5.3 Instalaciones

Utility

Working Division: ENTRADA CONGUILLO
Conguillo Inlet (Electrical)

Description	Calculation Details	Unit	Quantity	Remarks
	(Acometida CV Cable - 4×22 mm² or 4 AWG			
	inclusivo con Grupo Diesel 20 KVA)			
	(Main Conductor Cable is included with			
	the Diesel Generator)			
Numero Circuito Circuit Number				
CN-1	Esta inclusivo en Paquete 3			
CN-2	Included in Package 3 (for valve motors)			
CN-3	CV cable - 4×12 AWG (3.5 mm²) / Φ3/4"	m	12.0	
CN-4	"	m	47.0	
CN-5	2×14/Φ1/2" 8+6+1.5+3.5	m	19.0	
	4×14/Φ1/2" 8	m	8.0	
	3×14/Φ1/2" 13+3+3.5+8.5	m	28.0	
CN-7	2×14/Φ1/2" 5+9+21	m	35.0	
	4×14/Φ1/2" 3.5+3.5+1.5+3.5	m	12.0	
	3×14/Φ1/2" 4.5+4.5+8+8+8+9+2+3+3+8.5+3+2.5	m	64.0	
	5×14/Φ3/4"	m	4.5	
CN-8	2×14/Φ1/2"	m	33.0	
	4×14/Φ1/2" 5+8+9.5+	m	22.5	
	3×14/Φ1/2" 5.5+4+4+3.5+4×3+5.5+2.5+3+1+8.5+1.5+2	m	53.0	
	5×14/Φ3/4" 4.5+1	m	5.5	
CN-9	2×14/Φ1/2" 7+12.5+15+6	m	40.5	
	3×14/Φ1/2"	m	8.5	
CN-6	2×12/Φ1/2" 8+7	m	15.0	
CN-10	" 34+12+3+13+8+4.5+8.5+2+7.5	m	92.5	

ENTRADA CONGUILLO

Working Division: Conguillo Inlet (Electrical)

Description	Calculation Details	Unit	Quantity	Remarks
Resumen (Summary)				
2x14 AWG / Φ½"	17 + 35 + 33 + 40.5 = 127.5 ≑ 128	m		
3x14 AWG / Φ½"	26 + 64 + 53 + 8.5 = 151.5 ≑ 152	m		
4x14 AWG / Φ½"	8 + 12 + 22.5 = 42.5 ≑ 43	m		
5x14 AWG / Φ¾"	4.5 + 5.5 = 10	m		
2x12 AWG / Φ½"	15 + 92.5 = 107.5 ≑ 108	m		
CV 4x12 AWG / Φ¾"	12 + 47 = 59	m		
Conductor (Wiring and Cable)				
TW 14 AWG	(128 x 2 + 152 x 3 + 43 x 4 + 10 x 5) x 1.05	m	980.0	
TW 12 AWG	(108 x 2) x 1.05	m	230.0	
Conduit (Conduit Pipe)				
Φ ½" or 13 mm	(128 + 152 + 43 + 108) x 1.05	m	453.0	
Φ ¾" or 22 mm	(10 + 59) x 1.05	m	75.0	
CV Cable				
4X12 AWG	(59) x 1.05	m	65.0	
	EL. $90.^{2}$ + EL. 82 + EL. 74 + EL. 66°			
Tumbler Switch	4 + 1 + 1 + 1	set	7	
Three way Switch	1 + 2 + 2 + 1	set	6	
Convenience	Outlet: $127^{V} - 20^{A}$	set	7	
Malla de Tierra (Grounding Mesh)				
Conductor	Principal (Main Conductor)			
	$50\ mm^2$ - 1/0 AWG 565 x 1.05	m	600	
Conductor	Conexiones (Connection Conductor)			
	$38\ mm^2$ - 2 AWG 50 →	m	60	

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ENTRADA CONGUILLO

Working Division: Conguillo Inlet (Electrical)

Description	Calculation Details	Unit	Quantity	Remarks
Panel de	Alumbrado (Lighting Panel)	set	1	
Alumbrado.				
Tipo-A (Type A)	Fl 40^w x 2	set	13	
Tipo B (Type B)	Fl 40^w x 1	set	30	
Tipo E (Type E)	Il 60^w x 1	set	2	

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Calculo de Areas de chapa de ductos del Sistema de Ventilación Conguillo

SECCION	DIMENSIONES	* LONGITUD	PERIMITRO	AREA G. 22	AREA G. 24
V - 1	800 x 800	2.40	3.2	7.68	
1 - 2	800 x 500	9.50	2.6	24.7	
2 - 9	900 x 350	2.00	1.5		3.0
9 - 10	300 x 300	7.00	1.2		8.4
2 - 8	400 x 200	4.20	1.2		5.04
2 - 4	500 x 500	8.00	2.0		16.0
4 - 12	500 x 300	2.00	1.6		3.2
12 - 13	500 x 200	7.00	1.4		9.8
4 - 11	500 x 200	4.20	1.4		5.88
4 - 5	300 x 200	5.00	1.0		5.0
5 - 14	250 x 200	4.20	0.9		3.78
5 - 15	250 x 200	2.00	0.9		1.8
1 - 3	800 x 500	14.00	2.6	36.6	
3 - 17	400 x 350	2.00	1.5		3.0
17 - 18	300 x 300	7.00	1.2		8.4
3 - 16	400 x 200	4.20	1.2		5.04
3 - 6	500 x 500	8.00	2.0		16.0
6 - 20	500 x 300	2.00	1.6		3.2
20 - 21	500 x 200	7.00	1.4		9.8
6 - 19	500 x 200	4.20	1.4		5.88
6 - 7	300 x 200	5.00	1.0		5.0
7 - 22	250 x 200	4.20	0.9		3.78
7 - 23	250 x 200	2.00	0.9		1.80
		SUBTOTAL	m^2	68.98	123.7
		PESO	Kg	449.7	616

* **Incluidas formas especiales**

Conguillo Ventilation System Duct Sheet Area Calculation

SECTION	SIZE	LENGTH	PERIMITER	AREA G. 22	AREA G. 24
V - 1	800 x 800	2.40	3.2	7.68	
1 - 2	800 x 500	9.50	2.6	24.7	
2 - 9	900 x 350	2.00	1.5		3.0
9 - 10	300 x 300	7.00	1.2		8.4
2 - 8	400 x 200	4.20	1.2		5.04
2 - 4	500 x 500	8.00	2.0		16.0
4 - 12	500 x 300	2.00	1.6		3.2
12 - 13	500 x 200	7.00	1.4		9.8
4 - 11	500 x 200	4.20	1.4		5.88
4 - 5	300 x 200	5.00	1.0		5.0
5 - 14	250 x 200	4.20	0.9		3.78
5 - 15	250 x 200	2.00	0.9		1.8
1 - 3	800 x 500	14.00	2.6	36.6	
3 - 17	400 x 350	2.00	1.5		3.0
17 - 18	300 x 300	7.00	1.2		8.4
3 - 16	400 x 200	4.20	1.2		5.04
3 - 6	500 x 500	8.00	2.0		16.0
6 - 20	500 x 300	2.00	1.6		3.2
20 - 21	500 x 200	7.00	1.4		9.8
6 - 19	500 x 200	4.20	1.4		5.88
6 - 7	300 x 200	5.00	1.0		5.0
7 - 22	250 x 200	4.20	0.9		3.78
7 - 23	250 x 200	2.00	0.9		1.80
		SUBTOTAL	m^2	68.98	123.7
		WEIGTH	Kg	449.7	616

* **Specials forms included**

ENTRADA POZA HONDA

Working Division: Poza Honda Inlet (Electrical)

Description	Calculation Details	Unit	Quantity	Remarks
	Acometida CV cable - 4×22 mm² inclusivo con Grupo Diesel Main Conductor is included with the Diesel Generator			
Numero Circuito Circuit Number				
CN-1	Este inclusivo en Paquete 3			
CN-2	Included in Package 3			
CN-3	CV cable 4×12 en/to ϕ 3/4" (3.5 mm² or 22 mm²)	m	13.0	
CN-4	" " 23+18	m	41.0	
CN-5.	2×14/ϕ 1/2" 20+3+4	m	27.0	
	4×14/ϕ 1/2" 3+ + 2	m	5.0	
	3×14/ϕ 1/2" 11+8+3.5+10.5	m	33.0	
CN-7.	2×14/ϕ 1/2" 30+5+4+	m	42.5	
	4×14/ϕ 1/2"	m	3.5	
	3×14/ϕ 1/2" 38+2+2+2+13+3.5+7	m	67.5	
	5×14/ϕ 3/4"	m	5.0	
CN-8	2×14/ϕ 1/2" 40+8+9-	m	57.0	
	4×14/ϕ 1/2"	m	1.0	
	3×14/ϕ 1/2" 39+4+9+3+2	m	57.0	
	5×14/ϕ 3/4"	m	5.0	
CN-9.	2×14/ϕ 1/2" 8+18+22.5	m	48.5	
CN-6	2×12/ϕ 1/2" 13+3	m	16	
CN-10	2×12/ϕ 1/2" 9+29+14+21+8+7	m	88	

Working Division: ENTRADA POZA HONDA.
Poza Honda Inlet (Electrical).

Description	Calculation Details	Unit	Quantity	Remarks
Resumen				
Summary				
2x14/ϕ1/2"	27 + 42.5 + 57 + 48.5 = 175.0	m		
3x14/ϕ1/2"	33 + 67.5 + 57 = 157.5	m		
4x14/ϕ1/2"	5 + 3.5 + 1 = 9.5	m		
5x14/ϕ3/4"	10 = 10.0	m		
CV 4/12/ϕ3/4"	23 + 18 = 54.0	m		
2x12/ϕ1/2"	16 + 84 = 104	m		
Conductor				
TW 14 AWG	(175x2 + 158x3 + 10x4 + 10x5) x 1.05	m	960.0	
TW 12 AWG	(104x2) x 1.05	m	220.0	
Conduit Pipe				
ϕ1/2"	(175 + 158 + 10 + 104) x 1.05	m	470.0	
ϕ3/4	(10 + 54) x 1.05	m	70.0	
CV Cable				
4x12 AWG	(54) x 1.05	m	60.0	
–	EL. 112.5 , EL. 104.0 EL 95.5 EL 90.8			
Tumbler Switch	4 + 1 + 1 + 1	Set	7	
Three way Switch	1 + 2 + 2 + 1	Set	6.	
Convenience Outlet : 127V – 20A		Set	7	
Malla de Tierra (Grounding Mesh)				
Conductor Principal (Main Conductor)				
50mm² – 1/0" AWG.	(55 + 4.5 + 15x5 + 23x2 + 15 + 7.6x6 + 9x3 + 4x6) x 1.05	m	500	
Conductor Conexiones (Connection Conductor)				
38mm² - 2AWG	40 →	m	50	

Working Division: ENTRADA POZA HONDA.
Poza Honda Inlet (Electrical)

Description	Calculation Details	Unit	Quantity	Remarks
Alumbrado	(LIGHTING FIXTURES)			
Tipo A	(Type A) Fl 40W x 2	set	7	
Tipo B-1	(Type B-1) Fl 40W x 2	set	6	
Tipo B-2	(Type B-2) Fl 40W x 1	set	24	
Tipo F	(Type F) Il 60W x 1	set	2	
Panel de	Alumbrado (Lighting Panel( )	set	1	

Calculo de Areas de Chapa de ductos de ventilación Poza Honda

SECCION	DIMENSIONES	* LONGITUD	PERIMITRO	AREA G. 22	AREA G. 24
V - 1	800 x 600	3.12	2.8	8.72	
1 - 2	750 x 400	9.80	2.3	22.55	
2 - 9	350 x 300	3.00	1.3		3.9
9 - 10	350 x 200	6.50	1.1		7.15
2 - 8	300 x 200	5.00	1.0		5.0
2 - 4	650 x 300	8.50	1.9		16.15
4 - 12	400 x 300	3.00	1.4		4.2
12 - 13	400 x 200	6.00	1.2		7.2
4 - 11	350 x 200	5.00	1.1		5.5
4 - 5	250 x 150	5.00	0.8		4.0
5 - 14	250 x 150	4.00	0.8		3.2
5 - 15	250 x 150	2.00	0.8		1.6
1 - 3	750 x 400	12.70	2.3	29.15	
3 - 17	350 x 300	3.00	1.3		3.9
17 - 18	350 x 200	6.50	1.1		7.15
3 - 16	300 x 200	5.00	1.0		5.0
3 - 6	650 x 300	8.50	1.9		16.15
6 - 20	400 x 300	3.00	1.4		4.2
20 - 21	400 x 200	6.00	1.2		7.2
6 - 19	350 x 200	5.00	1.1		5.5
6 - 7	250 x 150	5.00	0.8		4.0
7 - 22	250 x 150	4.00	0.8		3.2
7 - 23	250 x 150	2.00	0.8		1.6
		SUBTOTAL	m^2	60.42	1156
		PESO	Kg	394	603

* **Incluidas formas especiales**

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Poza Honda Ventilation System Duct Sheet Area Calculation

SECTION	SIZE	LENGTH	PERIMITER	AREA G. 22	AREA G. 24
V - 1	800 x 600	3.12	2.8	8.72	
1 - 2	750 x 400	9.80	2.3	22.55	
2 - 9	350 x 300	3.00	1.3		3.9
9 - 10	350 x 200	6.50	1.1		7.15
2 - 8	300 x 200	5.00	1.0		5.0
2 - 4	650 x 300	8.50	1.9		16.15
4 - 12	400 x 300	3.00	1.4		4.2
12 - 13	400 x 200	6.00	1.2		7.2
4 - 11	350 x 200	5.00	1.1		5.5
4 - 5	250 x 150	5.00	0.8		4.0
5 - 14	250 x 150	4.00	0.8		3.2
5 - 15	250 x 150	2.00	0.8		1.6
1 - 3	750 x 400	12.70	2.3	29.15	
3 - 17	350 x 300	3.00	1.3		3.9
17 - 18	350 x 200	6.50	1.1		7.15
3 - 16	300 x 200	5.00	1.0		5.0
3 - 6	650 x 300	8.50	1.9		16.15
6 - 20	400 x 300	3.00	1.4		4.2
20 - 21	400 x 200	6.00	1.2		7.2
6 - 19	350 x 200	5.00	1.1		5.5
6 - 7	250 x 150	5.00	0.8		4.0
7 - 22	250 x 150	4.00	0.8		3.2
7 - 23	250 x 150	2.00	0.8		1.6
		SUBTOTAL	m^2	60.42	1156
		WEIGTH	Kg	394	603

* **Specials forms included**

6. Camino de Acceso

Access Road

Working Division: 12 Severino Access Road

Description	Calculation Details	Unit	Quantity	Remarks
12.1	Earthwork			
101	Clearing			
106	Compaction of original ground			
	$A = 6.0 \times 5,478 \times 0.1 = 3,286.8\,m^2$			
		m^2	3,287	

12.1701 Clearing

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Severino Access Road (1)			Station
Clearing		Total Area	
Length (m)	Area (m2)	(m2)	
0.0			0 + 0.000
7.5	47	47	0 + 12.630
25.0	425	425	0 + 38.780
17.0	446	446	0 + 60.000
17.0	340	340	0 + 80.000
21.0	380	380	0 + 100.000
21.0	148	148	0 + 107.050
30.0	671	671	0 + 133.370
15.0	599	599	0 + 160.000
12.0	270	270	0 + 180.000
8.0	108	108	0 + 190.780
12.0	72	72	0 + 198.000
11.0	253	253	0 + 220.000
13.0	342	342	0 + 248.520
13.0	425	425	0 + 281.190
15.0	263	263	0 + 300.000
14.5	295	295	0 + 320.000
14.0	276	276	0 + 339.370
10.0	214	214	0 + 357.170
16.0	297	297	0 + 380.000
17.0	330	330	0 + 400.000
18.0	205	205	0 + 411.723
17.0	670	670	0 + 450.000
16.0	978	978	0 + 509.270
18.5	185	185	0 + 520.000
25.5	440	440	0 + 540.000
16.0	482	482	0 + 563.250
17.5	281	281	0 + 580.000
18.0	142	142	0 + 588.000
16.0	204	204	0 + 600.000
15.5	240	240	0 + 615.230
24.0	687	687	0 + 650.000
23.5	1,188	1,188	0 + 700.000
23.0	1,334	1,334	0 + 757.360
20.0	487	487	0 + 780.000
19.0	390	390	0 + 800.000
13.0	310	310	0 + 819.380
26.0	246	246	0 + 832.000
32.5	527	527	0 + 850.000
35.0	1,758	1,758	0 + 902.080
29.5	578	578	0 + 920.000
23.0	525	525	0 + 940.000
23.5	465	465	0 + 960.000
11.0	345	345	0 + 980.000
8.0	190	190	1 + 0.000
8.0	160	160	1 + 20.000
9.7	177	177	1 + 40.000
8.0	177	177	1 + 60.000
8.3	170	170	1 + 81.620
13.0	196	196	1 + 100.000
10.5	588	588	1 + 150.000
11.0	311	311	1 + 178.930
12.3	245	245	1 + 200.000
10.0	223	223	1 + 220.000
6.5	122	122	1 + 234.790
8.0	442	442	1 + 295.810
11.5	236	236	1 + 320.000
	22,102	22,102	

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
11.5			1 + 320.000
10.5	220	220	1 + 340.000
12.3	183	183	1 + 356.040
14.0	136	136	1 + 366.360
17.0	211	211	1 + 380.000
16.8	338	338	1 + 400.000
15.5	323	323	1 + 420.000
15.8	313	313	1 + 440.000
18.0	338	338	1 + 460.000
16.5	345	345	1 + 480.000
11.3	278	278	1 + 500.000
30.0	413	413	1 + 520.000
17.0	470	470	1 + 540.000
26.0	215	215	1 + 550.000
24.5	758	758	1 + 580.000
24.8	493	493	1 + 600.000
30.0	548	548	1 + 620.000
22.5	525	525	1 + 640.000
27.5	500	500	1 + 660.000
26.0	535	535	1 + 680.000
20.0	536	536	1 + 699.480
18.5	1,200	1,200	1 + 750.000
15.5	497	497	1 + 779.230
11.5	280	280	1 + 800.000
12.0	235	235	1 + 820.000
14.0	260	260	1 + 840.000
19.3	333	333	1 + 860.000
13.0	97	97	1 + 866.000
9.7	386	386	1 + 900.000
13.0	385	385	1 + 933.940
13.5	80	80	1 + 940.000
12.5	260	260	1 + 960.000
11.8	61	61	1 + 965.000
14.5	197	197	1 + 980.000
13.0	312	312	2 + 2.710
12.8	610	610	2 + 50.000
36.3	1,203	1,203	2 + 99.000
39.0	791	791	2 + 120.000
45.0	840	840	2 + 140.000
28.3	806	806	2 + 162.000
13.0	628	628	2 + 192.390
11.5	93	93	2 + 200.000
11.0	563	563	2 + 250.000
9.7	518	518	2 + 300.000
12.5	245	245	2 + 322.100
15.0	246	246	2 + 340.000
21.0	360	360	2 + 360.000
21.0	420	420	2 + 380.000
27.0	180	180	2 + 387.400
21.0	300	300	2 + 400.000
18.0	225	225	2 + 411.560
15.0	139	139	2 + 420.000
26.5	415	415	2 + 440.000
44.5	710	710	2 + 460.000
25.0	695	695	2 + 480.000
14.7	383	383	2 + 499.280
16.0	773	773	2 + 549.620
11.5	143	143	2 + 560.000
17.8	293	293	2 + 580.000
14.0	318	318	2 + 600.000
	24,157	24,157	Sub Total
	46,259	46,259	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
14.0			2 + 600.000
21.5	211	211	2 + 611.890
28.0	458	458	2 + 630.410
9.5	974	974	2 + 682.360
12.0	270	270	2 + 707.500
35.5	1,284	1,284	2 + 761.560
27.5	1,478	1,478	2 + 808.480
23.0	291	291	2 + 820.000
13.5	365	365	2 + 840.000
13.0	93	93	2 + 847.000
15.0	182	182	2 + 860.000
15.0	63	63	2 + 864.100
14.7	390	390	2 + 890.430
8.0	109	109	2 + 900.000
13.0	210	210	2 + 920.000
15.0	287	287	2 + 940.520
10.5	581	581	2 + 986.100
12.5	140	140	2 + 996.100
18.7	71	71	3 + 0.000
21.0	397	397	3 + 20.000
19.5	419	419	3 + 40.710
13.3	328	328	3 + 60.700
17.5	297	297	3 + 80.000
11.5	290	290	3 + 100.000
13.5	142	142	3 + 111.730
13.0	512	512	3 + 150.000
15.0	360	360	3 + 175.600
15.0	65	65	3 + 180.000
16.0	310	310	3 + 200.000
16.0	288	288	3 + 218.000
28.3	443	443	3 + 238.010
34.0	375	375	3 + 250.060
29.0	387	387	3 + 262.330
27.0	495	495	3 + 280.000
24.5	515	515	3 + 300.000
15.0	391	391	3 + 319.810
12.5	39	39	3 + 322.620
19.0	274	274	3 + 340.000
25.5	445	445	3 + 360.000
16.5	280	280	3 + 373.320
19.3	831	831	3 + 419.730
20.0	398	398	3 + 440.000
34.0	540	540	3 + 460.000
16.3	545	545	3 + 481.660
12.0	260	260	3 + 500.000
10.3	568	568	3 + 550.980
11.5	98	98	3 + 560.000
14.6	261	261	3 + 580.000
9.5	241	241	3 + 600.000
10.0	195	195	3 + 620.000
11.5	215	215	3 + 640.000
11.5	230	230	3 + 660.000
13.3	248	248	3 + 680.000
9.0	283	283	3 + 705.300
17.0	803	803	3 + 767.140
21.0	244	244	3 + 780.000
19.0	400	400	3 + 800.000
25.5	445	445	3 + 820.000
28.0	442	442	3 + 836.530
27.0	370	370	3 + 850.000
	22,125	22,125	Sub Total
	68,384	68,384	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
27.0			3 + 850.000
35.0	1,550	1,550	3 + 900.000
33.0	1,700	1,700	3 + 950.000
31.7	1,618	1,618	4 + 0.000
42.0	778	778	4 + 21.100
31.5	1,062	1,062	4 + 50.000
37.0	1,750	1,750	4 + 101.100
23.0	567	567	4 + 120.000
22.0	450	450	4 + 140.000
49.0	710	710	4 + 160.000
67.0	1,160	1,160	4 + 180.000
69.0	322	322	4 + 184.740
60.0	984	984	4 + 200.000
56.5	3,495	3,495	4 + 260.000
59.0	1,040	1,040	4 + 270.000
48.7	1,185	1,185	4 + 300.000
53.5	2,952	2,952	4 + 357.760
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	21,322	21,322	Sub Total
	89,706	89,706	Total

12.1/01 Clearing

Severino Access Road (2)

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
25.0			0 + 0.000
36.0	549	549	0 + 18.000
35.0	1,595	1,595	0 + 62.940
33.0	580	580	0 + 80.000
33.0	495	495	0 + 95.000
27.0	825	825	0 + 122.500
23.0	594	594	0 + 146.240
22.7	432	432	0 + 165.130
15.5	614	614	0 + 197.280
18.5	765	765	0 + 242.280
17.5	401	401	0 + 264.550
24.5	477	477	0 + 287.280
14.0	481	481	0 + 312.280
9.5	187	187	0 + 328.230
9.0	85	85	0 + 386.420
12.0	351	351	0 + 419.800
11.5	393	393	0 + 453.340
15.0	618	618	0 + 500.000
19.5	880	880	0 + 551.000
14.5	833	833	0 + 600.000
12.2	672	672	0 + 650.350
7.5	241	241	0 + 674.800
14.0	271	271	0 + 700.000
18.5	406	406	0 + 725.000
16.5	451	451	0 + 750.780
10.0	434	434	0 + 783.500
27.0	398	398	0 + 805.000
18.5	569	569	0 + 830.000
16.0	259	259	0 + 845.000
18.0	264	264	0 + 860.520
15.3	344	344	0 + 881.210
13.5	343	343	0 + 905.000
14.0	344	344	0 + 930.000
16.0	352	352	0 + 953.480
15.0	123	123	0 + 961.440
36.0	669	669	0 + 987.660
11.5	623	623	1 + 13.880
8.7	163	163	1 + 30.000
11.0	246	246	1 + 55.000
11.0	190	190	1 + 72.300
15.0	360	360	1 + 100.000
31.0	794	794	1 + 134.540
47.0	429	429	1 + 145.540
10.0	412	412	1 + 160.000
8.0	225	225	1 + 185.000
14.0	246	246	1 + 207.360
14.0	182	182	1 + 220.390
13.0	544	544	1 + 260.650
8.0	131	131	1 + 273.090
41.0	677	677	1 + 300.720
51.5	571	571	1 + 313.070
13.0	492	492	1 + 328.340
14.8	387	387	1 + 356.200
13.3	428	428	1 + 386.650
13.5	383	383	1 + 415.220
14.5	400	400	1 + 443.790
14.5	225	225	1 + 459.310
	25,404	25,404	

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
14.5			1 + 459.310
8.0	371	371	1 + 492.300
17.3	532	532	1 + 534.320
21.0	144	144	1 + 541.860
16.2	190	190	1 + 552.080
22.0	382	382	1 + 572.070
10.8	378	378	1 + 595.140
16.5	534	534	1 + 634.230
11.8	518	518	1 + 671.880
11.8	630	630	1 + 727.130
10.5	311	311	1 + 755.000
21.5	400	400	1 + 780.000
8.8	379	379	1 + 805.000
10.0	235	235	1 + 830.000
8.5	231	231	1 + 855.000
8.0	206	206	1 + 880.000
9.0	213	213	1 + 905.000
10.0	391	391	1 + 946.210
10.5	614	614	2 + 6.120
18.3	463	463	2 + 38.300
11.0	787	787	2 + 92.000
12.5	642	642	2 + 146.640
12.0	655	655	2 + 200.110
11.0	470	470	2 + 241.020
9.0	177	177	2 + 258.700
8.0	224	224	2 + 285.000
10.5	231	231	2 + 310.000
16.0	398	398	2 + 340.000
14.3	305	305	2 + 360.150
19.5	528	528	2 + 391.390
10.7	501	501	2 + 424.600
10.5	332	332	2 + 455.910
12.0	271	271	2 + 480.000
16.5	631	631	2 + 524.270
11.3	631	631	2 + 569.650
12.0	295	295	2 + 595.000
21.5	419	419	2 + 620.000
23.0	556	556	2 + 645.000
12.5	444	444	2 + 670.000
15.5	251	251	2 + 687.950
13.5	682	682	2 + 735.000
13.5	567	567	2 + 777.000
14.3	342	342	2 + 801.630
12.8	223	223	2 + 818.090
9.3	242	242	2 + 840.000
9.8	191	191	2 + 860.000
11.3	172	172	2 + 876.280
12.0	118	118	2 + 886.390
15.5	545	545	2 + 926.030
10.5	598	598	2 + 972.000
11.5	572	572	3 + 23.970
12.3	298	298	3 + 48.990
11.5	250	250	3 + 70.000
10.0	430	430	3 + 110.000
13.3	229	229	3 + 129.670
7.0	419	419	3 + 170.910
10.5	80	80	3 + 180.000
13.0	71	71	3 + 186.000
10.0	81	81	3 + 193.000
9.5	215	215	3 + 215.000
	22,192	22,192	Sub Total
	47,595	47,595	Total

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
9.5			3 + 215.000
14.3	298	298	3 + 240.000
13.5	348	348	3 + 265.000
11.0	238	238	3 + 284.430
13.0	499	499	3 + 326.000
12.0	218	218	3 + 343.430
23.5	436	436	3 + 368.000
13.5	929	929	3 + 418.210
15.0	390	390	3 + 445.600
22.3	772	772	3 + 487.000
24.7	682	682	3 + 516.000
60.5	239	239	3 + 521.600
23.3	243	243	3 + 527.400
12.5	390	390	3 + 549.200
13.3	60	60	3 + 553.870
11.3	346	346	3 + 582.000
12.0	297	297	3 + 607.490
39.5	536	536	3 + 628.300
88.5	749	749	3 + 640.000
27.2	694	694	3 + 652.000
24.2	514	514	3 + 672.000
14.0	410	410	3 + 693.460
13.7	312	312	3 + 716.000
13.5	598	598	3 + 760.000
13.0	294	294	3 + 782.210
14.3	449	449	3 + 815.110
8.7	286	286	3 + 840.000
19.5	353	353	3 + 865.000
11.0	381	381	3 + 890.000
13.5	247	247	3 + 910.190
11.0	415	415	3 + 944.030
43.0	1,015	1,015	3 + 981.640
34.3	246	246	3 + 988.000
28.0	218	218	3 + 995.000
13.5	519	519	4 + 20.000
42.5	560	560	4 + 40.000
33.0	378	378	4 + 50.000
34.3	367	367	4 + 60.900
14.5	775	775	4 + 92.660
12.5	396	396	4 + 122.000
17.7	526	526	4 + 156.860
13.5	188	188	4 + 168.930
26.0	268	268	4 + 182.500
15.0	359	359	4 + 200.000
13.5	230	230	4 + 216.170
14.0	328	328	4 + 240.000
19.5	335	335	4 + 260.000
14.5	404	404	4 + 283.740
20.0	284	284	4 + 300.190
16.0	411	411	4 + 323.000
25.3	475	475	4 + 346.000
15.0	480	480	4 + 369.800
11.0	345	345	4 + 396.350
24.5	466	466	4 + 422.590
23.0	1,126	1,126	4 + 470.000
10.0	829	829	4 + 520.230
13.5	279	279	4 + 544.000
9.5	253	253	4 + 566.000
14.0	265	265	4 + 588.580
15.5	611	611	4 + 630.000
	23,557	23,557	Sub Total
	73,152	73,152	Total

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
15.5			4 + 630.000
17.5	495	495	4 + 660.000
24.0	625	625	4 + 690.100
15.5	630	630	4 + 722.000
9.7	531	531	4 + 764.110
15.5	326	326	4 + 790.000
25.5	410	410	4 + 810.000
33.3	705	705	4 + 833.970
38.0	701	701	4 + 853.630
44.5	1,945	1,945	4 + 900.780
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	6,367	6,367	Sub Total
	79,519	79,519	Total

Quantity Calculation

Access Road Name : **Severino Access Road** (1)

Station	Distance	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume							Left Side		Right Side		Total	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total	Balance	Accumulated	Lateral						
	(m)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	A - B (m3)	Volume (m3)	Volume (m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	Area (m2)	
0 + 0.000		0.0			0.0				0.0					0		0.0		0.0			0 + 0.000
0 + 12.630	12.630	9.5	60	54	0.0	0	0	54	0.0	0		0	54	54	0	1.8	11	0.0	0	11	0 + 12.630
0 + 38.780	26.150	0.0	124	112	0.0	0	0	112	95.2	1,245		1,245	-1,133	-1,079	112	0.0	24	12.5	163	187	0 + 38.780
0 + 60.000	21.220	0.0	0	0	0.0	0	0	0	58.2	1,628		1,628	-1,628	-2,707	0	0.0	0	7.5	212	212	0 + 60.000
0 + 80.000	20.000	4.2	42	38	0.0	0	0	38	8.4	666		666	-628	-3,335	38	5.6	56	5.6	131	187	0 + 80.000
0 + 100.000	20.000	13.0	172	155	2.4	24	26	181	4.4	128		128	53	-3,282	128	5.8	114	5.0	106	220	0 + 100.000
0 + 107.050	7.050	8.0	74	67	0.0	8	9	76	5.5	35		35	41	-3,240	35	8.0	49	6.4	40	89	0 + 107.050
0 + 133.370	26.320	11.1	251	226	1.0	13	14	241	16.8	293		293	-53	-3,293	241	5.2	174	16.2	297	471	0 + 133.370
0 + 160.000	26.630	30.0	547	493	6.2	96	105	598	0.0	224		224	374	-2,919	224	4.4	128	2.6	250	378	0 + 160.000
0 + 180.000	20.000	15.8	458	412	0.0	62	68	480	0.0	0		0	480	-2,439	0	3.0	74	0.0	26	100	0 + 180.000
0 + 190.780	10.780	2.4	98	88	0.0	0	0	88	0.0	0		0	88	-2,350	0	0.5	19	0.0	0	19	0 + 190.780
0 + 198.000	7.220	0.0	9	8	0.0	0	0	8	9.0	32		32	-25	-2,375	8	9.0	34	3.0	11	45	0 + 198.000
0 + 220.000	22.000	1.6	18	16	0.0	0	0	16	2.2	123		123	-107	-2,482	16	1.4	114	2.2	57	172	0 + 220.000
0 + 248.520	28.520	3.8	77	69	0.0	0	0	69	1.6	54		54	15	-2,467	54	2.0	48	3.6	83	131	0 + 248.520
0 + 281.190	32.670	17.2	343	309	12.4	203	223	532	0.0	26		26	505	-1,962	26	3.2	85	1.0	75	160	0 + 281.190
0 + 300.000	18.810	20.8	357	322	42.0	512	563	884	0.0	0		0	884	-1,077	0	2.4	53	1.8	26	79	0 + 300.000
0 + 320.000	20.000	21.8	426	383	28.4	704	774	1,158	0.0	0		0	1,158	80	0	2.6	50	2.0	38	88	0 + 320.000
0 + 339.370	19.370	8.6	294	265	0.6	281	309	574	1.0	10		10	564	645	10	3.4	58	3.0	48	107	0 + 339.370
0 + 357.170	17.800	11.2	176	159	0.9	13	15	173	0.0	9		9	164	809	9	2.6	53	0.0	27	80	0 + 357.170
0 + 380.000	22.830	20.4	361	325	22.0	261	288	612	0.0	0		0	612	1,421	0	3.4	68	1.6	18	87	0 + 380.000
0 + 400.000	20.000	23.4	438	394	25.8	478	526	920	0.0	0		0	920	2,341	0	4.0	74	1.8	34	108	0 + 400.000
0 + 411.723	11.723	24.4	280	252	38.2	375	413	665	0.0	0		0	665	3,006	0	3.8	46	1.6	20	66	0 + 411.723
0 + 450.000	38.277	31.2	1,064	958	33.8	1,378	1,516	2,473	0.0	0		0	2,473	5,480	0	4.5	159	1.6	61	220	0 + 450.000
0 + 509.270	59.270	24.8	1,660	1,494	81.4	3,414	3,755	5,249	0.0	0		0	5,249	10,728	0	1.7	184	1.6	95	279	0 + 509.270
0 + 520.000	10.730	29.4	291	262	101.6	982	1,080	1,342	0.0	0		0	1,342	12,070	0	2.6	23	1.6	17	40	0 + 520.000
0 + 540.000	20.000	38.8	682	614	163.4	2,650	2,915	3,529	0.0	0		0	3,529	15,599	0	2.6	52	1.5	31	83	0 + 540.000
0 + 563.250	23.250	22.6	714	642	63.0	2,632	2,895	3,537	0.0	0		0	3,537	19,136	0	2.2	56	1.8	38	94	0 + 563.250
0 + 580.000	16.750	24.4	394	354	55.2	990	1,089	1,443	0.0	0		0	1,443	20,580	0	3.0	44	1.7	29	73	0 + 580.000
0 + 588.000	8.000	14.4	155	140	3.8	236	260	399	1.2	5		5	394	20,974	5	5.0	32	1.3	12	44	0 + 588.000
0 + 600.000	12.000	7.8	133	120	0.3	25	27	147	5.2	38		38	109	21,083	38	4.4	56	1.3	16	72	0 + 600.000
0 + 615.230	15.230	18.6	201	181	24.6	190	209	390	0.0	40		40	350	21,433	40	3.6	61	1.0	18	78	0 + 615.230
0 + 650.000	34.770	20.4	678	610	28.8	928	1,021	1,631	0.0	0		0	1,631	23,064	0	5.6	160	0.0	17	177	0 + 650.000
0 + 700.000	50.000	21.6	1,050	945	27.8	1,415	1,557	2,502	0.0	0		0	2,502	25,565	0	5.6	280	0.0	0	280	0 + 700.000
0 + 757.360	57.360	22.4	1,262	1,136	34.0	1,772	1,950	3,085	0.0	0		0	3,085	28,651	0	5.2	310	0.0	0	310	0 + 757.360
0 + 780.000	22.640	22.0	503	452	22.8	643	707	1,160	0.0	0		0	1,160	29,810	0	8.3	153	0.0	0	153	0 + 780.000
0 + 800.000	20.000	27.0	490	441	60.4	832	915	1,356	0.0	0		0	1,356	31,167	0	4.5	128	1.8	18	146	0 + 800.000
0 + 819.380	19.380	14.6	403	363	5.6	640	703	1,066	0.0	0		0	1,066	32,233	0	2.8	71	0.0	17	88	0 + 819.380
0 + 832.000	12.620	0.0	92	83	0.0	35	39	122	74.6	471		471	-349	31,884	122	0.0	18	18.2	115	133	0 + 832.000
0 + 850.000	18.000	1.2	11	10	0.0	0	0	10	57.4	1,188		1,188	-1,178	30,706	10	2.5	23	23.4	374	397	0 + 850.000
0 + 902.080	52.080	0.0	31	28	0.0	0	0	28	187.6	6,380		6,380	-6,352	24,354	28	0.0	65	24.2	1,240	1,305	0 + 902.080
0 + 920.000	17.920	0.0	0	0	0.0	0	0	0	247.6	3,899		3,899	-3,899	20,455	0	0.0	0	17.4	373	373	0 + 920.000
0 + 940.000	20.000	0.0	0	0	0.0	0	0	0	138.4	3,860		3,860	-3,860	16,595	0	0.0	0	12.4	298	298	0 + 940.000
0 + 960.000	20.000	0.0	0	0	0.0	0	0	0	50.4	1,888		1,888	-1,888	14,707	0	0.0	0	7.0	194	194	0 + 960.000
0 + 980.000	20.000	0.0	0	0	0.0	0	0	0	18.4	688		688	-688	14,019	0	0.0	0	4.0	110	110	0 + 980.000
1 + 0.000	20.000	2.0	20	18	0.0	0	0	18	0.4	188		188	-170	13,849	18	0.8	8	0.3	43	51	1 + 0.000
1 + 20.000	20.000	5.2	72	65	0.0	0	0	65	0.0	4		4	61	13,909	4	1.4	22	0.0	3	25	1 + 20.000
1 + 40.000	20.000	9.2	144	130	0.0	0	0	130	0.0	0		0	130	14,039	0	1.0	24	1.0	10	34	1 + 40.000
1 + 60.000	20.000	0.8	100	90	0.0	0	0	90	0.6	6		6	84	14,123	6	0.2	12	0.3	13	25	1 + 60.000
1 + 81.620	20.810	0.4	12	11	0.0	0	0	11	0.6	12		12	-1	14,122	11	0.0	2	0.2	5	7	1 + 81.620
1 + 100.000	18.380	0.0	4	3	0.0	0	0	3	7.4	74		74	-70	14,052	3	0.0	0	2.2	22	22	1 + 100.000
1 + 150.000	50.000	12.0	300	270	0.0	0	0	270	0.0	185		185	85	14,137	185	2.2	55	1.2	85	140	1 + 150.000
1 + 178.930	28.930	12.1	349	314	0.0	0	0	314	0.0	0		0	314	14,450	0	2.6	69	1.2	35	104	1 + 178.930
1 + 200.000	21.070	20.2	340	306	0.0	0	0	306	0.0	0		0	306	14,757	0	3.4	63	2.4	38	101	1 + 200.000
1 + 220.000	20.000	17.8	380	342	0.0	0	0	342	0.0	0		0	342	15,099	0	0.0	34	2.6	50	84	1 + 220.000
1 + 234.790	14.790	2.6	151	136	0.0	0	0	136	0.0	0		0	136	15,234	0	0.0	0	0.0	19	19	1 + 234.790
1 + 295.810	61.020	10.2	391	351	0.0	0	0	351	0.0	0		0	351	15,586	0	0.0	0	0.0	0	0	1 + 295.810
1 + 320.000	24.190	17.2	331	298	3.4	41	45	343	0.0	0		0	343	15,929	0	0.0	0	0.0	0	0	1 + 320.000
Total	1319.190		17,013	15,312		21,833	24,016	39,328		23,399		23,399	15,929		1,369		3,495		5,061	8,556	

6-4

Station	Distance	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume							Left Side		Right Side			
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total	Balance	Accumulated	Lateral					Total	
	(m)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	A - B (m3)	Volume (m3)	Volume (m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	Area (m2)	
1 + 320.000		17.2			3.4				0.0					15,929		0.0		0.0			1 + 320.000
1 + 340.000	20.000	17.8	350	315	3.2	66	73	388	0.0	0		0	388	16,317	0	3.4	34	0.0	0	34	1 + 340.000
1 + 356.040	16.040	20.0	303	273	11.4	117	129	402	0.0	0		0	402	16,719	0	3.2	53	0.0	0	53	1 + 356.040
1 + 366.360	10.320	22.8	221	199	17.8	151	166	365	0.0	0		0	365	17,083	0	3.2	33	0.0	0	33	1 + 366.360
1 + 380.000	13.640	30.8	366	329	27.2	307	338	667	0.0	0		0	667	17,750	0	3.4	45	0.0	0	45	1 + 380.000
1 + 400.000	20.000	24.0	548	493	28.0	552	607	1,100	0.0	0		0	1,100	18,850	0	4.2	76	0.0	0	76	1 + 400.000
1 + 420.000	20.000	18.4	424	382	21.2	492	541	923	0.0	0		0	923	19,773	0	4.0	82	0.0	0	82	1 + 420.000
1 + 440.000	20.000	16.4	348	313	21.8	430	473	786	0.0	0		0	786	20,559	0	3.6	76	0.0	0	76	1 + 440.000
1 + 460.000	20.000	36.8	532	479	52.8	746	821	1,299	0.0	0		0	1,299	21,858	0	4.0	76	2.4	24	100	1 + 460.000
1 + 480.000	20.000	34.8	716	644	29.2	820	902	1,546	0.0	0		0	1,546	23,405	0	4.0	80	3.0	54	134	1 + 480.000
1 + 500.000	20.000	11.6	464	418	0.0	292	321	739	0.0	0		0	739	24,144	0	4.0	80	0.0	30	110	1 + 500.000
1 + 520.000	20.000	0.0	116	104	0.0	0	0	104	46.6	466		466	-362	23,782	104	0.0	40	16.8	168	208	1 + 520.000
1 + 540.000	20.000	0.0	0	0	0.0	0	0	0	14.6	612		612	-612	23,170	0	0.0	0	7.4	242	242	1 + 540.000
1 + 550.000	10.000	0.0	0	0	0.0	0	0	0	70.0	423		423	-423	22,747	0	0.0	0	19.0	132	132	1 + 550.000
1 + 580.000	30.000	0.0	0	0	0.0	0	0	0	52.4	1,836		1,836	-1,836	20,911	0	0.0	0	15.6	519	519	1 + 580.000
1 + 600.000	20.000	3.6	36	32	0.0	0	0	32	17.2	696		696	-664	20,247	32	2.2	22	15.8	314	336	1 + 600.000
1 + 620.000	20.000	0.0	36	32	0.0	0	0	32	81.4	986		986	-954	19,294	32	0.0	22	23.8	396	418	1 + 620.000
1 + 640.000	20.000	0.0	0	0	0.0	0	0	0	97.0	1,784		1,784	-1,784	17,510	0	0.0	0	12.6	364	364	1 + 640.000
1 + 660.000	20.000	0.0	0	0	0.0	0	0	0	164.6	2,616		2,616	-2,616	14,894	0	0.0	0	14.2	268	268	1 + 660.000
1 + 680.000	20.000	0.0	0	0	0.0	0	0	0	173.4	3,380		3,380	-3,380	11,514	0	0.0	0	14.4	286	286	1 + 680.000
1 + 699.480	19.480	0.0	0	0	0.0	0	0	0	187.2	3,512		3,512	-3,512	8,002	0	0.0	0	14.2	279	279	1 + 699.480
1 + 750.000	50.520	0.0	0	0	0.0	0	0	0	109.2	7,487		7,487	-7,487	515	0	0.0	0	8.0	561	361	1 + 750.000
1 + 779.230	29.230	0.0	0	0	0.0	0	0	0	60.0	2,473		2,473	-2,473	-1,958	0	0.0	0	5.0	190	190	1 + 779.230
1 + 800.000	20.770	0.0	0	0	0.0	0	0	0	12.4	752		752	-752	-2,710	0	0.0	0	3.0	83	83	1 + 800.000
1 + 820.000	20.000	18.4	184	166	0.0	0	0	166	0.0	124		124	42	-2,669	124	2.6	26	1.0	40	66	1 + 820.000
1 + 840.000	20.000	27.4	458	412	2.8	28	31	443	0.0	0		0	443	-2,226	0	4.2	68	2.2	32	100	1 + 840.000
1 + 860.000	20.000	0.0	274	247	0.0	28	31	277	10.6	106		106	171	-2,054	106	0.0	42	3.0	52	94	1 + 860.000
1 + 866.000	6.000	0.0	0	0	0.0	0	0	0	6.8	52		52	-52	-2,106	0	0.0	0	3.0	18	18	1 + 866.000
1 + 900.000	34.000	9.0	153	138	0.0	0	0	138	0.0	116		116	22	-2,084	116	1.4	24	0.8	65	88	1 + 900.000
1 + 933.940	33.940	25.0	577	519	5.6	95	105	624	0.0	0		0	624	-1,460	0	3.6	85	2.6	58	143	1 + 933.940
1 + 940.000	6.060	26.8	157	141	6.4	36	40	181	0.0	0		0	181	-1,279	0	3.6	22	2.7	16	38	1 + 940.000
1 + 960.000	20.000	21.6	484	436	5.6	120	132	568	0.0	0		0	568	-712	0	3.8	74	0.8	35	109	1 + 960.000
1 + 965.000	5.000	18.2	100	90	0.0	14	15	105	0.0	0		0	105	-607	0	3.2	18	1.4	6	23	1 + 965.000
1 + 980.000	15.000	27.4	342	308	18.0	135	149	456	0.0	0		0	456	-150	0	4.2	56	1.6	23	78	1 + 980.000
2 + 2.710	22.710	15.0	481	433	9.6	313	345	778	0.0	0		0	778	628	0	3.6	89	0.0	18	107	2 + 2.710
2 + 50.000	47.290	20.4	837	753	11.0	487	536	1,289	0.0	0		0	1,289	1,917	0	3.6	170	0.0	0	170	2 + 50.000
2 + 99.000	49.000	0.0	500	450	0.0	270	296	746	120.8	2,960		2,960	-2,213	-297	746	0.0	88	29.6	725	813	2 + 99.000
2 + 120.000	21.000	1.2	13	11	0.0	0	0	11	64.0	1,940		1,940	-1,929	-2,226	11	1.0	11	31.6	643	653	2 + 120.000
2 + 140.000	20.000	1.3	25	23	0.0	0	0	23	50.8	1,148		1,148	-1,126	-3,351	23	1.0	20	37.4	690	710	2 + 140.000
2 + 162.000	22.000	0.0	14	13	0.0	0	0	13	22.8	810		810	-797	-4,148	13	0.0	11	6.0	477	488	2 + 162.000
2 + 192.390	30.390	0.0	0	0	0.0	0	0	0	12.7	539		539	-539	-4,687	0	0.0	0	4.6	161	161	2 + 192.390
2 + 200.000	7.610	0.3	1	1	0.0	0	0	1	9.6	85		85	-84	-4,771	1	0.6	2	3.8	32	34	2 + 200.000
2 + 250.000	50.000	0.0	8	7	0.0	0	0	7	13.0	565		565	-558	-5,329	7	0.0	15	4.0	195	210	2 + 250.000
2 + 300.000	50.000	3.6	90	81	0.0	0	0	81	0.5	338		338	-257	-5,586	81	1.6	40	1.0	125	165	2 + 300.000
2 + 322.100	22.100	0.1	41	37	0.0	0	0	37	7.2	85		85	-48	-5,634	37	0.0	18	5.4	71	88	2 + 322.100
2 + 340.000	17.900	7.8	71	64	0.0	0	0	64	1.8	81		81	-17	-5,651	64	3.8	34	4.8	91	125	2 + 340.000
2 + 360.000	20.000	5.6	134	121	0.0	0	0	121	10.4	122		122	-1	-5,652	121	3.2	70	8.2	130	200	2 + 360.000
2 + 380.000	20.000	0.0	56	50	0.0	0	0	50	34.9	453		453	-403	-6,055	50	0.0	32	8.2	164	196	2 + 380.000
2 + 387.480	7.480	0.0	0	0	0.0	0	0	0	50.4	319		319	-319	-6,374	0	0.0	0	8.0	61	61	2 + 387.480
2 + 400.000	12.520	0.0	0	0	0.0	0	0	0	33.4	525		525	-525	-6,899	0	0.0	0	8.4	103	103	2 + 400.000
2 + 411.560	11.560	0.0	0	0	0.0	0	0	0	14.0	274		274	-274	-7,173	0	0.0	0	4.4	74	74	2 + 411.560
2 + 420.000	8.440	29.4	124	112	7.8	33	36	148	0.0	59		59	89	-7,084	59	4.2	18	3.0	31	49	2 + 420.000
2 + 440.000	20.000	62.0	914	823	124.4	1,322	1,454	2,277	0.0	0		0	2,277	-4,807	0	4.6	88	3.4	64	152	2 + 440.000
2 + 460.000	20.000	142.8	2,048	1,843	446.0	5,704	6,274	8,118	0.0	0		0	8,118	3,311	0	5.0	96	7.6	110	206	2 + 460.000
2 + 480.000	20.000	55.4	1,982	1,784	11.8	4,578	5,036	6,820	0.0	0		0	6,820	10,130	0	3.6	86	3.2	108	194	2 + 480.000
2 + 499.280	19.280	17.6	704	633	12.6	235	259	892	0.0	0		0	892	11,022	0	3.4	67	1.7	47	115	2 + 499.280
2 + 549.620	50.340	18.0	896	806	13.8	664	731	1,537	0.0	0		0	1,537	12,560	0	4.2	191	0.0	43	234	2 + 549.620
2 + 560.000	10.380	3.2	110	99	0.0	72	79	178	2.4	12		12	165	12,725	12	2.2	33	2.4	12	46	2 + 560.000
2 + 580.000	20.000	0.0	32	29	0.0	0	0	29	13.2	156		156	-127	12,598	29	0.0	22	12.2	146	168	2 + 580.000
2 + 600.000	20.000	15.6	156	140	5.6	56	62	202	0.0	132		132	70	12,668	132	4.0	40	0.0	122	162	2 + 600.000
Sub Total	1,280.000		16,424	14,782		18,163	19,980	34,761		38,023		38,023	-3,262		1,900		2,374		8,696	11,070	Sub Total
Total	2,599.190		33,437	30,094		39,996	43,996	74,089		61,422		61,422	12,668		3,270		5,869		13,757	19,625	Total

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Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A (m3)	Embankment Section			Total Embankment Volume B (m3)									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)		Sectional Area (m2)	Volume (m3)	Vary Volume (m3)					Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
2 + 600.000		15.6			5.6				0.0					12,668		4.0		0.0			2 + 600.000
2 + 611.890	11.890	29.2	266	240	70.0	449	494	734	0.0	0		0	734	13,402	0	3.8	46	1.6	10	56	2 + 611.890
2 + 630.410	18.520	48.0	715	643	168.0	2,204	2,424	3,068	0.0	0		0	3,068	16,470	0	4.0	72	1.8	31	104	2 + 630.410
2 + 682.360	51.950	0.3	1,255	1,129	0.0	4,364	4,800	5,929	5.2	135		135	5,794	22,254	135	0.0	104	2.4	109	213	2 + 682.360
2 + 707.500	25.140	20.8	265	239	0.0	0	0	239	0.0	65		65	173	22,437	65	3.8	48	1.5	49	97	2 + 707.500
2 + 761.560	54.060	79.6	2,714	2,442	294.8	7,968	8,765	11,208	0.0	0		0	11,208	33,645	0	5.0	238	2.6	111	349	2 + 761.560
2 + 808.480	46.920	0.0	1,867	1,681	0.0	6,916	7,608	9,288	189.6	4,448		4,448	4,840	38,485	4,448	0.0	117	12.0	343	460	2 + 808.480
2 + 820.000	11.520	0.0	0	0	0.0	0	0	0	53.9	1,403		1,403	-1,403	37,083	0	0.0	0	12.6	142	142	2 + 820.000
2 + 840.000	20.000	19.2	192	173	16.6	166	183	355	0.0	539		539	-184	36,899	355	3.2	32	1.8	144	176	2 + 840.000
2 + 847.000	7.000	16.4	125	112	9.8	92	102	214	0.0	0		0	214	37,113	0	3.2	22	1.8	13	35	2 + 847.000
2 + 860.000	13.000	18.6	228	205	30.6	263	289	494	0.0	0		0	494	37,606	0	3.0	40	1.8	23	64	2 + 860.000
2 + 864.180	4.180	20.8	82	74	36.6	140	154	229	0.0	0		0	229	37,835	0	2.4	11	1.8	8	19	2 + 864.180
2 + 890.430	26.250	15.0	470	423	5.2	549	603	1,026	0.0	0		0	1,026	38,861	0	3.2	74	0.0	24	97	2 + 890.430
2 + 900.000	9.570	4.6	94	84	0.0	25	27	112	0.0	0		0	112	38,973	0	1.6	23	0.0	0	23	2 + 900.000
2 + 920.000	20.000	18.2	228	205	17.2	172	189	394	0.0	0		0	394	39,368	0	2.6	42	1.8	18	60	2 + 920.000
2 + 940.520	20.520	19.6	388	349	31.6	501	551	900	0.0	0		0	900	40,267	0	2.8	55	1.8	37	92	2 + 940.520
2 + 986.100	45.580	0.0	447	402	0.0	720	792	1,194	10.8	246		246	948	41,215	246	0.0	64	2.6	100	164	2 + 986.100
2 + 996.100	10.000	38.4	192	173	41.2	206	227	399	0.0	54		54	345	41,561	54	4.0	20	2.8	27	47	2 + 996.100
3 + 0.000	3.900	41.2	155	140	48.4	175	192	332	0.0	0		0	332	41,893	0	4.2	16	3.2	12	28	3 + 0.000
3 + 20.000	20.000	47.6	888	799	79.2	1,276	1,404	2,203	0.0	0		0	2,203	44,095	0	4.0	82	3.2	64	146	3 + 20.000
3 + 40.710	20.710	42.8	936	842	57.2	1,412	1,554	2,396	0.0	0		0	2,396	46,492	0	4.4	87	3.4	68	155	3 + 40.710
3 + 60.700	19.990	26.6	694	624	1.9	591	650	1,274	0.0	0		0	1,274	47,766	0	4.0	84	3.0	64	148	3 + 60.700
3 + 80.000	19.300	0.0	257	231	0.0	18	20	251	122.4	1,181		1,181	-930	46,836	251	0.0	39	0.0	29	68	3 + 80.000
3 + 100.000	20.000	4.4	44	40	0.0	0	0	40	1.0	1,234		1,234	-1,194	45,641	40	2.6	26	1.6	16	42	3 + 100.000
3 + 111.330	11.330	17.2	122	110	12.0	68	75	185	0.0	6		6	179	45,821	6	1.8	25	3.0	26	51	3 + 111.330
3 + 150.000	38.670	17.2	665	599	15.6	534	587	1,186	0.0	0		0	1,186	47,006	0	0.0	35	2.8	112	147	3 + 150.000
3 + 175.690	25.690	20.2	480	432	9.6	324	356	788	0.0	0		0	788	47,795	0	1.5	19	2.6	69	89	3 + 175.690
3 + 180.000	4.310	17.8	82	74	40.2	107	118	192	0.0	0		0	192	47,986	0	1.0	5	2.6	11	17	3 + 180.000
3 + 200.000	20.000	15.2	330	297	46.0	862	948	1,245	0.0	0		0	1,245	49,232	0	1.0	20	2.2	48	68	3 + 200.000
3 + 218.000	18.000	4.6	178	160	0.0	414	455	616	6.4	58		58	558	49,790	58	1.4	22	4.1	57	78	3 + 218.000
3 + 238.010	20.010	37.6	422	380	197.2	1,973	2,170	2,550	0.0	64		64	2,486	52,276	64	1.6	30	4.1	82	112	3 + 238.010
3 + 250.060	12.050	47.6	513	462	255.6	2,728	3,001	3,463	0.0	0		0	3,463	55,739	0	1.5	19	4.2	50	69	3 + 250.060
3 + 262.330	12.270	41.4	546	491	191.2	2,741	3,015	3,507	0.0	0		0	3,507	59,246	0	1.0	15	2.5	41	56	3 + 262.330
3 + 280.000	17.670	34.0	666	600	140.4	2,930	3,223	3,822	0.0	0		0	3,822	63,068	0	1.5	22	4.9	65	87	3 + 280.000
3 + 300.000	20.000	45.6	796	716	79.0	2,194	2,413	3,130	0.0	0		0	3,130	66,198	0	2.0	35	5.4	103	138	3 + 300.000
3 + 319.810	19.810	26.6	715	644	31.0	1,090	1,199	1,842	0.0	0		0	1,842	68,040	0	2.0	40	3.2	85	125	3 + 319.810
3 + 322.620	2.810	17.6	62	56	3.6	49	53	109	0.0	0		0	109	68,149	0	0.0	3	5.0	12	14	3 + 322.620
3 + 340.000	17.380	31.8	429	386	35.6	341	375	761	0.0	0		0	761	68,910	0	2.0	17	5.2	89	106	3 + 340.000
3 + 360.000	20.000	47.2	790	711	109.6	1,452	1,597	2,308	0.0	0		0	2,308	71,218	0	2.0	40	5.2	104	144	3 + 360.000
3 + 373.320	13.320	27.6	498	448	42.8	1,015	1,116	1,565	0.0	0		0	1,565	72,783	0	2.0	27	3.3	57	83	3 + 373.320
3 + 419.730	46.410	0.0	640	576	0.0	993	1,092	1,669	20.2	469		469	1,200	73,983	469	5.0	162	0.0	77	239	3 + 419.730
3 + 440.000	20.270	0.0	0	0	0.0	0	0	0	45.6	667		667	-667	73,316	0	12.4	176	0.0	0	176	3 + 440.000
3 + 460.000	20.000	0.0	0	0	0.0	0	0	0	158.4	2,040		2,040	-2,040	71,276	0	25.2	376	0.0	0	376	3 + 460.000
3 + 481.660	21.660	0.0	0	0	0.0	0	0	0	52.0	2,279		2,279	-2,279	68,998	0	8.4	364	0.0	0	364	3 + 481.660
3 + 500.000	18.340	0.0	0	0	0.0	0	0	0	19.0	651		651	-651	68,347	0	5.0	123	0.0	0	123	3 + 500.000
3 + 550.980	50.980	0.0	0	0	0.0	0	0	0	11.4	775		775	-775	67,572	0	3.6	219	0.0	0	219	3 + 550.980
3 + 560.000	9.020	0.0	0	0	0.0	0	0	0	24.8	163		163	-163	67,409	0	4.4	36	0.0	0	36	3 + 560.000
3 + 580.000	20.000	0.0	0	0	0.0	0	0	0	69.2	940		940	-940	66,469	0	6.2	106	0.0	0	106	3 + 580.000
3 + 600.000	20.000	0.8	8	7	0.0	0	0	7	1.8	710		710	-703	65,766	7	1.8	80	0.6	6	86	3 + 600.000
3 + 620.000	20.000	1.0	18	16	0.0	0	0	16	4.8	66		66	-50	65,716	16	2.4	42	0.6	12	54	3 + 620.000
3 + 640.000	20.000	0.0	10	9	0.0	0	0	9	15.4	202		202	-193	65,523	9	4.4	68	0.0	6	74	3 + 640.000
3 + 660.000	20.000	0.0	0	0	0.0	0	0	0	18.2	336		336	-336	65,187	0	4.2	86	0.0	0	86	3 + 660.000
3 + 680.000	20.000	0.0	0	0	0.0	0	0	0	53.0	712		712	-712	64,475	0	4.6	88	0.0	0	88	3 + 680.000
3 + 705.390	25.390	2.4	30	27	0.0	0	0	27	0.4	678		678	-650	63,824	27	0.6	66	1.3	17	83	3 + 705.390
3 + 767.140	61.750	16.0	568	511	16.2	500	550	1,061	0.0	12		12	1,049	64,874	12	0.0	19	5.6	213	232	3 + 767.140
3 + 780.000	12.860	18.0	219	197	30.6	301	331	528	0.0	0		0	528	65,401	0	0.0	0	5.0	68	68	3 + 780.000
3 + 800.000	20.000	15.2	332	299	24.6	552	607	906	0.0	0		0	906	66,307	0	0.0	0	4.6	96	96	3 + 800.000
3 + 820.000	20.000	24.2	394	355	53.6	782	860	1,215	0.0	0		0	1,215	67,522	0	1.0	10	6.0	106	116	3 + 820.000
3 + 836.530	16.530	26.6	420	378	102.8	1,293	1,422	1,800	0.0	0		0	1,800	69,322	0	1.0	17	5.6	96	112	3 + 836.530
3 + 850.000	13.470	24.2	342	308	88.2	1,286	1,415	1,723	0.0	0		0	1,723	71,045	0	1.0	13	5.4	74	88	3 + 850.000
Sub Total	1,250.000		22,779	20,501		52,735	58,009	78,509		20,132		20,132	58,377		6,263		3,768		3,222	6,989	Sub Total
Total	3,849.190		56,216	50,594		92,731	102,005	152,599		81,554		81,554	71,045		9,533		9,636		16,978	26,615	Total

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume							Left Side		Right Side			
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total	Balance	Accumulated	Lateral					Total	
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	A - B (m3)	Volume (m3)	Volume (m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	Area (m2)	
3 + 850.000		24.2			88.2				0.0					71,045		1.0		5.4			3 + 850.000
3 + 900.000	50.000	32.0	1,405	1,265	121.4	5,240	5,764	7,029	0.0	0		0	7,029	78,073	0	1.0	50	6.2	290	340	3 + 900.000
3 + 950.000	50.000	33.6	1,640	1,476	116.0	5,935	6,529	8,005	0.0	0		0	8,005	86,078	0	1.0	50	6.0	305	355	3 + 950.000
4 + 0.000	50.000	34.6	1,705	1,535	133.2	6,230	6,853	8,388	0.0	0		0	8,388	94,465	0	1.6	65	3.2	230	295	4 + 0.000
4 + 21.100	21.100	42.8	817	735	166.0	3,157	3,472	4,207	0.0	0		0	4,207	98,673	0	1.0	27	4.8	84	112	4 + 21.100
4 + 50.000	28.900	34.0	1,110	999	133.8	4,332	4,765	5,764	0.0	0		0	5,764	104,437	0	1.0	29	2.4	104	133	4 + 50.000
4 + 101.100	51.100	34.6	1,753	1,577	166.8	7,680	8,448	10,026	0.0	0		0	10,026	114,462	0	1.0	51	6.0	215	266	4 + 101.100
4 + 120.000	18.900	52.8	826	743	118.8	2,699	2,969	3,712	0.0	0		0	3,712	118,175	0	3.0	38	2.0	76	113	4 + 120.000
4 + 140.000	20.000	31.6	844	760	29.2	1,480	1,628	2,388	0.0	0		0	2,388	120,562	0	2.8	58	1.4	34	92	4 + 140.000
4 + 160.000	20.000	3.2	348	313	0.0	292	321	634	93.0	930		930	-296	120,267	634	6.3	91	34.9	363	454	4 + 160.000
4 + 180.000	20.000	0.0	32	29	0.0	0	0	29	522.0	6,150		6,150	-6,121	114,145	29	0.0	63	59.4	943	1,006	4 + 180.000
4 + 184.740	4.740	0.0	0	0	0.0	0	0	0	606.6	2,675		2,675	-2,675	111,471	0	0.0	0	60.4	284	284	4 + 184.740
4 + 200.000	15.260	0.0	0	0	0.0	0	0	0	632.0	9,451		9,451	-9,451	102,020	0	0.0	0	54.4	876	876	4 + 200.000
4 + 260.000	60.000	0.0	0	0	0.0	0	0	0	754.8	41,604		41,604	-41,604	60,416	0	0.0	0	38.8	2,796	2,796	4 + 260.000
4 + 278.000	18.000	0.0	0	0	0.0	0	0	0	394.0	10,339		10,339	-10,339	50,077	0	0.0	0	50.0	799	799	4 + 278.000
4 + 300.000	22.000	0.0	0	0	0.0	0	0	0	323.4	7,891		7,891	-7,891	42,186	0	0.0	0	36.0	946	946	4 + 300.000
4 + 357.760	57.760	0.0	0	0	0.0	0	0	0	205.6	15,278		15,278	-15,278	26,908	0	0.0	0	52.4	2,553	2,553	4 + 357.760
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Sub Total	507.760		10,479	9,431		37,045	40,749	50,181		94,317		94,317	-44,137		663		522		10,898	11,420	Sub Total
Total	4,356.950		66,695	60,025		129,776	142,754	202,779		175,871		175,871	26,908		10,196		10,158		27,876	38,034	Total

6-7

Quantity Calculation

Access Road Name : Severino Access Road (2)

2-9

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B	Accumulated Volume	Lateral Volume	Left Side		Right Side		Total Area	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A	Embankment Section			Total Embankment Volume B				Slope Length	Area	Slope Length	Area		
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	(m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	(m3)	(m3)	(m3)	(m3)	(m)	(m2)	(m)	(m2)	(m2)	
0 + 0.000		27.2			29.0				0.0					0		0.0		4.0			0 + 0.000
0 + 18.000	18.000	49.2	688	619	206.9	2,123	2,335	2,954	0.0	0		0	2,954	2,954	0	1.1	10	3.3	66	76	0 + 18.000
0 + 62.940	44.940	46.8	2,157	1,941	192.1	8,966	9,862	11,803	0.0	0		0	11,803	14,758	0	1.1	49	4.5	175	225	0 + 62.940
0 + 80.000	17.060	55.6	873	786	245.2	3,730	4,103	4,889	0.0	0		0	4,889	19,647	0	1.4	21	4.0	73	94	0 + 80.000
0 + 95.000	15.000	71.6	954	859	294.4	4,047	4,452	5,310	0.0	0		0	5,310	24,957	0	1.1	19	3.3	55	74	0 + 95.000
0 + 122.500	27.500	50.2	1,675	1,507	155.6	6,188	6,806	8,314	0.0	0		0	8,314	33,271	0	1.6	37	4.0	100	138	0 + 122.500
0 + 146.240	23.740	39.6	1,066	959	68.4	2,659	2,925	3,884	0.0	0		0	3,884	37,155	0	2.0	43	5.0	107	150	0 + 146.240
0 + 165.130	18.890	48.2	829	746	54.8	1,164	1,280	2,026	0.0	0		0	2,026	39,181	0	2.3	41	5.8	102	143	0 + 165.130
0 + 197.280	32.150	24.8	1,173	1,056	1.4	903	994	2,050	0.0	0		0	2,050	41,231	0	1.0	53	7.5	214	267	0 + 197.280
0 + 242.280	45.000	6.8	711	640	0.0	32	35	675	7.6	171		171	504	41,735	171	7.0	180	4.5	270	450	0 + 242.280
0 + 264.550	22.270	5.6	138	124	0.0	0	0	124	10.4	200		200	-76	41,659	124	6.9	155	4.0	95	249	0 + 264.550
0 + 287.280	22.730	1.2	77	70	0.0	0	0	70	40.4	577		577	-508	41,151	70	13.4	231	2.3	72	302	0 + 287.280
0 + 312.280	25.000	0.0	15	14	0.0	0	0	14	32.8	915		915	-902	40,249	14	6.2	245	0.0	29	274	0 + 312.280
0 + 328.230	15.950	0.0	0	0	0.0	0	0	0	18.6	410		410	-410	39,839	0	1.2	59	0.0	0	59	0 + 328.230
0 + 386.420	9.180	0.0	0	0	0.0	0	0	0	4.4	106		106	-106	39,734	0	1.3	11	0.0	0	11	0 + 386.420
0 + 419.890	33.470	19.8	331	298	0.0	0	0	298	0.0	74		74	225	39,958	74	2.3	60	3.4	57	117	0 + 419.890
0 + 453.340	33.450	20.8	679	611	2.0	33	37	648	0.0	0		0	648	40,606	0	3.3	94	0.0	57	151	0 + 453.340
0 + 500.000	46.660	26.8	1,111	999	1.3	77	85	1,084	0.0	0		0	1,084	41,690	0	4.7	187	4.7	110	296	0 + 500.000
0 + 551.000	51.000	43.2	1,785	1,607	58.8	1,533	1,686	3,292	0.0	0		0	3,292	44,983	0	4.7	240	3.3	204	444	0 + 551.000
0 + 600.000	49.000	30.2	1,798	1,618	5.2	1,568	1,725	3,343	0.0	0		0	3,343	48,326	0	5.5	250	2.3	137	387	0 + 600.000
0 + 650.350	50.350	21.8	1,309	1,178	0.4	141	155	1,333	0.0	0		0	1,333	49,659	0	4.2	244	1.0	83	327	0 + 650.350
0 + 674.800	24.450	0.2	269	242	0.0	5	5	247	0.3	4		4	244	49,903	4	0.0	51	0.2	15	66	0 + 674.800
0 + 700.000	25.200	0.0	3	2	0.0	0	0	2	17.8	228		228	-226	49,677	2	0.0	0	7.5	97	97	0 + 700.000
0 + 725.000	25.000	0.0	0	0	0.0	0	0	0	29.5	591		591	-591	49,086	0	0.0	0	11.3	235	235	0 + 725.000
0 + 750.780	25.780	0.0	0	0	0.0	0	0	0	70.0	1,283		1,283	-1,283	47,803	0	0.0	0	6.5	229	229	0 + 750.780
0 + 783.500	32.720	6.4	105	94	0.0	0	0	94	1.7	1,173		1,173	-1,079	46,725	94	1.9	31	1.0	123	154	0 + 783.500
0 + 805.000	21.500	0.0	69	62	0.0	0	0	62	81.2	891		891	-829	45,895	62	0.0	20	18.9	214	234	0 + 805.000
0 + 830.000	25.000	0.0	0	0	0.0	0	0	0	14.8	1,200		1,200	-1,200	44,695	0	2.2	28	11.0	374	401	0 + 830.000
0 + 845.000	15.000	31.2	234	211	21.6	162	178	389	0.0	111		111	278	44,973	111	4.8	53	2.3	100	152	0 + 845.000
0 + 860.520	15.520	38.8	543	489	48.4	543	598	1,086	0.0	0		0	1,086	46,060	0	3.8	67	3.8	47	114	0 + 860.520
0 + 881.210	20.690	33.8	751	676	25.8	768	844	1,520	0.0	0		0	1,520	47,580	0	3.8	79	3.2	72	151	0 + 881.210
0 + 905.000	23.790	11.8	542	488	0.0	307	338	826	0.8	10		10	816	48,396	10	5.0	105	3.1	75	180	0 + 905.000
0 + 930.000	25.000	6.4	228	205	0.0	0	0	205	2.8	45		45	160	48,556	45	3.6	108	3.7	85	193	0 + 930.000
0 + 953.480	23.480	25.8	378	340	20.2	237	261	601	0.0	33		33	568	49,124	33	4.3	93	2.9	77	170	0 + 953.480
0 + 961.440	7.960	25.3	203	183	11.6	127	139	322	0.0	0		0	322	49,446	0	4.5	35	1.8	19	54	0 + 961.440
0 + 987.660	26.220	0.0	332	299	0.0	152	167	466	197.0	2,583		2,583	-2,117	47,330	466	0.0	59	22.2	315	374	0 + 987.660
1 + 13.880	26.220	0.0	0	0	0.0	0	0	0	20.0	2,845		2,845	-2,845	44,485	0	0.0	0	4.2	346	346	1 + 13.880
1 + 30.000	16.120	3.2	26	23	0.0	0	0	23	0.0	161		161	-138	44,347	23	1.6	13	0.0	34	47	1 + 30.000
1 + 55.000	25.000	16.8	250	225	0.0	0	0	225	0.0	0		0	225	44,572	0	2.0	45	2.3	29	74	1 + 55.000
1 + 72.300	17.300	20.0	318	286	0.0	0	0	286	0.0	0		0	286	44,858	0	1.8	33	3.0	46	79	1 + 72.300
1 + 100.000	27.700	0.0	277	249	0.0	0	0	249	8.4	116		116	133	44,991	116	2.4	58	6.0	125	183	1 + 100.000
1 + 134.540	34.540	0.0	0	0	0.0	0	0	0	100.2	1,876		1,876	-1,876	43,116	0	11.0	231	16.6	390	622	1 + 134.540
1 + 145.540	11.000	0.0	0	0	0.0	0	0	0	305.0	2,229		2,229	-2,229	40,887	0	0.0	61	30.4	259	319	1 + 145.540
1 + 160.000	14.460	0.0	0	0	0.0	0	0	0	7.2	2,257		2,257	-2,257	38,630	0	1.5	11	2.2	236	247	1 + 160.000
1 + 185.000	25.000	0.0	0	0	0.0	0	0	0	1.8	113		113	-113	38,517	0	1.0	31	0.5	34	65	1 + 185.000
1 + 207.360	22.360	29.2	326	294	11.6	130	143	436	0.0	20		20	416	38,934	20	3.7	53	3.2	41	94	1 + 207.360
1 + 220.390	13.030	30.8	391	352	18.8	198	218	570	0.0	0		0	570	39,503	0	3.3	46	3.2	42	87	1 + 220.390
1 + 260.650	40.260	26.3	1,149	1,034	12.6	632	695	1,730	0.0	0		0	1,730	41,233	0	3.6	139	2.3	111	250	1 + 260.650
1 + 273.090	12.440	0.6	167	151	0.0	78	86	237	2.6	16		16	221	41,454	16	0.6	26	0.4	17	43	1 + 273.090
1 + 300.720	27.630	0.0	8	7	0.0	0	0	7	145.6	2,047		2,047	-2,040	39,414	7	0.0	8	34.6	484	492	1 + 300.720
1 + 313.070	12.350	0.0	0	0	0.0	0	0	0	468.3	3,791		3,791	-3,791	35,623	0	0.0	0	30.4	401	401	1 + 313.070
1 + 328.340	15.270	0.0	0	0	0.0	0	0	0	10.4	3,655		3,655	-3,655	31,968	0	0.0	0	4.7	268	268	1 + 328.340
1 + 356.200	27.860	19.8	276	248	3.6	50	55	303	0.0	145		145	159	32,127	145	5.0	70	0.0	65	135	1 + 356.200
1 + 386.650	30.450	18.8	588	529	0.4	61	67	596	0.0	0		0	596	32,723	0	5.3	157	0.0	0	157	1 + 386.650
1 + 415.220	28.570	26.8	651	586	14.8	217	239	825	0.0	0		0	825	33,548	0	3.5	126	2.2	31	157	1 + 415.220
1 + 443.790	28.570	31.2	829	746	24.0	554	610	1,355	0.0	0		0	1,355	34,903	0	3.5	100	2.8	71	171	1 + 443.790
1 + 459.310	15.520	29.2	469	422	19.6	338	372	794	0.0	0		0	794	35,697	0	3.9	57	2.5	41	99	1 + 459.310
Total	1410.300		26,752	24,077		37,722	41,494	65,571		29,874		29,874	35,697		1,606		4,219		7,151	11,370	

Station	Distance	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance	Accumulated	Lateral	Left Side		Right Side		Total	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total									
	(m)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	A - B (m3)	Volume (m3)	Volume (m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	Area (m2)	
1 + 459.310		29.2			19.6				0.0					35,697		3.9		2.5			1 + 459.310
1 + 492.300	32.990	0.3	487	438	0.0	323	356	794	0.3	5		5	789	36,486	5	0.0	64	0.5	49	114	1 + 492.300
1 + 534.320	42.020	39.2	830	747	55.6	1,168	1,285	2,032	0.0	6		6	2,026	38,511	6	3.5	74	3.0	74	147	1 + 534.320
1 + 541.860	7.540	45.6	320	288	64.2	452	497	785	0.0	0		0	785	39,296	0	6.5	38	3.0	23	60	1 + 541.860
1 + 552.080	10.220	30.1	387	348	18.8	424	467	815	0.0	0		0	815	40,110	0	4.2	55	3.1	31	86	1 + 552.080
1 + 572.070	19.990	30.8	609	548	65.4	842	926	1,474	0.0	0		0	1,474	41,584	0	4.5	87	1.5	46	133	1 + 572.070
1 + 595.140	23.070	4.4	406	365	0.0	754	830	1,195	0.8	9		9	1,186	42,770	9	2.4	80	1.5	35	114	1 + 595.140
1 + 634.230	39.090	22.1	518	466	4.8	94	103	569	0.0	16		16	554	43,324	16	6.0	164	0.0	29	193	1 + 634.230
1 + 671.880	37.650	2.2	457	412	0.0	90	99	511	2.4	45		45	466	43,790	45	1.7	145	2.2	41	186	1 + 671.880
1 + 727.130	55.250	0.0	61	55	0.0	0	0	55	16.0	508		508	-454	43,336	55	0.0	47	4.9	196	243	1 + 727.130
1 + 755.000	27.870	0.0	0	0	0.0	0	0	0	0.7	233		233	-233	43,103	0	0.0	0	0.6	77	77	1 + 755.000
1 + 780.000	25.000	3.6	45	41	0.0	0	0	41	0.0	9		9	32	43,135	9	0.0	0	0.0	8	8	1 + 780.000
1 + 805.000	25.000	2.6	78	70	0.0	0	0	70	0.0	0		0	70	43,205	0	0.8	10	0.4	5	15	1 + 805.000
1 + 830.000	25.000	10.2	160	144	0.0	0	0	144	0.0	0		0	144	43,349	0	2.0	35	0.8	15	50	1 + 830.000
1 + 855.000	25.000	6.2	205	185	0.0	0	0	185	0.0	0		0	185	43,533	0	1.3	41	0.0	10	51	1 + 855.000
1 + 880.000	25.000	2.8	113	101	0.0	0	0	101	0.1	1		1	100	43,633	1	0.8	26	0.3	4	30	1 + 880.000
1 + 905.000	25.000	1.6	55	50	0.0	0	0	50	0.6	9		9	41	43,674	9	1.0	23	0.9	15	38	1 + 905.000
1 + 946.210	41.210	10.0	239	215	0.0	0	0	215	0.0	12		12	203	43,877	12	2.5	72	0.8	35	107	1 + 946.210
2 + 6.120	59.910	13.8	713	642	0.0	0	0	642	0.0	0		0	642	44,518	0	3.2	171	0.8	48	219	2 + 6.120
2 + 38.300	32.180	0.0	222	200	0.0	0	0	200	39.6	637		637	-437	44,081	200	0.0	51	11.2	193	245	2 + 38.300
2 + 92.000	53.700	6.4	172	155	0.0	0	0	155	0.0	1,063		1,063	-909	43,173	155	1.0	27	3.5	395	422	2 + 92.000
2 + 146.640	54.640	3.2	262	236	0.0	0	0	236	4.0	109		109	127	43,299	109	3.1	112	3.0	178	290	2 + 146.640
2 + 200.110	53.470	0.0	86	77	0.0	0	0	77	3.2	192		192	-115	43,184	77	2.8	158	5.0	214	372	2 + 200.110
2 + 241.020	40.910	17.6	360	324	2.0	41	45	369	0.0	65		65	304	43,487	65	4.4	147	0.0	102	250	2 + 241.020
2 + 258.700	17.680	7.2	219	197	0.0	18	19	217	0.0	0		0	217	43,704	0	2.0	57	0.0	0	57	2 + 258.700
2 + 285.000	26.300	4.4	153	137	0.0	0	0	137	0.0	0		0	137	43,841	0	1.0	39	0.0	0	39	2 + 285.000
2 + 310.000	25.000	0.0	55	50	0.0	0	0	50	11.2	140		140	-91	43,751	50	2.1	39	1.6	20	59	2 + 310.000
2 + 340.000	30.000	0.0	0	0	0.0	0	0	0	33.6	672		672	-672	43,079	0	4.8	104	5.9	113	216	2 + 340.000
2 + 360.150	20.150	0.0	0	0	0.0	0	0	0	21.2	552		552	-552	42,527	0	4.1	90	4.6	106	195	2 + 360.150
2 + 391.390	31.240	35.6	556	500	34.4	537	591	1,092	0.0	331		331	760	43,287	331	5.8	155	4.2	137	292	2 + 391.390
2 + 424.600	33.210	0.0	591	532	0.0	571	628	1,160	18.4	306		306	855	44,142	306	0.0	96	1.7	98	194	2 + 424.600
2 + 455.910	31.310	0.0	0	0	0.0	0	0	0	10.0	445		445	-445	43,697	0	0.0	0	3.6	83	83	2 + 455.910
2 + 480.000	24.090	21.6	260	234	0.0	0	0	234	0.0	120		120	114	43,811	120	3.0	36	2.5	73	110	2 + 480.000
2 + 524.270	44.270	28.6	1,111	1,000	17.4	385	424	1,424	0.0	0		0	1,424	45,235	0	4.0	155	5.0	166	321	2 + 524.270
2 + 569.630	45.380	9.6	867	780	0.0	395	434	1,214	0.0	0		0	1,214	46,449	0	2.5	147	2.5	170	318	2 + 569.630
2 + 595.000	25.350	13.6	294	265	0.0	0	0	265	0.0	0		0	265	46,714	0	2.5	63	3.2	72	136	2 + 595.000
2 + 620.000	25.000	0.0	170	153	0.0	0	0	153	86.6	1,083		1,083	-930	45,784	153	11.4	174	0.0	40	214	2 + 620.000
2 + 645.000	25.000	1.6	20	18	0.0	0	0	18	48.0	1,683		1,683	-1,665	44,120	18	13.5	311	2.7	34	345	2 + 645.000
2 + 670.000	25.000	21.8	293	263	2.4	30	33	296	0.0	600		600	-304	43,816	296	0.0	169	5.5	103	271	2 + 670.000
2 + 687.950	17.950	0.8	203	183	0.0	22	24	206	10.8	97		97	109	43,925	97	8.4	75	0.7	56	131	2 + 687.950
2 + 735.000	47.050	7.6	198	178	0.0	0	0	178	1.9	299		299	-121	43,804	178	3.5	280	4.5	122	402	2 + 735.000
2 + 777.000	42.000	10.9	389	350	3.2	67	74	424	0.1	42		42	382	44,186	42	0.8	90	4.5	189	279	2 + 777.000
2 + 801.630	24.630	23.2	420	378	2.4	69	76	454	0.0	1		1	453	44,639	1	0.0	10	5.0	117	127	2 + 801.630
2 + 818.090	16.460	24.6	393	354	1.6	33	36	390	0.0	0		0	390	45,029	0	2.0	16	4.2	76	92	2 + 818.090
2 + 840.000	21.910	6.0	335	302	0.0	18	19	321	0.0	0		0	321	45,350	0	1.6	39	0.4	50	90	2 + 840.000
2 + 860.000	20.000	0.0	60	54	0.0	0	0	54	8.0	80		80	-26	45,324	54	1.8	34	3.0	34	68	2 + 860.000
2 + 876.280	16.280	0.0	0	0	0.0	0	0	0	14.4	182		182	-182	45,142	0	3.2	41	0.0	24	65	2 + 876.280
2 + 886.390	10.110	8.0	40	36	0.0	0	0	36	1.1	78		78	-42	45,100	36	1.5	24	4.3	22	45	2 + 886.390
2 + 926.030	39.640	30.4	761	685	11.8	234	257	942	0.0	22		22	920	46,020	22	2.7	83	5.1	186	270	2 + 926.030
2 + 972.000	45.970	10.0	929	836	0.0	271	298	1,134	0.0	0		0	1,134	47,154	0	1.0	85	2.5	175	260	2 + 972.000
3 + 23.970	51.970	10.4	530	477	0.0	0	0	477	0.0	0		0	477	47,631	0	0.0	26	2.1	120	146	3 + 23.970
3 + 48.990	25.020	0.0	130	117	0.0	0	0	117	24.4	305		305	-188	47,443	117	4.6	58	0.0	26	84	3 + 48.990
3 + 70.000	21.010	0.0	0	0	0.0	0	0	0	12.6	389		389	-389	47,054	0	2.5	75	2.6	27	102	3 + 70.000
3 + 110.000	40.000	0.8	16	14	0.0	0	0	14	3.6	324		324	-310	46,745	14	0.4	58	2.3	98	156	3 + 110.000
3 + 129.670	19.670	0.0	8	7	0.0	0	0	7	19.2	224		224	-217	46,528	7	0.0	4	5.9	81	85	3 + 129.670
3 + 170.910	41.240	0.2	4	4	0.0	0	0	4	0.0	396		396	-392	46,135	4	0.0	0	0.0	122	122	3 + 170.910
3 + 180.000	9.090	5.3	25	22	0.0	0	0	22	0.0	0		0	22	46,158	0	0.7	3	0.0	0	3	3 + 180.000
3 + 186.000	6.000	0.0	16	14	0.0	0	0	14	7.9	24		24	-9	46,148	14	0.0	2	5.9	18	20	3 + 186.000
3 + 193.000	7.000	4.0	14	13	0.0	0	0	13	0.0	28		28	-15	46,133	13	0.7	2	0.0	21	23	3 + 193.000
3 + 215.000	22.000	7.8	130	117	0.0	0	0	117	0.0	0		0	117	46,250	0	1.3	22	0.9	10	32	3 + 215.000
Sub Total	1,755.690		13,972	14,373		6,838	7,521	21,896		11,343		11,343	10,553		2,647		4,289		4,609	8,898	Sub Total
Total	3,165.990		42,724	38,451		44,560	49,016	87,467		41,217		41,217	46,250		4,253		8,508		11,760	20,268	Total

6-9

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B	Accumulated Volume	Lateral Volume	Left Side		Right Side		Total Area	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	(m3)	(m3)	(m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	(m2)	
3 + 215.000		7.8			0.0				0.0					46,250		1.3		0.9			3 + 215.000
3 + 240.000	25.000	28.8	458	412	7.4	93	102	514	0.0	0		0	514	46,764	0	4.7	75	2.1	38	113	3 + 240.000
3 + 265.000	25.000	19.2	600	540	2.4	123	135	675	0.0	0		0	675	47,439	0	5.0	121	0.6	34	155	3 + 265.000
3 + 284.430	19.430	4.0	225	203	0.0	23	26	228	2.4	23		23	205	47,644	23	3.3	81	1.2	17	98	3 + 284.430
3 + 326.000	41.570	0.0	83	75	0.0	0	0	75	24.2	553		553	-478	47,166	75	0.0	69	4.0	108	177	3 + 326.000
3 + 343.430	17.430	0.0	0	0	0.0	0	0	0	23.6	417		417	-417	46,749	0	0.0	0	4.4	73	73	3 + 343.430
3 + 368.000	24.570	7.6	93	84	0.0	0	0	84	13.0	450		450	-366	46,383	84	13.0	160	4.5	109	269	3 + 368.000
3 + 418.210	50.210	23.6	783	705	2.8	70	77	782	0.0	326		326	456	46,839	326	5.0	452	1.5	151	603	3 + 418.210
3 + 445.600	27.390	30.4	740	666	15.2	247	271	937	0.0	0		0	937	47,776	0	4.9	136	2.0	48	184	3 + 445.600
3 + 487.000	41.400	0.0	629	566	0.0	315	346	912	65.4	1,354		1,354	-441	47,335	912	4.2	188	12.2	294	482	3 + 487.000
3 + 516.000	29.000	0.0	0	0	0.0	0	0	0	84.4	2,172		2,172	-2,172	45,163	0	7.2	165	13.6	374	539	3 + 516.000
3 + 521.600	5.600	0.0	0	0	0.0	0	0	0	259.2	962		962	-962	44,201	0	27.6	97	32.7	130	227	3 + 521.600
3 + 527.400	5.800	0.0	0	0	0.0	0	0	0	78.8	980		980	-980	43,220	0	10.6	111	8.4	119	230	3 + 527.400
3 + 549.200	21.800	24.6	268	241	6.4	70	77	318	0.0	859		859	-541	42,680	318	2.5	143	3.3	128	270	3 + 549.200
3 + 553.870	4.670	27.8	122	110	11.8	42	47	157	0.0	0		0	157	42,836	0	3.0	13	2.8	14	27	3 + 553.870
3 + 582.000	28.130	1.2	408	367	0.0	166	183	550	3.2	45		45	505	43,341	45	1.0	56	3.6	90	146	3 + 582.000
3 + 607.490	25.490	15.0	206	186	0.0	0	0	186	0.0	41		41	145	43,486	41	5.3	80	0.0	46	126	3 + 607.490
3 + 628.300	20.810	0.0	156	140	0.0	0	0	140	131.6	1,369		1,369	-1,229	42,257	140	7.0	128	29.4	306	434	3 + 628.300
3 + 640.000	11.700	0.0	0	0	0.0	0	0	0	584.0	4,186		4,186	-4,186	38,071	0	17.3	142	71.9	593	735	3 + 640.000
3 + 652.000	12.000	0.0	0	0	0.0	0	0	0	70.8	3,929		3,929	-3,929	34,142	0	5.2	135	17.9	539	674	3 + 652.000
3 + 672.000	20.000	0.0	0	0	0.0	0	0	0	39.4	1,102		1,102	-1,102	33,040	0	0.0	52	17.4	353	405	3 + 672.000
3 + 693.460	21.460	4.0	43	39	0.0	0	0	39	3.6	461		461	-423	32,617	39	2.8	30	4.2	232	262	3 + 693.460
3 + 716.000	22.540	24.6	322	290	2.8	32	35	325	0.0	41		41	284	32,902	41	5.0	88	1.2	61	149	3 + 716.000
3 + 760.000	44.000	22.8	1,043	939	12.0	326	358	1,297	0.0	0		0	1,297	34,198	0	3.5	187	2.2	75	262	3 + 760.000
3 + 782.210	22.210	23.2	511	460	10.0	244	269	728	0.0	0		0	728	34,927	0	3.5	78	2.5	52	130	3 + 782.210
3 + 815.110	32.900	3.4	438	394	5.6	257	282	676	0.0	0		0	676	35,603	0	1.6	84	6.2	143	227	3 + 815.110
3 + 840.000	24.890	7.3	133	120	0.0	70	77	197	0.0	0		0	197	35,799	0	1.6	40	0.0	77	117	3 + 840.000
3 + 865.000	25.000	0.0	91	82	0.0	0	0	82	60.0	750		750	-668	35,132	82	7.3	111	7.8	98	209	3 + 865.000
3 + 890.000	25.000	1.2	15	14	0.0	0	0	14	3.2	790		790	-777	34,355	14	0.6	99	3.6	143	241	3 + 890.000
3 + 910.190	20.190	3.2	44	40	0.0	0	0	40	4.8	81		81	-41	34,314	40	2.0	26	4.7	84	110	3 + 910.190
3 + 944.030	33.840	13.8	288	259	0.6	10	11	270	0.0	81		81	189	34,503	81	4.5	110	0.0	80	190	3 + 944.030
3 + 981.640	37.610	0.0	260	234	0.0	11	12	246	138.0	2,595		2,595	-2,349	32,154	246	10.6	284	29.5	555	839	3 + 981.640
3 + 988.000	6.360	0.0	0	0	0.0	0	0	0	186.8	1,033		1,033	-1,033	31,121	0	11.5	70	19.4	156	226	3 + 988.000
3 + 995.000	7.000	0.0	0	0	0.0	0	0	0	78.4	928		928	-928	30,193	0	3.3	52	19.4	136	188	3 + 995.000
4 + 20.000	25.000	3.6	45	41	0.0	0	0	41	2.1	1,006		1,006	-966	29,227	41	1.5	60	4.0	298	353	4 + 20.000
4 + 40.000	20.000	0.0	36	32	0.0	0	0	32	263.6	2,657		2,657	-2,625	26,603	32	8.9	104	15.2	192	296	4 + 40.000
4 + 50.000	10.000	0.0	0	0	0.0	0	0	0	228.0	2,458		2,458	-2,458	24,145	0	0.0	45	10.4	128	173	4 + 50.000
4 + 60.900	10.900	0.0	0	0	0.0	0	0	0	233.8	2,517		2,517	-2,517	21,628	0	13.9	76	16.6	147	223	4 + 60.900
4 + 92.660	31.760	21.2	337	303	7.2	114	126	429	0.0	3,713		3,713	-3,284	18,344	429	4.5	292	0.0	264	556	4 + 92.660
4 + 122.000	29.340	15.6	540	486	1.6	129	142	628	0.0	0		0	628	18,972	0	4.7	135	0.0	0	135	4 + 122.000
4 + 156.860	34.860	25.6	718	646	6.6	143	157	804	0.0	0		0	804	19,775	0	4.4	159	0.0	0	159	4 + 156.860
4 + 168.930	12.070	0.1	155	140	0.0	40	44	183	10.0	60		60	123	19,898	60	0.0	27	5.7	34	61	4 + 168.930
4 + 182.500	13.570	0.0	1	1	0.0	0	0	1	109.4	810		810	-810	19,089	1	6.7	45	14.4	136	182	4 + 182.500
4 + 200.000	17.500	0.0	0	0	0.0	0	0	0	10.2	1,047		1,047	-1,047	18,042	0	2.3	79	0.0	126	205	4 + 200.000
4 + 216.170	16.170	21.6	175	157	1.9	8	9	166	0.0	82		82	84	18,126	82	1.8	33	21.6	175	208	4 + 216.170
4 + 240.000	23.830	18.8	481	433	1.6	31	34	467	0.0	0		0	467	18,593	0	0.0	21	4.0	305	326	4 + 240.000
4 + 260.000	20.000	0.0	188	169	0.0	16	18	187	33.0	330		330	-143	18,450	187	4.5	45	0.0	40	85	4 + 260.000
4 + 283.740	23.740	25.4	301	271	18.6	221	243	514	0.0	392		392	122	18,572	392	2.4	82	3.5	42	123	4 + 283.740
4 + 300.190	16.450	27.8	438	394	5.6	199	219	613	0.0	0		0	613	19,185	0	0.0	20	3.6	58	78	4 + 300.190
4 + 323.000	22.810	0.0	317	285	0.0	64	70	356	34.4	392		392	-37	19,148	356	8.1	92	0.0	41	133	4 + 323.000
4 + 346.000	23.000	0.0	0	0	0.0	0	0	0	60.7	1,094		1,094	-1,094	18,055	0	16.9	288	0.0	0	288	4 + 346.000
4 + 369.800	23.800	0.0	0	0	0.0	0	0	0	31.4	1,096		1,096	-1,096	16,959	0	7.6	292	0.0	0	292	4 + 369.800
4 + 396.350	26.550	13.8	183	165	1.0	13	15	179	0.0	417		417	-237	16,721	179	0.0	101	3.5	46	147	4 + 396.350
4 + 422.590	26.240	4.0	234	210	0.0	13	14	225	18.4	241		241	-17	16,705	225	15.8	207	0.0	46	253	4 + 422.590
4 + 470.000	47.410	0.0	95	85	0.0	0	0	85	33.7	1,235		1,235	-1,150	15,555	85	16.1	756	0.0	0	756	4 + 470.000
4 + 520.230	50.230	5.2	131	118	0.0	0	0	118	0.1	849		849	-731	14,824	118	0.5	417	2.4	60	477	4 + 520.230
4 + 544.000	23.770	21.6	319	287	3.2	38	42	329	0.0	1		1	327	15,151	1	0.0	6	4.0	76	82	4 + 544.000
4 + 566.000	22.000	0.8	246	222	0.0	35	39	260	1.2	13		13	247	15,398	13	1.3	14	0.9	54	68	4 + 566.000
4 + 588.580	22.580	0.0	9	8	0.0	0	0	8	34.8	406		406	-398	15,000	8	5.3	75	0.0	10	85	4 + 588.580
4 + 630.000	41.420	0.0	0	0	0.0	0	0	0	93.4	2,655		2,655	-2,655	12,345	0	5.8	230	0.0	0	230	4 + 630.000
Sub Total	1,413.000		12,907	11,617		3,162	3,478	15,095		49,000		49,000	-33,905		4,716		7,362		7,726	15,087	Sub Total
Total	4,580.990		55,631	50,068		47,722	52,494	102,562		90,217		90,217	12,345		8,969		15,870		19,486	35,356	Total

6-10

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)				Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
4 + 630.000		0.0			0.0				93.4					12,345		5.8		0.0			4 + 630.000
4 + 660.000	30.000	0.0	0	0	0.0	0	0	0	107.2	3,009		3,009	-3,009	9,336	0	6.3	182	0.0	0	182	4 + 660.000
4 + 690.100	30.100	0.0	0	0	0.0	0	0	0	128.0	3,540		3,540	-3,540	5,796	0	12.8	287	0.0	0	287	4 + 690.100
4 + 722.000	31.900	0.0	0	0	0.0	0	0	0	41.2	2,699		2,699	-2,699	3,097	0	6.7	311	0.0	0	311	4 + 722.000
4 + 764.110	42.110	0.0	0	0	0.0	0	0	0	24.5	1,383		1,383	-1,383	1,714	0	2.3	189	0.0	0	189	4 + 764.110
4 + 790.000	25.890	0.0	0	0	0.0	0	0	0	58.6	1,076		1,076	-1,076	638	0	7.0	120	0.0	0	120	4 + 790.000
4 + 810.000	20.000	0.0	0	0	0.0	0	0	0	107.6	1,662		1,662	-1,662	-1,024	0	16.7	237	0.0	0	237	4 + 810.000
4 + 833.970	23.970	0.0	0	0	0.0	0	0	0	178.1	3,424		3,424	-3,424	-4,448	0	24.1	489	0.0	0	489	4 + 833.970
4 + 853.630	19.660	0.0	0	0	0.0	0	0	0	273.4	4,438		4,438	-4,438	-8,886	0	29.2	524	0.0	0	524	4 + 853.630
4 + 900.780	47.150	0.0	0	0	0.0	0	0	0	194.2	11,024		11,024	-11,024	-19,910	0	37.1	1,563	0.0	0	1,563	4 + 900.780
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Sub Total	270.780		0	0		0	0	0		32,235		32,235	-32,235		0		3,903		0	3,903	Sub Total
Total	4,851.770		55,631	50,068		47,722	52,494	102,562		122,472		122,472	-19,910		8,969		19,773		19,486	39,259	Total

Working Division: 12 Saverino Access Road

Description	Calculation Details	Unit	Quantity	Remarks
12.2	Excavation and Filling for			
	Structure			
101	Open-cut excavation, all classes			
	V_1= {(4.2+2.2)/2×2+ (4.5+2.5)/2×2}/2			
	×23.6 = 158.1 m^3			
	V_2= (4.1+2.1)/2×2.0×10.0+ {(4.1+2.1)/2×2.0			
	+(4.3+2.3)/2×2.0}/2×20.0+ (4.3+2.3)/2			
	×2.0×25.8 =360.3			
	V_3 = (5.3+3.3)/2×2.0×44.98= 386.8			
	V_4= (2.5+4.5)/2×2.0×19.0 = 133.0			
	V_5 = (5.2+3.2)/2×2.0×12.74= 107.0			
	V_6 = (5.5+3.5)/2×2.0×13.81 = 124.3			
	V_7= 93.1			
	Total 1,362.6 m^3			
		m^3	1,363	
102	Backfill			
	V_1= 158.1 − {(2.2+1.8)/2×2.0+ (2.5+2.1)/2			
	×2.0}/2×23.6 = 56.6 m^3			
	V_2= 360.3 − (2.1+1.7)/2×2.0 − {(2.1+1.7)/2			
	×2.0 + (2.3+1.9)/2×2.0}/2×20.0			
	− (2.3+1.9)/2×2.0×25.8= 168.1 m^3			
	V_3 = 386.8 − (3.3+2.9)/2×2.0×44.98= 107.9			
	V_4 = 133 − (2.5+2.1)/2×2.0×19.0 = 45.6			
	V_5 = 107 − (3.2+2.8)/2×2.0×12.74 = 30.6			
	V_6 = 124.3 − (3.5+3.1)/2×2.0×13.81 = 33.2			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
	Total 442m^3			
	$V = 442/2 = 221 m^3$			
		m^3	221	
103	Free draining backfill			
	$V = 442/2 = 221 m^3$	m^3	221	
104	Gravel bedding			
	$V_1 = (2.2+2.5)/2 \times 23.6 \times 0.2 = 11.1$			
	$V_2 = 2.1 \times 10.0 \times 0.2 + (2.1+2.3)/2 \times 20.0$			
	$\times 0.2 + 2.3 \times 25.8 \times 0.2 = 24.9$			
	$V_3 = 3.3 \times 44.98 \times 0.2 = 29.7$			
	$V_4 = 2.5 \times 19.0 \times 0.2 = 9.5$			
	$V_5 = 3.2 \times 12.74 \times 0.2 = 8.2$			
	$V_6 = 3.5 \times 13.81 \times 0.2 = 9.7$			
	Total 93.1 m^3			
		m^3	93	

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
12.4 105	Rubble concrete for retaining wall			
	$V_1 = \{(2.2+1.5)/2 \times 3.5 + (2.5+1.5)/2 \times 5.0\}/2$			
	$\times 23.6 = 194.4\ m^3$			
	$V_2 = (2.1+1.5)/2 \times 3.0 \times 10.0 + \{(2.1+1.5)/2$			
	$\times 3.0 + (2.3+1.5)/2 \times 4.0\}/2 \times 20.0$			
	$+ (2.3+1.5)/2 \times 4.0 \times 25.8 = 380.1\ m^3$			
	$V_3 = (3.3+2.0)/2 \times 6.5 \times 44.98 = 774.8$			
	$V_4 = (2.5+1.5)/2 \times 5.0 \times 19.0 = 190.0$			
	$V_5 = (3.2+2.0)/2 \times 6.0 \times 12.74 = 198.7$			
	$V_6 = (3.5+2.0)/2 \times 7.5 \times 13.81 = 284.8$			
	Total 2,022.8 m^3			
		m^3	2,023	
106	Formwork, F1			
	Retaining wall			
	$A_1 = (3.5+5.0)/2 \times 23.6 = 100.3$			
	$A_2 = 3.0 \times 10.0 + (3.0+4.0)/2 \times 20.0$			
	$+ 4.0 \times 25.8 = 203.2$			
	$A_3 = 6.5 \times 44.98 = 292.4$			
	$A_4 = 5.0 \times 19.0 = 95.0$			
	$A_5 = 6.0 \times 12.74 = 76.4$			
	$A_6 = 7.5 \times 13.81 = 103.6$			
	Total area $A = 870.9\ m^2$			94.5 m^2 Contraction joints
	$870.9 \times 1.5 + 94.5 = 1400.9$	m^2	1401	

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
107	Formwork, F2			
	Retaining wall			
	$A = 870.9/2 = 435$			
		m^2	435	
/12	Bituminous coating for contraction joint			
	Retaining wall			
	$A_1 = (2.5+1.5)/2 \times 5.0 \times 1 = 10.0 m^2$			
	$A_2 = (2.3+1.5)/2 \times 4.0 \times 3 = 22.8 m^2$			
	$A_3 = (3.3+2.0)/2 \times 6.5 \times 3 = 51.7 m^2$			
	$A_4 = (2.5+1.5)/2 \times 5.0 \times 1 = 10.0 m^2$			
	Total 94.5 m^2			
		m^2	95	
12.6 /07	PVC pipe, 75 mm for weephole			
	$l = (23.6/1.5 \times 2.2 + 10/1.5 \times 2.1$			
	$+ 20.0/1.5 \times 2.3 + 25.8/1.5 \times 2.3$			
	$+ 44.98/1.5 \times 3.3 + 12.74/1.5 \times 3.2$			
	$+ 13.81/1.5 \times 3.5) \times 2 = 554.4 m$			

Working Division:

Description	Calculation Details	Unit	Quantity	Remarks
12.6				
101	Guardrail			
	L = 0 m			
102	Warning signs			
	N = 9,208.72 / 250m = 36	nos	36	

Working Division: 12 Severino Access Road

Description	Calculation Details	Unit	Quantity	Remarks
12.5	Pavement			
101	Improved subgrade material			
	Cut section			
	L = 5,478.07 m			
	Embankment section			
	L = 3,730.65 m			
	V = 6.0 × 0.075 × 5,478.07			
	+ 6.0 × (0.35 + 0.2)/2 × 3,730.65			
	= 8,620.70 m^3			
		m^3	8,621	
102	Graded crushed stone subbase			
	V = 6.0 × 0.15 × 9208.72 = 8,287.8			
		m^3	8,288	
103	Transportation of improved subgrade material			
	V = 8621 × 0.01 × 10 km = 862			
		m^3·km	862	

Working Division: 13 Caña Dulce Inlet Access Road

Description	Calculation Details	Unit	Quantity	Remarks
13.1	Earthwork			
101	Clearing			
106	Compaction of original ground			
	A= 4.0× 1676.3 × 0.1 = 670.5			
		m²	671	

13.1/01 Clearing

Cana Dulce Inlet Access Road			Station
Clearing		Total Area	
Length (m)	Area (m2)	(m2)	
16.5			0 + 0.000
9.5	188	188	0 + 14.460
9.5	53	53	0 + 20.000
31.5	410	410	0 + 40.000
27.5	390	390	0 + 60.000
11.5	390	390	0 + 80.000
19.7	175	175	0 + 91.200
24.0	192	192	0 + 100.000
13.5	532	532	0 + 128.390
8.0	215	215	0 + 148.380
7.5	13	13	0 + 150.000
6.5	70	70	0 + 160.000
8.5	150	150	0 + 180.000
14.0	223	223	0 + 199.780
14.5	716	716	0 + 250.000
16.0	1,068	1,068	0 + 320.000
13.0	290	290	0 + 340.000
9.8	228	228	0 + 360.000
12.0	250	250	0 + 382.900
8.5	358	758	0 + 456.890
8.5	300	300	0 + 492.190
12.0	593	593	0 + 550.000
16.0	442	442	0 + 581.570
13.0	267	267	0 + 600.000
11.5	245	245	0 + 620.000
7.0	175	175	0 + 638.970
12.5	108	108	0 + 650.000
13.0	638	638	0 + 700.000
12.5	638	638	0 + 750.000
12.0	69	69	0 + 755.600
12.0	53	53	0 + 760.000
12.5	245	245	0 + 780.000
14.0	265	265	0 + 800.000
19.0	330	330	0 + 820.000
19.5	385	385	0 + 840.000
19.0	360	360	0 + 858.680
20.5	899	899	0 + 904.180
12.7	761	761	0 + 950.000
11.0	339	339	0 + 978.600
18.5	316	316	1 + 0.000
20.0	385	385	1 + 20.000
18.5	241	241	1 + 32.500
55.5	870	870	1 + 56.000
18.7	140	140	1 + 59.770
13.5	326	326	1 + 80.000
11.5	250	250	1 + 100.000
11.0	240	240	1 + 121.330
6.7	53	53	1 + 127.340
20.3	171	171	1 + 140.000
19.0	393	393	1 + 160.000
23.0	488	488	1 + 183.260
19.0	756	756	1 + 219.260
15.3	430	430	1 + 244.360
29.5	1,139	1,139	1 + 295.220
12.5	718	718	1 + 329.390
8.7	112	112	1 + 340.000
12.0	207	207	1 + 360.000
	20,853	20,853	

			Station
Clearing		Total Area	
Length (m)	Area (m2)	(m2)	
12.0			1 + 360.000
14.0	260	260	1 + 380.000
7.8	90	90	1 + 388.280
25.0	952	952	1 + 446.300
22.0	1,262	1,262	1 + 500.000
18.5	332	332	1 + 516.400
8.5	454	454	1 + 550.000
20.0	352	352	1 + 574.690
9.5	373	373	1 + 600.000
10.0	340	340	1 + 634.910
9.0	143	143	1 + 650.000
8.0	413	413	1 + 698.630
12.0	214	214	1 + 720.000
12.3	243	243	1 + 740.000
8.3	206	206	1 + 760.000
11.0	193	193	1 + 780.000
22.5	335	335	1 + 800.000
34.7	519	519	1 + 818.130
29.0	474	474	1 + 833.000
24.5	1,789	1,789	1 + 899.880
27.0	647	647	1 + 925.000
23.0	375	375	1 + 940.000
19.0	420	420	1 + 960.000
6.0	192	192	1 + 975.330
8.0	173	173	2 + 0.000
10.5	605	605	2 + 65.440
11.5	160	160	2 + 80.000
6.7	182	182	2 + 100.000
5.0	114	114	2 + 119.440
8.5	81	81	2 + 131.440
8.5	73	73	2 + 140.000
8.0	165	165	2 + 160.000
7.5	155	155	2 + 180.000
17.5	355	355	2 + 208.420
26.0	938	938	2 + 251.530
31.5	244	244	2 + 260.000
22.5	216	216	2 + 268.000
16.5	117	117	2 + 274.000
11.5	84	84	2 + 280.000
6.5	194	194	2 + 301.570
11.0	338	338	2 + 340.200
23.5	235	235	2 + 353.810
21.7	592	592	2 + 380.000
12.0	337	337	2 + 400.000
7.0	190	190	2 + 420.000
18.2	252	252	2 + 440.000
14.5	116	116	2 + 447.070
16.0	219	219	2 + 461.440
11.0	245	245	2 + 479.600
14.0	255	255	2 + 500.000
15.0	725	725	2 + 550.000
7.0	263	263	2 + 573.930
9.0	113	113	2 + 588.000
6.0	45	45	2 + 594.000
8.0	98	98	2 + 608.000
11.0	171	171	2 + 626.000
11.0	153	153	2 + 639.940
10.5	425	425	2 + 679.520
			+
			+
	19,204	19,204	Sub Total
	40,057	40,057	Total

Quantity Calculation 13.1 Earthwork

Access Road Name : Cana Duke Inlet Access Road

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)				Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
0 + 0.000									43.4					0		6.2		8.2			0 + 0.000
0 + 14.460	14.460	14.8	107	96	0.0	0	0	96	0.0	314		314	-217	-217	96	2.6	64	2.6	78	142	0 + 14.460
0 + 20.000	5.540	13.8	79	71	0.0	0	0	71	0.0	0		0	71	-146	0	2.8	15	2.2	13	28	0 + 20.000
0 + 40.000	20.000	0.0	138	124	0.0	0	0	124	114.0	1,140		1,140	-1,016	-1,162	124	7.0	98	22.9	251	349	0 + 40.000
0 + 60.000	20.000	0.0	0	0	0.0	0	0	0	91.6	2,056		2,056	-2,056	-3,218	0	16.4	234	15.0	379	613	0 + 60.000
0 + 80.000	20.000	0.0	0	0	0.0	0	0	0	14.6	1,062		1,062	-1,062	-4,280	0	1.5	179	5.7	207	386	0 + 80.000
0 + 91.200	11.200	0.0	0	0	0.0	0	0	0	31.6	259		259	-259	-4,539	0	4.0	31	12.8	104	134	0 + 91.200
0 + 100.000	8.800	0.0	0	0	0.0	0	0	0	24.4	246		246	-246	-4,785	0	0.0	18	18.4	137	155	0 + 100.000
0 + 128.390	28.390	20.0	284	256	37.2	528	581	836	0.0	346		346	490	-4,295	346	2.6	37	1.4	281	318	0 + 128.390
0 + 148.380	19.990	5.8	258	232	0.0	372	409	641	0.0	0		0	641	-3,654	0	1.4	40	0.0	14	54	0 + 148.380
0 + 150.000	1.620	3.0	7	6	0.0	0	0	6	0.0	0		0	6	-3,648	0	0.0	1	0.0	0	1	0 + 150.000
0 + 160.000	10.000	1.1	21	18	0.8	4	4	23	0.0	0		0	23	-3,625	0	0.0	0	0.8	4	4	0 + 160.000
0 + 180.000	20.000	5.8	69	62	0.0	8	9	71	0.0	0		0	71	-3,554	0	0.0	0	0.0	8	8	0 + 180.000
0 + 199.780	19.780	12.6	182	164	19.8	196	215	379	0.0	0		0	379	-3,175	0	1.6	16	0.0	0	16	0 + 199.780
0 + 250.000	50.220	6.0	467	420	1.8	542	597	1,017	2.0	50		50	967	-2,208	50	4.0	141	4.0	100	241	0 + 250.000
0 + 320.000	70.000	14.0	700	630	16.4	637	701	1,331	0.0	70		70	1,261	-947	70	4.6	301	0.0	140	441	0 + 320.000
0 + 340.000	20.000	15.8	298	268	5.8	222	344	512	0.0	0		0	512	-435	0	4.6	92	0.0	0	92	0 + 340.000
0 + 360.000	20.000	10.2	260	234	1.2	70	77	311	0.0	0		0	311	-124	0	4.4	90	0.0	0	90	0 + 360.000
0 + 382.900	22.900	8.4	213	192	0.3	17	19	211	0.0	0		0	211	87	0	4.4	101	0.8	9	110	0 + 382.900
0 + 456.890	73.990	0.0	311	280	0.0	11	12	292	9.8	363		363	-71	16	292	0.0	163	3.6	163	326	0 + 456.890
0 + 492.190	35.300	9.0	159	143	0.0	0	0	143	0.0	173		173	-30	-14	143	2.6	46	0.6	74	120	0 + 492.190
0 + 550.000	57.810	15.0	694	624	21.4	619	680	1,305	0.0	0		0	1,305	1,291	0	2.6	150	1.6	64	214	0 + 550.000
0 + 581.570	31.570	21.4	575	517	66.2	1,383	1,521	2,038	0.0	0		0	2,038	3,329	0	2.6	82	1.8	54	136	0 + 581.570
0 + 600.000	18.430	21.6	396	357	30.6	892	981	1,338	0.0	0		0	1,338	4,667	0	2.6	48	2.6	41	88	0 + 600.000
0 + 620.000	20.000	16.0	376	338	9.4	400	440	778	0.0	0		0	778	5,445	0	3.0	56	3.0	56	112	0 + 620.000
0 + 638.970	18.970	3.9	189	170	0.0	89	98	268	0.0	0		0	268	5,713	0	2.0	47	0.0	28	76	0 + 638.970
0 + 650.000	11.030	0.0	22	19	0.0	0	0	19	11.1	61		61	-42	5,671	19	0.0	11	7.6	42	53	0 + 650.000
0 + 700.000	50.000	16.8	420	378	12.2	305	336	714	0.0	278		278	436	6,107	278	5.2	130	1.6	230	360	0 + 700.000
0 + 750.000	50.000	14.4	780	702	4.4	415	457	1,159	0.0	0		0	1,159	7,266	0	0.0	130	4.4	150	280	0 + 750.000
0 + 755.600	5.600	14.6	81	73	5.6	28	31	104	0.0	0		0	104	7,370	0	4.4	12	0.0	12	25	0 + 755.600
0 + 760.000	4.400	14.6	64	58	8.8	32	35	93	0.0	0		0	93	7,462	0	4.0	18	2.0	4	23	0 + 760.000
0 + 780.000	20.000	17.8	324	292	15.4	242	266	558	0.0	0		0	558	8,020	0	4.0	80	1.6	36	116	0 + 780.000
0 + 800.000	20.000	3.1	209	188	0.0	154	169	358	5.4	54		54	304	8,324	54	2.4	64	6.6	82	146	0 + 800.000
0 + 820.000	20.000	24.4	275	248	32.6	326	359	606	0.0	54		54	552	8,876	54	5.5	79	1.6	82	161	0 + 820.000
0 + 840.000	20.000	27.8	522	470	61.6	942	1,036	1,506	0.0	0		0	1,506	10,382	0	3.6	91	1.6	32	123	0 + 840.000
0 + 858.680	18.680	24.6	489	440	47.4	1,018	1,120	1,560	0.0	0		0	1,560	11,942	0	4.0	71	1.6	30	101	0 + 858.680
0 + 904.180	45.500	30.0	1,242	1,118	68.4	2,634	2,898	4,016	0.0	0		0	4,016	15,958	0	5.0	205	1.6	73	278	0 + 904.180
0 + 950.000	45.820	0.0	687	619	0.0	1,567	1,724	2,342	21.6	495		495	1,847	17,805	495	0.0	115	7.2	202	316	0 + 950.000
0 + 978.600	28.600	15.2	217	196	4.2	60	66	262	0.0	309		309	-47	17,758	262	3.6	51	2.0	132	183	0 + 978.600
1 + 0.000	21.400	24.6	426	383	40.8	482	530	913	0.0	0		0	913	18,671	0	6.1	104	1.8	41	144	1 + 0.000
1 + 20.000	20.000	29.0	536	482	95.0	1,358	1,494	1,976	0.0	0		0	1,976	20,647	0	2.6	87	1.6	34	121	1 + 20.000
1 + 32.500	12.500	32.6	385	347	63.0	988	1,086	1,433	0.0	0		0	1,433	22,080	0	5.0	48	2.4	25	73	1 + 32.500
1 + 56.000	23.500	0.0	383	345	0.0	740	814	1,159	208.4	2,390		2,390	-1,231	20,849	1,159	0.0	59	50.0	616	674	1 + 56.000
1 + 59.770	3.770	0.0	0	0	0.0	0	0	0	132.6	633		633	-633	20,216	0	0.0	0	8.4	110	110	1 + 59.770
1 + 80.000	20.230	10.4	105	95	0.0	0	0	95	0.0	1,341		1,341	-1,247	18,969	95	2.2	22	0.0	85	107	1 + 80.000
1 + 100.000	20.000	13.2	236	212	0.0	0	0	212	3.2	32		32	180	19,150	32	3.8	60	0.0	0	60	1 + 100.000
1 + 121.330	21.330	8.6	232	209	0.0	0	0	209	0.0	34		34	175	19,325	34	2.4	66	0.0	0	66	1 + 121.330
1 + 127.340	6.010	4.2	38	35	0.0	0	0	35	0.0	0		0	35	19,359	0	1.6	12	0.0	0	12	1 + 127.340
1 + 140.000	12.660	1.6	37	33	0.0	0	0	33	11.6	73		73	-40	19,319	33	0.0	10	14.9	94	104	1 + 140.000
1 + 160.000	20.000	24.8	264	238	52.2	522	574	812	0.0	116		116	696	20,015	116	3.6	36	1.0	159	195	1 + 160.000
1 + 183.260	23.260	28.0	614	553	91.4	1,670	1,837	2,390	0.0	0		0	2,390	22,405	0	4.4	93	1.0	23	116	1 + 183.260
1 + 219.260	36.000	27.0	990	891	63.4	2,786	3,065	3,956	0.0	0		0	3,956	26,361	0	3.0	133	1.6	47	180	1 + 219.260
1 + 244.360	25.100	4.2	392	352	0.0	796	875	1,228	2.3	29		29	1,199	27,559	29	0.0	38	2.4	50	88	1 + 244.360
1 + 295.220	50.860	0.0	107	96	0.0	0	0	96	100.4	2,612		2,612	-2,516	25,044	96	0.0	0	24.2	676	676	1 + 295.220
1 + 329.390	34.170	12.8	219	197	3.6	62	68	264	0.0	1,715		1,715	-1,451	23,593	264	3.8	65	0.0	413	478	1 + 329.390
1 + 340.000	10.610	7.2	106	95	0.0	19	21	116	0.0	0		0	116	23,709	0	3.0	36	0.0	0	36	1 + 340.000
1 + 360.000	20.000	15.8	230	207	14.4	144	158	365	0.0	0		0	365	24,075	0	3.4	64	1.8	18	82	1 + 360.000
Total	1,360.000		16,415	14,773		23,279	25,607	40,380		16,305		16,305	24,075		4,142		4,039		5,703	9,742	

Station	Distance	Earthwork														Slope Protection					Station
	(m)	Cut Volume							Embankment Volume				Balance	Accumulated	Lateral	Left Side		Right Side		Total	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total	A - B	Volume	Volume					Area	
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	(m3)	(m3)	(m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	(m2)	
1 + 360.000		15.8			14.4				0.0					24,075		3.4		1.8			1 + 360.000
1 + 380.000	20.000	3.6	194	175	0.0	144	158	333	100.0	1,000		1,000	-667	23,408	333	0.0	34	2.6	44	78	1 + 380.000
1 + 388.280	8.280	44.4	199	179	167.0	691	761	939	0.0	414		414	525	23,983	414	1.0	4	0.0	11	15	1 + 388.280
1 + 446.300	58.020	40.6	2,466	2,219	95.4	7,612	8,373	10,593	0.0	0		0	10,593	34,526	0	3.0	116	2.6	75	191	1 + 446.300
1 + 500.000	53.700	31.0	1,922	1,730	67.8	4,382	4,820	6,550	0.0	0		0	6,550	41,076	0	3.0	161	2.6	140	301	1 + 500.000
1 + 516.400	16.400	4.0	287	258	0.0	556	612	870	0.1	1		1	869	41,945	1	2.4	44	2.4	41	85	1 + 516.400
1 + 550.000	33.600	13.8	299	269	0.0	0	0	269	67.8	1,141		1,141	-872	41,074	269	3.2	94	0.4	47	141	1 + 550.000
1 + 574.690	24.690	0.0	170	153	0.0	0	0	153	16.4	1,039		1,039	-886	40,188	153	0.0	40	12.8	163	202	1 + 574.690
1 + 600.000	25.310	15.4	195	175	4.4	56	61	237	0.0	208		208	29	40,217	208	0.0	0	4.0	213	213	1 + 600.000
1 + 634.910	34.910	11.0	461	415	0.0	77	84	499	0.0	0		0	499	40,716	0	2.8	49	1.8	101	150	1 + 634.910
1 + 650.000	15.090	0.0	83	75	0.0	0	0	75	129.4	976		976	-902	39,814	75	4.0	51	0.6	18	69	1 + 650.000
1 + 698.630	48.630	3.6	88	79	0.0	0	0	79	0.2	3,151		3,151	-3,072	36,742	79	2.0	146	0.4	24	170	1 + 698.630
1 + 720.000	21.370	23.2	286	258	7.4	79	87	345	0.0	2		2	343	37,084	2	3.4	58	2.4	30	88	1 + 720.000
1 + 740.000	20.000	11.2	344	310	0.0	74	81	391	0.0	0		0	391	37,475	0	4.0	74	2.8	52	126	1 + 740.000
1 + 760.000	20.000	0.0	112	101	0.0	0	0	101	0.0	0		0	101	37,576	0	2.0	60	1.6	44	104	1 + 760.000
1 + 780.000	20.000	0.0	0	0	0.0	0	0	0	19.6	196		196	-196	37,380	0	3.2	52	4.0	56	108	1 + 780.000
1 + 800.000	20.000	0.0	0	0	0.0	0	0	0	71.4	910		910	-910	36,470	0	5.0	82	14.8	188	270	1 + 800.000
1 + 818.130	18.130	0.0	0	0	0.0	0	0	0	193.6	2,402		2,402	-2,402	34,068	0	11.0	145	22.6	339	484	1 + 818.130
1 + 833.000	14.870	0.0	0	0	0.0	0	0	0	167.4	2,684		2,684	-2,684	31,384	0	16.0	201	11.2	251	452	1 + 833.000
1 + 899.880	66.880	0.0	0	0	0.0	0	0	0	113.4	9,390		9,390	-9,390	21,994	0	11.8	930	10.4	722	1,652	1 + 899.880
1 + 925.000	25.120	0.0	0	0	0.0	0	0	0	128.6	3,040		3,040	-3,040	18,954	0	17.4	367	8.2	234	600	1 + 925.000
1 + 940.000	15.000	0.0	0	0	0.0	0	0	0	58.8	1,406		1,406	-1,406	17,549	0	15.8	249	4.6	96	345	1 + 940.000
1 + 960.000	20.000	2.4	24	22	0.0	0	0	22	9.4	682		682	-660	16,889	22	13.2	290	0.6	52	342	1 + 960.000
1 + 975.330	15.330	0.0	18	17	0.0	0	0	17	0.8	78		78	-62	16,827	17	0.4	104	0.6	9	113	1 + 975.330
2 + 0.000	24.670	0.0	0	0	0.0	0	0	0	6.6	91		91	-91	16,736	0	2.4	35	1.6	27	62	2 + 0.000
2 + 65.440	65.440	0.0	0	0	0.0	0	0	0	13.4	654		654	-654	16,081	0	3.4	190	2.8	144	334	2 + 65.440
2 + 80.000	14.560	0.0	0	0	0.0	0	0	0	15.0	207		207	-207	15,874	0	4.0	54	3.2	44	98	2 + 80.000
2 + 100.000	20.000	0.0	0	0	0.0	0	0	0	2.4	174		174	-174	15,700	0	1.0	50	0.8	40	90	2 + 100.000
2 + 119.440	19.440	1.6	16	14	0.0	0	0	14	0.0	23		23	-9	15,691	14	0.0	10	0.0	8	17	2 + 119.440
2 + 131.440	12.000	12.0	82	73	0.0	0	0	73	0.0	0		0	73	15,765	0	1.8	11	1.6	10	20	2 + 131.440
2 + 140.000	8.560	10.2	95	86	0.0	0	0	86	0.0	0		0	86	15,850	0	1.1	12	1.7	14	27	2 + 140.000
2 + 160.000	20.000	8.2	184	166	0.0	0	0	166	0.0	0		0	166	16,016	0	1.4	25	1.2	29	54	2 + 160.000
2 + 180.000	20.000	5.0	132	119	0.0	0	0	119	0.0	0		0	119	16,135	0	1.0	24	0.5	17	41	2 + 180.000
2 + 208.420	28.420	0.0	71	64	0.0	0	0	64	47.0	668		668	-604	15,531	64	6.6	108	8.2	124	232	2 + 208.420
2 + 251.530	43.110	0.0	0	0	0.0	0	0	0	82.6	2,794		2,794	-2,794	12,737	0	11.0	379	13.0	457	836	2 + 251.530
2 + 260.000	8.470	0.0	0	0	0.0	0	0	0	163.4	1,042		1,042	-1,042	11,695	0	13.2	102	17.6	130	232	2 + 260.000
2 + 268.000	8.000	0.0	0	0	0.0	0	0	0	95.6	1,036		1,036	-1,036	10,659	0	12.8	104	7.4	100	204	2 + 268.000
2 + 274.000	6.000	0.0	0	0	0.0	0	0	0	41.2	410		410	-410	10,249	0	7.6	61	6.2	41	102	2 + 274.000
2 + 280.000	6.000	0.0	0	0	0.0	0	0	0	19.0	181		181	-181	10,068	0	4.6	37	3.4	29	65	2 + 280.000
2 + 301.570	21.570	0.0	0	0	0.0	0	0	0	2.8	235		235	-235	9,833	0	1.2	63	0.4	41	104	2 + 301.570
2 + 340.200	38.630	11.0	212	191	0.0	0	0	191	0.0	54		54	137	9,970	54	0.0	23	4.2	89	112	2 + 340.200
2 + 353.810	13.610	0.0	75	67	0.0	0	0	67	102.2	695		695	-628	9,342	67	16.9	115	0.0	29	144	2 + 353.810
2 + 380.000	26.190	0.0	0	0	0.0	0	0	0	91.8	2,540		2,540	-2,540	6,802	0	15.1	419	0.0	0	419	2 + 380.000
2 + 400.000	20.000	0.0	0	0	0.0	0	0	0	30.8	1,226		1,226	-1,226	5,576	0	5.8	209	0.0	0	209	2 + 400.000
2 + 420.000	20.000	2.8	28	25	0.0	0	0	25	0.0	308		308	-283	5,293	25	0.0	58	1.9	19	77	2 + 420.000
2 + 440.000	20.000	23.8	266	239	50.2	502	552	792	0.0	0		0	792	6,085	0	1.8	18	6.5	84	102	2 + 440.000
2 + 447.070	7.070	19.2	152	137	44.6	335	369	505	0.0	0		0	505	6,590	0	1.8	13	2.4	31	44	2 + 447.070
2 + 461.440	14.370	29.0	346	312	40.4	611	672	983	0.0	0		0	983	7,573	0	3.6	39	3.0	39	78	2 + 461.440
2 + 479.600	18.160	13.6	387	348	3.9	402	442	791	0.0	0		0	791	8,364	0	1.8	49	3.6	60	109	2 + 479.600
2 + 500.000	20.400	0.0	139	125	0.0	40	44	169	28.4	290		290	-121	8,243	169	6.5	85	4.2	80	164	2 + 500.000
2 + 550.000	50.000	30.2	755	680	23.6	590	649	1,329	0.0	710		710	619	8,861	710	3.4	248	4.2	210	458	2 + 550.000
2 + 573.930	23.930	0.0	361	325	0.0	282	311	636	4.2	50		50	586	9,447	50	2.2	67	0.2	53	120	2 + 573.930
2 + 588.000	14.070	0.0	0	0	0.0	0	0	0	8.8	91		91	-91	9,356	0	3.4	39	1.4	11	51	2 + 588.000
2 + 594.000	6.000	3.6	11	10	0.0	0	0	10	0.0	26		26	-17	9,339	10	0.0	10	1.6	9	19	2 + 594.000
2 + 608.000	14.000	0.0	25	23	0.0	0	0	23	5.6	39		39	-17	9,322	23	2.2	15	1.2	20	35	2 + 608.000
2 + 626.000	18.000	22.8	205	185	0.8	7	8	193	0.0	50		50	142	9,465	50	2.9	46	4.0	47	93	2 + 626.000
2 + 639.940	13.940	17.2	279	251	6.6	52	57	308	0.0	0		0	308	9,772	0	2.3	36	3.0	49	85	2 + 639.940
2 + 679.520	39.580	15.6	649	584	2.4	178	196	780	0.0	0		0	780	10,552	0	1.6	77	3.6	131	208	2 + 679.520
+																					+
+																					+
Sub Total	1,319.520		11,618	10,456		16,670	18,337	28,794		42,316		42,316	-13,522		2,806		6,181		3,162	11,343	Sub Total
Total	2,679.520		28,083	25,230		39,949	43,944	69,174		58,622		58,622	10,552		6,950		10,220		10,866	21,085	Total

Working Division: 13 Caña Dulce Access Road

Description	Calculation Details	Unit	Quantity	Remarks
13.5	Pavement			
101	Improved subgrade material			
	Cut section			
	L = 1676.34m			
	Embankment section			
	L = 1003.18m			
	V = 4.0 × 0.075 × 1676.34			
	+ 4.0 × (0.35 + 0.2)/2 × 1003.18			
	= 1606.4 m³			
		m³	1606	
102	Graded crushed stone subbase			
	V = 4.0 × 0.15 × 2679.52 = 1607.7 m³			
		m³	1608	
103	Transportation of improved subgrade material			
	V = 1606.4 × 0.01 × 10 km = 160.64			
		m³	161	

Working Division: 13 Caña Dulce Inlet Access Road

Description	Calculation Details	Unit	Quantity	Remarks
13.6				
101	Guardrail			
	L = 0			
		m	0	
102	Warning signs			
	N = 2679.5 / 250 = 11			
		no	11	

Working Division: 14 La Seca Access Road

Description	Calculation Details	Unit	Quantity	Remarks
14.1	Earthwork			
101	Clearing			
106	Compaction of original ground			
	A = 4.0 × 2,700.4 × 0.1 = 1,080.2			
		m²	1,080	

14-1/01 Clearing

La Seca Access Road

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
17.5			0 - 100.086
40.5	1,452	1,452	0 - 50.000
34.5	1,875	1,875	0 + 0.000
13.5	916	916	0 + 38.180
21.5	382	382	0 + 60.000
29.5	510	510	0 + 80.000
12.0	415	415	0 + 100.000
18.0	300	300	0 + 120.000
17.0	350	350	0 + 140.000
19.0	360	360	0 + 160.000
22.0	410	410	0 + 180.000
9.5	394	394	0 + 205.000
6.5	82	82	0 + 215.230
9.7	201	201	0 + 250.000
10.5	505	505	0 + 300.000
13.5	600	600	0 + 350.000
10.5	600	600	0 + 400.000
22.7	241	241	0 + 414.500
10.5	510	510	0 + 445.220
12.5	254	254	0 + 467.340
15.0	366	366	0 + 493.960
12.2	457	457	0 + 527.560
12.0	151	151	0 + 540.000
11.5	235	235	0 + 560.000
11.0	225	225	0 + 580.000
18.5	295	295	0 + 600.000
12.0	305	305	0 + 620.000
19.6	316	316	0 + 640.000
31.7	502	502	0 + 659.560
19.6	1,166	1,166	0 + 705.030
24.0	326	326	0 + 720.000
12.7	367	367	0 + 740.000
9.0	217	217	0 + 760.000
12.0	210	210	0 + 780.000
11.0	192	192	0 + 796.660
15.0	693	693	0 + 850.000
16.5	347	347	0 + 872.000
25.5	158	158	0 + 879.500
6.5	168	168	0 + 890.000
14.5	374	374	0 + 925.600
8.8	448	448	0 + 964.070
16.5	202	202	0 + 980.000
22.5	390	390	1 + 0.000
16.0	385	385	1 + 20.000
34.5	498	498	1 + 39.710
15.0	358	358	1 + 54.180
30.0	1,031	1,031	1 + 100.000
12.7	997	997	1 + 146.680
19.0	211	211	1 + 160.000
22.5	415	415	1 + 180.000
12.0	345	345	1 + 200.000
12.0	240	240	1 + 220.000
13.0	250	250	1 + 240.000
13.0	260	260	1 + 260.000
12.8	279	279	1 + 281.660
13.0	237	237	1 + 300.000
16.0	325	325	1 + 322.420
	24,296	24,296	

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
16.0			1 + 322.420
10.0	418	418	1 + 354.580
20.5	743	743	1 + 403.300
16.5	687	687	1 + 440.410
15.0	309	309	1 + 460.000
13.5	285	285	1 + 480.000
11.0	245	245	1 + 500.000
10.0	210	210	1 + 520.000
7.0	150	150	1 + 537.660
8.5	377	377	1 + 586.360
5.3	230	230	1 + 619.740
10.5	385	385	1 + 668.480
21.5	184	184	1 + 680.000
7.0	285	285	1 + 700.000
6.5	135	135	1 + 720.000
10.5	170	170	1 + 740.000
12.0	225	225	1 + 760.000
10.5	279	279	1 + 784.800
15.0	654	654	1 + 836.060
14.5	422	422	1 + 864.660
21.0	272	272	1 + 880.000
17.0	380	380	1 + 900.000
20.0	492	492	1 + 926.620
18.2	256	256	1 + 940.000
14.0	322	322	1 + 960.000
13.0	229	229	1 + 976.980
21.0	185	185	1 + 987.860
31.3	317	317	2 + 0.000
37.5	688	688	2 + 20.000
9.0	558	558	2 + 43.080
21.5	307	307	2 + 64.100
18.0	314	314	2 + 80.000
22.5	405	405	2 + 100.000
12.3	263	263	2 + 115.130
16.3	432	432	2 + 145.310
9.0	503	503	2 + 185.040
9.8	75	75	2 + 193.040
12.1	605	605	2 + 246.270
10.0	289	289	2 + 274.380
13.5	66	66	2 + 280.000
16.3	298	298	2 + 300.000
26.0	423	423	2 + 320.000
14.0	400	400	2 + 340.000
9.7	216	216	2 + 358.270
7.5	359	359	2 + 400.000
9.2	395	395	2 + 447.300
13.0	609	609	2 + 502.200
13.2	233	233	2 + 520.000
8.7	219	219	2 + 540.000
19.0	277	277	2 + 560.000
11.5	305	305	2 + 580.000
8.5	200	200	2 + 600.000
9.0	62	62	2 + 607.120
14.0	493	493	2 + 650.000
14.5	637	637	2 + 694.670
13.0	73	73	2 + 700.000
10.0	230	230	2 + 720.000
8.0	180	180	2 + 740.000
12.0	200	200	2 + 760.000
11.3	154	154	2 + 773.230
	19,314	19,314	Sub Total
	43,610	43,610	Total

Clearing		Total	Station
Length (m)	Area (m2)	Area (m2)	
11.3			2 + 773.230
15.0	846	846	2 + 837.580
13.0	314	314	2 + 860.000
12.3	253	253	2 + 880.000
14.3	266	266	2 + 900.000
12.0	263	263	2 + 920.000
9.3	213	213	2 + 940.000
9.5	188	188	2 + 960.000
10.0	195	195	2 + 980.000
11.5	215	215	3 + 0.000
14.0	255	255	3 + 20.000
16.0	300	300	3 + 40.000
13.5	295	295	3 + 60.000
13.7	272	272	3 + 80.000
14.0	134	134	3 + 89.700
16.0	155	155	3 + 100.000
7.8	756	756	3 + 163.540
8.0	130	130	3 + 180.000
7.5	155	155	3 + 200.000
7.5	150	150	3 + 220.000
8.7	162	162	3 + 240.000
11.8	205	205	3 + 260.000
13.1	249	249	3 + 280.000
14.0	307	307	3 + 302.650
9.5	556	556	3 + 350.000
10.5	500	500	3 + 400.000
14.0	613	613	3 + 450.000
9.7	593	593	3 + 500.000
10.0	143	143	3 + 514.490
10.0	55	55	3 + 520.000
11.0	210	210	3 + 540.000
12.0	230	230	3 + 560.000
11.5	235	235	3 + 580.000
8.5	200	200	3 + 600.000
9.5	88	88	3 + 609.800
10.0	392	392	3 + 650.000
13.5	271	271	3 + 671.290
10.5	559	559	3 + 714.290
11.0	61	61	3 + 720.000
9.0	200	200	3 + 740.000
7.3	163	163	3 + 760.000
9.2	187	187	3 + 782.720
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
			+
	11,535	11,535	Sub Total
	55,145	55,145	Total

6-25

Quantity Calculation *14.1 Earthwork*

Access Road Name : La Seca Access Road

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A (m3)	Embankment Section			Total Embankment Volume B (m3)									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)		Sectional Area (m2)	Volume (m3)	Vary Volume (m3)					Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
0 - 100.086		15.4			48.8				0.0					0		1.0		2.0			0 - 100.086
0 - 50.000	50.086	0.0	386	347	0.0	1,222	1,344	1,691	117.2	2,935		2,935	-1,244	-1,244	1,691	33.9	874	0.0	50	924	0 - 50.000
0 + 0.000	50.000	0.4	10	9	0.0	0	0	9	27.6	3,620		3,620	-3,611	-4,855	9	26.7	1,515	0.0	0	1,515	0 + 0.000
0 + 38.180	38.180	9.2	183	165	0.0	0	0	165	0.0	527		527	-362	-5,217	165	0.0	510	0.0	0	510	0 + 38.180
0 + 60.000	21.820	12.4	236	212	30.4	332	365	577	0.0	0		0	577	-4,640	0	5.6	61	2.5	27	88	0 + 60.000
0 + 80.000	20.000	28.8	412	371	61.6	920	1,012	1,383	0.0	0		0	1,383	-3,257	0	0.0	56	3.0	55	111	0 + 80.000
0 + 100.000	20.000	4.8	336	302	5.0	666	733	1,035	0.0	0		0	1,035	-2,222	0	0.0	0	0.0	30	30	0 + 100.000
0 + 120.000	20.000	16.4	212	191	14.7	197	217	408	0.0	0		0	408	-1,814	0	0.0	0	3.0	30	30	0 + 120.000
0 + 140.000	20.000	14.4	308	277	19.8	345	380	657	0.0	0		0	657	-1,158	0	0.0	0	2.3	53	53	0 + 140.000
0 + 160.000	20.000	10.0	244	220	18.9	387	426	645	0.0	0		0	645	-512	0	0.0	0	3.7	60	60	0 + 160.000
0 + 180.000	20.000	19.8	298	268	13.9	328	361	629	0.0	0		0	629	117	0	0.0	0	6.6	103	103	0 + 180.000
0 + 205.000	25.000	0.0	248	223	0.0	174	191	414	27.5	344		344	70	187	344	4.0	50	0.0	83	133	0 + 205.000
0 + 215.230	10.230	1.9	10	9	0.0	0	0	9	0.2	142		142	-133	54	9	0.5	23	1.1	6	29	0 + 215.230
0 + 250.000	24.770	3.0	61	55	0.0	0	0	55	0.8	12		12	42	96	12	1.8	28	2.0	38	67	0 + 250.000
0 + 300.000	50.000	5.6	215	194	0.0	0	0	194	0.6	35		35	159	255	35	1.0	70	4.6	165	235	0 + 300.000
0 + 350.000	50.000	0.1	143	128	0.0	0	0	128	10.3	273		273	-144	110	128	8.4	235	0.0	115	350	0 + 350.000
0 + 400.000	50.000	0.1	5	5	0.0	0	0	5	4.4	368		368	-363	-253	5	5.2	340	0.0	0	340	0 + 400.000
0 + 414.500	14.500	0.0	1	1	0.0	0	0	1	90.6	689		689	-688	-941	1	14.1	140	0.0	0	140	0 + 414.500
0 + 445.220	30.720	8.8	135	122	4.2	65	71	193	0.0	1,392		1,392	-1,199	-2,140	193	2.6	257	3.7	57	313	0 + 445.220
0 + 467.340	22.120	13.2	243	219	7.4	128	141	360	0.0	0		0	360	-1,780	0	0.0	29	3.9	84	113	0 + 467.340
0 + 493.960	26.620	13.4	354	319	12.8	269	296	614	0.0	0		0	614	-1,165	0	0.0	0	4.8	116	116	0 + 493.960
0 + 527.560	33.600	10.4	400	360	8.8	363	399	759	0.0	0		0	759	-406	0	0.0	0	4.0	148	148	0 + 527.560
0 + 540.000	12.440	12.0	139	125	2.0	67	74	199	0.0	0		0	199	-207	0	0.0	0	5.7	60	60	0 + 540.000
0 + 560.000	20.000	1.8	138	124	0.0	20	22	146	5.2	52		52	94	-113	52	4.5	45	1.8	75	120	0 + 560.000
0 + 580.000	20.000	2.4	42	38	0.0	0	0	38	3.0	82		82	-44	-157	38	3.3	78	2.6	44	122	0 + 580.000
0 + 600.000	20.000	0.6	30	27	0.0	0	0	27	12.2	152		152	-125	-282	27	12.6	159	1.5	41	200	0 + 600.000
0 + 620.000	20.000	8.8	94	85	0.0	0	0	85	0.3	125		125	-40	-322	85	3.4	160	4.5	60	220	0 + 620.000
0 + 640.000	20.000	11.2	200	180	2.0	20	22	202	2.0	23		23	179	-143	23	7.4	108	6.4	109	217	0 + 640.000
0 + 659.560	19.560	12.4	231	208	0.8	27	30	238	9.2	110		110	128	-15	110	16.4	233	10.0	160	393	0 + 659.560
0 + 705.030	45.470	6.0	418	376	0.0	18	20	396	2.0	255		255	142	127	255	4.0	464	6.0	364	828	0 + 705.030
0 + 720.000	14.970	7.4	100	90	0.1	1	1	91	7.2	69		69	22	149	69	13.4	130	5.3	85	215	0 + 720.000
0 + 740.000	20.000	1.2	86	77	0.0	1	1	79	6.4	136		136	-58	92	79	6.3	197	6.7	120	317	0 + 740.000
0 + 760.000	20.000	7.2	84	76	0.0	0	0	76	0.0	64		64	12	103	64	0.0	63	4.6	113	176	0 + 760.000
0 + 780.000	20.000	9.9	171	154	0.8	8	9	163	0.0	0		0	163	266	0	0.0	0	6.3	109	109	0 + 780.000
0 + 796.660	16.660	14.0	199	179	0.9	14	16	195	0.0	0		0	195	461	0	0.0	0	5.0	94	94	0 + 796.660
0 + 850.000	53.340	0.0	373	336	0.0	24	26	362	33.8	901		901	-539	-78	362	6.8	181	5.0	267	448	0 + 850.000
0 + 872.000	22.000	0.0	0	0	0.0	0	0	0	42.4	838		838	-838	-917	0	8.2	165	6.5	127	292	0 + 872.000
0 + 879.500	7.500	0.0	0	0	0.0	0	0	0	87.0	485		485	-485	-1,402	0	12.7	78	11.4	67	146	0 + 879.500
0 + 890.000	10.500	5.8	30	27	0.0	0	0	27	0.0	457		457	-429	-1,831	27	0.0	67	1.8	69	136	0 + 890.000
0 + 925.600	35.600	19.8	456	410	3.6	64	70	481	0.0	0		0	481	-1,351	0	0.0	0	6.2	142	142	0 + 925.600
0 + 964.070	38.470	5.2	481	433	0.0	69	76	509	0.2	4		4	505	-845	4	1.0	19	3.1	179	198	0 + 964.070
0 + 980.000	15.930	17.6	182	163	8.4	67	74	237	0.0	2		2	235	-610	2	0.0	8	7.0	80	88	0 + 980.000
1 + 0.000	20.000	22.8	404	364	12.0	204	224	588	0.0	0		0	588	-22	0	0.0	0	11.7	187	187	1 + 0.000
1 + 20.000	20.000	11.2	340	306	0.4	124	136	442	0.7	7		7	435	413	7	1.6	16	9.5	212	228	1 + 20.000
1 + 39.710	19.710	0.0	110	99	0.0	4	4	104	232.0	2,293		2,293	-2,190	-1,776	104	18.0	193	0.0	94	287	1 + 39.710
1 + 54.180	14.470	17.4	126	113	6.8	49	54	167	0.0	1,679		1,679	-1,511	-3,287	167	0.0	130	6.5	47	177	1 + 54.180
1 + 100.000	45.820	10.2	632	569	7.2	321	353	922	9.8	225		225	697	-2,590	225	19.2	440	2.6	208	648	1 + 100.000
1 + 146.680	46.680	12.4	527	475	11.4	434	478	952	0.0	229		229	724	-1,866	229	0.0	448	2.8	126	574	1 + 146.680
1 + 160.000	13.320	19.6	213	192	24.4	238	262	454	0.0	0		0	454	-1,412	0	0.0	0	2.5	35	35	1 + 160.000
1 + 180.000	20.000	14.8	344	310	4.8	292	321	631	0.3	3		3	628	-785	3	2.7	27	14.5	170	197	1 + 180.000
1 + 200.000	20.000	8.2	230	207	4.0	88	97	304	0.4	7		7	297	-488	7	8.4	111	4.7	192	303	1 + 200.000
1 + 220.000	20.000	11.8	200	180	1.6	56	62	242	0.0	4		4	238	-250	4	0.0	84	6.0	107	191	1 + 220.000
1 + 240.000	20.000	13.4	252	227	3.2	48	53	280	0.0	0		0	280	29	0	0.0	0	5.8	118	118	1 + 240.000
1 + 260.000	20.000	16.0	294	265	0.9	41	45	310	0.0	0		0	310	339	0	0.0	0	7.8	136	136	1 + 260.000
1 + 281.660	21.660	16.0	347	312	1.5	26	29	340	0.0	0		0	340	680	0	0.0	0	6.0	149	149	1 + 281.660
1 + 300.000	18.340	14.0	275	248	0.4	17	19	267	0.0	0		0	267	946	0	0.0	0	7.5	124	124	1 + 300.000
1 + 322.420	22.420	20.8	390	351	3.2	40	44	395	0.0	0		0	395	1,342	0	0.0	0	8.0	174	174	1 + 322.420
Total	1412.506		12,578	11,320		7,779	8,557	19,877		18,535		18,535	1,342		4,532		7,792		5,664	13,457	

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A (m3)	Embankment Section			Total Embankment Volume B (m3)									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)		Sectional Area (m2)	Volume (m3)	Vary Volume (m3)					Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
1 + 322.420		20.8			3.2				0.0					1,342		0.0		8.0			1 + 322.420
1 + 354.580	32.160	0.0	334	301	0.0	51	57	358	63.2	1,016		1,016	-659	683	358	2.6	42	0.0	129	170	1 + 354.580
1 + 403.300	48.720	18.4	448	403	54.4	1,325	1,458	1,861	0.0	1,540		1,540	322	1,005	1,540	0.4	73	2.4	58	132	1 + 403.300
1 + 440.410	37.110	18.0	675	608	8.2	1,162	1,278	1,886	0.0	0		0	1,886	2,890	0	0.0	7	7.5	184	191	1 + 440.410
1 - 460.000	19.590	16.2	335	301	7.8	157	172	474	0.0	0		0	474	3,364	0	0.0	0	6.0	132	132	1 + 460.000
1 + 480.000	20.000	10.4	266	239	6.4	142	156	396	0.0	0		0	396	3,760	0	0.0	0	5.3	113	113	1 + 480.000
1 + 500.000	20.000	12.4	228	205	0.4	68	75	280	0.0	0		0	280	4,040	0	0.0	0	6.0	113	113	1 + 500.000
1 + 520.000	20.000	1.6	140	126	0.0	4	4	130	2.6	26		26	104	4,144	26	3.7	37	1.5	75	112	1 + 520.000
1 + 537.660	17.660	2.0	32	29	0.0	0	0	29	0.3	26		26	3	4,147	26	0.6	38	1.2	24	62	1 + 537.660
1 + 586.360	48.700	6.0	195	175	0.0	0	0	175	0.0	7		7	168	4,315	7	0.0	15	3.5	114	129	1 + 586.360
1 + 619.740	33.380	2.8	147	132	0.0	0	0	132	0.0	0		0	132	4,447	0	0.0	0	0.5	67	67	1 + 619.740
1 + 668.480	48.740	0.0	68	61	0.0	0	0	61	39.8	970		970	-909	3,539	61	0.0	0	0.0	12	12	1 + 668.480
1 + 680.000	11.520	0.0	0	0	0.0	0	0	0	28.8	395		395	-395	3,144	0	3.7	21	0.0	0	21	1 + 680.000
1 + 700.000	20.000	0.0	0	0	0.0	0	0	0	10.4	392		392	-392	2,752	0	0.8	45	0.0	0	45	1 + 700.000
1 + 720.000	20.000	1.1	11	10	0.0	0	0	10	0.0	104		104	-94	2,658	10	0.0	8	0.4	4	12	1 + 720.000
1 + 740.000	20.000	19.6	207	186	0.5	5	6	192	0.0	0		0	192	2,850	0	2.4	24	3.8	42	66	1 + 740.000
1 + 760.000	20.000	23.2	428	385	11.2	117	129	514	0.0	0		0	514	3,363	0	2.1	45	4.1	79	124	1 + 760.000
1 + 784.800	24.800	4.8	347	312	0.0	139	153	465	0.8	10		10	455	3,819	10	0.8	36	5.0	113	149	1 + 784.800
1 - 836.060	51.260	17.0	559	503	12.4	318	350	852	0.0	21		21	832	4,651	21	0.0	21	6.2	287	308	1 + 836.060
1 + 864.660	28.600	14.4	449	404	4.6	243	267	672	0.0	0		0	672	5,322	0	0.0	0	7.6	197	197	1 + 864.660
1 + 880.000	15.340	20.0	264	237	5.2	75	83	320	0.0	0		0	320	5,642	0	0.0	0	14.4	169	169	1 + 880.000
1 + 900.000	20.000	13.8	338	304	2.2	74	81	386	0.0	0		0	386	6,028	0	0.0	0	11.5	259	259	1 + 900.000
1 + 926.620	26.620	6.8	274	247	2.4	61	67	314	9.2	122		122	192	6,220	122	10.0	133	3.0	193	326	1 + 926.620
1 + 940.000	13.380	28.0	233	210	17.2	131	144	354	0.0	62		62	292	6,512	62	2.0	80	8.3	76	156	1 + 940.000
1 + 960.000	20.000	17.2	452	407	2.4	196	216	622	0.0	0		0	622	7,134	0	0.0	20	6.5	148	168	1 + 960.000
1 + 976.980	16.980	0.4	149	134	0.0	20	22	157	10.8	92		92	65	7,199	92	7.5	64	0.4	59	122	1 + 976.980
1 + 987.860	10.880	1.1	8	7	0.0	0	0	7	25.4	197		197	-190	7,010	7	15.0	122	1.3	9	132	1 + 987.860
2 + 0.000	12.140	0.0	7	6	0.0	0	0	6	94.6	728		728	-722	6,287	6	23.2	232	6.8	49	281	2 + 0.000
2 - 20.000	20.000	0.0	0	0	0.0	0	0	0	163.0	2,576		2,576	-2,576	3,711	0	23.1	463	14.9	217	680	2 + 20.000
2 - 43.980	23.980	0.0	0	0	0.0	0	0	0	4.8	2,012		2,012	-2,012	1,700	0	3.6	320	0.6	186	506	2 + 43.980
2 + 64.100	20.120	27.6	278	250	51.6	519	571	821	0.0	48		48	773	2,472	48	1.3	49	5.3	59	109	2 + 64.100
2 + 80.000	15.900	18.6	367	331	42.8	750	826	1,156	0.0	0		0	1,156	3,628	0	1.7	24	2.0	58	82	2 + 80.000
2 + 100.000	20.000	29.9	485	437	31.1	739	813	1,249	0.0	0		0	1,249	4,878	0	1.8	35	8.2	102	137	2 + 100.000
2 + 115.130	15.130	15.8	346	311	1.4	246	270	582	0.0	0		0	582	5,459	0	0.0	14	5.5	104	117	2 + 115.130
2 + 145.310	30.180	16.9	498	444	1.2	39	43	487	3.9	59		59	428	5,888	59	5.3	80	3.8	140	220	2 + 145.310
2 + 185.040	39.730	4.4	423	381	0.0	24	26	407	0.5	87		87	320	6,207	87	1.1	127	0.9	93	221	2 + 185.040
2 + 193.040	8.000	4.8	37	33	0.0	0	0	33	0.0	2		2	31	6,238	2	0.0	4	2.6	14	18	2 + 193.040
2 + 248.270	55.230	21.6	729	656	0.0	0	0	656	0.0	0		0	656	6,895	0	1.4	39	4.5	196	235	2 + 248.270
2 + 274.380	26.110	0.0	282	254	0.0	0	0	254	5.6	73		73	181	7,075	73	2.7	54	0.0	59	112	2 + 274.380
2 + 280.000	5.620	0.0	0	0	0.0	0	0	0	24.6	85		85	-85	6,990	0	6.0	24	0.0	0	24	2 + 280.000
2 + 300.000	20.000	0.0	0	0	0.0	0	0	0	43.0	676		676	-676	6,314	0	8.4	144	0.0	0	144	2 + 300.000
2 + 320.000	20.000	0.0	0	0	0.0	0	0	0	90.6	1,336		1,336	-1,336	4,978	0	16.8	252	0.0	0	252	2 + 320.000
2 + 340.000	20.000	0.0	0	0	0.0	0	0	0	61.2	1,518		1,518	-1,518	3,460	0	0.0	168	0.0	0	168	2 + 340.000
2 + 358.270	18.270	0.0	0	0	0.0	0	0	0	11.2	661		661	-661	2,799	0	0.9	8	1.5	14	22	2 + 358.270
2 + 400.000	41.730	1.2	25	23	0.0	0	0	23	0.0	234		234	-211	2,588	23	0.2	23	0.0	31	54	2 + 400.000
2 + 447.300	47.300	7.0	194	175	0.0	0	0	175	0.0	0		0	175	2,762	0	0.6	19	1.4	33	52	2 + 447.300
2 + 502.200	54.900	1.9	244	220	0.0	0	0	220	0.0	0		0	220	2,982	0	0.0	16	0.0	38	55	2 + 502.200
2 + 520.000	17.800	0.0	17	15	0.0	0	0	15	5.0	45		45	-29	2,953	15	0.0	0	2.2	20	20	2 + 520.000
2 + 540.000	20.000	0.7	7	6	0.0	0	0	6	1.0	60		60	-54	2,899	6	0.0	0	1.1	33	33	2 + 540.000
2 + 560.000	20.000	8.2	89	80	0.0	0	0	80	0.0	10		10	70	2,969	10	0.0	0	0.0	11	11	2 + 560.000
2 + 580.000	20.000	8.9	171	154	0.0	0	0	154	0.0	0		0	154	3,123	0	0.0	0	1.5	15	15	2 + 580.000
2 + 600.000	20.000	0.8	97	87	0.0	0	0	87	1.6	16		16	71	3,195	16	1.8	18	0.2	17	35	2 + 600.000
2 + 607.120	7.120	0.0	3	3	0.0	0	0	3	6.4	28		28	-26	3,169	3	1.5	12	0.0	1	12	2 + 607.120
2 - 650.000	42.860	0.1	2	2	0.0	0	0	2	11.5	384		384	-382	2,787	2	4.3	124	0.0	0	124	2 + 650.000
2 - 694.670	44.670	0.0	2	2	0.0	0	0	2	29.2	909		909	-907	1,880	2	5.3	214	4.4	98	313	2 + 694.670
2 - 700.000	5.330	0.0	0	0	0.0	0	0	0	20.6	133		133	-133	1,747	0	4.2	25	3.5	21	46	2 + 700.000
2 - 720.000	20.000	0.0	0	0	0.0	0	0	0	10.4	310		310	-310	1,437	0	1.9	61	2.0	55	116	2 + 720.000
2 - 740.000	20.000	2.8	28	25	0.0	0	0	25	0.0	104		104	-79	1,358	25	0.7	26	0.0	20	46	2 + 740.000
2 + 760.000	20.000	21.6	244	220	0.8	8	9	228	0.0	0		0	228	1,587	0	3.5	42	1.3	13	55	2 + 760.000
2 + 773.230	13.230	19.4	271	244	0.0	5	6	250	0.0	0		0	250	1,837	0	3.4	46	1.2	17	62	2 + 773.230
Sub Total	1,430.810		11,430	10,287		6,619	7,281	17,568		17,073		17,073	495		2,718		3,495		4,370	7,865	Sub Total
Total	2,863.316		24,007	21,607		14,399	15,838	37,445		35,608		35,608	1,837		7,250		11,287		10,034	21,322	Total

Station	Distance	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance	Accumulated	Lateral	Left Side		Right Side		Total	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total	Embankment Section			Total									
	(m)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Corrected Cut Volume A (m3)	Sectional Area (m2)	Volume (m3)	Vary Volume (m3)	Embankment Volume B (m3)	A - B (m3)	Volume (m3)	Volume (m3)	Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)	Area (m2)	
2 + 773.230		19.4			0.0				0.0					1,837		3.4		1.2			2 + 773.230
2 + 837.580	64.350	0.0	624	562	0.0	0	0	562	27.2	875		875	-313	1,523	562	4.7	261	4.5	183	444	2 + 837.580
2 + 860.000	22.420	0.0	0	0	0.0	0	0	0	20.0	529		529	-529	994	0	3.6	93	3.3	87	180	2 + 860.000
2 + 880.000	20.000	6.8	68	61	0.0	0	0	61	0.0	200		200	-139	855	61	0.0	36	1.3	46	82	2 + 880.000
2 + 900.000	20.000	22.0	288	259	0.3	3	3	263	0.0	0		0	263	1,118	0	0.0	0	4.0	53	53	2 + 900.000
2 + 920.000	20.000	20.6	426	383	0.6	9	10	393	0.0	0		0	393	1,511	0	0.8	8	4.5	85	93	2 + 920.000
2 + 940.000	20.000	7.8	284	256	0.0	6	7	262	0.0	0		0	262	1,773	0	0.6	14	1.3	58	72	2 + 940.000
2 + 960.000	20.000	7.2	150	135	0.0	0	0	135	0.0	0		0	135	1,908	0	0.7	13	1.5	28	41	2 + 960.000
2 + 980.000	20.000	7.6	148	133	0.0	0	0	133	0.0	0		0	133	2,041	0	1.5	22	1.5	30	52	2 + 980.000
3 + 0.000	20.000	15.6	232	209	0.0	0	0	209	0.0	0		0	209	2,250	0	3.0	45	1.9	34	79	3 + 0.000
3 + 20.000	20.000	28.8	444	400	7.2	72	79	479	0.0	0		0	479	2,729	0	3.6	66	3.8	57	123	3 + 20.000
3 + 40.000	20.000	33.4	622	560	15.2	224	246	806	0.0	0		0	806	3,585	0	4.4	80	4.3	81	161	3 + 40.000
3 + 60.000	20.000	13.2	466	419	4.4	196	216	635	0.0	0		0	635	4,170	0	1.1	55	4.9	92	147	3 + 60.000
3 + 80.000	20.000	0.0	132	119	0.0	44	48	167	26.4	264		264	-97	4,073	167	6.0	71	0.0	49	120	3 + 80.000
3 + 89.700	9.700	0.0	0	0	0.0	0	0	0	43.2	338		338	-338	3,736	0	5.2	54	0.0	0	54	3 + 89.700
3 + 100.000	10.300	0.0	0	0	0.0	0	0	0	64.8	556		556	-556	3,180	0	7.0	63	0.0	0	63	3 + 100.000
3 + 163.540	63.540	2.4	76	69	0.0	0	0	69	0.0	2,059		2,059	-1,990	1,190	69	0.2	229	0.1	3	232	3 + 163.540
3 + 180.000	16.460	2.8	43	39	0.0	0	0	39	0.0	0		0	39	1,228	0	0.2	3	0.2	2	6	3 + 180.000
3 + 200.000	20.000	0.0	28	25	0.0	0	0	25	0.0	0		0	25	1,253	0	0.0	2	0.0	2	4	3 + 200.000
3 + 220.000	20.000	2.0	20	18	0.0	0	0	18	0.0	0		0	18	1,271	0	0.6	6	0.0	0	6	3 + 220.000
3 + 240.000	20.000	4.8	68	61	0.0	0	0	61	0.0	0		0	61	1,333	0	0.8	14	0.1	1	15	3 + 240.000
3 + 260.000	20.000	19.6	244	220	0.0	0	0	220	0.0	0		0	220	1,552	0	1.5	23	3.8	39	62	3 + 260.000
3 + 280.000	20.000	26.2	458	412	3.2	32	35	447	0.0	0		0	447	2,000	0	2.7	42	4.2	80	122	3 + 280.000
3 + 302.650	22.650	27.6	609	548	2.0	59	65	613	0.0	0		0	613	2,613	0	2.8	62	4.6	100	162	3 + 302.650
3 + 350.000	47.350	8.0	843	759	0.0	47	52	811	0.0	0		0	811	3,423	0	0.8	85	1.4	142	227	3 + 350.000
3 + 400.000	50.000	0.0	200	180	0.0	0	0	180	15.2	380		380	-200	3,223	180	3.2	100	0.0	35	135	3 + 400.000
3 + 450.000	50.000	0.0	0	0	0.0	0	0	0	30.8	1,150		1,150	-1,150	2,073	0	3.7	223	0.0	0	223	3 + 450.000
3 + 500.000	50.000	0.0	0	0	0.0	0	0	0	6.0	920		920	-920	1,153	0	1.4	178	0.0	0	178	3 + 500.000
3 + 514.490	14.490	5.8	42	38	0.0	0	0	38	0.0	43		43	-6	1,148	38	0.6	14	1.7	12	27	3 + 514.490
3 + 520.000	5.510	8.0	38	34	0.0	0	0	34	0.0	0		0	34	1,182	0	1.1	5	2.0	10	15	3 + 520.000
3 + 540.000	20.000	15.6	236	212	0.0	0	0	212	0.0	0		0	212	1,394	0	2.5	36	2.4	44	80	3 + 540.000
3 + 560.000	20.000	18.8	344	310	0.0	0	0	310	0.0	0		0	310	1,704	0	2.9	54	2.5	49	103	3 + 560.000
3 + 580.000	20.000	18.8	376	338	0.0	0	0	338	0.0	0		0	338	2,042	0	2.0	49	2.6	51	100	3 + 580.000
3 + 600.000	20.000	0.0	188	169	0.0	0	0	169	13.2	132		132	37	2,079	132	1.1	31	0.0	26	57	3 + 600.000
3 + 609.800	9.800	0.0	0	0	0.0	0	0	0	12.8	127		127	-127	1,952	0	2.1	16	0.0	0	16	3 + 609.800
3 + 650.000	40.200	1.2	24	22	0.0	0	0	22	4.6	350		350	-328	1,624	22	2.5	92	0.7	14	107	3 + 650.000
3 + 671.290	21.290	10.0	119	107	0.0	0	0	107	0.0	49		49	58	1,682	49	0.0	27	2.0	29	55	3 + 671.290
3 + 714.290	43.000	12.8	490	441	0.0	0	0	441	0.0	0		0	441	2,124	0	1.0	22	2.6	99	120	3 + 714.290
3 + 720.000	5.710	12.0	71	64	0.0	0	0	64	0.0	0		0	64	2,187	0	0.0	3	2.5	15	17	3 + 720.000
3 + 740.000	20.000	4.2	162	146	0.0	0	0	146	0.0	0		0	146	2,333	0	0.5	5	1.0	35	40	3 + 740.000
3 + 760.000	20.000	1.0	52	47	0.0	0	0	47	0.0	0		0	47	2,380	0	0.0	5	0.3	13	18	3 + 760.000
3 + 782.720	22.720	0.0	11	10	0.0	0	0	10	7.4	84		84	-74	2,306	10	1.7	19	0.0	3	23	3 + 782.720
+																					+
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Sub Total	1,009.490		8,627	7,764		692	761	8,526		8,056		8,056	469		1,290		2,225		1,688	3,913	Sub Total
Total	3,872.806		32,634	29,371		15,091	16,600	45,971		43,665		43,665	2,306		8,540		13,512		11,723	25,235	Total

6-28

Working Division: 14 La Saca Access Road

Description	Calculation Details	Unit	Quantity	Remarks
14.5	Pavement			
101	Improved subgrade material			
	Cut section			
	$L = 2700.37\,m$			
	Embankment section			
	$L = 1172.44\,m$			
	$V = 4.0 \times 0.075 \times 2700.37$			
	$+4.0 \times (0.35+0.2)/2 \times 1172.44$			
	$= 2{,}099.8\ m^3$			
		m^3	2100	
102	Graded crushed stone subbase			
	$V = 4.0 \times 0.15 \times 3872.81 = 2323.7$			
		m^3	2,324	
103	Transportation of improved subgrade material			
	$V = 2099.8 \times 0.01 \times 10\ km = 210.0$			
		$m^3 \cdot km$	210	

Working Division: 14 La Seca Access Koad

Description	Calculation Details	Unit	Quantity	Remarks
14.6				
101	Guardrail			
	L = 0 m	m	0	
102	Warning signs			
	N = 3,872.8 / 250 = 15	nos	15	

Working Division: 15 Los Cuyuyes Access Road

Description	Calculation Details	Unit	Quantity	Remarks
15.1	Earthwork			
101	Clearing			
106	Compaction of original ground			
	A= 6.0 × 8,751.7 × 0.1			
	+ 4.0 × 874.3 × 0.1 = 5600.7			
		m^2	5601	

15-1/01 Clearing

Los Cuyuyes Access Road			Station
Clearing		Total Area	
Length (m)	Area (m2)	(m2)	
32.5			0 + 0.000
23.0	622	622	0 + 22.427
24.0	507	507	0 + 44.000
21.5	364	364	0 + 60.000
16.0	469	469	0 + 85.000
23.0	338	338	0 + 102.340
25.3	426	426	0 + 120.000
26.0	385	385	0 + 135.000
20.5	581	581	0 + 160.000
37.0	719	719	0 + 185.000
39.7	697	697	0 + 203.180
36.0	881	881	0 + 230.000
37.0	562	562	0 + 247.850
17.0	868	868	0 + 280.000
16.5	486	486	0 + 309.020
24.0	532	532	0 + 335.270
25.5	365	365	0 + 350.000
15.5	1,025	1,025	0 + 400.000
8.0	144	144	0 + 412.260
9.5	330	330	0 + 450.000
12.0	327	327	0 + 480.450
11.8	233	233	0 + 500.000
14.1	259	259	0 + 520.000
15.5	222	222	0 + 535.000
26.0	498	498	0 + 558.980
16.5	1,297	1,297	0 + 620.000
14.7	312	312	0 + 640.000
33.5	300	300	0 + 652.460
14.5	1,230	1,230	0 + 703.710
26.0	330	330	0 + 720.000
12.0	380	380	0 + 740.000
11.0	201	201	0 + 757.500
15.5	563	563	0 + 800.000
11.3	670	670	0 + 850.000
8.5	338	338	0 + 884.180
29.5	301	301	0 + 900.000
23.5	530	530	0 + 920.000
16.3	554	554	0 + 947.860
14.5	711	711	0 + 994.050
10.3	322	322	1 + 20.000
12.0	223	223	1 + 40.000
7.8	382	382	1 + 78.580
13.8	231	231	1 + 100.000
13.5	683	683	1 + 150.000
8.5	440	440	1 + 190.000
8.8	173	173	1 + 210.000
8.0	168	168	1 + 230.000
9.0	156	156	1 + 248.380
9.8	297	297	1 + 280.000
9.2	316	316	1 + 313.220
13.0	297	297	1 + 340.000
13.3	263	263	1 + 360.000
11.3	246	246	1 + 380.000
44.0	553	553	1 + 400.000
9.5	535	535	1 + 420.000
8.0	230	230	1 + 446.330
10.0	519	519	1 + 503.990
	25,592	25,592	

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
10.0			1 + 503.990
35.5	592	592	1 + 530.000
23.5	590	590	1 + 550.000
23.0	427	427	1 + 568.260
48.0	1,123	1,123	1 + 600.000
17.0	535	535	1 + 616.460
15.3	219	219	1 + 630.000
12.5	417	417	1 + 660.000
12.5	225	225	1 + 678.010
10.5	253	253	1 + 700.000
13.0	588	588	1 + 750.000
13.0	650	650	1 + 800.000
15.3	283	283	1 + 820.000
8.5	238	238	1 + 840.000
16.0	245	245	1 + 860.000
13.5	567	567	1 + 898.470
17.3	332	332	1 + 920.000
17.5	348	348	1 + 940.000
16.0	355	355	1 + 961.180
17.3	825	825	2 + 10.750
9.0	253	253	2 + 30.000
22.5	315	315	2 + 50.000
22.5	450	450	2 + 70.000
28.5	602	602	2 + 93.590
25.3	396	396	2 + 108.320
26.3	559	559	2 + 130.000
21.8	481	481	2 + 150.000
24.5	570	570	2 + 174.630
28.0	1,782	1,782	2 + 242.520
28.0	489	489	2 + 260.000
16.5	445	445	2 + 280.000
15.8	379	379	2 + 303.430
14.5	314	314	2 + 324.160
14.5	230	230	2 + 340.000
26.8	413	413	2 + 360.000
24.5	375	375	2 + 374.610
14.0	874	874	2 + 420.000
12.3	94	94	2 + 427.160
14.8	445	445	2 + 460.000
10.5	380	380	2 + 490.000
9.0	237	237	2 + 514.270
16.5	456	456	2 + 550.000
11.7	303	303	2 + 571.480
14.5	532	532	2 + 612.070
13.5	251	251	2 + 630.000
16.8	303	303	2 + 650.000
32.5	740	740	2 + 680.000
21.5	540	540	2 + 700.000
30.3	543	543	2 + 720.980
10.3	792	792	2 + 760.000
14.5	394	394	2 + 791.800
9.5	218	218	2 + 810.000
17.5	270	270	2 + 830.000
14.0	243	243	2 + 845.440
13.5	194	194	2 + 859.580
22.5	368	368	2 + 880.000
47.0	695	695	2 + 900.000
40.0	674	674	2 + 915.500
35.5	681	681	2 + 933.530
32.5	560	560	2 + 950.000
	27,650	27,650	Sub Total
	53,242	53,242	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
32.5			2 + 950.000
43.0	755	755	2 + 970.000
12.0	662	662	2 + 994.080
15.0	685	685	3 + 44.790
12.5	209	209	3 + 60.000
13.0	450	450	3 + 95.310
18.0	693	693	3 + 140.000
23.5	777	777	3 + 177.450
16.5	251	251	3 + 190.000
13.0	295	295	3 + 210.000
25.5	408	408	3 + 231.220
19.0	418	418	3 + 250.000
15.0	340	340	3 + 270.000
19.0	252	252	3 + 284.820
12.8	559	559	3 + 320.000
19.3	518	518	3 + 352.280
9.7	257	257	3 + 370.000
25.0	347	347	3 + 390.000
16.5	323	323	3 + 405.590
22.5	671	671	3 + 440.000
23.5	888	888	3 + 478.600
22.0	259	259	3 + 490.000
15.8	378	378	3 + 510.000
16.0	318	318	3 + 530.000
15.5	229	229	3 + 544.570
15.5	415	445	3 + 573.300
17.5	441	441	3 + 600.000
17.0	345	345	3 + 620.000
12.5	205	205	3 + 640.000
23.0	355	355	3 + 660.000
15.0	570	570	3 + 690.000
13.5	415	415	3 + 719.140
33.0	486	486	3 + 740.060
7.5	404	404	3 + 760.000
16.5	240	240	3 + 780.000
17.0	392	392	3 + 803.430
13.5	353	253	3 + 820.000
14.8	283	283	3 + 840.000
23.7	380	380	3 + 859.720
33.0	575	575	3 + 880.000
28.0	610	610	3 + 900.000
10.2	252	252	3 + 913.190
12.0	409	409	3 + 950.000
27.3	720	720	3 + 986.660
14.7	700	700	4 + 20.000
16.0	267	267	4 + 37.420
11.5	651	651	4 + 84.730
21.0	411	411	4 + 110.000
44.0	650	650	4 + 130.000
48.5	925	925	4 + 150.000
25.5	645	645	4 + 167.420
33.0	368	368	4 + 180.000
36.5	695	695	4 + 200.000
39.0	1,133	1,133	4 + 230.000
34.0	730	730	4 + 250.000
30.7	491	491	4 + 265.180
30.0	1,057	1,057	4 + 300.000
42.0	720	720	4 + 320.000
46.0	931	931	4 + 341.170
12.8	554	554	4 + 360.000
	29,740	29,740	Sub Total
	82,982	82,982	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
12.8			4 + 360.000
10.0	228	228	4 + 380.000
8.5	179	179	4 + 399.300
11.5	407	407	4 + 440.000
8.0	225	225	4 + 463.070
7.5	131	131	4 + 480.000
9.7	172	172	4 + 500.000
10.2	144	144	4 + 514.500
9.5	317	317	4 + 546.640
8.5	532	532	4 + 605.800
9.0	293	293	4 + 639.270
13.5	233	233	4 + 660.000
12.5	390	390	4 + 690.000
26.0	385	385	4 + 710.000
11.5	375	375	4 + 730.000
10.8	157	157	4 + 744.070
9.5	517	517	4 + 794.960
10.7	152	152	4 + 810.000
10.5	212	212	4 + 830.000
11.5	181	181	4 + 846.490
16.0	736	736	4 + 900.000
9.5	664	664	4 + 952.070
20.5	269	269	4 + 970.000
10.5	310	310	4 + 990.000
10.0	321	321	5 + 21.280
7.5	251	251	5 + 50.000
10.5	450	450	5 + 100.000
9.5	500	500	5 + 150.000
8.5	450	450	5 + 200.000
10.5	475	475	5 + 250.000
12.5	419	419	5 + 286.410
12.0	411	411	5 + 320.000
9.5	215	215	5 + 340.000
8.0	175	175	5 + 360.000
12.0	191	191	5 + 379.110
16.0	590	590	5 + 421.280
10.7	250	250	5 + 440.000
15.0	257	257	5 + 460.000
13.0	280	280	5 + 480.000
8.0	493	493	5 + 526.920
8.0	105	105	5 + 540.000
10.0	180	180	5 + 560.000
12.7	227	227	5 + 580.000
14.0	267	267	5 + 600.000
14.0	280	280	5 + 620.000
13.0	399	399	5 + 649.560
8.0	490	490	5 + 696.210
9.0	202	202	5 + 720.000
12.0	210	210	5 + 740.000
11.0	284	284	5 + 764.660
10.0	371	371	5 + 800.000
11.5	538	538	5 + 850.000
8.5	500	500	5 + 900.000
7.2	393	393	5 + 950.000
11.0	455	455	6 + 0.000
9.0	500	500	6 + 50.000
12.5	538	538	6 + 100.000
33.0	1,138	1,138	6 + 150.000
10.0	1,075	1,075	6 + 200.000
14.0	600	600	6 + 250.000
	21,686	21,686	Sub Total
	104,668	104,668	Total

15.1/01 Clearing

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
14.0			6 + 250.000
18.0	453	453	6 + 278.300
14.5	353	353	6 + 300.000
12.3	433	433	6 + 332.340
22.3	479	479	6 + 360.000
7.7	600	600	6 + 400.000
9.5	430	430	6 + 450.000
13.5	692	692	6 + 510.150
13.5	133	133	6 + 520.000
13.0	265	265	6 + 540.000
13.5	265	265	6 + 560.000
16.0	172	172	6 + 571.680
18.2	657	657	6 + 610.100
12.0	300	300	6 + 630.000
11.5	235	235	6 + 650.000
11.5	230	230	6 + 670.000
9.5	182	182	6 + 687.300
9.0	302	302	6 + 720.000
13.5	322	322	6 + 748.609
13.5	154	154	6 + 760.000
17.0	305	305	6 + 780.000
10.5	289	289	6 + 801.020
10.0	430	430	6 + 843.820
31.5	335	335	6 + 860.000
26.0	575	575	6 + 880.000
27.0	400	400	6 + 895.080
12.0	291	291	6 + 910.000
19.0	310	310	6 + 930.000
7.5	292	292	6 + 952.000
7.0	348	348	7 + 0.000
15.0	350	350	7 + 50.000
8.5	294	294	7 + 75.000
7.5	296	296	7 + 111.980
14.5	198	198	7 + 130.000
14.0	285	285	7 + 150.0[illegible]
24.5	296	296	7 + 165.370
13.5	658	658	7 + 200.000
11.0	226	226	7 + 218.410
10.0	227	227	7 + 240.000
10.0	200	200	7 + 260.000
8.0	126	126	7 + 274.010
10.5	148	148	7 + 290.000
7.0	350	350	7 + 330.000
8.0	75	75	7 + 340.000
13.3	210	210	7 + 359.760
15.5	401	401	7 + 387.640
8.5	268	268	7 + 410.000
8.0	165	165	7 + 430.000
13.5	101	101	7 + 439.390
43.5	587	587	7 + 460.000
25.0	1,380	1,380	7 + 500.300
12.5	369	369	7 + 520.000
8.0	205	205	7 + 540.000
11.0	113	113	7 + 551.860
8.0	457	457	7 + 600.000
10.5	463	463	7 + 650.000
13.0	588	588	7 + 700.000
13.0	326	326	7 + 725.100
16.3	218	218	7 + 740.000
12.3	286	286	7 + 760.000
	20,306	20,306	Sub Total
	124,974	124,974	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
12.3			7 + 760.000
17.0	293	293	7 + 780.000
15.5	325	325	7 + 800.000
14.0	738	738	7 + 850.000
39.0	1,325	1,325	7 + 900.000
21.0	1,124	1,124	7 + 937.450
11.5	366	366	7 + 960.000
12.0	235	235	7 + 980.000
11.5	198	198	7 + 996.870
16.5	324	324	8 + 20.000
18.0	345	345	8 + 40.000
16.5	345	345	8 + 60.000
17.0	394	394	8 + 83.540
12.0	239	239	8 + 100.000
10.0	220	220	8 + 120.000
9.5	167	167	8 + 137.000
7.5	365	365	8 + 180.000
12.5	400	400	8 + 220.000
12.0	245	245	8 + 240.000
10.0	220	220	8 + 260.000
8.5	185	185	8 + 280.000
7.0	131	131	8 + 296.920
10.0	366	366	8 + 340.000
13.0	575	575	8 + 390.000
8.5	445	445	8 + 431.400
7.5	149	149	8 + 450.000
12.0	195	195	8 + 470.000
11.5	171	171	8 + 484.520
11.5	401	401	8 + 519.420
25.3	379	379	8 + 540.000
11.5	368	368	8 + 560.000
10.0	215	215	8 + 580.000
11.0	210	210	8 + 600.000
13.0	240	240	8 + 620.000
12.0	250	250	8 + 640.000
15.5	275	275	8 + 660.000
15.5	310	310	8 + 680.000
14.5	395	395	8 + 706.350
12.0	313	313	8 + 730.000
13.0	625	625	8 + 780.000
12.0	250	250	8 + 800.000
15.5	275	275	8 + 820.000
15.5	237	237	8 + 835.320
8.0	370	370	8 + 866.830
10.0	119	119	8 + 880.000
13.5	235	235	8 + 900.000
14.0	275	275	8 + 920.000
10.0	251	251	8 + 940.950
15.0	238	238	8 + 960.000
22.5	750	750	9 + 0.000
9.5	480	480	9 + 30.000
10.0	488	488	9 + 80.000
9.0	380	380	9 + 120.000
12.0	210	210	9 + 140.000
15.5	275	275	9 + 160.000
14.7	302	302	9 + 180.000
13.2	279	279	9 + 200.000
9.0	555	555	9 + 250.000
12.8	545	545	9 + 300.000
18.0	308	308	9 + 320.000
	20,887	20,887	Sub Total
	145,862	145,862	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
18.0			9 + 320.000
17.5	533	533	9 + 350.000
16.5	252	252	9 + 364.800
39.5	684	684	9 + 400.000
13.2	1,007	1,007	9 + 438.210
12.0	275	275	9 + 460.000
11.3	258	258	9 + 482.120
15.5	240	240	9 + 500.000
13.5	377	377	9 + 526.030
12.5	297	297	9 + 548.910
24.0	385	385	9 + 570.000
32.2	562	562	9 + 590.000
9.0	375	375	9 + 608.200
10.0	397	397	9 + 650.000
8.5	433	433	9 + 696.760
9.5	209	209	9 + 720.000
9.0	185	185	9 + 740.000
12.0	96	96	9 + 749.110
11.0	503	503	9 + 792.880
11.5	193	193	9 + 810.000
9.5	210	210	9 + 830.000
8.0	149	149	9 + 847.010
10.0	477	477	9 + 900.000
10.0	243	243	9 + 924.290
14.0	189	189	9 + 940.000
7.0	210	210	9 + 960.000
8.0	150	150	9 + 980.000
10.0	202	202	10 + 2.450
11.5	511	511	10 + 50.000
8.5	500	500	10 + 100.000
8.0	413	413	10 + 150.000
8.0	400	400	10 + 200.000
11.0	475	475	10 + 250.000
9.5	513	513	10 + 300.000
10.0	488	488	10 + 350.000
9.0	475	475	10 + 400.000
8.5	438	438	10 + 450.000
7.0	388	388	10 + 500.000
8.0	233	233	10 + 531.040
14.5	664	664	10 + 590.020
8.0	225	225	10 + 610.000
8.0	160	160	10 + 630.000
14.5	178	178	10 + 645.800
14.5	351	351	10 + 670.000
10.5	250	250	10 + 690.000
11.0	157	157	10 + 704.560
8.0	432	432	10 + 750.000
11.0	285	285	10 + 780.000
8.5	195	195	10 + 800.000
10.5	195	195	10 + 820.480
13.5	354	354	10 + 850.000
10.0	588	588	10 + 900.000
9.0	285	285	10 + 930.000
22.5	315	315	10 + 950.000
11.3	230	230	10 + 963.580
11.3	412	412	11 + 0.000
9.0	508	508	11 + 50.000
8.5	438	438	11 + 100.000
15.0	235	235	11 + 120.000
14.0	290	290	11 + 140.000
	20,662	20,662	Sub Total
	166,524	166,524	Total

Clearing		Total Area	Station
Length (m)	Area (m2)	(m2)	
14.0			11 + 140.000
15.0	290	290	11 + 160.000
13.8	288	288	11 + 180.000
35.5	1,233	1,233	11 + 230.000
12.0	1,188	1,188	11 + 280.000
17.5	738	738	11 + 330.000
16.3	507	507	11 + 360.000
13.5	298	298	11 + 380.000
9.0	225	225	11 + 400.000
12.5	215	215	11 + 420.000
15.5	280	280	11 + 440.000
12.5	322	322	11 + 462.990
7.0	361	361	11 + 500.000
10.5	438	438	11 + 550.000
16.0	663	663	11 + 600.000
14.0	600	600	11 + 640.000
12.7	267	267	11 + 660.000
10.0	227	227	11 + 680.000
7.0	340	340	11 + 720.000
17.0	622	622	11 + 771.860
25.0	381	381	11 + 790.000
9.5	345	345	11 + 810.000
12.0	170	170	11 + 825.270
12.5	574	574	11 + 872.650
11.8	211	211	11 + 890.000
9.5	213	213	11 + 910.000
11.0	248	248	11 + 934.170
9.2	261	261	11 + 960.000
9.7	514	514	12 + 14.970
8.5	228	228	12 + 40.000
8.5	170	170	12 + 60.000
13.0	215	215	12 + 80.000
15.0	280	280	12 + 100.000
12.0	270	270	12 + 120.000
11.5	235	235	12 + 140.000
12.0	235	235	12 + 160.000
11.0	140	140	12 + 172.150
17.0	390	390	12 + 200.000
33.0	1,517	1,517	12 + 260.600
33.5	642	642	12 + 280.000
38.5	720	720	12 + 300.000
24.0	757	757	12 + 324.210
15.3	507	507	12 + 350.000
10.0	633	633	12 + 400.000
15.0	510	510	12 + 440.800
21.5	314	314	12 + 458.000
32.0	214	214	12 + 466.000
12.0	176	176	12 + 474.000
12.0	312	312	12 + 500.000
12.0	222	222	12 + 518.460
12.5	386	386	12 + 550.000
14.5	675	675	12 + 600.000
13.5	299	299	12 + 619.960
16.0	316	316	12 + 640.000
15.0	310	310	12 + 660.000
11.5	265	265	12 + 680.000
13.0	265	265	12 + 701.660
16.8	323	323	12 + 723.320
15.5	568	568	12 + 758.470
18.0	693	693	12 + 799.870
19.5	377	377	12 + 820.000
18.5	380	380	12 + 840.000
17.0	355	355	12 + 860.000
28.3	181	181	12 + 868.000
36.0	141	141	12 + 872.390
27.0	240	240	12 + 880.000
27.0	243	243	12 + 889.000
27.0	270	270	12 + 899.000
18.0	360	360	12 + 915.000
21.0	342	342	12 + 932.560
11.3	283	283	12 + 950.000
15.0	880	880	13 + 16.420
12.5	324	324	13 + 40.000
18.0	441	441	13 + 68.930
22.3	626	626	13 + 100.000
30.0	1,106	1,106	13 + 142.300
15.3	687	687	13 + 172.650
18.5	124	124	13 + 180.000
13.0	315	315	13 + 200.000
10.5	235	235	13 + 220.000
9.5	200	200	13 + 240.000
9.5	190	190	13 + 260.000
14.1	249	249	13 + 281.000
16.0	195	195	13 + 294.070
12.0	840	840	13 + 354.070
8.0	818	818	13 + 435.900
10.0	217	217	13 + 460.000
9.5	195	195	13 + 480.000
9.5	203	203	13 + 501.350
12.5	416	416	13 + 539.130
14.0	277	277	13 + 560.000
23.0	370	370	13 + 580.000
33.0	455	455	13 + 596.250
18.3	446	446	13 + 613.650
13.0	533	533	13 + 642.680
9.3	180	180	13 + 663.790
14.7	195	195	13 + 680.000
12.3	270	270	13 + 700.000
13.7	329	329	13 + 725.290
13.5	269	269	13 + 745.000
11.5	186	186	13 + 760.000
7.5	190	190	13 + 780.000
14.0	215	215	13 + 800.000
16.0	137	137	13 + 809.130
8.5	540	540	13 + 853.240
8.0	251	251	13 + 883.720
7.5	126	126	13 + 900.000
7.5	150	150	13 + 920.000
6.3	138	138	13 + 940.000
12.5	188	188	13 + 960.000
15.5	280	280	13 + 980.000
16.3	225	225	13 + 994.140
13.5	952	952	14 + 58.000
19.5	922	922	14 + 113.890
8.5	1,030	1,030	14 + 187.480
6.8	96	96	14 + 200.000
34.5	413	413	14 + 220.000
12.5	470	470	14 + 240.000
13.5	220	220	14 + 256.950
15.0	153	153	14 + 267.700
39.5	907	907	14 + 301.000
19.0	475	475	14 + 317.230
20.7	174	174	14 + 326.000
10.5	218	218	14 + 340.000
32.5	430	430	14 + 360.000
38.5	263	263	14 + 367.410
36.5	397	397	14 + 378.000
9.5	506	506	14 + 400.000
12.5	215	215	14 + 419.540
7.8	340	340	14 + 453.000
11.5	256	256	14 + 479.560
19.0	741	741	14 + 528.180
18.5	222	222	14 + 540.000
24.0	425	425	14 + 560.000
15.3	480	480	14 + 584.410
16.5	48	48	14 + 587.410
20.0	377	377	14 + 619.040
10.5	320	320	14 + 640.000
10.0	205	205	14 + 660.000
19.3	344	344	14 + 683.450
	53,983	53,983	Sub Total
	220,509	220,509	Total

Quantity Calculation 15.1 Earthwork

Access Road Name : Los Cuyuyes Access Road

Station	Distance (m)	Earthwork														Slope Protection					Station
		Cut Volume							Embankment Volume				Balance A - B (m3)	Accumlated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A (m3)	Embankment Section			Total Embankment Volume B (m3)									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)		Sectional Area (m2)	Volume (m3)	Vary Volume (m3)					Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
0 + 0.000		18.8			6.4				0.0					0		13.9		0.0			0 + 0.000
0 + 22.427	22.427	33.6	588	529	34.4	458	503	1,032	0.0	0		0	1,032	1,032	0	8.3	249	3.4	38	287	0 + 22.427
0 + 44.000	21.573	53.0	934	841	96.0	1,407	1,547	2,388	0.0	0		0	2,388	3,420	0	4.2	135	2.8	67	202	0 + 44.000
0 + 60.000	16.000	47.6	805	724	73.6	1,357	1,492	2,217	0.0	0		0	2,217	5,637	0	5.4	77	3.0	46	123	0 + 60.000
0 + 85.000	25.000	1.6	615	554	0.0	920	1,012	1,566	19.8	248		248	1,318	6,955	248	3.2	108	5.6	108	215	0 + 85.000
0 + 102.340	17.340	26.6	244	220	18.4	160	175	396	0.0	172		172	224	7,179	172	10.1	115	0.0	49	164	0 + 102.340
0 + 120.000	17.660	53.6	708	637	133.8	1,344	1,478	2,116	0.0	0		0	2,116	9,294	0	4.4	128	2.5	22	150	0 + 120.000
0 + 135.000	15.000	48.2	764	687	88.6	1,668	1,835	2,522	0.0	0		0	2,522	11,816	0	5.8	77	2.2	35	112	0 + 135.000
0 + 160.000	25.000	0.0	603	542	0.0	1,108	1,218	1,761	66.4	830		830	931	12,747	830	6.0	148	10.4	158	305	0 + 160.000
0 + 185.000	25.000	39.2	490	441	85.5	1,069	1,176	1,617	0.0	830		830	787	13,533	830	9.2	190	1.5	149	339	0 + 185.000
0 + 203.180	18.180	38.4	705	635	132.0	1,977	2,175	2,810	0.0	0		0	2,810	16,343	0	8.4	160	1.0	23	183	0 + 203.180
0 + 230.000	26.820	7.6	617	555	1.6	1,792	1,971	2,526	18.2	244		244	2,282	18,625	244	6.6	201	11.8	172	373	0 + 230.000
0 + 247.850	17.850	17.6	225	202	22.4	214	236	438	12.3	272		272	166	18,791	272	8.0	130	12.2	214	345	0 + 247.850
0 + 280.000	32.150	0.0	283	255	0.0	360	396	651	39.4	831		831	-180	18,610	651	0.0	129	7.8	322	450	0 + 280.000
0 + 309.020	29.020	2.0	29	26	0.0	0	0	26	16.8	815		815	-789	17,821	26	3.6	52	6.2	203	255	0 + 309.020
0 + 335.270	26.250	10.4	163	146	0.0	0	0	146	15.2	420		420	-274	17,547	146	11.6	200	5.4	152	352	0 + 335.270
0 + 350.000	14.730	13.2	174	156	15.8	116	128	284	6.2	158		158	127	17,674	158	7.6	141	3.6	66	208	0 + 350.000
0 + 400.000	50.000	0.0	330	297	0.0	395	435	732	30.4	915		915	-184	17,491	732	0.0	190	7.4	275	465	0 + 400.000
0 + 412.260	12.260	0.0	0	0	0.0	0	0	0	3.2	206		206	-206	17,285	0	0.0	0	0.4	48	48	0 + 412.260
0 + 450.000	37.740	3.6	68	61	0.0	0	0	61	0.0	60		60	1	17,286	60	0.8	15	0.0	8	23	0 + 450.000
0 + 480.450	30.450	7.6	171	153	2.0	30	33	187	0.8	12		12	175	17,460	12	0.0	12	3.2	49	61	0 + 480.450
0 + 500.000	19.550	10.2	174	157	15.8	174	191	348	0.0	8		8	340	17,801	8	0.0	0	1.4	45	45	0 + 500.000
0 + 520.000	20.000	8.4	186	167	27.0	428	471	638	0.0	0		0	638	18,439	0	0.0	0	2.1	35	35	0 + 520.000
0 + 535.000	15.000	0.0	63	57	0.0	203	223	279	32.0	240		240	39	18,478	240	0.0	0	7.0	68	68	0 + 535.000
0 + 558.980	23.980	9.2	110	99	34.4	412	454	553	0.0	384		384	169	18,647	384	7.4	89	0.0	84	173	0 + 558.980
0 + 620.000	61.020	15.0	738	665	11.2	1,391	1,530	2,195	0.0	0		0	2,195	20,842	0	4.6	366	0.6	18	384	0 + 620.000
0 + 640.000	20.000	0.0	150	135	0.0	112	123	258	26.8	268		268	-10	20,833	258	0.0	46	6.8	74	120	0 + 640.000
0 + 652.460	12.460	0.0	0	0	0.0	0	0	0	65.4	574		574	-574	20,258	0	0.0	0	25.4	201	201	0 + 652.460
0 + 703.710	51.250	0.8	21	18	9.0	231	254	272	2.2	1,732		1,732	-1,460	18,798	272	3.0	77	1.0	677	753	0 + 703.710
0 + 720.000	16.290	2.2	24	22	40.6	404	444	466	0.0	18		18	448	19,247	18	6.8	80	0.0	8	88	0 + 720.000
0 + 740.000	20.000	9.6	118	106	0.0	406	447	553	0.2	2		2	551	19,797	2	5.0	118	0.3	3	121	0 + 740.000
0 + 757.500	17.500	0.4	88	79	0.0	0	0	79	2.6	25		25	54	19,852	25	0.3	46	3.6	34	81	0 + 757.500
0 + 800.000	42.500	0.0	9	8	0.0	0	0	8	7.2	208		208	-201	19,651	8	0.0	6	4.0	162	168	0 + 800.000
0 + 850.000	50.000	1.4	35	32	0.0	0	0	32	0.2	185		185	-154	19,497	32	0.2	5	0.2	105	110	0 + 850.000
0 + 884.180	34.180	0.2	27	25	0.0	0	0	25	1.2	24		24	1	19,498	24	0.0	3	0.8	17	21	0 + 884.180
0 + 900.000	15.820	0.0	2	1	0.0	0	0	1	48.0	389		389	-388	19,110	1	0.0	0	22.8	187	187	0 + 900.000
0 + 920.000	20.000	0.0	0	0	0.0	0	0	0	60.6	1,086		1,086	-1,086	18,024	0	0.0	0	15.0	378	378	0 + 920.000
0 + 947.860	27.860	14.6	203	183	7.2	100	110	293	0.0	844		844	-551	17,474	293	6.8	95	0.4	215	309	0 + 947.860
0 + 994.050	46.190	11.8	610	549	0.0	166	183	732	0.0	0		0	732	18,205	0	7.4	328	1.0	32	360	0 + 994.050
1 + 20.000	25.950	1.1	167	151	0.0	0	0	151	4.0	52		52	99	18,304	52	0.4	101	2.8	49	151	1 + 20.000
1 + 40.000	20.000	0.3	14	13	0.0	0	0	13	10.4	144		144	-131	18,173	13	0.0	4	4.8	76	80	1 + 40.000
1 + 78.580	38.580	0.8	21	19	0.0	0	0	19	0.1	203		203	-183	17,989	19	0.2	4	0.2	96	100	1 + 78.580
1 + 100.000	21.420	12.4	141	127	1.6	17	19	146	0.0	1		1	145	18,134	1	6.0	66	0.2	4	71	1 + 100.000
1 + 150.000	50.000	8.4	520	468	2.6	105	116	584	0.0	0		0	584	18,718	0	5.4	285	0.0	5	290	1 + 150.000
1 + 190.000	40.000	3.2	232	209	0.0	52	57	266	0.0	0		0	266	18,984	0	0.8	124	0.2	4	128	1 + 190.000
1 + 210.000	20.000	3.6	68	61	0.0	0	0	61	0.0	0		0	61	19,045	0	0.9	17	0.2	4	21	1 + 210.000
1 + 230.000	20.000	0.0	36	32	0.0	0	0	32	4.7	47		47	-15	19,030	32	0.0	9	1.0	12	21	1 + 230.000
1 + 248.380	18.380	0.0	0	0	0.0	0	0	0	14.6	177		177	-177	18,853	0	0.0	0	1.4	22	22	1 + 248.380
1 + 280.000	31.620	7.2	114	102	0.0	0	0	102	0.0	231		231	-128	18,725	102	2.0	32	0.6	32	63	1 + 280.000
1 + 313.220	33.220	5.6	213	191	0.0	0	0	191	0.0	0		0	191	18,916	0	0.8	47	0.5	18	65	1 + 313.220
1 + 340.000	26.780	4.5	135	122	3.1	42	46	167	0.0	0		0	167	19,083	0	4.4	70	0.6	15	84	1 + 340.000
1 + 360.000	20.000	12.4	169	152	1.8	49	54	206	0.0	0		0	206	19,289	0	4.6	90	0.6	12	102	1 + 360.000
1 + 380.000	20.000	0.2	326	113	0.0	18	20	133	3.1	31		31	102	19,391	31	0.0	46	4.0	46	92	1 + 380.000
1 + 400.000	20.000	0.1	3	3	0.0	0	0	3	70.4	735		735	-732	18,659	3	0.0	0	36.8	408	408	1 + 400.000
1 + 420.000	20.000	1.6	17	15	6.8	68	75	90	0.0	704		704	-614	18,045	90	0.0	0	0.0	368	368	1 + 420.000
1 + 446.330	26.330	7.6	121	109	4.0	142	156	265	0.0	0		0	265	18,311	0	0.0	0	0.0	0	0	1 + 446.330
1 + 503.990	57.660	5.6	381	343	15.6	565	622	964	0.0	0		0	964	19,275	0	0.0	0	0.0	0	0	1 + 503.990
Total	1503.990		13,550	12,195		19,459	21,404	33,600		14,325		14,325	19,275		6,288		4,609		5,716	10,325	

Station	Distance	Earthwork														Slope Protection					Station
	(m)	Cut Volume							Embankment Volume				Balance A - B (m3)	Accumulated Volume (m3)	Lateral Volume (m3)	Left Side		Right Side		Total Area (m2)	
		Common (C=0.90)			Weathered Rock (C=1.10)			Total Corrected Cut Volume A (m3)	Embankment Section			Total Embankment Volume B (m3)									
		Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)	Sectional Area (m2)	Ground Volume (m3)	Corrected Volume (m3)		Sectional Area (m2)	Volume (m3)	Vary Volume (m3)					Slope Length (m)	Area (m2)	Slope Length (m)	Area (m2)		
1 + 503.990		5.6			15.6				0.0					19,275		0.0		0.0			1 + 503.990
1 + 530.000	26.010	51.2	739	665	265.2	3,652	4,017	4,682	0.0	0		0	4,682	23,957	0	3.8	49	1.1	14	64	1 + 530.000
1 + 550.000	20.000	22.2	734	661	73.2	3,384	3,722	4,383	0.0	0		0	4,383	28,340	0	4.8	86	1.0	21	107	1 + 550.000
1 + 568.360	18.360	0.0	204	183	0.0	672	739	923	35.0	321		321	601	28,941	321	0.0	44	16.4	160	204	1 + 568.360
1 + 600.000	31.640	0.0	0	0	0.0	0	0	0	362.8	6,293		6,293	-6,293	22,648	0	20.4	323	28.4	709	1,031	1 + 600.000
1 + 616.460	16.460	0.0	0	0	0.0	0	0	0	52.6	3,419		3,419	-3,419	19,229	0	5.6	214	7.0	291	505	1 + 616.460
1 + 630.000	13.540	34.0	230	207	28.2	191	210	417	0.0	356		356	61	19,290	356	3.4	61	3.4	70	131	1 + 630.000
1 + 660.000	30.000	21.2	828	745	5.2	501	551	1,297	0.0	0		0	1,297	20,587	0	2.6	90	1.9	66	156	1 + 660.000
1 + 678.010	18.010	18.4	357	321	1.6	61	68	388	0.0	0		0	388	20,975	0	4.2	61	0.0	9	70	1 + 678.010
1 + 700.000	21.990	13.2	347	313	1.0	29	31	344	0.1	1		1	343	21,318	1	3.2	81	0.3	3	85	1 + 700.000
1 + 750.000	50.000	25.6	970	873	9.6	265	292	1,165	0.0	3		3	1,162	22,480	3	3.4	165	2.2	63	228	1 + 750.000
1 + 800.000	50.000	26.0	1,290	1,161	3.1	318	349	1,510	0.0	0		0	1,510	23,990	0	5.2	215	0.0	55	270	1 + 800.000
1 + 820.000	20.000	12.9	389	350	19.6	227	250	600	0.0	0		0	600	24,590	0	4.0	92	0.0	0	92	1 + 820.000
1 + 840.000	20.000	0.0	129	116	0.0	196	216	332	6.4	64		64	268	24,858	64	0.0	40	1.2	12	52	1 + 840.000
1 + 860.000	20.000	0.0	0	0	0.0	0	0	0	57.4	638		638	-638	24,220	0	0.0	0	5.2	64	64	1 + 860.000
1 + 898.470	38.470	25.6	492	443	5.8	112	123	566	0.0	1,104		1,104	-538	23,682	566	4.6	88	1.6	131	219	1 + 898.470
1 + 920.000	21.530	35.6	659	593	41.6	510	561	1,154	0.0	0		0	1,154	24,836	0	4.0	93	3.4	54	146	1 + 920.000
1 + 940.000	20.000	24.0	596	536	23.6	652	717	1,254	0.0	0		0	1,254	26,089	0	6.0	100	2.6	60	160	1 + 940.000
1 + 961.180	21.180	18.0	445	400	2.2	273	301	701	0.4	4		4	697	26,786	4	4.6	112	2.5	54	166	1 + 961.180
2 + 10.750	49.570	17.0	867	781	2.2	109	120	901	0.5	22		22	878	27,664	22	6.8	283	2.6	126	409	2 + 10.750
2 + 30.000	19.250	7.6	237	213	8.6	104	114	327	0.0	5		5	323	27,987	5	0.0	65	0.0	25	90	2 + 30.000
2 + 50.000	20.000	36.4	440	396	23.4	320	352	748	0.0	0		0	748	28,735	0	10.3	103	2.0	20	123	2 + 50.000
2 + 70.000	20.000	26.8	632	569	14.4	378	416	985	0.0	0		0	985	29,720	0	10.7	210	0.0	20	230	2 + 70.000
2 + 93.590	23.590	32.0	694	624	36.8	604	664	1,288	0.0	0		0	1,288	31,008	0	10.0	244	0.0	0	244	2 + 93.590
2 + 108.320	14.730	26.8	433	390	25.3	457	503	893	0.0	0		0	893	31,901	0	8.4	136	0.0	0	136	2 + 108.320
2 + 130.000	21.680	23.6	546	492	72.8	1,063	1,170	1,661	0.0	0		0	1,661	33,563	0	5.4	150	0.8	9	158	2 + 130.000
2 + 150.000	20.000	23.6	472	425	65.6	1,384	1,522	1,947	0.0	0		0	1,947	35,510	0	3.0	84	2.2	30	114	2 + 150.000
2 + 174.630	24.630	30.0	660	594	20.6	1,062	1,168	1,762	0.0	0		0	1,762	37,271	0	11.9	183	0.0	27	211	2 + 174.630
2 + 242.520	67.890	0.0	1,018	917	0.0	699	769	1,686	161.4	5,479		5,479	-3,793	33,478	1,686	0.0	404	19.4	659	1,062	2 + 242.520
2 + 260.000	17.480	0.0	0	0	0.0	0	0	0	140.8	2,641		2,641	-2,641	30,837	0	13.0	114	16.8	316	430	2 + 260.000
2 + 280.000	20.000	0.0	0	0	0.0	0	0	0	60.0	2,008		2,008	-2,008	28,829	0	0.0	130	6.2	230	360	2 + 280.000
2 + 303.440	23.440	12.4	145	131	1.4	16	18	149	3.2	741		741	-592	28,237	149	5.2	61	2.4	101	162	2 + 303.440
2 + 324.160	20.720	10.8	240	216	2.6	41	46	262	0.6	39		39	223	28,460	39	6.2	118	0.8	33	151	2 + 324.160
2 + 340.000	15.840	5.6	130	117	13.2	125	138	255	0.0	5		5	250	28,710	5	4.0	81	0.0	6	87	2 + 340.000
2 + 360.000	20.000	26.6	322	290	23.7	369	406	696	0.0	0		0	696	29,405	0	15.1	191	0.0	0	191	2 + 360.000
2 + 374.610	14.610	28.4	402	362	48.8	530	583	944	0.0	0		0	944	30,350	0	7.0	161	0.0	0	161	2 + 374.610
2 + 420.000	45.390	23.2	1,171	1,054	2.3	1,160	1,276	2,330	0.0	0		0	2,330	32,679	0	6.0	295	0.0	0	295	2 + 420.000
2 + 427.160	7.160	13.6	132	119	1.0	12	13	132	0.0	0		0	132	32,811	0	4.0	36	1.7	6	42	2 + 427.160
2 + 460.000	32.840	0.0	223	201	0.0	16	18	219	58.5	961		961	-742	32,069	219	0.0	66	5.8	123	189	2 + 460.000
2 + 490.000	30.000	2.4	36	32	11.6	174	191	224	0.0	878		878	-654	31,416	224	0.0	0	1.8	114	114	2 + 490.000
2 + 514.270	24.270	0.0	29	26	0.0	141	155	181	22.6	274		274	-93	31,322	181	0.0	0	0.0	22	22	2 + 514.270
2 + 550.000	35.730	10.4	186	167	14.4	257	283	450	0.0	404		404	46	31,369	404	5.2	93	0.0	0	93	2 + 550.000
2 + 571.480	21.480	0.7	119	107	9.6	258	284	391	0.0	0		0	391	31,760	0	1.2	69	0.0	0	69	2 + 571.480
2 + 612.070	40.590	3.2	79	71	6.8	333	366	437	0.0	0		0	437	32,197	0	4.6	118	0.0	0	118	2 + 612.070
2 + 630.000	17.930	1.2	39	36	0.0	61	67	103	4.6	41		41	61	32,258	41	0.0	41	4.8	43	84	2 + 630.000
2 + 650.000	20.000	0.0	12	11	0.0	0	0	11	40.8	454		454	-443	31,815	11	0.0	0	11.4	162	162	2 + 650.000
2 + 680.000	30.000	57.2	858	772	120.9	1,814	1,995	2,767	0.0	612		612	2,155	33,970	612	7.0	105	0.6	180	285	2 + 680.000
2 + 700.000	20.000	18.2	754	679	83.2	2,041	2,245	2,924	0.0	0		0	2,924	36,894	0	5.8	128	1.0	16	144	2 + 700.000
2 + 720.980	20.980	9.4	290	261	41.6	1,309	1,440	1,701	0.0	0		0	1,701	38,595	0	7.0	134	0.0	10	145	2 + 720.980
2 + 760.000	39.020	5.4	289	260	9.6	999	1,099	1,359	0.0	0		0	1,359	39,953	0	0.0	137	0.0	0	137	2 + 760.000
2 + 791.800	31.800	7.6	207	186	0.0	153	168	354	3.5	56		56	298	40,251	56	3.4	54	4.6	73	127	2 + 791.800
2 + 810.000	18.200	9.0	151	136	4.2	38	42	178	0.0	32		32	146	40,398	32	0.0	31	0.0	42	73	2 + 810.000
2 + 830.000	20.000	14.6	236	212	12.2	164	180	393	0.0	0		0	393	40,790	0	3.8	38	0.0	0	38	2 + 830.000
2 + 845.440	15.440	9.2	184	165	3.8	124	136	301	0.0	0		0	301	41,092	0	4.5	64	0.0	0	64	2 + 845.440
2 + 859.580	14.140	8.6	126	113	0.6	31	34	147	0.1	1		1	147	41,238	1	6.2	76	0.5	4	79	2 + 859.580
2 + 880.000	20.420	0.0	88	79	0.0	6	7	86	75.6	773		773	-687	40,551	86	0.0	63	15.2	160	224	2 + 880.000
2 + 900.000	20.000	0.0	0	0	0.0	0	0	0	308.0	3,836		3,836	-3,836	36,715	0	15.0	150	32.7	479	629	2 + 900.000
2 + 915.500	15.500	0.0	0	0	0.0	0	0	0	197.6	3,918		3,918	-3,918	32,797	0	13.8	223	24.6	444	667	2 + 915.500
2 + 933.530	18.030	0.0	0	0	0.0	0	0	0	215.4	3,723		3,723	-3,723	29,074	0	0.0	124	26.4	460	584	2 + 933.530
2 + 950.000	16.470	0.0	0	0	0.0	0	0	0	310.8	4,333		4,333	-4,333	24,740	0	0.0	0	19.4	377	377	2 + 950.000
Sub Total	1,446.010		20,856	18,770		27,394	30,134	48,904		43,438		43,438	5,466		5,087		6,677		6,154	12,831	Sub Total
Total	2,950.000		34,406	30,966		46,853	51,538	82,504		57,763		57,763	24,740		11,374		11,287		11,869	23,156	Total