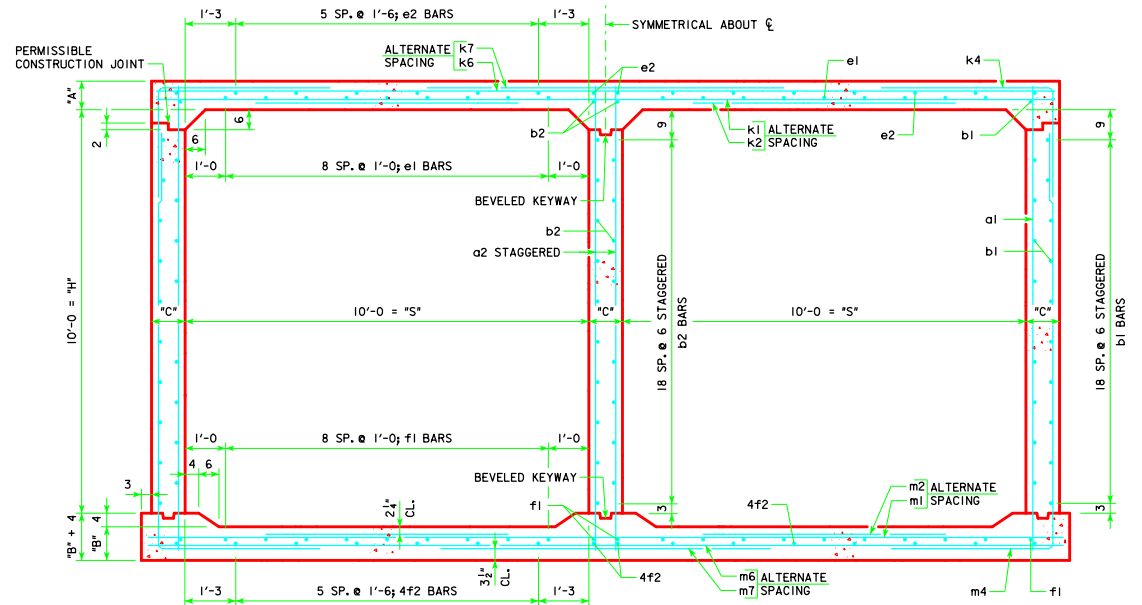


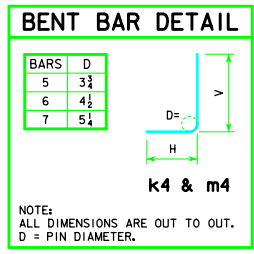
# VARIABLE DIMENSIONS AND QUANTITIES FOR TWIN 10 x 10 BARREL SECTIONS

| DIMENSIONS |    |     |      |      |      |     |   |       |       |       |       |    | BAR LIST |        |    |    |        |     |    |    |    |     |    |    |    |     |      |    |    |     |    |       |      |     |       |     |    |       |      |      |       |      |       |       |       |       |   |     |       |   |     |       |   |     |       |
|------------|----|-----|------|------|------|-----|---|-------|-------|-------|-------|----|----------|--------|----|----|--------|-----|----|----|----|-----|----|----|----|-----|------|----|----|-----|----|-------|------|-----|-------|-----|----|-------|------|------|-------|------|-------|-------|-------|-------|---|-----|-------|---|-----|-------|---|-----|-------|
| FILL       | S  | H   | A    | B    | C    | D   | E | U     | W     | X     | Z     | a1 | a2       | b1     | b2 | e1 | e2     | f1  | f2 | k1 | k2 | k3  | k4 | k6 | k7 | k9  | SIZE |    |    | NO. |    |       | SIZE |     |       | NO. |    |       | SIZE |      |       | NO.  |       |       | SIZE  |       |   | NO. |       |   |     |       |   |     |       |
| L          |    | SP. |      | L    |      | SP. |   | L     |       | SP.   |       | L  |          | SP.    |    | L  |        | SP. |    | L  |    | SP. |    | L  |    | SP. |      | L  |    | SP. |    | L     |      | SP. |       | L   |    | SP.   |      |      |       |      |       |       |       |       |   |     |       |   |     |       |   |     |       |
| 0          | 10 | 10  | 13.5 | 12   | 10   | 9   | 9 | 0'-0  | 6'-4  | 1'-10 | 6'-4  | 4  | 12       | 12'-0  | 7  | 9  | 12'-0  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 6   | 18 | 22'-2 | 6    | 18  | 11'-1 | 6   | 12 | 10'-2 | 6'-6 | 3'-8 | 4     | 12   | 22'-2 | 5     | 12    | 12'-8 | 5 | 4.5 | 22'-2 |   |     |       |   |     |       |
| 1          | 10 | 10  | 13   | 11.5 | 10   | 9   | 9 | 0'-6  | 6'-4  | 2'-0  | 6'-9  | 4  | 12       | 11'-11 | 7  | 9  | 11'-11 | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 6   | 18 | 10'-7 | 5    | 6    | 9'-9  | 6'-6 | 3'-3  | 4     | 9     | 22'-2 | 4 | 9   | 13'-8 | 4 | 4.5 | 22'-2 |   |     |       |
| 2          | 10 | 10  | 9.5  | 10.5 | 10   | 9   | 9 | 1'-2  | 6'-9  | 2'-10 | 4'-5  | 4  | 12       | 11'-7  | 7  | 9  | 11'-7  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-2 | 5    | 12   | 9'-11 | 5    | 6     | 9'-0  | 6'-1  | 2'-11 | 5 | 18  | 22'-2 | 7 | 18  | 13'-6 | 7 | 4.5 | 22'-2 |
| 3          | 10 | 10  | 9    | 10.5 | 10   | 9   | 9 | 2'-0  | 5'-7  | 2'-10 | 4'-5  | 4  | 12       | 11'-6  | 7  | 9  | 11'-6  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-2 | 5    | 12   | 7'-11 | 5    | 6     | 7'-8  | 4'-9  | 2'-11 | 4 | 12  | 22'-2 | 6 | 12  | 11'-2 | 6 | 4.5 | 22'-2 |
| 4          | 10 | 10  | 8.5  | 10   | 10   | 9   | 9 | 1'-10 | 4'-5  | 3'-0  | 4'-1  | 4  | 12       | 11'-5  | 7  | 9  | 11'-5  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-2 | 5    | 12   | 8'-5  | 5    | 6     | 7'-2  | 4'-3  | 2'-11 | 4 | 12  | 22'-2 | 6 | 12  | 8'-10 | 6 | 4.5 | 22'-2 |
| 5-7        | 10 | 10  | 8.5  | 10   | 10   | 9   | 9 | 2'-0  | 4'-0  | 3'-1  | 3'-7  | 4  | 12       | 11'-5  | 7  | 9  | 11'-5  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-2 | 5    | 12   | 7'-10 | 5    | 6     | 7'-0  | 4'-1  | 2'-11 | 5 | 12  | 22'-2 | 6 | 12  | 8'-0  | 6 | 4.5 | 22'-2 |
| 8-10       | 10 | 10  | 9    | 11.5 | 10   | 9   | 9 | 2'-1  | 3'-6  | 2'-2  | 3'-6  | 4  | 9        | 11'-7  | 7  | 9  | 11'-7  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-2 | 5    | 12   | 7'-10 | 6    | 9     | 7'-1  | 3'-10 | 3'-3  | 5 | 9   | 22'-2 | 5 | 9   | 7'-0  | 5 | 4.5 | 22'-2 |
| 11-13      | 10 | 10  | 11   | 13.5 | 10   | 9   | 9 | 1'-9  | 3'-6  | 2'-1  | 3'-8  | 4  | 9        | 11'-11 | 7  | 9  | 11'-11 | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 6   | 18 | 22'-2 | 6    | 18   | 8'-10 | 6    | 9     | 7'-4  | 3'-8  | 3'-8  | 5 | 9   | 22'-2 | 5 | 9   | 7'-0  | 5 | 4.5 | 22'-2 |
| 14-16      | 10 | 10  | 12.5 | 15   | 10.5 | 9   | 9 | 1'-9  | 3'-8  | 2'-0  | 3'-9  | 4  | 9        | 12'-2  | 7  | 9  | 12'-2  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 6   | 18 | 22'-3 | 6    | 18   | 9'-2  | 5    | 6     | 6'-11 | 3'-8  | 3'-3  | 4 | 9   | 22'-3 | 6 | 9   | 7'-4  | 6 | 4.5 | 22'-3 |
| 17-19      | 10 | 10  | 14   | 16   | 11   | 6   | 9 | 1'-6  | 3'-9  | 2'-3  | 3'-10 | 4  | 6        | 12'-5  | 7  | 9  | 12'-5  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-5 | 5    | 12   | 9'-7  | 6    | 9     | 7'-6  | 3'-9  | 3'-9  | 5 | 12  | 22'-5 | 7 | 12  | 7'-6  | 7 | 4.5 | 22'-5 |
| 20-22      | 10 | 10  | 14.5 | 17   | 11.5 | 6   | 9 | 1'-6  | 3'-9  | 1'-11 | 3'-11 | 4  | 6        | 12'-6  | 7  | 9  | 12'-6  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-6 | 5    | 12   | 9'-7  | 6    | 9     | 7'-6  | 3'-9  | 3'-9  | 5 | 12  | 22'-6 | 7 | 12  | 7'-6  | 7 | 4.5 | 22'-6 |
| 23-25      | 10 | 10  | 16   | 18   | 12   | 6   | 9 | 1'-8  | 3'-10 | 1'-9  | 4'-0  | 4  | 6        | 12'-9  | 7  | 9  | 12'-9  | 4   | 6  | 40 | 4  | 6   | 21 | 4  | 12 | 18  | 4    | 18 | 16 | 4   | 12 | 22    | 4    | 18  | 16    | 5   | 12 | 22'-8 | 4    | 9    | 9'-5  | 6    | 9     | 7'-8  | 3'-10 | 3'-10 | 5 | 12  | 22'-8 | 7 | 12  | 7'-8  | 7 | 4.5 | 22'-8 |

| DIMENSIONS |   |     |        |   |    |       |   |    |        |       |        |    | BAR LIST |        |    |    |       |     |     |        |       |       |       |       |        |     |      |   |  |     |  |   |      |     |  |     |  |     |      | QUANTITIES |  |     |  |  |      |  |  |     |  |  |
|------------|---|-----|--------|---|----|-------|---|----|--------|-------|--------|----|----------|--------|----|----|-------|-----|-----|--------|-------|-------|-------|-------|--------|-----|------|---|--|-----|--|---|------|-----|--|-----|--|-----|------|------------|--|-----|--|--|------|--|--|-----|--|--|
| FILL       | S | H   | A      | B | C  | D     | E | U  | W      | X     | Z      | a1 | a2       | b1     | b2 | e1 | e2    | f1  | f2  | k1     | k2    | k3    | k4    | k6    | k7     | k9  | SIZE |   |  | NO. |  |   | SIZE |     |  | NO. |  |     | SIZE |            |  | NO. |  |  | SIZE |  |  | NO. |  |  |
| L          |   | SP. |        | L |    | SP.   |   | L  |        | SP.   |        | L  |          | SP.    |    | L  |       | SP. |     | L      |       | SP.   |       | L     |        | SP. |      | L |  | SP. |  | L |      | SP. |  | L   |  | SP. |      | L          |  | SP. |  |  |      |  |  |     |  |  |
| 0          | 6 | 18  | 22'-8  | 6 | 18 | 8'-9  | 7 | 12 | 16'-11 | 6'-6  | 10'-5  | 4  | 9        | 22'-8  | 4  | 9  | 12'-8 | 4   | 4.5 | 22'-8  | 0.998 | 0.914 | 0.887 | 2.799 | 395.21 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 1          | 5 | 12  | 22'-8  | 5 | 12 | 8'-0  | 5 | 6  | 16'-6  | 6'-1  | 10'-5  | 5  | 18       | 22'-8  | 7  | 18 | 13'-6 | 7   | 4.5 | 22'-8  | 0.964 | 0.878 | 0.887 | 2.729 | 404.05 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 2          | 5 | 9   | 22'-8  | 4 | 9  | 6'-6  | 5 | 6  | 15'-4  | 5'-0  | 10'-4  | 4  | 9        | 22'-8  | 5  | 9  | 8'-10 | 5   | 4.5 | 22'-8  | 0.721 | 0.807 | 0.887 | 2.415 | 398.16 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 3          | 5 | 9   | 22'-8  | 4 | 9  | 6'-6  | 5 | 6  | 14'-7  | 4'-3  | 10'-4  | 5  | 18       | 22'-8  | 8  | 18 | 8'-10 | 8   | 4.5 | 22'-8  | 0.686 | 0.807 | 0.887 | 2.380 | 389.61 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 4          | 5 | 9   | 22'-8  | 4 | 9  | 6'-0  | 5 | 6  | 14'-3  | 4'-0  | 10'-3  | 5  | 18       | 22'-8  | 8  | 18 | 8'-2  | 8   | 4.5 | 22'-8  | 0.651 | 0.772 | 0.887 | 2.310 | 376.45 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 5-7        | 5 | 9   | 22'-8  | 4 | 9  | 5'-10 | 5 | 6  | 14'-1  | 3'-10 | 10'-3  | 5  | 9        | 22'-8  | 5  | 9  | 7'-2  | 5   | 4.5 | 22'-8  | 0.651 | 0.772 | 0.887 | 2.310 | 387.21 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 8-10       | 5 | 12  | 22'-8  | 5 | 12 | 7'-11 | 6 | 9  | 14'-3  | 3'-10 | 10'-5  | 5  | 9        | 22'-8  | 5  | 9  | 7'-0  | 5   | 4.5 | 22'-8  | 0.686 | 0.878 | 0.887 | 2.451 | 395.21 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 11-13      | 5 | 12  | 22'-8  | 5 | 12 | 8'-5  | 5 | 6  | 14'-4  | 3'-9  | 10'-7  | 5  | 9        | 22'-8  | 5  | 9  | 7'-4  | 5   | 4.5 | 22'-8  | 0.825 | 1.020 | 0.887 | 2.732 | 401.32 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 14-16      | 5 | 12  | 22'-9  | 5 | 12 | 9'-0  | 5 | 6  | 14'-5  | 3'-9  | 10'-8  | 4  | 9        | 22'-9  | 6  | 9  | 7'-6  | 6   | 4.5 | 22'-9  | 0.936 | 1.132 | 0.934 | 3.002 | 393.79 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 17-19      | 5 | 9   | 22'-11 | 4 | 9  | 8'-4  | 6 | 9  | 14'-6  | 3'-9  | 10'-9  | 5  | 12       | 22'-11 | 7  | 12 | 7'-8  | 7   | 4.5 | 22'-11 | 1.048 | 1.211 | 0.978 | 3.237 | 424.21 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 20-22      | 5 | 9   | 23'-0  | 4 | 9  | 9'-1  | 6 | 9  | 14'-8  | 3'-10 | 10'-10 | 5  | 12       | 23'-0  | 7  | 12 | 7'-10 | 7   | 4.5 | 23'-0  | 1.091 | 1.291 | 1.022 | 3.404 | 427.34 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |
| 23-25      | 5 | 9   | 23'-2  | 4 | 9  | 9'-5  | 6 | 9  | 14'-8  | 3'-9  | 10'-11 | 5  | 9        | 23'-2  | 6  | 9  | 8'-0  | 6   | 4.5 | 23'-2  | 1.205 | 1.372 | 1.067 | 3.644 | 441.92 |     |      |   |  |     |  |   |      |     |  |     |  |     |      |            |  |     |  |  |      |  |  |     |  |  |



TWIN 10 x 10 BARREL SECTION



### NOTES:

- DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET TWRCB G2-12.
- DIMENSIONS "A", "B", "C", "D", "E", "U", "W", "X", AND "Z" LISTED IN THE BAR LIST ARE IN INCHES.

LATEST REVISION DATE

Approved by BRIDGE ENGINEER

Iowa Department of Transportation  
Highway Division

STANDARD DESIGN  
**TWIN REINFORCED CONCRETE BOX CULVERTS**  
APRIL, 2012

**CULVERT BARREL DETAILS**  
10 x 10 BARREL SECTIONS

TWRCB 10-10-12