NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La'Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE 2)	**Pay Item No. (BOQ)**	2G-0208
Quantity Item	SUBBASE COURSE	**Unit**	m^3

Calculation Procedure Applied

Pavement area was computed using geometric formulas.
Pavement volume was obtained multiplying the area to the thickness of each type of course.
The volume was computed with zero decimal for total.

References, Calculation Base and Revisions

References : Tender Drawings :

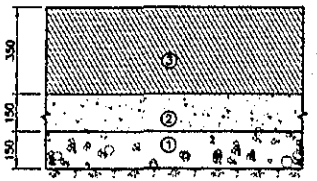
DW-PV-00-001 General Plan of Pavement Area

DW-PV-00-004 Typical Section of Pavement and Road

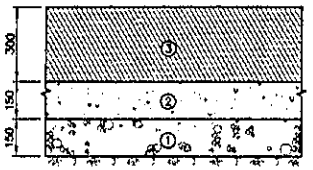
Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla Garcia	26 June 2002		Mr. Thoma		Ms. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg cover

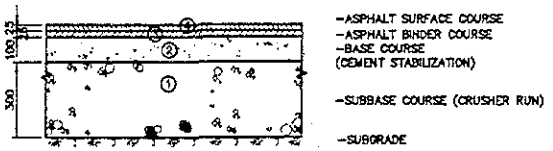
TYPICAL SECTION OF PAVEMENT
SCALE : 1:20



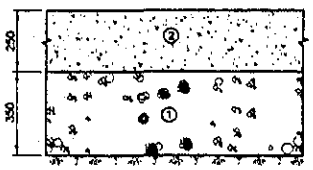
TYPE 1 CONCRETE PAVEMENT
(FOR R.T.G. TRAFFIC LANE)



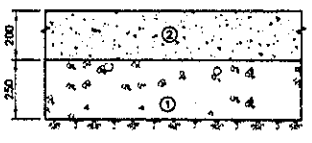
TYPE 2 CONCRETE PAVEMENT



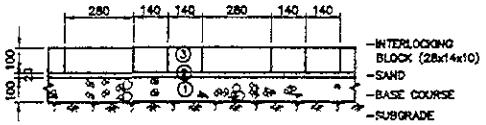
TYPE 3 ASPHALT CONCRETE PAVEMENT



TYPE 4 MACADAM PAVEMENT (1)

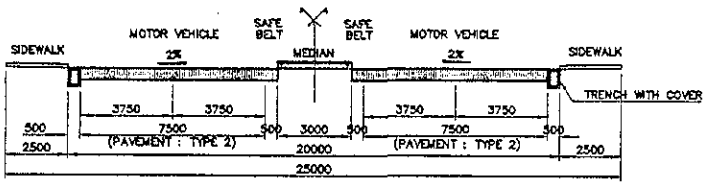


TYPE 5 MACADAM PAVEMENT (2)

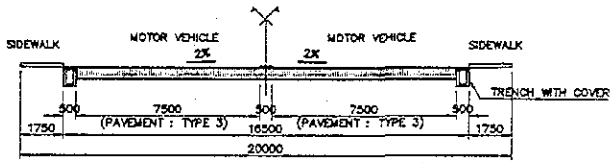


TYPE 6 INTERLOCKING CONCRETE BLOCK PAVEMENT
(FOR SIDEWALK)

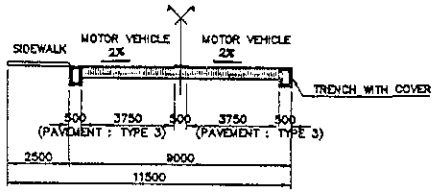
TYPICAL SECTION ROADS
SCALE 1:200



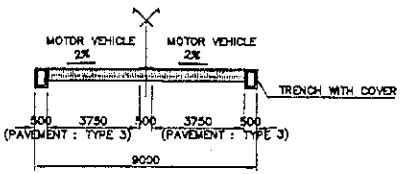
TYPICAL SECTION OF MAIN ROAD (TYPE A)



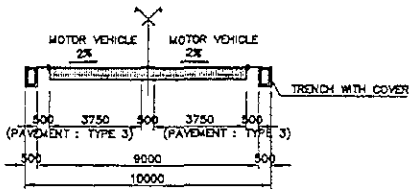
TYPICAL SECTION OF SUB-TRUNK ROAD (TYPE B)



TYPICAL SECTION OF
BRANCH ROAD (TYPE C)



TYPICAL SECTION OF
BRANCH ROAD (TYPE D)



TYPICAL SECTION OF
BRANCH ROAD (TYPE E)

REV. NO.	DATE	COORDINATE	BY	APPROVED	DATE

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

SECTION : ROAD AND PAVEMENT
SUB-SECTION : GENERAL
TITLE :

TYPICAL SECTION OF PAVEMENT AND ROAD

DATE : JULY/2002
SCALE : INDICATE
DRAWING NO. DW-PV-00-004

NIPPON KOEI CO.,LTD.

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE 2)	Calc. Index No.	
Subject	SUBBASE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{67,000}\ 71,200\ m^2$

$t = 15\ cm$

$V = (\cancel{67,000}\ 71,200\ m^2)(0.15\ m)$

$V = \cancel{10,050}\ m^3$

10680

$V = \cancel{10,050}\ m^3$

$10,680\ m^3$

	Prepared by		Checked by	
	Kaito G.	26 / June /2002		/ /200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE 2)	**Pay Item No. (BOQ)**	2G - 0203
Quantity Item	BASE COURSE	**Unit**	M3

Calculation Procedure Applied

Pavement area was computed using geometric formulas. Pavement volume was obtained multiplying the area to the thickness of each type of course. The volume was computed with zero decimal for total.

References, Calculation Base and Revisions

References : Tender Drawings :

DW - PV - 00 - 001 General Plan of Pavement Area

DW - PV - 00 - 004 Typical Section of Pavement and Road

(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Kala G.	26 June 2002		Mr. Iwama		Mr. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg cover

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE 2)	Calc. Index No.	
Subject	BASE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{67,000}\ 71,200\ m^2$

$t = 15\ cm$

$V = (\cancel{67,000}\ 71,200\ m^2)(0.15\ m)$

$V = \cancel{10,050}\ 10,680\ m^3$

$V = \cancel{10,050}\ m^3$

$10,680\ m^3$

	Prepared by		Checked by	
	Korlo G.	26 / June / 2002		1 / 200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE 2)	**Pay Item No. (BOQ)**	26-0204
Quantity Item	PRIME COATING	**Unit**	m^2

Calculation Procedure Applied

Pavement area was computed sectioning the prime coating area into small section areas and using geometric formulas.

The area was computed with zero decimal for total.

References, Calculation Base and Revisions

References : Tender Drawings :

DW - PV - 00 - 001 General Plan of Pavement Area

DW - PV - 00 - 004 Typical Section of Pavement and Road

(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karlo G.	26 June 2002		Mr. Inuma		Mr. Ando		
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2								
3								

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE 2)	Calc. Index No.	
Subject	PRIME COATING	Page No.	Rev.

References/ Notes

$A = \cancel{67,000}\ 71,200\ m^2$

$A = \cancel{67,000}\ 71200\ m^2$

	Prepared by	Checked by	
	Kailo G. 26 / June /2002		/ /200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE 2)	**Pay Item No. (BOQ)**	2G - 020501
Quantity Item	CONCRETE SLAB	**Unit**	m3

Calculation Procedure Applied

Pavement area was computed using geometric formulas.
Pavement volume was obtained multiplying the area to the thickness of each type of course.
The volume was computed with zero decimal for total.

References, Calculation Base and Revisions

Refrances : Tender Drawings :
DW - PV - 00 - 001 General Plan of Pavement Area
DW - PV - 00 - 004 Typical Section of Pavement and Road.
(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla Garcia	26 June 2002		Mr. Inuma		Mr. Ando		
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FN : Calculation_Cover_Sheet_020504_seg cover

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE 2)	Calc. Index No.	
Subject	CONCRETE SLAB	Page No.	Rev.

References/ Notes

$A = \cancel{67,000}\ 71,200\ m^2$

$t = 30\ cm$

$V = (\cancel{67,000}\ 71,200\ m^2)(0.30\ m)$

$V = \cancel{20,100}\ 21,360\ m^3$

$V = \cancel{20,100}\ 21,360\ m^3$

	Prepared by		Checked by	
	Karla G.	26 / June / 2002		/ /200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE -2)	**Pay Item No. (BOQ)**	2G - 020502
Quantity Item	REINFORCEMENT AND JOINT BAR	**Unit**	m^2

Calculation Procedure Applied

Reinforcement and joint bar was computed for container yard pavement.
Reinforcement lenght was computed summarizing all distances of the reinforcement.

References, Calculation Base and Revisions

References : Tender Drawings :

DW - PV - 01 - 005 Joint Arrangement of Concrete Pavement (1)
DW - PV - 01 - 006 " " (2)
DW - PV - 01 - 008 " " (4)

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla G.	4 July 2002		Mr. Inuma		Mr. Ando		
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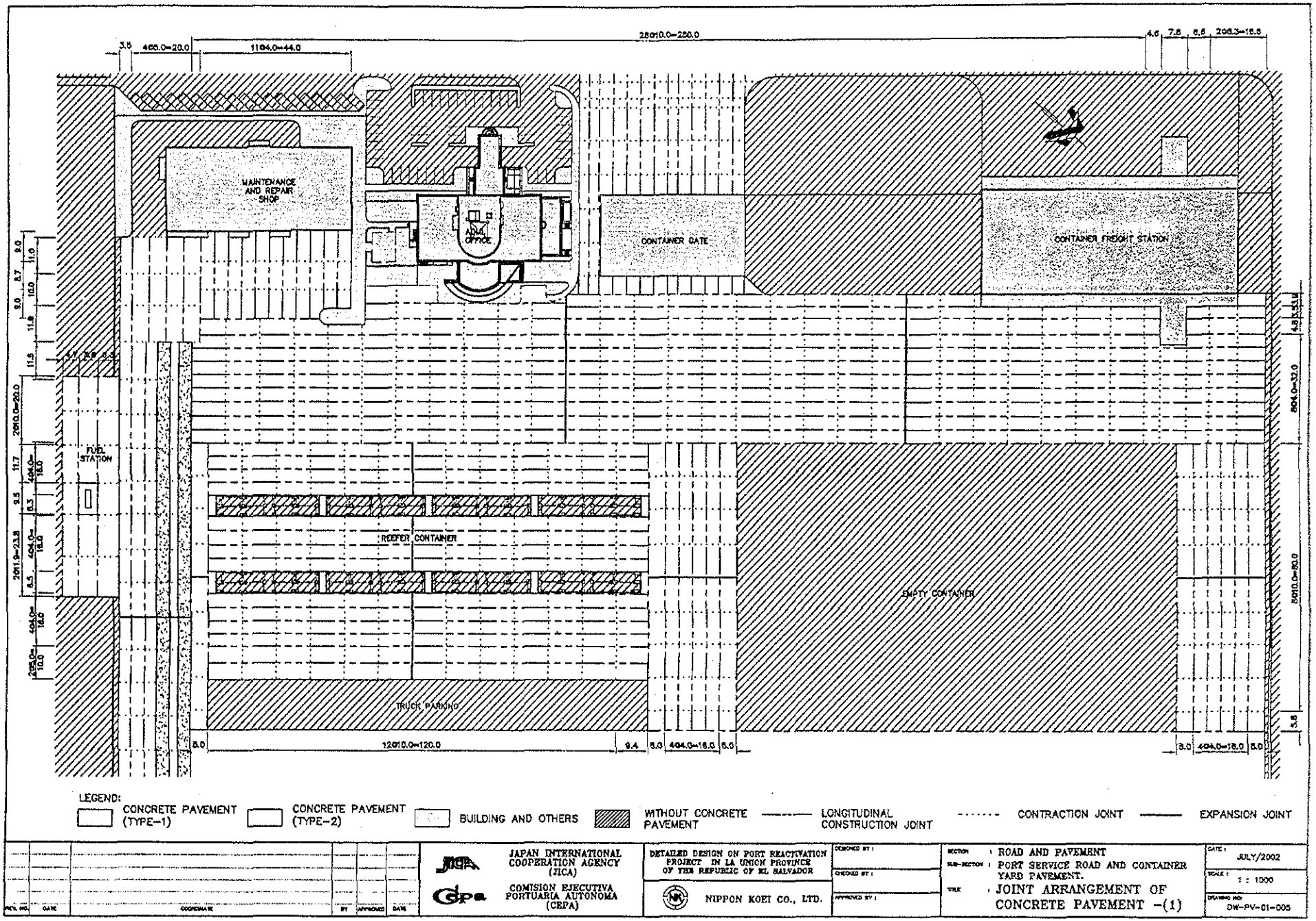
FN : Calculation_Cover_Sheet_020504_seg cover



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

SECTION : ROAD AND PAVEMENT

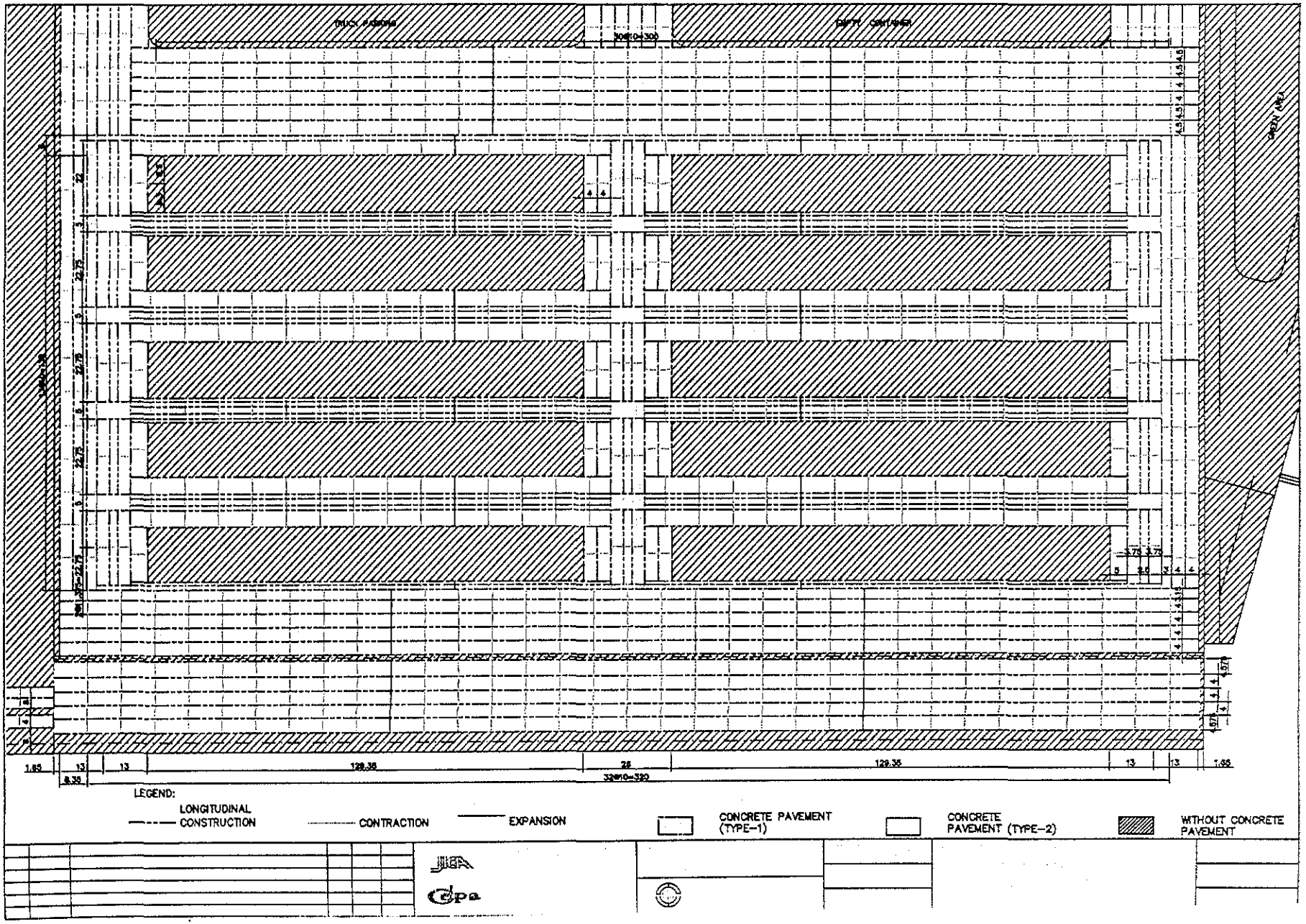
SUB-SECTION : PORT SERVICE ROAD AND CONTAINER YARD PAVEMENT.

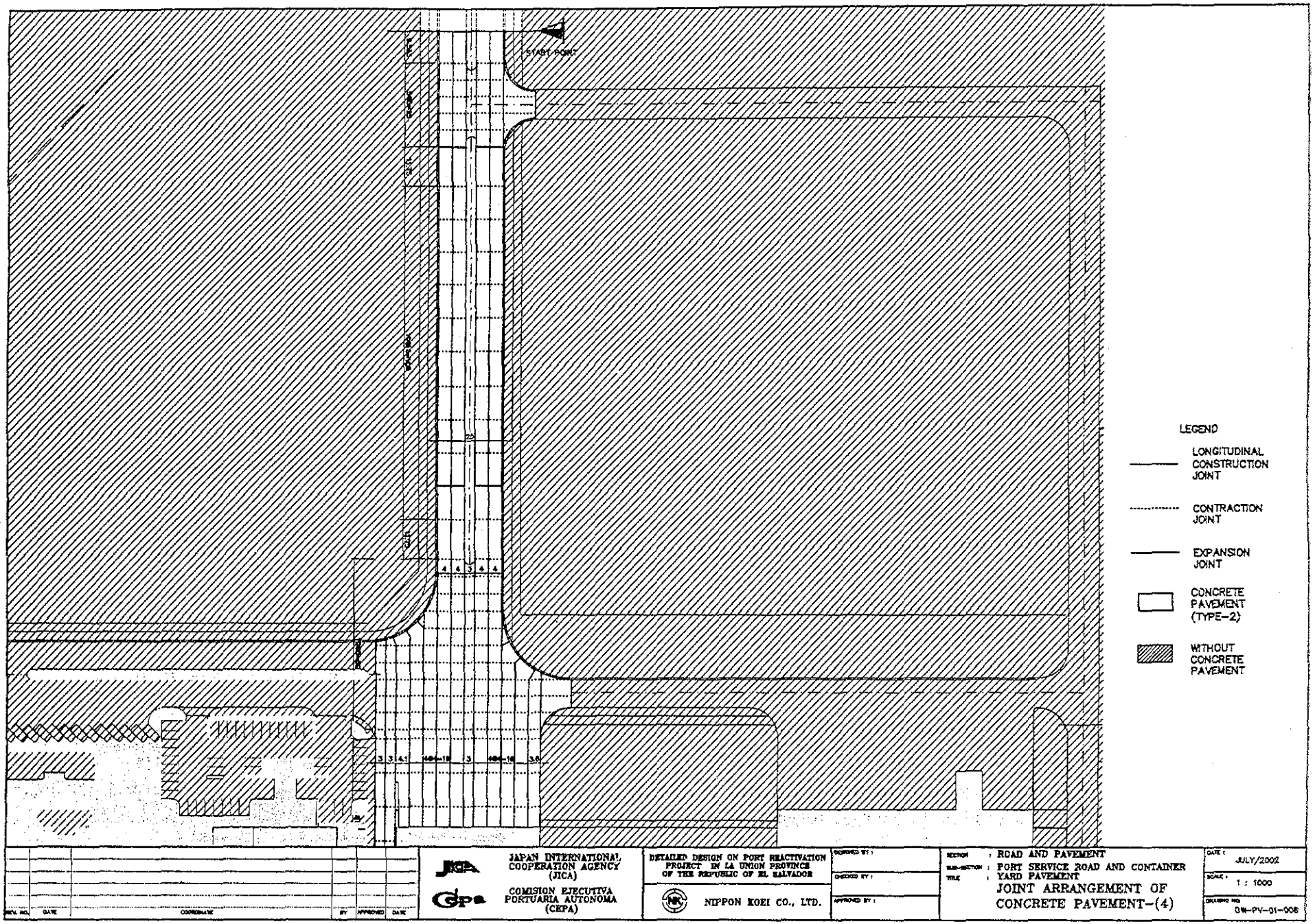
TITLE : JOINT ARRANGEMENT OF CONCRETE PAVEMENT -(1)

DATE : JULY/2002

SCALE : 1 : 1000

DRAWING NO. DW-PV-01-005


LEGEND:
LONGITUDINAL CONSTRUCTION
CONTRACTION
EXPANSION
CONCRETE PAVEMENT (TYPE-1)
CONCRETE PAVEMENT (TYPE-2)
WITHOUT CONCRETE PAVEMENT



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

SECTION : ROAD AND PAVEMENT

SUB-SECTION : PORT SERVICE ROAD AND CONTAINER YARD PAVEMENT

TITLE : JOINT ARRANGEMENT OF CONCRETE PAVEMENT-(4)

DATE : JULY/2002

SCALE : 1 : 1000

DRAWING NO. DW-PV-01-006

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE -2)	Calc. Index No.	
Subject	REINFORCEMENT AND JOINT BAR	Page No.	Rev.

References/ Notes

Container Yard Pavement :

1. longitudinal Construction Joint :

1.1 Lenght (m) :

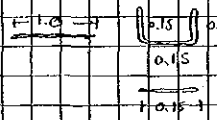
L = (142.35 m)(10)(2) + (315.70 m)(6 + (136.00 m)(2) + (16.60 m)(30) +
277.55 m + (32.00 m)(6) + (26.70 m)(8) + 47.70 m + (85.75 m)(2) +
(85.83 m)(6) + (85.75 m)(6) + (315.70 m)(8) + 1070.6 m + (236.78 m)
(6) + 138.28 m + 231.13 + (336.70 m)(5) + 30 x 17 + 19 x 3 + 136.2 x 2 + 8

= ~~14,512.82~~ m ≃ ~~14,520~~ m
15,360.22 m ≃ 15,370 m

1.2 Total Re-bar (Kg)

D32 W = (6.23 Kg/m)(1 m) = 6.23 Kg

D13 W = (0.995 Kg/m)(1.50 m)(2) = 2.99 Kg



L = (0.15 m)(3)(2) = 0.90 m

L = (0.15 m)(4) = 0.60 m

W = 6.23 Kg + 2.99 Kg = 9.22 Kg

No Sets = 14,520

W_T = (9.22 Kg) (~~14,520~~) = ~~133,874.40~~ Kg ≃ W_1 = ~~133,900~~ Kg
15,370 141,711.4 kg 141,800

2. Contraction Joint :

2.1 lenght (m) :

L = (11.00 m)(39) + (5.00 m)(10) + (8.00 m)(10) + (1.00 m)(130) +
(2 m)(26)(4) + (5.15 m)(26)(4) + (4.40 m)(26) + (26.00 m)(29) +
(~~16.00~~ 15.00 m)(5) + (23.50 m)(4) + (44.05 m)(2) + (36.80 m)(3) +

	Prepared by		Checked by	
	Karla G.	4 / July /2002		/ /200

FN: Calculation_Sheet

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE-2)	Calc. Index No.	
Subject	REINFORCEMENT AND JOINT BAR	Page No.	Rev.

References/ Notes

(35m)(2) + 47 m + (41.50m)(4) + (44.13 m)(11) + (40.25m)(5) + (28.25m)(2) + 80.50 m + 35.00 m + (182.00 m)(2) + 352.00 m + 287.65 m + 18.00 m + 699.68 m + (19.15m)(31)

= ~~6,125.86~~ 6273.36 m ≈ ~~6,130~~ 6280 m 8×13 + 7.5×2 + 9.5×3

2.2 Total Re-bar (Kg)

W = 9.22 Kg

No Sets = ~~6,130~~ 6280

W_T = (9.22 Kg)(~~6,130~~ 6280) = ~~56,518.60~~ 57902 Kg ≈ W_2 = ~~56,600~~ 57910 Kg

3. Expansion Joint:

3.1 Lenght (m):

L = (1.00m)(10) + (2.00m)(8) + (5.15m)(8) + (4.40m)(2) + (26.00 m)(2) + 11.00 m + 2.50 m + (16.00m)(2) + 26.15m + (8.00m)(4) + (19.15m)(2) + 8

= ~~269.95~~ 277.95 m ≈ ~~270~~ 278 m

3.2 Total Re-bar (Kg):

D32 ⇒ w = (6.23 Kg/m)(0.60 m) = 3.74 Kg

D16 ⇒ w = (0.995 Kg/m)(1.50 m)(2) = 2.99 Kg

W = 3.74 Kg + 2.99 Kg = 6.73 Kg

No Sets = ~~270~~ 278

W_T = (6.73 Kg)(~~270~~ 278) = ~~1,817.10~~ 1870.94 Kg ≈ 1,900 Kg W_3 = 1,900 Kg

		Prepared by		Checked by	
		Koila G.	4 / July /2002		/ /200

FN: Calculation_Sheet

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE-2)	Calc. Index No.	
Subject	REINFORCEMENT AND JOINT BAR	Page No.	Rev.

References/ Notes

1. Joint with existing concrete :

1.1 Lenght (m) :

L = 162 m + 19.15 m + 336.70 m = 317.85 m ≈ 520 m

W_T = (~~133,900~~ + ~~56,700~~ + 1,900) Kg = ~~192,500~~ Kg

14,800 + 2,910 = 20,610

W_T = ~~192,500~~ Kg

20,700

	Prepared by		Checked by	
	Karla G.	9 / July /2002		/ /200

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE - 2)	**Pay Item No. (BOQ)**	2G-020503
Quantity Item	ELAS TIGH BOARD	**Unit**	m²

Calculation Procedure Applied

Elastic fish board area was computed for container yard pavement.

It was computed multiplying the length of elastic fish board to the width.

References, Calculation Base and Revisions

References : Tender Drawings.

DW-PV-01-009 Details of Concrete Pavement.

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla García	4 July 2002		Ms. Inuma		Mr. Ando		
1								
2								
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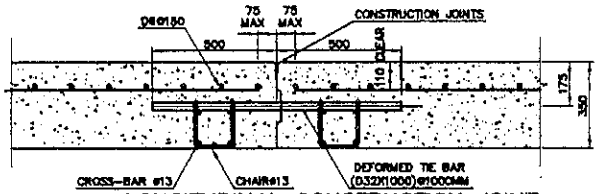
FN : Calculation_Cover_Sheet_020504_seg cover

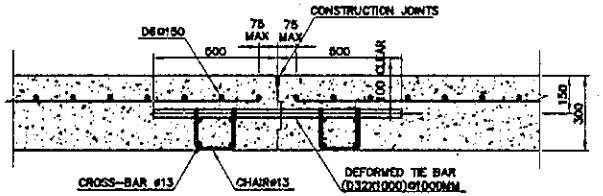
DETAILS OF JOINT

CONCRETE PAVEMENT (TYPE-1)
SCALE 1:20

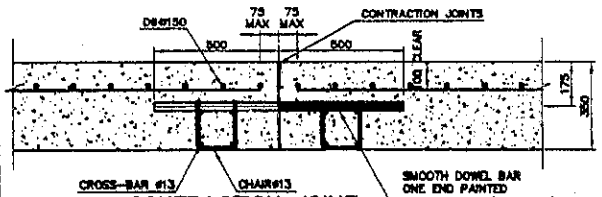


LONGITUDINAL CONSTRUCTION JOINT

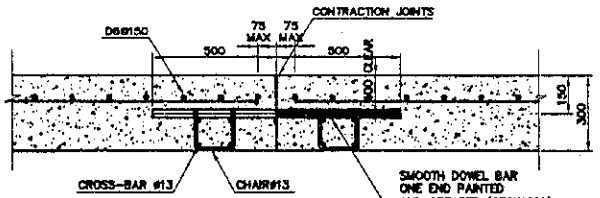
CONCRETE PAVEMENT (TYPE-2)
SCALE 1:20



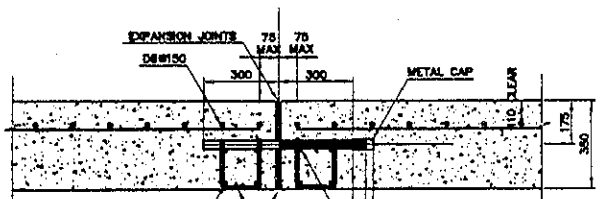
LONGITUDINAL CONSTRUCTION JOINT



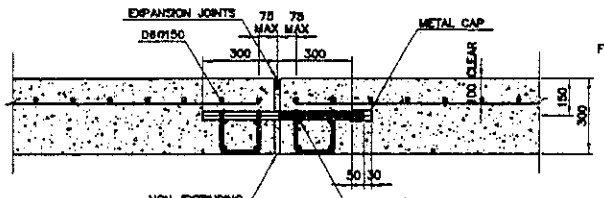
CONTRACTION JOINT



CONTRACTION JOINTS

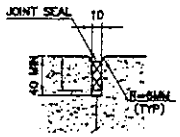


EXPANSION JOINT

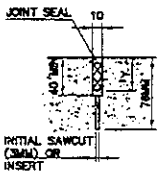


EXPANSION JOINTS

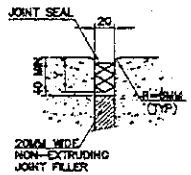
DETAILS OF JOINT SEALING
SCALE1:5



CONSTRUCTION JOINTS

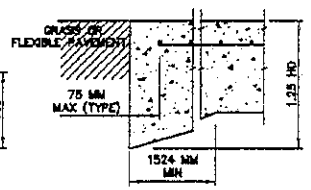


CONTRACTION JOINTS

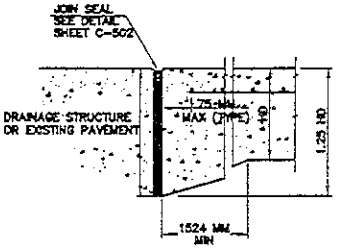


EXPANSION JOINTS

JOINTS BETWEEN CONCRETE PAVEMENT AND OTHERS



THICKENED EDGE BUTT CONSTRUCTION JOINT



THICKENED EDGE EXPANSION JOINT

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE - 2)	Calc. Index No.	
Subject	ELASTIC BOARD	Page No.	Rev.

References/ Notes

Container Yard Pavement :

- Expansion Joint :

L = ~~270~~ 278 m

Width = 30 cm

$A = (0.30\ m)(\underset{278}{\cancel{270}}\ m) = \underset{83.4}{\cancel{81.00}}\ m^2 \simeq 90\ m^2$ → $A = 90.\ m^2$

- Joint with existing concrete :

L = 520 m

Width = 30 cm

$A = (0.30\ m)(520\ m) = 156\ m^2 \simeq 160\ m^2$ → $A = 160\ m^2$

$A_T = (90 + 160)\ m^2 = 250\ m^2$ → $A_T = 250\ m^2$

	Prepared by		Checked by	
	Karla G.	4 July 2002		1 /200

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE-2)	**Pay Item No. (BOQ)**	2G-020504
Quantity Item	JOINT FILTER	**Unit**	m^2

Calculation Procedure Applied

Joint filter area was computed for container yard pavement.

Area was computed multiplying the lenght of joint filter to the width.

References, Calculation Base and Revisions

References: Tender Drowings :

DW-PV-02-009 Details of Concrete Pavement.

(Some as "Elas Tigh Boord")

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla G.	4 July 2002		Mr. Inuma		Mr. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg cover

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE - 2)	Calc. Index No.	
Subject	JOINT FILTER	Page No.	Rev.

References/ Notes

Container Yard Pavement:

- Longitudinal Construction Joint:

L = ~~14,520~~ m 15,370 m

Width = 4 cm

$A = (0.04\ m)(\cancel{14,520}\ m) = \cancel{580.80}\ m^2 \simeq \cancel{600}\ m^2$ $A = \cancel{600}\ m^2$

15,370 614.8 620 620

- Contraction Joint:

L = ~~6,130~~ m 6280

Width = 4 cm

$A = (0.04\ m)(\cancel{6,130}\ m) = \cancel{245.20}\ m^2 \simeq 252\ m^2$ $A = 252\ m^2$

6280 251.2

$A_T = (600 + 250)\ m^2 = 850\ m^2 \simeq$ $\boxed{A_T = \cancel{850}\ m^2}$

872

		Prepared by		Checked by	
		Karla G.	4 / July /2002		/ /200

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	CONCRETE PAVEMENT (TYPE-2)	**Pay Item No. (BOQ)**	2G-020505
Quantity Item	IRON MESH	**Unit**	m^2

Calculation Procedure Applied

Iron mesh area was computed for Container Yard pavement.
Area was computed using geometric formulas and sectioning the area into small sections area.

References, Calculation Base and Revisions

References: Tender Drawings:
DW-PV-00-001 General Plan of Pavement Area.
(Same as "Subgrade Preparation")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla G.	5 July 2002		Mr. Inuma		Mr. Ando		
1								
2								
3								

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	CONCRETE PAVEMENT (TYPE-2)	Calc. Index No.	
Subject	IRON MESH	Page No.	Rev.

References/ Notes

Container Yard Pavement.

$A = 66,000\ m^2 + (15.00m)(6.5\ m) + 3416 + 260$

$A = \cancel{66,975\ m^2} \simeq \cancel{67,000}$

71151 71200

$A = \cancel{67,000}\ m^2$

$\boxed{71,200}\ m^2$

	Prepared by		Checked by	
	Karla G.	5 / July / 2002		/ /200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE 3)	**Pay Item No. (BOQ)**	2G-0301
Quantity Item	SUBGRADE PREPARATION	**Unit**	m^2

Calculation Procedure Applied

Pavement area was computed sectioning the preparation area into small section areas and using geometric formulas.

The area was computed with two decimal for section area and zero decimal for total.

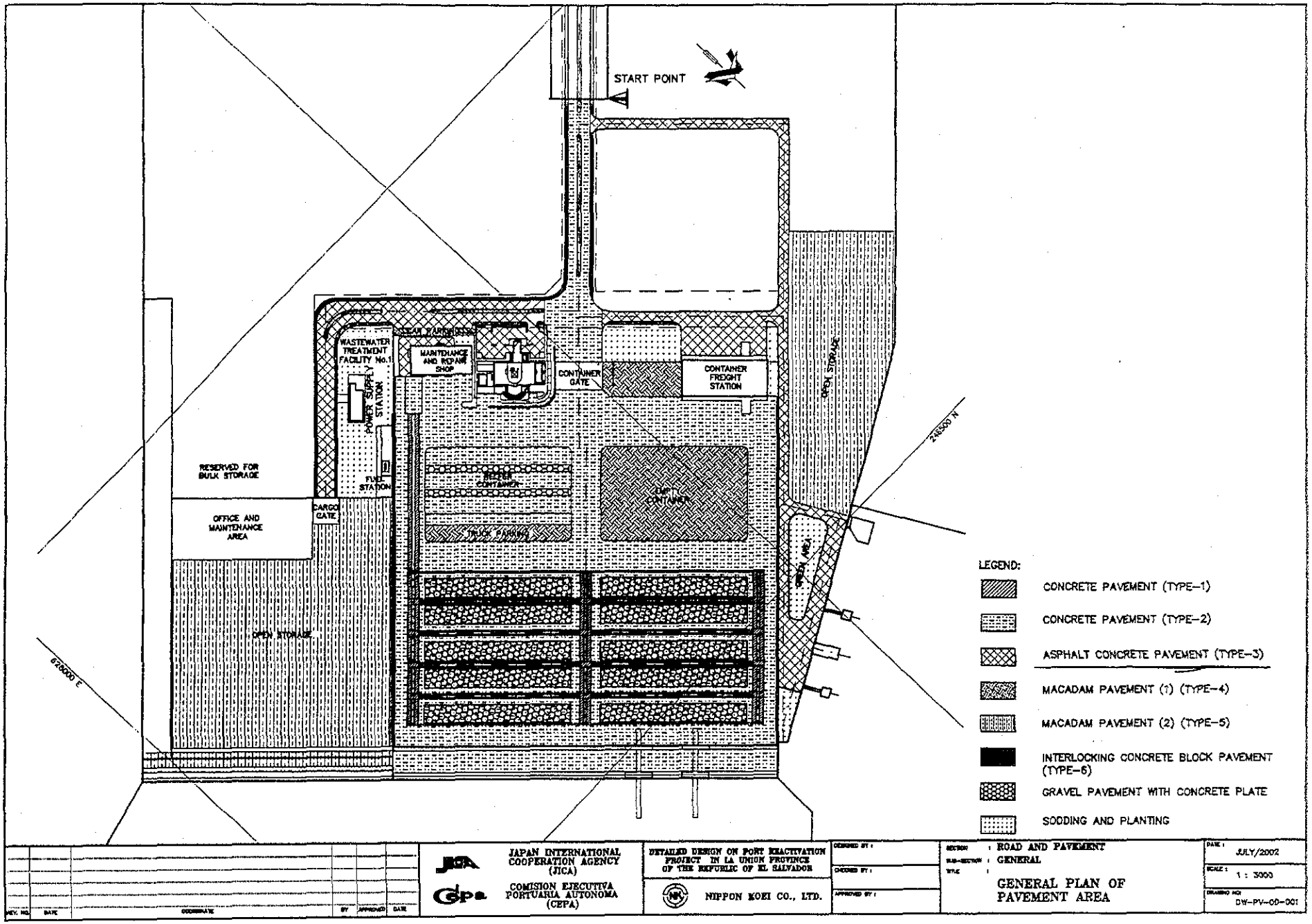
References, Calculation Base and Revisions

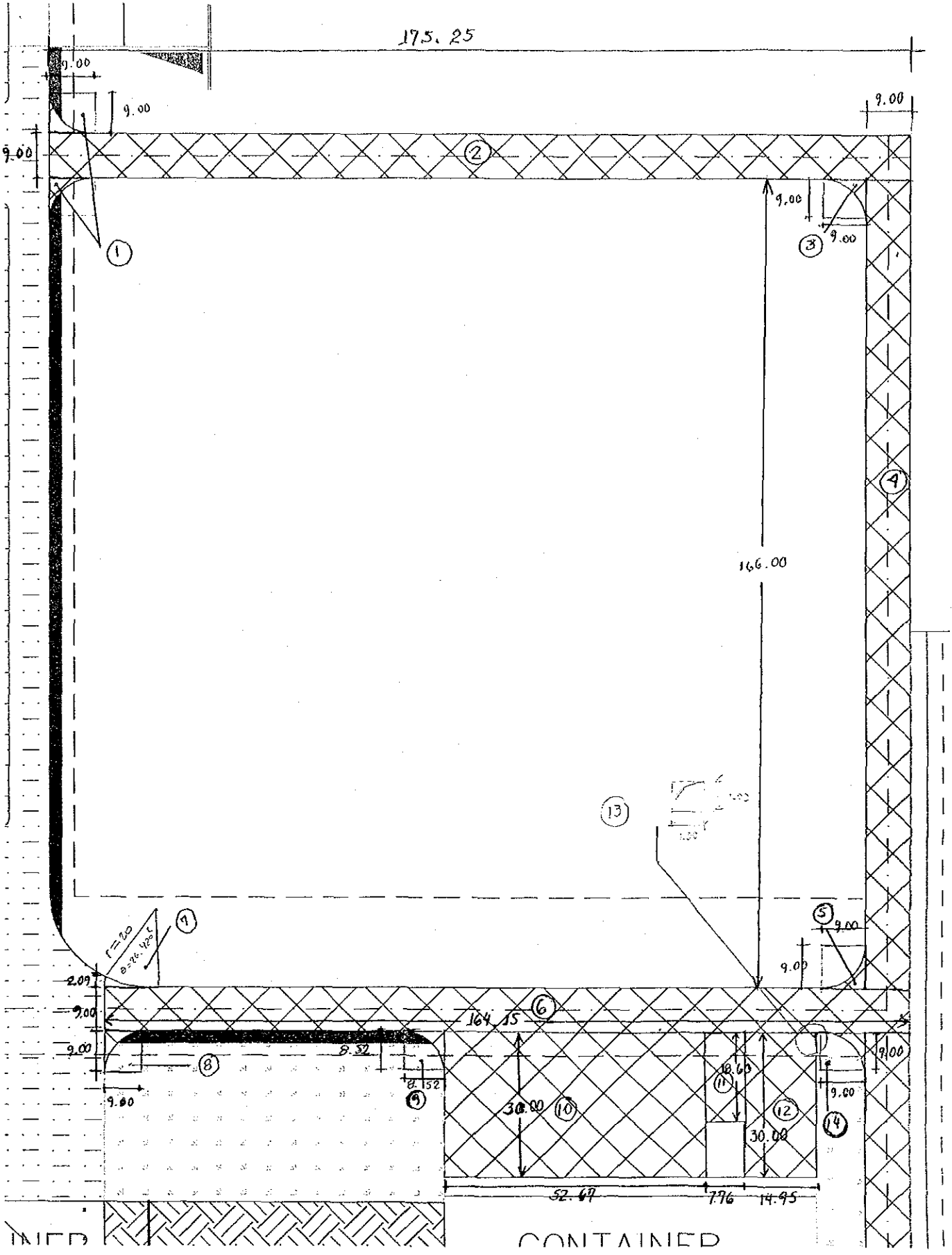
References : Tender Drawings :

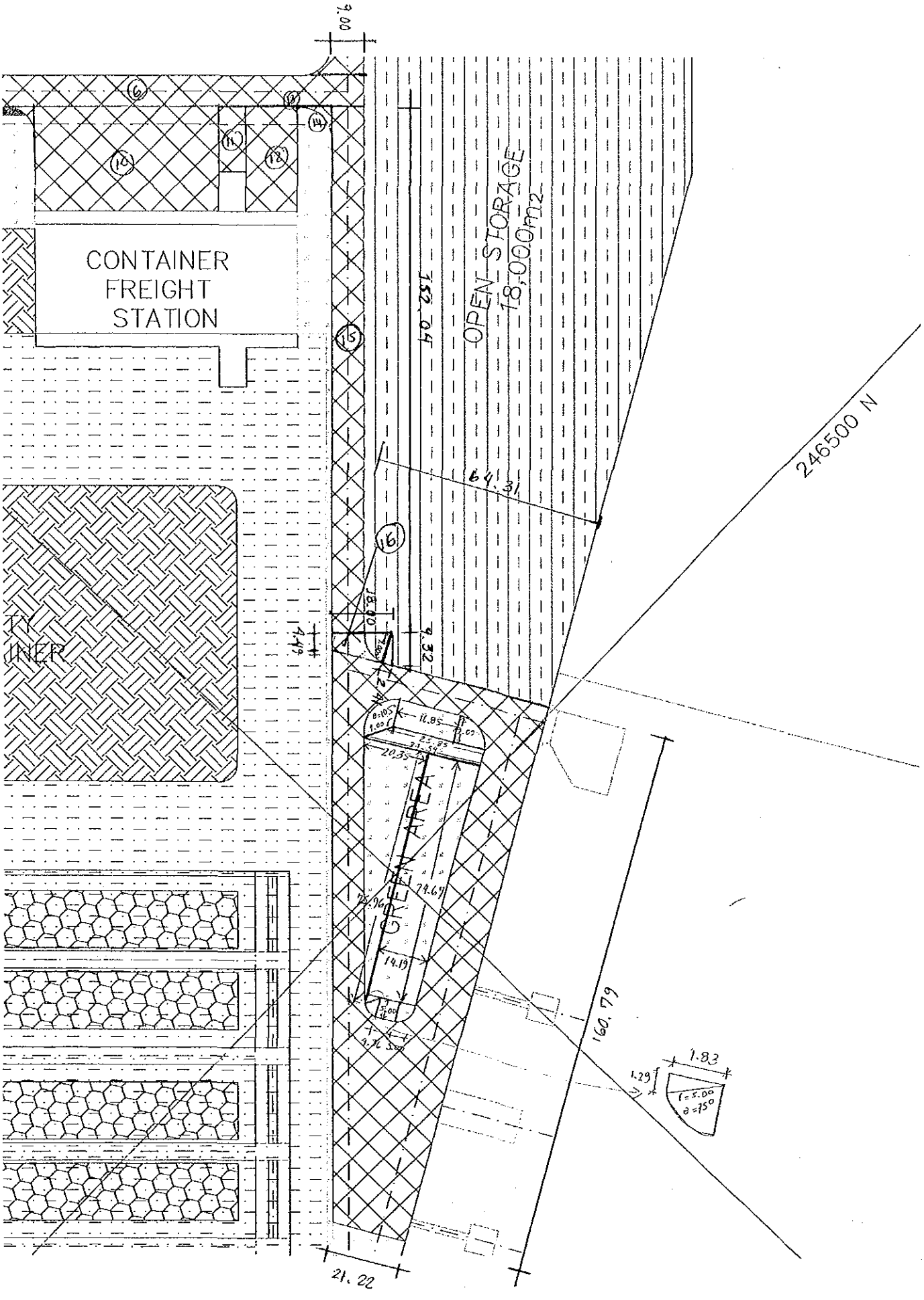
DW - PV - 00 - 001 General Plan of Pavement Area.

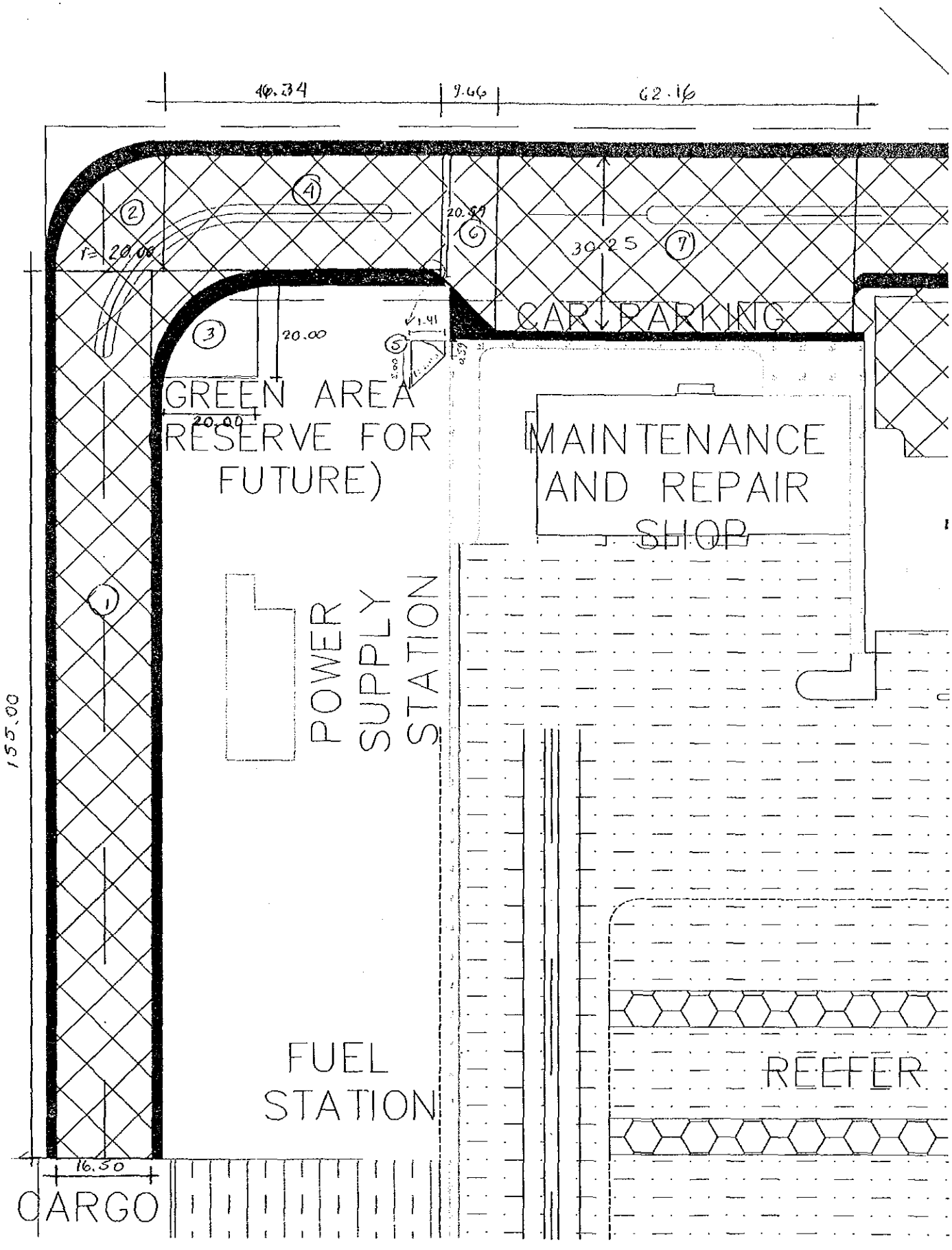
Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla Garcia	26 June 2002		Mr. Inuma		Mr. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg
cover


START POINT
WASTEWATER TREATMENT FACILITY No.1
POWER SUPPLY STATION
MAINTENANCE AND REPAIR SHOP
CONTAINER GATE
CONTAINER FREIGHT STATION
OPEN STORAGE
RESERVED FOR BULK STORAGE
FUEL STATION
CARGO GATE
OFFICE AND MAINTENANCE AREA
BEEFER CONTAINER
EMPTY CONTAINER
TRUCK PARKING
OPEN STORAGE
GREEN AREA
246500 N
626000 E
LEGEND:
CONCRETE PAVEMENT (TYPE-1)
CONCRETE PAVEMENT (TYPE-2)
ASPHALT CONCRETE PAVEMENT (TYPE-3)
MACADAM PAVEMENT (1) (TYPE-4)
MACADAM PAVEMENT (2) (TYPE-5)
INTERLOCKING CONCRETE BLOCK PAVEMENT (TYPE-6)
GRAVEL PAVEMENT WITH CONCRETE PLATE
SODDING AND PLANTING
REV. NO.
DATE
COORDINATE
BY
APPROVED
DATE
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)
DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR
NIPPON KOEI CO., LTD.
DESIGNED BY :
CHECKED BY :
APPROVED BY :
SECTION : ROAD AND PAVEMENT
SUB-SECTION : GENERAL
TITLE :
GENERAL PLAN OF PAVEMENT AREA
DATE : JULY/2002
SCALE : 1 : 3000
DRAWING NO: DW-PV-00-001


175.25
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
166.00
164.15
8.52
8.52
2.09
30.00
30.00
18.60
52.67
7.76
14.95
CONTAINER


CONTAINER
FREIGHT
STATION
OPEN STORAGE
18,000m2
246500 N
GREEN AREA
152.04
64.31
160.79
21.22
9.00
9.32
4.49
18.00
1.83
1.29
r=5.00
θ=75°


40.34
9.66
62.16
20.00
30.25
CAR PARKING
20.00
GREEN AREA
(RESERVE FOR
FUTURE)
20.00
MAINTENANCE
AND REPAIR
SHOP
POWER
SUPPLY
STATION
155.00
FUEL
STATION
REEFER
16.30
CARGO

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	SUB GRADE PREPARATION	Page No.	Rev.

References/ Notes

A_1 :

$A_1 = (9m)(9m) - \frac{\pi (9m)^2}{4}(2) = 34.76\ m^2$

$A_2 = (9m)(175.25\ m) = 1,577.25\ m^2$

$A_3 = (9m)(9m) - \frac{\pi (9m)^2}{4} = 17.38\ m^2$

$A_4 = (9m)(166m) = 1,494\ m^2$

$A_5 = (9m)(9m) - \frac{\pi (9m)^2}{4} = 17.38\ m^2$

$A_6 = (164.15\ m)(9m) = 1,477.35\ m^2$

$A_7 = \left(\frac{20m + 2.09m}{2}\right)(8.90\ m) - \frac{\pi (24m)^2 (26.42°)}{360°} = 6.08\ m^2$

$A_8 = (9m)(9m) - \frac{\pi (9m)^2}{4} = 17.38\ m^2$

$A_9 = (8.52m)(8.52m) - \frac{\pi (8.52m)^2}{4} = 15.41\ m^2$

$A_{10} = (30m)(52.67\ m) = 1,580.10\ m^2$

$A_{11} = (7.76\ m)(18.60\ m) = 144.34\ m^2$

$A_{12} = (30m)(14.95\ m) = 448.50\ m^2$

$A_{13} = (1m)(1m) - \pi (1m)^2/4 = 0.21\ m^2$

$A_{14} = (9m)(9m) - \pi (9m)^2/4 = 17.38\ m^2$

$A_{15} = (152.94\ m)(9m) = 1,376.46\ m^2$

$A_{16} = \left(\frac{9.32m + 9.49m}{2}\right)(18m) - \left[\frac{(9m)(2.91m)}{2} + \frac{\pi (9m)^2 (75°)}{360°}\right]$

$= 60.43\ m^2$

$A_{17} = \left(\frac{64.31m + 21.22m}{2}\right)(160.79m) - \left[(14.19m)(74.67m) + \left(\frac{34.54m + 25.85m}{2}\right)(2.83m) + \frac{(20.35m)(75.96m)}{2} + \frac{\pi (5m)^2}{4} + (4.36m)(5m) + \frac{(4.83m)(1.29m)}{2} + \frac{\pi (5m)^2 (75°)}{360°} + \frac{\pi (9m)^2}{4} + (9m)(16.85m) + \frac{\pi (9m)^2 (105°)}{360°}\right]$

$= 4,422.97$

$A_1 = \Sigma (A_1 - A_{17}) = 12,899.28\ m^2$

		Prepared by		Checked by	
		Karlo G.	24 / June / 2002		1 / 200

FN: Calculation_Sheet

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	SUBGRADE PREPARATION	Page No.	Rev.

References/ Notes

A2 :

$A_1 = (155\,m)(16.50\,m) = 2,557.50\ m^2$

$A_2 = \pi(20m)^2/4 = 314.16\ m^2$

$A_3 = (20m)(20m) - \pi(20m)^2/4 = 85.84\ m^2$

$A_4 = (20m)(46.34m) = 926.80\ m^2$

$A_5 = \left(\frac{0.59m + 2m}{2}\right)(1.41m) - \frac{\pi(2m)^2(45°)}{360°} = 0.26\ m^2$

$A_6 = \left(\frac{20.59m + 30.25m}{2}\right)(9.66m) = 245.56\ m^2$

$A_7 = (62.16m)(30.25m) = 1,880.34\ m^2$

$A_8 = (2m)(2m) - \pi(2m)^2/4 = 0.86\ m^2$

$A_9 = \left(\frac{1.48m + 3.25m}{2}\right)(1.97m) + \left(\frac{3.25m + 0.59m}{2}\right)(2.57m) + \left[\left(\frac{0.59m + 2m}{2}\right)(1.41m) - \frac{\pi(2m)^2(45°)}{360°}\right]$

$= 9.38\ m^2$

$A_{10} = (63.84m)(20m) = 1,276.80\ m^2$

$A_{12} = \left(\frac{1.36m + 6.60m}{2}\right)(4.12m) - \left[\frac{\pi(6.67m)^2(29.86°)}{360°} + \frac{(0.96m)(6.60m)}{2}\right]$

$= 1.64\ m^2$

$A_{13} = (24.46m)(5.23m) - (5.23m)(1.51m) = 120.03\ m^2$

$A_{14} = (2m)(2m) - \pi(2m)^2/4 = 0.86\ m^2$

$A_{15} = (8m)(29.46m) - \left[\frac{\pi(0.76m)^2}{2} + (1.24m)(1.51m)\right] = 232.90\ m^2$

$A_{16} = (42.50m)(5m) = 62.50\ m^2$

$A_{17} = (1.50m)(1.50m) - \pi(1.50m)^2/4 = 0.48\ m^2$

$A_{18} = (11.94m)(19.85m) - \left[(3.85m)(5.94m) + (4.53m)(0.94m) + \frac{\pi(0.47m)^2}{2}\right]$

$= 209.53\ m^2$

$A_{19} = \left\{(11m)(31m) + \left[(1m)(1m) - \pi(1m)^2/4\right]\right\} - \left[(1.50m)(1m) + \pi(0.5m)^2/2\right]$

$= 341.40\ m^2$

		Prepared by		Checked by	
		Koila G.	26 / Jun / 2002		1 / 1200

FN: Calculation_Sheet

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	SUBGRADE PREPARATION	Page No.	Rev.

References/ Notes

$A_{20} = (5.06\,m)(6\,m) = 30.48\,m^2$

$A_{21} = (1.50\,m)(1.50\,m) - \pi(1.50\,m)^2/4 = 0.48\,m^2$

$A_{22} = (8\,m)(5\,m) = 40\,m^2$

$A_{23} = (2\,m)(2\,m) - \pi(2\,m)^2/4 = 0.86\,m^2$

$A_{24} = (11.95\,m)(16\,m) = 191.20\,m^2$

$A_{25} = (14.43\,m)(5.55\,m) = 31.19\,m^2$

$A_{26} = (2\,m)(2\,m) - \pi(2\,m)^2/4 = 0.86\,m^2$

$A_{27} = (5.36\,m)(11.43\,m) - \left[(1.62\,m)(1\,m) + \frac{\pi(4.5\,m)^2}{2}\right] = 56.26\,m^2$

$A_{28} = (2\,m)(2\,m) - \pi(2\,m)^2/4 = 0.86\,m^2$

$A_{29} = \left(\frac{1.89\,m + 2.00\,m}{2}\right)(1.89\,m) - \frac{\pi(2\,m)^2(93\,32')}{360°} = 0.48\,m^2$

$A_{30} = (0.85\,m)(0.75\,m) - \pi(0.75\,m)^2/4 = 0.28\,m^2$

$A_{31} = (1.18\,m)(0.096\,m)/2 = 0.06\,m^2$

$A_{32} = \left(\frac{6.60\,m + 1.36\,m}{2}\right)(4.12\,m) - \frac{\pi(6.79\,m)^2(29\,30')}{360°} - \frac{(1.01\,m)(6.71\,m)}{2}$

$= 1.22\,m^2$

$A_{33} = (4.095\,m)(8.50\,m) = 34.81\,m^2$

$A_2 = \Sigma(A_1 - A_{33}) = 8,715.83\,m^2$

$A_T = A_1 + A_2 = 12,899.28 + 8715.83 - 3416$

$= \cancel{21,615.11}\,m^2 \simeq \cancel{22,000}\,m^2$

$18199.11 \simeq 19,000$

$A = \cancel{22,000}\,m^2$

$19,000$

		Prepared by		Checked by	
		Karla G.	26 / June/2002		/ /200

FN: Calculation_Sheet

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE 3)	**Pay Item No. (BOQ)**	2G - 0302
Quantity Item	SUBBASE COURSE	**Unit**	m3

Calculation Procedure Applied

Pavement area was computed using geometric formulas.
Pavement volume was obtained multiplying the area to the thickness of each type of course.
The volume was computed with zero decimal for total.

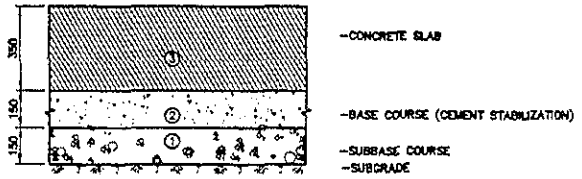
References, Calculation Base and Revisions

References : Tender Drawings :
DW - PV - 00 - 001 General Plan of Pavement Area
DW - PV - 00 - 004 Typical Section of Pavement and Road.

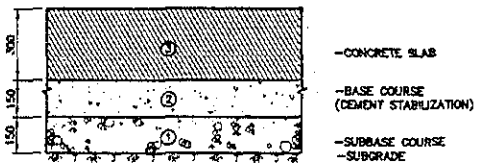
Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla Godio	26 June 2002		Mr. Inuma		Mr. Ando		
1								
2								
3								

TYPICAL SECTION OF PAVEMENT

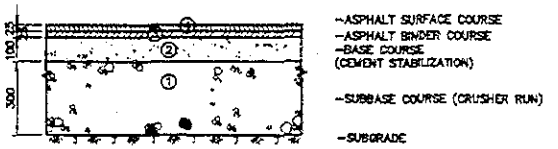
SCALE : 1:20



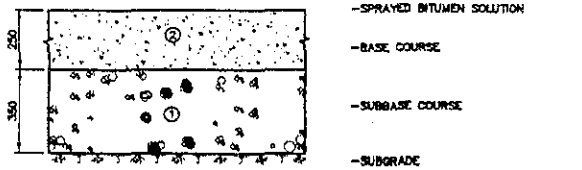
TYPE 1 CONCRETE PAVEMENT
(FOR R.T.G. TRAFFIC LANE)



TYPE 2 CONCRETE PAVEMENT

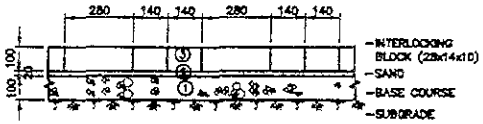


TYPE 3 ASPHALT CONCRETE PAVEMENT



TYPE 4 MACADAM PAVEMENT (1)

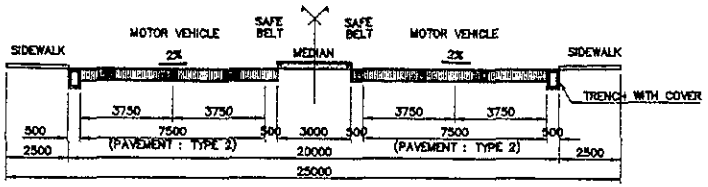
TYPE 5 MACADAM PAVEMENT (2)



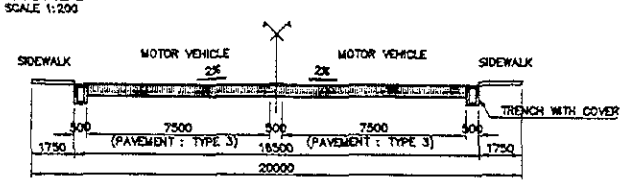
TYPE 6 INTERLOCKING CONCRETE BLOCK PAVEMENT
(FOR SIDEWALK)

TYPICAL SECTION ROADS

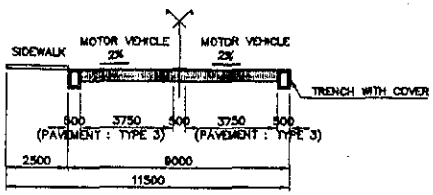
SCALE 1:200



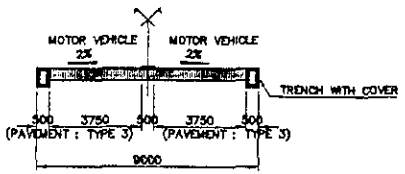
TYPICAL SECTION OF MAIN ROAD (TYPE A)



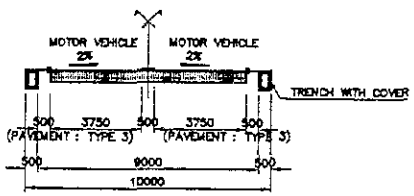
TYPICAL SECTION OF SUB-TRUNK ROAD (TYPE B)



TYPICAL SECTION OF
BRANCH ROAD (TYPE C)



TYPICAL SECTION OF
BRANCH ROAD (TYPE D)



TYPICAL SECTION OF
BRANCH ROAD (TYPE E)

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)	DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR NIPPON KOEI CO., LTD.	DESIGNED BY : CHECKED BY : APPROVED BY :	SECTION : ROAD AND PAVEMENT SUB-SECTION : GENERAL TITLE : TYPICAL SECTION OF PAVEMENT AND ROAD	DATE : JULY/2002 SCALE : INDICATE DRAWING NO. DW-PV-00-004

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	SUBBASE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{22,000}\ 19,000\ m^2$

$t = 30\ cm$

$V = (\cancel{22,000}\ 19,000\ m^2)(0.30\ m)$

$V = \cancel{6,600}\ 5,700\ m^3$

$V = \cancel{6,600}\ 5,700\ m^3$

		Prepared by		Checked by	
		Kolo G.	26 / Junc/2002		1 /200

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE 3)	**Pay Item No. (BOQ)**	2G-0303
Quantity Item	BASE COURSE	**Unit**	m^3

Calculation Procedure Applied

Pavement area was computed using geometric formulas.
Pavement volume was obtained multiplying the area to the thickness of each type of course.
The volume was computed with zero decimal for total.

References, Calculation Base and Revisions

References : Tender Drawings :

DW - PV - 00 - 001 General Plan of Pavement Area.

DW - PV - 00 - 004 Typical Section of Pavement and Road.

(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla Garcia	26 June 2002		M. Inuma		M. Ando		
1								
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3								

FN : Calculation_Cover_Sheet_020504_seg cover

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	BASE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{22,000}\ 19,000\ m^2$

$t = 10\ cm$

$V = (\cancel{22,000}\ 19,000\ m^2)(0.10\ m)$

$V = \cancel{2,200}\ 1,900\ m^3$

$V = \cancel{2,200}\ 1,900\ m^3$

		Prepared by		Checked by	
		Kaila G.	26 / Junc / 2002		1 / 200

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NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE 3)	**Pay Item No. (BOQ)**	2G - 0304
Quantity Item	PRIME COATING	**Unit**	m^2

Calculation Procedure Applied

Pavement area was computed sectioning the prime coating area into small section areas and using geometric formulas.

The area was computed with zero decimal for total.

References, Calculation Base and Revisions

References : Tender Drawings :

DWG-SV-00-001 General Plan of Pavement Area

(Same as "Subgrade Preparation")

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Kaila Goria	26 June 2002		Mr. Inuma		Mr. Ando		
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Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE 3)	Calc. Index No.	
Subject	PRIME COATING	Page No.	Rev.

	References/ Notes
$A = \cancel{22,000}\ m^2$	$A = 22,000\ m^2$
19,000	

		Prepared by		Checked by	
		Koila G.	26 /June/2002		/ /200

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NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE-3)	**Pay Item No. (BOQ)**	2G - 0305
Quantity Item	ASPHALT BASE COURSE	**Unit**	M^3

Calculation Procedure Applied

Asphalt base volume was computed using geometric formulas.
The volume was computed multiplying the area to the thickness of the course.
Zero decimal was computed for total.

References, Calculation Base and Revisions

References: Tender Drawings:
DW - PV - 00 - 001 General Plan of Pavement Area
DW - PV - 00 - 004 Typical Section of Pavement and Road.

(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Kailag G.	3 July 2002		Mr. Inuma		[illegible]		
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Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE -3)	Calc. Index No.	
Subject	ASPHALT BASE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{22,000}\ 19,000\ m^2$

$th = 2.5\ cm$

$V = (\cancel{22,000}\ 19,000\ m^2)(0.025\ m)$

$V = \cancel{550}\ 475\ m^3$

$V = \cancel{550}\ 475\ m^3$

	Prepared by		Checked by	
	Koilo G.	3 /July /2002		/ /200

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QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE-3)	**Pay Item No. (BOQ)**	2G-0306
Quantity Item	TACK COATING	**Unit**	m^2

Calculation Procedure Applied

Tack coating area was computed using geometric formulas.

Area was computed with zero decimal.

References, Calculation Base and Revisions

References : Tender Drawings :

DW - PV - 00 - 001 General Plan of Pavement Area

(Same as "Subgrade Preparation")

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla Garcia	3 July 2002		Ms. Tsuma		Mr. Ando		
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Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE -3)	Calc. Index No.	
Subject	TACK COATING	Page No.	Rev.

References/ Notes

$A = \cancel{22,000}\ m^2$

$19,000$

$A = \cancel{22,000}\ m^2$

$19,000$

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NIPPON KOEI CO.,LTD.

QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	ASPHALT CONCRETE PAVEMENT (TYPE-3)	**Pay Item No. (BOQ)**	2G-0307
Quantity Item	SURFACE COURSE	**Unit**	m3

Calculation Procedure Applied

Surface course volume was computed using geometric formulas.

The volume was computed multiplying the area to the thickness of the course.

References, Calculation Base and Revisions

References: Tender Drawings:

DW - PV - 00 - 001 General Plan of Pavement Area

DW - PV - 00 - 004 Typical Section of Pavement and Road

(Same as "Subgrade Preparation and Subbase Course")

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla García	3 July 2002		Mr. Tsuma		Mr. Ando		
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3								

FN : Calculation_Cover_Sheet_020504_seg cover

NIPPON KOEI CO.,LTD.

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	ASPHALT CONCRETE PAVEMENT (TYPE-3)	Calc. Index No.	
Subject	SURFACE COURSE	Page No.	Rev.

References/ Notes

$A = \cancel{22,000}\ 19,000\ m^2$

$t = 2.50\ cm$

$V = (0.025\ m)(\cancel{22,000}\ 19,000\ m^2)$

$V = \cancel{550}\ 475\ m^3$

$V = \cancel{550}\ 475\ m^3$

	Prepared by		Checked by	
	Karla C.	31 July 2002		1 /200

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QUANTITY CALCULATION COVER SHEET

Project	Detailed Design on Port Reactivation Project in La Union Province	**Project Code**	JC1N004/2N001
Work Section Title	MACADAM PAVEMENT (1) (TYPE 4)	**Pay Item No. (BOQ)**	2G-0401
Quantity Item	SUBGRADE PREPARATION	**Unit**	m^2

Calculation Procedure Applied

Pavement area was computed sectioning the porporation area into small section areas and using geometric formulas.

The area was computed with two decimal for section area and zero decimal for total.

References, Calculation Base and Revisions

References: Tender Drawings:
DW-PV-00-001 General Plan of Pavement Area

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
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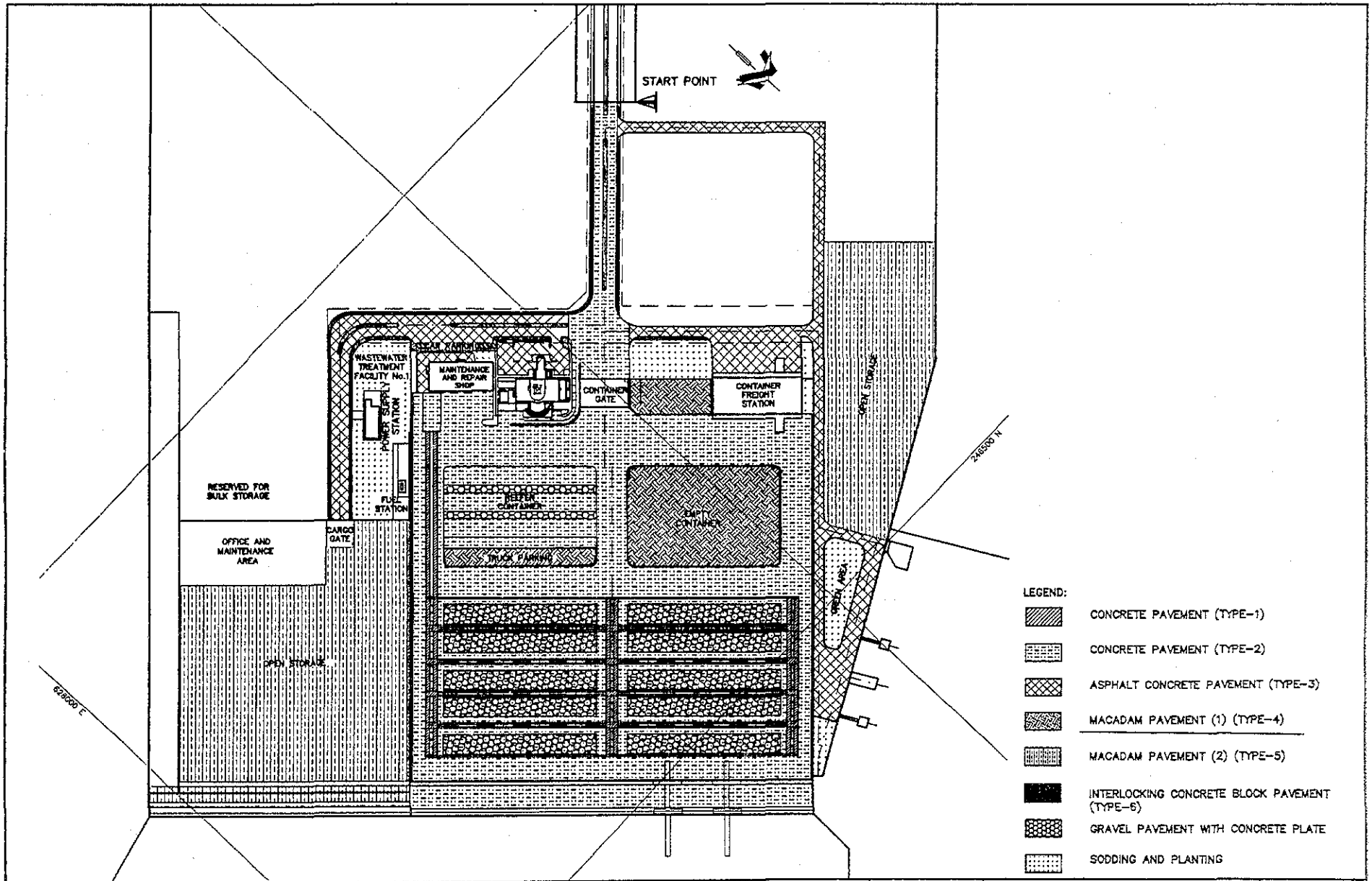
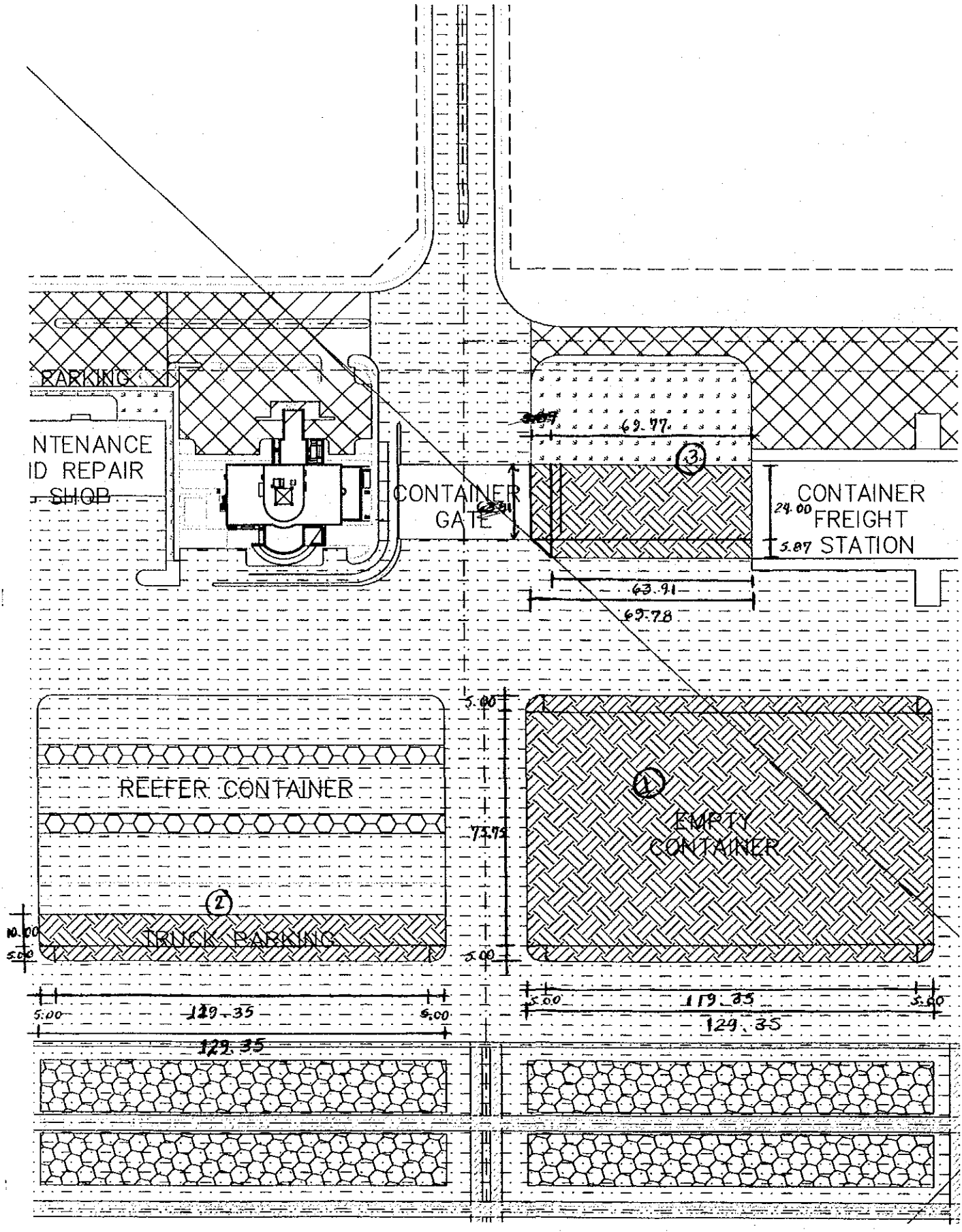
FN : Calculation_Cover_Sheet_020504_seg cover


START POINT
WASTEWATER TREATMENT FACILITY No.1
POWER SUPPLY STATION
MAINTENANCE AND REPAIR SHOP
CONTAINER GATE
CONTAINER FREIGHT STATION
OPEN STORAGE
246500 N
RESERVED FOR BULK STORAGE
FUEL STATION
REEFER CONTAINER
EMPTY CONTAINER
TRUCK PARKING
CARGO GATE
OFFICE AND MAINTENANCE AREA
OPEN STORAGE
628000 E
LEGEND:
CONCRETE PAVEMENT (TYPE-1)
CONCRETE PAVEMENT (TYPE-2)
ASPHALT CONCRETE PAVEMENT (TYPE-3)
MACADAM PAVEMENT (1) (TYPE-4)
MACADAM PAVEMENT (2) (TYPE-5)
INTERLOCKING CONCRETE BLOCK PAVEMENT (TYPE-6)
GRAVEL PAVEMENT WITH CONCRETE PLATE
SODDING AND PLANTING
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)
DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR
NIPPON KOEI CO., LTD.
SECTION : ROAD AND PAVEMENT
SUB-SECTION : GENERAL
GENERAL PLAN OF PAVEMENT AREA
DATE : JULY/2002
SCALE : 1 : 3000
DRAWING NO. DW-PV-00-001


PARKING
NTENANCE
ID REPAIR
SHOP
CONTAINER
GATE
69.77
3
CONTAINER
FREIGHT
STATION
24.00
5.07
63.91
69.78
REEFER CONTAINER
2
TRUCK PARKING
10.00
5.00
5.00
77.75
5.00
1
EMPTY
CONTAINER
5.00
119.35
5.00
129.35
5.00
129.35
129.35

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	MACADAM PAVEMENT (1) (TYPE 4)	Calc. Index No.	
Subject	SUBGRADE PREPARATION	Page No.	Rev.

References/ Notes

$A_1 = (75.75\,m)(129.35\,m) + (119.35\,m)(5\,m)(2) + \frac{\pi (5\,m)^2}{4}(4)$

$= 9,788.26\,m^2 + 1,193.50\,m^2 + 78.54\,m^2$

$= 11,070.30\,m^2$

$A_2 = (129.35\,m)(10\,m) + (119.35\,m)(5\,m) + \frac{\pi (5\,m)^2}{4}(2)$

$= 1,293.50\,m^2 + 596.75\,m^2 + 39.30\,m^2$

$= 1,929.55\,m^2$

$A_3 = \left(\frac{69.78\,m + 63.77\,m}{2}\right)(24\,m) + \left(\frac{69.78\,m + 63.91\,m}{2}\right)(5.84\,m)$

$= 1,674.60\,m^2 + 392.38\,m^2$

$= 2,066.98\,m^2$

$A = 16,000\,m^2$

$A = A_1 + A_2 + A_3 = 15,046.83\,m^2 \simeq 16,000\,m^2$

$A = 16,000\,m^2$

		Prepared by		Checked by	
		Koilo G.	26 / June / 2002		1 / 200

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