

TYPICAL SET OUT TABLES & QUANTITY CALCULATIONS FOR REINFORCED CONCRETE BOX CULVERTS (UP TO 1800mm CULVERT CELL HEIGHT) & UP TO 35° SKEW

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TABLE 1: CULVERT SKEW ANGLE 0° TO 20°
(WINGWALL ANGLES $\alpha = 45^\circ$ & $\beta = 45^\circ$) (BATTER SLOPE OF 1V:2H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	1260	1260	1260	W+2520
600	980	1560	1560	1560	W+3120
750	1130	1860	1860	1860	W+3720
900	1280	2160	2160	2160	W+4320
1050	1430	2460	2460	2460	W+4920
1200	1580	2760	2760	2760	W+5520
1350	1730	3060	3060	3060	W+6120
1500	1880	3360	3360	3360	W+6720
1650	2030	3660	3660	3660	W+7320
1800	2180	3960	3960	3960	W+7920

TABLE 2: CULVERT SKEW ANGLE 0° TO 20°
(WINGWALL ANGLES $\alpha = 45^\circ$ & $\beta = 45^\circ$) (BATTER SLOPE OF 1V:4H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	2520	2520	2520	W+5040
600	980	3120	3120	3120	W+6240
750	1130	3720	3720	3720	W+7440
900	1280	4320	4320	4320	W+8640
1050	1430	4920	4920	4920	W+9840
1200	1580	5520	5520	5520	W+11040
1350	1730	6120	6120	6120	W+12240
1500	1880	6720	6720	6720	W+13440
1650	2030	7320	7320	7320	W+14640
1800	2180	7920	7920	7920	W+15840

TABLE 3: CULVERT SKEW ANGLE 0° TO 20°
(WINGWALL ANGLES $\alpha = 45^\circ$ & $\beta = 45^\circ$) (BATTER SLOPE OF 1V:6H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	3780	3780	3780	W+7560
600	980	4680	4680	4680	W+9360
750	1130	5580	5580	5580	W+11160
900	1280	6480	6480	6480	W+12960
1050	1430	7380	7380	7380	W+14760
1200	1580	8280	8280	8280	W+16560
1350	1730	9180	9180	9180	W+18360
1500	1880	10080	10080	10080	W+20160
1650	2030	10980	10980	10980	W+21960
1800	2180	11880	11880	11880	W+23760

TABLE 4: CULVERT SKEW ANGLE 20° TO 30°
(WINGWALL ANGLES $\alpha = 9.5^\circ$ & $\beta = 51^\circ$) (BATTER SLOPE OF 1V:2H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	1260	220	1560	W+1780
600	980	1560	270	1930	W+2200
750	1130	1860	320	2300	W+2620
900	1280	2160	370	2670	W+3040
1050	1430	2460	420	3040	W+3460
1200	1580	2760	470	3410	W+3880
1350	1730	3060	520	3780	W+4300
1500	1880	3360	570	4150	W+4720
1650	2030	3660	620	4520	W+5140
1800	2180	3960	670	4900	W+5570

TABLE 5: CULVERT SKEW ANGLE 20° TO 30°
(WINGWALL ANGLES $\alpha = 9.5^\circ$ & $\beta = 51^\circ$) (BATTER SLOPE OF 1V:4H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	2520	430	3120	W+3550
600	980	3120	530	3860	W+4390
750	1130	3720	630	4600	W+5230
900	1280	4320	730	5340	W+6070
1050	1430	4920	830	6080	W+6910
1200	1580	5520	930	6820	W+7750
1350	1730	6120	1030	7560	W+8590
1500	1880	6720	1130	8300	W+9430
1650	2030	7320	1230	9040	W+10270
1800	2180	7920	1330	9790	W+11120

TABLE 6: CULVERT SKEW ANGLE 20° TO 30°
(WINGWALL ANGLES $\alpha = 9.5^\circ$ & $\beta = 51^\circ$) (BATTER SLOPE OF 1V:6H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	3780	640	4670	W+5310
600	980	4680	790	5780	W+6570
750	1130	5580	940	6900	W+7840
900	1280	6480	1090	8010	W+9100
1050	1430	7380	1240	9120	W+10360
1200	1580	8280	1390	10230	W+11620
1350	1730	9180	1540	11340	W+12880
1500	1880	10080	1690	12450	W+14140
1650	2030	10980	1840	13560	W+15400
1800	2180	11880	1990	14680	W+16670

TABLE 7: CULVERT SKEW ANGLE 30° TO 35°
(WINGWALL ANGLES $\alpha = 8.5^\circ$ & $\beta = 54^\circ$) (BATTER SLOPE OF 1V:2H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	1260	190	1740	W+1930
600	980	1560	240	2150	W+2390
750	1130	1860	280	2470	W+2850
900	1280	2160	330	2980	W+3310
1050	1430	2460	370	3390	W+3760
1200	1580	2760	420	3800	W+4220
1350	1730	3060	460	4220	W+4680
1500	1880	3360	510	4630	W+5140
1650	2030	3660	550	5040	W+5590
1800	2180	3960	600	5460	W+6060

TABLE 8: CULVERT SKEW ANGLE 30° TO 35°
(WINGWALL ANGLES $\alpha = 8.5^\circ$ & $\beta = 54^\circ$) (BATTER SLOPE OF 1V:4H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	2520	380	3470	W+3850
600	980	3120	470	4300	W+4770
750	1130	3720	560	5130	W+5690
900	1280	4320	650	5950	W+6600
1050	1430	4920	740	6780	W+7520
1200	1580	5520	830	7600	W+8430
1350	1730	6120	920	8430	W+9350
1500	1880	6720	1010	9250	W+10260
1650	2030	7320	1100	10080	W+11180
1800	2180	7920	1190	10910	W+12100

TABLE 9: CULVERT SKEW ANGLE 30° TO 35°
(WINGWALL ANGLES $\alpha = 8.5^\circ$ & $\beta = 54^\circ$) (BATTER SLOPE OF 1V:6H)

SETOUT DIMENSIONS					
D	H	A	B	E	C
450	830	3780	640	4670	W+5310
600	980	4680	790	5780	W+6570
750	1130	5580	940	6900	W+7840
900	1280	6480	1090	8010	W+9100
1050	1430	7380	1240	9120	W+10360
1200	1580	8280	1390	10230	W+11620
1350	1730	9180	1540	11340	W+12880
1500	1880	10080	1690	12450	W+14140
1650	2030	10980	1840	13560	W+15400
1800	2180	11880	1990	14680	W+16670

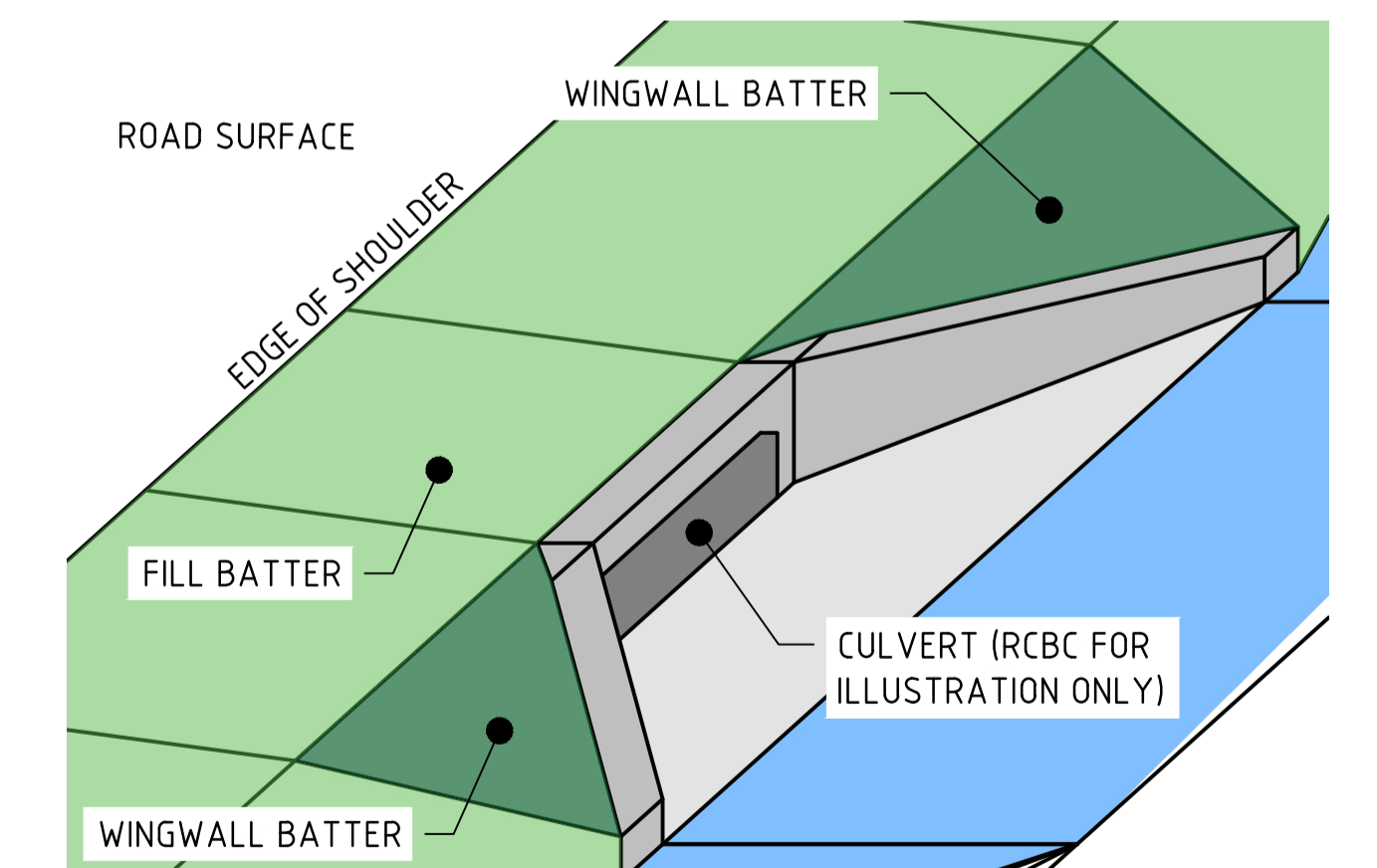
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED ELSEWHERE
- STANDARD DRAWING REFERENCES:
 - CS3107 - RCBC SETOUT DETAILS
 - CS3108 - RCBC CROWN UNIT & LINK SLAB INSTALLATION DETAIL
 - CS3109 - RCBC WINGWALL AND HEADWALL DETAIL FOR D < 900mm
 - CS3110 - RCBC WINGWALL AND HEADWALL DETAIL FOR D > 900mm
 - CS3111 - RCBC CONSTRUCTION OF BASES WITH NIBS & APRONS
 - CS3112 - RCBC CONSTRUCTION OF BASES WITH RECESSES & APRONS
- TO ASSIST PROJECT DEVELOPMENT, TENDERING AND CONSTRUCTION, FORMULAS ARE PROVIDED TO DEVELOP QUANTITIES FOR RCBC BOX CULVERTS. IT IS THE RESPONSIBILITY OF THE DESIGNER / CONSULTANT / CONTRACTOR TO VERIFY THE BELOW FORMULAS WHEN PROVIDING QUANTITIES. IF A DISCREPANCY EXISTS, INFORM THE DEPARTMENT AS SOON AS PRACTICAL.
- THE SETOUT DIMENSIONS & QUANTITY CALCULATIONS PROVIDED REFERENCE THE BELOW STANDARD DRAWINGS:
 - CS3107 - REFERENCE FOR [H], [A], [B], [E], [T], [a], [b] AND HEADWALL DEPTH
 - CS3110 - REFERENCE FOR RCBC FOOTING
 - CS3111 & CS3112 - VALUES FOR [B]
 - CS3129 - VALUES FOR [a] & [b]

QUANTITY CALCULATIONS FOR RCBC CULVERTS

CULVERT COMPONENT	FORMULA
HEADWALL	$Q_{HEADWALL} = [T] \times \text{HEADWALL DEPTH} \times [W]$
WINGWALL 1 LENGTH - A_{W1}	$A_{W1} = [A] / \cos(\alpha)$
WINGWALL LENGTH 2 - A_{W2}	$A_{W2} = [A] / \cos(\beta)$
WINGWALL - Q DUE TO A_{W1}	$Q_{AW1} = ([A_{W1}] \times 200\text{mm} \times [T]) + ([A_{W1}] \times (H - 200\text{mm}) \times 0.5 \times [T])$
WINGWALL - Q DUE TO A_{W2}	$Q_{AW2} = ([A_{W2}] \times 200\text{mm} \times [T]) + ([A_{W2}] \times (H - 200\text{mm}) \times 0.5 \times [T])$
APRON	$Q_{APRON} = (150\text{mm} \times ([A] \times [W]) + (0.5 \times [B] \times [A]) + (0.5 \times [E] \times [A]))$
CUT OFF WALL - INLET	$Q_{CUT-IN} = ([W] + [B] + [E]) \times 200\text{mm} \times 150\text{mm}$
CUT OFF WALL - OUTLET	$Q_{CUT-OUT} = ([W] + [B] + [E]) \times 450\text{mm} \times 150\text{mm}$
FOOTING DUE TO A_{W1}	$Q_{F1} = ([A_{W1}] \times 300\text{mm} \times 100\text{mm}) + ((0.75[H] - 300\text{mm}) \times [A_{W1}] \times 0.5 \times 0.1)$
FOOTING DUE TO A_{W2}	$Q_{F2} = ([A_{W2}] \times 300\text{mm} \times 100\text{mm}) + ((0.75[H] - 300\text{mm}) \times [A_{W2}] \times 0.5 \times 0.1)$
IN-SITU BASE SLAB	$Q_{BASE} = [B] \times [W] \times \text{LENGTH OF CULVERT FROM INVERT TO INVERT}$
TOTAL PER CULVERT	$Q_T = 2 \times (Q_{HEADWALL} + Q_{AW1} + Q_{AW2} + Q_{APRON} + Q_{F1} + Q_{F2}) + Q_{CUT-IN} + Q_{CUT-OUT} + Q_{BASE}$

- NOTES:
1. QUANTITY CALCULATIONS ARE PROVIDED AND INCLUDE THE FOLLOWING: HEADWALL, WINGWALLS, APRON, CUT OFF WALL & FOOTINGS



ISOMETRIC ILLUSTRATION

NOT TO SCALE

No.	AMENDMENT DESCRIPTION	DATE	INIT.	DEPT/COMPANY
0	ISSUED AS A STANDARD DRAWING	APR 2023	J. COOK	TCS / DIPL

Drawn J. COOK Date: MAR 2023	Checked S. HATZI Date: APR 2023
Designed J. COOK Date: MAR 2023	Checked S. HATZI Date: APR 2023
Design Project Leader DIPL Date: APR 2023	NTG Project Manager DIPL Date: APR 2023



STANDARD DRAWINGS				
DRAINAGE				
RCBC - 450mm - 1800mm HEIGHT & 1V:2H TO 1V:6H BATTER SETOUT DIMENSIONS & QUANTITIES - 0° TO 35° SKEW				
NTG Project No.	NTG Asset No.	Sheet Reference	NTG Drawing No.	Amendment
-	-	3 OF 6	CS3129	0 A1