

Appendix 3.E, Pile Driving Assumptions for the Proposed Action

Table 3.E-1. Physical Location of Pile Driving

| Facility/ Structure | Location | Lat/long | On land (distance to water in ft) or in water | River depth (ft) ¹ | River width (ft) | Width of in-river constructio n (ft) | Length of construc- tion along river bank (ft) | Proportio n of river available for passage | Straight line distance to river bend (furthest upstream/downstre am location) (ft) | Distance to concurr ent pile driving sites (ft) ² |
|------------------------|------------------------------|-------------------------|--|-------------------------------------|------------------------|---|--|--|--|---|
| Intake 2 | | | | | | | | | | |
| Intake 2 cofferdam | Sac River (RM 41.1) | 38.40541, -121.51452 | In water | -14 | 700 | 60 | 2,000 | 95% | 6,500-12,000 | 2,000 |
| Intake 2 foundation | Sac River (RM 41.1) | 38.40541, -121.51452 | In cofferdam 40-90 ft from open water | -14 | 700 | NA | 1,667 | NA | 6,500-12,000 | 2,000 |
| Intake 3 | | | | | | | | | | |
| Intake 3 cofferdam | Sac River (RM 39.4) | 38.38209, -121.51991 | In water | -25 | 500 | 60 | 1,600 | 93% | 1,500-4,500 | 1,600 |
| Intake 3 foundation | Sac River (RM 39.4) | 38.38209, -121.51991 | In cofferdam 40-90 ft from open water | -25 | 500 | NA | 1,373 | NA | 1,500-4,500 | 1,600 |
| Intake 5 | | | | | | | | | | |
| Intake 5 cofferdam | Sac River (RM 36.8) | 38.35057, -121.53302 | In water | -14 | 600 | 60 | 2,000 | 94% | 4,500-7,500 | 2,000 |
| Intake 5 foundation | Sac River (RM 36.8) | 38.35057, -121.53302 | In cofferdam 40-90 ft from open water | -14 | 600 | NA | 1,667 | NA | 4,500-7,500 | 2,000 |
| Barge Landings | | | | | | | | | | |
| Dock piles | IF barge | 38.28106, -121.49816 | In water | -11 | 265 | 50 | 300 | 81% | 1,400-2,700 | 300 |

| Facility/ Structure | Location | Lat/long | On land (distance to water in ft) or in water | River depth (ft) ¹ | River width (ft) | Width of in-river constructio n (ft) | Length of construc- tion along river bank (ft) | Proportio n of river available for passage | Straight line distance to river bend (furthest upstream/downstre am location) (ft) | Distance to concurren t pile driving sites (ft) ² |
|------------------------------|--|-------------------------|--|-------------------------------------|-----------------------------|---|--|--|--|--|
| | landing | | | | | | | | | |
| Dock piles | Bouldin Is. barge landing | 38.08762, -121.54505 | In water | -11 to -18 | 980 | 50 | 300 | 95% | 1,800-2,900 | 300 |
| Dock piles | Venice Is. barge landing | 38.06630, -121.54130 | In water | -19 to -36 | 1,030 | 50 | 300 | 95% | 2,000-4,700 | 300 |
| Dock piles | Mandev ille Is. barge landing | 38.04264, -121.53177 | In water | -5 to - 47 | 760 | 50 | 300 | 93% | 6,500-8,500 | 300 |
| Dock piles | Bacon Is. barge landing | 38.00392, -121.54343 | In water | -8 to - 28 | 340 | 50 | 300 | 85% | 1,200-1,800 | 300 |
| Dock piles | Victoria Is. barge landing | 37.91087, -121.56185 | In water | -7 | 433 | 50 | 300 | 88% | 2,200-3,200 | 300 |
| Dock piles | CCPP barge landing | 37.85505, -121.56435 | In water | -4 to - 10 | 285 | 50 | 300 | 82% | 705-720 | 300 |
| Clifton Court Forebay | | | | | | | | | | |
| Embankment cofferdams | CCF | 37.83204, -121.57494 | In water | -3 | 10,500 (width of CCF) | 25 | 20,800 | NA | NA | Unknown |

| Facility/ Structure | Location | Lat/long | On land (distance to water in ft) or in water | River depth (ft) ¹ | River width (ft) | Width of in-river constructio n (ft) | Length of construc- tion along river bank (ft) | Proportio n of river available for passage | Straight line distance to river bend (furthest upstream/downstre am location) (ft) | Distance to concurren t pile driving sites (ft) ² |
|---|---|-------------------------|--|-------------------------------------|---|---|--|--|--|--|
| Divider wall | CCF | 37.83961, -121.57514 | In water | -3 | 10,500 (width of CCF) | <5% of total surface area of CCF | 9,800 | NA | NA | Unknown |
| NCCF siphon | CCF | 37.83257, -121.59218 | In cofferdam 20-30 feet from open water | -17 | 600 (width of entran ce channe l) | 300 | 150 | 50% | NA | 300 |
| HOR Gate | | | | | | | | | | |
| HOR gate cofferdams | Old River 400 ft from SJR junction | 37.80798, -121.32912 | In water | -6 | 150 | 75 | 50-100 | 50% | 700-1,500 | 100 |
| HOR gate foundation | Old River 400 ft from SJR junction | 37.80798, -121.32912 | In cofferdam 20-30 feet from open water | -6 | 150 | NA | 30-80 | NA | 700-1,500 | 80 |
| Notes NA = Not applicable ¹ Depths at sites other than barge landings represent channel bottom elevation based on NAVD 88, from design drawings in Appendix 3.C. Depths at barge landings are based on NOAA charts 18661 and 18662 which show feet at mean lower low water, based on WGS84. ² Pile drivers may operate concurrently within this range. | | | | | | | | | | |

Table 3.E-2. Pile Driving Details

| Structure | Pile Type/Sizes | Total Piles per site | # of concurrent pile drivers per site | Piles per day | Strikes per pile (impact driving only) | Total strikes per day | Sound Attenuation Devices | Expected acoustic dampening in dB |
|------------------------------|---------------------------------|----------------------|---------------------------------------|---------------|--|-----------------------|--|-----------------------------------|
| Intake 2 | | | | | | | | |
| Intake 2 cofferdam | Sheet piles | 2,500 | 4 | 60 | 210 ¹ | 12,600 | None | NA |
| Intake 2 foundation | 42-inch steel piles | 1,120 | 4 | 60 | 1,500 | 90,000 | Dewatering or bubble curtains, if feasible/practicable | 5 dB |
| Intake 3 | | | | | | | | |
| Intake 3 cofferdam | Sheet piles | 2,500 | 4 | 60 | 210 ¹ | 12,600 | None | NA |
| Intake 3 foundation | 42-inch steel piles | 850 | 4 | 60 | 1,500 | 90,000 | Dewatering or bubble curtains, if feasible/practicable | 5 dB |
| Intake 5 | | | | | | | | |
| Intake 5 cofferdam | Sheet piles | 2,500 | 4 | 60 | 210 ¹ | 12,600 | None | NA |
| Intake 5 foundation | 42-inch steel piles | 1,120 | 4 | 60 | 1,500 | 90,000 | Dewatering or bubble curtains, if feasible/practicable | 5 dB |
| Barge Landings | | | | | | | | |
| Dock piles | 24-inch steel piles | 107 | 4 | 60 | 315 ¹ | 18,900 | None | NA |
| Clifton Court Forebay | | | | | | | | |
| Embankment cofferdams | Sheet piles (AZ-28-700) | 5,125 | 4 | 60 | 210 ¹ | 12,600 | None | NA |
| Divider wall | Sheet piles (AZ-28-700) | 5,169 | 4 | 60 | 210 ¹ | 12,600 | None | NA |
| NCCF siphon | 14-inch concrete or steel piles | 2,160 | 2 | 30 | 1,050 | 31,500 | Dewatering or bubble curtains, if feasible/practicable | 5 dB |

| Structure | Pile Type/Sizes | Total Piles per site | # of concurrent pile drivers per site | Piles per day | Strikes per pile (impact driving only) | Total strikes per day | Sound Attenuation Devices | Expected acoustic dampening in dB |
|---|-------------------------------|-----------------------------|--|----------------------|---|------------------------------|----------------------------------|--|
| HOR Gate | | | | | | | | |
| HOR gate cofferdams | Sheet piles (AZ-28-700) | 550 | 1 | 15 | 210 ¹ | 3,150 | None | NA |
| HOR gate foundation | 14-inch steel pipe or H-piles | 100 | 1 | 15 | 1,050 | 15,750 | None | NA |
| Notes | | | | | | | | |
| ¹ Assumes 70% of pile can be driven using vibratory driving followed by impact driving to drive the remainder of the pile. | | | | | | | | |
| General: All assumptions will be refined as part of next engineering phase when site-specific geotechnical data are collected. | | | | | | | | |

Table 3.E-3. Pile Driving Acoustics.

| Structure (one pile driver only) | Distance to 206 dB SPL Injury Threshold (feet) | Distance to Cumulative 187 dB SEL Injury Threshold or Effective Quiet (feet) ¹ | Distance to 150 dB RMS Behavioral Threshold (feet) | Number and Timing of Construction Seasons | Timing of Pile Driving | Duration of Pile Driving (days) | Preferred period within that work window ² |
|--|--|--|---|--|---------------------------|---------------------------------------|--|
| Intake 2 | | | | | | | |
| Intake 2 cofferdam | 30 | 2,814 | 13,058 | Year 8 | Jun-Oct | 42 | Aug-Sep |
| Intake 2 foundation (no attenuation) | 46 | 3,280 | 32,800 | Year 9 | Jun-Oct | 19 | Aug-Sep |
| Intake 2 foundation (with attenuation) | 20 | 1,522 | 15,226 | Year 9 | Jun-Oct | 19 | Aug-Sep |
| Intake 3 | | | | | | | |
| Intake 3 cofferdam | 30 | 2,814 | 13,058 | Year 7 | Jun-Oct | 42 | Aug-Sep |
| Intake 3 foundation (no attenuation) | 46 | 3,280 | 32,800 | Year 8 | Jun-Oct | 14 | Aug-Sep |
| Intake 3 foundation (with attenuation) | 20 | 1,522 | 15,226 | Year 8 | Jun-Oct | 14 | Aug-Sep |
| Intake 5 | | | | | | | |
| Intake 5 cofferdam | 30 | 2,814 | 13,058 | Year 5 | Jun-Oct | 42 | Aug-Sep |
| Intake 5 foundation (no attenuation) | 46 | 3,280 | 32,800 | Year 6 | Jun-Oct | 19 | Aug-Sep |
| Intake 5 foundation (with attenuation) | 20 | 1,522 | 15,226 | Year 6 | Jun-Oct | 19 | Aug-Sep |
| Barge Landings | | | | | | | |
| Dock piles | 46 | 1,774 | 9,607 | 1 (Year 1 or 2) | Aug-Oct | 2 | Aug-Sep |

| Structure (one pile driver only) | Distance to 206 dB SPL Injury Threshold (feet) | Distance to Cumulative 187 dB SEL Injury Threshold or Effective Quiet (feet) ¹ | Distance to 150 dB RMS Behavioral Threshold (feet) | Number and Timing of Construction Seasons | Timing of Pile Driving | Duration of Pile Driving (days) | Preferred period within that work window ² |
|--|--|--|---|--|---------------------------|---------------------------------------|--|
| Clifton Court Forebay | | | | | | | |
| Embankment cofferdams | 30 | 2,814 | 13,058 | 1 (Year 5) | Jul-Nov | 85 | Aug-Oct |
| Divider wall | 30 | 2,814 | 13,058 | 1 (Year 4) | Jul-Nov | 86 | Aug-Oct |
| NCCF siphon (no attenuation) | 46 | 1,774 | 9,607 | 2 (Years 2 and 3) | Jul-Nov | 72 | Aug-Oct |
| NCCF siphon (with attenuation) | 20 | 823 | 4,458 | 2 (Years 2 and 3) | Jul-Nov | 72 | Aug-Oct |
| HOR Gate | | | | | | | |
| HOR gate cofferdams | 30 | 2,063 | 13,058 | 2 years | Aug-Nov | 19 | Aug-Oct |
| HOR gate foundation (no attenuation) | 46 | 1,774 | 9,607 | 2 years | Aug-Nov | 4 | Aug-Oct |
| HOR gate foundation (with attenuation) | 20 | 823 | 4,458 | 2 years | Aug-Nov | 4 | Aug-Oct |
| Notes | | | | | | | |
| ¹ Calculated injury distance is governed by the distance to effective quiet (150 SEL). Calculation assumes that single strike SELs <150 dB do not accumulate to cause injury. Accordingly, once the distance to the cumulative injury threshold exceeds the distance to effective quiet, increasing the number of strikes does not increase the presumed injury distance. | | | | | | | |
| ² To the extent feasible, pile driving will occur within this timeframe. In all circumstances, pile driving will be limited to the period specified in column 6. | | | | | | | |