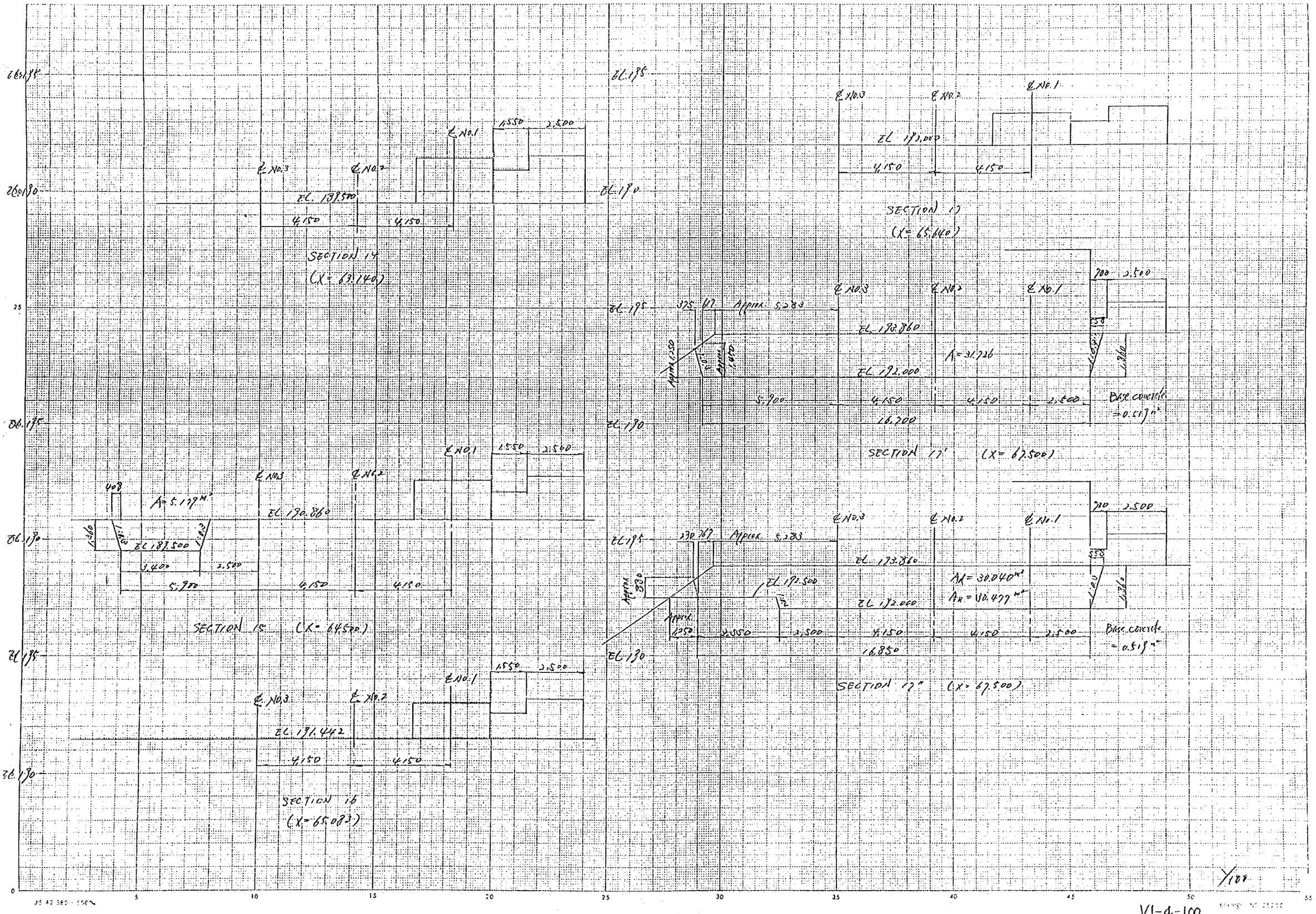

SECTION 14
(X= 63.140)
EL. 189.500
4,150
4,150
1,550
2,500
SECTION 15 (X= 64.500)
408
A= 5.179 m²
EL 190.860
EL 189.500
3,400
2,500
5,900
4,150
4,150
SECTION 16
(X= 65.083)
EL 191.442
SECTION 17
(X= 65.640)
EL 192.000
SECTION 17' (X= 67.500)
EL 193.860
A= 31.726
EL 192.000
5,900
4,150
4,150
2,500
16,700
Base concrete = 0.519 m²
SECTION 17" (X= 67.500)
EL 193.860
EL 192.500
EL 192.000
Ak= 30.040 m²
Ak= 30.477 m²
16,850
Base concrete = 0.519 m²
Approx. 5,283
Approx. 1,250
Approx. 1,450
Approx. 880

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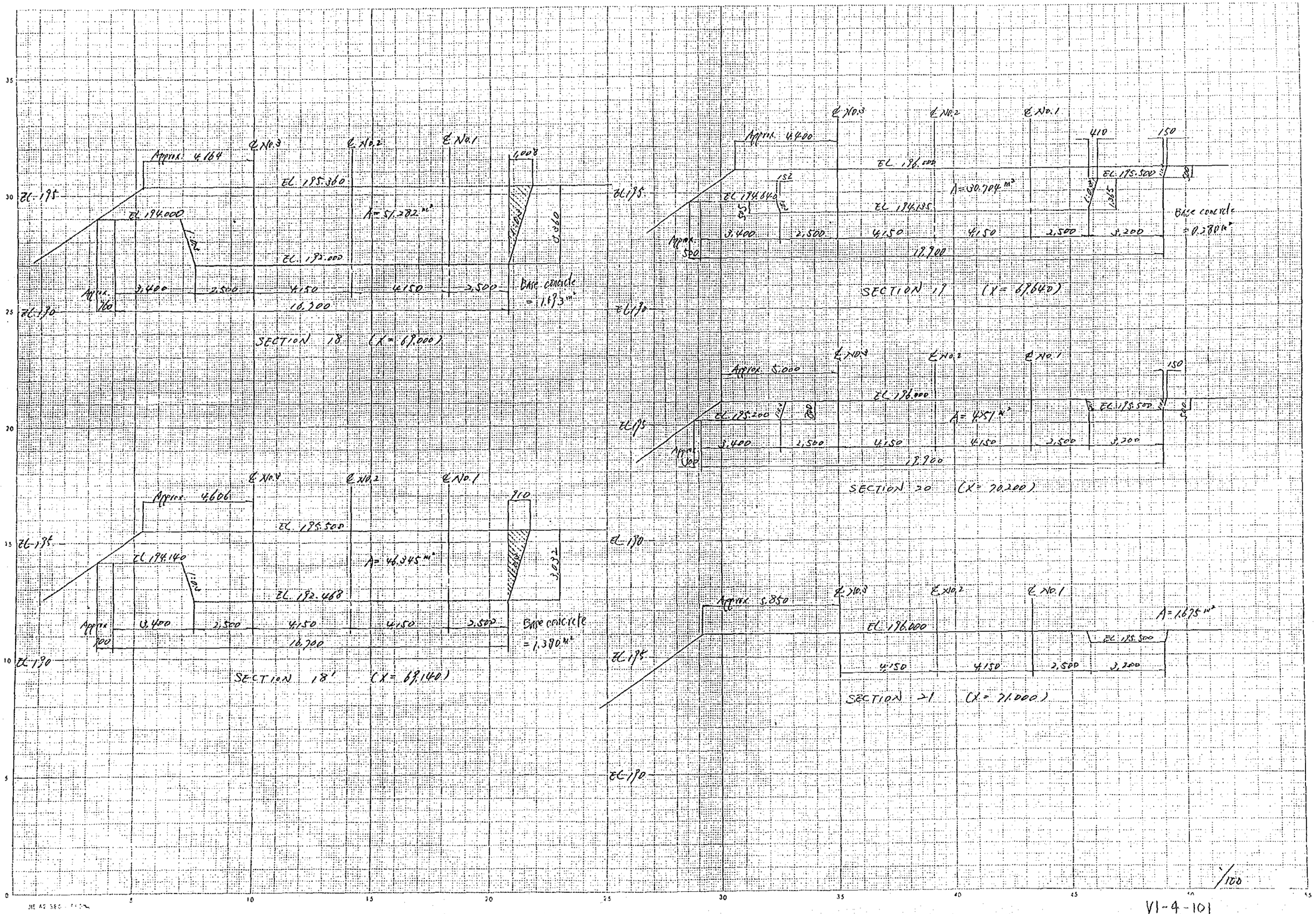

Approx. 4.164
℄ No.3
℄ No.2
℄ No.1
1.008
EL. 195.360
EL. 194.000
A = 51.282 m²
EL. 192.000
3.360
Approx. 760
3.400
2.500
4.150
4.150
2.500
16.700
Base concrete = 1.193 m²
SECTION 18 (X = 69.000)
Approx. 4.400
℄ No.3
℄ No.2
℄ No.1
410
150
EL. 196.000
EL. 195.500
EL. 194.640
A = 30.704 m²
EL. 194.135
Base concrete = 0.280 m²
Approx. 500
3.400
2.500
4.150
4.150
2.500
3.200
19.900
SECTION 19 (X = 69.640)
Approx. 5.000
℄ No.3
℄ No.2
℄ No.1
150
EL. 196.000
EL. 195.200
A = 4.251 m²
EL. 195.500
Approx. 500
3.400
2.500
4.150
4.150
2.500
3.200
19.900
SECTION 20 (X = 70.200)
Approx. 4.606
℄ No.3
℄ No.2
℄ No.1
910
EL. 195.500
EL. 194.140
A = 46.345 m²
EL. 192.468
3.032
Approx. 700
3.400
2.500
4.150
4.150
2.500
16.700
Base concrete = 1.380 m²
SECTION 18' (X = 69.140)
Approx. 5.850
℄ No.3
℄ No.2
℄ No.1
A = 1.675 m²
EL. 196.000
EL. 195.500
4.150
4.150
2.500
3.200
SECTION 21 (X = 71.000)
EL. 195
EL. 190

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/03	Concrete class C			
	Retaining wall at RL 138.0			
	70 m³.			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Works			
E2/04	Concrete class D			
	Steps between No.1 Intake and No.2 Intake			
	and between No.2 Intake and No.3 Intake			
	Block 5 between No.2 Intake and			
	No.3 Intake			
	B=0.85m			
	$(32.945\ m^2{}^{c1} - 0.60 \times 13.250) \times 0.85 = 21.246\ m^3$			
	c1 See page 56			
	Block 6 both between No.1 and No.2, and			
	between No.2 and No.3 Intakes			
	$(37.612\ m^2{}^{c2} - 0.60 \times 15.0) \times 0.85 \times 2 = 05.040\ m^3$			
	c2 See page 60			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Works			
E2/04	Concrete class D			
	Steps			
	Block 7 both			
	cl			
	$(22.760^{M^2} - 0.60 \times 15.9) \times 0.85 \times 2 = 22.477^{M^3}$			
	cl. See page 61			
	Step			
	Summary			
	Block 5 21.246 M^3			
	" 6 35.040			
	" 7 22.477			
	Total 78.763 M^3			

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Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/05	Form F1			
	Construction joint			
	Intake No.3			
	between			
	Block 1 and 2 $4.8 \times 4.0 - (2.4 \times 2.1 - 4 \times \frac{1}{2} \times 0.5^2)$ = 14.660	m^2		
	" 2 " 3 $4.0 \times 3.7 - 4.54$ = 10.260	m^2		
	" 3 " 4 $4.0 \times 3.7 - 4.54$ = 10.260			
	" 4 " 5 2.6×3.7 = 9.62			
	" 5 " 6 2.4×3.3 = 7.92			
	" 6 " 7 1.9×3.3 = 6.27			
	Sub-total 58.990	m^2		
	Intake No.2			
	between			
	Block 3 & 4 2.7×4.3 = 11.610	m^2		
	" 4 & 5 2.6×3.8 = 8.580			
	1.9×0.65 = 1.235			
	" 5 " 6 2.4×3.3 = 7.92			
	1.8×0.85 = 1.530			
	" 6 " 7 1.9×3.3 = 6.365			
	1.2×0.85 = 1.020			
	Sub-total. 38.260	m^2		

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	Intake No.1			
	between			
	Block 5 and 6 3.4 × 4.5 = 10.800 m²			
	" 6 " 7 1.3 × 3.3 = 6.270			
	1.2 × 0.85 = 1.020			
	Sub-total 18.090 m².			
	Construction joint			
	No.3 Intake 58.990 m²			
	No.2 " 38.260			
	No.1 " 18.090			
	Total 115.34 m².			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/05	Form F1			
	Blockout.			
	Intake See page 25			
	A (0.30+0.41) x 3.20 = 2.272 m^2			
	2x 0.30 x 0.41 = 0.246			
	B (0.41 + 0.41) x 3.20 = 2.624 m^2			
	2x $\frac{1}{2}$ (0.41+0.60) x 0.30 = 0.303			
	C 0.600 x 3.30 = 1.980 m^2			
	2x $\frac{1}{2}$ (0.60+0.40) x 0.3 = 0.300			
	D (0.35+0.35+0.5) x 1.3 = 2.280			
	2x 0.7 x 1.2 = 1.680			
	2x (1.2-0.5) x 0.35 = 0.490			
	2x 1.2 x 0.35 = 0.840			
	4x 0.7 x 0.35 = 0.980			
	E (0.3+0.3) x 2.1 = 1.260			
	F (0.3+0.7) x 2.3 = 2.300			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	See B-B $2\times(0.6+1.2+0.2)\times2.1 = 8.400$	M^2		
	" C-C $2\times(0.5+0.6+1.2+0.2)\times2.5 = 12.500$			
	" D-D $2\times(0.6+0.6)\times 3.5 = 8.400$			
	Sub-total 46.855	M^2		
	Intake $3\times 46.855^{M^2} = 140.565$	M^3		
	Spindle support			
	No. 1 Intake 5 Nos			
	No. 2 " 8 "			
	No. 3 " 11 "			
	Total 24 Nos			
	Concrete class A			
	$24\times 0.30\times0.30\times0.30 = 0.648$	M^3		
	Form F1			
	$24\times 5\times0.3\times0.3 = 10.80$	M^2		

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	Thrust Block			
	Concrete class A			
	$2 \times 0.4 \times 0.6 \times 0.35 = 0.252\ m^3$			
	Form F1			
	$3 \times \{2 \times 0.40 \times 0.35 + 2 \times 0.60 \times 0.35$			
	$+ 0.40 \times 0.60\} = 2.82\ m^2$			
E2/04	Form F1 Summary			
	Intake 140.585 m^2			
	Spindle support 10.800			
	Thrust block 2.820			
	Total 154.185 m^2	m^2	155	
E2/01	concrete class A Summary			
		m^3		
	Intake [1] $3 \times 5.933\ m^3 = 17.817$			
	Spindle support 0.648			
	Thrust block 0.252			
	Total 18.717 m^3	m^3	20	

[1] See page 25

Working Division: E Intake

Description	Calculation Details			Unit	Quantity	Remarks
	E2 Concrete Work					
E2/06	From F2 Summary					
		No.3	No.2	No.1		
	Block 1	337.667 m²	—	—		
	" 2	195.058	—	—		
	" 3	195.491	349.589	—		
	" 4	—	339.844	—		
	" 5	109.615	76.670	443.315		
	" 6	108.704	108.704	108.704		
	" 7	96.344	96.344	96.344		
	Thrust Block	—	112.704	—		
	Unloading slope	30.464				
	Sub-total	2.805.616 m²				
	Loading slope	219.804 m²				
	Steps	41.870 m²				
	Retaining wall at EL 158.0	41.458 m²				
	Total	3,108.778		m²	3.110	

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Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Forms F2			
	No.3 Intake			
	Block 1'			
	a: 3.595" × 2.500" = 9.488			
	b: $\frac{1}{2}$(12.148 + 10.225) × 2.5 × 2 = 55.932			
	−2.534 × 2.5			
	+2.851 × 2.5 = 0.668			
	c: $\frac{1}{2}$(10.225 − 2.126 + 1.852)			
	× 3.0 × 2 = 29.373			
	d: 4.32 × 3.2 − 3.0 × 3.0 = 6.744			
	(14.350 − 140.50) × 0.9 × 2 = 5.400			
	e: 2 × 0.5 × 5.8 = 5.800			
	f: 5.0 × 1.2 − 2.9 × 0.8 = 3.680			
	0.643 × 2.1 = 1.350			
	1.357 × 2.1 = 2.850			
	$\frac{1}{2}$(0.643 + 1.357) × 2.1 × 2 = 4.200			
	2.433 × 2.1 = 5.109			
	3.257 × 2.1 − 2.9 × 0.8 = 4.520			
	$\frac{1}{2}$(2.433 + 3.257) × 2.1 × 2 = 11.849			
	4 × $\frac{1}{2}$(2.1 + 3.0) × 1.26 = 12.852			
	2 × 0.6 × 2.5 = 3.000			
	2 × 0.8 × 2.5 = 4.000			
	2.9 × 2.5 × 2 = 14.500			
	Sub-total	182.015 m²		

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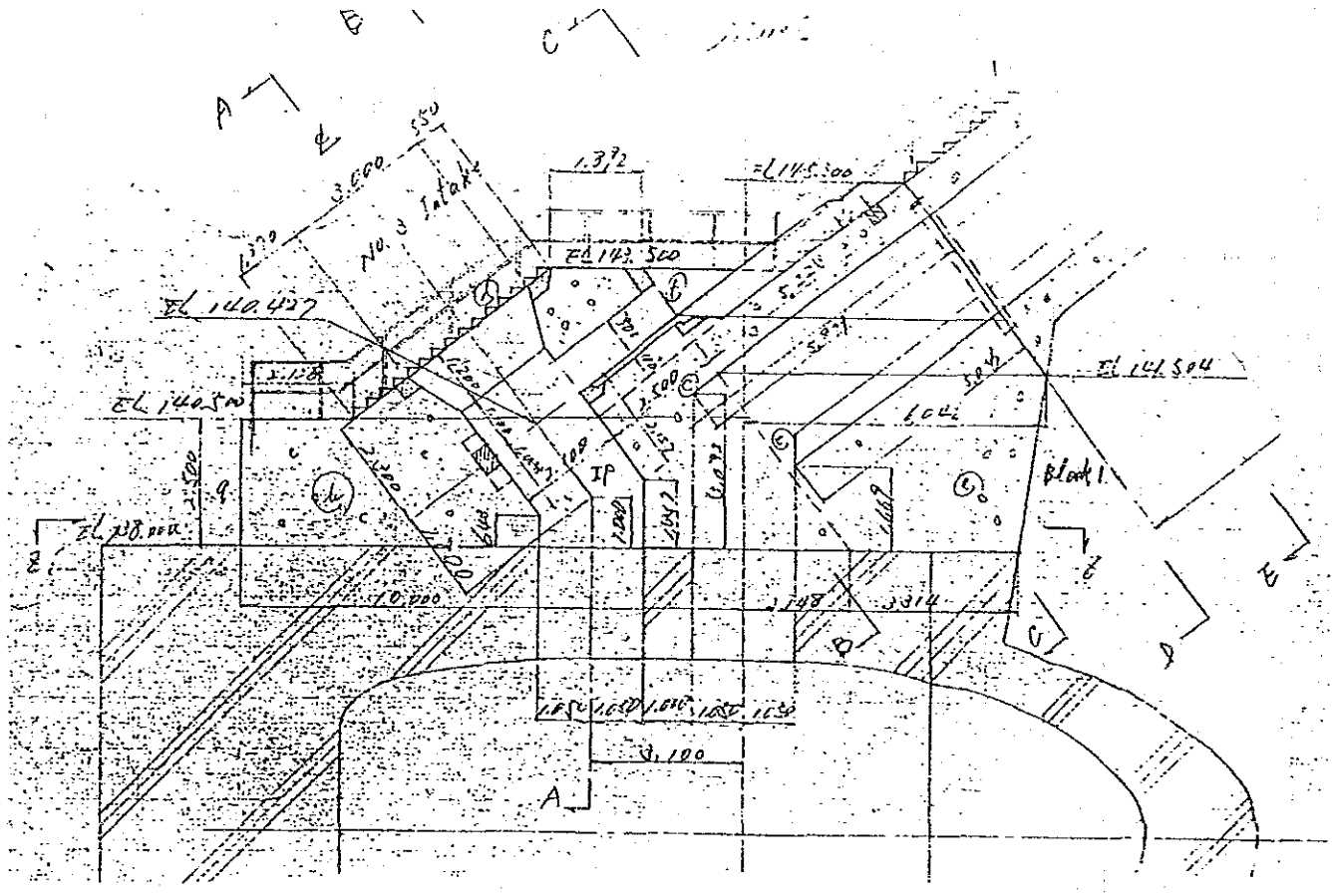
Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
T-2/06	Zone F2			
	No. 5 Intake			
	Block 1			
	1: $2 \times \frac{1}{2}(3.314+6.6) \times 3.504 = 34.738$	m^2		
	$2 \times 6.60 \times 1.10 = 14.520$			
	$2 \times \frac{1}{2}(6.60+0.8) \times 2.636 = 19.350$			
	$2 \times 0.60 \times 5.233 = 6.268$			
	$2 \times 0.85 \times 4.6 = 8.740$			
	$2.1 \times 5.2 = 10.920$			
	Slop. $0.25 \times 3.0 = 2.250$			
	Path $2 \times \frac{1}{2} \times 1.9 \times 1.0 = 1.900$			
	Waterway $1.669 \times 2.1 = 3.505$			
	$3.082 \times 2.1 = 6.472$			
	$2 \times \frac{1}{2}(1.669+3.082) \times 2.1 = 5.117$			
	$1.1 \times 5.076 = 5.584$			
	$2 \times 0.707 \times 5.076 = 7.177$			
	$2 \times 1.4 \times \frac{1}{2}(5.076+5.373) = 15.337$			
	$2 \times 0.707 \times 5.373 = 8.313$			
	Sub-total. 155.652	m^2		

Working Division:

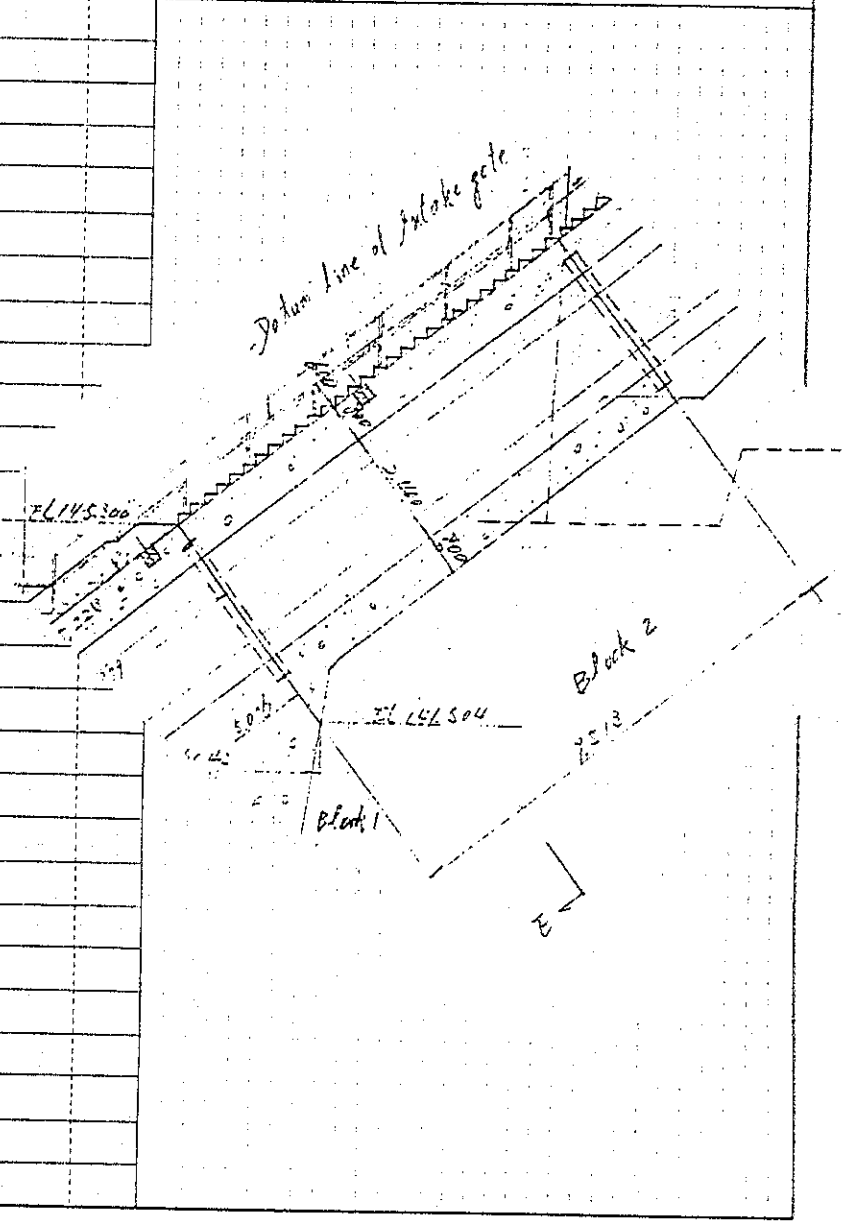
Description	Calculation Details	Unit	Quantity	Remarks
E2/06	Form F2			
	No.3 Intake			
	Block 1			
	Block 1' 182.015 m²			
	" 1" 155.652			
	Total. 337.667 m²			



No. 3 Intake
EL 140.427
EL 140.500
EL 143.500
EL 145.500
EL 141.504
Block 1
IP
10,000
3,100

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.3 Intake			
	Block 2			
	2 × 4.0 × 9.513 = 76.104	m²		
	2 × ½ × 1.1 × 0.8 = 0.880			
	3.4 × 9.513 = 32.344			
	Step. 0.30 × 9.513 = 8.562			
	0.40 × 9.513 = 3.805			
	0.30 × 5.7 = 5.100			
	Waterway (2×1.1 + 2×1.4 + 4×0.707) × 9.513 = 74.468			
	Side −½ 5.2 × 2.4 = −6.240			
	Total. 185.053	m²		



Working Division: F Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.2 Intake			
	Block 3			
	Block 3' (See page 37 Thru 38)			
		m²		
	Rear surface 1.0012 × 8.0 × 4.6 = 36.844			
	2.530 × 4.6 = 11.638			
	0.4 × 4.6 = 1.840			
	0.2 × 4.6 = 0.920			
	Side surface 2 × ½ (3.50 + 3.875) × 1.5 = 11.062			
	2 × ½ (6.415 + 8.667) × 4.972 = 75.012			
	2 × ½ (8.667 + 7.40) × 1.528 = 24.543			
	2 × ½ (7.4 + 2.4 + 3.0) × 1.0			
	− ½ 2.4 × 0.8 = 16.880			
	2 × ½ (7.2 + 1.836) × 2.6 = 23.494			
	0.3 × 5.3 = 1.590			
	1.2 × 4.6 = 5.520			
	4.264 × 3.2 − 3.0 × 3.0 = 4.645			
	2 × 2.6 × 0.8 = 4.160			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	Waterway			
	1.1 × 1.6 = 1.760	m^2		
	3 × 0.707 × 2.1 = 4.454			
	3 × 1.3 × 2.1 = 11.970			
	4 × 2.5 × 2.1			
	− 2.3 × 0.8 = 18.680			
	4 × ½ (2.1 + 3.0) × 1.26 = 12.852			
	~~2~~ × 1.1 × 1.25 = 2.750			
	4 × 0.707 × 1.25 = 3.535			
	2 × 1.4 × 1.25 = 3.500			
	Sub-total. 27.649	m^2		

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.2 Intake			
	Block U			
	Block 3'' (See page 37 Item 38)			
	2 x $\frac{1}{2}$ (4.70 + 2.50) x 3.65 = 27.740 m^2			
	2 x $\frac{1}{2}$ (2.50 + 2.60) x 1.62 = 8.910			
	4 x 0.6 x 5.267 = 12.641			
	0.95 x 5.267 = 5.004			
	1.25 x 5.267 = 6.584			
	2.10 x 5.267 = 11.061			
	Sub-total 71.940 m^2			
	Block U			
	Block 3'' 277.649 m^2			
	" 3° 71.940			
	Total 349.589 m^2			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	X103 Intake			
	Block 3 See page 26'			
	Side 1 x 4.0 x 12.793 = 51.172	m²		
	Top (3.70-0.40) x 12.793 = 42.217			
	step 0.4 x 7.800 = 3.120			
	Waterway 2 x 1.1 x 12.793 = 28.145			
	1 x 1.3 x 12.793 = 16.631			
	1 x 1.3 (12.793 - 2.1) = 13.901			
	2 x 0.707 x 12.793 = 18.089			
	2 x 0.707 x (12.793 - 2.1) = 15.120			
	2 x 1.1 x 0.8 = 1.760			
	2 x 1.3 x 0.8 = 2.080			
	4 x 0.707 x 0.8 = 3.256			
	Total 135.481	m²		

Working Division: E2 Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.1 Intake			
	Block 5			
	Block 5' See page 46 Item 47			
	Road surface 1.0012 × 8.550 × 4.90 = 41.089	m²		
	1.0012 × (10.950 − 8.550) × 4.60 = 11.237			
	$\sqrt{3.4^2 + 0.8^2}$ × 4.60 = 11.637			
	(0.4 + 0.1) × 4.60 = 2.760			
	Side $2 \times \frac{1}{2}$ (1.150 + 11.622) × 1.892 = 5.245			
	$2 \times \frac{1}{2}$ (1.622 + 4.090) × 2.588 = 14.840			
	$2 \times \frac{1}{2}$ (4.090 + 2.335 + 8.663) × 4.892 = 75.018			
	$2 \times \frac{1}{2}$ (8.663 + 7.50) × 1.528 = 24.697			
	$2 \times \frac{1}{2}$ (2.40 + 7.50 + 7.2 + 1.826) × 1.0			
	− $2 \times \frac{1}{2}$ 2.40 × 1.80 = 17.006			
	$2 \times \frac{1}{2}$ (7.2 + 1.838) × 2.6 = 23.494			
	0.20 × 5.2 = 1.040			
	Trh 4.264 × 3.20 − 3.0×3.0 = 4.645			
	2 × 2.6 × 0.7 = 3.640			

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Working Division:

Description	Calculation Details		Unit	Quantity	Remarks
			m^2		
	0.3×5.8	= 1.590			
	$1.2 \times 4.6 - 2.8 \times 0.8$	= 3.200			
	Waterway 1.1×9.4	= 10.340			
	0.707×2.1	= 1.485			
	$2 \times 0.707 \times 3.4$	= 13.292			
	$2 \times \frac{1}{2}(7.2 + 5.8) \times 1.4$	= 18.200			
	$2 \times 0.707 \times 5.8$	= 8.201			
	1.1×5.4	= 5.940			
	$2 \times 2.1 \times 4.552$	= 19.118			
	2.1×4.552	= 9.559			
	2.1×2.8	= 5.880			
	$4 \times 2.1 \times 1.1$				
	$- 2.8 \times 0.8$	= 6.920			
	$4 \times \frac{1}{2}(2.1 + 3.0) \times 1.26$	= 12.852			
	$2 \times 2.8 \times 2.5$	= 14.500			
	$2 \times 0.5 \times 2.5$	= 4.500			
	Sub-Total	371.925 m^2			

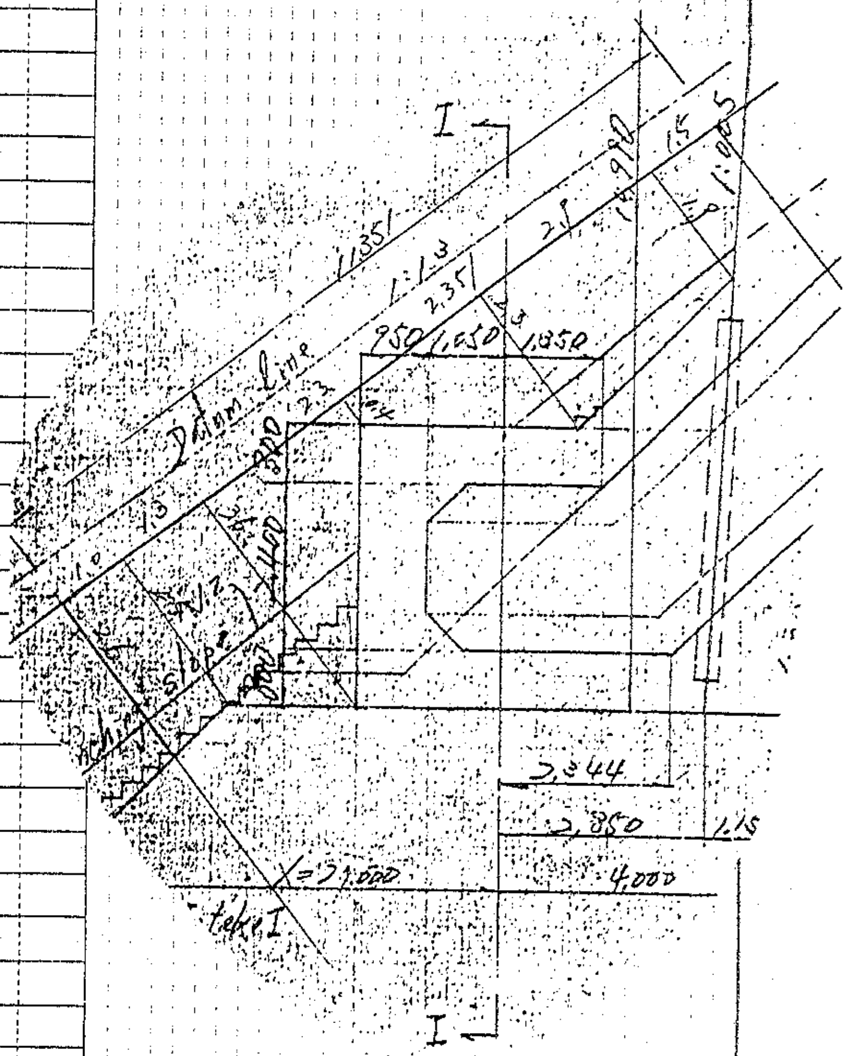
Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	No.1 Intake			
	Block 5			
	Block 5"			
	Side $2 \times \frac{1}{2}(4.7+2.3) \times 4.8 = 34.300$	m^2		
	$2 \times \frac{1}{2}(2.3+2.2) \times 0.4 = 1.800$			
	$4.6 \times 0.6 \times 5.267 = 12.641$			
	$0.95 \times 5.267 = 5.004$			
	$1.25 \times 5.267 = 6.584$			
	$2.10 \times 5.267 = 11.061$			
	Sub-total 71.390	m^2		
	No.1 Intake			
	Block 5	m^2		
	Block 5' 371.925			
	" 5" 71.390			
	Total 443.315	m^2		

Working Division: E2 Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.1, No.2, No.3 Intake			
	Block 4 See (page 51 Item 54)			
	Side 4.0 x 2.32 = 9.280	M^2		
	$\frac{1}{2}$(4.0 + 6.40) x 3.04 = 15.808			
	$\frac{1}{2}$(6.40 + 2.70) x 5.04 = 22.936			
	$\frac{1}{2}$(2.70 + 2.60) x 0.95 = 2.518			
	Top. 2x 0.77 x 11.351 · cos θ = 13.855			
	3.7 x 11.351 = 41.999			
	3.3 x 11.351 = 37.458			
	0.65 x 11.351 · Sin θ = 4.498			
	Side 4.0 x 5.0 = 20.000			
	$\frac{1}{2}$ x 3.0 x 1.5 = 2.250			
	3.0 x 4.35 = 13.050			
	4.0 x 4.35 = 17.040			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	No.2 Intake			
	Side ½ (2.6 + 2.5) × 1.0 = 2.550 m²			
	½ (2.5 + 3.6) × 1.3 = 3.965			
	½ (3.6 + 0.4) × 2.3 = 4.600			
	½ (0.4 + 2.3) × 2.35 = 3.174			
	½ (2.3 + 1.9) × 2.9 = 6.090			
	½ 1.9 × 1.5 = 1.425			
	Waterway			
	1.1 × 2.4 = 2.640			
	1.1 × 0.8 = 0.880			
	2 × ½ (2.1 + 1.0) × 1.3 = 4.030			
	2 × 0.707 × 2.4 = 3.394			
	2 × 0.707 × 0.8 = 1.131			
	0.707 × 2.3 = 1.626			
	0.707 × 3.0 = 2.121			
	½ (3.3 + 2.6) × 1.3 = 3.835			
	1.9 × 2.1 = 3.990			
	1.3 × 8.35 = 10.855			
	2 × 0.707 × 8.35 = 11.807			
	1.1 × 6.2 = 6.820			
	2 × 0.707 × 6.2 = 8.767			
	1.3 × 6.2 = 8.060			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	Waterway in No.3 intake			
	1.3 × 2.1 = 2.730 m^2			
	2 × 0.707 × 2.1 = 2.969			
	1.3 × 2.1 = 2.730			
	2 × 0.707 × 2.1 = 2.969			
	1.1 × 2.1 = 2.310			
	1.1 × 1.95 = 2.145			
	2 × 0.707 × 1.80 = 2.545			
	2 × $\frac{1}{2}$ (1.95 + 1.2) × 1.3 = 3.835			
	2 × 0.707 × 1.0 = 1.414			
	1.1 × 3.5 = 3.850			
	2 × 0.707 × 3.3 = 4.666			
	2 × $\frac{1}{2}$ (3.3 + 3.0) × 1.3 = 8.190			
	2 × 0.707 × 2.8 = 3.959			
	1.1 × 2.8 = 3.080			
	Total 339.844 m^2			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	No.3 Intake			
	Block 5 See page 56			
	2 x 32.945 m² = 65.890 m²			
	3.3 x 13.250 = 43.725			
	Total 109.615 m²			
	No.2 Intake			
	Block 5 See page 56			
	1 x 32.945 m² = 32.945 m²			
	3.3 x 13.250 = 43.725			
	Total 76.670 m²			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form. F2			
	Block 6			
	Same for No.1, No.2 and No.3 Intake			
	See page 60			
	2 x 27,612 m² = 55,224 m²			
	3.3 x 15,000 = 49,500 m²			
	Total 104,724 m²			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	Block 7			
	Same for No.1, No.2 and No.3 Intake			
	See page 61			
	$2 \times 22.762\ m^2 = 45.524\ m^2$			
	$2.3 \times 17.4 = 50.820$			
	Total. $96.344\ m^2$			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	Normal block See page 62			
	$2 \times \frac{1}{2}(2.60+3.00) \times 4.00 = 22.400$ m²			
	$1.0188 \times 4.0 \times 13.30 = 54.253$			
	$3 \times 1.0188 \times 1.50 \times 1.80 = 8.260$			
	$3 \times 1.2616 \times 1.50 \times 1.30 = 7.380$			
	$3 \times \frac{1}{2}(1.30+1.0) \times 1.50 = 5.175$			
	$3 \times 1.0 \times 0.5 = 1.500$			
	$6 \times 0.15 \times 0.25 = 0.375$			
	$3 \times 1.5 \times 0.5 = 2.250$			
	$3 \times \frac{1}{2} \times 1.75 \times 1.0 = 1.125$			
	$3 \times \frac{1}{2}(2.454+1.0) \times 1.5 = 7.772$			
	Total. 112.704 m²			
	$\sqrt{1+1.3^2}/1.8 = 1.2616$			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	Unloading slope.			
	Side $\frac{1}{2}$ 3.10 x 1.25 = 1.938 m^2			
	$\sqrt{1.402^2 \times 3.0 \times 4.25}$ = 13.002			
	$\sqrt{2} \times 3.5 \times 2.5$ = 12.374			
	3.5 x 0.9 = 3.150			
	Total 30.464 m^2			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	Launching slope See page 63 thru 66			
	EC138~EC148 2×½(2.78(+0.781)×10.0 = 35.620 m²			
	EC148~EC158 〃 = 35.620			
	½×2.3×1.5 = 1.725			
	EC158~EC168 ½(2.78(+0.781)×10.0 = 17.810			
	EC168~EC178 〃 = 17.810			
	EC178~EC188 〃 = 17.810			
	EC188~191 ½(2.78(+1.0)×8.0 = 15.124			
	Step 39.1/√(1+1.0²) × 1.350 = 33.792			
	10.2/ 〃 × 0.900 = 5.877			
	5.1/ 〃 × 1.200 = 3.918			
	34.1/ 〃 × 1.550 = 33.837			
	2.1/ 〃 × 0.700 = 0.941			
	Total 219.884 m²			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	F2 Forms			
	Steps between No.1 and No.2 Intake and between No.2 and No.3 Intake			
	Step between No.1 and No.2 Intake			
	(EL 186.0 - EL 173.50) × 0.85 = 19.125 m²			
	Step between No.2 and No.3 Intake			
	(EL 186.0 - 169.30) × 0.85 = 22.695			
	Total. 41,820 m²			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/06	Form F2			
	Retaining wall at EL 138.0			
	See page 20			
	1.0 × 5.0 = 5.000	m²		
	√(10.3² × 6.5 × 6.5 = 36.458			
	Total 41.458	m²		

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/07	Reinforcing bars			
	Conduit	Concrete		
	No.3 Intake Block 1"	90 m³		
	" Block 2	106		
	" " 3	145		
	" " 4	187		
	total	528 m³		
	Intake			
	No.3 Intake Block 1'	180 m³		
	No.2 " " 3'	348		
	No.1 " " 5'	313		
	Total	841 m³		
	Others	1,785 m³		
	Total	3,154 m³.		

Working Division:

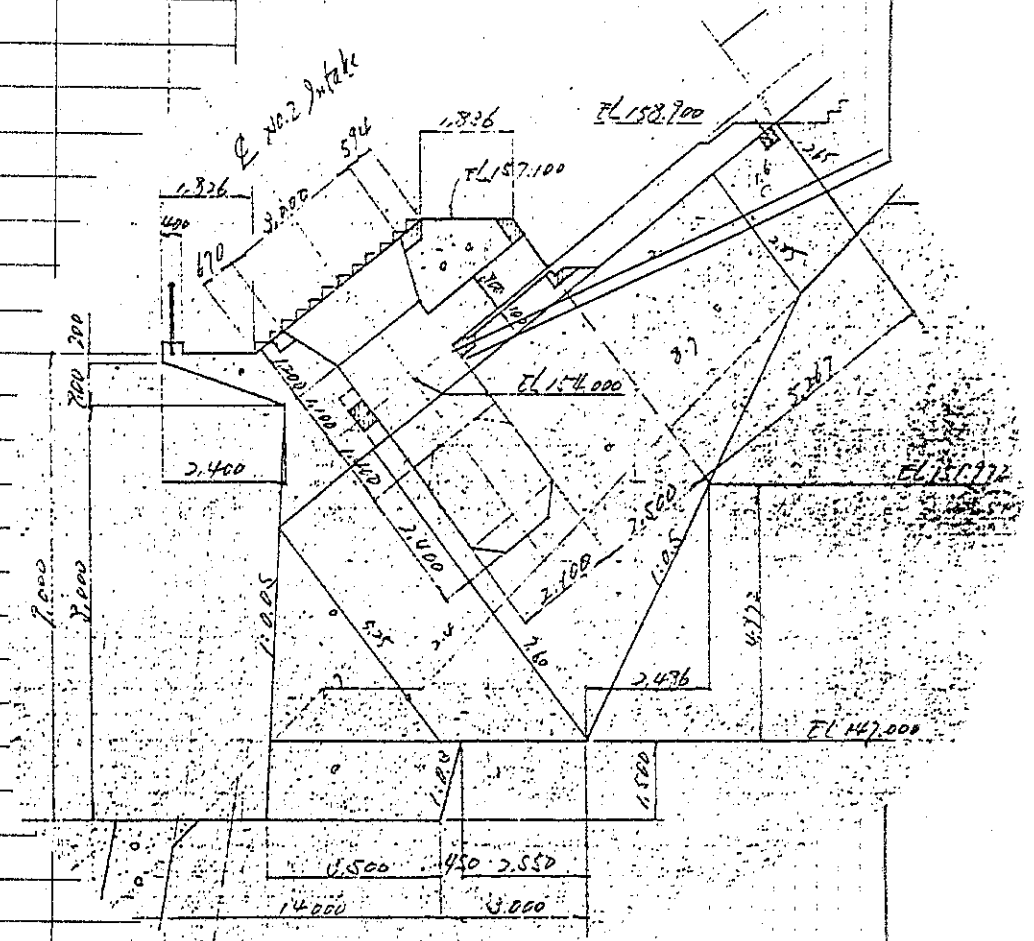
Description	Calculation Details	Unit	Quantity	Remarks
	Reinforcement bar			
		t		
	Conduit 528 m³ × 150 kg/m³ = 79.20			
	Intake 841 × 50 " = 42.05			
	Others 1,785 × 20 " = 35.70			
	Total 156.95	ton		
		ton	160	

Working Division: B Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/08	Water stop, type A			
	No.3 Intake			
	between			
	Block 1 and 2 12.2 m			
	" 2 " 3 12.2 m			
	" 3 " 4 12.2 m			
	between No.2 Intake and No.3 Intake 12.2 m			
	No.1 Intake			
	between Block 4 and Block 5 16.0 m			
	Total 64.5 m			
		m	70	

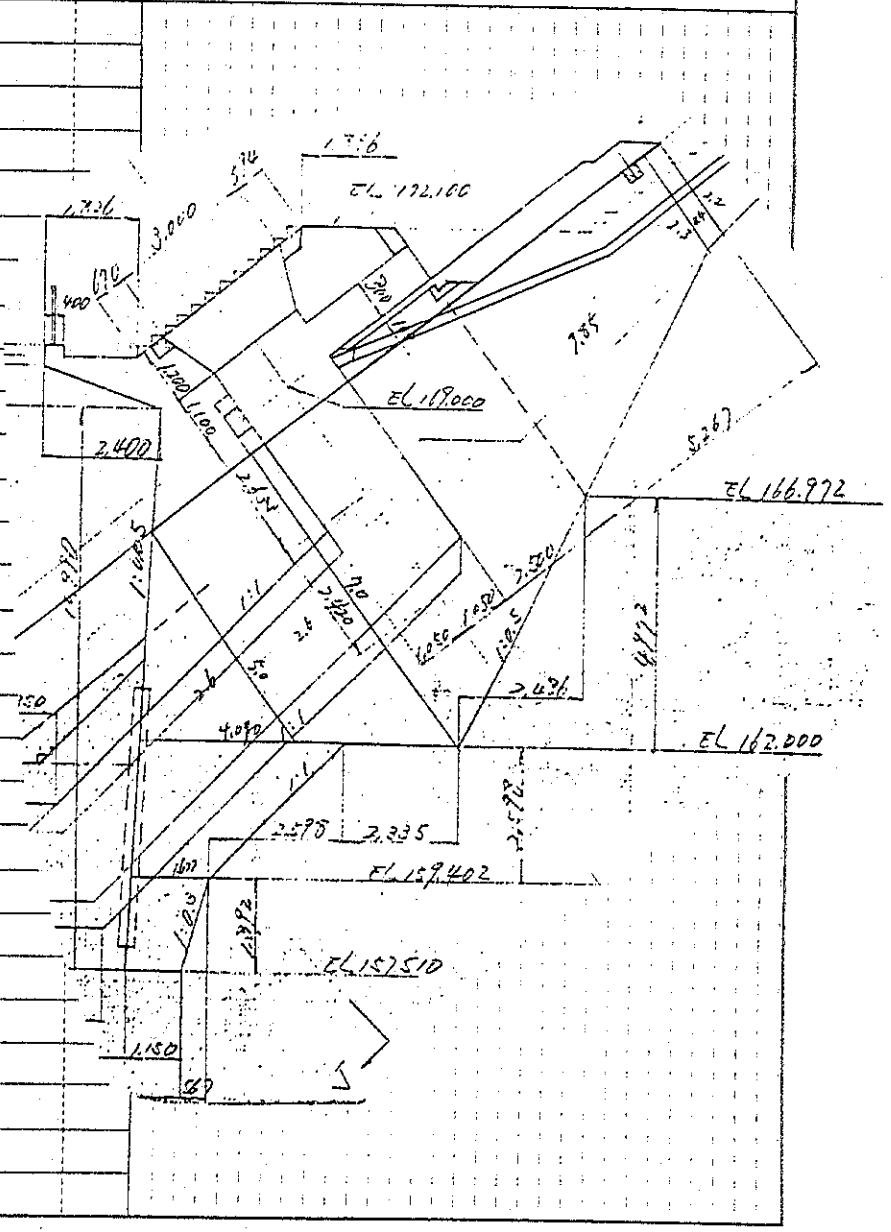
Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/09	Joint filler			
	Block 2 and Block 3 between No.3 and No.2 Intake			
	$\frac{1}{2}(3.50+3.85)\times 1.5 = 5.588$	m^2		
	$\frac{1}{2}\times 5.15\times 2.7 = 7.088$			
	$\frac{1}{2}(5.25+7.10)\times 2.4 = 14.820$			
	$\frac{1}{2}(7.10+2.85)\times 8.7 = 43.282$			
	$\frac{1}{2}(2.85+2.65)\times 1.6 = 4.400$			
	Total 75.178	m^2		



Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/09	Joint filler			
	Block 5			
	between No.3 and No.2 Intake			
	2× (32.945 − 0.60×13.250) = 41.550	m²		
	between No.2 and No.1 Intake			
	$\frac{1}{2}$ (1.150 + 1.622) × 1.892 = 2.622			
	$\frac{1}{2}$ (1.622 + 4.090) × 2.598 = 7.120			
	$\frac{1}{2}$ 5.0 × 2.6 = 6.500			
	$\frac{1}{2}$ (5.0 + 7.0) × 2.6 = 15.600			
	$\frac{1}{2}$ (7.0 + 2.3) × 9.85 = 45.802			
	$\frac{1}{2}$ (2.3 + 2.2) × 0.40 = 0.900			
	Total 128.534	m²		



Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E2 Concrete Work			
E2/09	Joint filler			
	Block 6 m^2			
	$4 \times (27.612^{m^2} - 0.60 \times 15.00) = 82.448$			
	Block 7 m^2			
	$4 \times (22.912 - 0.60 \times 16.0) = 52.648$			
	Joint filler			
	Block 2 and 3 75.178^{m^2}			
	Block 5 128.534			
	" 6 82.448			
	" 7 52.648			
	Total 338.808^{m^2}			
		m^2	340.	

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E3 Miscellaneous Metal work			
E3/01/	Embedded Metal work			
	Handrail			
	No.3 Intake			
	2.50+1.25+2.85			
	+5.0×2+2.5			
	+4.8+13.0 = 36.90 m			
	No.2 Intake			
	4.6+2×(2.0+4.1+1.8)			
	+2.7+2.0+1.5 = 26.60 m			
	No.1 Intake			
	4.6+2×(2.5+4.1+1.8)			
	+3.0 = 23.4 m			
	Total 86.90 m			
	≒ 87 m			
	W = 87 m × 8.7 kg/m = 756.9 kg			
		kg	760	

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	E3 Miscellaneous Metal work			
E3/01	Embedded Metal work			
	φ200 steel pipe in Thrust block			
	3 × 2.2m = 6.6m			
	W = 6.6m × 23.5kg/m = 155.1kg			
	Handrail 756.9kg			
	pipe 155.1			
	Total 912.0kg			

Working Division: E Intake

Description	Calculation Details	Unit	Quantity	Remarks
	E3 Miscellaneous Metal work			
E3/02	200φ steel air vent pipe 145"	m	150	