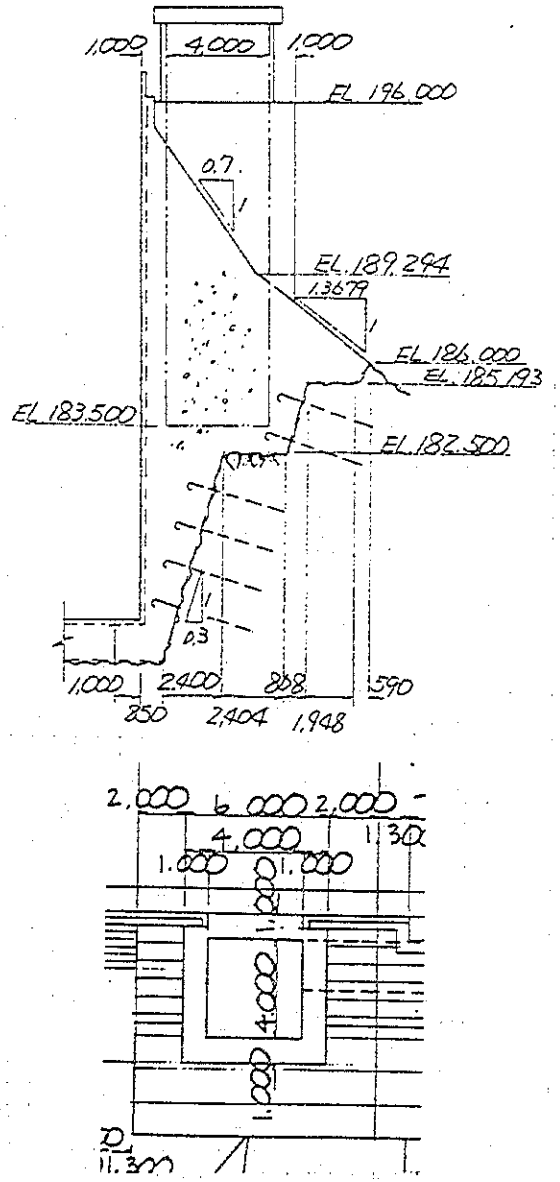
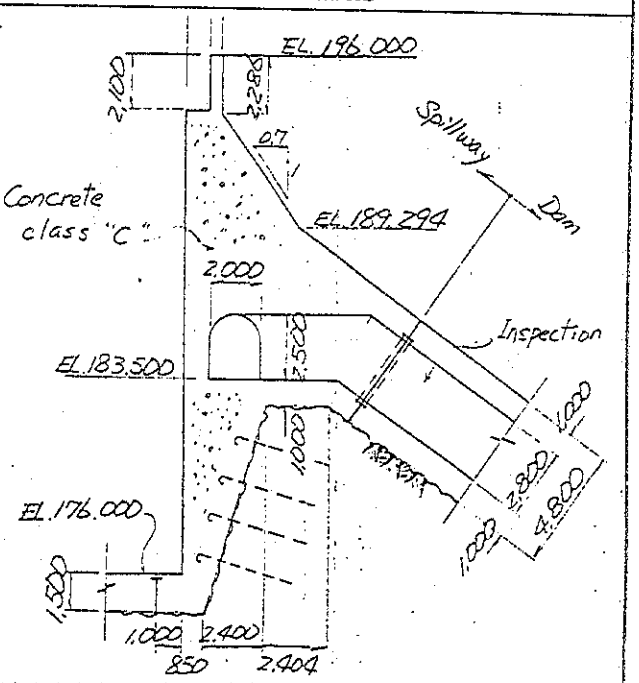
Working Division: Concrete, Dam Abutment and Guide Wall (9)

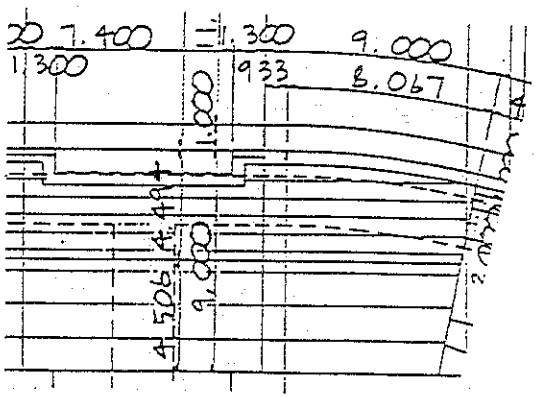
Description	Calculation Details	Unit	Quantity	Remarks
SCR-1	Total			
	216.63 + 335.96 + 289.82 + 66.38			
	= 908.79 m³			
SCR-2	{0.2×0.9 + 0.5×1.2 + (0.5 + 4.494)×½			
	× 5.706 + (4.494 + 9.00)×½ × 3.294			
	+ (9.00 + 8.41)×½ × 0.807 + (6.462			
	+ 5.654)×½ × 2.693 + (3.25 + 0.85)			
	×½ × 8.0 + 1.5 × 1.0}			
	= 78.49 m²			
	⊕ 78.49 × 10.0 = 784.9 m³			
	5.5 × 1.0 + (5.5 + 1.506)×½ × 5.706			
	+ 1.506 × 1.10 ×½			
	= 26.32 m²			
	⊕ 26.32 × 6.0 = 157.90 m³			
	⊖ 4.0 × 4.0 × 12.5 + (2.0 × 1.5 + ¼ × π × 2.0²			
	×½)×3.0			
	= 213.71 m³			
	784.9 + 157.9 − 213.71 = 729.09	m³		



Working Division: Concrete Dam Abutment and Guide Wall (10)

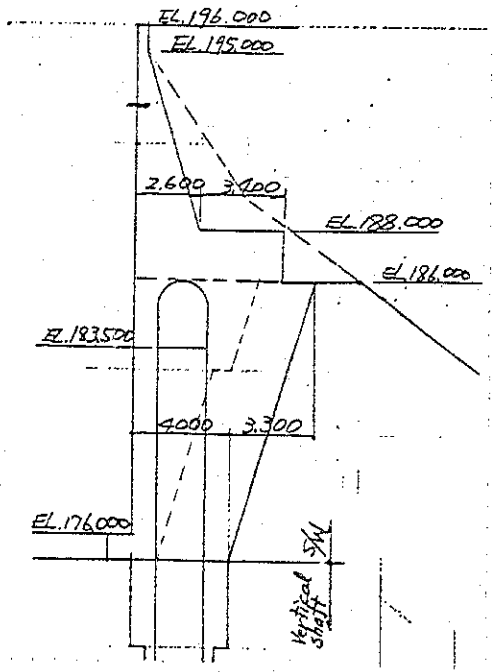
Description	Calculation Details	Unit	Quantity	Remarks
SCR-3	$\{0.5\times1.0+(0.5+4.494)\times\frac{1}{2}\times5.706$			
	$+(4.494+9.00)\times\frac{1}{2}\times3.294+(9.00+$			
	$6.441)\times\frac{1}{2}\times3.5+0.787\times0.359\times\frac{1}{2}$			
	$+(3.25+0.85)\times\frac{1}{2}\times8.0+1.5\times1.0\}$			
	$=82.04\ m^2$			
	(See page 5)			
	$82.04\times10.0+0.36\times7.4$			
	$=823.06\ m^3$			
	$\ominus\ (1.5\times2.0+\frac{1}{4}\pi\times2.0^2\times\frac{1}{2})\times(10.0+5.2)$			
	$=69.48\ m^3$			
	$823.06-69.48=\underline{753.58\ m^3}$			
SCR-4	$82.04\times9.0=738.36\ m^3$			
	$\ominus\ (1.5\times2.0+\frac{1}{4}\pi\times2.0^2\times\frac{1}{2})\times9.0$			
	$=41.14\ m^3$			
	$738.36-41.14=\underline{697.22\ m^3}$			





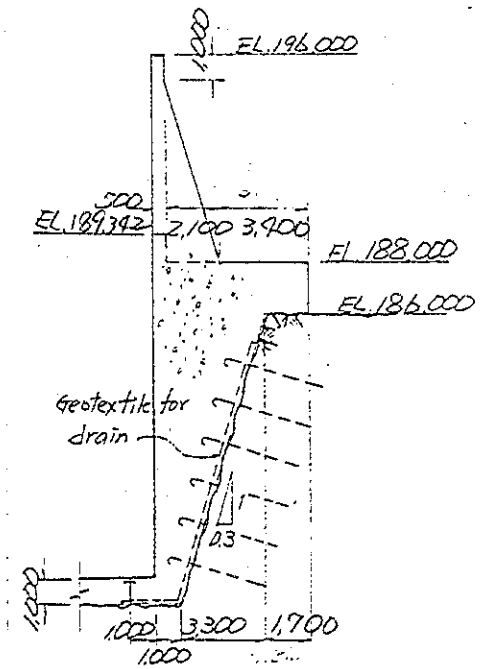
Working Division: Concrete, Dam Abutment and Guide Wall (II)

Description	Calculation Details	Unit	Quantity	Remarks
SCR-5	$\{0.5\times1.0+(0.5+2.6)\times\frac{1}{2}\times7.0$			
	$+6.0\times2.0\}\times11.0$			
	$=23.35\times11.0$			
	$=256.85\ m^3$			
	$\{(5.05+4.0)\times\frac{1}{2}\times3.5+(3.25+1.0)\times\frac{1}{2}$			
	$\times2.5+1.0\times1.0\}$			
	$=32.78\ m^2$			
	$(4.0+7.3)\times\frac{1}{2}\times11.0=62.15\ m^3$			
	$(1.0+4.3)\times\frac{1}{2}\times11.0=29.15\ m^2$			
	$(32.78+62.15)\times\frac{1}{2}\times(4.626-2.0)$			
	$=124.64\ m^3$			
	$62.15\times4.0=248.6\ m^3$			
	$(62.15+29.15)\times\frac{1}{2}\times3.3=150.65\ m^3$			
	$29.15\times(6.374-3.3-2.0)=31.31\ m^3$			
	$\ominus(1.5\times2.0+\frac{1}{4}\pi\times2.0^2\times\frac{1}{2})\times5.626+2.0^2$			
	$\times\pi\times\frac{1}{4}\times8.5=\ominus52.42\ m^3$			
	$258.85+124.64+248.6+150.65+31.31$			
	$-52.42=759.63\ m^3$			



Working Division: Concrete, Dam Abutment and Guide Wall (12)

Description	Calculation Details	Unit	Quantity	Remarks
SCR-6	{0.5×1.0 + (0.5+2.6)×1/2×7.0			
	+ 6.1×2.0 + (4.3+1.0)×1/2×11.0			
	+1.0×1.0}			
	= 53.70 m^2			
Sec. E'	{0.5×1.0 + 6.0×2.0 + (4.3+1.0)×1/2			
	×11.0 + 1.0×1.0}			
	= 42.65 m^2			
	53.70×1.877 + (53.70+42.65)×1/2			
	×8.927			
	= 530.85 m^3			
SCR-7	Same as SCL-16 = 210.5 m^3			
Total volume of dam abutment and guide wall SCR-1 to SCR-7		m^3	4,589.7	
	908.8+729.1+753.6+697.2+759.6+530.9+210.5			
	= 4,589.7			

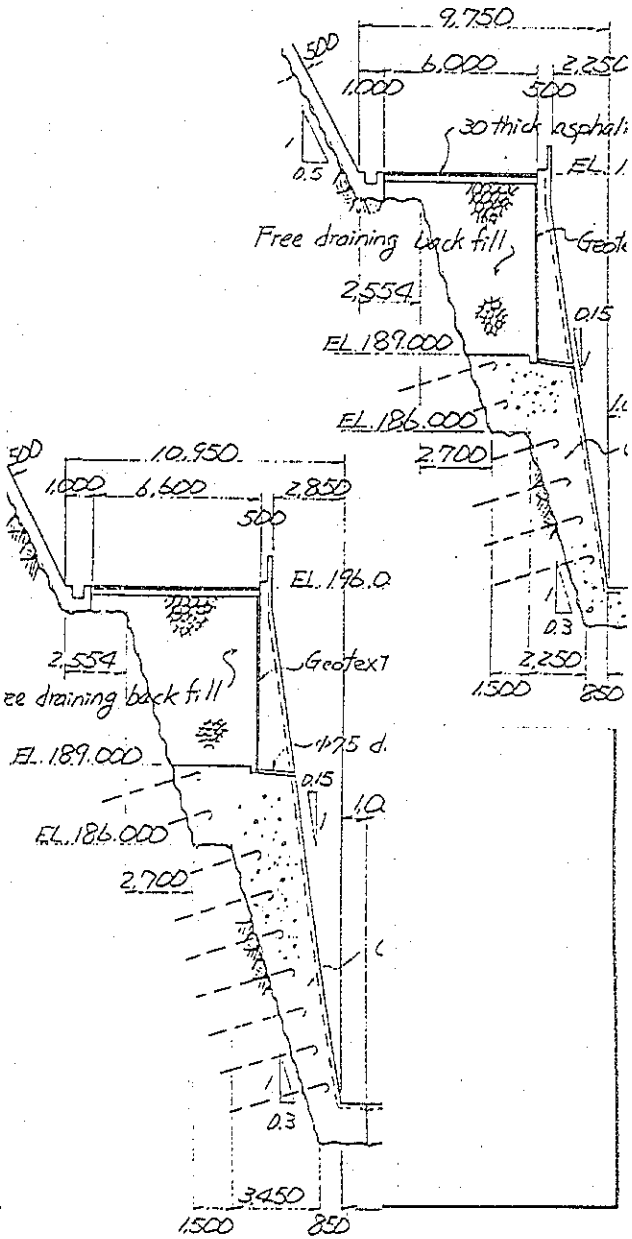


Working Division: Concrete, Side - channel (1)

Description	Calculation Details	Unit	Quantity	Remarks
D2/06	Concrete, class "C", Side - channel			
	SCL-1 ~ SCL-16	m^3	7,930.	
	Slab	m^3	5,260.	
	Total	m^3	13,190.	

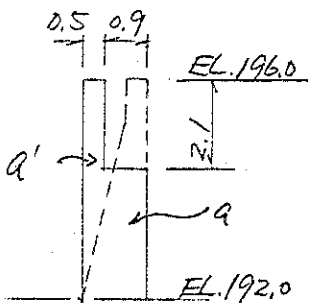
Working Division: Concrete, Side-channel (2)

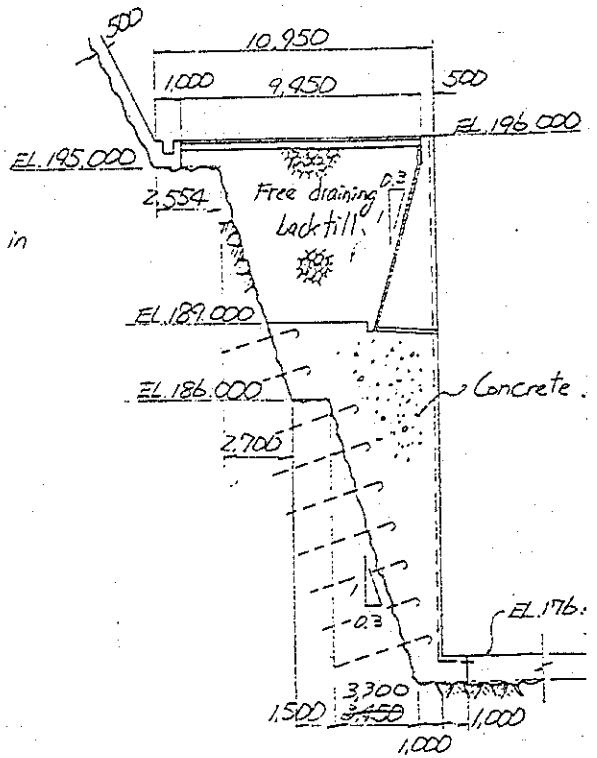
Description	Calculation Details	Unit	Quantity	Remarks
SCL-1				
SCL-9	$\{0.2\times0.9 + 0.5\times1.2 + (0.5+1.4)\times\frac{1}{2}\times6.0$			
	$+ (3.7+4.15)\times\frac{1}{2}\times3.0 + (2.2+0.85)$			
	$\times\frac{1}{2}\times7.5 + 1.5\times1.0\}$			
	$= 31.19\ m^2$			
	$\{0.2\times0.9 + 0.5\times1.2 + (0.5+1.4)\times\frac{1}{2}\times6.0$			
	$+6.7+4.15)\times\frac{1}{2}\times3.0 + (2.8+0.85)\times\frac{1}{2}$			
	$\times11.5 + 1.5\times1.0\}$			
	$= 40.74\ m^2$			
	$(31.19+40.74)\times\frac{1}{2}\times10.092\times9$			
	$= 3,266.63\ m^3$			
SCL-10				
~SCL-11	$\{0.2\times0.9 + 0.5\times1.2 + (0.5+2.3)\times\frac{1}{2}\times6.0$			
	$+ (6.7+5.8)\times\frac{1}{2}\times3.0 + (4.3+0.85)$			
	$\times\frac{1}{2}\times11.5 + 1.5\times1.0\}$			
	$= 59.04\ m^2$			
	$59.04\times(11.129+10.242) = 1,261.74\ m^3$			



Working Division: Concrete, Side-channel (3)

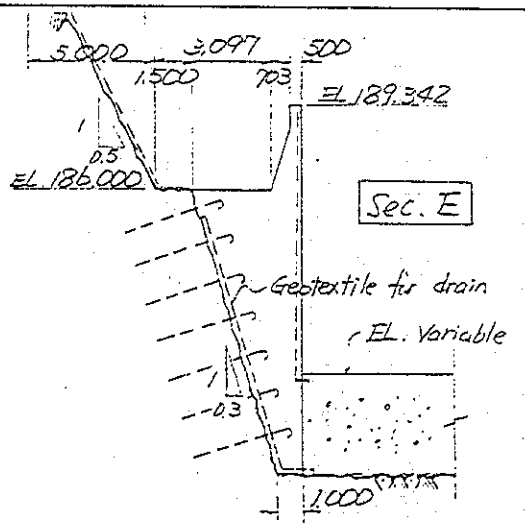
Description	Calculation Details	Unit	Quantity	Remarks
SCL-12	$a = 0.5 \times 1.0 + (0.5 + 1.4) \times \frac{1}{2} \times 3.0$			
	$= 3.35\ m^2$			
	$a' = 1.4 \times 4.0 - 0.9 \times 2.1 = 3.71\ m^2$			
	$\Delta a = a' - a = 0.36\ m^2$			
	$590.4 \times 10.011 + 0.36 \times 7.4$			
	$= 593.71\ m^3$			
SCL-13 & 14	$\{0.2 \times 0.9 + 0.5 \times 1.2 + (0.5 + 2.3) \times \frac{1}{2} \times 6.0$			
	$+ (6.7 + 5.8) \times \frac{1}{2} \times 3.0 + (4.3 + 1.0) \times \frac{1}{2}$			
	$\times 11.0 + 1.0 \times 1.0\}$			
	$= 58.08\ m^2$			
	$58.08 \times 15.0 \times 2 = 1,742.4\ m^3$			

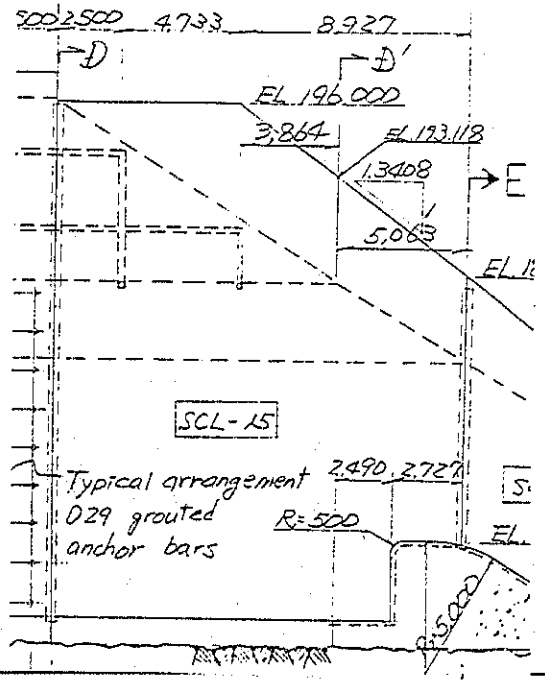




Working Division: Concrete, Side-channel (4)

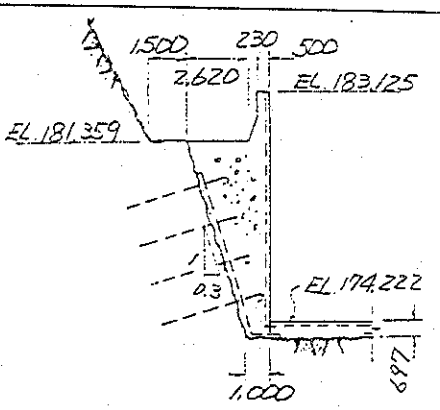
Description	Calculation Details	Unit	Quantity	Remarks
SCL-15	$58.08 - 0.2 \times 0.9 = 57.9\ m^2$			
(Sec. D)	$57.9 \times (2.5 + 4.733) = 418.79\ m^3$			
(Sec. D')	$\{0.5 \times 1.0 + (0.5 + 1.74) \times \frac{1}{2} \times 4.118 + (6.7 + 5.8) \times \frac{1}{2} \times 3.0 + (4.3 + 1.0) \times \frac{1}{2} \times 11.0 + 1.0 \times 1.0\}$ $= 54.01\ m^2$			
	$(57.9 + 54.01) \times \frac{1}{2} \times 3.864 = 216.21\ m^3$			
	$54.01 - 1.0 \times 1.0 = 53.01\ m^2$			
(Sec. E)	$\{0.5 \times 1.0 + (0.5 + 1.203) \times \frac{1}{2} \times 3.342 + (4.3 + 1.0) \times \frac{1}{2} \times 11.0\}$ $= 32.50\ m^2$			
	$(53.01 + 32.50) \times \frac{1}{2} \times (8.927 - 3.864)$ $= 216.47\ m^3$			
	$418.79 + 216.21 + 216.47 = 851.47\ m^3$			

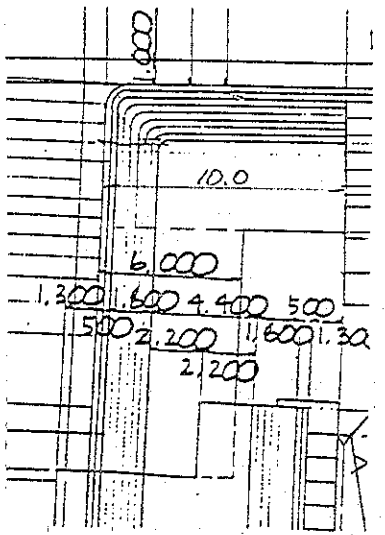




Working Division: Concrete, Side-channel (5)

Description	Calculation Details	Unit	Quantity	Remarks
SCL-16				
Sec.E	$32.50\ m^2$			
Sec.F	$\{0.5 \times 1.0 + (0.5 + 0.73) \times \frac{1}{2} \times 0.766$			
	$+ (3.75 + 1.0) \times \frac{1}{2} \times 7.834\}$			
	$= 18.01\ m^2$			
	$(32.50 + 18.01) \times \frac{1}{2} \times 8.336 = 210.53\ m^3$			
Total volume of dam abutment and guide wall SCL-1 ~ SCL-16		m^3	7,926.4	
	$T = 3,266.6 + 1,261.7 + 593.7 + 1,742.4 + 851.5 + 210.5$			
	$= 7,926.4$			





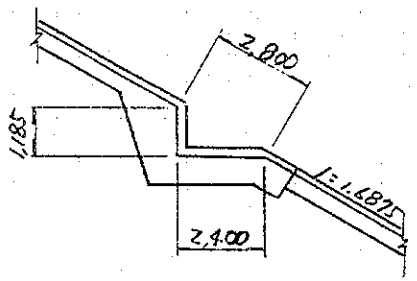
Working Division: Concrete, Side-channel (6)

Description	Calculation Details	Unit	Quantity	Remarks
Slab				
SCS-1	$11.5 - 1.0 \times \tan 7.737 = 10.636$ m			
~SCS-17				
	$11.5 + 19.5 = 26.0$			
	$\{(10.636 + 26.0) \times 1/2 \times (9.1 + 11.0 + 10.0)\}$			
	$\times 1.5$			
	$= 3,077.42$ m^3			
SCS-18	$10.0 \times 26.0 \times 1.5 = 390$ m^3			
& -19				
SCS-20				
~ SCS-25	by Planimeter			
	9.14 m^2 $\times 1.0 = 9.14$ m^3			
SCS-26	$\{1.0 \times 2.49 + (3.0 + 9.75) \times 1/2 \times 4.0$			
& -27	$+ 0.6 \times 2.0\}$			
	$= 29.19$ m^2			
	$29.19 \times 30 = 875.7$ m^3			
	$3,077.42 + 390.0 + 914.0 + 875.7$			
	$= 5257.12$ m^3	m^3	5257.1	

VI-3-61

Working Division: Water Stop (1)

Description	Calculation Details	Unit	Quantity	Remarks
₱2/08	Water stop (type A, B = 300 mm)			
(1) Chuteway	1) Slab			
	$L_1 = 28.0 \times 8 + 10.0 \times 1.1624 \times 8 \times 3 + (1.185 + 2.40 - 2.80) \times 3 \times 2 = 507.69$ m			
	2) Traing wall (Left & Right)			
	$L_2 = (1.20 + 7.20) \times 8 \times 2 = 134.40$ m			
	3) Total of chuteway			
	$L = 507.69 + 134.40 = 642.09$ m			
(2) Silling Basin				
	1) Slab			
	$L_1 = 28.0 \times 11 + (25.0 \times 1.1624 + 90.0 + 7.0) \times 3 = 686.18$ m			
	2) Traing wall (Left & Right)			
	$L_2 = \{(132.00 - 120.889 + 0.20) + 1.20\} \times 2 = 25.02$ m			
	$L_3 = \{(132.00 - 114.963 + 0.20) + 1.20\} \times 2 = 36.87$ m			
	$L_4 = \{(132.00 - 112.00 + 0.20) + 1.20\} \times 8 \times 2 = 342.40$ m			
	$L_5 = \{(132.00 - 119.00 + 0.20) + 1.20\} \times 2 = 28.80$ m			
	3) Total of silling basin			
	$L = 686.18 + 25.02 + 36.87 + 342.40 + 28.80 = 1,119.27$ m			
(3) sub-total	$L = 642.09 + 1,119.27 = 1,761.36$ m			



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Working Division: Water stop (2)

Description	Calculation Details	Unit	Quantity	Remarks
	GWL-1 (196.0 - 185.0) + 1.0 = 12.0 m			
	GWL-2 (196.0 - 180.0) + 1.0 = 17.0 m			
	SCL-1 ~ SCL-9			
	1.0 + (195.0 - 180.0) x 1.011 + 1.0			
	= 17.165 m			
	1.0 + (195.0 + 176.0) x 1.011 + 1.0			
	= 21.209 m			
	(17.165 + 21.209) x 1/2 x 10 = 191.87 m			
	SCL-10 & -11			
	{21.209 + (196.0 - 176.0) + 1.0} x 1/2			
	= 21.105 m			
	SCL-12 ~ 14			
	21.0 x 4 = 84.0 m			
	SCL-15			
	(189.342 - 179.0) = 10.342 m			
	SCL-16			
	(183.125 - 174.222) + 1.0 = 9.903 m			

Working Division: Water stop (3)

Description	Calculation Details	Unit	Quantity	Remarks
	SW-1 ~ SW-9			
	18.629 + 1.5 + 1.0 = 21.129 m			
	23.753 + 1.5 + 1.0 = 26.253 m			
	(21.129 + 26.253) x 1/2 x 10 = 236.91 m			
	SCS-1 ~ SCS-12			
	90.0 + 40.0 + 10.092 x 9			
	= 220.83 m			
	SCS-14 ~ SCS-24			
	11.0 + 10.0 x 2 + 9.0 + 11.0 + 10.804			
	-(2.49 + 2.727)			
	= 56.587 m			
	SCS-15 ~ SCS-25			
	11.129 + 10.242 + 10.011 + 15.0 x 2 + 16.16			
	-(2.49 + 2.727)			
	= 72.325 m			
	(Center)			
	11.0 + 10.0 x 2 + 11.0 x 3 = 64.0 m			
	SCS-1 ~ SCS-17			
	(10.5 + 26.0) x 1/2 x 11 = 200.75 m			

Working Division: Water stop (4)

Description	Calculation Details	Unit	Quantity	Remarks
	SCS-18 ~ SCS-29			
	(26.0 + 28.0) × ½ × 6 = 162 m			
	GWR-1			
	(196.0 - 185.0) + 1.0 = 12.0 m			
	SCR-1 ~ SCR-5			
	{(196.0 - 176.0) + 1.0} × 5 = 105.0 m			
	SCR-6 & -7 (see, SCL-15 & 16)			
	10.342 + 9.903 = 20.245 m			
	SCL-26 & -27			
	2.49 + 3.0 + 2.727 + (179.0 - 174.222)			
	× 1.962			
	= 17.59			
	17.59 × 3 = 52.77 m			
(x) sub-total	12.0 + 170 + 191.87 + 21.11 + 8.40 + 10.34			
	+ 9.90 + 236.91 + 220.83 + 56.59 + 72.33			
	+ 6.40 + 200.75 + 162.0 + 12.0 + 105.0			
	+ 20.25 + 52.77			
	= 1,549.65 m			
Total length of water stop	1,761.4 + 1549.7 = 3,311.1	m	3,311.1	

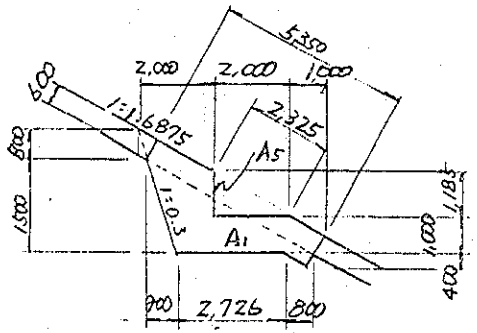
Working Division: Summary of Form Work for Chuteway and Stilling Basin

Description	Calculation Details			Unit	Quantity	Remarks
Summary of	Form Work for Chuteway and Stilling Basin					
	Form class	F1	F2		F4	
	Chuteway					
	Slab	345.1	-		2,539.9	
	Traing wall (Right)	183.8	94.8		821.4	
	" " (Left)	183.8	94.8		821.4	
	Stilling basin					
	Slab	984.2	-		1,251.7	
	Traing wall (Right)	1,100.6	843.5		2,428.6	
	" " (Left)	1,467.3	132.1		2,495.4	
		4,264.8	1,165.2		10,358.4	
D2/16 Form	F1				4,264.8	
D2/17 Form	F2				1,165.2	
D2/18 Form	F4				10,358.4	

VI-3-66

Working Division: Form (1)

Description	Calculation Details	Unit	Quantity	Remarks
D2/09 Form, F1	Contraction joint			
Block CWS-1	to CWS-16 (16 blocks, 80 m long)	m^2	345.1	
	$A_1 = 5.35 \times 0.60 + (0.80 + 2.726) \times 1.50/2 + 0.8 \times 0.4/2$			
	$- 2.00 \times 1.185/2 = 4.83\ m^2$			
	$A_2 = (92.991 - 5.350 \times 2) \times 0.60 = 49.37\ m^2$			
	$A_3 = 0.60\ m^2/m$			
	$A = 4.83 \times 3 \times 2 + 49.37 \times 3 + 0.60 \times 28.0 \times 10 = 345.09\ m^2$			
D2/11 Form, F4	Surface of waterway			
Block CWS-1 to	CWS-16	m^2	2,539.9	
	$A_4 = (92.991 - 2.325 \times 2) \times 28.0 = 2,473.55\ m^2$			
	$A_5 = 1.185 \times 28.0 \times 2 = 66.36\ m^2$			
	Total $A = 2,539.91\ m^2$			



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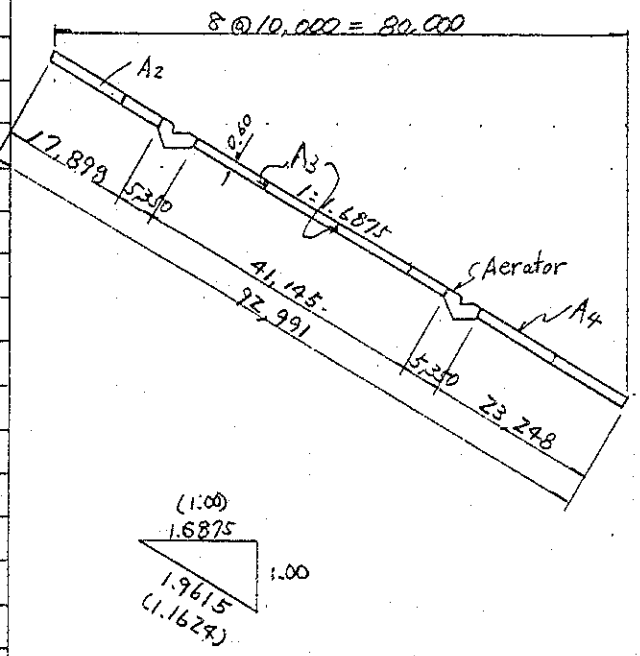
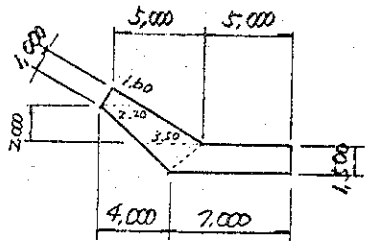
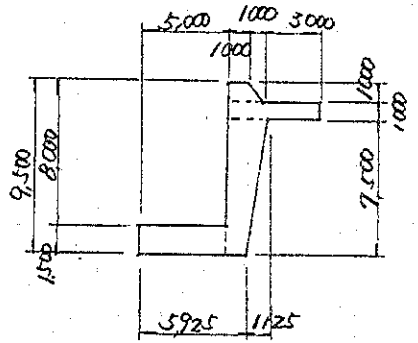


Working Division: Form (-)

Description	Calculation Details	Unit	Quantity	Remarks
D2/09 Form, Fl	Contraction joint			
Block SBS-1	to SBS-24	m^2	984.2	
	SBS-1, 2 $A_1 = 10.0 \times 1.1624 \times 0.60 \times 3 = 20.92\ m^2$			
	$A_2 = 0.6 \times 28.0 = 16.80\ m^2$			
	$A = 37.72\ m^2$			
	SBS-3, 4 $A_1 = 10.0 \times 1.1624 \times 1.00 \times 3 = 34.87\ m^2$			
	$A_2 = 1.0 \times 28.0 = 28.00\ m^2$			
	$A = 62.87\ m^2$			
	SBS-5, 6 $A_1 = \{1.60 \times 1.00/2 + (2.20+3.50)/2 \times 2.0 + 3.50 \times 1.50$			
	$/2 + (5.00+7.00)/2 \times 1.50\} \times 3 = 54.38\ m^2$			
	$A_2 = 1.50 \times 28.0 = 42.00\ m^2$			
	$A = 96.38\ m^2$			
	SBS-7 ~ 20 (L = 70.00 m)			
	$A_1 = 1.50 \times 70.00 \times 3 = 315.00\ m^2$			
	$A_2 = 1.50 \times 28.00 \times 7 = 294.00\ m^2$			
	$A = 609.00\ m^2$			
	SBS-21, 22 $A_1 = \{5.00 \times 1.50 + (0.925 \times 2 + 1.125)/2 \times 7.50$			
	$+ 1.00 \times 5.00 + (1.0+2.0)/2 \times 1.0\} \times 3$			
	$= 75.47\ m^2$			
	$A_2 = 1.00 \times 28.00 = 28.00\ m^2$			
	$A = 103.47\ m^2$			
	SBS-23, 24 $A_1 = \{1.0 \times 5.0 + (1.5+1.0)/2 \times 1.0\} \times 3$			
	$= 18.75\ m^2$			
	$A_2 = 2.0 \times 28.00 = 56.00\ m^2$			
	$A = 74.75\ m^2$			
	Total $A = 37.72 + 62.87 + 96.38 + 609.00 + 103.47$			
	$+ 74.75 = 984.19\ m^2$	—	—	



BLOCK SBL-5, 6



BLOCK SBL-21, 22

Working Division: Form (3)

Description	Calculation Details	Unit	Quantity	Remarks
D2/11 Form, F4	Surface			
Block SBS-1 &	SBS-24	m^2	1,251.7	
	SBS-1 & 4 $A = 10.0 \times 2 \times 1.1624 \times 28.0$			
	$= 650.94\ m^2$			
	SBS-5 & 6 $A_1 = 5.0 \times 2 \times 1.1624 \times 28.0 - 3.375 \times$			
	$1.1624 \times 2.5 \times 6 = 266.63\ m^2$			
	$A_2 = 2.0 \times 3.375/2 \times 2 \times 6 + 2.5 \times 2.0$			
	$\times 6 = 70.5\ m^2$			
	$A = 337.13\ m^2$			
	SBS-21 & 22 $A_1 = 8.0 \times 28.0 = 224.00\ m^2$			
	$A_2 = \sqrt{2} \times 1.0 \times 28.0 = 39.60\ m^2$			
	$A = 263.60\ m^2$			
	Total $A = 650.94 + 337.13 + 263.60 = 1,251.67\ m^2$			

Working Division: Form (4)

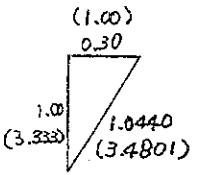
Description	Calculation Details	Unit	Quantity	Remarks
D2/09 Form, F1	Block CWR-1 to CWR-8 (Contraction joint)	m^2	183.8	
	$A = 19.17 \times 8 + 3.81 \times 8 = 183.84\ m^2$ (* Shear Key)			
D2/10 Form, F2	(Exposed surface)	m^2	94.8	
	CWR-1 $A_1 = (1.903 + 1.137)/2 \times 10.0 = 15.20\ m^2$			
	CWR-2 to 8 $A_2 = 1.137 \times 10.0 \times 7 = 79.59\ m^2$			
	Total $A = 94.79\ m^2$			
D2/11 Form, F4	(Waterway and aerator)	m^2	821.4	
	CWR-1 $A_1 = (8.903 + 8.137)/2 \times 10.0 = 85.20\ m^2$			
	CWR-2 to 8 $A_2 = 8.137 \times 10.0 \times 7 = 569.59\ m^2$			
	Aerator $A_3 = \{(1.50 \times 2 + 0.80 \times 2) \times 8.137 -$			
	$(0.296 + 1.185)/2 \times 1.50 + 0.5 \times$			
	$(1.50 \times 1.1624 + 0.296 + 1.185)\}$			
	$\times 2 = 75.86\ m^2$			
	CWR-1 to 8 $A_4 = (92.991 - 2.325 \times 2) \times 1.0 = 88.34\ m^2$			
	$A_5 = 1.185 \times 1.0 \times 2 = 2.37\ m^2$			
	Total $A = 821.36\ m^2$			
*	Shear Key ($\ell = 6.5$ m)			
	$A = \sqrt{2} \times 0.10 \times (6.5 \times 2 + 0.3 \times 2) + 6.3 \times 0.3$			
	$= 3.81\ m^2/no.$			

Working Division: Form (5)

Description	Calculation Details	Unit	Quantity	Remarks
	(Same as right Traing wall)			
D2/09 Form F1	Block CWL-1 to CWL-8	m^2	183.8	
D2/10 Form F2	" " "	m^2	94.8	
D2/11 Form F4	" " "	m^2	821.4	

Working Division: Form (6)

Description	Calculation Details	Unit	Quantity	Remarks
D2/09 Form, F1	(Contraction joint and shear key)	m^2	1,100.6	
	SBR-1 $A_1 = 34.89 + 3.81 = 38.70\ m^2$			
	SBR-2 $A_2 = 39.98 + 3.81 = 43.79\ m^2$			
	SBR-3 to 7 $A_3 = 49.93 \times 5 = 249.65\ m^2$			
	A_4 (Shear Key) $= \{\sqrt{2} \times 0.10 \times 2 \times (16.0 + 0.3 + 2.0 \times 2 + 0.3 \times 2) + (15.8 + 1.8 \times 2) \times 0.3\} \times 5 = 11.73 \times 5$			
	$= 58.66\ m^2$			
	SBR-8 to 10 $A_5 = 55.31 \times 3 = 165.93\ m^2$			
	$A_6 = 11.23 \times 3 = 35.19\ m^2$			
	SBR-11 $A_7 = 43.65\ m^2$			
	A_8 (Shear Key) $= \sqrt{2} \times 0.10 \times 2 \times (10.0 + 5.0 + 0.3 \times 2) + (9.8 + 4.8) \times 0.3$			
	$= 8.79\ m^2$			
	Sub-total $A = 644.36\ m^2$			
	(Backfilled surface)			
	SBR-1 $A_1 = (1.0 + 3.0 \times 1.044) \times 5.0 = 20.66\ m^2$			
	SBR-2 to 5 $A_2 = (1.0 + 6.0 \times 1.044) \times 10.0 \times 4 = 290.56\ m^2$			
	SBR-7 $A_3 = 6.0 \times 30/2 + 2.0 \times 1.0/2 = 10.00\ m^2$			
	SBR-8 to 12 $A_4 = 3.0 \times 45.0 = 135.00\ m^2$			
	Sub-total $A = 456.22\ m^2$			
	Total $A = 644.36 + 456.22 = 1,100.58\ m^2$			



Working Division: Form (7)

Description	Calculation Details	Unit	Quantity	Remarks
D2/10 Form, Fz	Exposed surface of backside	m^2	843.5	
	SBR-1 to 5 $A_1 = 1.0 \times 5 \times 10.0 = 50.00\ m^2$			
	SBR-6 & 7 $A_2 = (2.0 + 1.044 \times 6.0) \times 10.0 \times 2 = 165.28\ m^2$			
	SBR-8 $A_3 = \{2.0 + 1.044 \times (6.0 + 11.0)/2\}$			
	$\times 10.00 = 108.24\ m^2$			
	SBR-9 to 11 $A_4 = (2.0 + 1.044 \times 11.0) \times 10.0 \times 3$			
	$= 404.52\ m^2$			
	SBR-12 $A_5 = (2.0 + 1.044 \times 11.0) \times (1.2 + 2.2$			
	$+ 3.3 \times 2/2) = 90.34\ m^2$			
	$A_6 = 0.5 \times 2.0 + (0.5 + 3.8)/2 \times 11.0$			
	$= 24.65\ m^2$			
	Total $A = 843.53\ m^2$			

Working Division: Form (8)

Description	Calculation Details	Unit	Quantity	Remarks
D2/11 Form F4	(Waterway side)	m^2	2,428.6	
	SBR-1 $A_1 = 8.137 \times 1.606 + (8.137 + 13.111)/2 \times 8.394 = 102.25\ m^2$			
	$A_2 = 10.0 \times 1.1624 \times 1.0 = 11.62\ m^2$			
	SBR-2 $A_3 = (13.111 + 19.037)/2 \times 10.0 = 160.74\ m^2$			
	$A_4 = 10.0 \times 1.1624 \times 1.0 = 11.62\ m^2$			
	SBR-3 $A_5 = (19.037 + 22.00)/2 \times 5.0 + 22.00 \times 5.0 = 212.59\ m^2$			
	$A_6 = 5.0 \times 1.1624 \times 1.0 = 5.81\ m^2$			
	SBR-4 to 6 $A_7 = 22.00 \times 10.0 \times 3 = 660.00\ m^2$			
	SBR-7 to 10 $A_8 = (21.5 + 0.3 + \sqrt{0.2^2 + 0.5^2}) \times 10.0 \times 4 = 22.34 \times 40.0 = 893.54\ m^2$			
	SBR-11 $A_9 = 22.34 \times 5.0 + (\sqrt{0.2^2 + 0.5^2} + 0.3) \times 5.0 + 14.5 \times 5.0 - (1.0 + 2.0)/2 \times 1.0 = 186.89\ m^2$			
	SBR-12 $A_{10} = (14.5 + 0.3 + \sqrt{0.2^2 + 0.5^2}) \times 5.0 = 76.69\ m^2$			
	$A_{11} = 6.0 \times 16.0 + 1.0 \times 1.0 + (0.5 + 0.5)/2 \times 1.0 = 97.40\ m^2$			
	SBR-11 $A_{12} = (8.0 + \sqrt{2} \times 1.0) \times 1.0 = 9.41\ m^2$			
	Total $A = 2,428.56\ m^2$			

Working Division: Form (9)

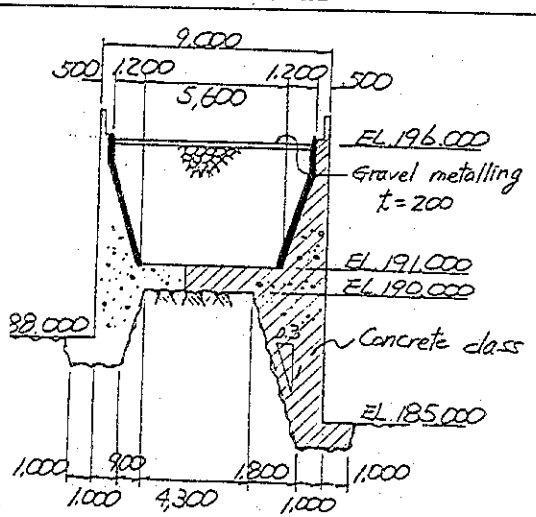
Description	Calculation Details	Unit	Quantity	Remarks
D2/09 Form F1	(Contraction joint and shear key)	m^2	1,467.3	
	SBL-1 $A_1 = 38.70\ m^2$ (= SBR-1)			
	SBL-2 $A_2 = 43.79\ m^2$ (= SBR-2)			
	SBL-3 to 10 $A_3 = 49.93 \times 8 = 399.44\ m^2$			
	$A_4 = 11.73 \times 8 = 93.84\ m^2$			
	SBL-11 $A_5 = 40.13\ m^2$			
	$A_6 = \sqrt{2} \times 0.19 \times 2 \times (10.0 + 0.3) + 9.8 \times 0.3$			
	$= 5.85\ m^2$			
	Sub-total $A = 622.15\ m^2$			
	(Backfilled surface)			
	SBL-1 $A_1 = 20.66\ m^2$ (= SBR-1)			
	SBL-2 to 11 $A_2 = (1.0 + 6.0 \times 1.044) \times 10.0 \times 10 = 726.40\ m^2$			
	SBL-12 $A_3 = (1.0 + 6.0 \times 1.044) \times (2.7 + 1.8/2 \times 2 +$			
	$5.5 + 7.0/2) = 98.06\ m^2$			
	Sub-total $A = 845.12\ m^2$			
	Total $A = 622.15 + 845.12 = 1,467.27\ m^2$			

Working Division: Form (10)

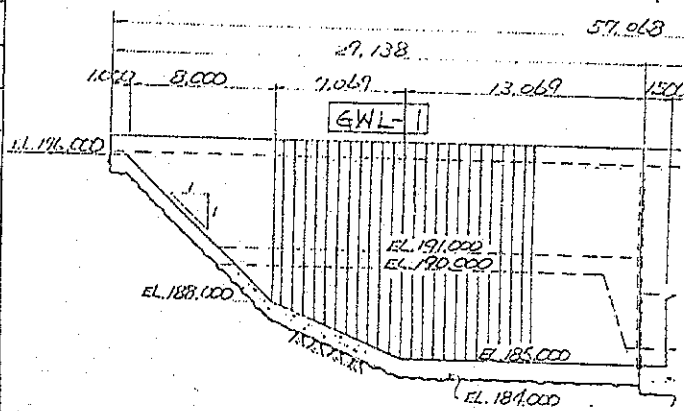
Description	Calculation Details	Unit	Quantity	Remarks
D2/10 Form F2	(Exposed surface of backside)	m^2	132.1	
	SBL-1 to 12 $A = 1.0 \times (115.0 + 18.050 - 0.5 \times 2)$			
	$= 132.05\ m^2$			
D2/18 Form F4	(Waterway side)	m^2	2,495.4	
	SBL-1 to 12 (A1 to A10 and A12 are same as those for right wing wall)			
	$A_{1\sim12}$ excluding 11 $= 102.25 + 11.62 +$			
	$160.79 + 11.62 + 212.59 + 5.81 +$			
	$660.00 + 893.54 + 186.89 + 76.69$			
	$+ 9.41 = 2,331.16\ m^2$			
	SBL-12 $A_{11} = (0.3 + 0.5)/2 \times 1.0 + 18.05 \times 2.00 +$			
	$(16.05 + 2.05)/2 \times 14.0 + 1.0 \times 1.0$			
	$= 164.20\ m^2$			
	Total $A = 2,331.16 + 164.20 = 2,495.36\ m^2$			

Working Division: Form (11)

Description	Calculation Details	Unit	Quantity	Remarks
Form F1				
GWL-1	1.2 x 29.138 = 34.97 m^2			
	$(195-191)^2 \times 1/2 + \{(195-191) \times (29.138 - 1.0 - 4.0)\} \times 1.044$			
	= 108.80 m^2			
	Joint for GWL-2			
	$0.2 \times 0.9 + 0.5 \times 1.2 + (0.5+1.7) \times 1/2 \times 4.0$			
	$+ 1.0 \times (6.5+0.6) + (2.8+1.0) \times 1/2 \times 6.0$			
	$(1.0+1.3) \times 1/2 \times 1.0$			
	= 24.83 m^2			
	34.97 + 108.80 + 24.83 = 168.60 m^2	m^2	168.6	
GWL-2	$\{0.5 \times 1.2 + (195-191) \times 1.044\} \times 13.698$			
	= 65.42 m^2			
	Joint for SW-1 42.09 m^2			
	Key $(0.5+0.14 \times 2) \times (4.0 \times 2 + 3.4 + 2.5$			
	$+1.3) + (0.5+0.7) \times 1/2 \times 0.14 \times 10$			
	= 12.70 m^2			
	Joint for GWL-3 40.64 m^2			
	65.42 + 42.09 + 12.70 + 40.64 = 160.85	m^2	160.9	



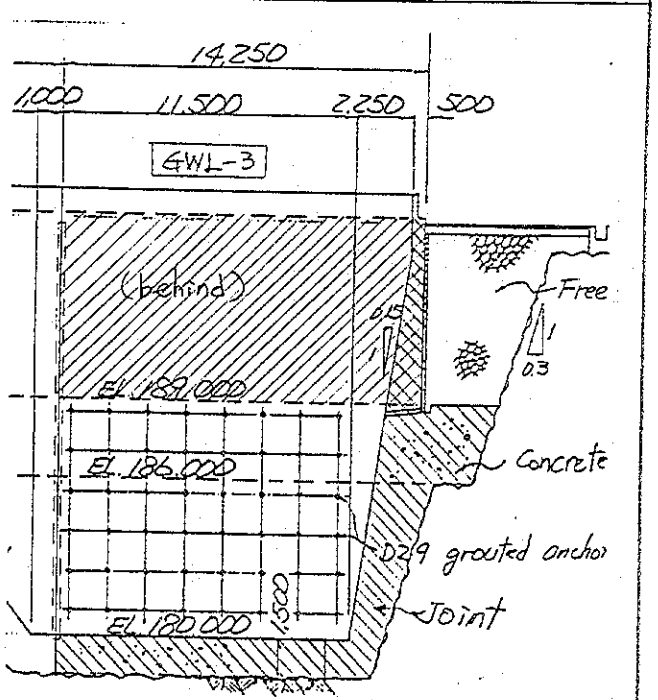
SECTION D-D
(SCALE B)



VI-3-77

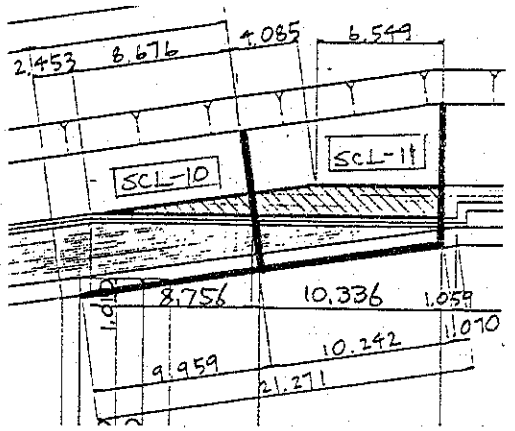
Working Division: Form (12)

Description	Calculation Details	Unit	Quantity	Remarks
GWL-3	(0.5×1.2 + 40×1.044) × 14.25			
	= 68.06 m^2			
	Joint for SCS-1 1.5×10.5 = 15.75 m^2			
	Joint for SCL-1 31.19 m^2			
	68.06 + 15.75 + 31.19 = 115.0 m^2	m^2	115.0	
SCL-1 ~SCL-9	(31.19 + 40.74) × 1/2 × 8 = 287.72 m^2			
	(196.2 − 189) × 10.092 × 9 = 653.96 m^2			
	1.5×10.092×9 = 136.24 m^2			
	287.72 + 653.96 + 136.24 = 1,077.92 m^2	m^2	1,077.9	



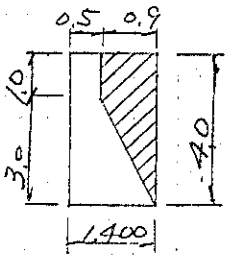
VI-3-78

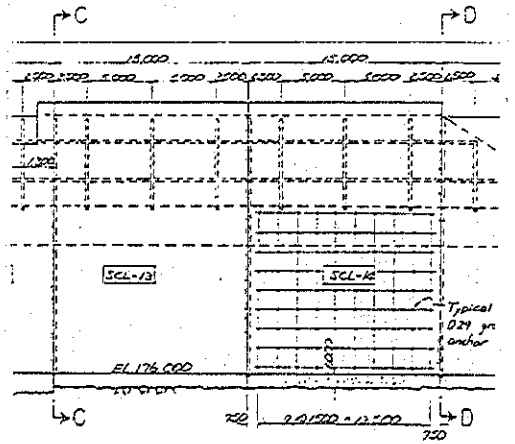
Working Division: Form (13)

Description	Calculation Details	Unit	Quantity	Remarks
SCL-10	1.2 x (2.453 + 8.756 + 10.336) = 25.85	m^2		
& -11				
	{(195-189) + (195-189) x 1.044} x 1/2			
	x (8.676 + 4.085)			
	= 78.25 m^2			
	Joint for SCL-11 & -12			
	(40.74 + 59.04) x 1/2 + 59.04			
	= 108.93 m^2			
	Joint for SCS-15 & -17			
	1.5 x (21.271 - 1.070) = 30.30 m^2			
	25.85 + 78.25 + 108.93 + 30.30 = 243.33	m^2	243	

Working Division: Form (14)

Description	Calculation Details	Unit	Quantity	Remarks
SCL-12	{ 4.0 x (17.4 + 0.5 x 2) + (1.0 + 4.0)			
	x ½ x 0.9 x 2 + (1.0 + 3.0 x 1.044) x (10 - 8.4)			
	+ (192 - 189) x 1.044 x 10.0 }			
	= 76.03 m^2			
	Joint for SCL-13 (sec. C-C)			
	58.08 m^2			
	Joint for SCS-19			
	1.5 x 10.0 = 15.0 m^2			
	76.03 + 58.08 + 15.0 = 149.11	m^3	149	
SCL-13				
& -14	{ 1.0 + (195 - 189) x 1.044 } x (15.0 x 2)			
	= 217.92 m^2			
	Joint for SCL-14 & -15			
	58.08 x 2 = 116.16 m^2			
	Joint for SCS-21, 23 & 25			
	1.0 x 15 x 2 = 30.0 m^2			
	217.92 + 116.16 + 30.0 = 364.08	m^2	364	





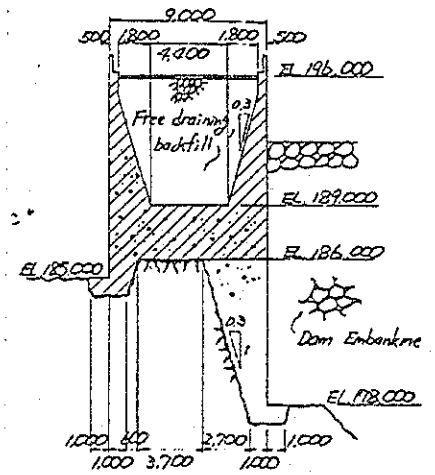
VI-3-80

Working Division: Form (15)

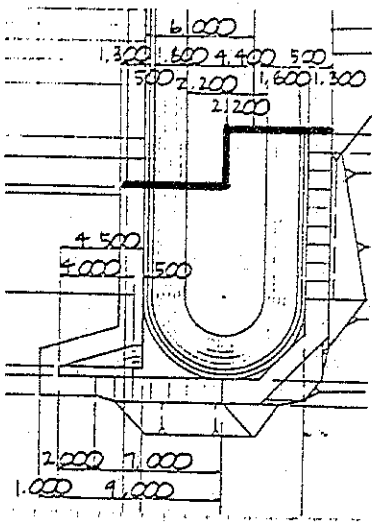
Description	Calculation Details	Unit	Quantity	Remarks
SCL-15	Joint for SCL-16 (Sec. E-E)			
	32.50 m^2			
	Joint for SCS-25			
	1.0 × 16.16 + 2.727 × (179-176)			
	= 24.34 m^2			
	32.50 + 24.34 = 56.84 m^2	m^2	56.8	
	Finish for behind of wall will be			
	applied F2.			
SCL-16	Joint for CWL-1 (Sec. F-F)			
	18.01 m^2			
	Joint for SCS-27			
	4.0 × 6.75 × ½ + 0.6 × 2.0			
	= 14.7 m^2			
	18.01 + 14.7 = 32.71 m^2	m^2	32.7	

Working Division: Form (16)

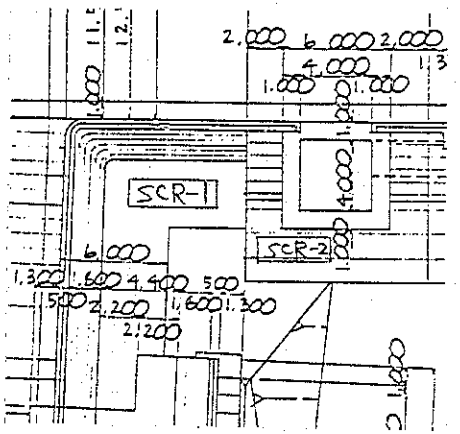
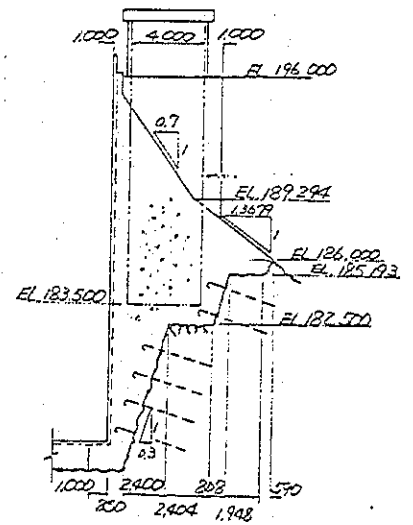
Description	Calculation Details	Unit	Quantity	Remarks
GWR-1	$1.2 + (195-189) \times 1.044 = 7.464^{m}$			
	$l = (4.5 - 2.3 \times 1/2) \times 2 \times \pi \times 1/2 + 1.0 + 8.0 + 6.0$			
	$= 25.52^{m}$			
	$7.464 \times 25.52 = 190.51\ m^2$			
	Sec. F-E			
	$\{0.2 \times 0.9 + 0.5 \times 1.2 + (0.5+2.3) \times 1/2 \times 6.0\} \times 2 + 9.0 \times 3.0 + (1.0+1.6) \times 1/2 \times 2.0 + (1.0+1.3) \times 1/2 \times 1.0 + 3.0 \times 6.0$			
	$= 67.11$			
	$190.51 + 67.11 = 257.62\ m^2$	m^2	257.6	



SECTION E-E
(SCALE B)

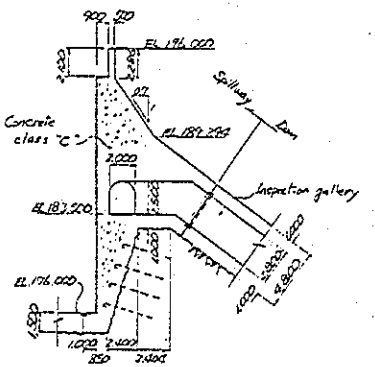


Working Division: Form (17)

Description	Calculation Details	Unit	Quantity	Remarks
SCR-1	(1.2 + 6.0 x 1.044) x (7.7 + 2.3 + 13.598)			
	= 176.14 m²			
	3.0 x (4.2 + 7.0) = 33.6 m²			
	Joint for SW-9			
	49.77 m²			
	Joint for SCS-14			
	1.5 x 11.0 = 16.5			
	176.14 + 33.6 + 49.77 + 16.5 = 276.01	m²	276.0	
SCR-2	{1.2 + (195 - 189.294) x 1.221 + (189.294			
	- 186.0) x 1.694} x (10.0 - 6.0)			
	= 54.99 m²			
	{5.5 x 1.0 + (5.5 + 1.506) x ½ x 5.706			
	+ 1.506 x ½ x 1.10} x 2			
	= 52.63 m²			
	{196 - (189.294 - 1.10)} x 6.0			
	= 46.84 m²			
	Joint for SCR-3 & SCR-1			
	78.49 x 2 = 156.98 m²			

Working Division: Form (18)

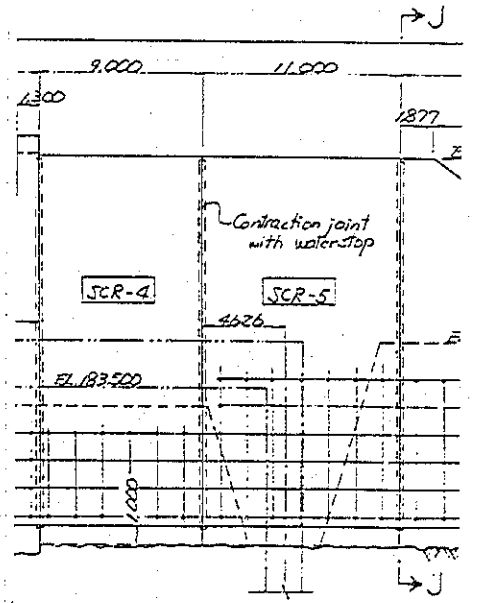
Description	Calculation Details	Unit	Quantity	Remarks
	Joint for SCS-16			
	1.5 × 10.0 = 15.0 m²			
	54.99 + 52.63 + 46.84 + 156.98			
	+ 15.0			
	= 311.44 m²	m²	311.4	
SCR-3	{2.286 × (17.4 + 0.5×2) + (1.0 + 2.286)			
	×½ × 0.9 × 2 + (1.0 + 1.286 × 1.221) × 1.6			
	+4.42 × 1.221 × 10.0 + (189.294 − 186.0)			
	× 1.694 × 10}			
	= 136.04 m²			
	Joint for SCR-4			
	82.04 m²			
	Joint for SCS-18			
	1.5 × 10.0 = 15.0 m²			
	136.04 + 82.04 + 15.0 = 233.08 m²	m²	233.1	

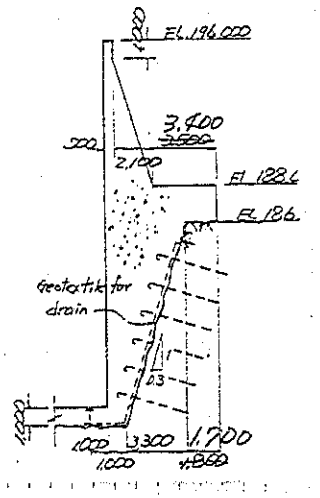


SECTION H-H (SCALE A)

Working Division: Form (19)

Description	Calculation Details	Unit	Quantity	Remarks
SCR-4	{1.0 + (195.0 − 189.294) × 1.221			
	+ (189.294 − 186.0) × 1.694} × 9.0			
	= 13.547 × 9.0			
	= 121.92 m^2			
	Joint for SCR-5			
	82.04 m^2			
	Joint for SCS-20			
	1.0 × 9.0 = 9.0 m^2			
	121.92 + 82.04 + 9.0 = 212.96	m^2	213.0	
SCR-5	{1.0 + (195 − 188) × 1.044 + 2.0} × 11.0			
	= 10.308 × 11.0			
	= 113.39 m^2			
	Joint for SCS-22			
	1.0 × 11.0 = 11.0 m^2			
	Joint for SCR-6			
	23.35 + 29.15 = 52.5 m^2			
	113.39 + 11.0 + 52.5 = 176.89 m^2	m^2	176.9	

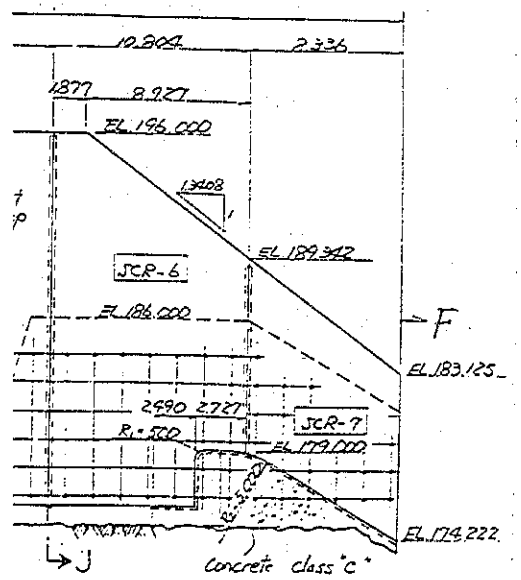


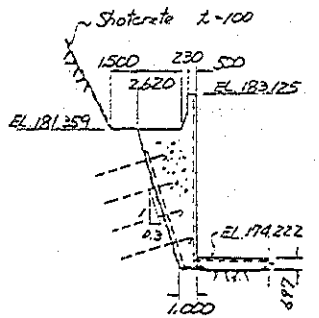


VI-3-85

Working Division: Form (20)

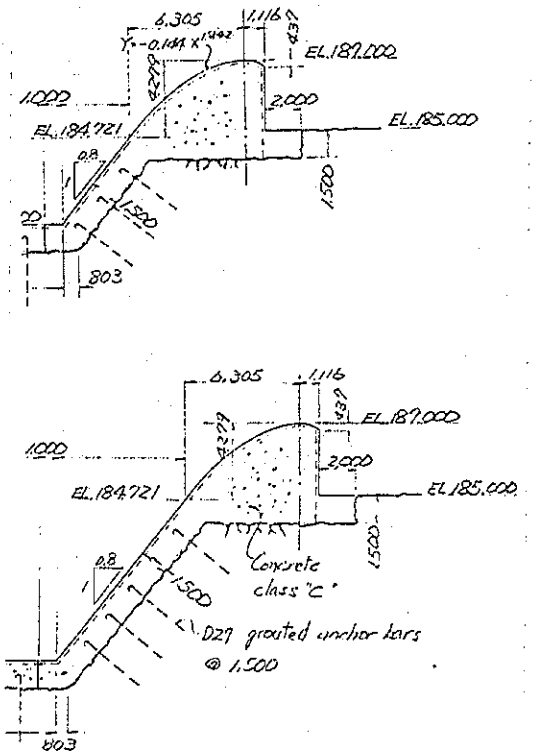
Description	Calculation Details	Unit	Quantity	Remarks
SCR-6				
	Joint for SCR-7			
	53.70 m²			
	Joint for SCS-24 & -26			
	1.0 x 10.804 + 2.727 x 3.0 = 18.99 m²			
	53.70 + 18.99 = 72.69			
		m²	72.7	
SCR-7	Same as SCL-16			
	32.71 m²	m²	32.7	





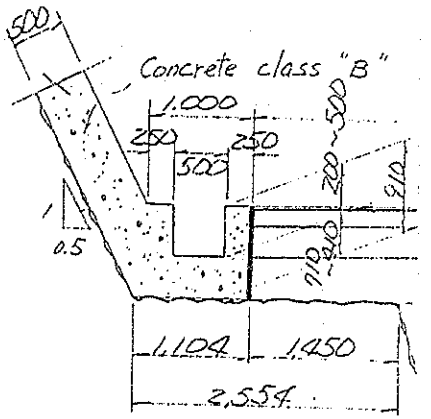
SECTION F-F
(SCALE A)

Working Division: Form (21)

Description	Calculation Details	Unit	Quantity	Remarks
SW-1				
~SW-9	SW-1 42.09 m^2			
	SW-9 49.77 m^2			
	$(42.09 + 49.77) \times 1/2 + 12.70 = 58.63\ m^2$			
	$58.63 \times 8 = 469.04\ m^2$			
	Joint for slab			
	$1.5 \times 90 = 135\ m^2$			
	$469.04 + 135 = 604.04\ m^2$	m^2	604.0	
SCS-1				
~SCS-17	$(15.75 + 26.0) \times 1/2 \times 10 = 208.75\ m^2$			
SCS-18 ~25	$(26.0 + 28.0) \times 1/2 \times 5 = 135\ m^2$			
SCS-26 & 27	$0.6 \times 30.0 = 18.0\ m^2$			
SCS-6	$(10.0 \times 6 + 11.0 \times 1) \times 1.5 + 11.0 \times 1.0 \times 3$			
~SCS-25	$= 139.5$			
SCS-26 & 27	$14.7\ m^2$			
	$208.75 + 135 + 18 + 139.5 + 14.7 = 515.95\ m^2$	m^2	516.0	

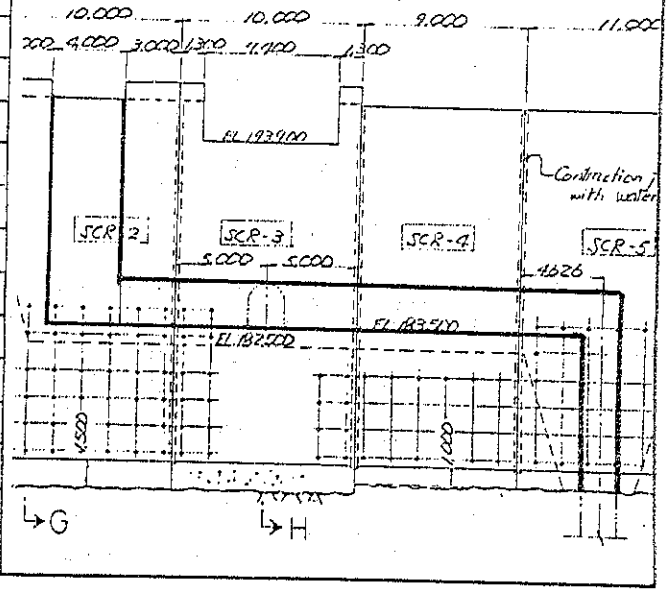
Working Division: Form (2-)

Description	Calculation Details	Unit	Quantity	Remarks
Drain ditch				
	0.91 x 316.0 = 287.56 m²	m²	287.6	
	Total			
	168.6 + 160.9 + 115.0 + 1,077.9 + 243.3			
	+ 149.1 + 364.1 + 56.8 + 32.7 + 257.6			
	+ 276.0 + 311.4 + 233.1 + 213.0 + 176.9			
	+ 72.7 + 32.7 + 604.0 + 516.0			
	= 5,061.8	m²	5,061.8	



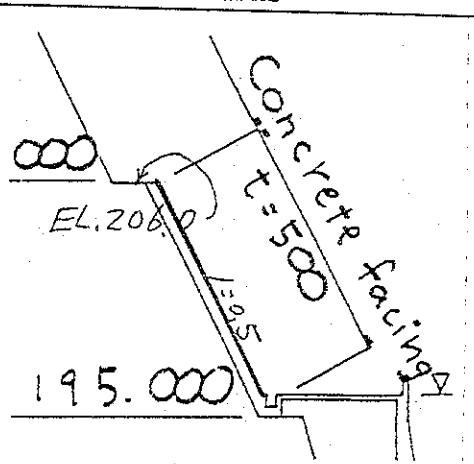
Working Division: Form (23)

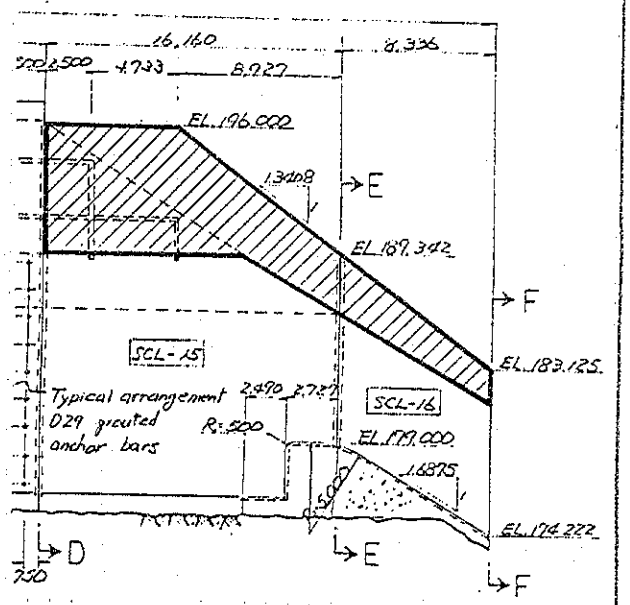
Description	Calculation Details	Unit	Quantity	Remarks
Form, F2				
Parapet wall	0.9 x 2 = 1.8 m			
	GWL-1 ~ GWL-3 57.068 m			
	SCL-1 ~ SCL-14			
	177.573 - (16.16 + 8.336 + .74) = 145.677 m			
	GWR-1 45.036 m			
	SCR-1 ~ SCR-3			
	15.898 + 10.0 + 3.0 + 3.0 + 1.3 x 2			
	= 34.498 m			
	1.8 x (57.068 + 145.677 + 45.036 + 34.498)			
	= 508.10 m^2	m^2	508	
Vertical shaft & inspection gallery	(4.0 x 4) x (196 - 183.5) = 200.0 m^2			
	⊖ 1.5 x 2.0 + $\frac{\pi}{4}$ x 2.0^2 x 1/2 = 4.57 m^2			
	(1.5 x 2 + 2.0 x π x 1/2) x 27.626 = 169.67 m^2			
	2.0 x π x (183.5 - 175.0) = 53.41 m^2			
	(1.5 x 2 + 2.0 x π x 1/2) x 5.0 = 30.71 m^2			



Working Division: Form (24)

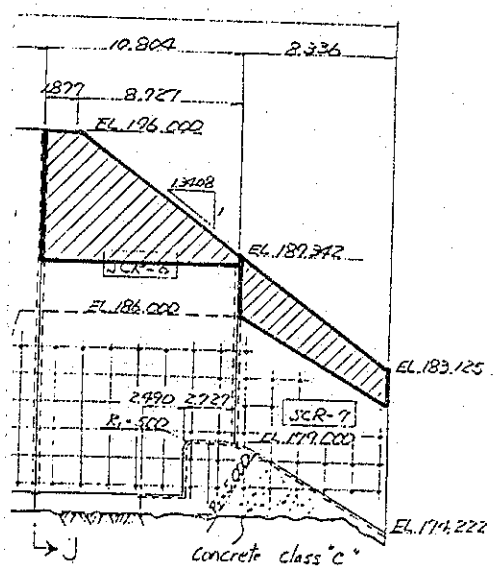
Description	Calculation Details	Unit	Quantity	Remarks
	200.0 − 4.57 + 169.67 + 53.41 + 30.71 = 449.22 m^2	m^2	449	
Bridge abutment	20 × (7.4 + 0.9 × 2) × 2 = 36.8 m^2	m^2	36.8	
Concrete facing	(206.0 − 196.0) × 1.118 × 305.0 = 3,409.9 m^2	m^2	3,409.9	
Drain ditch	(0.2 + 0.5) × ½ × 2 × 316.0 = 221.2 m^2	m^2	221.2	
SCL-15 & -16	(7.264) {1.0 + (195 − 189) × 1.044} × 17.233 = 52.54 m^2			
	1.0 + (182.125 − 181.359) × 1.044 = 1.800 m			
	(7.264 + 1.800) × ½ × (8.927 + 8.336) = 78.24 m^2			
	52.54 + 78.24 = 130.78 m^2	m^2	130.8	





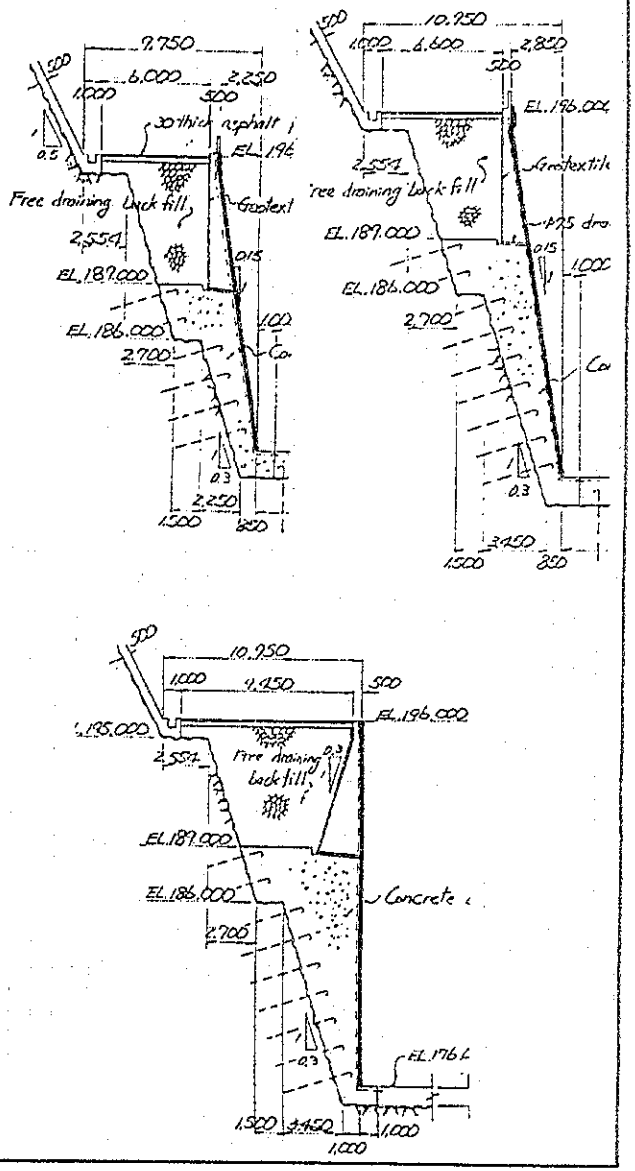
VI-3-90

Working Division: Form (>5)

Description	Calculation Details	Unit	Quantity	Remarks
SCR-6	10.308 x 1.877 = 19.35 m^2			
	1.0 + (188.342 - 188.0) x 1.044 + 2.0			
	= 3.357 m			
	(10.308 + 3.357) x ½ x 8.927 = 60.99 m^2			
	19.35 + 60.99 = 80.34 m^2	m^2	80.3	
SCR-7	(188.342 - 186.0) x 1.044 + 1.0			
	= 3.445 m			
	(182.125 - 181.359) x 1.044 + 1.0			
	= 1.80 m			
	(3.445 + 1.80) x ½ x 8.336 = 21.86	m^2	21.9	
	Total			
	508.1 + 449.2 + 36.8 + 3409.9 + 221.2			
	+ 130.8 + 80.3 + 21.9			
	= 4858.2	m^2	4858.2	

Working Division: Form (26)

Description	Calculation Details	Unit	Quantity	Remarks
Form, F4				
SCL-1	1.0 + (195.0 − 180.0) × 1.011			
~ -9	= 16.165 m			
	1.0 + (195.0 − 176.0) × 1.011			
	= 20.209 m			
	(16.165 + 20.209) × ½ + (10.092 × 9 +			
	0.867 + 2.453)			
	= 1,712.27 m²	m²	1,712	
SCL-10				
~ -11	{20.209 + (196.0 − 176.0)} × ½ × 21.271			
	= 427.64 m²	m²	427.6	
SCL-12	(196.0 − 176.0) × (10.011 + 15.0 × 2 + 7.233)			
~ -15	= 944.88 m²			
	{(189.342 − 176.0) + 20.0} × ½ × 8.927			
	= 148.82 m²			
	⊖ 7.4 × 2.1 = ⊖ 15.54 m²			
	⊖ 2.727 × (179 − 176) = ⊖ 8.18 m²			
		m²		
	944.88 + 148.82 − 15.54 − 8.18 = 1,069.98			
		m²	1,070.0	

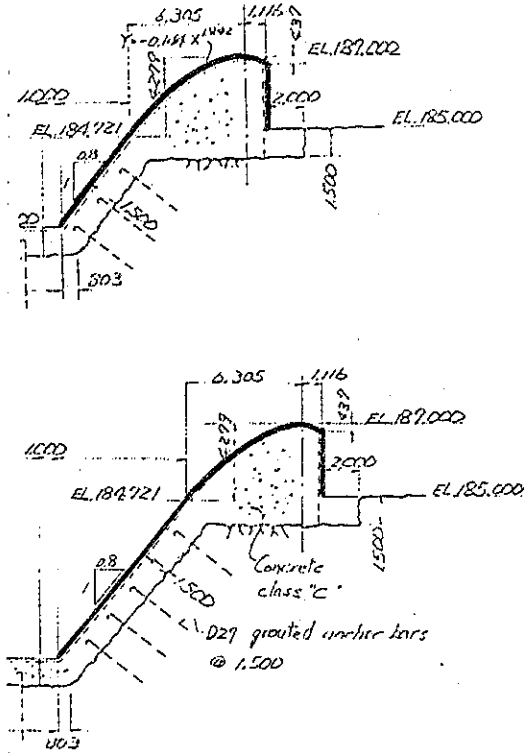


Working Division: Form (27)

Description	Calculation Details	Unit	Quantity	Remarks
SCL-16	{(189.342 - 179.0) + (183.125 - 174.222)}			
	× 1/2 × 8.336			
	= 80.21 m^2	m^2	80^2	
SCR-1	1.5 × 11.0 + 15.898 × 7.0 + (14.398 - 2.8)			
	× 13.0 × 1/2 + 20.0 × 10.0			
	= 403.17 m^2	m^2	407^2	
SCR-2				
~ -5	20.0 × (10.0 × 2 + 9.0 + 11.0)			
	= 800.0 m^2			
	⊖ 7.4 × 2.1 = ⊖ 15.54 m^2			
	800.0 - 15.54 = 784.46 m^2	m^2	784^5	
SCR-6	20.0 × 1.877 + (20.0 + 13.342) × 1/2			
	× 8.927 - 2.727 × 3.0			
	= 178.18 m^2	m^2	178^2	
SCR-7	same as SCL-16	m^2	80^2	

Working Division: Form (28)

Description	Calculation Details	Unit	Quantity	Remarks
weir				
	$\sqrt{(1.116^2 + 0.437^2)} = 1.199$ m			
	$X = 2.0$ m $\quad Y = 0.516$			
	$\sqrt{(0.516^2 + 2.0^2)} = 2.066$ m			
	$X = 4.0$ m $\quad Y = 1.851 \quad Y_o = 1.335$			
	$\sqrt{(2.0^2 + 1.335^2)} = 2.405$ m			
	$X = 6.305$ m $\quad Y = 4.279 \quad Y_o = 2.428$			
	$\sqrt{(2.365^2 + 2.428^2)} = 3.348$ m			
	$1.199 + 2.066 + 2.405 + 3.348$			
	$= 9.018$ m			
	$189.0 - 185.0 - 0.437 = 3.563$ m			
	$(184.721 - 180.0) \times \sqrt{1^2+0.8^2}/1.281 = 6.048$ m			
	$(184.721 - 176.0) \times 1.281 = 11.172$ m			
	$9.018 + 3.563 + 6.048 = 18.629$ m			
	$9.018 + 3.563 + 11.172 = 23.753$ m			
	$(18.629 + 23.753) \times 1/2 \times 91.944$			
	$= 1,948.39$ m^2	m^2	1,948	

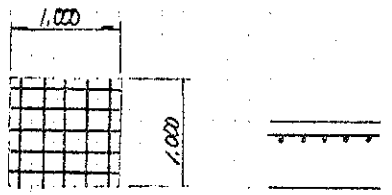


Working Division: Form (29)

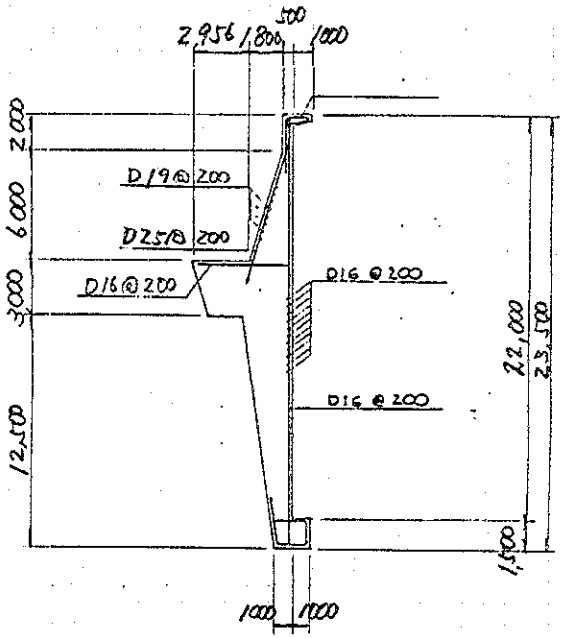
Description	Calculation Details	Unit	Quantity	Remarks
	Total			
	1,712.3 + 427.6 + 1,070.0 + 80.2			
	+ 407.2 + 784.5 + 178.2 + 80.2			
	+ 1,948.4			
	= 6,688.6	m^2	6,688.6	

Working Division: Reinforcing bar (1)

Description	Calculation Details	Unit	Quantity	Remarks
D2/12	Reinforcing bars			
	1) Slab			
	D16@200 both way			
	$\ell = 1.0 \times 10 = 10.0\ m/m^2$			
	$w = 10.0 \times 1.56\ kg/m = 15.6\ kg/m^2$			
	Chuteway 0.60 m thick $w = 26.0\ kg/m^3$			
	Stilling basin 1.50 m " $w = 10.4\ kg/m^2$			
	2) Wall			
	D25 $w = 8.25\ m \times 5\ no \times 3.98 = 174\ kg/m$			
	D19 $w = 1.00 \times 31 \times 2.25 = 70$ "			
	D16 $w = (2.50 + 1.5 + 0.5 + 23.3 + 2.0 + 1.8 + 2.5 + 1.3 + 4.8) \times 5 \times 1.56 = 314\ kg/m$			
	$w = 1.00 \times (10 + 8 + 111 + 5 + 10 + 10) \times 1.56 = 240\ kg/m$			
	Total $w = 798\ kg/m$			
	Volume $V = 49.93\ m^3/m$			
	Unit weight $= W/V = 798/49.93 = 16.0\ kg/m^3$			
	3) Estimated weight for B/Q			
	Concrete class B and C $= 330 + 4,190 + 5,030 + 7,220 + 15,840 + 13,190 + 310$			
	$= 46,060\ m^3$			



Slab



Working Division: Reinforcing bar (2)

Description	Calculation Details	Unit	Quantity	Remarks
	Estimated unit weight of reinforcing bar $W = 20\ kg/m^3$			
	Total weight estimated			
	$N = 46,060 \times 20/1,000$			
	$= 921.2$ ton	Ton	921.2	

Working Division: Bituminous joint filler in contraction joints (1)

Description	Calculation Details	Unit	Quantity	Remarks
D2/21 Bituminous joint filler in contraction joints				
(1) Chuteway	1) Slab			
	$A_1 = 345.09\ m^2$			
	2) Traing wall (Left and Right)			
	$A_2 = 183.84 \times 2 = 367.68\ m^2$			
	3) Total			
	$A = 345.09 + 367.68 = 712.77\ m^2$			
(2) Stilling basin				
	1) Slab			
	$A_1 = 989.19\ m^2$			
	2) Traing wall (Right)			
	$A_2 = 644.36\ m^2$			
	3) Traing wall (Left)			
	$A_3 = 622.15\ m^2$			
	4) Total			
	$A = 989.19 + 644.36 + 622.15 = 2,250.70\ m^2$			
(3) Sub-total	$A = 712.77 + 2,250.70 = 2,963.47\ m^2$			

Working Division: Bituminous joint filler in contraction joints (2)

Description	Calculation Details	Unit	Quantity	Remarks
Bituminous				
joint filler	GWL-1 24.83 m^2			
	GWL-2 42.09 + 12.70 + 40.64			
	= 95.43 m^2			
	GWL-3 15.25 + 31.19 = 46.94 m^2			
	SCL-1			
	~SCL-9 287.72 + 136.24 = 423.96 m^2			
	SCL-10 ~11 108.93 + 30.3 = 139.23 m^2			
	SCL-12 58.08 + 15.0 = 73.08 m^2			
	SCL-13 ~14 116.16 + 30.0 = 146.16 m^2			
	SCL-15 32.5 + 24.34 = 56.84 m^2			
	SCL-16 18.01 + 14.7 = 32.71 m^2			
	GWR-1 62.11 m^2			
	SCR-1 49.77 + 16.5 = 66.27 m^2			
	SCR-2 156.98 + 15.0 = 171.98 m^2			
	SCR-3 82.04 + 15.0 = 97.04 m^2			
	SCR-4 82.04 + 9.0 = 91.04 m^2			
	SCR-5 11.0 + 52.5 = 63.5 m^2			
	SCR-6 72.69 m^2			
	SCR-7 32.71 m^2			
	SW-1 ~SW-9 604.09 m^2			
	SCS-1 ~ SCS-27 515.95 m^2			
	sub-Total 2,821.51 m^2			
total	A= 2,963.5 + 2821.5 = 5785 m^2	m^2	5,785	

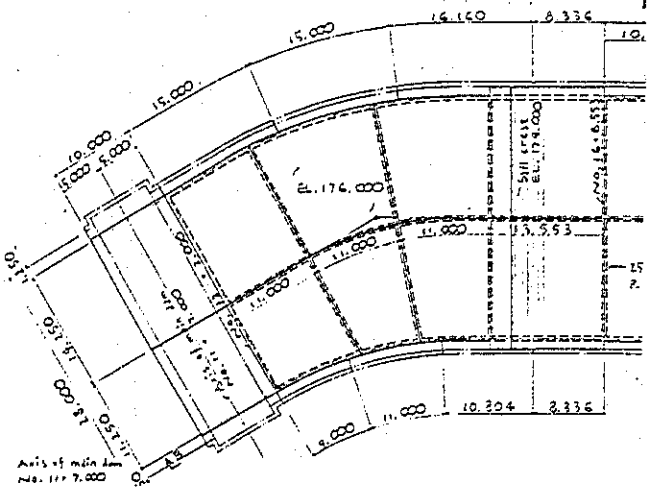
VI-3-88

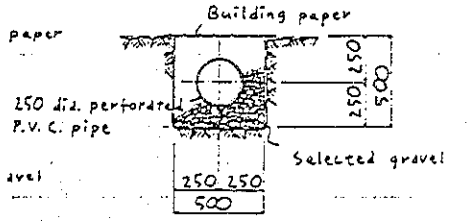
Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
D2/26 75ϕ PVC. pipe for weep hole		m	16.6	
	L = 2.30 x 4 + 1.85 x 4 = 16.60 m			
	(see item D3 drainage and aeration)			

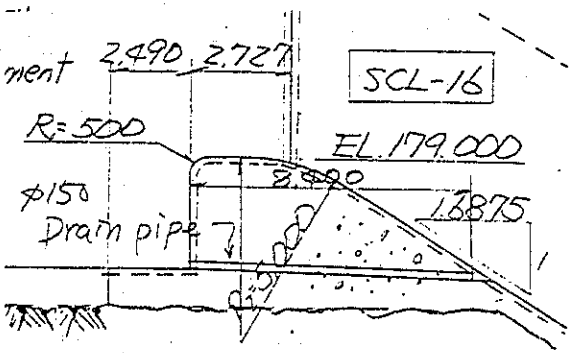
Working Division: Drainage and Saration (1)

Description	Calculation Details	Unit	Quantity	Remarks
D1/05	Trench excavation, all classes, for underdrain beneath slab			
	$0.5 \times 0.5 = 0.25\ m^2$			
	$l = (28.0 + 30.0) \times \frac{1}{2} \times 5 + 15.0 \times 2 +$			
	$16.16 + 8.336 + 11.0 \times 3 + 13.553 + 9.0 + 11.0$			
	$+ 10.804 + 8.336 = 285.19\ m$			
	$0.25 \times 285.19 = 71.30\ m^3$	m^3	71	
D1/06	Free drain backfill with selected gravel, for underdrain beneath slab			
	$0.5 \times 0.5 - 0.25^2 \times \frac{\pi}{4} = 0.20\ m^2$			
	$0.2 \times 285.19 = 57.04\ m^3$	m^3	57	
D3/01	P.V.C. perforated pipe, 250 mm dia			
	$l = 285.19\ m$	m	285	
D2/15	P.V.C. pipe for weep hole, 75 mm dia			
	$2.3 \times 4 + 1.4 \times 18 + 2.3 \times 14$			
	$= 66.6\ m$	m	66	
D3/02	Steel drain pipe, 150 mm dia			
	$l = 8.40\ m$			
	$8.4 \times 6 = 50.4\ m$	m	50	



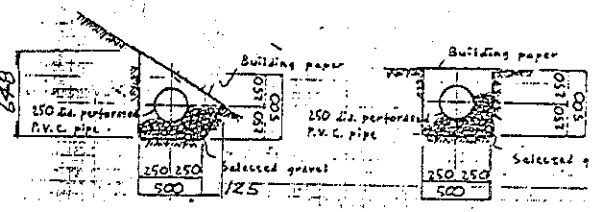


SECTION 2-2



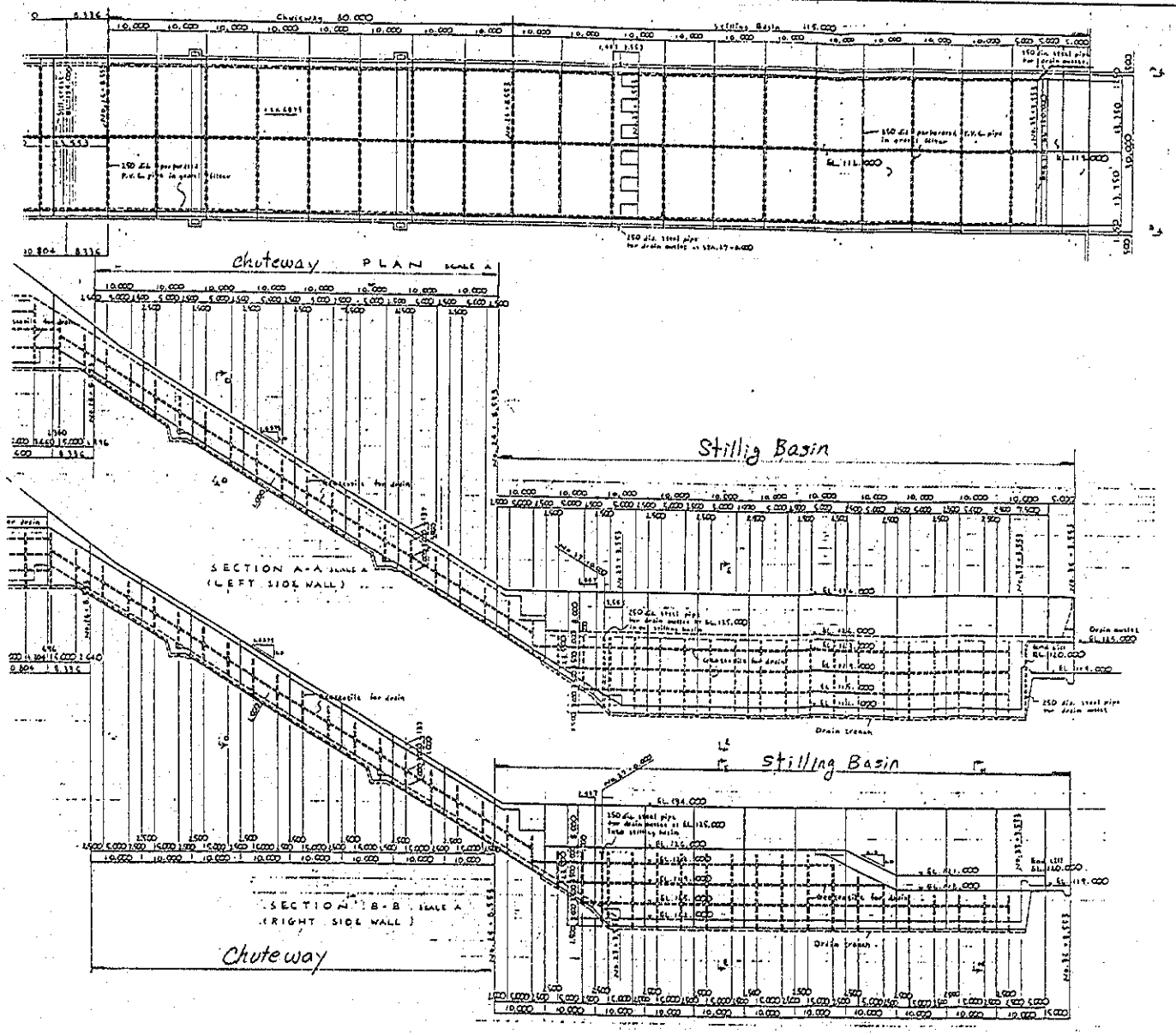
Working Division: Drainage and Aeration (2)

Description	Calculation Details	Unit	Quantity	Remarks
D3/04	Geo-textile drain			
(1) Unit quantity				
	1) Excavation (D1/05)			
	Type 1 $V_1 = (0.50+0.625)/2 \times 0.25 + 0.625 \times (0.698-0.25)/2 = 0.27\ m^3/m$			
	Type 2 $V_2 = 0.50 \times 0.50 = 0.25\ m^3/m$			
	2) Free drain backfill (D1/06)			
	Type 1 $V_1 = 0.27 - 0.25^2/4 \times 3.14 = 0.22\ m^3/m$			
	Type 2 $V_2 = 0.25 - 0.25^2/4 \times 3.14 = 0.20\ m^3/m$			
(2) Length	1) Chuteway			
	Type 1 $L_1 = 13.75 \times 2 \times 8 = 220.00\ m$			
	Type 2 $L_2 = 80.0 \times 1.1624 \times 3 = 278.98\ m$			
	2) Stilling basin			
	Type 1 $L_3 = 13.75 \times 2 \times 2 = 55.00\ m$			
	Type 2 $L_4 = 25.0 \times 1.1624 \times 3 + 80.925 \times 3 = 249.75\ m$			
D1/05	Trench excavation, all classes, for under-drain beneath slab	m^3	206.4	
	$V = 0.27 \times (220.00+55.00) + 0.25 \times (278.98+249.75) = 206.43\ m^3$			



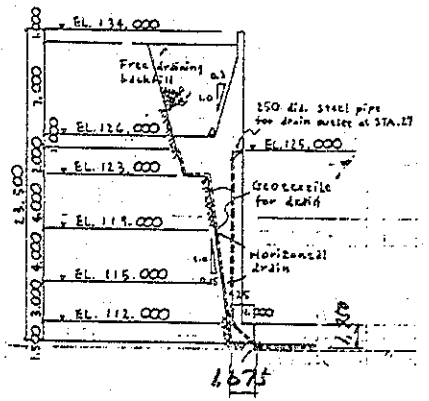
Type 1 Type 2

Working Division: Drainage and Aeration (3)



Working Division: Drainage and Aeration (4)

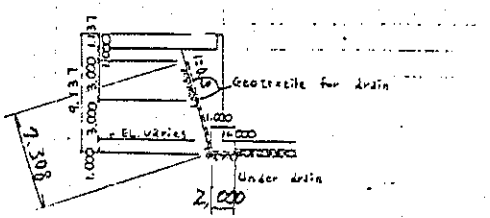
Description	Calculation Details	Unit	Quantity	Remarks
D1/06	Free drain backfill with selected gravel, for underdrain beneath slab	m^3	166.3	
	$V = 0.22 \times (220.00 + 55.00) + 0.20 \times (278.98 + 249.75) = 166.25\ m^3$			
D3/01	PVC perforated pipe, 250 mm dia	m	803.7	
	$L = 220.00 + 278.98 + 55.00 + 249.75 = 803.73$ m			
D3/03	Steel pipe, 250 mm dia	m	56.6	
	$L_1 = \{13.0 + 0.425 + (1.675^2 + 1.75^2)^{1/2}\} \times 2 = 31.69$ m			
	$L_2 = 13.0 + (1.675^2 + 1.75^2)^{1/2} + 9.50 = 24.92$ m			
	Total $L = 31.69 + 24.92 = 56.61$ m			



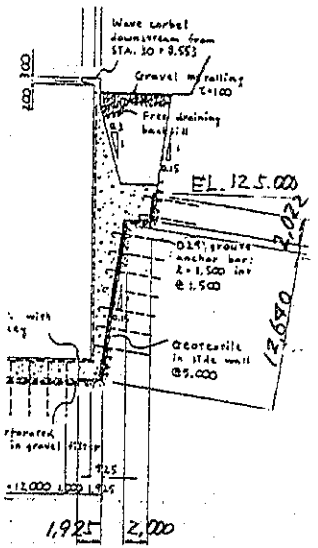
Steel pipe 250 dia

Working Division: Drainage and Aeration (5)

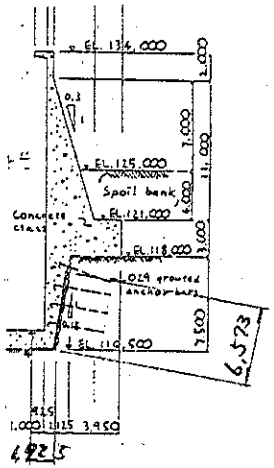
Description	Calculation Details	Unit	Quantity	Remarks
₱3104	Geo-textile-made drain	m	1,629.12	
	(1) Chuteway, Traing wall (Left and Right)			
	$L_1 = (7.308 + 2.00) \times 16 \times 2 = 297.86$ m			
	$L_2 = 80.0 \times 1.1624 \times 2 = 185.98$ m			
	Total $L = 297.86 + 185.98 = 483.84$ m			
	(2) Stilling basin, Right traing wall			
	$L_1 = 9.308 \times 3 = 27.92$ m			
	$L_2 = 9.308 + 3.0 = 12.31$ m			
	$L_3 = (2.022 + 12.690 + 2.00 + 1.925) \times 9 = 167.28$ m			
	$L_4 = 12.64 + 2.00 + 1.925 = 16.57$ m			
	$L_5 = (16.573 + 1.925) \times 5 = 42.49$ m			
	$L_6 = \{(12.64 + 2.00 + 1.925) + (6.573 + 1.925)\}/2 \times 2$			
	$= 25.07$ m			
	$L_7 = 7.5 \times 1.1624 + 60.0 + 65.0 + 85.0$			
	$= 218.72$ m			
	Total $L = 510.36$ m			
	(3) Stilling basin, Left training wall			
	$L_1 = 27.92$ m			
	$L_2 = 12.31$ m			
	$L_3 = 167.28/9 \times 17 = 315.97$ m			
	$L_4 = 7.5 \times 1.1624 + 95.0 + 90.0 + 85.0 = 278.72$ m			
	Total $L = 634.92$ m			
	(4) Total			
	$L = 483.84 + 510.36 + 634.92 = 1,629.12$ m			



BLOCK CWR-1 to CWR-8 & CWL-1 to CWL-8



BLOCK SBR-3 to SBR-7



BLOCK SBR-9 to SBR-11

Working Division: Drainage and Aeration (6)

Description	Calculation Details	Unit	Quantity	Remarks
GWL-2 & -3	(196.0 - 189.0) × 4 + (13.698 + 14.25) × 2 = 83.90 m	m	(83.9)	
SCL-1 ~ -9	(196.0 - 189.0) × 18 + (10.092 × 9 + 0.867) × 2 = 309.39 m	m	(309.4)	
SCL-10 ~ -11	196.0 - 189.0 = 7.0 1.0 + (195 - 189) × 1.044 = 7.264 (7.0 + 7.264) × 1/2 × 4 = 28.53 m (11.129 + 10.242) × 2 = 42.74 m 28.53 + 42.74 = 71.27 m	m	(71.3)	
SCL-12 ~ -14	7.0 × 8 = 56.0 m (10.011 + (5.0 × 2)) × 2 = 80.02 m 56.0 + 80.02 = 136.02 m	m	(136.0)	
SCL-15	5.0 + 2.0 + 2.6 + 7.4 = 17.0	m	(17.0)	

Working Division: Drainage and Aeration (7)

Description	Calculation Details	Unit	Quantity	Remarks
SCL-13 ~ 16	Under EL. 189.0			
	(188.0 - 175.0) x 1.044 + 1.5 + 2.0			
	= 17.072 m			
	17.072 x 9 + (15.0 x 2 + 16.16) x 3			
	= 292.13 m	m	(292.1)	
SCR-4 ~ 7	under EL. 186.0			
	(185.0 - 175.0) x 1.044 + 2.0 = 12.44 m			
	12.44 x 6 + (9.0 + 11.0 + 10.804) x 3			
	= 167.05 m	m	(167.1)	
	Total length			
	83.9 + 309.4 + 71.3 + 136.0 + 17.0			
	+ 292.1 + 167.1 = 1,076.8 m	m	1,076.8	
Total length of Geo-textile-made drain				
	1,629.1 + 1,076.8 = 2,705.9	m	2,705.9	

Working Division: D4 Road Work

Description	Calculation Details	Unit	Quantity	Remarks
D4/01	Asphalt pavement			
	$(6.0+6.6)\times\frac{1}{2}\times 93.0 = 585.9\ m^2$			
	$(6.6+9.45)\times\frac{1}{2}\times 20.0 = 160.5\ m^2$			
	$(9.45+12.0)\times\frac{1}{2}\times 23.0 = 246.7\ m^2$			
	$12.0\times 15.0 = 180.0\ m^2$			
	$6.0\times 62.0 = 372.0\ m^2$			
	$(37.0+10.0)\times\frac{1}{2}\times 28.0 = 658.0\ m^2$			
	$585.9+160.5+246.7+180.0+372.0+658.0$			
	$= 2,203.1\ m^2$	m^2	2,203	

Working Division: D4 Road Work

Description	Calculation Details	Unit	Quantity	Remarks
D4/02	Base course			
	2,203.1 m^2 x 0.15 = 330.5 m^3	m^3	330.5	
D4/03	Subbase course			
	2,203.1 m^2 x 0.3 = 660.9 m^3	m^3	660.9	

I.STEEL MATERIAL

1.GIRDER MATERIAL

unit : kg

Material	Discription	Main Girder		Cross Beam	End sway	Int.sway	Lateral	Total
		G-1 & G-3	G-2					
SM50YB	PL22	432	220					652
	PL19	2,158	1,103					3,261
	total	2,590	1,323	0	0	0	0	3,913
SM50YA	PL14	1,194	597					1,791
	PL12	92	46					138
	PL11	944	270					1,214
	PL10	140	256					396
	PL9	6,770	3,385					10,155
	total	9,140	4,554	0	0	0	0	13,694
SS41	PL22	42	21					63
	PL13	312	210	34				556
	PL12			212				212
	PL9	844	399	504	116	120	258	2,241
	total	(1,198)	(630)	(750)	(116)	(120)	(258)	(3,072)
	L90x90x10				272	372		644
	L75x75x9					174		174
	total				(272)	(546)	(0)	(818)
	[250x90x9x13				324			324
	CT95x152x8x8						1,217	1,217
	total				(324)	(0)	(1,217)	(1,541)
	Total	1,198	630	750	712	666	1,475	5,431
SR24	RB16				12			12
F10T	M22-85	76	38					114
	M22-75	36	18					54
	M22-70	152	76					228
	M22-65			40	24	36	6	106
	M22-60			16			118	134
	total	264	132	56	24	36	124	636
	STUD 22x150	256	128					384
	TOTAL	13,448	6,767	806	748	702	1,599	24,070

2.Numbers of Bolt

Material	Discription	Main Girder		Cross Beam	End sway	Int.sway	Lateral	Total
		G-1 & G-3	G-2					
F10T	M22-85	128	64					192
	M22-75	64	32					96
	M22-70	272	136					408
	M22-65			76	48	72	12	208
	M22-60			32			224	256
	TOTAL	464	232	108	48	72	236	1160

3.Detail of Material List

3.1 Main Girder

G1(G3) - Block.1

Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	230x11	5,100	101.000	101	SM50YA
1	UFLG PL	280x14	4,188	129.000	129	SM50YA
1	LFLG PL	280x11	5,100	123.000	123	SM50YA
1	LFLG PL	440x19	3,478	224.000	224	SM50YB
1	LFLG PL	440x22	710	54.000	54	SM50YB
1	WEB PL	1550x9	9,288	1017.000	1,017	SM50YA
1	SPL PL	280x10	620	13.600	14	SM50YA
2	SPL PL	115x11	620	6.160	12	SM50YA
1	SPL PL	440x10	620	21.400	21	SM50YA
2	SPL PL	195x12	620	11.400	23	SM50YA
2	SPL PL	320x9	1,080	24.400	49	SM50YA
4	SPL PL	175x9	470	5.810	23	SM50YA
2	VSTF PL	110x13	1,550	17.400	35	SS41
6	VSTF PL	110x9	1,515	11.800	71	SS41
1	VSTF PL	110x13	1,550	17.400	17	SS41
4	HSTF PL	100x9	1,105	7.810	31	SS41
3	HSTF PL	100x9	1,155	8.160	24	SS41
1	HSTF PL	100x9	390	2.760	3	SS41
1	SOLE PL	200x22	250	8.640	9	SS41
7	PL	90x9	150	0.954	7	SS41
90	STUD	22x150	0	0.517	47	
16	H.T.B	22x75	0	0.570	9	F10T
32	H.T.B	22x85	0	0.600	19	F10T
68	H.T.B	22x70	0	0.555	38	F10T
				Total	2,100	

G1(G3) - Block.2

Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	280x14	11,025	339.000	339	SM50YA
1	LFLG PL	440x22	710	54.000	54	SM50YB
1	LFLG PL	444x19	9,605	631.000	631	SM50YB
1	LFLG PL	440x22	710	54.000	54	SM50YB
1	WEB PL	1550x9	11,025	1207.000	1,207	SM50YA
1	SPL PL	280x10	620	13.600	14	SM50YA
2	SPL PL	115x11	620	6.160	12	SM50YA
1	SPL PL	440x11	620	21.400	21	SM50YA
2	SPL PL	195x12	620	11.400	23	SM50YA
2	SPL PL	320x9	1,080	24.400	49	SM50YA
4	SPL PL	175x9	470	5.810	23	SM50YA
6	VSTF PL	110x9	1,515	11.800	71	SS41
3	PL	110x13	1,550	17.400	52	SS41
1	HSTF PL	100x9	390	2.760	3	SS41
3	HSTF PL	100x9	1,155	8.160	24	SS41
1	HSTF PL	100x9	1,145	8.090	8	SS41
1	HSTF PL	100x9	1,165	8.230	8	SS41

3	HSTF PL	100x9	1,155	8.160	24	SS41
1	HSTF PL	100x9	390	2.760	3	SS41
9	PL	90x9	150	0.954	9	SS41
66	STUD	22x150		0.517	34	
16	H.T.B	22x75		0.570	9	F10T
32	H.T.B	22x85		0.600	19	F10T
68	H.T.B	22x70		0.555	38	F10T
				Total	2,730	
	G1(G3) - Block.3					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	280x14	4188	129.000	129	
1	UFLG PL	230x11	5100	101.000	101	
1	LFLG PL	440x22	710	54.000	54	
1	LFLG PL	440x19	3478	224.000	224	
1	LFLG PL	280x11	5100	123.000	123	
1	WEB PL	1550x9	9288	1017.000	1,017	
2	VSTF PL	110x13	1550	17.400	35	
6	VSTF PL	110x9	1515	11.800	71	
1	VSTF PL	110x13	1550	17.400	17	
1	HSTF PL	100x9	390	2.760	3	
3	HSTF PL	100x9	1155	8.160	24	
4	HSTF PL	100x9	1105	7.810	31	
1	SOLE PL	200x22	350	12.100	12	
7	PL	90x9	150	0.954	7	
90	STUD	22x150	0	0.517	47	
				Total	1,895	
			TOTAL OF G1(G3)		6,724	
			G1+G3		13,448	

	3.Detail of Material List					
	3.1 Main Girder					
	G2 - Block.1					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	230x10	5,100	92.000	92	SM50YA
1	UFLG PL	280x14	4,188	129.000	129	SM50YA
1	LFLG PL	280x11	5,100	123.000	123	SM50YA
1	LFLG PL	450x19	3,478	229.000	229	SM50YB
1	LFLG PL	450x22	710	55.200	55	SM50YB
1	WEB PL	1550x9	9,288	1017.000	1,017	SM50YA
1	SPL PL	280x10	620	13.600	14	SM50YA
2	SPL PL	115x11	620	6.160	12	SM50YA
1	SPL PL	450x10	620	21.900	22	SM50YA
2	SPL PL	200x12	620	11.400	23	SM50YA
2	SPL PL	320x9	1,080	24.400	49	SM50YA
4	SPL PL	175x9	470	5.810	23	SM50YA
2	VSTF PL	110x13	1,550	17.400	35	SS41
6	VSTF PL	110x9	1,515	11.800	71	SS41
2	VSTF PL	110x13	1,550	17.400	35	SS41
4	HSTF PL	100x9	1,105	7.810	31	SS41
3	HSTF PL	100x9	1,155	8.160	24	SS41
1	HSTF PL	100x9	390	2.760	3	SS41
1	SOLE PL	200x22	250	8.640	9	SS41
90	STUD	22x150	0	0.517	47	
16	H.T.B	22x75	0	0.570	9	F10T
32	H.T.B	22x85	0	0.600	19	F10T
68	H.T.B	22x70	0	0.555	38	F10T
				Total	2,108	
	G2 - Block.2					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	280x14	11,025	339.000	339	SM50YA
1	LFLG PL	450x22	710	55.200	55	SM50YB
1	LFLG PL	450x19	9,605	645.000	645	SM50YB
1	LFLG PL	450x22	710	55.200	55	SM50YB
1	WEB PL	1550x9	11,025	1207.000	1,207	SM50YA
1	SPL PL	280x10	620	13.600	14	SM50YA
2	SPL PL	115x11	620	6.160	12	SM50YA
1	SPL PL	450x11	620	21.900	22	SM50YA
2	SPL PL	200x12	620	11.700	23	SM50YA
2	SPL PL	320x9	1,080	24.400	49	SM50YA
4	SPL PL	175x9	470	5.810	23	SM50YA
6	VSTF PL	110x9	1,515	11.800	71	SS41
4	VSTF PL	110x13	1,550	17.400	70	SS41
1	HSTF PL	100x9	390	2.760	3	SS41
3	HSTF PL	100x9	1,155	8.160	24	SS41
1	HSTF PL	100x9	1,145	8.090	8	SS41
1	HSTF PL	100x9	1,165	8.230	8	SS41
3	HSTF PL	100x9	1,155	8.160	24	SS41

1	HSTF PL	100x9	390	2.760	3	SS41
66	STUD	22x150		0.517	34	
16	H.T.B	22x75		0.570	9	F10T
32	H.T.B	22x85		0.600	19	F10T
68	H.T.B	22x70		0.555	38	F10T
				Total	2,756	
	G2 - Block.3					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	UFLG PL	280x14	4188	129.000	129	
1	UFLG PL	230x10	5100	92.100	92	
1	LFLG PL	450x22	710	55.200	55	
1	LFLG PL	450x19	3478	229.000	229	
1	LFLG PL	280x11	5100	123.000	123	
1	WEB PL	1550x9	9288	1017.000	1,017	
2	VSTF PL	110x13	1550	17.400	35	
6	VSTF PL	110x9	1515	11.800	71	
2	VSTF PL	110x13	1550	17.400	35	
1	HSTF PL	100x9	390	2.760	3	
3	HSTF PL	100x9	1155	8.160	24	
4	HSTF PL	100x9	1105	7.810	31	
1	SOLE PL	200x22	350	12.100	12	
90	STUD	22x150	0	0.517	47	
				Total	1,903	
			TOTAL OF G2		6,767	
			G1+G2 + G3		20,215	

3.Detail of Material List

3.2 Cross beam

F1

Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	FLG PL	250x12	2,255	53.100	53	SM50YA
1	FLG PL	200x9	360	5.090	5	SM50YA
1	FLG PL	250x12	2,255	53.100	53	SM50YA
1	FLG PL	200x9	360	5.090	5	SM50YB
2	SPL PL	360x9	465	10.300	21	SM50YB
1	WEB PL	1190x9	2,531	213.000	213	SM50YA
1	VSTF PL	90x9	1,190	7.570	8	SM50YA
1	PL	110x13	138	1.550	2	SM50YA
1	PL	110x13	198	2.220	2	SM50YA
1	PL	110x13	1,196	13.400	13	SM50YA
22	H.T.B	22x65	0	0.540	12	SM50YA
8	H.T.B	22x60	0	0.525	4	SM50YA
8	H.T.B	22x65	0	0.540	4	SS41
8	H.T.B	22x60	0	0.525	4	SS41
8	H.T.B	22x65	0	0.540	4	SS41
				Total	403	
				F1 x 2	806	

3.3 End sway

ES-1

Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	CH	250x90x9x13	2,330	80.600	81	SM50YA
2	L	90x90x10	1,385	18.400	37	SM50YB
1	L	90x90x10	2,330	31.000	31	SM50YB
1	GUSS PL	240x9	300	5.090	5	SM50YB
1	GUSS PL	250x9	300	5.190	5	SM50YA
1	GUSS PL	240x9	300	5.090	5	SM50YA
1	GUSS PL	250x9	300	5.190	5	SM50YA
1	GUSS PL	315x9	385	8.570	9	SM50YA
12	H.T.B	22x65	0	0.540	6	SM50YA
3	ROD	16	600	0.948	3	SM50YA
				Total	187	
				ES x 4	748	

	3.4 Int.sway					
	IS-1					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	L	90x90x10	2330	31.000	31	
2	L	230x10	1460	14.500	29	
1	L	75x75x9	2330	31.000	31	
1	GUSS PL	90x90x10	250	3.980	4	
1	GUSS PL	230x9	250	3.210	3	
1	GUSS PL	230x9	250	3.980	4	
1	GUSS PL	230x9	250	3.210	3	
1	GUSS PL	225x9	250	6.000	6	
12	H.T.B	22x65	385	0.540	6	
				Total	117	
				IS-1 x 6	702	
	3.5 Lateral					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
8	GUSS PL	240x9	470	7.090	57	
4	GUSS PL	245x9	465	7.090	28	
4	GUSS PL	290x9	400	4.920	20	
4	GUSS PL	290x9	450	7.010	28	
4	GUSS PL	330x9	575	10.900	44	
4	GUSS PL	340x9	575	11.200	45	
2	GUSS PL	375x9	725	18.100	36	
4	CT	95x152x8x8	3160	49.300	197	
4	CT	95x152x8x8	3175	49.500	198	
4	CT	95x152x8x8	3235	50.500	202	
4	CT	95x152x8x8	3260	50.900	204	
8	CT	95x152x8x8	3335	52.000	416	
224	H.T.B	22x60	0	0.525	118	
12	H.T.B	22x65	0	0.540	6	
				Total	1,599	

II.EXPANTION JOINT

EJ-1 & EJ-2

Descrip.	Material	Size(mm)	Weight(kg)
STEEL PLATE	SM41A	t=28	1,072
	SS41	t=12	1,102
		t=10	296
FLAT BAR	SS41	FB-50x9	104
STUD	SD30	D22	346
REINF.BAR	SD30	D16	88
H.T.B	F10T	M22	14
		TOTAL	3,022

	II.1.Detail of Material List					
	EJ-1					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
1	PL	405x28	6,020	89.020	536	SM41A
2	PL	203x10	830	15.940	26	SS41
2	PL	503x12	590	47.380	56	SS41
1	PL	280x12	6,020	26.380	159	SS41
15	PL	128x10	248	10.050	37	SS41
26	FB	50x9	279	3.530	26	SS41
98	STUD	D22	300	3.040	89	SD30
2	DB	D16	7,100	1.560	22	SD30
				Total	951	
				EJ-1 x 2	1,902	
	EJ-2					
Q'ty	Descrip.	Size(mm)	Length(mm)	Unit Wt(kg)	Weight(kg)	Material
2	PL	203x10	830	15.940	26	SS41
1	PL	190x12	7,200	17.900	129	SS41
2	PL	491x12	590	46.250	55	SS41
1	PL	268x12	6,020	25.250	152	SS41
15	PL	158x10	246	12.400	46	SS41
26	FB	50x9	279	3.530	26	SS41
92	STUD	D22	300	3.040	84	SD30
2	DB	D16	7,100	1.560	22	SD30
3	PL	190x10	280	14.920	13	SS41
12	H.T.B	M22	75	0.570	7	F10T
				Total	560	
				EJ-2 x 2	1,120	
				TOTAL	**3,022**	

SPILL WAY

COAT WITH PAINT . AREA . SUM UP LIST

(M2)

	OUTSIDE		
	SHOP	SPLICE	FIELD
MAIN GIRDER	405.22	14.38	419.60
CROSS BEAM	17.62	1.28	18.90
END SWAY	16.56	0.32	16.88
INT. SWAY	17.64	0.48	16.12
LATERAL	43.84	1.58	45.42
TOTAL	500.88	18.04	518.92

DESCRIP-TION		SIZE (M)				FACE	EACH		SHOP (M2)	SPLICE (M2)	FIELD (M2)
MAIN GIRDER											
G- 1											
BLOCK- 1											2 - REQ.D
UFLG	PL	0.230	*	5.100		* 1 *	1	=	1.17		1.17
UFLG	PL	0.280	*	4.188		* 1 *	1	=	1.17		1.17
LFLG	PL	0.291	*	5.100		* 2 *	1	=	2.97		2.97
LFLG	PL	0.459	*	3.478	* 0.98	* 2 *	1	=	3.13		3.13
LFLG	PL	0.462	*	0.710		* 2 *	1	=	0.66		0.66
WEB	PL	1.550	*	9.288		* 2 *	1	=	28.79		28.79
SPL	PL	0.115	*	0.620		* 1 *	2	=	-0.14	0.14	
SPL	PL	0.440	*	0.620		* 1 *	1	=	-0.27	0.27	
SPL	PL	0.195	*	0.620		* 1 *	2	=	-0.24	0.24	
SPL	PL	0.320	*	1.080		* 1 *	2	=	-0.69	0.69	
SPL	PL	0.175	*	0.470		* 1 *	4	=	-0.33	0.33	
VSTF	PL	0.110	*	1.550		* 2 *	2	=	0.68		0.68
VSTF	PL	0.110	*	1.515		* 2 *	6	=	2.00		2.00
VSTF	PL	0.110	*	1.550		* 2 *	1	=	0.34		0.34
HSTF	PL	0.100	*	1.105		* 2 *	4	=	0.88		0.88
HSTF	PL	0.100	*	1.155		* 2 *	3	=	0.69		0.69
HSTF	PL	0.100	*	0.390		* 2 *	1	=	0.08		0.08
	PL	0.090	*	0.150		* 2 *	7	=	0.19		0.19
SPL	HTB	6.700	*	0.001	* 0.50	* 1 *	16	=		0.05	0.05
SPL	HTB	6.700	*	0.001		* 1 *	32	=		0.21	0.21
SPL	HTB	6.700	*	0.001		* 1 *	68	=		0.46	0.46

BLOCK- 1 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	41.08	*	2	=	82.16 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	2.39	*	2	=	4.78 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	43.47	*	2	=	86.94 (M2)

DESCRIP-TION		SIZE (M)					FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
BLOCK- 2											2 - REQ.D
UFLG	PL	0.280	*	11.025			* 1 *	1 =	3.09		3.09
LFLG	PL	0.462	*	0.710			* 2 *	1 =	0.66		0.66
LFLG	PL	0.459	*	9.605			* 2 *	1 =	8.82		8.82
LFLG	PL	0.462	*	0.710			* 2 *	1 =	0.66		0.66
WEB	PL	1.550	*	11.025			* 2 *	1 =	34.18		34.18
SPL	PL	0.115	*	0.620			* 1 *	2 =	-0.14	0.14	
SPL	PL	0.440	*	0.620			* 1 *	1 =	-0.27	0.27	
SPL	PL	0.195	*	0.620			* 1 *	2 =	-0.24	0.24	
SPL	PL	0.320	*	1.080			* 1 *	2 =	-0.69	0.69	
SPL	PL	0.175	*	0.470			* 1 *	4 =	-0.33	0.33	
VSTF	PL	0.110	*	1.515			* 2 *	6 =	2.00		2.00
VSTF	PL	0.110	*	1.550			* 2 *	2 =	0.68		0.68
	PL	0.110	*	1.550			* 2 *	1 =	0.34		0.34
HSTF	PL	0.100	*	0.390			* 2 *	1 =	0.08		0.08
HSTF	PL	0.100	*	1.155			* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	*	1.145			* 2 *	1 =	0.23		0.23
HSTF	PL	0.100	*	1.165			* 2 *	1 =	0.23		0.23
HSTF	PL	0.100	*	1.155			* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	*	0.390			* 2 *	1 =	0.08		0.08
	PL	0.090	*	0.150			* 2 *	9 =	0.24		0.24
SPL	HTB	6.700	*	0.001	*	0.50	* 1 *	16 =		0.05	0.05
SPL	HTB	6.700	*	0.001			* 1 *	32 =		0.21	0.21
SPL	HTB	6.700	*	0.001			* 1 *	68 =		0.46	0.46

BLOCK- 2 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	51.00	*	2	=	102.00 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	2.39	*	2	=	4.78 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	53.39	*	2	=	106.78 (M2)

NO. 3

P.

DESCRIP-TION		SIZE (M)			FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
BLOCK- 3									2 - REQ.D
UFLG	PL	0.280	* 4.188		* 1 *	1 =	1.17		1.17
UFLG	PL	0.230	* 5.100		* 1 *	1 =	1.17		1.17
LFLG	PL	0.462	* 0.710		* 2 *	1 =	0.66		0.66
LFLG	PL	0.459	* 3.478	* 0.98	* 2 *	1 =	3.13		3.13
LFLG	PL	0.291	* 5.100		* 2 *	1 =	2.97		2.97
WEB	PL	1.550	* 9.288		* 2 *	1 =	28.79		28.79
VSTF	PL	0.110	* 1.550		* 2 *	2 =	0.68		0.68
VSTF	PL	0.110	* 1.515		* 2 *	6 =	2.00		2.00
VSTF	PL	0.110	* 1.550		* 2 *	1 =	0.34		0.34
HSTF	PL	0.100	* 0.390		* 2 *	1 =	0.08		0.08
HSTF	PL	0.100	* 1.155		* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	* 1.105		* 2 *	4 =	0.88		0.88
	PL	0.090	* 0.150		* 2 *	7 =	0.19		0.19

BLOCK- 3 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	42.75	* 2	=	85.50 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	0.00	* 2	=	0.00 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	42.75	* 2	=	85.50 (M2)

NO. 4

P.

DESCRIP-TION	SIZE (M)					FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
G- 2										
BLOCK- 1								1 - REQ.D		
UFLG	PL	0.230	*	5.100		* 1 *	1 =	1.17		1.17
UFLG	PL	0.280	*	4.188		* 1 *	1 =	1.17		1.17
LFLG	PL	0.291	*	5.100		* 2 *	1 =	2.97		2.97
LFLG	PL	0.469	*	3.478	* 0.98	* 2 *	1 =	3.20		3.20
LFLG	PL	0.472	*	0.710		* 2 *	1 =	0.67		0.67
WEB	PL	1.550	*	9.288		* 2 *	1 =	28.79		28.79
SPL	PL	0.115	*	0.620		* 1 *	2 =	-0.14	0.14	
SPL	PL	0.450	*	0.620		* 1 *	1 =	-0.28	0.28	
SPL	PL	0.200	*	0.620		* 1 *	2 =	-0.25	0.25	
SPL	PL	0.320	*	1.080		* 1 *	2 =	-0.69	0.69	
SPL	PL	0.175	*	0.470		* 1 *	4 =	-0.33	0.33	
VSTF	PL	0.110	*	1.550		* 2 *	2 =	0.68		0.68
VSTF	PL	0.110	*	1.515		* 2 *	6 =	2.00		2.00
VSTF	PL	0.110	*	1.550		* 2 *	2 =	0.68		0.68
HSTF	PL	0.100	*	1.105		* 2 *	4 =	0.88		0.88
HSTF	PL	0.100	*	1.155		* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	*	0.390		* 2 *	1 =	0.08		0.08
SPL	HTB	6.700	*	0.001	* 0.50	* 1 *	16 =		0.05	0.05
SPL	HTB	6.700	*	0.001		* 1 *	32 =		0.21	0.21
SPL	HTB	6.700	*	0.001		* 1 *	68 =		0.46	0.46

BLOCK- 1 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	41.29	* 1	=	41.29 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	2.41	* 1	=	2.41 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	43.70	* 1	=	43.70 (M2)

DESCRIP-TION	SIZE (M)						FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
BLOCK- 2								1 - REQ.D			
UFLG	PL	0.280	*	11.025			* 1 *	1 =	3.09		3.09
LFLG	PL	0.472	*	0.710			* 2 *	1 =	0.67		0.67
LFLG	PL	0.469	*	9.605			* 2 *	1 =	9.01		9.01
LFLG	PL	0.472	*	0.710			* 2 *	1 =	0.67		0.67
WEB	PL	1.550	*	11.025			* 2 *	1 =	34.18		34.18
SPL	PL	0.115	*	0.620			* 1 *	2 =	-0.14	0.14	
SPL	PL	0.450	*	0.620			* 1 *	1 =	-0.28	0.28	
SPL	PL	0.200	*	0.620			* 1 *	2 =	-0.25	0.25	
SPL	PL	0.320	*	1.080			* 1 *	2 =	-0.69	0.69	
SPL	PL	0.175	*	0.470			* 1 *	4 =	-0.33	0.33	
VSTF	PL	0.110	*	1.515			* 2 *	6 =	2.00		2.00
VSTF	PL	0.110	*	1.550			* 2 *	4 =	1.36		1.36
HSTF	PL	0.100	*	0.390			* 2 *	1 =	0.08		0.08
HSTF	PL	0.100	*	1.155			* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	*	1.145			* 2 *	1 =	0.23		0.23
HSTF	PL	0.100	*	1.165			* 2 *	1 =	0.23		0.23
HSTF	PL	0.100	*	1.155			* 2 *	3 =	0.69		0.69
HSTF	PL	0.100	*	0.390			* 2 *	1 =	0.08		0.08
SPL	HTB	6.700	*	0.001	*	0.50	* 1 *	16 =		0.05	0.05
SPL	HTB	6.700	*	0.001			* 1 *	32 =		0.21	0.21
SPL	HTB	6.700	*	0.001			* 1 *	68 =		0.46	0.46

BLOCK- 2 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	51.29	* 1	=	51.29 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	2.41	* 1	=	2.41 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	53.70	* 1	=	53.70 (M2)

DESCRIP-TION	SIZE (M)			FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
BLOCK- 3								1 - REQ.D
UFLG	PL	0.280	4.188	1	1	1.17		1.17
UFLG	PL	0.230	5.100	1	1	1.17		1.17
LFLG	PL	0.472	0.710	2	1	0.67		0.67
LFLG	PL	0.469	3.478 * 0.98	2	1	3.20		3.20
LFLG	PL	0.291	5.100	2	1	2.97		2.97
WEB	PL	1.550	9.288	2	1	28.79		28.79
VSTF	PL	0.110	1.550	2	2	0.68		0.68
VSTF	PL	0.110	1.515	2	6	2.00		2.00
VSTF	PL	0.110	1.550	2	2	0.68		0.68
HSTF	PL	0.100	0.390	2	1	0.08		0.08
HSTF	PL	0.100	1.155	2	3	0.69		0.69
HSTF	PL	0.100	1.105	2	4	0.88		0.88

BLOCK- 3 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	42.98 *	1	=	42.98 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	0.00 *	1	=	0.00 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	42.98 *	1	=	42.98 (M2)

MAIN GIRDER ALL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	=	405.22 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	=	14.38 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	=	419.60 (M2)

NO. 8

P.

CROSS BEAM

F- 1

BLOCK- 0 2 - REQ.D

DESCRIP-TION		SIZE (M)				FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
FLG	PL	0.250	* 2.255			* 2	* 1 =	1.13		1.13
FLG	PL	0.200	* 0.360			* 2	* 1 =	0.14		0.14
FLG	PL	0.250	* 2.255			* 2	* 1 =	1.13		1.13
FLG	PL	0.200	* 0.360			* 2	* 1 =	0.14		0.14
SPL	PL	0.360	* 0.465	* 0.87		* 1	* 2 =	-0.29	0.29	
WEB	PL	1.190	* 2.531			* 2	* 1 =	6.02		6.02
VSTF	PL	0.090	* 1.190			* 2	* 1 =	0.21		0.21
	PL	0.110	* 0.138			* 2	* 1 =	0.03		0.03
	PL	0.110	* 0.198			* 2	* 1 =	0.04		0.04
	PL	0.110	* 1.196			* 2	* 1 =	0.26		0.26
SPL	HTB	6.700	* 0.001			* 1	* 22 =		0.15	0.15
SPL	HTB	6.700	* 0.001			* 1	* 8 =		0.05	0.05
SPL	HTB	6.700	* 0.001			* 1	* 8 =		0.05	0.05
SPL	HTB	6.700	* 0.001			* 1	* 8 =		0.05	0.05
SPL	HTB	6.700	* 0.001			* 1	* 8 =		0.05	0.05

BLOCK- 0 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	8.81	* 2	=	17.62 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	0.64	* 2	=	1.28 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	9.45	* 2	=	18.90 (M2)

CROSS BEAM ALL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	=	17.62 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	=	1.28 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	=	18.90 (M2)

NO. 10

P.

DESCRIP -TION	SIZE (M)				FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
END SWAY									
ES- 1									
BLOCK- 0									4 - REQ.D
CH CHAN	0.770	*	2.330		* 1	* 1 =	1.79		1.79
L L	0.360	*	1.385		* 1	* 2 =	1.00		1.00
L L	0.360	*	2.330		* 1	* 1 =	0.84		0.84
GUSS PL	0.240	*	0.300	* 0.60	* 2	* 1 =	0.09		0.09
GUSS PL	0.250	*	0.300	* 0.60	* 2	* 1 =	0.09		0.09
GUSS PL	0.240	*	0.300	* 0.60	* 2	* 1 =	0.09		0.09
GUSS PL	0.250	*	0.300	* 0.60	* 2	* 1 =	0.09		0.09
GUSS PL	0.315	*	0.385	* 0.60	* 2	* 1 =	0.15		0.15
SPL HTB	6.700	*	0.001		* 1	* 12 =		0.08	0.08

BLOCK- 0 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	4.14	* 4	=	16.56 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	0.08	* 4	=	0.32 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	4.22	* 4	=	16.88 (M2)

END SWAY ALL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	=	16.56 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	=	0.32 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	=	16.68 (M2)

NO. 12

P.

DESCRIP -TION	SIZE (M)				FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
INT. SWAY									
IS- 1									
BLOCK- 0									6 - REQ.D
L L	0.360	* 2.330		*	1 *	1 =	0.84		0.84
L L	0.300	* 1.460		*	1 *	2 =	0.88		0.88
L L	0.360	* 2.330		*	1 *	1 =	0.84		0.84
GUSS PL	0.230	* 0.250	* 0.60	*	2 *	1 =	0.07		0.07
GUSS PL	0.230	* 0.250	* 0.60	*	2 *	1 =	0.07		0.07
GUSS PL	0.230	* 0.250	* 0.60	*	2 *	1 =	0.07		0.07
GUSS PL	0.230	* 0.250	* 0.60	*	2 *	1 =	0.07		0.07
GUSS PL	0.225	* 0.385	* 0.60	*	2 *	1 =	0.10		0.10
SPL HTB	6.700	* 0.001		*	1 *	12 =		0.08	0.08

BLOCK- 0 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	2.94	*	6	=	17.64 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	0.08	*	6	=	0.48 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	3.02	*	6	=	18.12 (M2)

INT. SWAY ALL PAINT-AREA

(1) OUTSIDE	SHOP	PAINT-AREA	=	17.64 (M2)
(2) OUTSIDE	SPLICE	PAINT-AREA	=	0.48 (M2)
(3) OUTSIDE	FIELD	PAINT-AREA	=	18.12 (M2)

DESCRIP -TION	SIZE (M)	FACE	EACH	SHOP (M2)	SPLICE (M2)	FIELD (M2)
LATERAL						
BLOCK- 0						1 - REQ.D
GUSS PL	0.240 * 0.470 * 0.60	* 2	* 8 =	1.08		1.08
GUSS PL	0.245 * 0.465 * 0.60	* 2	* 4 =	0.55		0.55
GUSS PL	0.290 * 0.400 * 0.60	* 2	* 4 =	0.56		0.56
GUSS PL	0.290 * 0.450 * 0.60	* 2	* 4 =	0.63		0.63
GUSS PL	0.330 * 0.575 * 0.60	* 2	* 4 =	0.91		0.91
GUSS PL	0.340 * 0.575 * 0.60	* 2	* 4 =	0.94		0.94
GUSS PL	0.375 * 0.725 * 0.60	* 2	* 2 =	0.65		0.65
CT CT	0.494 * 3.160	* 1	* 4 =	6.24		6.24
CT CT	0.494 * 3.175	* 1	* 4 =	6.27		6.27
CT CT	0.494 * 3.235	* 1	* 4 =	6.39		6.39
CT CT	0.494 * 3.260	* 1	* 4 =	6.44		6.44
CT CT	0.494 * 3.335	* 1	* 8 =	13.18		13.18
SPL HTB	6.700 * 0.001	* 1	* 224 =		1.50	1.50
SPL HTB	6.700 * 0.001	* 1	* 12 =		0.08	0.08

BLOCK- 0 TOTAL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	43.84 * 1	=	43.84 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	1.58 * 1	=	1.58 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	45.42 * 1	=	45.42 (M2)

LATERAL ALL PAINT-AREA

(1) OUTSIDE	SHOP PAINT-AREA	=	43.84 (M2)
(2) OUTSIDE	SPLICE PAINT-AREA	=	1.58 (M2)
(3) OUTSIDE	FIELD PAINT-AREA	=	45.42 (M2)

NO. 16

P.

SPILL WAY

TOTAL PAINT-AREA

(1)	OUTSIDE	(SHOP)	=	500.88	(M2)
(2)	OUTSIDE	(SPLICE)	=	18.04	(M2)
(3)	OUTSIDE	(FIELD)	=	518.92	(M2)