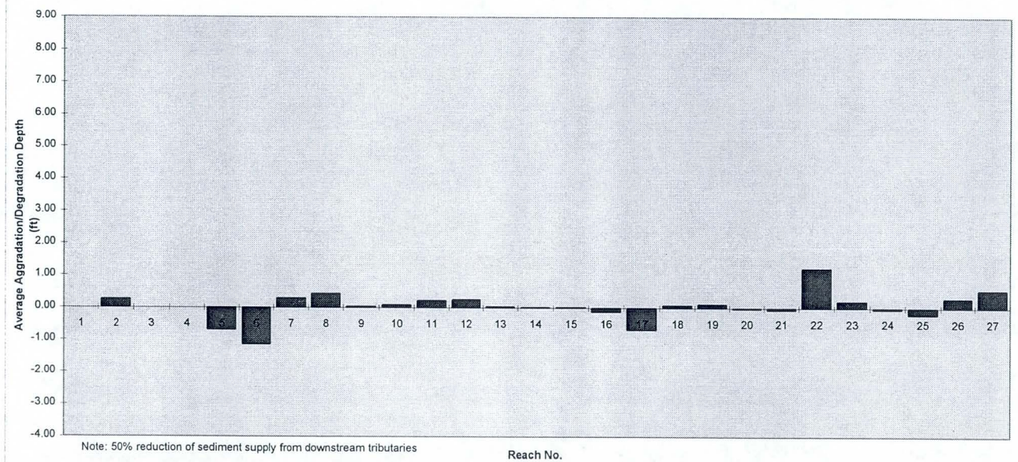
Note: No Adjustments

Long Term Conditions 100-Yr Flood



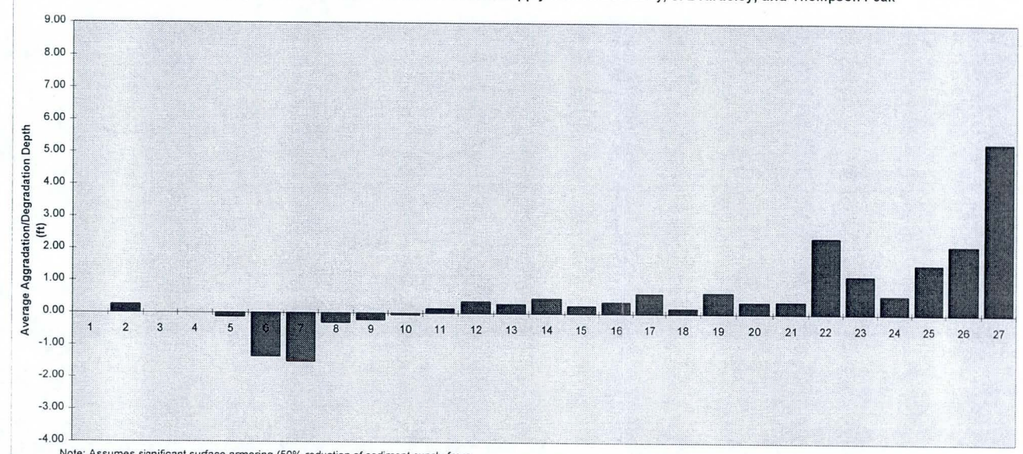
Note: No Adjustment

Short Term Conditions100-Year Flood - Reduced Sediment Supply for Downstream Tributaries



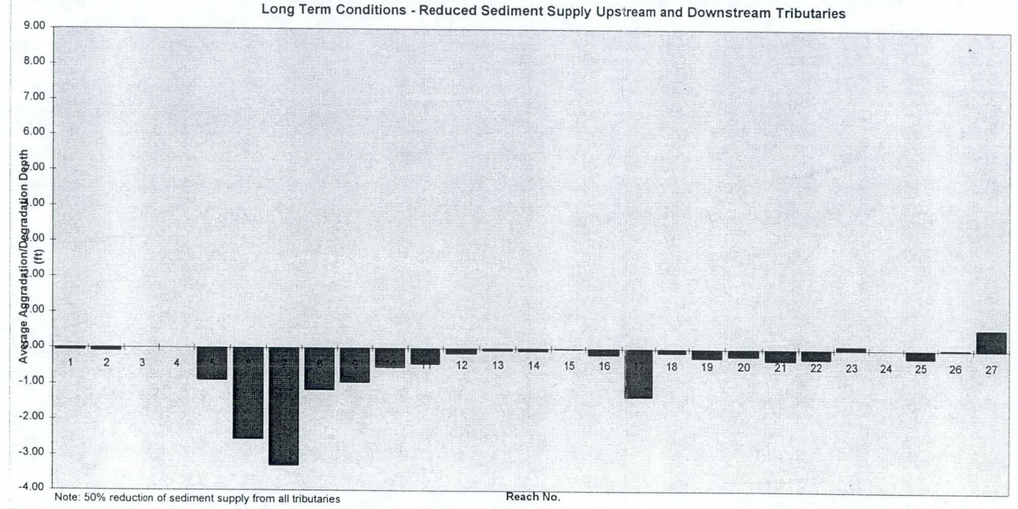
Note: 50% reduction of sediment supply from downstream tributaries

Long-term Conditions - Reduced Sediment Supply from N. Beardsley, S. Beardsley, and Thompson Peak



Note: Assumes significant surface armoring (50% reduction of sediment supply from downstream tributaries)

Long Term Conditions - Reduced Sediment Supply Upstream and Downstream Tributaries



Note: 50% reduction of sediment supply from all tributaries

Long-Term Scour Results for Toe-Down and Top of Levee Requirements		
Cross Section	Reach	Agg/Deg (ft)
1	1	-0.07
2	1	-0.07
3	1	-0.07
4	1	-0.07
5	1	-0.07
6	1	-0.07
7	1	-0.07
8	1	-0.07
9	1	-0.07
10	2	-0.10
11	2	-0.10
12	2	-0.10
13	2	-0.10
14	2	-0.10
15	3	0.00
16	3	0.00
17	4	0.00
18	4	0.00
19	4	0.00
20	4	0.00
21	4	0.00
22	5	-0.90
23	5	-0.90
24	5	-0.90
25	5	-0.90
26	5	-0.90
27	5	-0.90
28	6	-2.55
29	6	-2.55
30	6	-2.55
31	6	-2.55
32	6	-2.55
33	6	-2.55
34	6	-2.55
35	6	-2.55
36	6	-2.55
37	6	-2.55
38	6	-2.55
39	7	-3.31
40	7	-3.31
41	7	-3.31
42	7	-3.31
43	7	-3.31
44	7	-3.31
45	7	-3.31
46	7	-3.31
47	8	-1.17
48	8	-1.17
49	8	-1.17
50	8	-1.17
51	8	-1.17
52	8	-1.17
53	8	-1.17
54	8	-1.17
55	8	-1.17
56	8	-1.17
57	8	-1.17
58	8	-1.17
59	9	-0.96
60	9	-0.96
61	9	-0.96
62	9	-0.96
63	9	-0.96
64	9	-0.96
65	9	-0.96
66	10	-0.54
67	10	-0.54
68	10	-0.54
69	10	-0.54
70	10	-0.54
71	10	-0.54

Long-Term Scour Results for Toe-Down and Top of Levee Requirements		
Cross Section	Reach	Agg/Deg (ft)
72	10	-0.54
73	10	-0.54
74	10	-0.54
75	10	-0.54
76	10	-0.54
77	10	-0.54
78	10	-0.54
79	11	-0.45
80	11	-0.45
81	11	-0.45
82	11	-0.45
83	11	-0.45
84	11	-0.45
85	11	-0.45
86	11	-0.45
87	12	-0.15
88	12	-0.15
89	12	-0.15
90	12	-0.15
91	12	-0.15
92	12	-0.15
93	12	-0.15
94	12	-0.15
95	12	-0.15
96	12	-0.15
97	12	-0.15
98	12	-0.15
99	13	-0.07
100	13	-0.07
101	13	-0.07
102	13	-0.07
103	13	-0.07
104	13	-0.07
105	13	-0.07
106	13	-0.07
107	13	-0.07
108	14	-0.08
109	14	-0.08
110	14	-0.08
111	14	-0.08
112	14	-0.08
113	14	-0.08
114	14	-0.08
115	14	-0.08
116	15	-0.02
117	15	-0.02
118	15	-0.02
119	15	-0.02
120	15	-0.02
121	15	-0.02
122	15	-0.02
123	15	-0.02
124	15	-0.02
125	15	-0.02
126	15	-0.02
127	15	-0.02
128	15	-0.02
129	16	-0.18
130	16	-0.18
131	16	-0.18
132	16	-0.18
133	16	-0.18
134	16	-0.18
135	16	-0.18
136	16	-0.18
137	17	-1.34
138	17	-1.34
139	17	-1.34
140	17	-1.34
141	17	-1.34
142	18	-0.11

Long-Term Scour Results for Toe-Down and Top of Levee Requirements		
Cross Section	Reach	Agg/Deg (ft)
143	18	-0.11
144	18	-0.11
145	18	-0.11
146	18	-0.11
147	18	-0.11
148	18	-0.11
149	18	-0.11
150	18	-0.11
151	18	-0.11
152	18	-0.11
153	18	-0.11
154	18	-0.11
155	18	-0.11
156	19	-0.25
157	19	-0.25
158	19	-0.25
159	19	-0.25
160	19	-0.25
161	20	-0.20
162	20	-0.20
163	20	-0.20
164	20	-0.20
165	20	-0.20
166	20	-0.20
167	21	-0.32
168	21	-0.32
169	21	-0.32
170	21	-0.32
171	21	-0.32
172	21	-0.32
173	21	-0.32
174	22	-0.28
175	22	-0.28
176	22	-0.28
177	22	-0.28
178	23	0.10
179	23	0.10
180	23	0.10
181	23	0.10
182	23	0.10
183	23	0.10
184	24	0.00
185	24	0.00
186	24	0.00
187	24	0.00
188	24	0.00
189	24	0.00
190	24	0.00
191	24	0.00
192	25	-0.23
193	25	-0.23
194	25	-0.23
195	25	-0.23
196	25	-0.23
197	25	-0.23
198	25	-0.23
199	26	0.02
200	26	0.02
201	26	0.02
202	26	0.02
203	26	0.02
204	27	0.59
205	27	0.59
206	27	0.59

J: MINIMUM TOP OF LEVEE AND TOE DOWN RECOMMENDATIONS

Recommendations for top of levee and toe-down elevations are shown in this section. The elevations are based on the aggradation and degradation depths computed in Section I of the Technical Addendum.

1. Minimum Top of Levee Elevation Recommendations
2. Minimum Toe-Down Elevation Recommendations

Minimum Recommended Top of Levee Elevations

Section #	Thalweg El (ft)	Mixed WSEL (ft)	Subcritical WSEL (ft)	Antidune Wave ht. (ft)	General Agg. (ft)	Long-term Agg. (ft)	Superelevation (East) (ft)	Superelevation (West) (ft)	Free Board (ft)	Levee Ht. fromThalweg (ft)	Levee Base Elevation (East) (ft)	Levee Base Elevation (West) (ft)	Minimum Top of Levee (East) (ft)	Minimum Top of Levee (West) (ft)	Levee Height from Base (East) (ft)	Levee Height from Base (West) (ft)
271.50	2171.5	2181.4	2182.2	1.37	0.4	0.00	0.0	0.0	3.00	15.5			**2187.0**	**2187.0**		
270.00	2167.9	2178.7	2178.8	3.21	0.0	0.00	0.0	0.0	3.00	17.1		2176.1	**2185.0**	**2185.0**		8.9
267.00	2162.0	2165.9	2168.0	1.95	0.6	0.00	0.0	0.0	3.00	11.6		2167.6	**2173.6**	**2173.6**		6.0
265.50	2158.0	2162.6	2163.5	2.30	0.9	0.00	0.0	0.0	3.00	11.7			**2169.7**	**2169.7**		
264.00	2153.8	2158.1	2159.3	2.15	0.0	0.00	0.0	0.0	3.00	10.6		2172.5	**2164.4**	**2164.4**		0.0
262.50	2150.5	2154.6	2155.5	2.05	0.0	0.00	0.0	0.0	3.00	10.1		2165.9	**2160.6**	**2160.6**		0.0
261.00	2144.9	2149.6	2151.0	2.35	0.0	0.00	0.0	0.0	3.00	11.4		2147.9	**2156.3**	**2156.3**		8.4
259.50	2139.4	2145.4	2146.8	3.00	0.0	0.00	0.0	0.0	3.00	13.4		2143.2	**2152.8**	**2152.8**		9.6
258.00	2133.9	2139.7	2142.1	2.90	0.0	0.00	0.0	0.0	3.00	14.1		2139.7	**2148.0**	**2148.0**		8.3
256.50	2128.3	2133.6	2137.2	2.65	0.0	0.00	0.0	0.0	3.00	14.5		2138.1	**2142.8**	**2142.8**		4.7
255.00	2122.8	2128.0	2132.2	2.60	0.0	0.00	0.0	0.0	3.00	14.9		2130.6	**2137.8**	**2137.8**		7.2
253.50	2117.2	2122.4	2125.7	2.60	0.0	0.00	0.0	0.0	3.00	14.1		2125.2	**2131.3**	**2131.3**		6.1
252.00	2111.7	2116.8	2120.1	2.55	0.0	0.00	0.0	0.0	3.00	13.9		2117.7	**2125.6**	**2125.6**		7.9
250.50	2106.1	2111.2	2114.4	2.55	0.0	0.00	0.0	0.0	3.00	13.8		2111.8	**2119.9**	**2119.9**		8.1
249.00	2100.5	2105.7	2108.8	2.60	0.0	0.00	0.0	0.0	3.00	13.8		2107.6	**2114.4**	**2114.4**		6.8
247.50	2095.0	2100.1	2103.2	2.55	0.0	0.00	0.0	0.0	3.00	13.8		2105.0	**2108.8**	**2108.8**		3.8
246.00	2089.5	2094.6	2097.7	2.55	0.0	0.00	0.0	0.0	3.00	13.8		2102.1	**2103.3**	**2103.3**		1.2
244.50	2083.9	2089.0	2092.3	2.55	0.0	0.00	0.0	0.0	3.00	13.9		2095.6	**2097.8**	**2097.8**		2.2
243.00	2078.4	2082.5	2085.5	2.05	0.1	0.00	0.0	0.0	3.00	12.2		2089.1	**2090.6**	**2090.6**		1.5
240.80	2070.8	2075.5	2080.6	2.35	0.9	0.00	0.0	0.0	3.00	16.1			**2086.9**	**2086.9**		
240.30	2069.2	2075.7	2076.3	3.25	0.0	0.00	0.0	0.0	3.00	13.4			**2082.6**	**2082.6**		
240.00	2067.5	2072.9	2074.7	2.70	0.0	0.00	0.0	0.0	3.00	12.9			**2080.4**	**2080.4**		
238.50	2062.5	2067.2	2069.6	2.35	0.0	0.00	1.9	0.0	3.00	12.4			**2076.8**	**2075.0**		
237.00	2057.4	2062.0	2064.5	2.30	0.0	0.00	1.9	0.0	3.00	12.4			**2071.7**	**2069.8**		
235.50	2052.3	2056.8	2059.4	2.25	0.0	0.00	1.9	0.0	3.00	12.4			**2066.6**	**2064.7**		
234.00	2047.2	2052.0	2055.0	2.40	0.0	0.00	1.9	0.0	3.00	13.2			**2062.3**	**2060.4**		
232.50	2040.5	2044.9	2048.6	2.20	4.0	0.00	1.9	0.0	3.00	17.3			**2059.7**	**2057.8**		
231.00	2036.9	2043.0	2045.0	3.05	1.7	0.00	1.9	0.0	3.00	15.8			**2054.6**	**2052.7**		
229.50	2032.5	2038.5	2040.4	3.00	0.0	0.00	0.0	0.0	3.00	13.9			**2046.4**	**2046.4**		
228.00	2029.8	2034.9	2036.6	2.55	0.9	0.00	0.0	0.0	3.00	13.2			**2043.0**	**2043.0**		
226.50	2025.8	2031.3	2033.4	2.75	1.3	0.00	0.0	1.2	3.00	15.8		2034.8	**2040.5**	**2041.6**		6.8
225.00	2022.3	2028.9	2030.3	3.30	0.7	0.00	0.0	1.2	3.00	16.2		2029.5	**2037.3**	**2038.5**		9.0
223.50	2018.2	2025.3	2027.0	3.55	0.0	0.00	0.0	1.2	3.00	16.6		2026.4	**2033.6**	**2034.8**		8.4
222.00	2014.6	2021.6	2023.5	3.50	0.0	0.00	0.0	1.2	3.00	16.5		2022.3	**2030.0**	**2031.1**		8.8
220.50	2011.2	2017.5	2019.6	3.15	0.0	0.00	0.0	1.2	3.00	15.8		2018.5	**2025.8**	**2027.0**		8.5
219.00	2007.8	2013.7	2015.7	2.95	0.7	0.00	0.0	1.2	3.00	15.7		2012.9	**2022.4**	**2023.5**		10.6
217.50	2004.4	2011.3	2012.8	3.45	0.2	0.00	0.0	1.2	3.00	16.2		2009.2	**2019.5**	**2020.6**		11.4
216.00	2001.2	2007.3	2009.2	3.05	1.0	0.00	0.0	1.2	3.00	16.2		2006.0	**2016.2**	**2017.4**		11.4
214.50	1997.0	2004.1	2005.8	3.55	1.2	0.00	0.0	1.2	3.00	17.7		2001.6	**2013.5**	**2014.7**		13.1
213.00	1994.0	2000.0	2001.5	3.00	1.3	0.00	0.0	1.2	3.00	16.0	1998.1	1998.8	**2008.8**	**2010.0**	10.7	11.2
211.50	1990.0	1996.2	1997.3	3.10	0.0	0.00	0.0	1.2	3.00	14.6	1992.8	1993.8	**2003.4**	**2004.6**	10.6	10.8
210.00	1985.2	1990.4	1991.7	2.60	0.0	0.00	0.0	0.0	3.00	12.1	1992.1	1989.0	**1997.3**	**1997.3**	5.2	8.3
208.50	1980.2	1984.8	1986.1	2.30	0.0	0.00	0.0	0.0	3.00	11.2	1984.8	1980.8	**1991.4**	**1991.4**	6.6	10.6
207.00	1974.9	1978.6	1980.0	1.85	0.1	0.00	0.0	0.0	3.00	10.1	1977.8	1975.0	**1985.0**	**1985.0**	7.2	10.0
205.50	1967.8	1973.3	1974.4	2.75	0.0	0.00	0.0	0.0	3.00	12.4	1970.2	1972.0	**1980.2**	**1980.2**	10.0	8.2
204.00	1960.1	1965.6	1967.7	2.75	0.0	0.00	0.0	0.0	3.00	13.4	1961.2	1964.6	**1973.5**	**1973.5**	12.3	8.9
202.50	1950.1	1957.3	1960.7	3.60	0.0	0.00	0.0	0.0	3.00	17.2	1955.2	1960.0	**1967.3**	**1967.3**	12.1	7.3
201.00	1941.3	1946.7	1949.5	2.70	0.0	0.00	0.0	0.0	3.00	13.9	1944.6	1957.6	**1955.2**	**1955.2**	10.6	0.0
199.50	1937.4	1941.8	1945.2	2.20	1.0	0.00	0.0	0.0	3.00	14.0	1940.2	1952.2	**1951.4**	**1951.4**	11.2	0.0
198.00	1930.9	1941.5	1942.0	2.18	0.0	0.00	0.0	0.0	3.00	16.2	1932.6	1942.0	**1947.1**	**1947.1**	14.5	5.1
196.50	1925.5	1930.3	1932.6	2.40	0.2	0.00	0.0	0.0	3.00	12.7	1930.9	1933.8	**1938.2**	**1938.2**	7.3	4.4
195.00	1921.3	1926.0	1927.8	2.35	0.3	0.00	0.0	0.0	3.00	12.2		1925.6	**1933.5**	**1933.5**		7.9
193.50	1916.6	1921.3	1922.7	2.35	1.3	0.00	0.0	0.0	3.00	12.8		1925.1	**1929.4**	**1929.4**		4.3
192.00	1911.0	1915.8	1917.3	2.40	0.6	0.00	0.0	0.0	3.00	12.3		1914.9	**1923.3**	**1923.3**		8.4
190.50	1905.0	1909.8	1911.3	2.40	0.0	0.00	0.0	0.0	3.00	11.7		1910.1	**1916.7**	**1916.7**		6.6
189.00	1901.9	1905.2	1906.5	1.65	0.0	0.00	0.0	0.0	3.00	9.2		1902.1	**1911.1**	**1911.1**		9.0
187.50	1897.5	1901.1	1902.3	1.80	0.0	0.00	0.0	0.0	3.00	9.6		1898.3	**1907.1**	**1907.1**		8.8
186.00	1892.3	1895.6	1897.1	1.65	0.9	0.00	3.2	0.0	3.00	10.3		1894.3	**1905.8**	**1902.6**		8.3
184.50	1887.8	1892.0	1893.4	2.10	1.1	0.00	3.2	0.0	3.00	11.8		1893.8	**1902.8**	**1899.6**		5.8
183.00	1882.8	1889.0	1890.3	3.10	0.3	0.00	3.2	0.0	3.00	13.9	1889.9	1889.7	**1899.8**	**1896.7**	9.9	7.0
181.50	1879.1	1883.0	1884.6	1.95	1.8	0.00	3.2	0.0	3.00	12.2	1883.7	1883.3	**1894.5**	**1891.3**	10.8	8.0
180.00	1875.4	1880.4	1881.3	2.28	2.0	0.00	3.2	0.0	3.00	13.2	1880.0	1882.5	**1891.7**	**1888.6**	11.7	6.1
178.50	1872.2	1877.6	1878.7	2.28	1.0	0.00	3.2	0.0	3.00	12.8	1876.3	1877.3	**1888.2**	**1885.0**	11.9	7.7
177.00	1869.6	1874.7	1875.4	2.24	0.5	0.00	3.2	0.0	3.00	11.5	1874.3	1875.2	**1884.3**	**1881.1**	10.0	5.9
175.50	1866.1	1871.5	1872.9	2.35	0.3	0.00	3.2	0.0	3.00	12.4	1869.6	1872.1	**1881.7**	**1878.5**	12.1	6.4
174.00	1862.7	1868.7	1869.5	2.50	0.7	0.00	0.0	0.0	3.00	13.0	1870.5	1870.0	**1875.7**	**1875.7**	5.2	5.7
172.50	1857.5	1863.9	1866.6	3.20	1.2	0.00	0.0	0.0	3.00	16.5	1865.7	1867.7	**1874.0**	**1874.0**	8.3	6.3
171.00	1853.5	1863.2	1863.6	1.84	3.1	0.00	0.0	0.0	3.00	18.0	1863.1	1863.1	**1871.5**	**1871.5**	8.4	8.4
169.50	1850.5	1858.4	1859.6	3.78	0.0	0.00	0.0	0.0	3.00	15.9			**1866.4**	**1866.4**		
168.00	1846.7	1853.1	1854.9	3.20	0.9	0.00	0.0	0.0	3.00	15.3			**1862.0**	**1862.0**		
166.50	1844.8	1852.7	1852.5	0.48	0.9	0.00	0.0	0.0	3.00	12.1			**1856.9**	**1856.9**		
166.00	1843.3	1849.0	1852.2	2.84	0.0	0.00	0.0	0.0	3.00	14.7	1849.9	1849.7	**1858.0**	**1858.0**	8.1	8.3
165.50	1841.7	1849.6	1848.4	0.99	1.1	0.00	0.0	0.0	3.00	11.8	1849.8	1849.1	**1853.5**	**1853.5**	3.7	4.4
165.00	1840.2	1845.7	1847.1	2.75	1.2	0.00	0.0	0.0	3.00	13.8			**1854.0**	**1854.0**		
163.50	1836.0	1842.5	1843.4	2.84	0.2	0.00	0.0	0.0	3.00	13.5			**1849.5**	**1849.5**		
162.00	1832.4	1838.0	1839.2	2.80	0.3	0.00	0.0	0.0	3.00	12.9			**1845.3**	**1845.3**		
160.50	1827.7	1834.8	1835.8	3.04	0.1	0.00	0.0	0.0	3.00	14.3			**1842.0**	**1842.0**		
159.00	1825.4	1830.6	1832.1	2.60	0.0	0.00	0.0	0.0	3.00	12.3			**1837.7**	**1837.7**		
157.50	1821.9	1828.0	1828.7	2.53	0.0	0.00	0.0	0.0	3.00	12.4			**1834.3**	**1834.3**		
156.00	1818.8	1823.6	1824.7	2.40	0.0	0.00	0.0	0.0	3.00	11.3			**1830.1**	**1830.1**		
154.50	1815.5	1820.1	1821.0	2.30	0.0	0.00	0.0	0.0	3.00	10.8			**1826.3**	**1826.3**		
153.00	1811.7	1815.9	1816.9	2.10	0.0	0.00	0.0	0.0	3.00	10.3			**1822.0**	**1822.0**		

Minimum Recommended Top of Levee Elevations

Section #	Thalweg El (ft)	Mixed WSEL (ft)	Subcritical WSEL (ft)	Antidune Wave ht. (ft)	General Agg. (ft)	Long-term Agg. (ft)	Superelevation (East) (ft)	Superelevation (West) (ft)	Free Board (ft)	Levee Ht. fromThalweg (ft)	Levee Base Elevation (East) (ft)	Levee Base Elevation (West) (ft)	Minimum Top of Levee (East) (ft)	Minimum Top of Levee (West) (ft)	Levee Height from Base (East) (ft)	Levee Height from Base (West) (ft)
151.50	1804.6	1810.2	1811.2	2.80	0.9	0.00	0.0	0.0	3.00	13.3			1817.9	1817.9		
150.00	1801.0	1807.2	1807.8	1.40	0.4	0.00	0.0	0.0	3.00	11.6			1812.6	1812.6		
148.50	1797.8	1803.3	1804.0	1.94	0.0	0.00	0.0	0.0	3.00	11.1			1808.9	1808.9		
147.00	1793.1	1798.9	1799.7	2.32	0.0	0.00	0.0	0.0	3.00	11.9			1805.0	1805.0		
145.50	1790.9	1794.8	1795.6	1.95	0.0	0.00	0.0	0.0	3.00	9.6			1800.6	1800.6		
144.00	1786.6	1790.7	1791.6	2.05	0.0	0.00	0.0	0.0	3.00	10.1		1791.3	1796.7	1796.7		5.4
142.50	1782.2	1786.6	1787.6	2.20	0.0	0.00	0.0	0.0	3.00	10.6		1787.9	1792.8	1792.8		4.9
141.00	1777.7	1782.3	1783.4	2.30	0.0	0.00	0.0	0.0	3.00	11.0		1782.9	1788.7	1788.7		5.8
139.50	1774.0	1779.0	1779.8	2.46	0.0	0.00	0.0	0.0	3.00	11.2		1774.9	1785.2	1785.2		10.3
138.00	1770.5	1774.5	1775.5	2.00	0.0	0.00	0.0	0.0	3.00	10.0		1771.8	1780.5	1780.5		8.7
136.50	1767.6	1771.8	1772.8	2.07	0.0	0.00	0.0	0.0	3.00	10.3		1768.9	1777.9	1777.9		9.0
135.00	1765.1	1769.4	1770.6	2.11	0.0	0.00	0.0	0.0	3.00	10.6	1770.8	1766.1	1775.7	1775.7	4.9	9.6
133.50	1762.6	1767.0	1767.9	2.20	0.0	0.00	0.0	0.0	3.00	10.5	1769.4	1763.5	1773.1	1773.1	3.7	9.6
132.00	1759.8	1763.7	1764.7	1.95	0.0	0.00	0.0	0.0	3.00	9.9	1765.3	1760.2	1769.7	1769.7	4.4	9.5
130.50	1755.9	1760.8	1761.7	2.21	0.3	0.00	0.0	0.0	3.00	11.3	1758.6	1756.2	1767.2	1767.2	8.6	11.0
129.00	1751.5	1757.4	1758.1	2.28	0.2	0.00	0.0	0.0	3.00	12.1	1756.3	1754.1	1763.6	1763.6	7.3	9.5
127.50	1746.8	1753.0	1753.9	2.65	0.0	0.00	0.0	0.0	3.00	12.7	1752.8	1751.8	1759.5	1759.5	6.7	7.7
126.00	1743.6	1749.4	1750.1	2.18	0.0	0.00	0.0	0.0	3.00	11.6	1746.3	1748.2	1755.2	1755.2	8.9	7.0
124.50	1740.5	1745.1	1745.9	2.30	0.0	0.00	0.0	0.0	3.00	10.7	1742.9	1743.2	1751.2	1751.2	8.3	8.0
123.00	1736.2	1741.4	1742.0	2.11	0.0	0.00	0.0	0.0	3.00	10.9	1741.0	1740.4	1747.1	1747.1	6.1	6.7
121.50	1732.2	1737.1	1737.9	2.39	0.0	0.00	0.0	0.0	3.00	11.1	1737.0	1737.0	1743.3	1743.3	6.3	6.3
120.00	1727.7	1732.7	1733.5	2.46	0.0	0.00	0.0	0.0	3.00	11.2	1732.3	1731.5	1738.9	1738.9	6.6	7.4
118.50	1724.3	1728.3	1729.1	2.00	0.0	0.00	0.0	0.0	3.00	9.8	1726.6	1726.4	1734.1	1734.1	7.5	7.7
117.00	1720.3	1724.4	1725.1	2.05	0.0	0.00	0.0	0.0	3.00	9.8	1722.0	1722.8	1730.1	1730.1	8.1	7.3
115.50	1715.6	1720.6	1721.8	2.39	0.5	0.00	0.0	0.0	3.00	12.1	1717.0	1719.5	1727.7	1727.7	10.7	8.2
114.00	1712.4	1718.2	1718.8	1.78	0.0	0.00	0.0	0.0	3.00	11.2	1716.5	1716.8	1723.6	1723.6	7.1	6.8
112.50	1709.8	1714.7	1715.5	2.28	0.0	0.00	0.0	0.0	3.00	11.0	1711.2	1713.9	1720.8	1720.8	9.6	6.9
111.00	1706.6	1711.0	1711.8	2.20	0.0	0.00	0.0	0.0	3.00	10.4	1708.2	1711.3	1717.0	1717.0	8.8	5.7
109.50	1702.7	1707.3	1708.4	2.30	0.0	0.00	0.0	0.0	3.00	10.9	1703.8	1707.4	1713.7	1713.7	9.8	6.2
108.00	1698.7	1704.7	1705.7	2.01	0.3	0.00	0.0	0.0	3.00	12.3	1698.7	1703.5	1711.0	1711.0	12.3	7.5
106.50	1696.5	1701.9	1702.7	2.18	0.0	0.00	0.0	0.0	3.00	11.4	1698.8	1699.6	1707.9	1707.9	9.1	8.3
105.00	1693.9	1698.5	1699.4	2.30	0.0	0.00	0.0	0.0	3.00	10.8	1696.0	1695.3	1704.7	1704.7	8.7	9.4
103.50	1689.1	1695.3	1696.3	2.61	0.0	0.00	0.0	0.0	3.00	12.8	1693.1	1690.7	1701.9	1701.9	8.8	11.2
102.00	1686.7	1692.0	1692.8	2.61	0.0	0.00	0.0	0.0	3.00	11.7	1690.3	1686.7	1698.4	1698.4	8.1	11.7
100.50	1684.0	1687.5	1688.6	1.75	0.0	0.00	0.0	0.0	3.00	9.3	1685.0	1684.0	1693.3	1693.3	8.3	9.3
99.00	1675.8	1678.1	1680.6	1.15	0.0	0.00	0.0	0.0	3.00	8.9	1681.1	1679.9	1684.7	1684.7	3.6	4.8
98.50	1674.2	1677.0	1680.5	1.40	0.0	0.00	0.0	0.0	3.00	10.6	1680.6	1678.9	1684.9	1684.9	4.3	5.9
98.00	1672.6	1677.2	1676.7	1.43	0.0	0.00	0.0	0.0	3.00	8.5	1680.0	1677.9	1681.1	1681.1	1.1	3.2
97.50	1671.0	1673.8	1676.0	1.40	0.0	0.00	0.0	0.0	3.00	9.4	1679.4	1676.9	1680.4	1680.4	1.0	3.5
96.00	1669.5	1673.4	1674.7	1.63	1.5	0.00	0.0	0.0	3.00	11.3	1675.3	1676.6	1680.8	1680.8	5.5	4.2
94.50	1668.0	1672.3	1673.6	1.45	0.4	0.00	0.0	0.0	3.00	10.4	1671.2	1672.9	1678.4	1678.4	7.2	5.5
93.00	1666.0	1670.5	1670.9	1.57	0.0	0.00	0.0	0.0	3.00	9.4	1668.0	1668.6	1675.4	1675.4	7.4	6.8
91.50	1662.6	1666.2	1667.1	1.80	0.0	0.00	0.0	0.0	3.00	9.3	1664.3	1664.6	1671.9	1671.9	7.6	7.3
90.00	1658.5	1662.8	1664.0	2.07	0.6	0.00	0.0	0.0	3.00	11.2	1661.5	1661.7	1669.7	1669.7	8.2	8.0
88.50	1655.3	1660.6	1661.1	1.66	0.0	0.00	0.0	0.0	3.00	10.4	1658.1	1659.2	1665.7	1665.7	7.6	6.5
87.00	1652.1	1656.6	1657.5	2.25	0.0	0.00	0.0	0.0	3.00	10.6	1655.7	1655.7	1662.7	1662.7	7.0	7.0
85.50	1647.9	1652.9	1653.7	2.32	0.5	0.00	0.0	0.0	3.00	11.6	1652.8	1651.1	1659.5	1659.5	6.7	8.4
84.00	1645.0	1650.3	1651.7	1.91	1.4	0.00	0.0	0.0	3.00	13.0	1649.3	1647.6	1658.0	1658.0	8.7	10.4
82.50	1643.0	1648.9	1649.3	1.40	0.0	0.00	0.0	0.0	3.00	10.7	1647.2	1645.8	1653.7	1653.7	6.5	7.9
81.00	1641.0	1644.9	1645.8	1.95	0.0	0.00	0.0	0.0	3.00	9.8	1643.5	1642.5	1650.8	1650.8	7.3	8.3
79.50	1637.3	1641.5	1642.5	2.10	0.0	0.00	0.0	0.0	3.00	10.3	1638.4	1638.8	1647.6	1647.6	9.2	8.8
78.00	1633.9	1638.3	1639.0	2.18	0.1	0.00	0.0	0.0	3.00	10.3	1637.8	1637.0	1644.2	1644.2	6.4	7.2
76.50	1630.3	1634.9	1636.2	2.18	0.5	0.00	0.0	0.0	3.00	11.6	1634.3	1633.5	1641.9	1641.9	7.6	8.4
75.00	1627.5	1633.0	1633.5	1.51	0.0	0.00	0.0	0.0	3.00	10.5	1632.9	1630.0	1638.0	1638.0	5.1	8.0
73.50	1623.9	1628.9	1629.9	2.50	0.9	0.00	0.0	0.0	3.00	12.4	1629.6	1626.6	1636.3	1636.3	6.7	9.7
72.00	1620.4	1628.3	1629.1	0.73	1.5	0.00	0.0	0.0	3.00	13.9	1626.7	1623.1	1634.3	1634.3	7.6	11.2
70.50	1620.0	1626.7	1627.3	1.48	0.0	0.00	0.0	0.0	3.00	11.8	1625.4	1623.8	1631.8	1631.8	6.4	8.0
69.00	1618.2	1623.4	1624.2	2.46	0.0	0.00	0.0	0.0	3.00	11.5	1623.2	1621.3	1629.7	1629.7	6.5	8.4
67.50	1615.4	1619.8	1620.6	2.20	0.0	0.00	0.0	0.0	3.00	10.4	1618.8	1615.5	1625.8	1625.8	7.0	10.3
66.00	1611.8	1616.2	1616.9	2.20	0.0	0.00	0.0	0.0	3.00	10.3	1615.0	1614.0	1622.1	1622.1	7.1	8.1
64.50	1608.2	1613.0	1613.9	1.84	0.2	0.00	0.0	0.0	3.00	10.7	1613.5	1610.0	1618.9	1618.9	5.4	8.9
63.00	1604.2	1609.9	1610.5	1.81	0.0	0.00	0.0	0.0	3.00	11.1	1609.0	1609.2	1615.3	1615.3	6.3	6.1
61.50	1600.3	1605.7	1606.5	2.32	0.0	0.00	0.0	0.0	3.00	11.5	1604.2	1604.1	1611.8	1611.8	7.6	7.7
60.00	1597.0	1602.0	1603.2	2.18	0.3	0.00	0.0	0.0	3.00	11.7		1600.7	1608.7	1608.7		8.0
58.50	1593.3	1599.8	1600.3	1.60	0.0	0.00	0.0	0.0	3.00	11.6		1598.9	1604.9	1604.9		6.0
57.00	1589.3	1596.3	1597.8	2.50	0.0	0.00	0.0	0.0	3.00	14.0		1595.7	1603.3	1603.3		7.6
55.50	1585.9	1593.7	1594.5	2.53	0.0	0.00	0.0	0.0	3.00	14.2		1591.9	1600.1	1600.1		8.2
54.00	1583.7	1590.0	1591.7	2.84	0.7	0.00	0.0	0.0	3.00	14.5	1592.6	1591.1	1598.2	1598.2	5.6	7.1
52.50	1580.7	1588.3	1588.7	1.60	0.0	0.00	0.0	0.0	3.00	12.6	1587.9	1587.6	1593.3	1593.3	5.4	5.7
51.00	1577.5	1583.8	1585.0	3.15	0.0	0.00	0.0	0.0	3.00	13.7		1581.9	1591.2	1591.2		9.3
49.50	1574.5	1579.5	1582.1	2.50	0.0	0.00	0.0	0.0	3.00	13.1		1579.8	1587.6	1587.6		7.8
48.00	1571.2	1578.9	1579.0	1.40	0.5	0.00	0.0	0.0	3.00	12.7		1578.9	1583.9	1583.9		5.0
46.50	1568.0	1571.6	1576.2	1.80	3.0	0.00	0.0	0.0	3.00	16.0		1572.3	1584.0	1584.0		11.7
45.00	1566.1	1575.2	1575.9	0.56	3.2	0.00	0.0	0.0	3.00	16.6		1571.6	1582.7	1582.7		11.1
44.50	1566.2	1575.0	1575.6	0.71	0.3	0.00	0.0	0.0	3.00	13.4			1579.6	1579.6		
43.60	1565.8	1574.8	1575.5	0.67	0.3	0.00	0.0	0.0	3.00	13.7			1579.5	1579.5		
42.00	1567.4	1572.6	1572.6	1.94	0.0	0.10	0.0	0.0	3.00	10.3	1571.4	1568.1	1577.7	1577.7	6.3	9.6
40.50	1563.2	1567.9	1569.7	2.35	0.0	0.10	0.0	0.0	3.00	12.0	1564.1	1565.1	1575.2	1575.2	11.1	10.1
39.00	1559.2	1566.1	1566.9	2.53	0.5	0.10	0.0	0.0	3.00	13.9	1562.3	1562.3	1573.1	1573.1	10.8	10.8
37.50	1558.0	1563.3	1565.1	2.65	0.0	0.10	0.0	0.0	3.00	12.9	1566.1	1560.4	1570.9	1570.9	4.8	10.5
36.00	1554.7	1561.7	1562.3	2.28	0.0	0.10	0.0	0.0	3.00	12.9	1563.3	1559.3	1567.6	1567.6	4.3	8.3
34.50	1552.7	1558.0	1559.1	2.65	0.0	0.10	0.0	0.0	3.00	12.1	1560.6	1557.3	1564.8	1564.8	4.2	7.5
33.00	1549.6	1554.7	1555.8	2.55	0.1	0.00	0.0	0.0	3.00	11.8	1551.2	1554.3	1561.4	1561.4	10.2	7.1

Not req'd

49'

Minimum Recommended Top of Levee Elevations

Section #	Thalweg El (ft)	Mixed WSEL (ft)	Subcritical WSEL (ft)	Antidune Wave ht. (ft)	General Agg. (ft)	Long-term Agg. (ft)	Superelevation (East) (ft)	Superelevation (West) (ft)	Free Board (ft)	Levee Ht. fromThalweg (ft)	Levee Base Elevation (East) (ft)	Levee Base Elevation (West) (ft)	Minimum Top of Levee (East) (ft)	Minimum Top of Levee (West) (ft)	Levee Height from Base (East) (ft)	Levee Height from Base (West) (ft)
31.50	1547.3	1552.6	1553.6	1.63	0.8	0.00	0.0	0.0	3.00	11.8	1550.6	1551.1	**1559.1**	**1559.1**	8.5	8.0
30.00	1544.6	1550.5	1551.3	1.66	0.0	0.00	0.0	0.0	3.00	11.4	1547.8	1549.1	**1556.0**	**1556.0**	8.2	6.9
28.50	1542.6	1548.2	1549.5	1.88	0.2	0.00	0.0	0.0	3.00	12.0	1545.5	1547.8	**1554.6**	**1554.6**	9.1	6.8
27.00	1539.0	1546.8	1547.9	1.57	0.0	0.00	0.0	0.0	3.00	13.4	1544.9	1546.4	**1552.4**	**1552.4**	7.5	6.0
25.50	1536.2	1544.8	1546.5	1.94	0.0	0.00	0.0	0.0	3.00	15.2	1543.0	1540.8	**1551.4**	**1551.4**	8.4	10.6
24.00	1534.7	1543.7	1544.8	1.91	0.0	0.00	0.0	0.0	3.00	15.0	1540.8	1538.3	**1549.7**	**1549.7**	8.9	11.4
22.50	1533.0	1541.2	1541.8	2.50	0.0	0.00	0.0	0.0	3.00	14.3	1539.3	1537.8	**1547.3**	**1547.3**	8.0	9.5
21.00	1531.4	1538.0	1539.0	3.30	0.0	0.00	0.0	0.0	3.00	13.9	1537.0	1535.5	**1545.3**	**1545.3**	8.3	9.8
19.50	1528.6	1534.3	1536.4	2.85	0.0	0.00	0.0	3.3	3.00	17.0	1535.3	1532.9	**1542.2**	**1545.6**	10.3	12.7
18.00	1525.8	1530.7	1533.0	2.45	0.0	0.00	0.0	3.3	3.00	16.0	1536.0	1531.9	**1538.5**	**1541.8**	5.8	9.9
16.50	1523.0	1527.7	1529.4	2.35	0.0	0.00	0.0	3.3	3.00	15.1		1528.3	**1534.8**	**1538.1**		9.8
15.00	1520.2	1525.1	1527.8	2.45	0.0	0.00	0.0	3.3	3.00	16.4		1521.1	**1533.3**	**1536.6**		15.5
13.50	1517.4	1523.3	1524.4	2.95	0.0	0.00	0.0	3.3	3.00	16.2		1515.5	**1530.3**	**1533.7**		18.1
12.00	1514.6	1519.5	1521.9	2.45	1.2	0.00	0.0	0.0	3.00	14.0			**1528.6**	**1528.6**		
10.50	1511.8	1516.5	1521.9	2.35	2.6	0.02	0.0	0.0	3.00	18.1			**1529.9**	**1529.9**		
9.00	1510.9	1519.2	1521.3	1.48	1.6	0.02	0.0	0.0	3.00	16.5			**1527.4**	**1527.4**		
7.50	1510.1	1518.6	1520.6	1.57	1.1	0.02	0.0	0.0	3.00	16.2			**1526.3**	**1526.3**		
6.00	1509.5	1518.1	1519.9	1.57	0.0	0.02	0.0	0.0	3.00	15.0			**1524.5**	**1524.5**		
4.50	1509.1	1516.0	1518.8	2.69	0.0	0.02	0.0	0.0	3.00	15.4			**1524.5**	**1524.5**		
3.00	1508.0	1515.3	1518.0	2.32	0.0	0.59	0.0	0.0	3.00	15.9			**1523.9**	**1523.9**		
1.50	1507.0	1514.5	1517.2	2.24	0.0	0.59	0.0	0.0	3.00	16.0			**1523.0**	**1523.0**		
0.00	1506.0	1512.9	1516.4	2.80	0.0	0.59	0.0	0.0	3.00	16.8			**1522.8**	**1522.8**		

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
271.50	2171.5	0.0	3.0	1.37	0	0	0	5.68	5.68	0.00	5.68	5.68	**2165.8**	**2165.8**
270.00	2167.9	1.3	3.0	3.21	0	0	0	9.76	9.76	0.00	9.76	9.76	**2158.1**	**2158.1**
267.00	2162.0	0.0	3.0	1.95	0	0	0	6.44	6.44	0.90	7.34	7.34	**2154.7**	**2154.7**
265.50	2158.0	0.0	3.0	2.30	0	0	0	6.89	6.89	0.90	7.79	7.79	**2150.2**	**2150.2**
264.00	2153.8	0.0	3.0	2.15	0	0	0	6.69	6.69	0.90	7.59	7.59	**2146.2**	**2146.2**
262.50	2150.5	2.2	3.0	2.05	0	0	0	9.42	9.42	0.90	10.32	10.32	**2140.2**	**2140.2**
261.00	2144.9	5.3	3.0	2.35	0	0	0	13.84	13.84	0.90	14.74	14.74	**2130.2**	**2130.2**
259.50	2139.4	5.8	3.0	3.00	3.8	0	0	20.28	20.28	0.90	21.18	21.18	**2118.2**	**2118.2**
258.00	2133.9	4.1	3.0	2.90	3.8	0	0	17.94	17.94	2.55	20.49	20.49	**2113.4**	**2113.4**
256.50	2128.3	3.7	3.0	2.65	0	0	0	12.15	12.15	2.55	14.70	14.70	**2113.6**	**2113.6**
255.00	2122.8	3.1	3.0	2.60	0	0	0	11.31	11.31	2.55	13.86	13.86	**2108.9**	**2108.9**
253.50	2117.2	2.4	3.0	2.60	0	0	0	10.40	10.40	2.55	12.95	12.95	**2104.3**	**2104.3**
252.00	2111.7	1.9	3.0	2.55	0	0	0	9.69	9.69	2.55	12.24	12.24	**2099.5**	**2099.5**
250.50	2106.1	1.4	3.0	2.55	0	0	0	9.03	9.03	2.55	11.58	11.58	**2094.5**	**2094.5**
249.00	2100.5	1.3	3.0	2.60	0	0	0	8.97	8.97	2.55	11.52	11.52	**2089.0**	**2089.0**
247.50	2095.0	1.3	3.0	2.55	0	0	0	8.90	8.90	2.55	11.45	11.45	**2083.5**	**2083.5**
246.00	2089.5	1.3	3.0	2.55	0	0	0	8.90	8.90	2.55	11.45	11.45	**2078.0**	**2078.0**
244.50	2083.9	0.1	3.0	2.55	0	0	0	7.34	7.34	2.55	9.89	9.89	**2074.0**	**2074.0**
243.00	2078.4	0.0	3.0	2.05	0	0	0	6.56	6.56	2.55	9.11	9.11	**2069.3**	**2069.3**
240.80	2070.8	0.0	3.0	2.35	0	0	0	6.95	6.95	3.31	10.26	10.26	**2060.5**	**2060.5**
240.30	2069.2	0.3	3.0	3.25	0	0	0	8.52	8.52	3.31	11.83	11.83	**2057.4**	**2057.4**
240.00	2067.5	0.5	3.0	2.70	0	0	0	8.06	8.06	3.31	11.37	11.37	**2056.1**	**2056.1**
238.50	2062.5	0.1	3.0	2.35	0	0	0	7.08	7.08	3.31	10.39	10.39	**2052.1**	**2052.1**
237.00	2057.4	0.0	3.0	2.30	0	0	0	6.89	6.89	3.31	10.20	10.20	**2047.2**	**2047.2**
235.50	2052.3	0.0	3.0	2.25	0	0	0	6.83	6.83	3.31	10.14	10.14	**2042.2**	**2042.2**
234.00	2047.2	0.3	3.0	2.40	0	0	0	7.41	7.41	3.31	10.72	10.72	**2036.5**	**2036.5**
232.50	2040.5	0.0	3.0	2.20	0	0	0	6.76	6.76	3.31	10.07	10.07	**2030.4**	**2030.4**
231.00	2036.9	0.0	3.0	3.05	0	0	0	7.86	7.86	1.17	9.03	9.03	**2027.9**	**2027.9**
229.50	2032.5	0.1	3.0	3.00	0	0	0	7.93	7.93	1.17	9.10	9.10	**2023.4**	**2023.4**
228.00	2029.8	0.0	3.0	2.55	0	0	0	7.22	7.22	1.17	8.39	8.39	**2021.4**	**2021.4**
226.50	2025.8	0.0	3.0	2.75	0	0	0	7.48	7.48	1.17	8.65	8.65	**2017.2**	**2017.2**
225.00	2022.3	0.0	3.0	3.30	0	0	0	8.19	8.19	1.17	9.36	9.36	**2012.9**	**2012.9**
223.50	2018.2	0.3	3.0	3.55	0	0	0	8.90	8.90	1.17	10.07	10.07	**2008.1**	**2008.1**
222.00	2014.6	0.3	3.0	3.50	0	0	0	8.84	8.84	1.17	10.01	10.01	**2004.6**	**2004.6**
220.50	2011.2	0.5	3.0	3.15	0	0	0	8.64	8.64	1.17	9.81	9.81	**2001.4**	**2001.4**
219.00	2007.8	0.0	3.0	2.95	0	0	0	7.74	7.74	1.17	8.91	8.91	**1998.9**	**1998.9**
217.50	2004.4	0.0	3.0	3.45	0	0	0	8.38	8.38	1.17	9.55	9.55	**1994.8**	**1994.8**
216.00	2001.2	0.0	3.0	3.05	0	0	0	7.86	7.86	1.17	9.03	9.03	**1992.2**	**1992.2**
214.50	1997.0	0.0	3.0	3.55	0	0	0	8.51	8.51	1.17	9.68	9.68	**1987.3**	**1987.3**
213.00	1994.0	0.0	3.0	3.00	0	0	0	7.80	7.80	0.96	8.76	8.76	**1985.2**	**1985.2**
211.50	1990.0	0.2	3.0	3.10	0	0	0	8.19	8.19	0.96	9.15	9.15	**1980.9**	**1980.9**
210.00	1985.2	2.2	3.0	2.60	0	0	0	10.14	10.14	0.96	11.10	11.10	**1974.1**	**1974.1**
208.50	1980.2	1.5	3.0	2.30	0	0	0	8.84	8.84	0.96	9.80	9.80	**1970.4**	**1970.4**
207.00	1974.9	0.0	3.0	1.85	0	0	0	6.30	6.30	0.96	7.26	7.26	**1967.6**	**1967.6**
205.50	1967.8	2.9	3.0	2.75	0	0	0	11.25	11.25	0.96	12.21	12.21	**1955.6**	**1955.6**
204.00	1960.1	6.7	3.0	2.75	0	0	0	16.19	16.19	0.96	17.15	17.15	**1943.0**	**1943.0**
202.50	1950.1	4.8	3.0	3.60	0	0	0	14.82	14.82	0.54	15.36	15.36	**1934.7**	**1934.7**
201.00	1941.3	2.1	3.0	2.70	0	0	0	10.14	10.14	0.54	10.68	10.68	**1930.6**	**1930.6**
199.50	1937.4	0.0	3.0	2.20	0	0	0	6.76	6.76	0.54	7.30	7.30	**1930.1**	**1930.1**
198.00	1930.9	7.7	3.0	2.18	0	0	0	16.74	16.74	0.54	17.28	17.28	**1913.6**	**1913.6**
196.50	1925.5	0.0	3.0	2.40	0	0	0	7.02	7.02	0.54	7.56	7.56	**1917.9**	**1917.9**
195.00	1921.3	0.0	3.0	2.35	0	0	0	6.96	6.96	0.54	7.50	7.50	**1913.8**	**1913.8**
193.50	1916.6	0.0	3.0	2.35	0	0	0	6.96	6.96	0.54	7.50	7.50	**1909.1**	**1909.1**
192.00	1911.0	0.0	3.0	2.40	0	0	0	7.02	7.02	0.54	7.56	7.56	**1903.4**	**1903.4**
190.50	1905.0	0.7	3.0	2.40	0	0	0	7.93	7.93	0.54	8.47	8.47	**1896.5**	**1896.5**
189.00	1901.9	0.1	3.0	1.65	0	0	0	6.17	6.17	0.54	6.71	6.71	**1895.2**	**1895.2**
187.50	1897.5	0.0	3.0	1.80	0	0	0	6.24	6.24	0.54	6.78	6.78	**1890.7**	**1890.7**
186.00	1892.3	0.0	3.0	1.65	0	0	0	6.04	6.04	0.54	6.58	6.58	**1885.7**	**1885.7**
184.50	1887.8	0.0	3.0	2.10	0	1.13	0	8.10	6.63	0.54	8.64	7.17	**1879.2**	**1880.6**
183.00	1882.8	0.0	3.0	3.10	0	1.13	0	9.40	7.93	0.45	9.85	8.38	**1873.0**	**1874.4**
181.50	1879.1	0.0	3.0	1.95	0	1.13	0	7.90	6.44	0.45	8.35	6.89	**1870.7**	**1872.2**
180.00	1875.4	0.0	3.0	2.28	0	1.13	0	8.33	6.86	0.45	8.78	7.31	**1866.6**	**1868.1**
178.50	1872.2	0.0	3.0	2.28	0	1.13	0	8.33	6.86	0.45	8.78	7.31	**1863.4**	**1864.9**
177.00	1869.6	0.0	3.0	2.24	0	1.13	0	8.29	6.82	0.45	8.74	7.27	**1860.9**	**1862.3**
175.50	1866.1	0.0	3.0	2.35	0	1.13	0	8.43	6.96	0.45	8.88	7.41	**1857.2**	**1858.7**
174.00	1862.7	0.0	3.0	2.50	0	1.13	0	8.61	7.15	0.45	9.06	7.60	**1853.6**	**1855.1**
172.50	1857.5	0.0	3.0	3.20	0	0	0	8.06	8.06	0.45	8.51	8.51	**1849.0**	**1849.0**
171.00	1853.5	0.0	3.0	1.84	0	0	0	6.30	6.30	0.15	6.45	6.45	**1847.1**	**1847.1**
169.50	1850.5	4.9	3.0	3.78	0	0	0	15.18	15.18	0.15	15.33	15.33	**1835.2**	**1835.2**
168.00	1846.7	0.0	3.0	3.20	0	0	0	8.06	8.06	0.15	8.21	8.21	**1838.5**	**1838.5**
166.50	1844.8	0.0	3.0	0.48	0	0	0	4.52	4.52	0.15	4.67	4.67	**1840.1**	**1840.1**
166.00	1843.3	0.8	3.0	2.84	0	0	0	8.63	8.63	0.15	8.78	8.78	**1834.5**	**1834.5**
165.50	1841.7	0.0	3.0	0.99	0	0	0	5.19	5.19	0.15	5.34	5.34	**1836.4**	**1836.4**

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
165.00	1840.2	0.0	3.0	2.75	0	0	0	7.48	7.48	0.15	7.63	7.63	**1832.6**	**1832.6**
163.50	1836.0	0.0	3.0	2.84	0	0	0	7.59	7.59	0.15	7.74	7.74	**1828.3**	**1828.3**
162.00	1832.4	0.0	3.0	2.80	0	0	0	7.54	7.54	0.15	7.69	7.69	**1824.7**	**1824.7**
160.50	1827.7	0.0	3.0	3.04	0	0	0	7.85	7.85	0.15	8.00	8.00	**1819.7**	**1819.7**
159.00	1825.4	0.0	3.0	2.60	0	0	0	7.28	7.28	0.15	7.43	7.43	**1818.0**	**1818.0**
157.50	1821.9	0.0	3.0	2.53	0	0	0	7.19	7.19	0.15	7.34	7.34	**1814.6**	**1814.6**
156.00	1818.8	0.1	3.0	2.40	0	0	0	7.15	7.15	0.07	7.22	7.22	**1811.6**	**1811.6**
154.50	1815.5	0.0	3.0	2.30	0	0	0	6.89	6.89	0.07	6.96	6.96	**1808.5**	**1808.5**
153.00	1811.7	0.1	3.0	2.10	0	0	0	6.76	6.76	0.07	6.83	6.83	**1804.9**	**1804.9**
151.50	1804.6	0.0	3.0	2.80	0	0	0	7.54	7.54	0.07	7.61	7.61	**1797.0**	**1797.0**
150.00	1801.0	0.0	3.0	1.40	0	0	0	5.72	5.72	0.07	5.79	5.79	**1795.2**	**1795.2**
148.50	1797.8	0.0	3.0	1.94	0	0	0	6.42	6.42	0.07	6.49	6.49	**1791.3**	**1791.3**
147.00	1793.1	0.1	3.0	2.32	0	0	0	7.04	7.04	0.07	7.11	7.11	**1786.0**	**1786.0**
145.50	1790.9	0.2	3.0	1.95	0	0	0	6.69	6.69	0.07	6.76	6.76	**1784.1**	**1784.1**
144.00	1786.6	0.0	3.0	2.05	0	0	0	6.57	6.57	0.07	6.64	6.64	**1780.0**	**1780.0**
142.50	1782.2	0.4	3.0	2.20	0	0	0	7.28	7.28	0.08	7.36	7.36	**1774.8**	**1774.8**
141.00	1777.7	0.0	3.0	2.30	0	0	0	6.89	6.89	0.08	6.97	6.97	**1770.7**	**1770.7**
139.50	1774.0	0.1	3.0	2.46	0	0	0	7.23	7.23	0.08	7.31	7.31	**1766.7**	**1766.7**
138.00	1770.5	0.0	3.0	2.00	0	0	0	6.50	6.50	0.08	6.58	6.58	**1763.9**	**1763.9**
136.50	1767.6	0.0	3.0	2.07	0	0	0	6.59	6.59	0.08	6.67	6.67	**1760.9**	**1760.9**
135.00	1765.1	0.0	3.0	2.11	0	0	0	6.64	6.64	0.08	6.72	6.72	**1758.4**	**1758.4**
133.50	1762.6	0.1	3.0	2.20	0	0	0	6.89	6.89	0.08	6.97	6.97	**1755.6**	**1755.6**
132.00	1759.8	0.1	3.0	1.95	0	0	0	6.57	6.57	0.08	6.65	6.65	**1753.2**	**1753.2**
130.50	1755.9	0.0	3.0	2.21	0	0	0	6.77	6.77	0.02	6.79	6.79	**1749.1**	**1749.1**
129.00	1751.5	0.0	3.0	2.28	0	0	0	6.86	6.86	0.02	6.88	6.88	**1744.6**	**1744.6**
127.50	1746.8	0.1	3.0	2.65	0	0	0	7.47	7.47	0.02	7.49	7.49	**1739.3**	**1739.3**
126.00	1743.6	0.0	3.0	2.18	0	0	0	6.73	6.73	0.02	6.75	6.75	**1736.9**	**1736.9**
124.50	1740.5	0.0	3.0	2.30	0	0	0	6.89	6.89	0.02	6.91	6.91	**1733.6**	**1733.6**
123.00	1736.2	0.0	3.0	2.11	0	0	0	6.64	6.64	0.02	6.66	6.66	**1729.5**	**1729.5**
121.50	1732.2	0.1	3.0	2.39	0	0	0	7.13	7.13	0.02	7.15	7.15	**1725.0**	**1725.0**
120.00	1727.7	0.1	3.0	2.46	0	0	0	7.23	7.23	0.02	7.25	7.25	**1720.5**	**1720.5**
118.50	1724.3	0.0	3.0	2.00	0	0	0	6.50	6.50	0.02	6.52	6.52	**1717.8**	**1717.8**
117.00	1720.3	0.0	3.0	2.05	0	0	0	6.57	6.57	0.02	6.59	6.59	**1713.7**	**1713.7**
115.50	1715.6	0.0	3.0	2.39	0	0	0	7.00	7.00	0.02	7.02	7.02	**1708.6**	**1708.6**
114.00	1712.4	0.0	3.0	1.78	0	0	0	6.21	6.21	0.02	6.23	6.23	**1706.2**	**1706.2**
112.50	1709.8	0.1	3.0	2.28	0	0	0	6.99	6.99	0.02	7.01	7.01	**1702.8**	**1702.8**
111.00	1706.6	0.1	3.0	2.20	0	0	0	6.89	6.89	0.18	7.07	7.07	**1699.5**	**1699.5**
109.50	1702.7	0.2	3.0	2.30	0	0	0	7.15	7.15	0.18	7.33	7.33	**1695.4**	**1695.4**
108.00	1698.7	0.0	3.0	2.01	0	0	0	6.51	6.51	0.18	6.69	6.69	**1692.0**	**1692.0**
106.50	1696.5	0.0	3.0	2.18	0	0	0	6.73	6.73	0.18	6.91	6.91	**1689.6**	**1689.6**
105.00	1693.9	0.1	3.0	2.30	0	0	0	7.02	7.02	0.18	7.20	7.20	**1686.7**	**1686.7**
103.50	1689.1	0.7	3.0	2.61	0	0	0	8.20	8.20	0.18	8.38	8.38	**1680.7**	**1680.7**
102.00	1686.7	1.8	3.0	2.61	0	0	0	9.63	9.63	0.18	9.81	9.81	**1676.9**	**1676.9**
100.50	1684.0	1.8	3.0	1.75	0	0	0	8.52	8.52	0.18	8.70	8.70	**1675.3**	**1675.3**
99.00	1675.8	2.8	3.0	1.15	0	0	0	9.03	9.03	1.34	10.38	10.38	**1665.4**	**1665.4**
98.50	1674.2	1.2	3.0	1.40	0	0	0	7.28	7.28	1.34	8.62	8.62	**1665.6**	**1665.6**
98.00	1672.6	0.4	3.0	1.43	0	0	0	6.27	6.27	1.34	7.61	7.61	**1665.0**	**1665.0**
97.50	1671.0	0.1	3.0	1.40	0	0	0	5.85	5.85	1.34	7.19	7.19	**1663.8**	**1663.8**
96.00	1669.5	0.0	3.0	1.63	0	0	0	6.02	6.02	1.34	7.36	7.36	**1662.1**	**1662.1**
94.50	1668.0	0.0	3.0	1.45	0	0	0	5.79	5.79	0.11	5.90	5.90	**1662.1**	**1662.1**
93.00	1666.0	0.2	3.0	1.57	0	0	0	6.20	6.20	0.11	6.31	6.31	**1659.7**	**1659.7**
91.50	1662.6	0.5	3.0	1.80	0	0	0	6.89	6.89	0.11	7.00	7.00	**1655.6**	**1655.6**
90.00	1658.5	0.0	3.0	2.07	0	0	0	6.59	6.59	0.11	6.70	6.70	**1651.8**	**1651.8**
88.50	1655.3	0.3	3.0	1.66	0	0	0	6.45	6.45	0.11	6.56	6.56	**1648.7**	**1648.7**
87.00	1652.1	0.1	3.0	2.25	0	0	0	6.96	6.96	0.11	7.07	7.07	**1645.0**	**1645.0**
85.50	1647.9	0.0	3.0	2.32	0	0	0	6.91	6.91	0.11	7.02	7.02	**1640.9**	**1640.9**
84.00	1645.0	0.0	3.0	1.91	0	0	0	6.38	6.38	0.11	6.49	6.49	**1638.5**	**1638.5**
82.50	1643.0	0.2	3.0	1.40	0	0	0	5.98	5.98	0.11	6.09	6.09	**1636.9**	**1636.9**
81.00	1641.0	0.8	3.0	1.95	0	0	0	7.48	7.48	0.11	7.59	7.59	**1633.4**	**1633.4**
79.50	1637.3	0.1	3.0	2.10	0	0	0	6.76	6.76	0.11	6.87	6.87	**1630.4**	**1630.4**
78.00	1633.9	0.0	3.0	2.18	0	0	0	6.73	6.73	0.11	6.84	6.84	**1627.1**	**1627.1**
76.50	1630.3	0.0	3.0	2.18	0	0	0	6.73	6.73	0.11	6.84	6.84	**1623.5**	**1623.5**
75.00	1627.5	0.0	3.0	1.51	0	0	0	5.86	5.86	0.11	5.97	5.97	**1621.5**	**1621.5**
73.50	1623.9	0.0	3.0	2.50	0	0	0	7.15	7.15	0.25	7.40	7.40	**1616.5**	**1616.5**
72.00	1620.4	0.0	3.0	0.73	0	0	0	4.85	4.85	0.25	5.10	5.10	**1615.3**	**1615.3**
70.50	1620.0	1.0	3.0	1.48	0	0	0	7.13	7.13	0.25	7.38	7.38	**1612.6**	**1612.6**
69.00	1618.2	1.8	3.0	2.46	0	0	0	9.44	9.44	0.25	9.69	9.69	**1608.5**	**1608.5**
67.50	1615.4	1.5	3.0	2.20	0	0	0	8.71	8.71	0.25	8.96	8.96	**1606.4**	**1606.4**
66.00	1611.8	0.1	3.0	2.20	0	0	0	6.89	6.89	0.20	7.09	7.09	**1604.7**	**1604.7**
64.50	1608.2	0.0	3.0	1.84	0	0	0	6.30	6.30	0.20	6.50	6.50	**1601.7**	**1601.7**
63.00	1604.2	0.3	3.0	1.81	0	0	0	6.65	6.65	0.20	6.85	6.85	**1597.4**	**1597.4**
61.50	1600.3	0.2	3.0	2.32	0	0	0	7.17	7.17	0.20	7.37	7.37	**1592.9**	**1592.9**
60.00	1597.0	0.0	3.0	2.18	0	0	0	6.73	6.73	0.20	6.93	6.93	**1590.1**	**1590.1**
58.50	1593.3	0.3	3.0	1.60	0	0	0	6.37	6.37	0.20	6.57	6.57	**1586.7**	**1586.7**

Minimum Recommended Toe-Down Elevations

Section #	Thalweg El (ft)	General Scour (ft)	Low-flow Thalweg (ft)	Antidune Scour (ft)	Contraction Scour (ft)	Bend Scour East (ft)	Bend Scour West (ft)	Factored Total (*1.3) East (ft)	Factored Total (*1.3) West (ft)	Long-term Scour (ft)	Total Scour East (ft)	Total Scour West (ft)	Min. Toedown Elev. East (ft)	Min. Toedown Elev. West (ft)
57.00	1589.3	0.0	3.0	2.50	0	0	0	7.15	7.15	0.32	7.47	7.47	**1581.8**	**1581.8**
55.50	1585.9	0.2	3.0	2.53	0	0	0	7.45	7.45	0.32	7.77	7.77	**1578.1**	**1578.1**
54.00	1583.7	0.0	3.0	2.84	0	0	0	7.59	7.59	0.32	7.91	7.91	**1575.8**	**1575.8**
52.50	1580.7	0.7	3.0	1.60	0	0	0	6.89	6.89	0.32	7.21	7.21	**1573.5**	**1573.5**
51.00	1577.5	1.4	3.0	3.15	0	0	0	9.81	9.81	0.32	10.14	10.14	**1567.4**	**1567.4**
49.50	1574.5	0.0	3.0	2.50	0	0	0	7.15	7.15	0.32	7.47	7.47	**1567.0**	**1567.0**
48.00	1571.2	0.0	3.0	1.40	0	0	0	5.72	5.72	0.32	6.04	6.04	**1565.2**	**1565.2**
46.50	1568.0	0.0	3.0	1.80	3.7	0	0	11.05	11.05	0.28	11.33	11.33	**1556.7**	**1556.7**
45.00	1566.1	0.0	3.0	0.56	3.7	0	0	9.44	9.44	0.28	9.72	9.72	**1556.4**	**1556.4**
44.50	1566.2	0.0	3.0	0.71	3.7	0	0	9.63	9.63	0.28	9.91	9.91	**1556.3**	**1556.3**
43.60	1565.8	0.0	3.0	0.67	0	0	0	4.77	4.77	0.28	5.05	5.05	**1560.7**	**1560.7**
42.00	1567.4	1.0	3.0	1.94	0	0	0	7.72	7.72	0.00	7.72	7.72	**1559.7**	**1559.7**
40.50	1563.2	0.4	3.0	2.35	0	0	0	7.48	7.48	0.00	7.48	7.48	**1555.7**	**1555.7**
39.00	1559.2	0.0	3.0	2.53	0	0	0	7.19	7.19	0.00	7.19	7.19	**1552.0**	**1552.0**
37.50	1558.0	0.0	3.0	2.65	0	0	0	7.34	7.34	0.00	7.34	7.34	**1550.7**	**1550.7**
36.00	1554.7	0.2	3.0	2.28	0	0	0	7.12	7.12	0.00	7.12	7.12	**1547.6**	**1547.6**
34.50	1552.7	0.5	3.0	2.65	0	0	0	7.99	7.99	0.00	7.99	7.99	**1544.7**	**1544.7**
33.00	1549.6	0.0	3.0	2.55	0	0	0	7.22	7.22	0.00	7.22	7.22	**1542.4**	**1542.4**
31.50	1547.3	0.0	3.0	1.63	0	0	0	6.02	6.02	0.00	6.02	6.02	**1541.3**	**1541.3**
30.00	1544.6	0.0	3.0	1.66	2.1	0	0	8.79	8.79	0.00	8.79	8.79	**1535.8**	**1535.8**
28.50	1542.6	0.0	3.0	1.88	2.1	0	0	9.07	9.07	0.00	9.07	9.07	**1533.5**	**1533.5**
27.00	1539.0	0.0	3.0	1.57	2.1	0	0	8.67	8.67	0.00	8.67	8.67	**1530.3**	**1530.3**
25.50	1536.2	0.0	3.0	1.94	2.1	0	0	9.15	9.15	0.00	9.15	9.15	**1527.0**	**1527.0**
24.00	1534.7	0.4	3.0	1.91	2.1	0	0	9.63	9.63	0.00	9.63	9.63	**1525.1**	**1525.1**
22.50	1533.0	4.0	3.0	2.50	0	0	0	12.35	12.35	0.00	12.35	12.35	**1520.7**	**1520.7**
21.00	1531.4	5.5	3.0	3.30	0	0	0	15.34	15.34	0.23	15.57	15.57	**1515.8**	**1515.8**
19.50	1528.6	2.6	3.0	2.85	3.5	0	0	15.54	15.54	0.23	15.77	15.77	**1512.8**	**1512.8**
18.00	1525.8	1.3	3.0	2.45	3.5	0	0.78	13.33	14.34	0.23	13.56	14.57	**1512.2**	**1511.2**
16.50	1523.0	0.5	3.0	2.35	3.5	0	0.78	12.16	13.17	0.23	12.39	13.40	**1510.6**	**1509.6**
15.00	1520.2	0.0	3.0	2.45	0	0	0.78	7.08	8.10	0.23	7.31	8.33	**1512.9**	**1511.9**
13.50	1517.4	0.2	3.0	2.95	0	0	0.78	7.99	9.01	0.23	8.22	9.24	**1509.2**	**1508.2**
12.00	1514.6	0.0	3.0	2.45	0	0	0.78	7.09	8.10	0.23	7.32	8.33	**1507.3**	**1506.3**
10.50	1511.8	0.0	3.0	2.35	0	0	0	6.96	6.96	0.00	6.96	6.96	**1504.8**	**1504.8**
9.00	1510.9	0.0	3.0	1.48	0	0	0	5.83	5.83	0.00	5.83	5.83	**1505.1**	**1505.1**
7.50	1510.1	0.0	3.0	1.57	0	0	0	5.94	5.94	0.00	5.94	5.94	**1504.2**	**1504.2**
6.00	1509.5	0.0	3.0	1.57	0	0	0	5.94	5.94	0.00	5.94	5.94	**1503.6**	**1503.6**
4.50	1509.1	0.1	3.0	2.69	0	0	0	7.52	7.52	0.00	7.52	7.52	**1501.6**	**1501.6**
3.00	1508.0	0.1	3.0	2.32	0	0	0	7.04	7.04	0.00	7.04	7.04	**1501.0**	**1501.0**
1.50	1507.0	0.8	3.0	2.24	0	0	0	7.86	7.86	0.00	7.86	7.86	**1499.1**	**1499.1**
0.00	1506.0	2.0	3.0	2.80	0	0	0	10.14	10.14	0.00	10.14	10.14	**1495.9**	**1495.9**
max		7.7	3.0	3.8	3.8	1.1	0.8	20.3	20.3	3.3	21.2	21.2		
min		0.0	3.0	0.5	0.0	0.0	0.0	4.5	4.5	0.0	4.7	4.7		
avg		0.6	3.0	2.2	0.2	0.0	0.0	7.9	7.9	0.5	8.4	8.4		