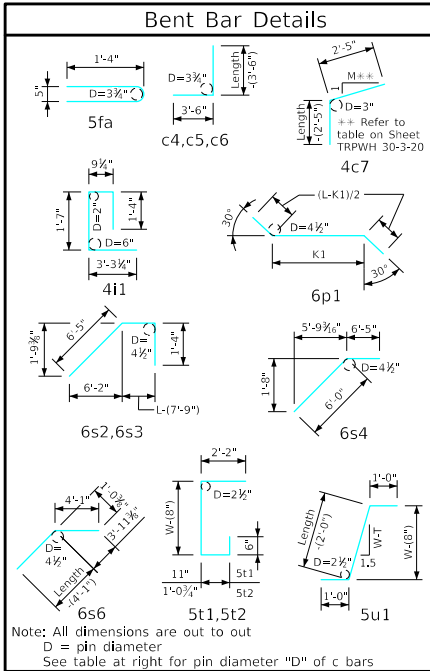


ENGLISHRFDDESIGNEDTRIPLECULVERTS.DGN - TRPWH 30-7-20 S2 - THIS SHEET ISSUED 07-2020.



Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap.

Bill of Reinforcing for One Headwall 30° Skew Span x Culvert Height

| Location | Shape | 10' x 6' | | | | 10' x 5' | | | | 10' x 4' | | | |
|-----------------------------------|--------------|-----------|---------|------------------------|------|----------|---------|-----------------------|------|----------|---------|------------------------|------|
| | | Bar | No. | Length | Wt. | Bar | No. | Length | Wt. | Bar | No. | Length | Wt. |
| Fence Anchor (Galv.) | | 5fa | 2 | 2'-10 | 6 | 5fa | 2 | 2'-10 | 6 | 5fa | 2 | 2'-10 | 6 |
| Wingwall, F.F.H. | | 5b1 | 2 | 25'-5 | 53 | 5b1 | 2 | 22'-0 | 46 | 5b1 | 2 | 18'-6 | 39 |
| Wingwall, F.F.H. | | 5b2 | 10 Var. | 2 Each 10'-0 to 23'-10 | 176 | 5b2 | 8 Var. | 2 Each 10'-0 to 20'-5 | 127 | 5b2 | 6 Var. | 2 Each 10'-0 to 16'-11 | 84 |
| Wingwall, B.F.H. | | 4b3 | 2 | 25'-7 | 34 | 4b3 | 2 | 22'-2 | 30 | 4b3 | 2 | 18'-8 | 25 |
| Wingwall, B.F.H. | | 4b4 | 8 Var. | 2 Each 13'-7 to 24'-0 | 100 | 4b4 | 6 Var. | 2 Each 13'-7 to 20'-7 | 68 | 4b4 | 4 Var. | 2 Each 13'-7 to 17'-1 | 41 |
| Interior Wall, Both F.H. | | 5b5 | 18 Var. | 2 Each 7'-7 to 24'-10 | 304 | 5b5 | 14 Var. | 2 Each 7'-9 to 21'-4 | 212 | 5b5 | 10 Var. | 2 Each 8'-1 to 17'-10 | 135 |
| Wingwall, F.F.V. | | 4c1 | 58 Var. | 2 Each 2'-7 to 8'-8 | 218 | 4c1 | 36 Var. | 2 Each 2'-7 to 7'-6 | 121 | 4c1 | 30 Var. | 2 Each 2'-7 to 6'-7 | 92 |
| Wingwall, F.F.V. | | c2 | -- | -- | -- | c2 | -- | -- | -- | c2 | -- | -- | -- |
| Wingwall, F.F.V. (O) | | 4c3 | 2 | 9'-0 | 12 | 4c3 | 2 | 8'-0 | 11 | 4c3 | 2 | 7'-0 | 9 |
| Wingwall, F.F.V. (A) | | 4c3 | 2 | 9'-0 | 12 | 4c3 | 2 | 8'-0 | 11 | 4c3 | 2 | 7'-0 | 9 |
| Wingwall, B.F.V. | | 5c4 | 44 Var. | 2 Each 6'-3 to 12'-4 | 426 | 5c4 | 48 Var. | 2 Each 6'-3 to 11'-3 | 438 | 5c4 | 30 Var. | 2 Each 6'-3 to 10'-4 | 259 |
| Wingwall, B.F.V. (O) | | 5c5 | 1 | 12'-6 | 13 | 5c5 | 1 | 11'-6 | 12 | 5c5 | 1 | 10'-6 | 11 |
| Wingwall, B.F.V. (A) | | 5c5 | 3 | 12'-6 | 39 | 5c5 | 3 | 11'-6 | 36 | 5c5 | 3 | 10'-6 | 33 |
| Wingwall, B.F.V. | | 5c6 | 14 | 8'-6 | 124 | c6 | -- | -- | -- | c6 | -- | -- | -- |
| Interior Wall, Both F.V | | 4c7 | 4 | 3'-9 | 10 | 4c7 | 4 | 3'-9 | 10 | 4c7 | 4 | 3'-9 | 10 |
| Interior Wall, Both F.V | | 4c8 | 84 Var. | 2 Each 1'-5 to 6'-3 | 215 | 4c8 | 70 Var. | 2 Each 1'-5 to 5'-3 | 156 | 4c8 | 56 Var. | 2 Each 1'-5 to 4'-2 | 104 |
| Interior Wall, Both F.V | | 4c9 | 4 | 6'-6 | 17 | 4c9 | 4 | 5'-6 | 15 | 4c9 | 4 | 4'-6 | 12 |
| Apron, Longit., Bott. | | 4d1 | 33 | 25'-4 | 558 | 4d1 | 33 | 21'-10 | 481 | 4d1 | 33 | 18'-4 | 404 |
| Apron, Longit., Top | | 6f1 | 33 | 25'-4 | 1256 | 6f1 | 33 | 21'-10 | 1082 | 6f1 | 33 | 18'-4 | 909 |
| Parapet, Vertical | | 4i1 | 63 | 7'-0 | 295 | 4i1 | 63 | 7'-0 | 295 | 4i1 | 63 | 7'-0 | 295 |
| Parapet, Horiz. | | 7j1 | 4 | 37'-8 | 308 | 7j1 | 4 | 37'-8 | 308 | 7j1 | 4 | 37'-8 | 308 |
| Apron, Trans., Top | | 5m1 | 18 | 33'-2 | 623 | 5m1 | 14 | 33'-2 | 484 | 5m1 | 9 | 33'-2 | 311 |
| Apron, Trans., Top | | 5m2 | 24 Var. | 2'-4 to 32'-3 | 433 | 5m2 | 23 Var. | 2'-10 to 31'-5 | 411 | 5m2 | 24 Var. | 2'-1 to 31'-11 | 426 |
| Apron, Trans., Bott. | | 4m3 | 19 | 33'-11 | 430 | 4m3 | 16 | 33'-11 | 363 | 4m3 | 13 | 33'-11 | 295 |
| Curtain, Horiz. | | 6p1 | 5 | 38'-0 | 285 | 6p1 | 5 | 38'-0 | 285 | 6p1 | 5 | 38'-0 | 285 |
| Wing Slope, Both F. | | 6s1 | 4 | 18'-8 | 112 | 6s1 | 4 | 15'-1 | 91 | 6s1 | 4 | 11'-6 | 69 |
| Wing Slope, Both F. (O) | | 6s2 | 2 | 8'-4 | 25 | 6s2 | 2 | 8'-4 | 25 | 6s2 | 2 | 8'-4 | 25 |
| Wing Slope, Both F. (A) | | 6s3 | 2 | 8'-9 | 26 | 6s3 | 2 | 8'-9 | 26 | 6s3 | 2 | 8'-9 | 26 |
| Wing Slope, F.F. | | 6s4 | 2 | 12'-5 | 37 | 6s4 | 2 | 12'-5 | 37 | 6s4 | 2 | 12'-5 | 37 |
| Wing Slope, F.F. | | 6s5 | 2 | 16'-3 | 49 | 6s5 | 2 | 12'-8 | 38 | 6s5 | 2 | 9'-0 | 27 |
| Interior Wall, Both F. | | 6s6 | 4 | 25'-11 | 156 | 6s6 | 4 | 22'-4 | 134 | 6s6 | 4 | 18'-9 | 113 |
| Curtain, Vert. | | 5t1 | 37 | 6'-5 | 248 | 5t1 | 37 | 6'-5 | 248 | 5t1 | 37 | 6'-5 | 248 |
| Curtain, Vert. Ends | | 5t2 | 4 | 6'-7 | 27 | 5t2 | 4 | 6'-7 | 27 | 5t2 | 4 | 6'-7 | 27 |
| Bracket, Vert. | | 5u1 | 4 | 5'-4 | 22 | 5u1 | 4 | 5'-4 | 22 | 5u1 | 4 | 5'-4 | 22 |
| Estimated Quantities One Headwall | Reinf. Steel | 6649 LB | | | | 5656 LB | | | | 4696 LB | | | |
| | Concrete | Parapet Δ | 3.5 | | 3.5 | | 3.5 | | 3.5 | | 3.5 | | 3.5 |
| | | Wingwalls | 9.4 | | 6.8 | | 42.8 | | 4.6 | | 35.7 | | 35.7 |
| | | Apron = | 37.5 | 50.4 CY | 32.3 | | 27.6 | | 27.6 | | | | |

Δ Includes top of wingwall quantities.
* Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.

(A) - Indicates bar located at acute corner.
(O) - Indicates bar located at obtuse corner.
Refer to Sheet TRPWH 30-1-20 for acute and obtuse corner locations.

Headwall Notes:

- This headwall is based on a 3:1 slope normal to centerline of roadway.
- The sides of the apron are to be formed to ensure correct line and grade.
- All apron reinforcing steel is to be supported by bar chairs at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.
- Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown. Clearance to the bottom ends of vertical bars shall be 3 inches.
- Concrete quantities are estimated from back of parapet.
- Horizontal tails of bars "b" & "s" estimated to extend 2'-5" beyond back of parapet (into end of barrel). Longitudinal bars "4d1" and "6f1" estimated to project into end section of barrel a minimum of 2'-5" beyond back of parapet. The "length" column reflects total number of feet necessary to meet these requirements.
- Dimensions are in feet and inches unless otherwise noted.

LATEST REVISION DATE

Standard Design - Triple Reinforced Concrete Box Culverts

Parallel Wing Headwalls

July, 2020

Quantity Tabulation

10'-0" Span

30° Skew

APPROVED BY BRIDGE ENGINEER

TRPWH

30-7-20

Sheet 2 of 2