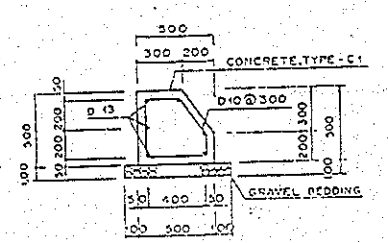
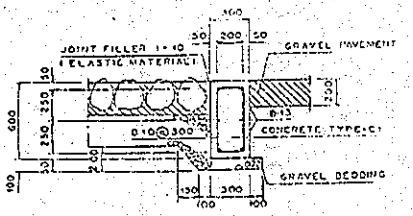
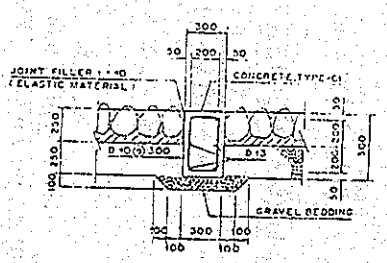
TYPE OF WORK : REVETMENT FOR SLOPE OF 1:1.5 ~ 1:2.0
(WET STONE MASONRY TYPE)
LOCATION : WF.110R + 10.0 ~ WF.110R + 25.0 m
: WF.104R + 17.0 ~ WF.104R + 32.0 m

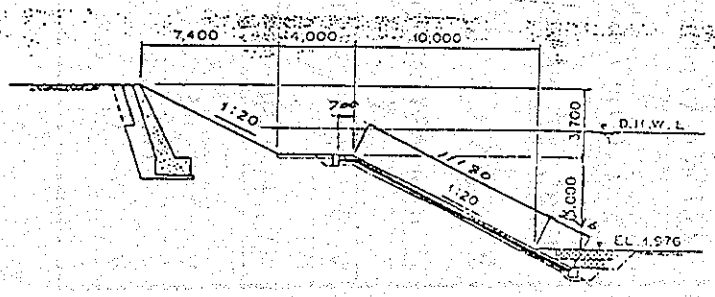
CALCULATION		RESULT
STRUCTURAL EXCAVATION		
V = (176.850 + 180.39) / 2 / 15.0 m x 30.00	= 357.240	357.240 m^3
BACKFILL WITH SELECTED SOIL		
V = (17.445 + 20.640) / 2 / 15.0 m x 30.00	= 38.085	38.085 m^3
WET STONE MASONRY		
V = (50.789 + 51.656) / 2 / 15.0 m x 30.00	= 102.445	102.445 m^3
CEMENT MORTAR POINTING		
A = {(9.014 + 0.70) + (11.18 + 0.70)}/ 2		
x (30.00 – 0.30 x 2)	= 317.432	317.432 m^2
WEEP HOLE		
PVC PIPE ø 50		
n = 9 / 15.0 x 15.0 x 2	= 18	
L = 18 x 0.80	= 14.400	14.400 m
FILTER CLOTH		
A = 0.640 m^2 /place x 18	= 11.520	11.520 m^2
GABION MATTRESS		
V = 33.750 m^3 / 15.0 x 15.0 x 2	= 67.500	67.500 m^3
RUBBLE STONE FILLING		
V = (5.625 + 7.50) / 2 / 15.0 m x 15.0 m x 2	= 13.125	13.125 m^3
GABION CYLINDER ø 500 (GALVANIZED AND COATED WITH PVC)		
V = $\pi/4$ x 0.50^2 x (3.00 + 11.18 + 1.00) x 6.00	= 17.884	17.884 m^3
SOIL FILLING		
V_1 = $\pi/4$ x 0.50^2 x (3.00 + 11.18 + 1.00) x 6.00	= 17.884	
V_2 = (3.00 + 11.18 + 1.00) x 3.00 x 0.50	= 22.770	
V = $V_2 - V_1$	= 4.886	4.886 m^3

TYPE OF WORK :	GRAVEL BEDDING
LOCATION :	



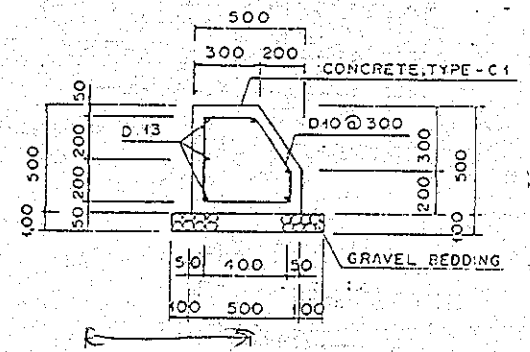


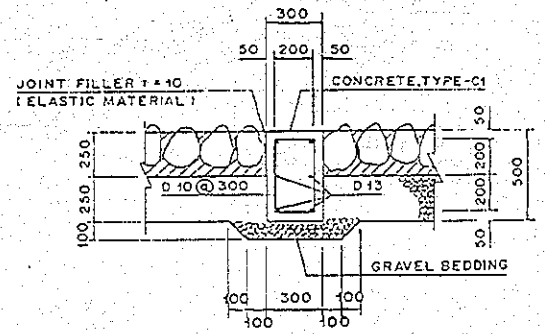


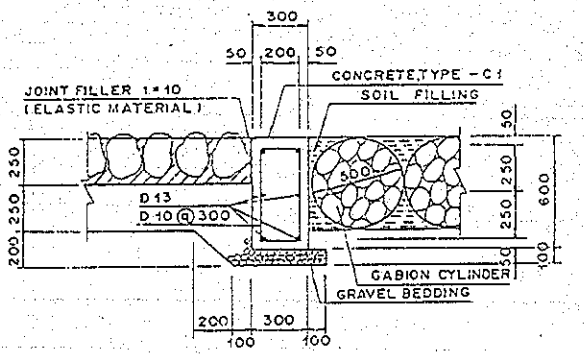


CALCULATION	RESULT
① BASE CONCRETE	
V = 1.20 m²/15.0m x 30.0 m = 2.400	2.400 m³
② TOP CONCRETE	
V = 0.60 m³/15.0m x 30.0m = 1.200	1.200 m³
③ PARTITION WALL	
V = 0.706 m²/place x 1 place = 0.706	0.706 m³
④ END WALL	
V = 0.706 m²/place x 1 place = 0.706	0.706 m³
⑤ STANDARD SECTION	
V = (49.409 + 51.876) ÷ 2 / 15.0m x 30.0 m = 101.285	101.285 m³
TOTAL	106.297 m³

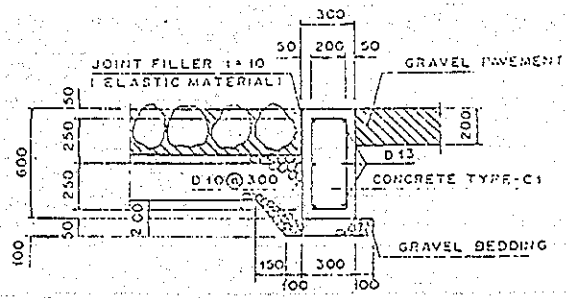
TYPE OF WORK :	DEFORMED REINFORCING BARS
LOCATION :	



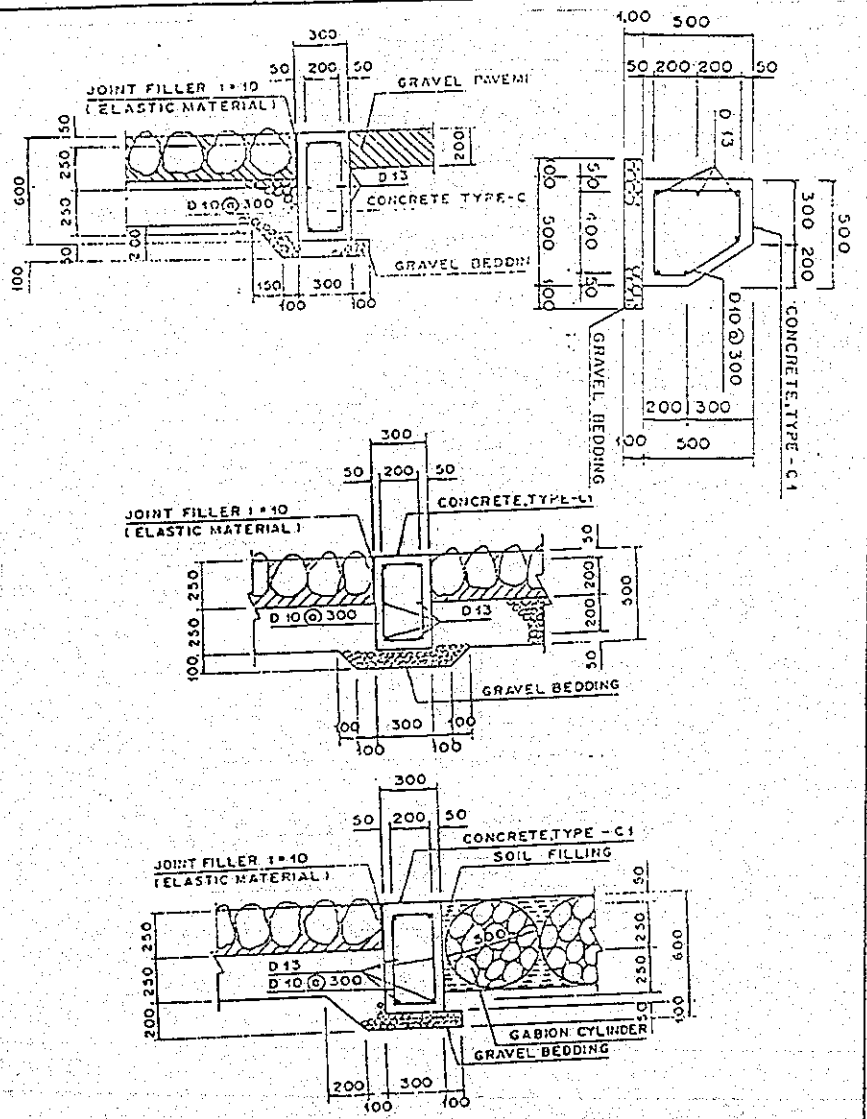




CALCULATION	RESULT
① TOP CONCRETE	
$W = (0.093 + 0.050) \times 15.207 \times 2 = 4.349$	4.349 tf
② BASE CONCRETE	
$W = (0.093 + 0.058) \times 15.0 \times 2 = 4.530$	4.530 tf
③ PARTITION WALL	
$W = 0.123$ tf / place $\times$ 1 place $= 0.123$	0.123 tf
④ END WALL	
$W = 0.129$ tf / place $\times$ 1 place $= 0.129$	0.129 tf
TOTAL	9.131 tf

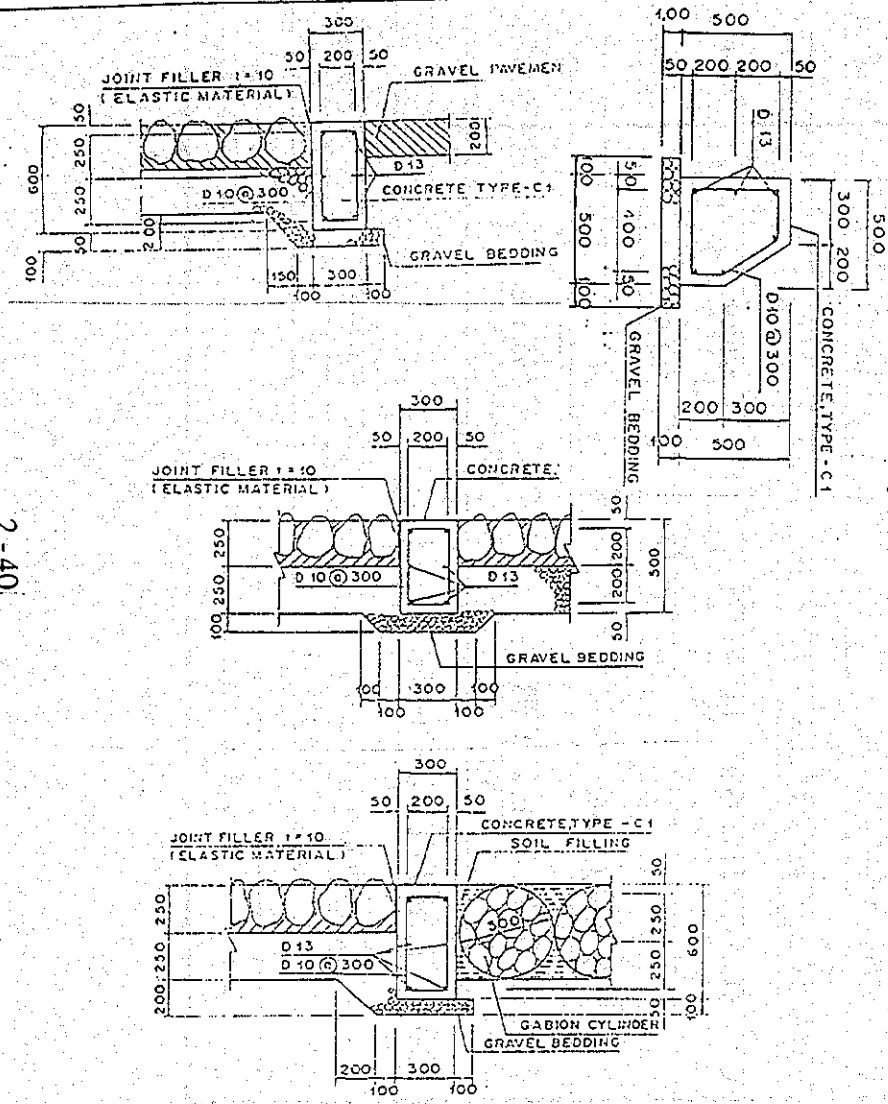


TYPE OF WORK :	CONCRETE , FORM
LOCATION :	



CALCULATION	RESULT
① TOP CONCRETE	
1) CONCRETE	
$V = 3.150\ m^3/15.0m \times 15.207 \times 2 = 6.387$	$6.387\ m^3$
2) FORM	
$A = 21.210\ m^2/15.0m \times 15.207 \times 2 = 43.005$	$43.005\ m^2$
② BASE CONCRETE	
1) CONCRETE	
$V = 4.725\ m^3/15.0m \times 15.0m \times 2 = 9.450\ m^3$	$9.450\ m^3$
2) FORM	
$A = 20.175\ m^2/15.0m \times 15.0m \times 2 = 40.350\ m^2$	$40.350\ m^2$
③ PARTITION WALL	
1) CONCRETE	
$V = 2.117\ m^3/place \times 1\ place = 2.117\ m^3$	$2.117\ m^3$
2) FORM	
$A = 14.116\ m^2/place \times 1\ place = 14.116\ m^2$	$14.116\ m^2$
④ END WALL	
1) CONCRETE	
$V = 2.541\ m^3/place \times 1\ place = 2.541$	$2.541\ m^3$
2) FORM	
$A = 8.470\ m^2/place \times 1\ place = 8.470$	$8.470\ m^2$
TOTAL CONCRETE	$20.495\ m^3$
TOTAL FORM	$106.941\ m^2$

TYPE OF WORK :	JOINT FILLER
LOCATION :	



CALCULATION	RESULT
① TOP CONCRETE	
A = 4.620 m²/15.0m x 15.207x2 = 9.368	9.368m²
② PARTITION WALL	
A = 3.529 m²/place x 1 place = 3.529	3.529 m²
③ END WALL	
A = 3.529 m²/ place x 1 place = 3.529	3.529m²
④ BASE CONCRETE.	
a = (0.3+0.6) x0.3÷2+ 0.3x0.6	
= 0.315 m²/ place	
A = 0.315 x 2 places = 0.630	0.630m²

TYPE OF WORK : REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)
LOCATION : WF.111L + 15.0 m ~ WF.111L + 90.0 m
:

CALCULATION			RESULT
STRUCTURAL EXCAVATION			
V = 180.390 m^3 / 15.0 m x 72.143	=	867.592	867.592 m^3
(R = 151.5)			
BACKFILL WITH SELECTED SOIL			
V = 20.640 m^3 / 15.0 m x 72.143	=	99.269	99.269 m^3
(R = 151.5)			
GRAVEL BEDDING			
1. FOR BASE CONCRETE			
V = 0.70 m^3 / 10.0 m x 69.286	=	4.850	4.850 m^3
(R = 145.5)			
2. FOR TOP CONCRETE			
V = 0.75 m^3 / 10.0 m x 75.640	=	5.673	5.673 m^3
(R = 158.35)			
3. FOR PARTITION WALL			
a = (0.40 + 0.60) x 0.10 / 2	=	0.050	
V' = 0.05 x (0.7 + 11.180 + 2.236)	=	0.706 m^3/ place	
V = 0.706 m^3 / place x 5 places	=	3.530	3.530 m^3
4. FOR STANDARD SECTION			
V = 51.876 m^3 / 15.0 m x 72.143	=	249.499	249.499 m^3
(R = 151.5)			
TOTAL	=	263.552	263.552 m^3
WET STONE MASONRY			
V = 51.656 m^3 / 15.0 m x 72.143	=	248.441	248.441 m^3
(R = 151.5)			
CEMENT MORTAR POINTING			
A = 174.636 m^2 / 15.0 m x 72.143	=	839.918	839.918 m^2
(R = 151.5)			

TYPE OF WORK : REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)
LOCATION : WF.111L + 15.0 m ~ WF.111L + 90.0 m
:

CALCULATION			RESULT
DEFORMED REINFORCING BAR			
1. BASE CONCRETE			
W = 0.1 tf / 10.0 m x 69.286		= 0.693	0.693 tf
(R = 145.5)			
2. TOP CONCRETE			
W = 0.094 tf / 10.0 m x 75.640		= 0.711	0.711 tf
3. PARTITION WALL			
W = 0.123 tf / place x 5 places		= 0.615	0.615 tf
4. END WALL			
W = 0.129 tf / place x 1 places		= 0.129	0.129 tf
	TOTAL	= 2.148	2.148 tf
CONCRETE, FORM			
1. BASE CONCRETE			
CONCRETE			
V = 2.20 m^3 / 10.0 m x 69.286		= 15.243	15.243 m^3
(R = 145.5)			
FORM			
A = 10.830 m^2 / 10.0 m x 69.286		= 75.037	75.037 m^2
2. TOP CONCRETE			
CONCRETE			
V = 1.80 m^3 / 10.0 m x 75.64		= 13.615	13.615 m^3
(R = 158.35)			
FORM			
A = 12.180 m^2 / 10.0 m x 75.64		= 92.130	92.130 m^2

TYPE OF WORK : REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)
LOCATION : WF.111L + 15.0 m ~ WF.111L + 90.0 m
:

CALCULATION			RESULT
3. PARTITION WALL			
CONCRETE			
V = 2.117 m^3 / place x 5 places	=	10.585	10.585 m^3
FORM			
A = 14.116 m^2 / place x 5 places	=	70.580	70.580 m^2
4. END WALL			
CONCRETE			
V = 2.541 m^3 / place x 1 places	=	2.541	2.541 m^3
FORM			
A = 8.470 m^2 / place x 1 places	=	8.470	8.470 m^2
TOTAL CONCRETE	=	41.984	41.984 m^3
TOTAL FORM	=	246.217	246.217 m^2
JOINT FILLER			
1. BASE CONCRETE			
A = 0.22 m^2 / 10.0 m x 69.286	=	1.524	1.524 m^2
(R =145.5)			
2. TOP CONCRETE			
A = 2.605 m^2 / 10.0 m x 75.640	=	19.704	19.704 m^2
(R = 158.35)			
3. PARTITION WALL			
A = 3.529 m^3 / place x 5 places	=	17.645	17.645 m^2
4. END WALL			
A = 3.529 m^3 / place x 1 places	=	3.529	3.529 m^2
TOTAL A	=	42.402	42.402 m^2

TYPE OF WORK : REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)
LOCATION : c
:

CALCULATION			RESULT
GABION MATTRESS t = 500 mm			
L_1 = 69.048 m (R =145 m)			
L_2 = 68.929 m (R = 144.75 m)			
V_1 = 69.048 x 0.5 x 3.0		= 103.572	
V_2 = 68.929 x 0.5 x 1.5		= 51.697	
	TOTAL V	= 155.269	155.269 m^3
RUBBLE STONE FILLING			
A = 1/2 x 1.0 x 0.5 x 2		= 0.500 m^2	
V = 0.500 x 69.762		= 34.881 m^3	34.881 m^3
(R = 146.5)			
GABION CYLINDER			
ø 500 (GALVANIZED AND COATED WITH PVC)			
V = $\pi/4$ x 0.50^2 x (3.00 + 11.18 + 1.00) x 6 x 2		= 35.767	35.767 m^3
SOIL FILLING			
V_1 = $\pi/4$ x 0.50^2 x (3.00 + 11.18 + 1.00) x 6 x 2		= 35.767	
V_2 = (3.00 + 11.18 + 1.00) x 3.00 x 0.50 x 2		= 45.540	
V = $V_2 - V_1$		= 9.773	9.773 m^3
WEEP HOLE			
PVC PIPE ø 50			
n = 9 / place x 5		= 45	
l = 45 x 0.80		= 36.000	36.000 m
FILTER CLOTH			
n = 45			
A = 0.640 m^2 / place x 45		= 28.800	28.800 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.115R + 15.0 ~ WF.117R + 32.0

CALCULATION			RESULT
SRTRUCTURAL EXCAVATION			
A_1 = 4.25 x 0.50 + 1.118 x 6.70 x 0.50	=	5.870 m^2	
A_2 = (0.30 + 0.725) x ½ x 0.85	=	0.436 m^2	
A	=	6.306 m^2	
V = 6.306 x (119.50 + 92.30) x ½	=	667.81	667.8 m^3
BACKFILL WITH SELECTED SOIL			
A = (0.30 + 0.725) x ½ x 0.85	=	0.436 m^2	
V = 0.436 x 92.30	=	40.24	40.24 m^3
CEMENT MORTAR POINTTING			
A_1 = 1.118 x 6.40 x 14.70	=	105.181 m^2/15.00 m	
A^1 = 105.181 m^2/15.00 m x 92.30	=	647.214	
A_2 = 3.95 x 14.70	=	58.065 m^2/15.00 m	
A^1 = 58.065 m^2/15.00 m x 119.50	=	462.585	
TOTAL (A_1 + A_2)	=	1109.799	1109.799 m^2
WET STONE MASONRY			
V_1 = 7.155 x 0.25 x 14.70	=	26.295 m^2/15.00 m	
V^1 = 26.295 m^2/15.00 m x 92.30	=	161.802	
V_2 = 3.95 x 0.25 x 14.70	=	14.516 m^2/15.00 m	
V^1 = 14.516 m^2/15.00 m x 119.50	=	115.644	
TOTAL (V_1 + V_2)	=	277.446	277.446 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.115R + 15.0 ~ WF.117R + 32.0

CALCULATION			RESULT
GRAVEL BEDDING			
V_1 = 1.118 x 6.40 x 0.25 x 14.70	=	26.295 m^2/15.00 m	
V^1 = 26.295 m^2/15.00 m x 92.30	=	161.802	
V_2 = 3.95 x 0.25 x 14.70	=	14.516 m^2/15.00 m	
V^1 = 14.516 m^2/15.00 m x 119.50	=	115.644	
TOTAL (V_1 + V_2)	=	277.446	277.446 m^2
WEEP HOLE			
n = 12 places / 15.00 m			
• PVC pipe Ø 50 (L = 0.80 m / pipe)			
n_1 = 12 places / 15.00 m x 92.30	=	74 places	
L = 74 places x 0.80	=	59.200	
• FILTER CLOTH			
A = 0.856 m^2/place x 74 places	=	63.344	63.344 m^2
BASE CONCRETE			
• CONCRETE (TYPE – C1)			
V = 2.20 m^3/10.00 m x 92.30	=	20.306	20.306 m^3
• GRAVEL BEDDING			
V = 0.70 m^3/10.00 m x 92.30	=	6.461	6.461 m^3
• FORM (H < 4.0 m)			
A = 10.83 m^2/10.00 m x 92.30	=	99.961	99.961 m^2
• REINFORCING BAR			
W = 0.10 tf / 10.00 m x 92.30	=	0.923	0.923 tf
• JOINT FILTER			
A = 0.22 m^2/10.00 x 92.30	=	2.031	2.031 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.115R + 15.0 ~ WF.117R + 32.0

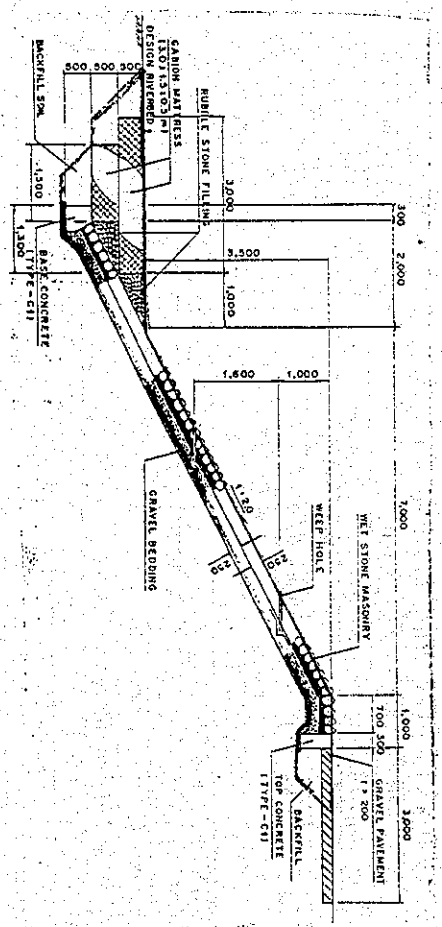
CALCULATION			RESULT
TOP CONCRETE			
• CONCRETE (TYPE – C1)			
V = (0.60 + 0.75) x ½ x 0.30 x 15.00	=	3.038 m^3/15.00 m	
V^1 = 3.038 m^3/15.00 m x 92.30	=	18.694	18.694 m^3
• GRAVEL BEDDING			
V = {(0.40 x 0.10) + ½ x 0.30 x 0.15} x 15.00	=	0.938 m^3/15.00 m	
V^1 = 0.938 m^3/15.00 m x 92.30	=	5.772	5.772 m^3
• FORM (H < 4.0 m)			
A = (0.60 + 0.75) x 15.00 + (0.60 + 0.75) x ½ x 0.30	=	20.453 m^2/15.00m	
A^1 = 20.453 m^2/15.00 m x 92.30	=	125.854	125.854 m^2
• REINFORCING BAR			
D 13 (W = 1.04 kgf / m)			
n_1 = 6 Bars			
W_1 = (15.00 - 0.05 x 2) x 6 Bars x 1.04	=	92.976	
D 10 (W = 0.617 kgf / m)			
n_2 = (15.00 - 0.05 x 2) : 0.30 + 1	=	51 Bars	
L_2 = 0.20 + 0.50 + 0.619 + 0.224 + 15 x 0.01	=	1.693 m / Bar	
W_2 = 1.693 x 51 x 0.617	=	53.274	
W = 146.250 kgf	=	0.146 tf / 15.00 m	
W^1 = 0.146 tf / 15.00 m x 92.30	=	0.898	0.898 tf
• JOINT FILTER			
n = 92.30 : 15.00	≅	6 places	
A_1 = (0.60 + 0.75) x ½ x 0.30 x 6 places	=	1.215	
A_2 = (0.25 x 14.70) / 15.00 m x 92.30	=	22.614	
TOTAL	=	23.829	23.829 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.115R + 15.0 ~ WF.117R + 32.0

CALCULATION				RESULT
PARTITION WALL				
• CONCRETE (TYPE – C1)				
V = (0.30 + 0.50 x 3.95) +(7.115 x 0.50 x 0.30)		=	1.660 m^3/place	
V^1 = 1.660 m^3/place x 7 place		=	11.620	11.620 m^3
• GRAVEL BEDDING				
V = (0.50 + 0.70) x ½ x 0.10 x (3.95 + 7.115)		=	0.664 m^3/place	
V^1 = 0.664 m^3/place x 7 place		=	4.648	4.648 m^3
• FORM (H < 4.0 m)				
A = (3.95 + 7.115) x 0.50 x 2		=	11.065 m^2/place	
A^1 = 11.065 m^2/place x 7 places		=	77.455	77.455 m^2
• REINFORCING BAR				
D 13 (W = 1.04 kgf / m)				
n_1 = 6 Bars				
W_1 = (3.95 + 7.115 – 0.05 x 4) x 6 Bars x 1.04		=	67.798	
D 10 (W = 0.617 kgf / m)				
n_2 = (3.95 + 7.115 – 0.05 x 4) : 0.30 + 1		=	37 Bars	
L_2 = 0.20 x 2 + 0.50 x 2 +15 x 0.01		=	1.550 m / Bar	
W_2 = 37 Bars x 1.55 x 0.617		=	35.385	
	W = 103.183 kgf	=	0.10 tf / place	
W^1 = 0.103 tf / place x 7 place		=	0.721	0.721 tf
• JOINT FILTER				
A = (3.95 + 7.115) x 0.25		=	2.766 m^2/place	
A^1 = 2.766 m^2/place x 7 place		=	19.362	
	TOTAL	=	19.362	19.362 m^2

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	STRUCTURAL EXCAVATION
LOCATION :	WF. 137R+60.775 ~ WF. 139R+61.545



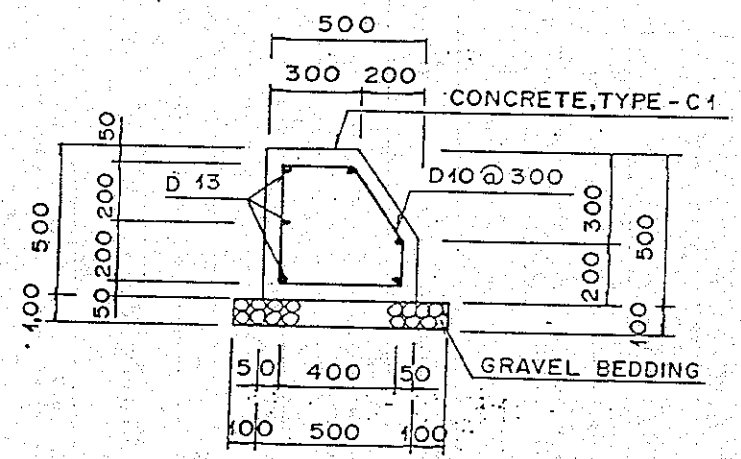
CALCULATION	RESULT
$A_1 = (1.10 + 2.10) \times 1/2 \times 0.50 = 0.80\ m^2$	
$A_2 = (2.00 + 5.00) \times 1/2 \times 1.00 = 3.50\ m^2$	
$A_3 = 1.118 \times 9.00 \times 0.50 + 0.70 \times 0.50 = 5.38\ m^2$	
$A_4 = (0.80 + 1.50) \times 1/2 \times 0.70 = 0.81\ m^2$	
$A = 10.49\ m^2$	
$V = 10.49 \times 135.00 = 1416.15$	$1416.2\ m^3$

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0
(WET STONE MASONRY TYPE)
LOCATION : WF.137R + 60.775 ~ WF.139R + 61.545
:

CALCULATION		RESULT
BACKFILL WITH SELECTED SOIL		
A_1 = (0.50 + 1.00) x ½ x 0.50	= 0.380	
A_2 = (0.50 + 1.50) x ½ x 1.00 – $(0.50)^2$	= 0.750	
A_3 = (0.50 + 1.00) x ½ x 0.50	= 0.380	
TOTAL A	= 1.510 m^2	
V = 1.51 x 135.00	= 203.850	203.900 m^3
GRAVEL BEDDING		
A_1 = 1.118 x 9.00 x14.70 / 15.0 m	= 147.911 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
V = (147.911 + 10.290)/ 15.0 m x 135.00 x 0.25	= 355.952	355.952 m^3
WET STONE MASONRY		
A_1 = 1.118 x 9.00 x14.70 / 15.0 m	= 147.911 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
V = (147.911 + 10.290)/ 15.0 m x 135.00 x 0.25	= 355.952	355.952 m^3
CEMENT MORTAR POINTING		
A_1 = 1.118 x 7.00 x14.70 / 15.0 m	= 115.042 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
A = (115.042 + 10.290)/ 15.0 m x 135.00	= 1127.988	1127.988 m^2
WEEP HOLE		
PVC PIPE ø 50		
n = 12 places / 15.0 m		
L = 12 places / 15.0 m x 135.0 x 0.80	= 86.400	86.400 m
FILTER CLOTH		
A = 0.856 x 12 places/ 15.0 m x 135.0	= 92.448	92.448 m^2

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

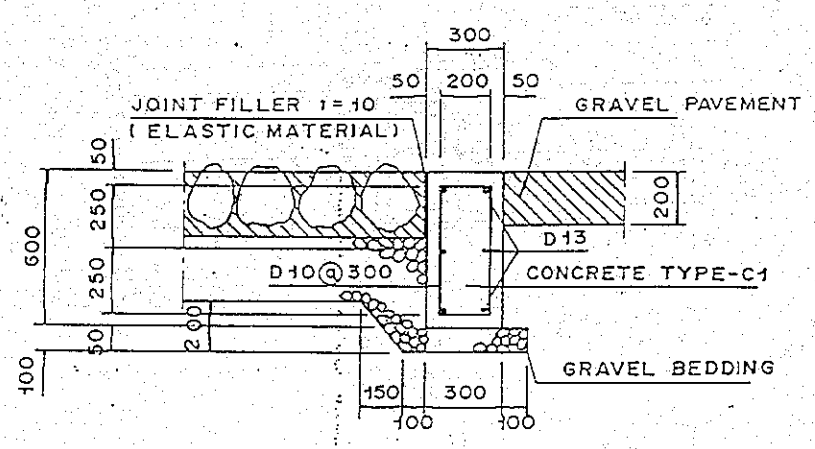
TYPE OF WORK :	BASE CONCRETE
LOCATION :	WF.137R+60.775 ~ WF.139R+61.545



CALCULATION	RESULT
• CONCRETE (TYPE-C1)	
V = 2.20 m³/10.00m x 129.944 = 28.588	28.588 m³
(R=147.75)	
• GRAVEL BEDDING	
V = 0.70 m³/10.00m x 129.944 = 9.096	9.096 m³
• FORM (H<4.0m)	
A = 10.83 m²/10.00m x 129.944 = 140.729	140.729 m²
• REINFORCING BAR	
W = 0.10 tf/10.00m x 129.944 = 1.299	1.299 tf
• JOINT FILLER	
A = 0.22 m²/10.00m x 129.944 = 2.859	2.859 m²

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

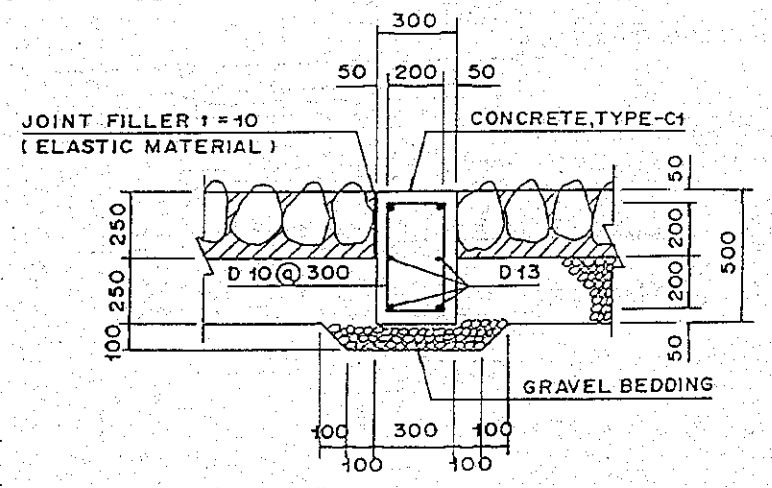
TYPE OF WORK :	TOP CONCRETE
LOCATION :	WF. 137R+60.775 ~ WF. 139R+61.545



CALCULATION	RESULT
·CONCRETE (TYPE-C1)	
$V = 1.80^{m^3}/10.00m \times 138.826 = 24.989$	$24.989\ m^3$
(R=157.85)	
·GRAVEL BEDDING	
$V = 0.75^{m^3}/10.00m \times 138.826 = 10.412$	$10.412\ m^3$
·FORM (H<4.0m)	
$A = 12.18^{m^2}/10.00m \times 138.826 = 169.090$	$169.090\ m^2$
·REINFORCING BAR	
$W = 0.094^{tf}/10.00m \times 138.826 = 1.305$	$1.305\ tf$
·JOINT FILLER	
$A = 2.605^{m^2}/10.00m \times 138.826 = 36.164$	$36.164\ m^2$

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

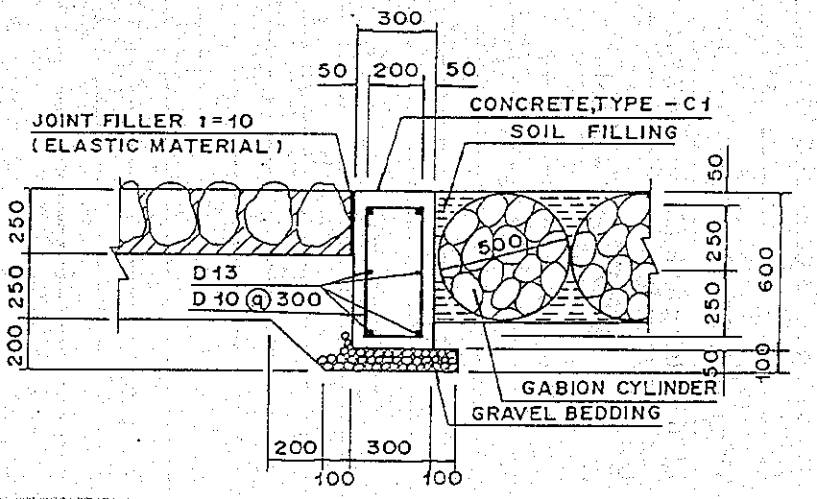
TYPE OF WORK :	PARTITION WALL
LOCATION :	WF. 137R+60.775 ~ WF. 139R+61.545



CALCULATION	RESULT
·CONCRETE (TYPE-C1)	
V = 1.605 m^3/place x 8places = 12.840	12.840 m^3
·GRAVEL BEDDING	
V = 0.639 m^3/place x 8places = 5.112	5.112 m^3
· FORM (H<4.0m)	
A = 10.703 m^2/place x 8places = 85.624	85.624 m^2
·REINFORCING BAR	
W = 0.097 tf/place x 8places = 0.776	0.776 tf
·JOINT FILLER	
A = 2.691 m^2/place x 8places = 21.528	21.528 m^2

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	END WALL
LOCATION :	WF.137R+60.775 ~ WF.139R+61.545



CALCULATION	RESULT
· CONCRETE (TYPE - C1)	
V = 1.927 m^3/place × 2 places = 3.854	3.854 m^3
· GRAVEL BEDDING	
V = 0.852 m^3/place × 2places = 1.704	1.704 m^3
· FORM (H<4.0m)	
A = 12.847 m^2/place × 2places = 25.694	25.694 m^2
· REINFORCING BAR	
W = 0.102 tf/place × 2 places = 0.204	0.204 tf
· JOINT FILLER	
A = 2.691 m^2/place × 2places = 5.382	5.382 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0
(WET STONE MASONRY TYPE)
LOCATION : WF.137R + 60.775 ~ WF.139R + 61.545
:

CALCULATION			RESULT
GABION MATTRESS			
t = 500 mm			
L_1 = 129.724 m (R = 147.5) L_2 = 129.504 m (R = 147.25)			
V_1 = 0.50 x 3.0 x 129.724	=	194.586	
V_2 = 0.50 x 1.5 x 129.504	=	97.128	
TOTAL V	=	291.714	291.714 m^3
RUBBLE STONE FILLING			
A = ½ x 1.00 x 0.50 x 2	=	0.500 m^2	
V = 0.50 x 131.043 (R = 149)	=	65.522	65.522 m^3
GABION CYLINDER ø 500 (GALVANIZED AND COATED WITH PVC)			
V = $\pi/4$ x 0.50^2 x (3.00 + 7.826 + 1.00) x 6.00 x 2	=	27.864	27.864 m^3
SOIL FILLING			
V_1 = (3.00 + 7.826 + 1.00) x 3.00 x 0.50 x 2	=	35.478	
V_2 = -$\pi/4$ x 0.50^2 x (3.00 + 7.826 + 1.00) x 6.00 x 2	=	-27.864	
TOTAL V	=	7.614	7.614 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

CALCULATION				RESULT
STRUCTURAL EXCAVATION				
A_1 = (1.10 + 2.60) x ½ x 0.60		=	1.110 m^2	
A_2 = (3.10 + 6.10) x ½ x 1.00		=	4.600 m^2	
A_3 = 1.118 x 10.00 x 0.50		=	5.590 m^2	
A_4 = (1.50 + 2.70) x ½ x 1.70		=	3.570 m^2	
	A	=	14.870 m^2	
V = 14.870 x 90.00		=	1338.30	1338.3 m^3
BACKFILL WITH SELECTED SOIL				
A_1 = (0.60 + 1.10) x ½ x 0.50		=	0.425 m^2	
A_2 = (0.50 + 1.50) x ½ x 1.00 - 0.50^2		=	0.750 m^2	
A_3 = (0.50 + 2.20) x ½ x 1.60		=	2.160 m^2	
	A	=	3.335 m^2	
V = 3.335 x 90.00		=	300.150	300.2 m^3
GRAVEL BEDDING				
V_1 = (1.118 x 12.00 x 14.70 x 0.25)/ 15.00 m x 60.00		=	197.215	
V_2 = 1.118 x (12.00 + 9.00) x ½ x 14.70 x 0.25 x 2		=	86.282	
	TOTAL	=	283.497	283.497 m^3
WET STONE MASONRY				
V_1 = (1.118 x 12.00 x 14.70 x 0.25)/ 15.00 m x 60.00		=	197.215	
V_2 = 1.118 x (12.00 + 9.00) x ½ x 14.70 x 0.25 x 2		=	86.282	
	TOTAL	=	283.497	283.497 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

CALCULATION			RESULT
CEMENT MORTAR POINTTING			
V_1 = {(1.118 x (10.00) – 0.2} x 14.70 / 15.00 m x 60.00	=	645.036	
V_2 = {1.118 x (10.00 + 7.00) x ½ - 0.2)} x 14.70 x 2	=	273.214	
TOTAL	=	918.250	918.250 m^3
RUBBLE STONE FILLING			
A = ½ x 0.50 x 1.00 x 2	=	0.500 m^2	
V = 0.50 x 90.00	=	45.000	45.000 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1: 2.0 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

CALCULATION			RESULT
GABION MATTRESS			
A = 3.00 x 0.50 + 1.50 x 0.50	=	2.250 m^2	
V = 2.25 x 90.00	=	202.500	202.500 m^3
GABION CYLINDER			
Ø 500			
V = π x 0.50^2 x (3.00 + 7.826 + 1.00)	=	2.322 m^3/place	
V^1 = 2.322 m^3/place x 6 place x 2	=	27.864	27.864 m^3
• SOIL FILLING			
V = (3.00 + 7.826 + 1.00) x 0.50 x 3.00 x 2	=	7.614	7.614 m^3
WEEP HOLE			
n = 26 places / 15.00 m			
• PVC pipe Ø 50 (L = 0.80 m / pipe)			
L = 0.80 x 26 places / 15.00 m x 90.00	=	124.800	124.800 m
• FILTER CLOTH			
A = 0.856 m^2/places x 104 places	=	89.024	89.024 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1: 2.0 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

CALCULATION			RESULT
BASE CONCRETE			
• CONCRETE (TYPE – C1)			
V = 2.20 m^3/10.00 m x 90.00	=	19.800	19.800 m^3
• GRAVEL BEDDING			
V = 0.70 m^3/10.00 m x 90.00	=	6.300	6.300 m^3
• FORM (H < 4.0 m)			
A = 10.83 m^2/10.00 m x 90.00	=	97.470	97.470 m^2
• REINFORCING BAR			
W = 0.10 tf / 10.00 m x 90.00	=	0.900	0.900 tf
• JOINT FILTER			
A = 0.22 m^2/10.00 m x 90.00	=	1.980	1.980 m^2
PARTITION WALL (V)			
• CONCRETE (TYPE – C1)			
V = (13.416 x 0.50 x 0.30)	=	2.012 m^3/place	
V^1 = 2.012 m^3/place x 5 places	=	10.060	10.060 m^3
• GRAVEL BEDDING			
V = (0.50 + 0.70) x ½ x 0.10 x 13.416	=	0.805 m^3/place	
V^1 = 0.805 m^3/place x 5 places	=	4.025	4.025 m^3
• FORM (H < 4.0 m)			
A = (13.416 x 0.50 x 2)	=	13.416 m^3/place	
A^1 = 13.416 m^3/place x 5 places	=	67.080	67.080 m^2
• REINFORCING BAR			
D 13 (W = 1.04 kgf / m)			
n_1 = 6 Bars			
W_1 = (13.416 - 0.05 x 2) x 6 Bars x 1.04	=	83.092	
D 10 (W = 0.617 kgf / m)			
n_2 = (13.416 - 0.05 x 2 + 15 x 0.01)	=	46 Bars	
L = 0.20 x 2 + 0.40 x 2 + 15 x 0.01	=	1.350 m / Bar	
W_1 = 1.35 x 46 x 0.617	=	38.316	
W = 121.408 kgf	=	0.121 tf / place	
W^1 = 0.121 tf / place x 5 places	=	0.605	0.605 tf
• JOINT FILTER			
A = (13.416 x 0.25) x 5 places	=	16.770	16.770 m^2

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1: 20 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

CALCULATION	RESULT
PARTITION WALL (H)	
• CONCRETE (TYPE – C1)	
V = $\{(0.470+0.60)x1/2x0.30+1/2x0.2)x0.25\}x14.70$	
= 2.745 m³/15.00 m	
V = 2.745 m³/15.00 m x 90.00 = 16.470	14.670 m³
• GRAVEL BEDDING	
V = $\{1/2x0.275x0.138+0.30x0.10+(0.10+0.325)x1/2x0.50\}$ x 14.70 = 2.282	
V' = 2.282 m³/15.00 m x 90.00 = 13.692	13.692 m²
• FORM (H < 4.0 m)	
A = $\{0.65+0.47+0.25\}x17.70$ = 19.404 m³/15.00 m	
A' = 19.404 m²/15.00 m x 90.00 = 116.424	116.424 m²
• REINFORCING BAR	
D 13 (W = 1.04 kgf / m)	
n_1 = 7 Bars	
W_1 = (14.70 - 0.05 x 2) x 7 Bars x 1.04 = 106.228	
D 10 (W = 0.617 kgf / m)	
n_2 = (14.70 - 0.05 x 2) : 0.30 + 1 = 50 Bars	
L = 0.20 + 0.50 + 0.42 + 0.11 + 15 x 0.01 = 1.580 m / Bar	
W_2 = 1.58 x 50 x 0.617 = 48.743	
W = 155.031 kgf = 0.155 tf / 15.00m	
W' = 0.155 tf / 15.00 m x 90.00 = 0.930	0.930 tf
• JOINT FILTER	
A_1 = {(0.47 + 0.60) x ½ x 0.30 + ½ x 0.21 x 0.25} x 7 places	
= 1.307	
A_2 = 1.118 x 0.25 x 14.70 x 7 places = 28.761	
TOTAL = 30.068	30.068 m²

TYPE OF WORK : REVETMENT FOR SIDE SLOP OF 1: 20 (WET STONE MASONRY)
LOCATION : WF.153R – 5.0 ~ WF.155R – 5.0

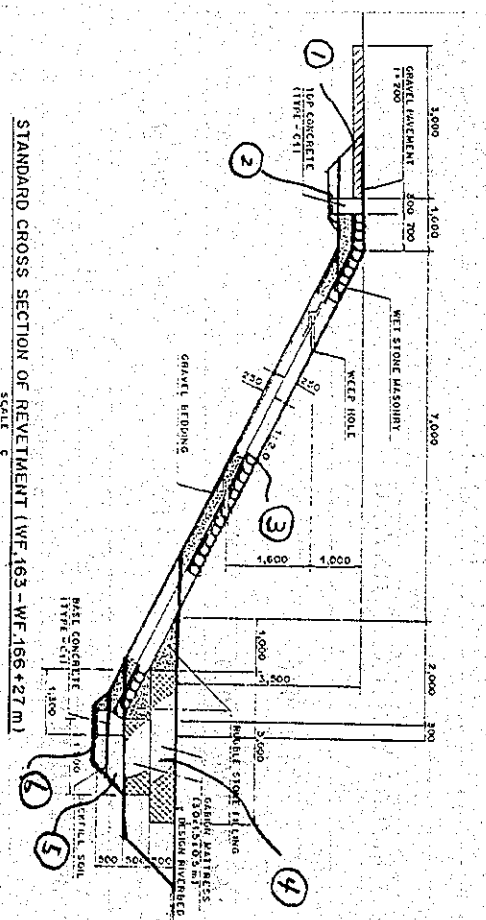
CALCULATION			RESULT
END WALL			
• CONCRETE (TYPE – C1)			
V = (13.416 x 0.60 x 0.30)	=	2.415 m^3/place	
V^1 = 2.415 m^3/place x 2 place	=	4.830	4.830 m^3
• GRAVEL BEDDING			
V = {(0.40 x 0.10) + (0.10 + 0.30) x ½ x 0.20} x 13.416	=	1.073 m^3/place	
V^1 = 1.037 m^3/place x 2 place	=	2.146	2.146 m^3
• FORM (H < 4.0 m)			
A = 13.416 x 0.60 x 2	=	16.099 m^2/place	
A^1 = 16.099 m^2/10.00 m x 2	=	32.198	32.198 m^2
• REINFORCING BAR			
D 13 (W = 1.04 kgf / m)			
n_1 = 6 Bars			
W_1 = (13.416 - 0.05 x 2) x 6 Bars x 1.04	=	83.092	
D 10 (W = 0.617 kgf / m)			
n_2 = (13.416 - 0.05 x 2) : 0.30 + 1	=	46 Bars	
L = 0.20 + 0.50 + 0.42 + 15 x 0.01	=	1.550 m / Bar	
W_2 = 1.55 x 46 x 0.617	=	43.992	
W = 127.084 kgf	=	0.127 tf / place	
W^1 = 0.155 tf /place x 2 place	=	0.254	0.254 tf
• JOINT FILTER			
A = (13.416 x 0.25) x 2 places	=	6.708	6.708 m^2

TYPE OF WORK : EARTH RETAINING WALL (WET STONE MASONRY)
LOCATION : WF.153R – 5.00 ~ WF.155R – 5.00

CALCULATION			RESULT
WET STONE MASONRY			
A_1 = (0.80 + 0.50) x ½ x 1.00	=	0.650 m^2	
A_2 = (1.00 + 0.50) x ½ x 1.600	=	1.200 m^2	
V_1 = (0.65 + 1.20) x ½ x 15.00	=	13.875	
V_2 = 1.20 x 60.00	=	72.000	
V_3 = (1.20 + 0.65) x ½ x 15.00	=	13.875	
TOTAL ($V_1 + V_2 + V_3$)	=	99.750	99.750 m^3
GRAVEL BEDDING			
A_1 = 0.10 x 1.00	=	0.100 m^2	
A_2 = 0.10 x 1.20	=	0.12 m^2	
V_1 = (0.10 + 0.12) x ½ x 15.00 x 2	=	3.300	
V_2 = 0.12 x 60.00	=	7.200	
TOTAL ($V_1 + V_2$)	=	10.500	10.500 m^3
CEMENT MORTAR POINTING			
A_1 = 0.50 x 90.00	=	45.000	
A_2 = 0.90 x 60.00	=	54.000	
TOTAL	=	99.000	99.000 m^2
JOINT FILTER			
A = (0.50 + 1.00) x ½ x 1.60 x 5 places	=	6.000	6.000 m^2

REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	STRUCTURAL EXCAVATION
LOCATION :	WF. 163L+1.5m ~ WF. 166L+32.0m

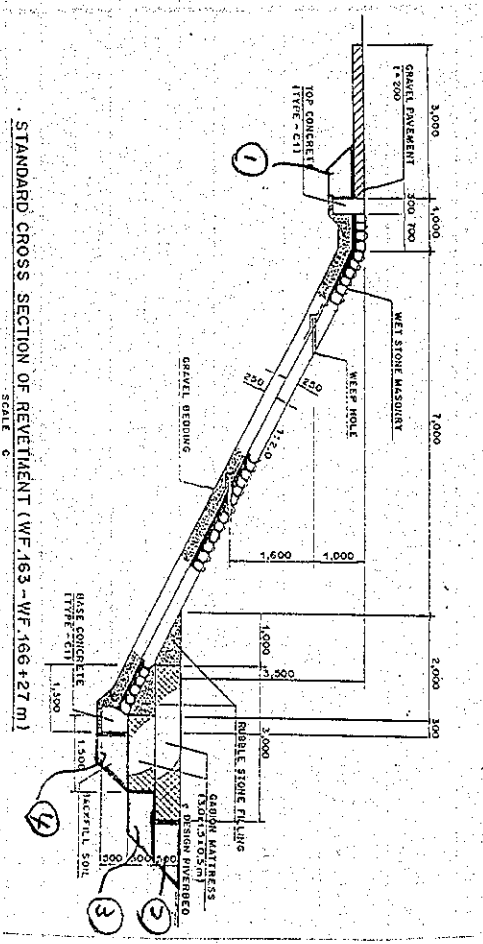


STANDARD CROSS SECTION OF REVETMENT (WF.163 ~ WF.166+27m)
SCALE

CALCULATION		RESULT
① (2.2 + 2.75) × 0.5 ÷ 2	= 1.238 m²	
② (1.2 + 0.9) × 0.3 ÷ 2	= 0.315 m²	
③ 1.0 × 3.0	= 3.000 m²	
④ (6.4 + 3.4) × 1.0 ÷ 2	= 4.900 m²	
⑤ (2.6 + 1.7) × 0.3 ÷ 2	= 0.645 m²	
⑥ (1.7 + 1.15) × 0.3 ÷ 2	= 0.428 m²	
TOTAL = ① + ② + ③ + ④ + ⑤ + ⑥	= 10.826 m²	
V = 10.826 × 145.87 m (R = 142.15)	= 1578.889 m³	1578.889 m³

REVETMENT FOR SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	BACKFILL WITH SELECTED SOIL
LOCATION :	WF.163L+1.5m ~ WF.166L+32.0m



STANDARD CROSS SECTION OF REVETMENT (WF.163~WF.166+27m)
SCALE 1:100

CALCULATION		RESULT
① (1.0 + 0.6) × 0.5 ÷ 2	= 0.400 m²	
② (1.15 + 0.7) × 0.5 ÷ 2	= 0.463 m²	
③ (1.25 + 0.8) × 0.5 ÷ 2	= 0.513 m²	
TOTAL = ① + ② + ③	= 1.376 m²	
V = 1.376 × 145.87 m (R = 142.15m)	= 200.717 m³	200.717 m³

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.163L + 1.50 m ~ WF.166L + 32.0

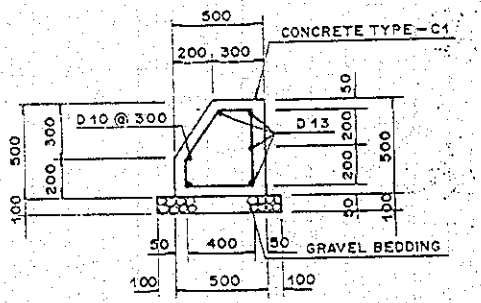
CALCULATION		RESULT
GRAVEL BEDDING		
A_1 = 1.118 x 9.0 m x 14.70 / 15.0 m	= 147.911 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
V = (147.911 + 10.29) / 15.0 x 145.87 x 0.25	= 384.613	384.613 m^3
WET STONE MASONRY		
A_1 = 1.118 x 9.0 m x 14.70 / 15.0 m	= 147.911 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
V = (147.911 + 10.29) / 15.0 x 145.87 x 0.25	= 384.613	384.613 m^3
CEMENT MORTAR POINTING		
A_1 = 1.118 x 7.0 m x 14.70 / 15.0 m	= 115.042 m^2/ 15.0 m	
A_2 = 0.70 x 14.70 / 15.0 m	= 10.290 m^2/ 15.0 m	
V = (115.042 + 10.29) / 15.0 x 145.87	= 1218.812	1218.812 m^3
WEEP HOLE		
PVC PIPE ø 50 (L = 0.80 m/pipe)		
n = 12 places / 15.0 m		
L = 12 places / 15.0 m x 145.87 x 0.80	= 93.357	93.357 m
FILTER CLOTH		
A = 0.856 x 12 places / 15.0 m x 145.87	= 99.892	99.892 m^2
GABION MATTRESS		
t = 500 mm		
L_1 = 141.820 m L_2 = 141.600 m		
(R = 137.5) (R = 137.25)		
V_1 = 0.50 x 3.0 x 141.820	= 212.730	
V_2 = 0.50 x 3.0 x 137.250	= 205.875	
TOTAL V	= 418.605	418.605 m^3

TYPE OF WORK : REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY)
LOCATION : WF.163L + 1.50 m ~ WF.166L + 32.0

CALCULATION			RESULT
RUBBLE STONE FILLING			
A = ½ x 1.00 x 0.50 x 2	=	0.500 m^2	
V = 0.50 x 143.120	=	71.560	71.560 m^3
(R = 139)			
GABION CYLINDER ø 500 (GALVANIZED AND COATED WITH PVC)			
V = $\pi/4$ x 0.50^2 x (4.00 + 7.826 + 1.00) x 6.00 x 2	=	30.221	30.221 m^3
SOIL FILLING			
V_1 = (4.00 + 7.826 + 1.00) x 3.00 x 0.50 x 2	=	38.478	
V_2 = -$\pi/4$ x 0.50^2 x (4.00 + 7.826 + 1.00) x 6.00 x 2	=	-30.221	
TOTAL V	=	8.267	8.267 m^3

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	BASE CONCRETE.
LOCATION :	WF. 163L + 1.5m ~ WF. 166 + 32.0m

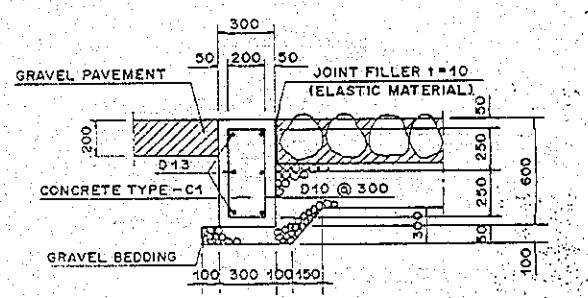


BASE CONCRETE
SCALE D

CALCULATION		RESULT
• CONCRETE (TYPE - C1)		
V = 2.20 m³/10.0m x 142.25	= 31.295	31.295 m³
(R = 138)		
• GRAVEL BEDDING		
V = 0.70 m³/10.0m x 142.25	= 9.958	9.958 m³
• FORM (H < 4.0 m)		
A = 10.83 m³/10.0m x 142.25	= 150.057	150.057 m²
• REINFORCING BAR		
W = 0.10 tf/100m x 142.25	= 1.423	1.423 tf
• JOINT FILLER		
A = 0.22 m²/10.0m x 142.25	= 3.130	3.130 m²

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	TOP CONCRETE
LOCATION :	WF.168L + 1.5m ~ WF.166L + 32.0m

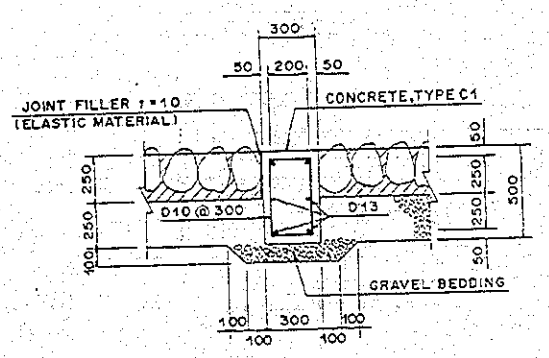


TOP CONCRETE
SCALE D

CALCULATION	RESULT
• CONCRETE (TYPE-C1)	
V = 1.80 m³/10.0m x 150.83 m = 27.149	27.149 m³
(R = 147.85)	
• GRAVEL BEDDING	
V = 0.75 m³/10.0m x 150.83 m = 11.312	11.312 m³
• FORM (H < 4.0m)	
A = 12.18 m²/10.0m x 150.83m = 183.711	183.711 m²
• REINFORCING BAR	
W = 0.094 tf/10.0m x 150.83 m = 1.418	1.418 tf
• JOINT FILLER	
A = 2.605 m²/10.0m x 150.83 m = 39.291	39.291 m²

REVETMENT FOR SIDE SLOPE OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	PARTITION WALL
LOCATION :	WF.163L+1.5m ~ WF.166L+32.0m

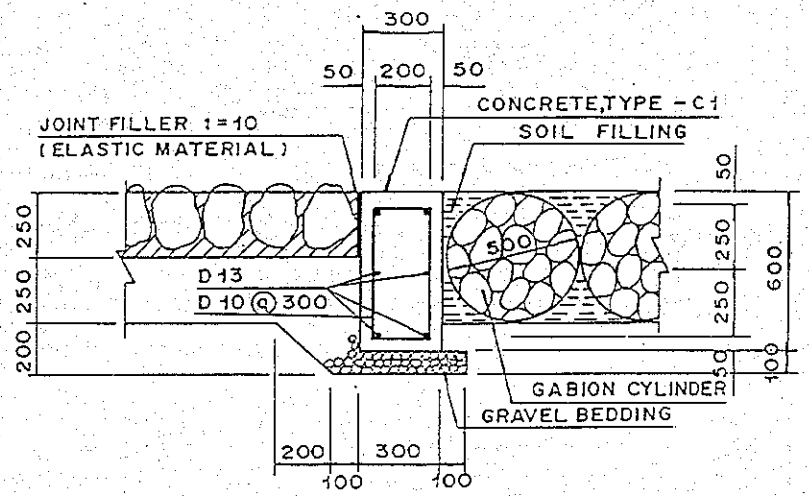


PARTITION WALL
SCALE 0

CALCULATION		RESULT
· CONCRETE (TYPE - C1)		
V = 1.605 m^3/place x 9 places	= 14.445	14.445 m^3
· GRAVEL BEDDING		
V = 0.639 m^3/place x 9 places	= 5.751	5.751 m^3
· FORM (H < 4.0m)		
A = 10.703 m^2/place x 9 places	= 96.327	96.327 m^2
· REINFORCING BAR		
W = 0.097 tf/place x 9 places	= 0.873	0.873 tf
· JOINT FILLER		
A = 2.691 m^2/place x 9 places	= 24.219	24.219 m^2

REVETMENT FOR SIDE SLOP OF 1:2.0 (WET STONE MASONRY TYPE)

TYPE OF WORK :	END WALL
LOCATION :	WF.163L +1.5m ~ WF.16DL +32.0m



CALCULATION	RESULT
· CONCRETE (TYPE - C1)	
V = 1.927 m^3/place × 2 places = 3.854	3.854 m^3
· GRAVEL BEDDING	
V = 0.852 m^3/place × 2places = 1.704	1.704 m^3
· FORM (H<4.0m)	
A = 12.847 m^2/place × 2places = 25.694	25.694 m^2
· REINFORCING BAR	
W = 0.102 tf/place × 2 places = 0.204	0.204 tf
· JOINT FILLER	
A = 2.691 m^2/place × 2places = 5.382	5.382 m^2

TYPE OF WORK :		CALCULATION	RESULT
LOCATION :		TOTAL	
		· CONCRETE (TYPE C-1)	76.743 m^3
		· GRAVEL BEDDING	28.725 m^3
		· FORM (H<4.0m)	455.789 m^2
		· REINFORCING BAR	3.918 tf
		· JOINT FILLER	65.022 m^2