Name of Structure	INSPECTION ROAD FOR ASIN DRAINAGE SYSTEM	Category Calculation	Works Volume	Page	1/5
	SUM	IMARY OF WOR	× VOLUME		
	<del>-</del>		, , , , , , , , , , , , , , , , , , ,		
SEMA	RANG RIVER	A MARINE SALES		1147	*
					-
	TRIPPING		The second of the second		m <sup>3</sup>
	MBANKMENT				m²
	GGREGATE CLASS B	• • • • • • • • • • • • • • • • • • • •		•	m³
44.7	GGREGATE CLASS A		man ka j <sup>e</sup> rje s	to provide a strong	m³
Alternative Control	AND BEDDING		= 	1934	m³
	ONCRETE BLOCK PAVEN	MENT	in the second second		m²
in an	EMENT MORTAR		A		m <sup>3</sup>
	ONCRETE CURB		<b>=</b>		m³
9. SO	DDDING		= 5	5,741 n	n <sup>2</sup>
ASIN R	RETARDING POND		en e	att die artisch	• .
				n i i se esce.	a a
1.00	RIPPING		=		
	MBANKMENT		<b>=</b>		n³
	GGREGATE CLASS B				n³
	GGREGATE CLASS A				n³ .
	AND BEDDING		=	and the second section of	n³
4.45	NCRETE BLOCK		= , , , ,	- T	n²
1 - 44 - 44 - 1 - 1 - 1	EMENT MORTAR		· =	grand the state of	n³
8. CO	ONCRETE CURB			85.38 m	n³
ASIN R	IVER				
	GGREGATE CLASS B			204.06	
	GREGATE CLASS B ND BEDDING			224.06 m	**
	NO BEDDING ONCRETE BLOCK			672.05 m	e efektiv
100	MENT MORTAR		÷ =	1,202.90 m	
	MENT MORTAR DNCRETE CURB			26.89 m	. "
				268.87 m	
6. SO	DDING		T	7,150.47 m	1 <sup>2</sup>
				table seg	
And the second					1 :

Name of Structure	INSPECTION ROAD FOR ASIN DRAINAGE SYSTEM	Category Calculation	Works V	<sup>7</sup> olume	Page	2/5
	RANG LEFT +23 TO SM 30) + (SM 3	0 TO AS.2)			I	
Length	= (913.481 - 645.16 = 268.32 + 89.31 = 357.63 m	1) + (50 + 39.31)		•	yiron X.	
1. Stri	pping of Top Soil (SM 30	TO AS.2) =		1125		*-
2. Em	bankment (SM 30 TO AS	= =	_ %,	vir jak	Transplan	original to the
3. Agi	gregate Class B (SM 30 To	O AS.2)				
5.2	× 0.2 × 89.3	=	92.87	m³	tigg gerafic v Tigger	
4. Agg	gregate Class A (SM 30 To	O AS.2)	141147 1			
	0.15 × 89.3	=	66.98	m³		1
5. San	nd Bedding (SM 21 + 23 to	10 2 A				
	$0.06 \times 357.63$	- No.2)	107.30	m3		
			107.30	HF	Andrew M	
	10 ncrete Block Pavement 357.63		1000.16		The same	
			1788.15	m²	we ye	
	nent Mortar		• • • • • • • • • • • • • • • • • • • •			
Z×	$0.2 \times 0.003 \times 357.63$		4.29			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	icrete Kerb					
2 ×	$0.3 \times 0.2 \times 357.63$	그런 그 상대, 어릴 	42.92	m³	i de de Ege Grand Britana Civi	
	ding					
{2×	$\left(\sqrt{0.6^2+1.2^2}+0.5\right) \times 357$	.63 =	959.62	m²		
OFFICE					Note that	
	ANG RIGHT TO SM 45)				uzbijele	
Length	= 1172.58					
l. Stri	pping (0.10 thick)					
- 1 (1) (1) (1) (1) (1) (1) (1)	20 × 0.10 × 1172.58		1196.03	m³		
2. Eml	bankment (average thick (	) 30 m)				
¥ .						
{9.6	$6 \times 0.30 + 2 \times \frac{1.0 + 1.98}{2} \times 0$	$).49 \times 1172.58 =$	5089.23	m³ .		
-	gregate Class B	1172 60	1224 = 1			
ηs.	$2 \times 0.20$ ) + $(2 \times 6.5 \times 0.1)$ } ×	11/2.58 =	1336.74	m³		

Name of Structure	INSPECTION ROAD FOR ASIN DRAINAGE SYSTEM	Category Calculation		Volume	Page	3/5
4. Ag	gregate Class A					
5 ×	0.15 × 1172.58		= 879.6	m³		
5. Sai	nd Bedding		7.5		* *	
5 ×	0.06 × 1172.58	=	= 351.77	m³	\$ <sup>*</sup>	
6. Co	ncrete Block Pavement					
5 ×	1172.58	· •	= 5862.9	m²		
7. Cei	ment Mortar	1.1.2. 1.1.2.				. :
2 ×	$0.2 \times 0.03 \times 1172.58$		= 14.07	m³		
8. Co	ncrete Kerb		•		e i persona	
• • •	$0.3 \times 0.2 \times 357.63$	1	= 42.92		V 18	
9. Soc	lding					
	$\langle (\sqrt{0.8^2 + 1.6^2} + 0.5) \rangle \times 1$	172.58 <i>=</i>	= 4781.44	m²		
•	<b>(,</b> , ,, ,, ,, ,, ,, ,, )				Parada da s	
I. <u>SUMM</u>	<u>ARY OF SEMARANG</u>	RIVER			Service Services	
1. Stri	ipping	1196.03 =	= 1196	m³		
2. Em	bankment	5089.23 =	= 5089	m³	ur en jûndir)	
3. Ag	gregate Class B =	92.87 + 1336.74 =	= 1430	m³		( )
4. Ag	gregate Class A =	66.98 + 879.60 =	947	m³	i Nggarangan Nggaraka Nggarangan	
5. Sar	nd bedding =	107.3 + 351.77 =	= 459	m³		
6. Co	ncrete block =	1788.15 + 5862.9 =	<del>- 765</del> 1	m²		
	nent mortar =	4.29 + 14.07 =		m³		
				\$45 J		nagar (
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ncrete curb =	42.92 + 140.71 =	•			
. 9. Soc	lding =	959.62 + 4781.44 =	5741	m²	Barrier Barre	

Name of Structure	INSPECTION ROAD FOR ASIN DRAINAGE SYSTEM	Category Calculation	Works Volume	Page	4/5
IV. <u>ASIN R</u> Length	ETARDING POND = (10.0 + 97.5 + 54 + (350 + 7.0 + 8.0	.8 + 47.5 + 8.0 + 7 ) + 27.23)	.0 + 10.0 + 74.5 +	10.0)	
	= 319.3 + 392.23 = 711.53 m			onska don Osebačka	
1. Str	pping of Top Soil	=	: <u>.</u>		
2. Em	bankment				
(1.	$0 \times \frac{1.0 + 1.98}{2} \times 0.49 \times 71$	1.53 =	863.14 m³		
7	gregate Class B 2 × 0.2 + 2 × 0.5 × 0.1) × °	711 62	011.14	er of the transfer	
		/11.53 =	811.14 m <sup>3</sup>		
	gregate Class A		•	e na linguista. Hang in	
5 ×	0.15 × 711.53	=	533.65 m³		
	d Bedding (SM 21 + 23 to	o AS.2)			
5 x	$0.06 \times 711.53$	=	213.46 m <sup>3</sup>		
6. Cor	ncrete Block Pavement			Property and	13 31
5 x	711.53	=	3557.65 m <sup>2</sup>		
7. Cer	nent Mortar				
2 ×	$0.2 \times 0.03 \times 711.53$		8.54 m <sup>3</sup>		
8. Cor	icrete Kerb				
	0.3 × 0.2 × 711.53		85.38 m³		
<b>9.</b> Sod	ding				
IV. <u>ASIN R</u> Length	= 2 × 1120.09			de Ministra	
	= 2240.18 m (both s	side)		in videnski Station	
1. Stri	pping of Top Soil				
2. Em	bankment		-		
3. Agg	gregate Class B				
	$0.5 \times 0.10 \times 2240.58$	<u>***</u>	224.06 m <sup>3</sup>		
Territoria					
	gregate Class A	<b>==</b>			
And the second	d Bedding				
5 ×	0.06 × 2240.58	=	672.174 m <sup>3</sup>		

Name o		INSPECTION ROAD FOR ASIN DRAINAGE SYSTEM	Category Calculation		Works Volu	ıme	Page	
6.	Cor	ncrete Block Pavement	* 1 * 1 * 1 * 1 * 1 * 1					
	5 ×	2240.58		: =	1120.9 m			
7.	Cen	nent Mortar						
	2 ×	$0.2 \times 0.03 \times 2240.58$	ng sa Marin San Na San San San San San San San San San Sa	==	26.89 m <sup>2</sup>	· .	:	
8.	Cor	icrete Kerb		,			***	2 1 2
1	2 ×	$0.3 \times 0.2 \times 2240.58$	主义 自然 医线点	==	268.87 m <sup>3</sup>		A. e.	
9.	Sod	ding		=	959.62 m <sup>2</sup>			\$***.
	{2 ×	$(0.5 + \sqrt{0.49^2 + 0.98^2})$	2240.58	. =	7150.47 m <sup>2</sup>			
	į.		ing professional section in the section of the sect					

(3)

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Name of Structure	ASIN BOX CULVERT	Category Calculation	Work Volume	Page	1/6
			L	L	L

# SUMMARY OF ASIN BOX CULVERT, INLET STRUCTURE AND OUTLET STRUCTURE

	· · · · · · · · · · · · · · · · · · ·		
1. STRUCTURE EXCAVATION	= 3729 + 415 + 1071	= 5,215	$m^3$
2. BACK FILL	= 1,350 + 240 + 534	= 2,124	$m^3 \sim$
3. LEVELING CONCRETE (E)	= 85.5 + 0.70 + 4.53	= 90.70	$m^3$
FORM WORK	= 39.68 + 0.34 + 12.22	= 52.24	$m^2$
4. CONCRETE TYPE C1	= 950.50 + 24 + 30.01	= 1005	m <sup>3</sup>
FORM WORK	= 2694 + 58 + 135	= 2,887	m²
SCAFFOLDING	= 1843 + 54 + 62	= 1,959	m²
FALSE WORK	= 1358 + 11 + 16	= 1,385	m <sup>3</sup>
5. REINFORCING BAR	= 92600 + 1438 + 1218	= 95,256	Kg
6. WATER STOP		= 212	m'
7. GRAVEL BEDDING	= 15.39 + 104.78	= 120.17	m <sup>3</sup>
8. COBBLE STONE	= 5.93 + 12.15	= 18.08	m³
9. WET STONE MASONRY	= 120 + 460.32	= 580.32	m <sup>3</sup>
10. LOG PILE φ 150, L=3.0 m	= 120 + 321	= 441	m'
11. WEEP HOLE φ 50	= 36 + 39	= 75	nos
12. POINTING	= 44.28 + 397.63	= 441.91	m²
13. ASPHALT CONCRETE	$= 47.12 \times 2.3$	= 108.38	ton
14. ASPHALT TREATED BASE	$= 47.12 \times 2.3$	= 108.38	ton
15. AGGREGATE CLASS A		= 176.70	m³
16. AGGREGATE CLASS B		= 252.70	m³

	Name of Structure	ASIN BOX CULVERT	Category Calculation	Work Volume	Page	2/6
ĺ	1. Ex	cavation of Structure				

- Total length = 194 m
- Excavation width = 6.20 m
- Depth of Excavation = 3.10 m

Excavation volume =  $6.20 \times 3.10 \times 194 = 3729 \text{ m}^3$ 

## **Leveling Concrete**

$$V_{LC} = 4.4 \times 0.10 \text{ x } 194 = 85.50 \text{ m}^3$$

Form Work =  $0.1 \times (2 \times 4.4 + 2 \times 194) = 39.68 \text{ m}^2$ 

## 3. Concrete K225

### (a.) Normal Section

$$-2 \times 0.35 \times 2.75 = 1.925 \text{ m}^2$$

$$-0.35 \times 3.50$$
 = 1.225 m<sup>2</sup>

$$-0.40 \times 3.50 = 1.400 \text{ m}^2$$

$$-4.0 \times \frac{0.30 \times 0.30}{2} = 0.180 \text{ m}^2$$
$$= 4.730 \text{ m}^2$$

Number of manhole = 
$$\frac{194}{10}$$
 = 19.4 ~ 19nos

Length of normal section  $= 194 - 1.7 \times 19 = 161.70 \text{ m}$ 

Volume of normal section =  $161.70 \times 4.73 = 764.841 \text{ m}^3$ 

### (b.) Manhole Section

- Volume of normal section 
$$= 1.7 \times 4$$
.

$$= 1.7 \times 4.73$$
  $= 8.041$  m<sup>2</sup>

$$= 1.0 \times 1.0 \times 0.1$$

$$= 0.100 \text{ m}^3 (-)$$

Top of manhole = 
$$0.35 \times (0.96 - 0.25) \times 4 \times 1.35 = 1.342 \text{ m}^3$$

$$= \begin{array}{cccc} 0.15 \times 0.25 \times 4 \times 1.55 & = 0.250 \text{ m}^3 \\ \text{Volume per block} & = 9.766 \text{ m}^3 \end{array}$$

 $= 19 \times 9.766 = 185.554 \text{ m}^3$ Volume of manhole section

Total volume of Concrete  $K_{225} = 764.841 + 185.554 = 950.395 \text{ m}^3$ 

### Steel Reinforcement

## Normal Section

Weight per meter = 458.126 kg (see Table)

Total weight for normal section =  $161.70 \times 458.126 = 74078.974$  kg

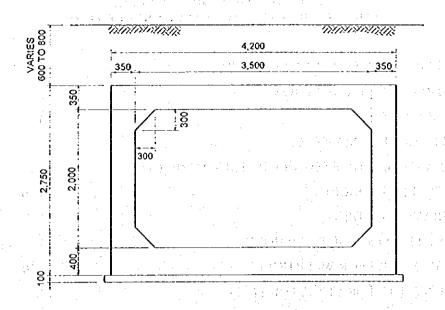
Name of Structure	ASIN BOX CULVERT	Category Calculation	Work Volume	Page	3/6
(b.)	Manhole Section		7 DE 18 PE	aratelli sargi	1 !
	<ul><li>Steel weight for non</li><li>Steel weight for man</li></ul>	ihole & cover (see	able) = 458.126 Table)	× 1.70 =	778.814   239.320
	<ul> <li>Decrease of ending of</li> </ul>	of hole		grant the state of	237.320 F
•	S <sub>i</sub> (D16)	= 5 x	$1.04 \times 1.58 =$	7.900	
	S₂(D16)	The second secon		14.220	
	S <sub>3</sub> (D16)			6.320	
	S <sub>4</sub> (D13) S <sub>5</sub> (D13)			6.136	1
	S <sub>6</sub> (D13)			5.200	
	00(1013)	- 4 x	0.87 × 1.04 =	3.619	42.205
	Steel weig	ght for manhole see	ction/block	= =	43:395 k
			The second second		
	Total steel weight = 74	$078.974 + 19 \times 97$	/4.739 = 92599.015	kg = 92.60	ton
5. Bac	•	• • • • • • • • • • • • • • • • • • •			
210	••••			landari . Ta	
Vc	lume of structure space	The second of the second			
-	Box culvert	= 2.75 >	< 4.20 × 194	= 2240.	70 m³
	Leveling concrete		< 4.40 × 194		76 m³(-)
-	Manhole	= 1.7 ×	$1.7 \times 0.96 \times 19$	= 52.	71 m <sup>3</sup>
			of structure space	e = 2378.	77 m <sup>3</sup>
	Volume of excavation	= 3729	m³	* **	
	Volume of backfill	= 3729	$-2379 = 1350 \text{ m}^3$		
6. Roa	d Pavement (Standard)				
			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		· .
: -`	Length of Reconstruction ]	Road = 190 m		editor, com	
7.	Width of existing pavemen	nt : = 6 m :	The Continue State Control		
_	Reconstruction with Road width of pavement				
	widin of pavement	= 6.20 m	1		
6.1	Demolition of Existing Pay	vement	ous et dael a eugh		
	$6 \times 190 = 1140 \text{ cm}^2$		to be has been as		
	0 x 130 - 1140 cm.				
6.2	Stripping				
					· · · · · · · · · · · · · · · · · · ·
	<ul> <li>width of stripping = 2 x</li> </ul>	1 m = 2 m			
	thickness of stripping = $V = 0.3 \times 2 \times 190 = 114$	0.30 m			
	V = 0.3 x 2 x 190 ≡ 114	cm	an an an an an an an Ann. Tagairtí an Ann an Ann.		
63	Embankment with Sandy S	loil			
0.5	width of base embankm		100 F		
0.3	~ WHITH OF DACE EMBANDM	ent = 2 + 7 m = 9	m		
	- thickness of base	1	A contract of the contract of		
	<ul> <li>thickness of base embar</li> </ul>	kment = 0.30 m			
	<ul> <li>thickness of base embar</li> <li>width of shoulder embar</li> <li>thickness of shoulder en</li> </ul>	$nkment = 0.30 m$ $nkment = 2 \times 1 m$	= 2 m		

Name of Structure	ASIN BOX CULVERT	Category Calculation	Work Volume	Page	4/6
6.4	Asphalt Concrete (A <sub>C</sub> )	3. 11 (1) (1) (1) (1)			
	- width = 6.20 m, thicl	cness = 0.04 m	e Na tronoca alektropolitika t	e de la companya de l	
	$V_{AC} = 0.0$	4 × 6.20 × 190	= 47.12 m <sup>3</sup>		•
6.5	Asphalt Treated Base (A	<sub>тв</sub> )	eri Virginia		
	$V_{TB} = 0.0$	4 × 6.20 × 190	≠ 47.12 m³		
6.6	Aggregate Class A		gradini se kalandara.		
0.0		5 × 6.20 × 190	= 176.70 m <sup>2</sup>	, Maria	
		J & 0.20 & 190	- 170.70 M		
6.7	Aggregate Class B				
	<ul> <li>pavement over should</li> </ul>		The second second		: :
· · · · · · · · · · · · · · · · · · ·	gate class B, width =				
	$\{(2 \times 0.45 \times 0.1) + (0.2)\}$	! × 6.20)} × 190 =	= 252.7 m <sup>3</sup>		
7. W	ater Stop (w=200, t=20) w	ith Rubber Joint )	Filler		
_	Distance of joint = 10 m				
· <u>-</u>	Number of joint = $\frac{194}{10}$	2 = 17 <i>nos</i>		Epilop (1)	
* * * * * * * * * * * * * * * * * * *	Water stop length = $2 \times (2)$		and the second of the second o		•
8. Ex	cavation of Structure				
o. Ex					
(α.,		(0.03 0.03)			•
4	$(2 \times 2.75 + 2 \times 1.4 + 2.9)$	$+4\times\sqrt{0.3^2+0.3^2}$	×194 = 2502	.029 m²	
(b.)					
	$4 \times 1.7 \times 0.775 + 4 \times 1$	$0 \times 0.875 + 4 \times 1.4$	$\times 0.25 = 10$	.170 m <sup>2</sup>	
(c.)					
<b>(1</b> )	$(4 \times 1.4 + 2 \times 1.4) \times 0.2$		= 2.	.100 m <sup>2</sup>	
(d.)		tion			
	$1.0 \times 1.0$		·	000 m²	
/2\		anhole portion	= H.	270 m²	
(e.)	For all manhole			500 3	
	17 × 11.27	2602 020 1 121 52		590 m²	
100	Total of form work =	2302.029 + 191.59	= 2693.	619 m² 🐇	

# SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

		Vo	lume
No	Structure	Scafolding (m²)	Form Support (m³)
l	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	person 11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River		34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	
9	Asin No.1 Bridge, Sub Structure	293	<b>-</b> 1.4
10	Asin No.2 Bridge, Sub Structure	251	
	Total	4876	2676

Name of Structure	ASIN BOX CULVERT SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	2/2
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## GENERAL CROSS SECTION SCALE A

1. Scafolding Area

Total length of box culvert

= 194 m

 $(2 \times 2.75 + 2 \times 2.0) \times 194$ 

 $= 1843 \text{ m}^2$ 

2. Form Support

 $3.5 \times 2 \times 194$ 

 $= 1358 \text{ m}^3$ 

Name of Structure	ASIN BOX CULVERT INLET STRUCTURE	Category Calculation	Work Volume	Page	1/7
	' '	*			

# SUMMARY OF WORK VOLUME FOR ASIN BOX CULVERT INLET STRUCTURE

1.	DEMOLITION OF STONE MASONRY	=	97	$m^3$
2.	STRUCTURE EXCAVATION	=	415	$\mathrm{m}^3$
3.	BACK FILL	=	240	$m^3$
4.	WET COBBLE MASONRY	=	120	 m³
5.	PLAIN CONCRETE FOR DROP STRUCTURE (C1)	:	7	. m³
6.	LEVELING CONCRETE	=	0.70	m <sup>3</sup>
7.	GRAVEL BEDDING	=	13	$m^3$
8.	PVC PIPE Ø 50 FOR WEEP HOLE	=	36	nos
9.	PALM FIBRE FOR WEEP HOLE	=	0.10	$m^3$
10.	CONCRETE FOR STRUCTURE (C1)	=	17	m³
11.	REINFORCING BAR FOR WING WALL	=	1,438	Kg
12.	FORM WORK	=	58	m²
13.	SAFETY SCREEN 3,500 x 4,200	=	1	set
14.	LOG PILE Ø150, L=3,000	=	120	m¹
15.	COBBLE STONE	==	5.93	m <sup>3</sup>

1. Demolition of Stone Masonry $-\frac{0.80+1.40}{2} \times 3.0 \times (2 \times 6.7 + 7.0) = 67.32 \text{ m}^3$ $-1.40 \times 1.0 \times (2 \times 6.7 + 7.0) = 28.56 \text{ m}^3$ $-1.95 \times 0.40 \times 1.50 = 1.17 \text{ m}^3$ $-2 \times \frac{0.2+49}{2} \times 4.7 \times 2.25 = 53.933 \text{ m}^3$ $-2 \times 1.65 \times 4.7 \times 2.25 = 34.898 \text{ m}^3$ $-2 \times \frac{0.2+11}{2} \times 0.9 \times 2.25 = 7.560 \text{ m}^3$ $-2 \times \frac{0.2+61}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^3$ $-2 \times \frac{0.2+61}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^3$ $-1.8 \times 4.2 \times 3.95 = 29.862 \text{ m}^3$ $-2 \times \frac{0.2+6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^3$ 3. Wet Cobble Masonry $-2 \times \frac{0.95+1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^3$ $-2 \times 1.2 \times 1.25 = 2.625 \text{ m}^3$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^3$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^3$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^3$ $-2 \times 1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^3$ $-2 \times 1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^3$ $-2 \times 1.2 \times 1.05 \times 2.05 \times 3.95 = 24.293 \text{ m}^3$ $-3.843 \text{ m}^3$ 4. Plain Concrete (C <sub>3</sub> )	Name of Structure	ASIN BOX CULVERT INLET STRUCTURE	Category Calculation	Work Vol	ıme Page	2/7
$-1.40 \times 1.0 \times (2 \times 6.7 + 7.0) = 28.56 \text{ m}^{3}$ $-1.95 \times 0.40 \times 1.50 = 1.17 \text{ m}^{3}$ $97.05 \text{ m}^{3}$ 2. Structure Excavation $-2 \times \frac{0.2 + 4.9}{2} \times 4.7 \times 2.25 = 53.933 \text{ m}^{3}$ $-2 \times 1.65 \times 4.7 \times 2.25 = 34.898 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25 = 2.633 \text{ m}^{3}$ $-0.80 \times 4.2 \times 2.25 = 7.560 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 95.551 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.3}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^{3}$ $-1.8 \times 4.2 \times 3.95 = 29.862 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ 3. Wet Cobble Masonry $-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^{3}$ $-2 \times 1.2 \times 1.65 \times 2.25 = 8.910 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-2 \times 1.2 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $-3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $-3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$	1. De	molition of Stone Masonry		V		
$-1.40 \times 1.0 \times (2 \times 6.7 + 7.0) = 28.56 \text{ m}^{3}$ $-1.95 \times 0.40 \times 1.50 = 1.17 \text{ m}^{3}$ $97.05 \text{ m}^{3}$ 2. Structure Excavation $-2 \times \frac{0.2 + 4.9}{2} \times 4.7 \times 2.25 = 34.898 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25 = 2.633 \text{ m}^{3}$ $-0.80 \times 4.2 \times 2.25 = 7.560 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 95.551 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.3}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^{3}$ $-1.8 \times 4.2 \times 3.95 = 29.862 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ 3. Wet Cobble Masonry $-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$	_	$\frac{0.80+1.40}{2} \times 3.0 \times (2 \times 6.7 +$	7.0) = 6	7.32 m³		
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2. Structure Excavation $-2 \times \frac{0.2 + 4.9}{2} \times 4.7 \times 2.25 = 53.933 \text{ m}^{3}$ $-2 \times 1.65 \times 4.7 \times 2.25 = 34.898 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25 = 2.633 \text{ m}^{3}$ $-0.80 \times 4.2 \times 2.25 = 7.560 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^{3}$ $-2 \times 2.05 \times 5.9 \times 3.95 = 95.551 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^{3}$ $-1.8 \times 4.2 \times 3.95 = 29.862 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ 3. Wet Cobbte Masonry $-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 8.910 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $120.096 \text{ m}^{3}$	—	1.95 × 0.40 × 1.50	=	1.17 m³	the second second	
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$-2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25 = 2.633 \text{ m}^{3}$ $-0.80 \times 4.2 \times 2.25 = 7.560 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.3}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ 3. Wet Cobble Masomry $-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^{3}$ $-2 \times 1.2 \times 1.65 \times 2.25 = 8.910 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $120.096 \text{ m}^{3}$		$2 \times \frac{0.2 + 4.9}{2} \times 4.7 \times 2.25$	= 53	.933 m³	pi, Presidenti Kalendari	f
$-2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25 = 2.633 \text{ m}^{3}$ $-0.80 \times 4.2 \times 2.25 = 7.560 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95 = 146.822 \text{ m}^{3}$ $-2 \times 2.05 \times 5.9 \times 3.95 = 95.551 \text{ m}^{3}$ $-2 \times \frac{0.2 + 1.3}{2} \times 1.1 \times 3.95 = 6.518 \text{ m}^{3}$ $-1.8 \times 4.2 \times 3.95 = 29.862 \text{ m}^{3}$ $-2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 1.0 = 37.170 \text{ m}^{3}$ 3. Wet Cobble Masonry $-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^{3}$ $-2 \times 1.2 \times 1.65 \times 2.25 = 8.910 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$	- · · · · - · · · ;	$2\times1.65\times4.7\times2.25$	= 34	.898 m³		
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$-2 \times \frac{0.95 + 1.65}{2} \times 3.5 \times 2.25 = 20.475 \text{ m}^{3}$ $-2 \times 1.2 \times 1.65 \times 2.25 = 8.910 \text{ m}^{3}$ $-0.5 \times 4.2 \times 1.25 = 2.625 \text{ m}^{3}$ $-0.3 \times 2.05 \times 4.2 = 2.583 \text{ m}^{3}$ $-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $120.096 \text{ m}^{3}$					414.947 m³	
$ \begin{array}{rcl}                                     $	3. We	t Cobble Masonry				. •
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$-0.3 \times 0.7 \times 4.2 = 0.882 \text{ m}^{3}$ $-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $120.096 \text{ m}^{3}$			= 2.	625 m³		
$-2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95 = 56.485 \text{ m}^{3}$ $-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^{3}$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^{3}$ $120.096 \text{ m}^{3}$					A superior of the superior of	31 - 125 - 5 
$-2 \times 1.5 \times 2.05 \times 3.95 = 24.293 \text{ m}^3$ $-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^3$ $120.096 \text{ m}^3$	;	$0.3\times0.7\times4.2$	= 0.	882 m³		
$-0.3 \times 4.2 \times 3.05 = 3.843 \text{ m}^3$ $120.096 \text{ m}^3$	- 2	$2 \times \frac{1.2 + 2.05}{2} \times 4.4 \times 3.95$	= 56.	485 m³		
120.096 m³			= 24.	293 m³		
医抗性氏结合乳状的 化二氯甲基化物性性 医皮肤 医乳腺管 经运行 网络地名美国雷尔 医二角性毒素 电电流电流 化二甲二甲二甲二	- (	$0.3\times4.2\times3.05$	= 3.	843 m³		
4. Plain Concrete (C <sub>2</sub> )					120.096 m³	
	4. Plai	in Concrete (C <sub>2</sub> )				

Name of Structure	ASIN BOX CULVERT INLET STRUCTURE	Category Calculation	W	ork Volume	Page	3/7
			75 (84)	en 18 y sett	e v Azerove e	
•	avel Bedding		i No.	1. 1. 1. 1. 1.	t in the	
	$2\times0.2\times3.40\times2.25$	=	3.060	m³		
	$2 \times 0.2 \times 4.29 \times 3.95$		6.778	$m^3$	1	
- 1	$0.2\times1.5\times4.8$		1.440	$m^3$		
1	$0.2\times4.2\times4.9$	<u> </u>	4.116	m³		· · · · · ·
					15.394 m	3
6. PV	C Ø50 for Weep Hole					
<u> </u>	$3 \times 1 \times 1.6$	=	4.800	m'		
	4 × 2 × 2.05	= =	16.400	m'		
· · - :	$3 \times 0.4$	= 1	1.200	m'	te fat ge	
				2	.2.400 m	3
7. Coi	nerete for Structure (C <sub>1</sub> )		anga in			
- (	$0.35 \times \left(6.2 \times 5.0 - 3.5 \times 2 - 3.5$	$+4 \times \frac{0.3 + 0.3}{2} =$	8.463	m <sup>3</sup>		
					Station & Co.	
<u>-</u>	$\frac{0.25+0.25}{2}$ × {(2×2.75)+	4.2} =	0.303	$m^3$		
_	$1.7 \times \begin{cases} 0.35 \times 4.2 + 2 \times (0.3) \\ + (0.4 \times 4.2) \end{cases}$	5×2.0)} =	<i>7.7</i> 35	m³		
				i vi	6.501 m	3
8. Rei	nforcing Bar					
(1.7	× 458.822) + 657.568 = 1	1437.565 kg			no distribution Vertification in a constitution in a c	
9. Lev	eling Concrete					
	× 4.4 × 0.1		in jan		0.714 m	
					0.714 III	
Fori	$m \text{ Work} = 0.1 \times 1.7 \times 2$				0.340 m	2 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
10. Bac	kfill					
- 2	$2 \times \frac{0.2 + 4.9}{2} \times 4.7 \times 2.25$		53.933	m³		
<del>-</del> .	$2 \times \frac{0.7 + 3.5}{2} \times 2.25$		9.450	m³		
- 2	$2 \times \frac{0.2 + 1.1}{2} \times 0.9 \times 2.25$		2.633	$m^3 = \{1, 2, 3, 3, \dots, 3, 1, \dots, 3, 1, \dots, 3, 1, \dots, 3, 1, \dots, 3, \dots, $		
- 1	$2 \times \frac{0.2 + 6.1}{2} \times 5.9 \times 3.95$	= 14	16.822	$m^3$		

Name of Structure	ASIN BOX CULVERT INLET STRUCTURE	Category Calculation	Work Volume	Page	4/7
. <u>-</u>	$2 \times \frac{0.85 + 4.4}{2} \times 3.95$	= 20	0.738 m³	spanish series	
	$2 \times \frac{0.2 + 1.3}{2} \times 1.1 \times 3.95$	= (	5.518 m³	Targetting	
			2	40.094 m³	· :
11. Fo	rm Work	and the grade	rigger en dien Sig	4	
_	$2 \times 2 \times 0.75 \times 3.9$	= :	5.850 m²	# # # # # # # # # # # # # # # # # # #	
-	$2 \times 0.9 \times 4.7$	= 1	8.460 m <sup>2</sup> (14.5)	in the late of the	
-	2× 1.1 × 6.2		3.640 m²	4	
	$2 \times \sqrt{0.25^2 + 0.25^2} \times 3$		2.121 m²		
·	$\sqrt{0.25^2 + 0.25^2} \times 4.7$	= 1	1.662 m²	e sei	
	2 × 1.45 × 2.75	= 1	7.975 m²	· .	
· · · · <u>-</u>	1.45 × 4.2	= (	5.090 m²		
	2 × 1.45 × 1.6	= 4	1.640 m²		
_	1.45 × 2.9	= 4	1.205 m <sup>2</sup>		
-	$4 \times \sqrt{0.3^2 + 0.3^2} \times 2.05$	= 3	3.479 m²		,
				58.122 m <sup>3</sup>	
12. Poi	nting			* .	
<del>-</del> 1	$(2.9 + 0.6) \times 1.8 \times 2$	= 12	2.600 m²		
<del>-</del> 1	$(3.8 \pm 0.6) \times 3.6 \times 2$	= 3]	.680 m²		
				14.280 m <sup>2</sup>	
13. Pla	stering				
0.5	$\times 2 \times 6.2 = 6.20 \text{ m}^2$				
14. Log	g Pile (Ø150; L=3,000 m)				
(a.)	Section A-A				
	Length of structure = 4.	20  m, ctc = 1.0  m;	2 coluns		
	$2\times3.0\times\left(\frac{4.20-2\times0.}{1.0}\right)$	<del>4</del> +1) =	24 m'		
(b.)	Section C-C & D-D				
	Length of structure = 7.	70 m, ctc = 1.0 m;	2 columns		
	$2\times2\times3.0\times\left(\frac{7.70-2}{1.0}\right)$	× 0.4 + 1) =	96 m'		

120

m'

(a) + (b)

Name of Structure	ASIN BOX CULVERT INLET STRUCTURE	Category Calculation	Work Volume	Page	5/7

## 15. Cobble Stone

(a.) Section A-A

Length of structure = 4.20 m

 $0.15\times1.6\times4.2$ 

 $= 1.008 \text{ m}^3$ 

(b.) Section C-C

Length of structure = 1.8 + 0.5 = 2.30 m

 $2\times0.15\times1.85\times2.3$ 

 $= 1.277 \text{ m}^3$ 

(c.) Section D-D

Length of structure = 2.4 + 2.0 + 1.0 = 5.40 m

 $2\times0.15\times2.25\times5.4$ 

 $= 3.645 \text{ m}^3$ 

(a) + (b) + (c)

= 5.930 m

	ASIN BOX CULVERT				***************************************
Name of	INLET STRUCTURE	Category	111-1-11	_	
Structure	SCAFOLDING AND	Calculation	Work Volume	Page	6/7
	FORM SUPPORT			* * :	

# SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

		Vo	lume
No	Structure	Scafolding (m²)	Form Support (m³)
1	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River		34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	
9	Asin No.1 Bridge, Sub Structure	293	-
10	Asin No.2 Bridge, Sub Structure	251	<del>-</del>
	Total	4876	2676

Name of INLET STRUCTURE SCAFOLDING AND FORM SUPPORT	Category Calculation	Work Volume	Page	7/7
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- 1. Scafolding Area  $\cdots$   $p_{q+1/q} + r_{q+1/2+q+1/2+q}$ 
  - (a.) Box Culvert

$$(2 \times 2.75 + 2 \times 2) \times 1.50$$

 $= 14.25 \text{ m}^2$ 

(b.) Wing Wall

$$(6.2 \times 5.0 - 3.5 \times 2.0) + (2 \times 0.75 \times 5.0) + (4.7 \times 0.90) + (2 \times 0.35 \times 5.0) = 39.23 \text{ m}^2$$
  
(a) + (b) = 53.48 m<sup>2</sup>

2. For Support Area

$$3.5 \times 1.5 \times 2.0 = 10.5 \,\mathrm{m}^3$$

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	1/11
	SIIMM	ARY OF WORK		. <sup>The strong state</sup>	

				_
1.	STRUCTURE EXCAVATION	=	1,070.55	$m^3$
2.	BACK FILL	=	533.44	$m^3$
3.	LEVELING CONCRETE, TYPE E	=	4.53	m³ -
4.	CONCRETE FOR STRUCTURE, TYPE CI	=	31.01	$m^3$
5.	WET COBBLE MASONRY	= .	460.32	$m^3$
6.	GRAVEL BEDDING	=	104.78	$m^3$
7.	STEEL REINFORCING	= .	1,217.29	Kg
8.	LOG PILE Ø150, L=3,000	= -	321	m'
9.	WEEP HOLE PVC Ø50	=	39	Nos
10.	PALM FIBRE	= (4)	0.14	$m^3$
11.	BOULDER FILLING	=	11.27	$m^3$
12.	FORM WORK	=	134.91	$m^3$
13.	COBBLE STONE	<b>z</b> z	12.15	m³

					i
Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	2/11

## 1. Structure Excavation

(a.) Section A-A (L=6.70 m)

$$\begin{pmatrix}
\frac{0.2+1.0}{2} \times 0.8 + \frac{0.3+0.5}{2} \times 0.5 + 0.3 \times 4.0 \\
+ \frac{0.2+0.7}{2} \times 0.5 + 0.4 \times 1.10 + \frac{0.2+1.2}{2} \times 1.0 \\
+ 0.4 \times 1.0
\end{pmatrix} \times 6.70 = 24.421 \text{ m}^{3}$$

(b.) Section B-B (L=2.25 m)

$$\left(2 \times \frac{0.2 + 4.1}{2} \times 4.0 + 4.4 \times 4.0\right) \times 2.25 = 78.300 \text{ m}^3$$

(c.) Section C-C (L=5.0+3.90 m)

$$\begin{pmatrix} \frac{0.2+1.0}{2} \times 0.8 + \frac{0.3+0.5}{2} \times 0.5 + 0.3 \times 4.0 \\ + \frac{0.2+1.3}{2} \times 1.1 + \frac{0.2+5.7}{2} \times 5.5 \\ + 2.0 \times 5.5 \end{pmatrix} \times (5.0 + 3.90) = 266.377 \text{ m}^3$$

(d.) Section D-D (L=3.90 m)

$$\left(\frac{0.2+1.0}{2} \times 0.8 + \frac{0.3+0.5}{2} \times 0.5 + 0.3 \times 4.0 \right) \times 3.9 = 29.621 \text{ m}^3$$

$$\left(+\frac{0.2+0.9}{2} \times 0.7 + \frac{0.8+1.4}{2} \times 3 + 1.0 \times 1.4\right) \times 3.9$$

(e.) Section E-E (L=6.20 m)

$$\begin{pmatrix} \frac{0.2+1.0}{2} \times 0.8 + \frac{0.3+0.5}{2} \times 0.5 + 0.3 \times 4.0 \\ + \frac{0.2+0.9}{2} \times 0.7 + \frac{0.2+4.2}{2} \times 4.0 + \frac{0.8+1.4}{2} \\ \times 3.0 + 1.4 \times 1.0 \end{pmatrix} \times 6.2 = 97.743 \text{ m}^3$$

(f.) Section F-F

Retaining wall (L=8.50 m) 
$$\left( \frac{0.2 + 5.7}{2} \times 5.5 + 2.0 \times 5.5 + \frac{0.2 + 1.6}{2} \times 1.4 \right) \times 8.5 = 242.123 \text{ m}^3$$

Bank protection portion (See Section H-H)

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	3/11
	$\left(\frac{0.2+0.85}{2}\right) \times$	0.65 + 1.5 × 0.65			
		$\frac{0.65 + 1.5 \times 0.65}{1^2 + 0.2^2} \times 0.65$ $\frac{0}{1} \times 3.1 + \sqrt{0.1^2 + 0.2}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	58.216	m³
	- Flat area (L=12.	50 m)		*	
		$0.4 + 0.9 \times 0.3 \times \left(8\right)$	$.6 + \frac{3.9}{2} \bigg) \qquad = \qquad$	15.087	m³
			$\frac{+0.5^2}{\times 0.5} \times 0.5$	48 522	m <sup>3</sup>
	$\times \left(17.3 + \frac{2.2}{2}\right)$				(1) (1) 1
(g.)	Section G-G (L=6.9 m)		Page in Part 1975 = Late algebra 1975 and Late and Late	363.948	m³
	$\left(\frac{0.2+0.9}{2}\times0.7+\frac{0.2+}{2}\right)$	$\frac{4.3}{4.1} \times 4.1 + 1.45 \times 4$	.1)×6.9 =	107.330	m³
<b>(</b> h.)	• Slope 1:0.5 (L=8.90				
	그 살은 하는데 그 그 얼마 아무리 첫		5 × 8.90 =	40.584	m³
	• Flat area (L=12.90 s $\left(\frac{3.0 + 2.8}{2} \times 0.4 + \frac{3.0 + 2.8}{2}\right)$	$0.9 \times 0.3 \times 12.90$		18.447	m <sup>3</sup>
	• Slope 1:2.0 (L=16.6	0 m)	$\frac{\overline{.5^2}}{-} \times 0.5 \times 16.6 =$	43.775	m³
	(a)+(b)+(c)+(d)+	(-) (6) (-) (0)	- 1	000 546	

9.916 m<sup>3</sup>

 $\left(\frac{0.2+1.0}{2}\times0.8+\frac{0.2+0.8}{2}\times0.6+\frac{0.2+1.2}{2}\times1.0\right)\times6.70 =$ 

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	4/11
(b.)	) Section B-B (L=2.25 n	n)		<del></del>	
	$\left(2 \times \frac{0.2 + 4.1}{2} \times 3.9 + 1\right)$	$(.15 \times 4.2) \times 2.25$		= 48.600	m³
(c.)	) Section C-C (L=5.0+3	.90 =8.9 m)		: .	
	$\left(\frac{0.2+1.0}{2} \times 0.8 + \frac{0.2+3.7}{2} \times 0.8 + \frac{0.2+3.7}{2} \times 0.5 + \frac{0.2+3.7}{2} \times 0.8 + \frac{0.2+3.7}{2} \times 0.$	$\begin{pmatrix} +1.3 \\ 2 \\ 9+4.1 \\ 2 \end{pmatrix} \times 8.9$		= 172.438	m³
(d.)	) Section D-D (L=3.90 r	n) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1			
	$\left(\frac{0.2 + 1.0}{2} \times 0.8 + \frac{0.2 + 0.2}{2}\right)$	$\left(\frac{+0.9}{2} \times 0.7\right) \times 3.9$		3.374	m³
(e.)	The second second				
	$\left(\frac{0.2 + 1.0}{2} \times 0.8 + \frac{0.2 + 0.2}{2}\right)$	$\frac{0.9}{2} \times 0.7 + \frac{0.2 + 4}{2}$	$\frac{2}{2} \times 4.0 \times 6.2 =$	59.923	m³
(f.)					
	• Retaining wall (L= $\left(\frac{0.2+1.0}{2} \times 5.5 + \frac{0.9+1}{2}\right)$		×8.5 =	- 163.423 1	m³
(g.)	Section G-G (L=6.90 n	n)			
	$\left(\frac{0.2+0.9}{2} \times 0.7 + \frac{0.2+0.9}{2}\right)$	-	(1) × 6.9 =	72.726 ı	m³
(h.)					
	$\frac{0.2+0.85}{2} \times 0.65 \times 8.9$		-	3.037 1	<u>m³</u>
	-	(a)+(b)+(c)+(d)+(e)-	+(f)+(g)+(h) =	533.437	m³
3. Lev	veling Concrete (E)		Allega, despuis . De la casa de la casa		
(a.)	Section A-A (L=2.25-0	.4 = 1.85 m)			
	$1.85 \times 4.4 \times 0.10$		= 0.814 m	1 <sup>3</sup>   fw =	0.37
(b.)		0 = 37.55 m)			
	$37.55 \times 0.70 \times 0.10$		= 2.629 m	1 <sup>3</sup>   fw =	7.51
(c.)		0 = 21.7 m)			
	$21.7 \times 0.50 \times 0.10$		= 1.085 m	North Control	
4. Con	ncrete for Structure (C <sub>1</sub> )		4.528 m	n³   fw=1:	2.22
(a.)				andronia († 1865) 1908 - Paris III. († 1865)	
	$(6.2 \times 5.0 - 2.0 \times 3.5 +$	$4 \times \frac{0.3 + 0.3}{2} \times 0.4$		9.672 1	m³

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	5/11
	$\begin{cases} (0.35 \times 4.2) + (0.4 \times 4) \\ + \left(4 \times \frac{0.3 \times 4.3}{2}\right) \end{cases}$	.2)+(2×0.35×2.0	)   ×1.85   ==	8.750	$ m m^3$
	$2 \times \frac{0.25 + 0.25}{2} \times 3.0 +$	-	ing on the <u>p</u>	0.334	m³
(b.)	The state of the s	in his war fit for a		18.756	m³
(c.)	$(0.5 \times 0.5 - 0.3 \times 0.15)$ Detail II (L=21.7 m) (7	op concrete)		7.698	
5. We		(a)+(b)+(c)		31.011	m³ m³
	Section A-A (L=18.0 n $\frac{0.3 + 0.8}{2} \times 1.25 \times 18$		valstini kilikini. Valoti		n <sup>3</sup>
(b.)	Section C-C (L=5.85 +				
(c.)	$\left\{ \left( \frac{1.10 + 2.0}{2} \right) \times 4.10 + \right.$ Section D-D (L=3.90 n		그리고 가장 차려를 기계하는 기계하는 자동사회	102.536 1	11 <sup>3</sup>
	$\left\{ \left( \frac{6.8 + 1.40}{2} \right) \times 3 + \left( 1 \times \right) \right\}$	• • •		18.330 ı	n³
(d.)	Section E-E (L=10.85 r $\left\{ \left( \frac{0.8+1.4}{2} \right) \times 3 + \left( 1 \times 1 \right) \right\}$			50.995 1	n³
(e.)	Section F-F (L=8.5 m) • Retaining wall (L=				
fage fight for the control of fage for the state of the fight for the state of	$\begin{cases} \frac{1.1+2}{2} \times 4.10 + (1 + \frac{1}{2}) \\ \text{Bank Protection / S} \end{cases}$	till (de Geberghil		77.818 r	m³
	$\left\{ \left( \frac{0.45 + 0.9}{2} \right) \times 3.6 \right.$	+ (1.5×0.65)}×14		42.670 r	n³
	• Bcd Protection (L= $ \left\{ (5 \times 3) + (1.85 \times 3) \right\} $			7.832 r	m³

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	6/11
	Rank Protection / 9	Slope 1:2 (L=5+3.6	+3 0+4 8+3 3 - 10	S)	
	$(\sqrt{2^2+1^2}) \times 0.3 + 19$	9.5		эт) <u>13.081 т</u>	<u>3</u>
(f.)	Section G-G (L= 2 + 3	$+19=69 \mathrm{m}$		146.401 m	<b>3</b>
. (-7					
ğ.	$\left\{ \left( \frac{0.85 + 1.45}{2} \right) \times 3.10 \right\}$	$+(1\times1.45)$ $\times6.9$	=	34.604 m	3
(g.)	Section H-H		British jaka di Art	at of the control of the	
		Slope 1:0.5 (L=5 + 4			
	$\left\{ \left( \frac{0.45 + 0.9}{2} \right) \times 3.6 \right\}$	$6 + (1.5 \times 0.65) \times 9.2$	25 	31.496 m	3
	Bed Protection (L=	= 5 + 7.95 = 12.95 n	n) · · · · · · · · · · · · · · · · · · ·	$\{\varphi_{i}^{N}(t)\}_{i=1}^{N}$	
	$3\times0.3\times12.95$			11.655 m	3
	,	Slope 1:2 (L=5 + 11	.65 = 16.65 m)		
	$\left(\sqrt{2^2+1^2}\right) \times 0.3 \times 16$	5.65	(1) (AyA) 特別 <b>人</b> 基	11.169 m	3 
				54.320 m	3
(h.)	Apron				
	Area:				
	(I) $(11.6 \times 6.55) - (\frac{9}{36}$	$\frac{0}{50} \times \frac{1}{2} \times \pi \times 6.55^2$	$\frac{1.85\times3.4}{2} =$	55.987 m	<b>?</b>
	(II) $\frac{5.50 + 9.90}{2} \times 3.80$			29.260 m	•
11 11 111	(III) $\frac{8.65 + 9.65}{2} \times 4.0$				
	$\frac{111}{2} \times 4.0$			36.600 m	
			<b>A</b> =	121.847 m	2
		$1.847 \times 0.30$		= 3	6.554 m <sup>3</sup>
	$T_{OE} = (I$	L = 9.9 + 5.5 + 8.65	= 24.05 m)		
	$V_{T} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$	$\frac{0.4+0.3}{2}\bigg)\times0.5\times2$	4.05		4.209 m³
				= 4	0.763 m <sup>3</sup>
	Total (a)+(b)+(c	)+(d)+(e)+(f)+(g)+	(h)	=46	0.324 m <sup>3</sup>
6. Gra	vel Bedding				
(a.)	Section C-C (L=5.85 +	5.35 = 11.20 m)			
	$(\sqrt{4^2+0.9^2}) \times 0.30 \times 11$	.20		13.776 m	
(b.)	Section F-F (L=8.5 m)				
	• Retaining wall (L= $(\sqrt{4^2 + 0.9^2}) \times 0.30$ )			10.455 m	

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	7/11
	• Bank Protection / Slope 1:0.5 (L=14 m) $ \left\{ \left( \sqrt{1.35^2 + 3.4^2} \right) \times 0.20 + 0.20 + \frac{0.25 + 0.10}{2} \times 0.65 \right\} \times 14 = 44 $ • Bed Protection (L=5+2.6+3.9 = 11.50 m) $ \left\{ \left( 3 \times 0.2 \right) + \left( \frac{0.4 \times 0.2}{2} \times 0.3 \right) \right\} \times 11.50 $ • Bank Protection / Slope 1:2 (L= 19.5 m) $ \left\{ \left( \sqrt{2^2 + 1^2} \right) \times 0.3 + \frac{0.4 + 0.2}{2} \times 0.3 \right\} \times 19.5 $ = (c.) Section G-G $ \left( \sqrt{0.6^2 + 3^2} \right) \times 0.20 \times 6.9 $ (d.) Section H-H • Bank Protection / Slope 1:0.5 (L=5 + 4.25 = 9.25 m) $ \left\{ \sqrt{2.25^2 + 3.6^2} \times 0.2 + 0.3 \times 0.2 + \frac{0.25 + 0.10}{2} \times 0.65 \right\} \times 9.25 = 444$ • Bed Protection (L= 5 + 7.95 = 12.95 m) $ \left\{ \left( 3 \times 0.2 \right) + \frac{0.4 + 0.2}{2} \times 0.3 \right\} \times 9.25 $ • Bank Protection / Slope 1:2 (L= 19.50 m) $ \left\{ \left( \sqrt{2^2 + 1^2} \right) \times 0.2 + \frac{0.4 + 0.2}{2} \times 0.30 \right\} \times 19.50 $ (e.) Bed Channel $ 0.2 \times 4.0 \times 23.0 $				
	$\left\{ \left( \sqrt{1.35^2 + 3.4^2} \right) \times 0 \right\}$	$0.20 + 0.20 + \frac{0.25 + 0.20}{2}$	$\frac{0.10}{1.00} \times 0.65 \times 14 = 0.65$	42.670	m³
1	Bed Protection (L=	-5+2.6+3.9 = 11.50	m)		
	$\left\{ \left(3 \times 0.2\right) + \left(\frac{0.4 \times 6}{2}\right) \right\}$	$\frac{0.2}{1.50} \times 0.3$	· =	7.935	m³
	Bank Protection / S	Slope 1:2 (L= 19.5 r	n)	e firen for Ge	
	$\left\{ \left( \sqrt{2^2 + 1^2} \right) \times 0.3 + \right.$	$\left.\frac{0.4+0.2}{2}\times0.3\right\}\times19$	0.5 <u>=</u>	10.476	_m³
*:i				42.064	m³ - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
	$\left(\sqrt{0.6^2+3^2}\right) \times 0.20 \times 6.9$	9	=	4.222	m³
(d				de da fili	
		Both spirit.		9.461	m³
				6.383	m³
	Bank Protection / S	Slope 1:2 (L= 19.50	m) - 4 - 6 - 1 - 1 - 1 - 1 - 1	49 1	
	$\left\{ \left(\sqrt{2^2+1^2}\right) \times 0.2 + \cdots \right\}$	, ,		10.476	<u>m³</u>
(е					
	$0.2 \times 4.0 \times 23.0$			18.40	
	Gravel bedding (a)+(t	)+(c)+(d)+(e)		26.320 ==	m³ 104.782 m³
7. Ste		da birdik diludi. Birdik dilu			
一点的概则的	法未证 化油 严急 克特拉			HI.	
	Stirrup: $L = 0.4 + 0.25$	$5 + 0.4 + 0.15 + (\sqrt{0})$	$\overline{.25^2 + 0.15^2}$		
	+ 2 × 0.0 Length of bed concrete	)2		1.532	m
	Weight of stirrup = $\frac{37}{0}$ .	$\frac{.5}{3}$ × 1.532 × 0.617		118.116	kg
	Main reinforcement = (	6 × 37.5 ×1.040		234.000	<u>k</u> g
				=	352.116 kg
(b.)					
	Stirrup: $L = 2 \times 0.2 + 2 \times 0.0$			1.532	<b>m</b>

Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	8/11
	Weight of stirrup = $\frac{21}{0}$	$\frac{.70}{.3} \times 1.640 \times 0.617$		72.181	kg
	Main reinforcement = (	6 × 21.70 ×1.040		135.408	kg
(c.)	Wing Wall			<u>=</u>	207.589 kg
	Weight of reinforcement	nt (see Table)		657.580	kg
1					
8. Wee	ep Hole (PVC Ø50)			<b>= 1</b>	217.285 kg
(a.)	Section C-C				
	Length of masonry = 1	1.20 m			
	Line number of weep h	ole = $\frac{11.20}{2.0}$ = 5.6 ~	·6		
	Length of weep hole =	$6 \times (1.5 + 2.0) = 21$	m' →	2 × 6	= 12 nos
(b.)	Section F-F • Retaining Wall (L=	= 8.5 m)			
	Line number of wee	ep hole = $\frac{8.5}{2.0}$ = 4.23		The second second	= 10 nos
	Bank protection/Slo	•	The state of the s		
	Line number of wee	2.0	and the second of the second o		= 7 nos
	Length of weep hole  Bank protection/Slo				
· .	Line number of wee	and the first of the second			0 = 10 nos
÷ .	Length of weep hole	2.0	=8.000 m		o To nos
(c.)	Section F-F		42.300 m	• →	= 139 nos
	• Retaining Wall (L=	6.90 m)			
	Line number of wee	₩.0	1960年,李朝·郑昭、李郎副群。		
(2)		· 1/(1.23 ( 1.30)	)= 11.5 m		
(d.)	• Bank protection/Slo				
	Line number of wee Length of weep hole	2.0			

• Bank protection/Slope 1:2.0 (L= 18.05 m)  Line number of weep hole = $\frac{18.05}{2.0} = 9$ Length of weep hole = $9 \times 0.80$ = $\frac{7.20 \text{ m}^3}{19.20 \text{ m}^3}$ Total length of weep hole = $9 \times 0.80$ = $93.50 \text{ m}^3$ 9. Palm Fibre  Total number of weep hole = $12 + 41 + 8 + 24 = 85 \text{ nos}$ Palm fibre dimension $200 \times 200 \times 40$ Volume of palm fibre = $0.2 \times 0.2 \times 0.04 \times 85$ = $0.136 \text{ m}^3$ 10. Boulder Filling  (a.) Section F-F (L= 19.50 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 19.50$ = $5.850 \text{ m}^3$ (b.) Section H-H (L= 18.05 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05$ = $5.415 \text{ m}^3$ 11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^3 + 0.25^2} + 22.75$ $\times \sqrt{0.25^3 + 0.25^3} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2$ = $30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right)$ = $38.828 \text{ m}^2$ $Total (a)+(b)+(c)$ = $134.912 \text{ m}^2$	9. Palm Fil Total nur Palm fibr	Line number of wee Length of weep hole  otal length of weep hore  mber of weep hole =  re dimension 200 × 20	p hole = $\frac{18.05}{2.0}$ = $e = 9 \times 0.80$ ole $12 + 41 + 8 + 24$ $00 \times 40$	9 =	19.20 m'		
Length of weep hole = $9 \times 0.80$ = $7.20 \text{ m}^2$ $19.20 \text{ m}^3$ Total length of weep hole = $93.50 \text{ m}^3$ 9. Palm Fibre  Total number of weep hole = $12 + 41 + 8 + 24 = 85 \text{ nos}$ Palm fibre dimension $200 \times 200 \times 40$ Volume of palm fibre = $0.2 \times 0.2 \times 0.04 \times 85$ = $0.136 \text{ m}^3$ 10. Boulder Filling  (a.) Section F-F (L= 19.50 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 19.50$ = $5.850 \text{ m}^3$ (b.) Section H-H (L= 18.05 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05$ = $5.415 \text{ m}^3$ 11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75$ = $65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2$ = $30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right)$ = $38.828 \text{ m}^2$	9. Palm Fil Total nur Palm fibr	Length of weep hole  otal length of weep hole  ore  mber of weep hole =  re dimension 200 × 20	$e = 9 \times 0.80$ Folia ole $= 12 + 41 + 8 + 24$ $= 100 \times 40$		19.20 m'		esti tog
Length of weep hole = $9 \times 0.80$ = $7.20 \text{ m}^2$ $19.20 \text{ m}^2$ Total length of weep hole = $93.50 \text{ m}^2$ 9. Palm Fibre  Total number of weep hole = $12 + 41 + 8 + 24 = 85 \text{ nos}$ Palm fibre dimension $200 \times 200 \times 40$ Volume of palm fibre = $0.2 \times 0.2 \times 0.04 \times 85$ = $0.136 \text{ m}^2$ 10. Boulder Filling  (a.) Section F-F (L= $19.50 \text{ m}$ ) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 19.50$ = $5.850 \text{ m}^3$ (b.) Section H-H (L= $18.05 \text{ m}$ ) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05$ = $5.415 \text{ m}^3$ 11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75$ = $65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L= $21.70 \text{ m}$ ) $21.70 \times 0.7 \times 2$ = $30.38 \text{ m}^2$ (c.) Base Concrete (L= $37.50 \text{ m}$ ) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right)$ = $38.828 \text{ m}^2$	9. Palm Fil Total nur Palm fibr	Length of weep hole  otal length of weep hole  ore  mber of weep hole =  re dimension 200 × 20	$e = 9 \times 0.80$ Folia ole $= 12 + 41 + 8 + 24$ $= 100 \times 40$		19.20 m'		entre Folgo
Total length of weep hole = 93.50 m <sup>3</sup> 9. Palm Fibre  Total number of weep hole = 12 + 41 + 8 + 24 = 85 nos  Palm fibre dimension 200 × 200 × 40  Volume of palm fibre = 0.2 × 0.2 × 0.04 × 85 = 0.136 m <sup>3</sup> 10. Boulder Filling  (a.) Section F-F (L= 19.50 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 19.50 = 5.850 \text{ m}^3$ (b.) Section H-H (L= 18.05 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05 = 5.415 \text{ m}^3$ 11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$	9. Palm Fil Total nur Palm fibr	otal length of weep hore  mber of weep hole =  re dimension 200 × 20	ole - 12 + 41 + 8 + 24 00 × 40		19.20 m'		e en
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(b.) Section H-H (L= 18.05 m) $V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05 \qquad = 5.415 \text{ m}^{3}$ $= 11.265 \text{ m}^{3}$ 11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^{2} + 0.25^{2}} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 \qquad = 30.38 \text{ m}^{2}$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^{2} + 0.3^{2}} + 0.20\right) \qquad = 38.828 \text{ m}^{2}$	1.5 444	医囊性性皮肤 医多种性皮肤炎		in the state of			
$V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05$ $= 5.415 \text{ m}^{3}$ $= 11.265 \text{ m}^{3}$ 11. Form Work (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^{2} + 0.25^{2}} + 22.75$ $\times \sqrt{0.25^{2} + 0.25^{2}} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2$ $= 30.38 \text{ m}^{2}$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^{2} + 0.3^{2}} + 0.20\right)$ $= 38.828 \text{ m}^{2}$	V	$=\frac{0.8+0.2}{2}\times0.6\times19.$	.50		· · · · · = ·	5.850	m³
$V = \frac{0.8 + 0.2}{2} \times 0.6 \times 18.05$ $= 5.415 \text{ m}^{3}$ $= 11.265 \text{ m}^{3}$ 11. Form Work (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^{2} + 0.25^{2}} + 22.75$ $\times \sqrt{0.25^{2} + 0.25^{2}} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2$ $= 30.38 \text{ m}^{2}$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^{2} + 0.3^{2}} + 0.20\right)$ $= 38.828 \text{ m}^{2}$	(b.) Sec	ction H-H (L= 18.05)	m)	in in die deutsche Ausgeber der die die deutsche Aufgeber deutsche Aufgeber der deutsche Aufgeber der deutsche Die deutsche Aufgeber deutsche Aufgeber deutsche Aufgeber deutsche Aufgeber deutsche Aufgeber deutsche Aufgebe	esia est. Est	e y <sub>a</sub> d	
11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$							
11. Form Work  (a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$	<b>V</b>	$=\frac{3.6 \times 3.2}{2} \times 0.6 \times 18.$	.05	Todaya Taraba Kabupatèn	<u>aktur = 1</u>	5.415	<u>m³</u>
(a.) Section A-A & B-B $6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$		ork Section	r CAZ + Salpanjak S	tario di Salah Hasayital H	= 	11.265	m³
$6.2 \times 5.0 - 3.5 \times 2.0 + 6.2 \times 0.9 + 22.75 \times 2.25$ $+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$	and the state of the state of						· · · · · · · · · · · · · · · · · · ·
$+1.10 \times 6.20 + 4.2 \times \sqrt{0.25^2 + 0.25^2} + 22.75 = 65.704 \text{ m}^2$ $\times \sqrt{0.25^2 + 0.25^2} + 21.5 \times 2.25 + 3.0 \times 2.25$ (b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2 = 30.38 \text{ m}^2$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$			2×0.9 + 22.75×2	2.25			
(b.) Top Concrete (L=21.70 m) $21.70 \times 0.7 \times 2$ = 30.38 m <sup>2</sup> (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right)$ = 38.828 m <sup>2</sup>				14		65.704	$m^2$
$21.70 \times 0.7 \times 2 = 30.38 \text{ m}^{2}$ (c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^{2} + 0.3^{2}} + 0.20\right) = 38.828 \text{ m}^{2}$	X 1	$\sqrt{0.25^2 + 0.25^2} + 21.5$	$\times 2.25 + 3.0 \times 2.2$	5		e Haranta	
(c.) Base Concrete (L=37.50 m) $37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2 + 0.20}\right) = 38.828 \text{ m}^2$	(b.) To	p Concrete (L=21.70	m)		je di		
$37.5 \times \left(0.5 + \sqrt{0.15^2 + 0.3^2} + 0.20\right) = 38.828 \text{ m}^2$	21.	70 × 0.7 × 2	A Charles			30.38	m²
The control of the set from the state of a control of the control of the set of the set of the control of the c	(c.) Ba	se Concrete (L=37.50	) m)		1954. N. S.	f:C	
ការប្រជាព្រះប្រើប្រឹស្ត្រមាន គឺ មានប្រឹង្ធមេនាំង អាការិយៈសារប្រធិប្រាស់ មានសំពេញក្រោយ មានសម្រាស់ នៅ ដូចបានប្រឹ	37	$.5 \times (0.5 + \sqrt{0.15^2 + 0.15^2})$	$(3^2 + 0.20)$		:	38.828	m²
		करा में अपने हमें सम्बद्ध करता		#n. #n j.m. h t.	= 1	11.37	<del>( , )</del>
	to an electric transfer of the second						

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Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	10/1
12. Col	oble Stone	Service of the service			
(a.)	Section C-C (L= 8.90 n 0.15 × 2.20 × 8.90	n)		2.937	m³
(b.)	Section D-D (L= $3.90 1$ $0.15 \times 1.6 \times 3.90$	m)	==	0.936	m³
(c.)	Section E-E (L= $6.20 \text{ n}$ $0.15 \times 1.6 \times 6.20$	n)		1.488 ı	m³
(d.)	Section F-F (L= 8.50 m 0.15 × 2.20 × 8.50		en e	2.805 ı	m³
(e.)	Section G-G (L= 6.90 r 0.15 × 1.65 × 6.90	<b>n)</b>		1.708 i	·
(f.)	Section II-H (L= 8.90 r 0.15 × 1.70 × 8.90	n)		3(1.λ.). +2.[e.;	,
	and the second of the second of the second	a)+(b)+(c) +(d)+(e		2.270 <u>1</u> 12.144 1	
	ber Log Pile				
(a.)	For bed concrete (total	e de la companya de			
	Total length of log pile	=	$+1 \times3.0$	57 r	n'
1-1					
<b>(b.)</b>	Section C-C (Total leng	gth of Structure = 8			
	$2\times3.0\times\left(\frac{8.9-2\times0.4}{1}\right)$	gth of Structure = 8	.90 m, etc=2,100, 2	columns) 54 r	
(b.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length)	gth of Structure = 8 + 1) gth of Structure = 3	3.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cd	columns) 54 r olumns)	
	$2\times3.0\times\left(\frac{8.9-2\times0.4}{1}\right)$	gth of Structure = 8 + 1) gth of Structure = 3	3.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cd	columns) 54 r olumns)	n'
	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length)	gth of Structure = 8 + 1  gth of Structure = 3 + 1	3.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cc	columns) 54 r olumns) 24 r	n'
(c.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length 2 \times 3.0 \times \left(\frac{3.9 - 2 \times 0.4}{1}\right)	eth of Structure = 8 + 1  gth of Structure = 3 + 1  th of Structure = 6	3.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cc	columns) 54 r olumns) 24 r olumns)	n'
(c.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length of the section E-E (Total length)) Section E-E (Total length)	gth of Structure = 8 $+1$ gth of Structure = 3 $+1$ $+1$ th of Structure = 6 $-+1$	2.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cd = 20 m, etc=1.0, 2 cd	columns) 54 r olumns) 24 r olumns)	n'
(c.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length of the expectation) $2 \times 3.0 \times \left(\frac{3.9 - 2 \times 0.4}{1}\right)$ Section E-E (Total length of the expectation) $2 \times 3.0 \times \left(\frac{6.20 - 2 \times 0.4}{1}\right)$	gth of Structure = 8 $+1$ gth of Structure = 3 $+1$ gth of Structure = 6 $+1$ th of Structure = 8	2.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cd = 20 m, etc=1.0, 2 cd	columns) 54 r olumns) 24 r olumns)	n' n'
(c.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length of the section E-E) (Total length of the section E-E) (Total length of the section E-F)	gth of Structure = 8 $+1$ gth of Structure = 3 $+1$ $+1$ th of Structure = 6 $+1$ $+1$	2.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cc = 2.20 m, etc=1.0, 2 cc = 50 m, etc=1.0, 2 cc	columns) 54 r olumns) 24 r olumns) 36 r olumns)	n' n'
(c.) (d.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length of the property	gth of Structure = 8 +1)  gth of Structure = 3 +1)  th of Structure = 6 (-+1)  th of Structure = 8 +1)	2.90 m, etc=2,100, 2 = 3.90 m, etc=1.0, 2 cc = 2.20 m, etc=1.0, 2 cc = 50 m, etc=1.0, 2 cc	columns) 54 r olumns) 24 r olumns) 36 r olumns)	n' n'
(c.) (d.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total length of the property	gth of Structure = $8$ +1) gth of Structure = $3$ +1) th of Structure = $6$ +1) gth of Structure = $8$ +1)	2.90 m, etc=2,100, 2 co 3.90 m, etc=1.0, 2 co = 20 m, etc=1.0, 2 co = 5.90 m, etc=1.0, 2 co	columns)  54 r olumns)  24 r olumns)  54 r olumns)	n' n'
(c.) (d.) (e.)	$2 \times 3.0 \times \left(\frac{8.9 - 2 \times 0.4}{1}\right)$ Section D-D (Total lengested 2 \times 3.0 \times \left(\frac{3.9 - 2 \times 0.4}{1}\right) Section E-E (Total lenges 2 \times 3.0 \times \left(\frac{6.20 - 2 \times 0.4}{1}\right) Section F-F (Total lenges 2 \times 3.0 \times \left(\frac{8.5 - 2 \times 0.4}{1}\right) Section G-G (Total lenges 2 \times 3.0 \times \left(\frac{6.9 - 2 \times 0.4}{1}\right)	gth of Structure = 8 $+1$ gth of Structure = 3 $+1$ $+1$ th of Structure = 6 $+1$ gth of Structure = 8 $+1$	2.90 m, etc=2,100, 2 co 3.90 m, etc=1.0, 2 co = 20 m, etc=1.0, 2 co = 5.90 m, etc=1.0, 2 co	columns)  54 r olumns)  36 r olumns)  54 r olumns)	n' n'

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Name of Structure	ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	11/11
14. Poi	nting ( ) A think a displace				
(a.)	Section C-C (L=11.20	m) :: [[::::::::::::::::::::::::::::::::		er egy be	;
	$(3.7 + 0.40) \times 11.2$		=	45.92 r	n²
(b.)	Section D-D (L= 3.90)	m)	e de la companya de l		
	$(3.7 - 0.7) \times 3.90$		· · · · · · · · · · · · · · · · · · ·	11.70 n	n²
(c.)	Section E-E (L= 10.85	m)			έ.
	$(3.7-0.7)\times10.85$		er i sa i sa 🚣	32.55 n	n²
(d.)	Section F-F				
· · · · · · · · · · · · · · · · · · ·	$(\sqrt{1^2+1.55^2})\times 19.5$	= 41	3.600 m²		
	$(3.7 \pm 0.4) \times 7.0$	= 53	3.900 m²		
	$3.0 \times (5 + 2.6 + 3.9)$	= 34	1.500 m²		
	$(\sqrt{3.1^2+1.55^2})\times 15$	letakota seksev Erro — ≢. <b>5</b> 1	1.990 m²	sa in 1990. Tanàna	
(e.)		The state of	a Maria da Parista.	$\{ \cdot \mid \cdot \}_{i=1}^n : i \in \mathbb{N}$	
	$(2.7 + 0.4) \times 6.90$	= 21	1.390 m²		
(f.)	Section H-H				
	$(\sqrt{3.1^2+1.55^2})\times 18.05$	= 31	.260 m²		
	3.0 + 12.93	医毛囊 医多角性病	3.790 m²		
	$(\sqrt{3.1^2+1.55^2}) \times 9.24$		2.025 m²		
				397.630 n	1 <sup>2</sup>

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Name of Structure	SCAFOLDING AND FORM SUPPORT FOR ASIN DRAINAGE SYSTEM	Category Calculation	Work Volume	Page	1/2
			4	4	

# SUMMARY OF SCAFOLDING AND FORM SUPPORT VOLUME FOR ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT.

<u> </u>		l Va	lume
No	Structure	Scafolding (m²)	Form Support (m³)
l	Asin Pumping Station	1342	941
2	Asin Pumping Station, Gate	732	254
3	Asin Box Culvert	1843	1358
4	Asin Box Culvert Inlet Structure	54	11
5	Asin Box Culvert Outlet Structure	62	16
6	Secondary Channel Outlet on Asin River		34
7	Fuel Tank Box for Asin Pumping Station	133	62
8	Asin Pumping Station Bridge, Sub Structure	166	5. Hest 7. 55
9	Asin No.1 Bridge, Sub Structure	293	
10	Asin No.2 Bridge, Sub Structure	251	
1. 1.	Total	4876	2676

Name of Structure	SCAFOLDING AND FORM SUPPORT FOR ASIN BOX CULVERT OUTLET STRUCTURE	Category Calculation	Work Volume	Page	2/2
1. Sea	afolding Area				
(a) (b)	Box culvert = $(2 \times 2.7)$			21.375 39.730	
		(a)+(b)	or the second second	61.105 m <sup>2</sup>	v
2. Fo	rm Support Area				
3.5	$0 \times 2.25 \times 2.0 = 15.75 \text{ m}$	<b>1<sup>3</sup></b>	and the second of the second o		

Name of Structure

ASIN RIVER No.1

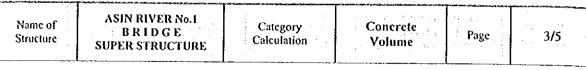
BRIDGE
SUPER STRUCTURE

Category
Calculation
Concrete
Volume
Page
1/5

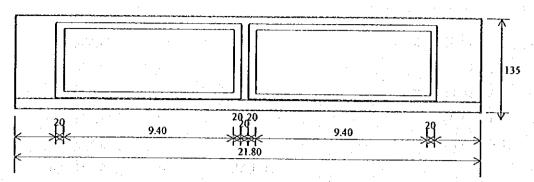
## SUMMARY OF QUANTITIES OF SUPER STRUCTURE

		5		1.			
1.	STRUCTURE CONCRETE K400			=	68.31	$m^3$	
2.	STRUCTURE CONCRETE K250			=	77.46	$m^3$	
3.	REINFORCING STEEL	==	15,787	kg		##2 1 	
4.	PC CABLE K1 Ø12.7 7 STRANDS	==	769,000	kg			
	PC CABLE K2 Ø12.7 12 STRANDS	_=	1,320,000	kg	,		
÷	PC CABLE K1 Ø12.7 7 STRANDS	. ==	771,000	kg			
	PC CABLE MONO STRAND CABLE/FS	=	48,500	kg			
	то	TAL		; . ==	2,908,500	kg	
5.	BRIDGE RAILLING			=	43.60	m	
6.	EXPANSION JOINT			=	20.10	m	ż
7.	BEARING SHOE AND RUBBER SHEET			=	12.00	pieces	
8.	PVC DRAINAGE PIPE Ø10 cm			=	10.50	m'	
9.	ASPHALT PAVEMENT AC ON TOP OF	SLA	В	=	14.60	m³ ·	
10.	FORM WORK			=	881.31	m²	•

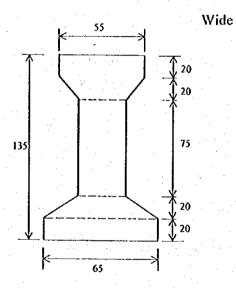
Name of Structure	ASIN RIVER No.1 BRIDGE SUPER STRUCTURE	Category Calculation	Concrete Volume	Page	2/5
	SUMMA	RY CONCRETE	VOLUME	. 7-34.	:
		$(x_{i}, x_{i}, \dots, x_{i}) \in \mathbb{R}^{n}$			
- MA	AIN GIRDER		· ==	64,638 kg	¥ .
- SL	AB		==	48,256 kg	
- PA	NEL PLATE		. · · · <b>=</b>	10,759 kg	
- SIE	DE WALK			18,443 kg	
- CR	OSS BEAM		. · . · · · =	3,675 kg	
		TOTAL	The second secon	145,771 kg	
			*	143,771 kg	
SO:					
9 7. 7 4	MODETE OHALITY FOR	12400		<b>60.010</b>	
	NCRETE QUALITY FOR	Company of the Compan	=	68,313 kg	
- 00	NCRETE QUALITY FOR	. K250		77,458 kg	
le fue le Table					
					A. Carrier
				•	
					* . * . * . * . * . * . * . * . * . * .
		and the second			ata e
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					* * *
			guardes de la propia de la seguira de la compania d Compania de la compania de la compa		
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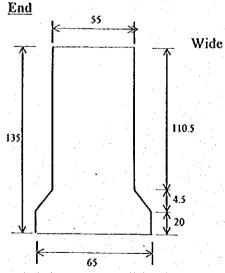


## 1. Main Girder



## Center



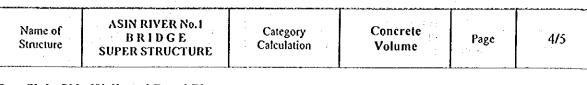


$$A_1 = 0.65 \times 0.20 = 0.130 \text{ m}^2$$
 $A_2 = \frac{0.65 + 0.55}{2} \times 0.045 = 0.027 \text{ m}^2$ 
 $A_3 = 0.55 \times 1.105 = 0.108 \text{ m}^2$ 
Sub Total = 0.765 m<sup>2</sup>

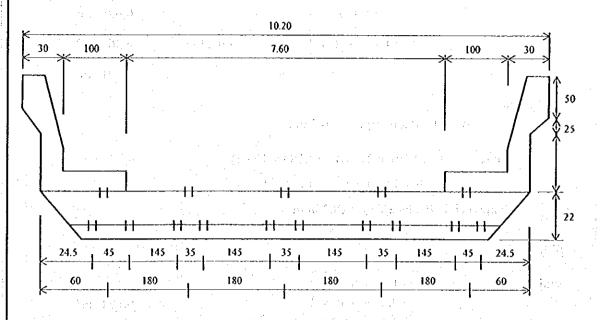
$$A = \frac{0.4575 + 0.765}{2} = 0.611 \text{ m}^2$$

Volume =  $[(0.4575 \times 9.40 \times 2) + (0.765 \times (100 \times 2 + 0.20) + (0.611 \times 0.20 \times 4))]$ = 8.601 + 1.683 + 0.489=  $10.773 \text{ m}^3$ 

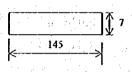
Volume Main Girder Total ( $V_G$ ) =  $6 \times 10.773 = 64.638 \text{ m}^3$ 



## 2. Slab, Side Walk and Panel Plate



## Panel Plate K250



One Panel:

Volume =  $1.45 \times 0.07 \times 1.0 = 0.1015 \text{ m}^3$ In one span =  $(21.80 - 0.30 \times 2)$ = 21.20 m

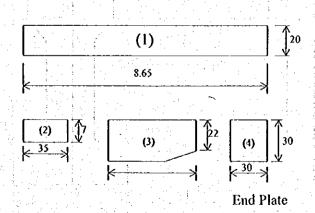
Length = 1.00 m

Volume =  $(21 + 0.20) \times 0.1015$ =  $2.1518 \text{ m}^3$ 

Total volume panel plate in Bridge (VP)

$$V_P = 5 \times 2.1518 = 10.759 \text{ m}^3$$

## Slab



Name of Structure	ASIN RIVEI BRIDC SUPER STRU	E	Category Calculation	Concrete Volume	Page	5/5
Wide:	$egin{array}{c} A_1 \ A_2 \end{array}$	= 8.65 = 0.35	× 0.20 × 0.07 × 4		1.730 m	
; ;	A <sub>3</sub>			$\frac{0.22}{0.245} \times 0.245 \times 2 = $	0.098 m 0.363 m	
			( 2	) =	2 191 m	25 I 2

## **End Plate**

$$A_4 = (0.30 \times 0.30) \times 2 = 0.180 \text{ m}^2$$

Volume = 
$$(2.191 \times 21.20) + (0.180 \times 10.04)$$
  
=  $46.449 + 1.807 = 48.256 \text{ m}^3$ 

Volume Slab in Bridge (VS) =  $48.256 \text{ m}^2$ 

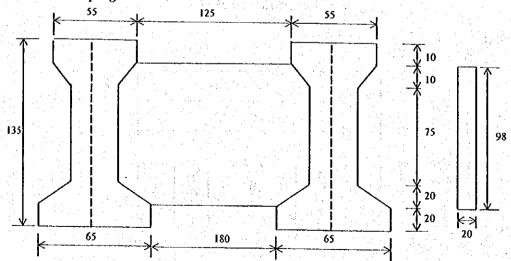
## Side Walk .

Wide: 
$$A_4 = 1.00 \times 0.25 \times 2$$
 = 0.500 m<sup>2</sup>  
 $A_5 = 0.22 \times 0.35 \times 2$  = 0.154 m<sup>2</sup>  
 $A_6 = \left(\frac{0.17 + 0.22}{2} \times 0.40 \times 2\right)$  = 0.164 m<sup>2</sup>  
 $A_7 = \left(\frac{0.20 + 0.25}{2} \times 0.08 \times 2\right)$  = 0.846 m<sup>2</sup>

Volume =  $\Sigma A \times L$ =  $0.846 \times 21.80 = 18.443 \text{ m}^3$ 

Volume Side walk in Bridge ( $V_{SW}$ ) = 18.443 m<sup>2</sup> Slab and Side walk = 48.256 + 18.443 = 66.699  $\sim$  66.70 m<sup>3</sup>

## 3. Cross Beam / Diapraghm K400



Volume =  $0.20 \times 0.98 \times 1.25 = 0.245 \text{ m}^3$ Total volume Cross Beam in Bridge (V<sub>CB</sub>) V<sub>CB</sub> =  $5 \times 3 \times 0.245 = 3.675 \text{ m}^3$ 

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Name of Structure	ASIN RIVER No.1 BRIDGE	Category Calculation	Reinforcing Volume	Page	1/4
	<u>SUMMA</u>	RY CONCRETE	VOLUME		
- M	AIN GIRDER		=	9,616 kg	ס
	AB		<del>=</del>	8,231 kg	
	AND RAIL AND KERB		1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997	6,033 kg	•
	NEL PLATE		=	1,526 kg	
- DI	APRAGHM		: · · · · · · · · · · · · · · · · · · ·	378 ks	5 4 T 5 3 5 5 5 5
		TOTAL		25,784 kg	
•					
. PC	CABLE KI Ø12.7 7 STR	ANDS =	769.000 kg		
i	CABLE K2 012.7 12 ST	结束 人名马克 美国	1320.000 kg		:
1 1	CABLE K1 Ø12.7 7 STR	The state of the s	771.000 kg		
1 4	CABLE for DIAPRAGHN		48.520 kg		
		TOTAL		2908.520 kg	)
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MAIN GIRDER

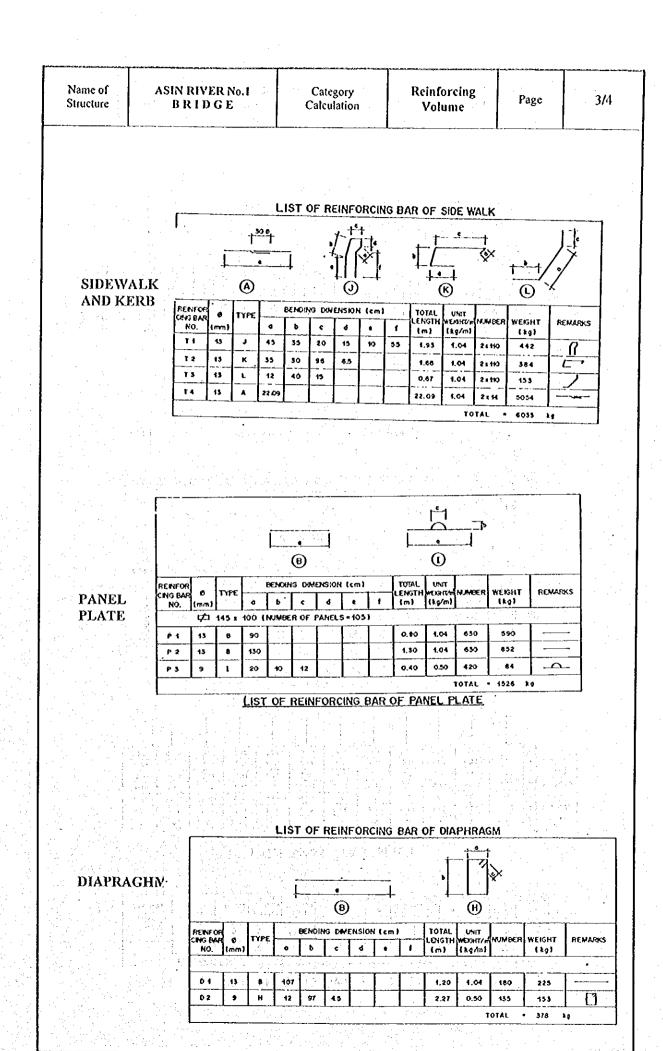
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8.5		-		21,17	<b>)</b>	·	ļ			22.22	1.04	614	835	
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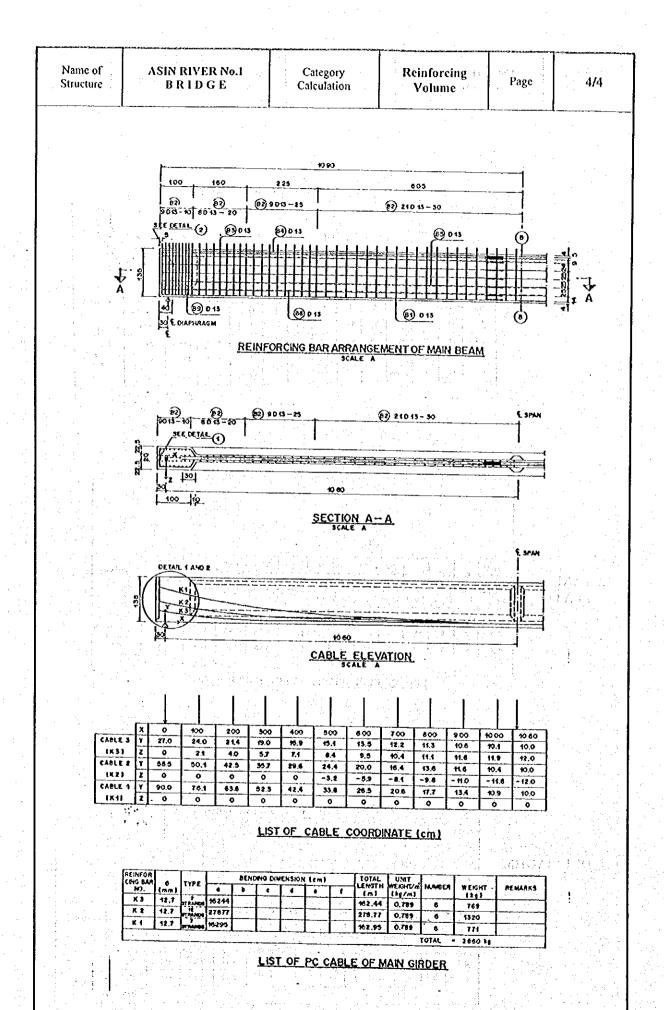
LIST OF REINFORCING BAR OF MAIN GIRDER

SLAB

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LIST OF REINFORCING BAR OF DECK SLAB



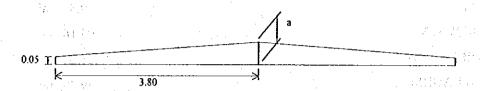


Name of ASIN RIVER No.1 Category Pavement Volume Page 1/1

## 7. Pavement

Span of bridge : 21.80 m

Thick of Asphalt at side: 5 cm



$$a: 2\% \times 3.80 = 0.076 + 0.05 = 0.126$$

Volume: 
$$A = 2 \times \frac{0.05 + 0.126}{2} \times 3.80 = 0.67 \text{ m}^2$$

$$V = 0.67 \times 21.80 = 14.606 \text{ m}^3$$

$$= 14.606 \times 2.2 = 32.13 \text{ t.m}$$

Name of Structure ASIN RIVER No.1 Category Calculation Form Volume Page 1/6

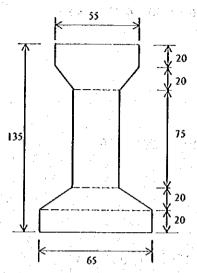
## SUMMARY OF BROAD FORM WORK

- MAIN GIRDER = 519.01 m<sup>2</sup>
- SLAB = 9.84 m<sup>2</sup>
- SIDE WALK = 94.16 m<sup>2</sup>
- PANEL PLATE = 208.01 m<sup>2</sup>
- DIAPRAGHM =  $50.30 \text{ m}^2$ TOTAL =  $881.31 \text{ m}^2$ 

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	Name of Structure	ASIN RIVER No.1 BRIDGE	Category Calculation	Form Volume	Page	2/6
						i

## 1. Main Girder

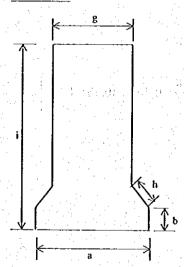
# Center Beam



Thick of Plate = 3 cm

a = 
$$65 + \frac{3}{2} \times 2$$
 =  $68 \text{ cm}$   
b =  $20 + \frac{3}{2} \times 2$  =  $23 \text{ cm}$   
c =  $35 + \frac{3}{2} \times 2$  =  $38 \text{ cm}$   
d =  $75 + \frac{3}{2} \times 2$  =  $78 \text{ cm}$   
e =  $12 + \frac{3}{2} \times 2$  =  $15 \text{ cm}$   
f =  $10 + \frac{3}{2}$  =  $11.5 \text{ cm}$ 

### **End Beam**

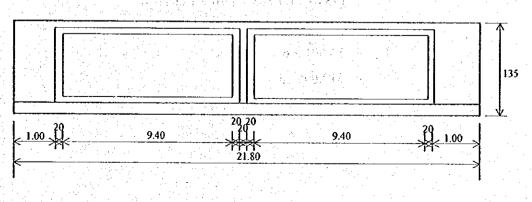


$$a = 68 cm$$

$$b = 23 \text{ cm}$$

h = 
$$6.75 + \frac{3}{2} \times 2$$
 = 9.75 cm  
i =  $110.5 + \frac{3}{2}$  = 112 cm

## Length of Beam = 21.80 m



Name of Structure ASIN RIVER No.1 Category Calculation Form Volume Page 3/6

### **Broad**

- Center 
$$A_1 = (a + 2b + 2c + 2d + 2e + 2f) \times L$$
$$= (0.68 + 0.46 + 0.76 + 1.56 + 0.30 + 0.23) \times 18.80$$
$$= 3.99 \times 18.80$$
$$= 75.012 \text{ m}^2$$

- End 
$$A_2 = (a + 2b + 2h + 2i) \times L$$
  
=  $(0.68 + 0.46 + 0.76 + 0.195 + 2.24) \times 2.20$   
=  $3.575 \times 2.20$   
=  $7.865 \text{ m}^2$ 

- Between 
$$A_3 = \left[ \left( \frac{0.75 + 1.05}{2} \times 0.20 + 2 \times \frac{1}{2} \times 0.20 \times 0.20 \right) \times 4 \right] \times 2$$
$$= (0.18 + 0.04) \times 4 \times 2$$
$$= 1.76 \text{ m}^2$$

#### Cover End Beam

$$A_4 = \left[ (0.68 \times 0.23) + \left( \frac{0.68 + 0.58}{2} \times 0.20 \right) + (0.58 \times 1.12) \right] \times 2$$

$$= (0.1564 + 0.126 + 0.6496) \times 2$$

$$= 0.932 \times 2$$

$$= 1.864 \text{ m}^2$$

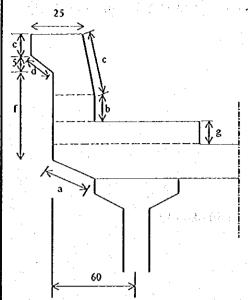
# Total Form in Bridge (FG)

$$F_G = \Sigma A \times 6$$
  
=  $(75.012 + 7.865 + 1.76 + 1.864) \times 6$ 

$$F_G = 86.501 \times 6$$
$$= 519.006 \text{ m}^2$$

Name of Structure	ASIN RIVER No.1 B R I D G E	Category Calculation	Form Volume	Page	4/6
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### 2. Bed Plate and Hand Rail + Side Walk



Thick of Plate = 3 cm

a = 
$$32.88 + \frac{3}{2}$$
 =  $34.38$  cm  
b =  $10 + \frac{3}{2}$  =  $11.50$  cm  
c =  $40.31 + \frac{3}{2}$  =  $41.81$  cm  
d =  $9.43 + \frac{3}{2} \times 2$  =  $12.43$  cm  
e =  $20 + \frac{3}{2}$  =  $21.50$  cm  
f =  $72 + \frac{3}{2} \times 2$  =  $75.00$  cm  
g =  $25.00$  cm

## Handrail + Sidewalk (70 8)

Length of Beam = 21.80 m

Wide: 
$$A_1 = (a+b+c+d+e+f+g) \times L \times 2$$
  
=  $(34.38+11.5+41.81+12.43+21.5+75+25) \times 21.8 \times 2$   
=  $92266.2 \text{ m}^2$ 

### **End Cover**

Wide: 
$$A_2 = \left[ (g \times 128) + (b \times 0.28) + \left( \frac{0.20 + 0.28}{2} \times 0.40 \right) + \left( \frac{0.20 + 0.25}{2} \times 0.11 \right) \right] \times 4$$

$$= \left[ (0.25 \times 128) + (0.115 \times 0.28) + (0.096 + 0.025) \right] \times 4$$

$$= 0.473 \times 4$$

$$= 1.892 \text{ m}^2$$

Total wide 
$$F_{SW1} = 92.266 + 1.892 = 94.158 \text{ m}^2$$

Total wide in Bridge = 94.158 m<sup>2</sup>

Name of Structure

ASIN RIVER No.1 BRIDGE

Category Calculation

Form Volume

Page

5/6

### Slab

End wide: A = 
$$[(0.33 \times 8.65) - 2(\% \times 0.344 \times 0.05) + 5(0.30 \times 1.25) + 2(0.30 \times 0.344)] \times 2$$
  
=  $(2.854 - 0.017 + 1.875 + 0.206) \times 2$   
=  $9.838 \text{ m}^2$ 

## Panel Plate

Thick of Plate = 3 cm

Thick of Plate = 7 cm



 $145 \times 100$ 

Wide

 $A_1 = (1.45 \times 1.03) + 4 \times (0.085 \times 1.48) + 2 \times (0.086 \times 1.03)$ = 1.5244 + 0.2516 + 0.1751

= 1.951 m<sup>2</sup>



 $145 \times 20$ 

Wide

 $A_2 = (1.48 \times 0.23) + 2 \times (0.085 \times 1.48) + 2 \times (0.085 \times 0.23)$ 

= 0.3404 + 0.2516 + 0.0391

 $= 0.6311 \text{ m}^2$ 

Total Wide =  $(21 \times 1.951) + 0.6311 = 41.602 \text{ m}^2$ 

Total Wide in Bridge  $F_P = 5 \times 41.602 = 208.01 \text{ m}^2$ 

#### Cross Beam

Wide ·

 $A = 2 \times (1.25 \times 0.98) + (1.25 \times 0.26) + 4 \times (0.175 \times 0.81)$ 

= 2.45 + 0.325 + 0.567

 $= 3.342 \,\mathrm{m}^2$ 

Total Wide =  $5 \times 3.342 = 16.71 \text{ m}^2$ 

Total Wide in Bridge  $F_{CB} = 3 \times 16.71 = 50.13 \text{ m}^2$ 

Name of Structure ASIN RIVER No.1 Category Approach Road Bridge Volume Page 1/8

## SUMMARY OF QUANTITY APPROACH ROAD OF ASIN RIVER NO.1 BRIDGE

1. Embankment = 17.787 + 16.17 + 18.48 + 98.175 + 24.624

+ 20.74 + 6.455 + 161.17 + 24.624 + 16.854

 $= 405.082 \text{ m}^3$ 

2. Pavement (Standard by Inspection Road)

Aggregate Class A = 149.225 m<sup>3</sup>

Aggregate Class B = 199.260 m<sup>3</sup>

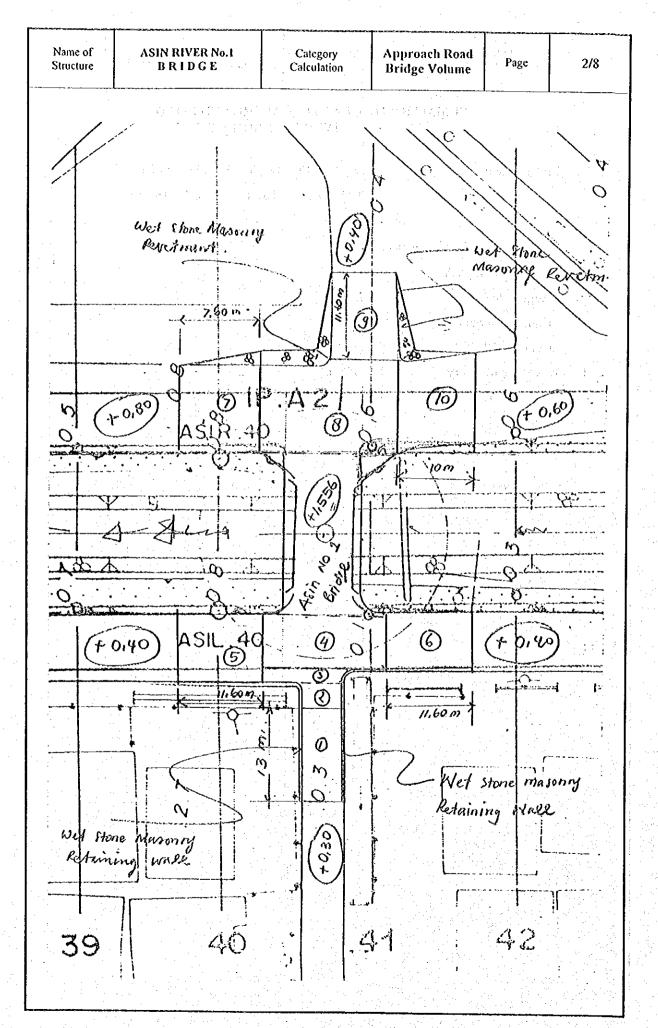
Compacted Sand = 59.420 m<sup>3</sup>

Concrete Block = 996.200 m<sup>3</sup>

3. Wet Stone Masonry  $= 183.348 \,\mathrm{m}^3$ 

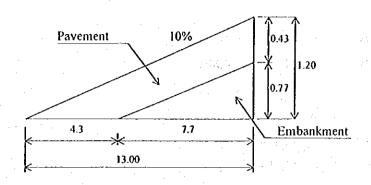
4. PVC Weep Hole = 70 holes

5. Pointing =  $223.220 \text{ m}^2$ 



Name of Structure ASIN RIVER No.1 Category Approach Road Bridge Volume Page 3/8

(No.1) Area:  $13.055 \times 6 = 78.33 \text{ m}^2$ 



Embankment :  $\frac{7.7 \times 0.77}{2} \times 6 = 17.787 \text{ m}^2$ 

Pavement

Aggregate Class A =  $78.33 \times 0.15 = 11.75 \text{ m}^3$ 

Aggregate Class B =  $78.33 \times 0.20 = 15.67 \text{ m}^3$ 

Sand =  $78.33 \times 0.06 = 4.69 \text{ m}^3$ 

Concrete Block = 78.33 m<sup>2</sup>

Wet Stone Masonry = 25.56 m<sup>3</sup>

Pointing =

(No.2) Area:  $6 \times 3.5 = 21 \text{ m}^2$ 

Embankment :  $21 \times 0.77 = 16.17 \text{ m}^2$ 

Pavement

Aggregate Class A =  $21 \times 0.15 = 3.15 \text{ m}^3$ 

Aggregate Class B =  $21 \times 0.20 = 4.20 \text{ m}^3$ 

Sand =  $21 \times 0.06 = 1.26 \text{ m}^3$ 

Concrete Block = 21 m<sup>2</sup>

Wet Stone Masonry = 19.66 m<sup>3</sup>

PVC Weep Hole = 8 holes

Pointing =  $30.6 \text{ m}^2$ 

Name of Structure ASIN RIVER No.1 Category Approach Road Bridge Volume Page 4/8

(No.3) Area:  $12 \times 2 = 24 \text{ m}^2$ 

Embankment :  $24 \times 0.77 = 18.48 \text{ m}^2$ 

Pavement

Aggregate Class A =  $24 \times 0.15 = 3.60 \text{ m}^3$ 

Aggregate Class B =  $24 \times 0.20 = 4.80 \text{ m}^3$ 

Sand =  $24 \times 0.06 = 1.14 \text{ m}^3$ 

Concrete Block = 24 m<sup>2</sup>
Wet Stone Masonry = 9.83 m<sup>3</sup>
PVC Weep Hole = 4 holes

Pointing =  $37.69 \text{ m}^2$ 

(No.4) Area:  $17 \times 7.5 = 127.5 \text{ m}^2$ 

Embankment :  $127.5 \times 0.77 = 98.175 \text{ m}^2$ 

Pavement :

Aggregate Class A =  $127.5 \times 0.15 = 19.175 \text{ m}^3$ 

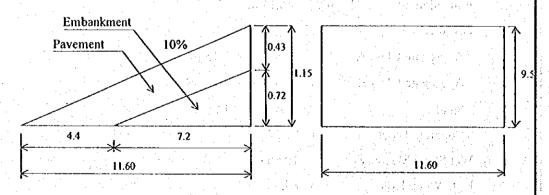
Aggregate Class B =  $127.5 \times 0.20 = 25.50 \text{ m}^3$ 

Sand =  $127 \times 0.06 = 7.65 \text{ m}^3$ 

Concrete Block =  $127.5 \text{ m}^2$ Wet Stone Masonry =  $21.412 \text{ m}^3$ 

Pointing =

(No.5) Area:  $11.5 \times 9.5 = 109.250 \text{ m}^2$ 



Embankment :  $\frac{7.2 \times 0.77}{2} \times 9.50 = 24.624 \text{ m}^2$ 

Pavement :

Aggregate Class A =  $109.25 \times 0.15 = 16.4 \text{ m}^3$ 

Aggregate Class B =  $109.25 \times 0.20 = 21.85 \text{ m}^3$ 

Name of Structure ASIN RIVER No.1 Category Approach Road Bridge Volume Page 5/8

Sand =  $109.25 \times 0.06 = 6.55 \text{ m}^3$ 

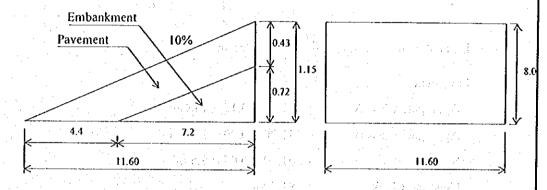
Concrete Block = 109.25 m<sup>2</sup>

Wet Stone Masonry = 22.05 m<sup>3</sup>

PVC Weep Hole =  $5 \text{ hole} \sim 5 \text{ m}$ 

Pointing =  $18.61 \text{ m}^2$ 

(No.6) Area:  $11.5 \times 9.5 = 109.250 \text{ m}^2$ 



Embankment :  $\frac{7.2 \times 0.77}{2} \times 8.0 = 20.736 \text{ m}^2$ 

Pavement

Aggregate Class A =  $92.80 \times 0.15 = 13.920 \text{ m}^3$ 

Aggregate Class B =  $92.80 \times 0.20 = 18.56 \text{ m}^3$ 

Sand =  $92.80 \times 0.06 = 5.51 \text{ m}^3$ 

Concrete Block =  $92.80 \text{ m}^2$ 

Wet Stone Masonry =  $26.86 \,\mathrm{m}^3$ 

PVC Weep Hole =  $5 \text{ holes} \sim 5 \text{ m}$ 

Pointing =  $18.61 \text{ m}^2$ 

Name of Structure

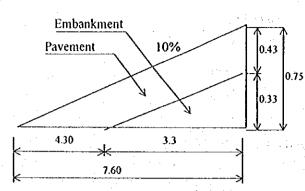
ASIN RIVER No.1 BRIDGE

Category Calculation Approach Road Bridge Volume

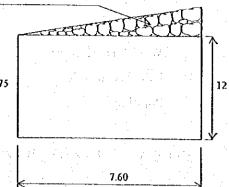
Page

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(No.7) Area:  $7.60 \times 12 = 91.20 \text{ m}^2$ 



Wet Stone Masonry



Embankment

:  $3.3 \times \frac{0.33}{2} \times 12 = 6.455 \text{ m}^2$ 

Pavement

Aggregate Class A =  $91.20 \times 0.15 = 13.680 \text{ m}^3$ 

Aggregate Class B =  $91.20 \times 0.20 = 18.24 \text{ m}^3$ 

Sand =  $91.20 \times 0.06 = 5.5 \text{ m}^3$ 

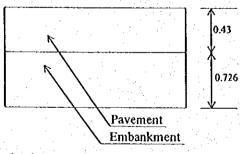
Concrete Block =  $91.20 \text{ m}^2$ 

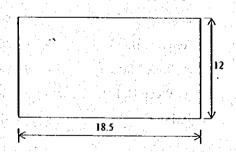
Wet Stone Masonry = 12.494 m<sup>3</sup>

PVC Weep Hole =  $5 \text{ holes} \sim 5 \text{ m}$ 

Pointing =  $10.26 \text{ m}^2$ 

(No.8) Area:  $18.5 \times 12 = 222.00 \text{ m}^2$ 





Embankment

 $: 222 \times 0.726 = 161.17 \text{ m}^2$ 

**Pavement** 

Aggregate Class A =  $222 \times 0.15 = 33.30 \text{ m}^3$ 

Aggregate Class B =  $222 \times 0.20 = 44.40 \text{ m}^3$ 

Sand =  $222 \times 0.06 = 13.32 \text{ m}^3$ 

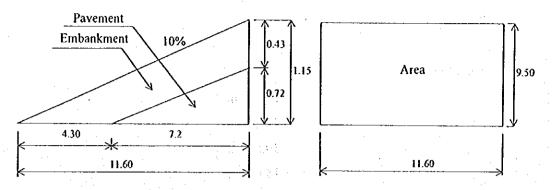
Concrete Block = 222 m<sup>2</sup>
Wet Stone Masonry = 9.97 m<sup>3</sup>

PVC Weep Hole = 8 holes ~ 8 m

Pointing =  $23.0 \text{ m}^2$ 

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(No.9) Area:  $11.60 \times 9.50 = 110.20 \text{ m}^2$ 



Embankment :  $\frac{7.2 \times 0.72}{2} \times 9.5 = 24.624 \text{ m}^3$ 

Pavement

Aggregate Class A =  $110.20 \times 0.15 = 16.30 \text{ m}^3$ 

Aggregate Class B =  $110.20 \times 0.20 = 22.04 \text{ m}^3$ 

Sand =  $110.20 \times 0.06 = 6.60 \text{ m}^3$ 

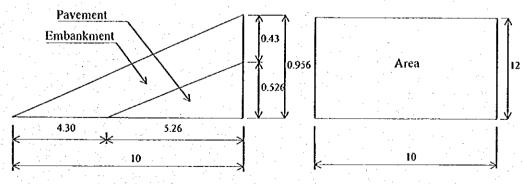
Concrete Block =  $110.20 \text{ m}^2$ 

Wet Stone Masonry = 19.07 m<sup>3</sup>

PVC Weep Hole = 10 holes ~ 10 m

Pointing =  $22.04 \text{ m}^2$ 

(No.10) Area:  $10 \times 12 = 120 \text{ m}^2$ 



Embankment :  $\frac{5.3 \times 0.53}{2} \times 12 = 16.854 \text{ m}^3$ 

Pavement

Aggregate Class  $\Lambda$  =  $120 \times 0.15 = 18.00 \text{ m}^3$ 

Aggregate Class B =  $120 \times 0.20 = 24.00 \text{ m}^3$ 

Sand =  $120 \times 0.06 = 7.2 \text{ m}^3$ 

Concrete Block = 120 m<sup>2</sup>

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Wet Stone Masonry	= ]	16.44 m³	region de la comp	, i	
PVC Weep Hole	= 4	4 holes ~ 4 m			
Pointing	= {	8 m²		and the state of t	
Total Pointing:	1.	30.60 m <sup>2</sup>			
	2.	23.56 m <sup>2</sup>			*
	3.	37.69 m <sup>2</sup>			
	4.	30.85 m <sup>2</sup>			
	5.	18.61 m <sup>2</sup>			
	6.	18.61 m <sup>2</sup>	Carlot Vision	almorata de Feri	
	7.	10.26 m <sup>2</sup>		to a transfer to the contract.	
	8.	23.00 m <sup>2</sup>		gga eseg <sup>l</sup> e e d	
	9.	22.09 m <sup>2</sup>	to one of the second		
	10.	8.00 m <sup>2</sup>			
		223.22 m <sup>2</sup>			
		1000	$e^{i(x_{i+1}, y_{i+1}, y_{i+$	(Provincja	
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Category Calculation Stone Masonry for Approach Road Bridge Volume

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## **STONE MASONRY** FOR APPROACH BRIDGE

(1) Section E-F

$$0.5 \times 0.3 + \frac{0.5 + 0.80}{2} \times 1.256 + 1.00 \times 1.0 = 1.966 \text{ m}^2$$

Volume:  $2 \times \frac{1.966}{2} \times 13 = 25.56 \text{ m}^3$ 

Pointing:  $1.25 + 0.3 + 0.5 + 0.3 \times 13 = 30.6 \text{ m}^2$ 

(2) Section F-F

 $1.966 \times 5 \times 2 = 19.66 \text{ m}^3$ 

Pointing:  $(1.256 + 0.6 + 0.5) \times 5 \times 2 = 23.56 \text{ m}^2$ 

(3) Section F-F

 $1.966 \times 5 = 9.83 \text{ m}^3$ 

Pointing:  $(1.256 + 0.6 + 0.5) \times 8 \times 2 = 37.69 \text{ m}^2$ 

(4) Section E-E

Section E-E  

$$0.5 \times 1.00 + \frac{0.5 \times 0.8}{2} \times 1.256 + 1 \times 1 = 2.316 \text{ m}^2$$

Volume:  $2.316 \times (2.5 + 2.5) = 11.582 \text{ m}^3$  $1.966 \times 5$ 

= 21.412 m<sup>3</sup>

Pointing:  $(1.156 + 1.1 + 0.5 + 1.1) \times 4 \times 2 = 30.85 \text{ m}^2$ 

(5) Section D-D

$$0.5 \times 0.3 + \frac{0.5 + 0.8}{2} \times 1.156 + 1 \times 1 = 1.901 \text{ m}^2$$

Volume:  $\frac{1.901+0}{2} \times 11.60 \times 2 = 22.0516 \text{ m}^3$ 

Pointing:  $1.156 \times 2 \times 11.60/2 = 13.41 \text{ m}^2 + 5.2 = 18.61 \text{ m}^2$ 

(6) Section E-E

$$0.5 \times 0.3 + \frac{0.5 + 0.8}{2} \times 1.256 + 1 \times 1 = 2.316 \text{ m}^2$$

Volume:  $\frac{2.316}{2} \times 11.60 \times 2 = 26.86 \text{ m}^3$ 

Pointing:  $1.156 \times 2 \times 11.60/2 = 13.41 \text{ m}^2 + 5.2 = 18.61 \text{ m}^2$ 

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## (7) Section G-G

$$0.5 \times 0.3 + \frac{0.5 + 0.8}{2} \times 0.76 + 1 \times 1 = 1.644 \text{ m}^2$$

Volume: 
$$\frac{1.644}{2} \times 7.60 \times 2 = 12.494 \text{ m}^3$$

Pointing:  $(0.8 \times 2 + 0.6 + 0.5) \times 7.6/2 = 10.26 \text{ m}^2$ 

## (8) Section G-G

$$1.644 \times 7.5 = 12.3 \text{ m}^2$$

$$0.5 \times 1 + \frac{0.5 + 0.8}{2} \times 0.76 + 1 \times 1 = 1.994 \text{ m}^2$$

Volume: 
$$1.994 \times 2.5 \times 2 = 9.97 \,\mathrm{m}^3$$

Pointing:  $0.8 + 0.5 + 0.6 \times 7.5 + 0.8 + 2.2 + 0.5 \times 2.5 = 23 \text{ m}^2$ 

## (9) Section H-H

$$0.5 \times 0.3 + \frac{0.5 + 0.8}{2} \times 0.76 + 1 \times 1 = 1.644 \text{ m}^2$$

Volume: 
$$\frac{1.644}{2} \times 11.60 \times 2 = 19.07 \text{ m}^3$$

Pointing:  $0.8 + 0.5 + 0.6 \times 2 \times 11.6/2 = 22.04 \text{ m}^2$ 

## (10) Section H-H

Volume: 
$$\frac{1.644}{2} \times 10 \times 2 = 16.44 \text{ m}^3$$

Pointing:  $0.8 \times 2 \times 10/2 = 8 \text{ m}^2$ 

183.348 m<sup>3</sup>