

付属資料 E : 施工済み構造物の転用可能性

1 Possibility of Usage of Existing Structures

Following structures were constructed in the NORTH Rail Project.

Table Bridge Accomplishment List

Bridge Name (Chainage)	Bored Piles	Pile cap	Pier Columns	Abutment Body	Coping Beam	Accomplished Percentage
Pascual Medium Bridge 117+759.28~117+796.30 L=37m	18/18	2/2	0/0	2/2	0/1	73%
Bocaua Major River Bridge 133+903.84~134+036.95 L=130m	53/53	5/6	3/4	0/2	0/6	50%
Santol Major River Bridge 135+975.35~136+109.66 L=134m	58/58	7/7	5/5	0/2	0/7	58%
Guiguinto Medium River Bridge 140+330.05~140+423.95 L=94m	42/42	3/5	6/3	0/2	0/5	39%
Guiguinto Viaduct 142+080.83~142+994.78 L=915m	277/313	37/38	30/36	0/2	0/38	53%
Malolos Viaduct 146+653.49~148+355.5 L=1,702m	572/573	66/70	66/70	0/2	6/71	60%
Total number of Structure	1,020/1,057	120/128	110/118	2/12	6/128	-
Accomplished Percentage	96%	94%	93%	17%	5%	-

Table Soil Improvement Accomplishment List

Chainage	Cement Mixing Pile	Jet Grouting Pile	Gravel Stone Pile	Accomplishment Percentage	Remarks
132+790~133+400 L=610m	-	2,992/6,712	-	46%	for Retaining Wall
133+415~133+785 L=370m	-	-	7,826/8,673	90%	for embankment
134+037~134+355 L=318m	-	4,122/4,750	-	87%	for Retaining Wall
136+109~136+215 L=106m	-	1,398/1,398	-	100%	for Retaining Wall
136+228~136+145 L=187m	5,245/5,245	-	-	100%	for Retaining Wall
136+438	137/137	-	-	100%	for Frame Culvert
136+660	151/151	-	-	100%	for Frame Culvert
136+890	120/127	-	-	92%	for Frame Culvert
137+135~137+600 L=465m	6,051/6,051	-	-	100%	for Retaining Wall
137+503	68/108	-	-	63%	for Frame Culvert
138+945	353/353	-	-	100%	for Frame Culvert
139+460	183/183	-	-	100%	for Frame Culvert
139+805~139+945 L=140m	5,359/5,359	-	-	100%	for Retaining Wall
139+973	199/199	-	-	100%	for Frame Culvert
140+228	152/152	-	-	100%	for Frame Culvert
140+250~140+295 L=45m	152/152	-	-	100%	for Embankment
140+464~140+650 L=186m	426/426	-	-	100%	for Retaining Wall
145+500~146+632 L=1,132m	7,921/7,921	-	-	100%	for Embankment
145+780	-	-	/	-	for Frame Culvert
145+800~146+200 L=400m	187/187	-	-	100%	
146+190	-	-	/	-	for Frame Culvert
146+200~146+550 L=350m	169/169	-	-	100%	
146+502	-	-	/	-	for Frame Culvert
146+550~146+653 L=103m	155/155	-	-	100%	

Table Other Structure Accomplishment List

Chainage	Structure Type	Accomplishment Percentage
116+382 ~ 116+822 L = 440m	Normal Embankment	100%
116+822	Frame Culvert	100%
116+822 ~ 117+759	Normal Embankment	100%

Detailed plan/vertical alignment for the AER will be decided in the next stage, and it is necessary to confirm whether these structures can be re-used or not for reduction of implementation project cost.

An example of the reviewing and checking method for structure design/condition in the design stage and Construction stage are shown below.

(1) Design stage

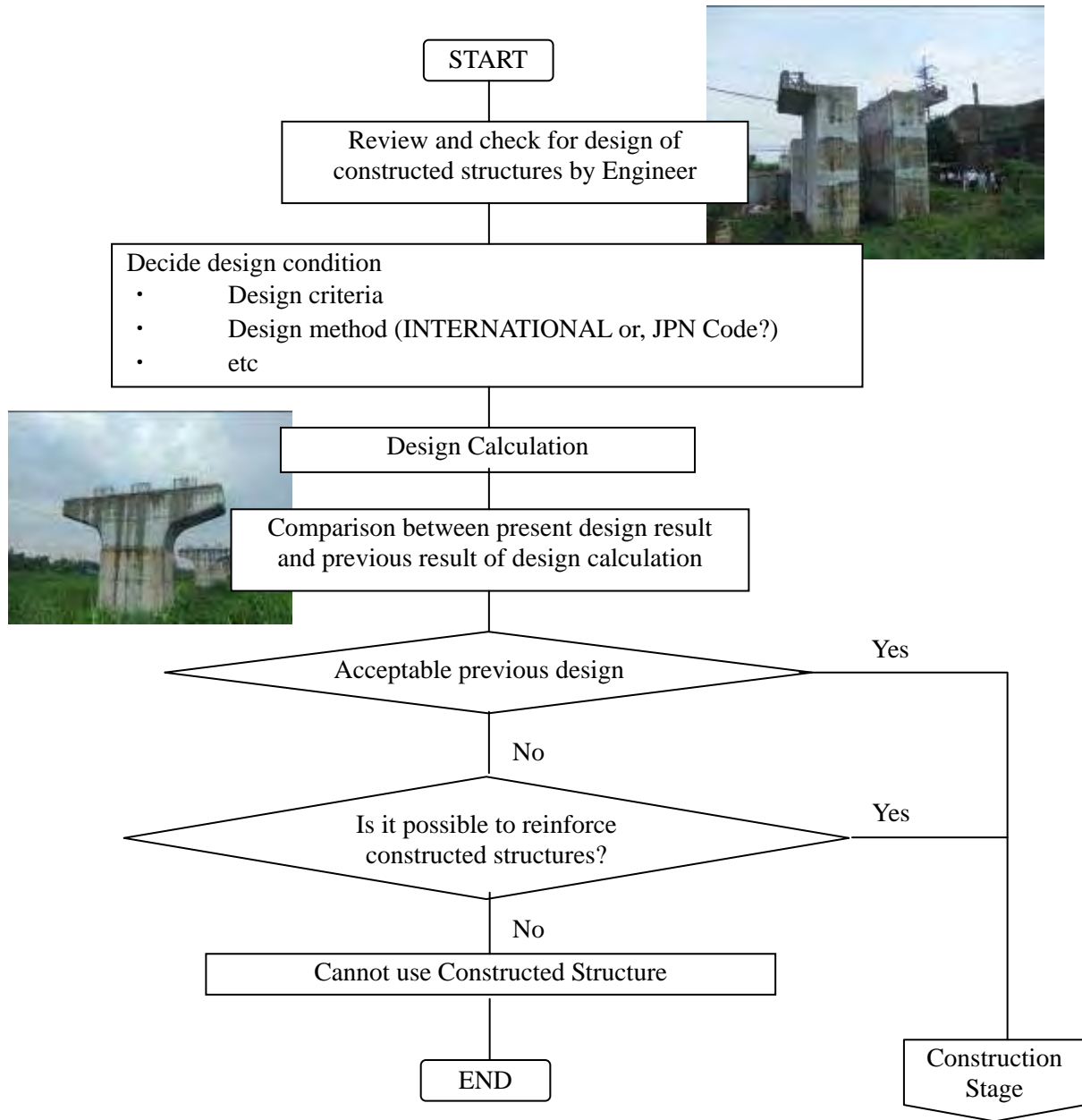


Figure Review and Check flowchart in Design stage

(2) Construction stage

The flowchart below shows the review and check method for constructed structures in the construction stage under the FIDIC Yellow Contract which will be applied for Civil works. Also the amount of the contract does not include new structure design/construction to replace the existing constructed structures.

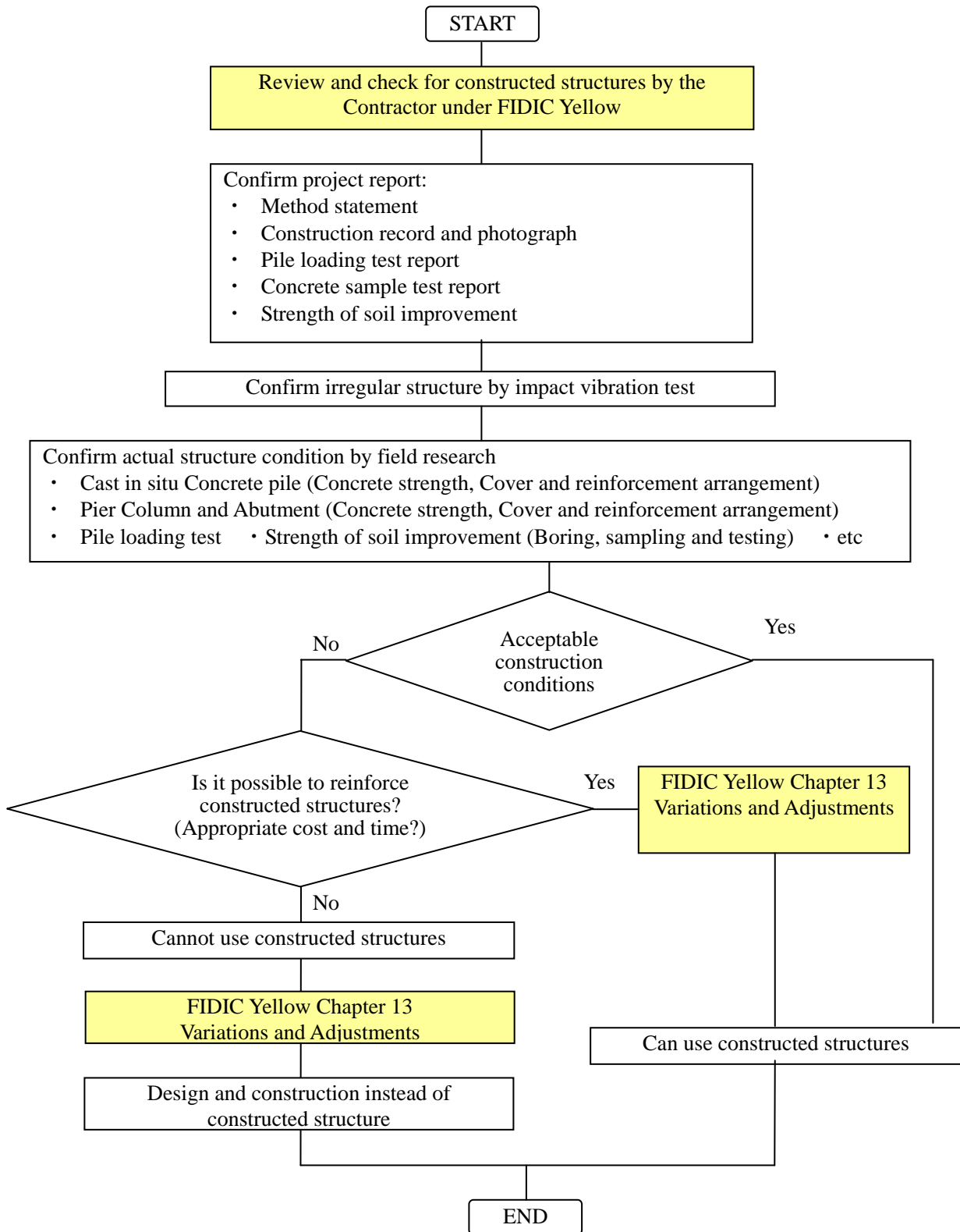


Figure Review and Check flowchart in Construction stage

2 Data Collection of Geological Investigation

2.1 Geological Data by Northrail

The Spanish Railway Group prepared a Basic Design with Geological Investigation for High Speed Train between Clark and Caloocan in 1997.

After that Sinomach under a Chinese loan prepared an Original Contract Design for North Luzon Railway Project phase 1 in 2005. However, they produced an Amended Contract Design from 2008 to 2010 because it was very difficult to conduct land acquisition. And then they completed a Modification Design including Preliminary Design from 2010 to 2011 in order to proceed to construction stage. A Chinese Contractor has carried out a Soil Investigation at each stage above.

1) Spanish Railway Group

Regarding the Basic Design of the Spanish Railway Group, there are some documents in the Northrail Library. However, there is no data regarding soil investigations. None of the Northrail Staff took over any documents regarding soil information from the Spanish Railway Group.

2) Sinomach

Sinomach has conducted soil investigation for 3 stages and phase 1 of section 1 was between Caloocan and Malolos and section 2 was between Malolos and Angeles.

Soil Investigations by Sinomach seem to be conducted in the Chinese style in section 1 and there is not enough soil investigation in section 2. There is no soil investigation between Angeles and Clark.

The soil investigations in 2005 and 2007, did not record N value data as standard penetration test with investigation report based on the design in the Chinese style. Therefore it is very difficult to judge in order to use directly on the design in the Japanese style. It seems to be necessary to carry out additional boring as confirmation, if existing boring distance is more than 2km.

There are soil data with N values by Standard Penetration Test in 2010. It seems to be possible to use existing soil data for design of structures.

2.2 NLEX – SLEX CONNECTOR ROAD by JICA PPP Study

NLEX-SLEX Connector Road Project as JICA PPP Project has conducted a feasibility study with soil investigation between C-3 road and San Andres along PNR route in 2011. The soil Investigation was divided into 2 stages with 12 borings and 5 borings. It seems to be possible to use them.

However, it seems to be necessary to carry out 2 additional borings because existing boring distance between 2 locations is more than 2 km.

2.3 METRO MANILA SKYWAY Project Phase 1

There is a lot of soil investigation data for Metro Manila Skyway Phase 1 by Japan ODA loan between Buendia and FTI. It seems to be possible to use them.

2.4 Summary of existing soil investigation data along PNR Route.

Summary of existing soil investigation data is shown in the following table including SINOMACH, JICAPP Study and Metro Manila Skyway Project. It seems to be possible to use data of blue color, green color and brown color. However, it is necessary to carry out additional boring in case of existing boring distance between 2 locations more than 2km.

investigation based on Design Method in the Chinese style. Therefore, it is necessary to carry out additional soil investigation by boring every 2km.

3 Topographical Survey Phase 1 between EDSA and Malolos

3.1 Caloocan – Malolos

A Chinese Contractor has prepared a Long Plan and Profile Drawing for the Northrail Project including right of way and cross sections every 25m.

3.2 EDSA – Caloocan

DPWH and MNTC have prepared a Long Plan and Profile Drawing and Cross Section Drawing for Skyway, Connector Road and Segment 10. It seems to be possible to use this for AER Project. However, it is necessary to carry out a confirmation survey for AER route including PNR right of way because these drawings have been prepared for the Road.

3.3 Center line Survey between EDSA and Malolos

A China Contractor has carried out a topographical survey with coordinates in order to set kilometer posts for the Northrail Project. However, it is necessary to carry out a center line survey between EDSA and Malolos through Caloocan because it would not use kilometer posts by China Contractor.

4 Other survey Phase 1 between EDSA and Malolos

There is no information for utility relocation between Caloocan and EDSA. It is necessary to carry out a survey if including underground gas pipes, water pipes, high voltage poles, and so on.

付属資料 F : 協議記録

頁

テクニカルワーキンググループ協議 (TWG) F-2

- TWG 1: 2012 年 10 月 25 日
- TWG 2: 2012 年 11 月 28 日
- TWG 3: 2013 年 2 月 6 日

合同調整会議 (JCC) F-17

- JCC 1: 2012 年 12 月 10 日
- JCC 2: 2013 年 2 月 14 日

電力会社へのヒアリング結果 F-29

- NGCP: 2013 年 1 月 13 日
- SFELAPCO: 2013 年 1 月 13 日
- MERALCO: 2013 年 1 月 21 日

Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

Technical Working Group Meeting - Minutes of Meeting

Date : 25 October 2012
Place : Unit 156, DOTC Conference Room
Attendance : Please refer to attached list
Time : 10:00 hrs.

Items

- I. Meetings started at 10:15hrs with participants from DOTC, DPWH, NEDA, Northrail, PNR, Embassy of Japan, JICA and JICA Study Team, and other TWG members.
- II. Introduction of Participants.
- III. Mr. Deo Manalo gave an overview of the project, since the mobilization of Consultants from September 2012 including the Kick-off meeting.
- IV. Explanation of Airport Express Railway (AER) Route options from Clark Airport to Metro Manila (MM), and within MM.
 - 1) JICA Study Team presented four (4) Route options from Clark to Metro Manila: These options include PNR Route or NLEX Route; and combination of PNR and NLEX alignments.
 - 2) JICA Study Team also presented five (5) route options within Metro Manila to connect at NAIA T3.
 - 3) TWG requested the JICA Study Team for the project implementation Schedule, and emphasised that it is important to implement this project as soon as possible.
 - 4) DOTC explained to NEDA that the Clark has to be developed as a Philippines Gateway airport whether it has dual role with NAIA, or as a single gateway airport for Philippines. DOTC pointed out that as presented to the President, that NAIA cannot accommodate the future demand, and to adopt a single or dual airport option, or close NAIA and to transfer all the operations to Clark.
 - 5) JICA Study Team explained to TWG that the requested ROW requirement for typical elevated section is 12m, but 14.9m width is necessary during construction. In case of NLEX alignment option one lane on both sides of the carriageway will be needed during construction.
 - 6) TWG requested to the Study Team to consult with MMDA regarding the construction of provincial bus stations in MM, and take account of the terminals when planning the AER alignment. The responsibility of developing the bus terminal was clarified by Northrail that MMDA is assigned to develop South West, DPWH to South East and DOTC for the North Bus Terminal.
 - 7) During the previous meeting with DOTC and JICA, it was mentioned that the travel time from Metro Manila to Clark should be around 45min. According to JICA Study Team, maximum speed AER within Metro Manila could not be determined at this stage of the project due to a number of

reasons, such as number of stations, which increase the travel time. However this average speed range from 40 to 50kph within density populated urban areas.

- 8) DOTC inquired on how this project would be integrated with the detailed engineering design of SLEX-NLEX connection project. JICA Study team answered that the detailed structure study is not within the scope of this project and study team examines the technical possibility of alignment and location of station only.
- 9) DOTC requested JICA Study Team to submit recommendations for the sidings tracks required for the mixed commuter and express train operation. JICA Team will submit the information to DOTC after the ridership forecast analysis and will develop station design accordingly.
- 10) DOTC requested the JICA Study Team to provide rough estimate of project costs for the four recommended alignment options. JICA Study Team gave the rough estimates of PhP240Billion for alignment from Clark to Metro Manila and PhP80Billion for the section within Metro Manila.
- 11) JICA Study Team recommended four (4) alignment options and requested DOTC to confirm that the Study Team may proceed with these four or fewer options for further analysis.
- 12) DOTC suggested that the project cost and designs should be discussed in more detail at the next TWG Meeting to be held by 3rd week of November 2012. Mr. Ito, Senior JICA Representative requested that the comments on the TWG meeting and confirmation of the selected options be submitted to JICA Study Team within 2 days after the meeting, or no later than Tuesday, October 30, 2012.
- 13) Mr. Ito requested DOTC to immediately start its internal discussions on the alignments so as to decide its preferable one before the Joint Coordination Committee (JCC). Mr. Feliciano Assistant Secretary of DOTC, responded that he would start discussing the alignments with NEDA and other relevant organizations accordingly.

The meeting was adjourned at 12:40hrs.

Prepared by:



DAISUKE NANJO

Railway Civil Engineering/Facility Plan
JICA Study Team

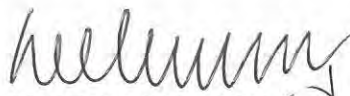
Concurred by:



KAZUMASA YAMAOKA

Deputy Team Leader
JICA Study Team

Noted by:



RENE K. LIMCAOCO
Undersecretary for Planning



**JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region**



ATTENDANCE SHEET

Subject : Technical Working Group Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue : Room 156, DOTC Training Room

Date : 25 October 2012

Time : 10:00AM

NO.	NAME	COMPANY/OFFICE	CONTACT NO.	SIGNATURE
1	Rene K. Limcaoco/Undersecretary	DOTC		
2	Jim Feliciano	DOTC		
3	Deo Leo Manalo	DOTC	0917-8320039	
4	F. Rey Alano	DPWH	304-3148	
5	G. Catapang	NEDA		
6	Ed Remonte	PNR	319-0063	
7	Rene Santiago	Northrail Advisor		
8	Aldrin Gatus	Northrail	0928-5005996	
9	Luisito Constantino	Northrail	0927-3567169	
10	Cristina Quinalayo	Northrail		
11	Preciosa Famadico	Northrail	0947-3025626	
12	Rodel Lim Rañola	Northrail	0917-8533021	
13	Simon Dabu	Northrail	0923-3497004	
14	Voltaire Tica	Northrail	0918-5022801	
15	Fidel Ayala, Jr.	Northrail	0906-4634296	
16	Jonor Ataas	Northrail	0919-8491425	
17	Masayuki Harigai	Embassy of Japan	0918-9097512	
18	Susumu Ito	JICA		
19	Hayato Maruyama	JICA		
20	Joan Salapare	JICA	889-7119	
21	Shinya Nakamura	JICA Study Team		
22	Kazumasa Yamaoka	JICA Study Team		

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for the Greater Capital Region**

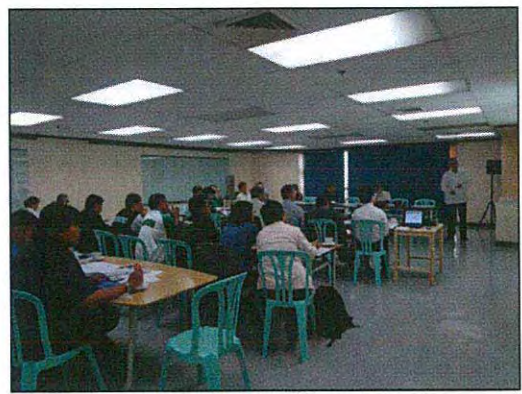
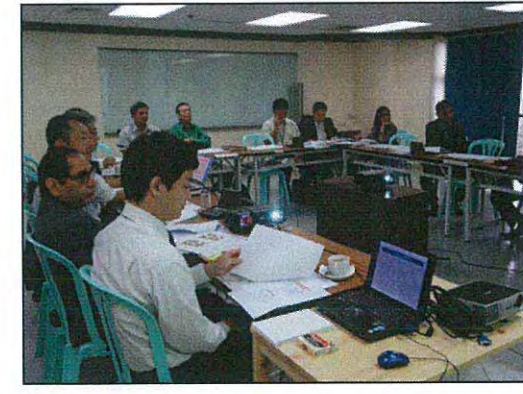
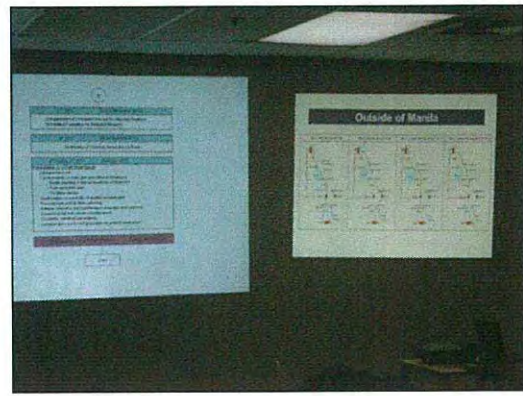
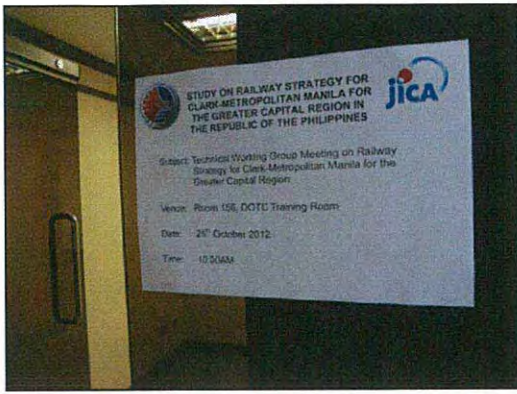


NO.	NAME	COMPANY/OFFICE	CONTACT NO.	SIGNATURE
23	Mazhar Iqbal	JICA Study Team		
24	Daisuke Nanjo	JICA Study Team		
25	Hiroshi Utsugi	JICA Study Team		
26	Jorge Müller	JICA Study Team		
27	Tetsuo Wakui	JICA Study Team		
28	Makoto Okamura	JICA Study Team		

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Key

Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

Technical Working Group Meeting - Minutes of Meeting

Date : November 28, 2012
Place : Unit 167, DOTC Conference Room
Attendance : Please refer to attached list
Time : 10:00 hrs.

Items

- I. Meetings started at 10:00hrs with participants from DOTC, DPWH, NEDA, BCDA, Northrail, PNR, JICA and JICA Study Team, and other TWG members.
- II. Introduction of Participants.
- III. Mr. Deo Manalo, from the DOTC gave an overview of the project and the last TWG meeting that was held on October 25, 2012. He also informed that the JCC meeting would be held on December 10 to discuss the selected route plan for Airport Express Railway (AER), final selection of best route plan and station location for AER. By December 14, 2012 the alignment for the NLEX/SLEX Connector and also the Stage 3 of the Skyway will be decided. DOTC needs final decision on the alignment because AER project will give impact to other projects.
- IV. Explanation of Selected Route Plan for AER; Final selection of best Route Plan and station location for AER.
 - 1) JICA Study Team explained the Selected Route Plan and the best recommendation for route and station locations.
 - 2) JICA Study Team explained demand forecast including fare structure.
 - 3) DPWH requested the figure of number of passengers for road transportation of DPWH project. JST replied that no data was available for road transportation.
 - 4) PNR pointed out that PNR structure would be affected by the proposed underground alignment. JICA Study Team explained that AER project would not affect to PNR.
 - 5) DOTC suggested having a separate discussion on the alignment of the DPWH Expressway Connector.
 - 6) BCDA asked the JICA Study Team to make construction phasing plan for optimum benefit to the government.
 - 7) JICA Study Team recommended Option A and D, utilizing NLEX route between CIA and Buro I.C, but DOTC wanted to have further study on land acquisition on resettlement issues.
 - 8) DOTC requested to JICA Study Team to work with Northrail counterpart to study a value on the ROW and number of informal settler.

- 9) JICA suggested to have only one Option and requested DOTC to explain conclusion to the DOTC Secretary so the JICA Study Team would not do so much changes in the Study.
- 10) DOTC decided to have another TWG meeting on December 6 in order to finalize the alignment.

The meeting was adjourned at 13:05hrs.

Prepared by:



DAISUKE NANJO

Railway Civil Engineering/Facility Plan
JICA Study Team

Concurred by:



KAZUMASA YAMAOKA

Deputy Team Leader
JICA Study Team

Noted by:



RENE K. LIMCAOCO

Undersecretary for Planning





**JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region**



ATTENDANCE SHEET

Subject : Technical Working Group Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue : Room 167, DOTC Training Room

Date : 28 November 2012

Time : 10:00AM

NO.	NAME	COMPANY/OFFICE	CONTACT NO.
1	Rene K. Limcaoco/Undersecretary	DOTC	
2	Deo Leo Manalo	DOTC	0917-8320039
3	Dean Santiago	BCDA	575-1752
4	Rebecca Garsuta	DPWH	304-3148
5	Gabriel Catapang	NEDA	0906-4241180
6	Ed Remonte	PNR	319-0063
7	Conrado Tolentino/President	Northrail	0917-5654297
8	Rene Santiago	Northrail	0917-5386550
9	Aldrin Gatus	Northrail	0928-5005996
10	Luisito Constantino	Northrail	0927-3567169
11	Cristina Quinalayo	Northrail	
12	Preciosa Famadico	Northrail	0947-3025626
13	Rodel Lim Rañola	Northrail	0917-8533021
14	Simon Dabu	Northrail	0923-3497004
15	Voltaire Tila	Northrail	0918-5022801
16	Fidel Ayala, Jr.	Northrail	0906-4634296
17	Jonor Ataat	Northrail	0919-8491425
18	Oliver Juico	Northrail	
19	Jesus Enrico Salazar	Northrail	0920-9089600
20	Arnold Mendoza	Northrail	0917-5405866
21	Susumu Ito	JICA	889-7119
22	Hayato Maruyama	JICA	889-7119

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25	Mazhar Iqbal	JICA Study Team	945-7842/727-7960 loc. 285
26	Daisuke Nanjo	JICA Study Team	945-7842/727-7960 loc. 285
27	Setsuo Kikuchi	JICA Study Team	945-7842/727-7960 loc. 285
28	Jorge Müller	JICA Study Team	945-7842/727-7960 loc. 285
29	Koyo Ogasawara	JICA Study Team	945-7842/727-7960 loc. 285
30	Makoto Okamura	JICA Study Team	945-7842/727-7960 loc. 285
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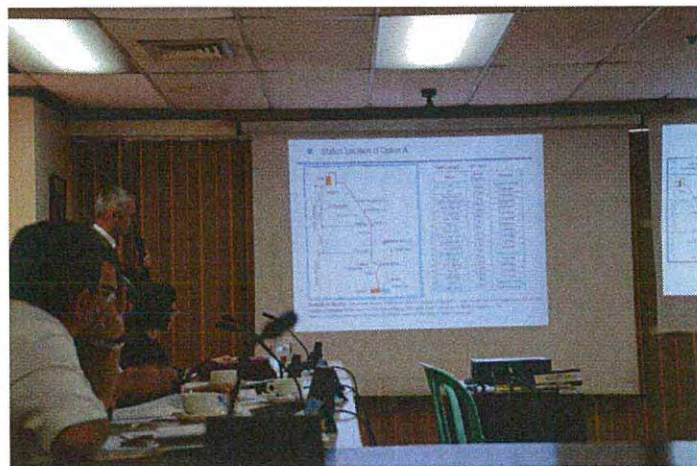
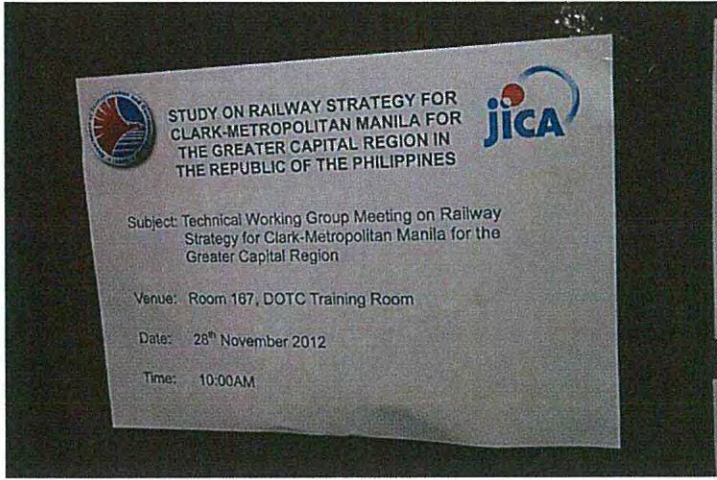


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Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

Technical Working Group Meeting - Minutes of Meeting

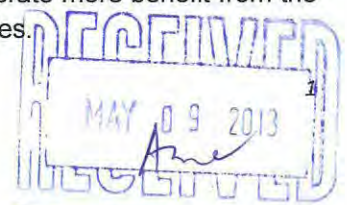
Date : February 06, 2013
Place : Unit 167, DOTC Conference Room
Attendance : Please refer to attached list
Time : 10:00 hrs.

Items

- I. Meetings started at 10:00hrs with participants from DOTC, NEDA, BCDA, Northrail, PNR, EOJ, JICA and JICA Study Team.
- II. Introduction of Participants.

Mr. Shinya Nakamura, JST gave an overview of the project which is about to finalize this month. Also the two previous TWG and JCC meeting on where was discussed the selected route plan for Airport Express Railway (AER), also the travel demand, economic and social consideration, cost estimate and schedules. Today, TWG will discuss the remaining issues of the railway system as proposed by JST and to discuss the results with the counterpart from DOTC and Northrail, including Rolling Stock planning operation, electrical and mechanical system, economic and financial analysis and also the Operation and Maintenance system.

- III. Explanation of Selected Route Plan for AER; Demand, Operation, System, Cost and Schedule, Environmental and Social Considerations, Economic and Financial Analysis and proposal of O&M System.
 - 1) Dr. Müller presented not only the proposed specifications of AER including the rolling stock features but also the result of the financial analysis.
 - 2) BCDA requested to JST the location plans of passing lanes between EDSA and Valenzuela Station. It might raise additional land acquisition and would give impact to the current on-going SLEX-NLEX connector project, therefore DOTC suggested to clarify the location of the passing lanes.
 - 3) Northrail pointed that SFELAPCO replied that the power supply of large amount capacity is "possible".
 - 4) DENR required submitting the new EIA study focusing on the update of resettlement action plan.
 - 5) Mr. Manalo requested Northrail to review the validity of the ECC for SLEX-NLEX connector project because the approval for railway might be involved with it as they are using the same ROW.
 - 6) BCDA suggested a consideration of non-fare revenue as it might generate more benefit from the private sector through promoting their business investment opportunities.



- 7) JST proposed the O&M Management Systems, namely Luzon Railway Corporation (LRC) and Philippines Railway Authority (PRA) which would be both established under DOTC.
- 8) JICA follow up with DOTC in relation to the coordination with DPWH for SLEX-NLEX Connector Project, on when to finalize the structure plans of the AER. DOTC informed JICA that DPWH & MNTC would submit the design by next week and requested JST to assist the design review.
- 9) Usec. Limcaoco suggested to have the next full-blown feasibility study in two staged.. The first stage might concentrate on the requirements for NEDA submissions, and the second stage items to be completed.

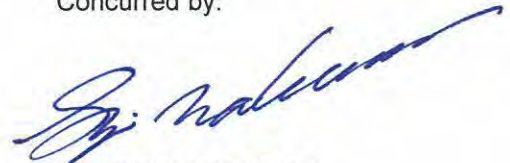
The meeting was adjourned at 12:45hrs.

Prepared by:



KAZUMASA YAMAOKA
Deputy Team Leader
JICA Study Team

Concurred by:

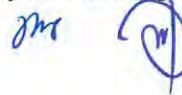


SHINYA NAKAMURA
Deputy Team Leader
JICA Study Team

Noted by:



HON. RENE K. LIMCAOCO
Undersecretary for Planning





*JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region*



ATTENDANCE SHEET

Subject : Technical Working Group Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue : Room 167, DOTC Training Room

Date : 06 February 2013

Time : 10:00AM

NO.	NAME	COMPANY/OFFICE	CONTACT NO.
1	Rene K. Limcaoco/Undersecretary	DOTC	
2	Jaime Feliciano/Assistant Secretary	DOTC	
3	Deo Leo Manalo	DOTC	0917-8320039
4	Dean Santiago	BCDA	575-1752
5	Gabriel Catapang	NEDA	0906-4241180
6	Ed Remonte	PNR	319-0063
7	Conrado Tolentino/President	Northrail	0917-5654297
8	Jesus Enrico Salazar	Northrail	0920-9089600
9	Aldrin Gatus	Northrail	0928-5005996
10	Luisito Constantino	Northrail	0927-3567169
11	Cristina Quinalayo	Northrail	
12	Bryan Paul Encarnacion	Northrail	
13	Rodel Lim Rañola	Northrail	0917-8533021
14	Simon Dabu	Northrail	0923-3497004
15	Voltaire Tila	Northrail	0918-5022801
16	Fidel Ayala, Jr.	Northrail	0906-4634296
17	Jonor Ataat	Northrail	0919-8491425
18	Pio Asuncion	Northrail	
19	Masayuki Harigai	EOJ	
20	Eki Kakuta	JICA	889-7119
21	Joan Salapare	JICA	889-7119
22	Floro Adviento	JICA	889-7119

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Railway Strategy for Clark-Metropolitan Manila
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23	Ryuichi Kuwajima	JICA-DOTC	
24	Shinya Nakamura/Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
25	Kazumasa Yamaoka/Deputy Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
26	Tetsuo Wakui	JICA Study Team	945-7842/727-7960 loc. 285
27	Mitsuyuki Osawa	JICA Study Team	945-7842/727-7960 loc. 285
28	Koyo Ogasawara	JICA Study Team	945-7842/727-7960 loc. 285
29	Jorge Müller	JICA Study Team	945-7842/727-7960 loc. 285
30	Daisuke Nanjo	JICA Study Team	945-7842/727-7960 loc. 285
31	Atsushi Kamiyama	JICA Study Team	945-7842/727-7960 loc. 285

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STUDY ON RAILWAY STRATEGY FOR CLARK-METROPOLITAN MANILA FOR THE GREATER CAPITAL REGION IN THE REPUBLIC OF THE PHILIPPINES



Subject: Technical Working Group Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue: Room 166, DOTC Training Room

Date: 06th February 2013

Time: 10:00AM



Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

Joint Coordination Committee - Minutes of Meeting

Date : 10 December 2012
Place : Unit 156, DOTC Conference Room
Attendance : Please refer to attached list
Time : 10:00 hrs.

Items

- I. Meetings started at 10:40hrs with participants from DOTC, DPWH, NEDA, DOF, Northrail, PNR, EOJ, JICA and JICA Study Team (JST).
- II. Introduction of Participants.
- III. Mr. Shinya Nakamura, Team Leader of JST, explained an overview of the Study and summary of TWG which was held on October 25 and November 28, 2012. Mr. Nakamura also expressed the purpose of the JCC: to select the best alternative of the alignment and location of station for the Airport Express Railway (AER).
- IV. JST presented the recommended route plan and location of stations for AER.
 - 1) JST explained the condition of land acquisition and resettlement near the CIA of Option C (Outside of Manila: This route utilizes the existing PNR route from Caloocan to CIA. Inside of Manila: This route utilizes the existing PNR route from Caloocan to NAIA T3. The viaduct/underground goes through urbanized zones all the way to NAIA T3).
 - 2) DPWH informed that the alignment of the NLEX-SLEX connector road will be in conflict with the recommended alignment of AER. DPWH informed that the two proponents which are MNTC and CITRA group would decide the basic alignment by December 15.
 - 3) The AER will pass the side of the connector and will have additional expenses for additional ROW. DPWH pointed that the part of the contract with Metropacific will provide ROW cost for connector project.
 - 4) DPWH would present the connector road alignment on December 20 for the next NEDA Board.
 - 5) DOTC wanted to clarify the following three issues: (1) Period of construction, (2) Ridership (3) Project cost for proposed option. These would be asked upon a presentation of the project to the President.
 - 6) DOTC pointed that there are many commuters coming from Bulacan and Pampanga. Further argument might be required for more beneficial options for the stations either Bocaue or Malolos to maximize project benefit such as employment opportunity for people living outside Metro Manila. And DOTC pointed that the commuter fare (PhP): 20+1.5/km and Express Fare (PhP): 20+3/km of the AER seemed feasible.

- 7) Option C (Outside of Manila: This route utilizes the existing PNR route from Caloocan to CIA. Inside of Manila: This route utilizes the existing PNR route from Caloocan to NAIA T3) route was selected by JCC. And end of station of AER in Metro Manila is EDSA.
- 8) JST explained the construction phasing, DOTC suggested that Phase 1 is from EDSA to Malolos, Phase 2 is Malolos to CIA.
- 9) Mr. Ito of JICA Senior Representative confirmed the agreed alignment of Option C with JCC among 4 proposed Options. DOTC would present Option C to the DOTC secretary in early December. DOTC would be requesting for an appointment with the President to present the selected option.
- 10) Mr. Ito suggests to DPWH to share information among all JCC members and JST to feedback the discussion with DOTC Secretary regarding the connector road alignment.
- 11) Closing remarks from JICA Study Team.

The meeting was adjourned at 13:05hrs.

Prepared by:



DAISUKE NANJO

Railway Civil Engineering/Facility Plan
JICA Study Team

Concurred by:



KAZUMASA YAMAOKA

Deputy Team Leader
JICA Study Team

Noted by:



RENE K. LIMCAOCO

Undersecretary for Planning





**JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region**



ATTENDANCE SHEET

Subject : Joint Coordination Committee Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue : Room 156, DOTC Training Room

Date : 10 December 2012

Time : 10:00AM

NO.	NAME	COMPANY/OFFICE	CONTACT NO.
1	Rene K. Limcaoco/Undersecretary	DOTC	
2	Deo Leo Manalo	DOTC	0917-8320039
3	John Arman Narag	DOF	
4	Rebecca Garsuta	DPWH	304-3148
5	Gabriel Catapang	NEDA	0906-4241180
6	Rorelita R. Maralit	NEDA	
7	Ed Remonte	PNR	319-0063
8	Conrado Tolentino/President	Northrail	0917-5654297
9	Aldrin Gatus	Northrail	0928-5005996
10	Bryan Paul A. Encarnacion	Northrail	
11	Luisito Constantino	Northrail	0927-3567169
12	Cristina Quinalayo	Northrail	
13	Jonor Ataot	Northrail	0919-8491425
14	Rodel Lim Rañola	Northrail	0917-8533021
15	Simon Dabu	Northrail	0923-3497004
16	Voltaire Tila	Northrail	0918-5022801
17	Fidel Ayala, Jr.	Northrail	0906-4634296
18	Susumu Ito	JICA	889-7119
19	Hayato Maruyama	JICA	889-7119
20	Eri Kakata	JICA	889-7119
21	Ryuichi Kuwajima	JICA	
22	Masayuki Harigai	EOJ	889-7119

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D. Magio



**JICA Study on
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23	Floro Adviento	JICA	889-7119
24	Joan Salapare	JICA	889-7119
25	Shinya Nakamura/Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
26	Kazumasa Yamaoka/Deputy Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
27	Mazhar Iqbal	JICA Study Team	945-7842/727-7960 loc. 285
28	Setsuo Kikuchi	JICA Study Team	945-7842/727-7960 loc. 285
29	Daisuke Nanjo	JICA Study Team	945-7842/727-7960 loc. 285
30	Jorge Müller	JICA Study Team	945-7842/727-7960 loc. 285
31	Koyo Ogasawara	JICA Study Team	945-7842/727-7960 loc. 285
32	Makoto Okamura	JICA Study Team	945-7842/727-7960 loc. 285
33	Atsushi Kamiyama	JICA Study Team	945-7842/727-7960 loc. 285

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D. Nanjo

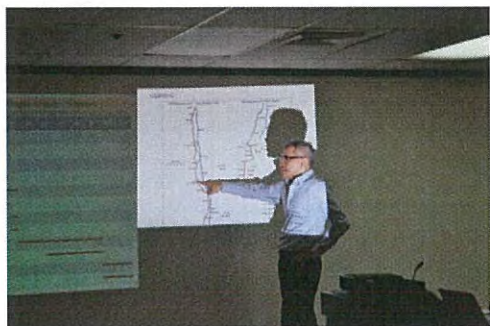
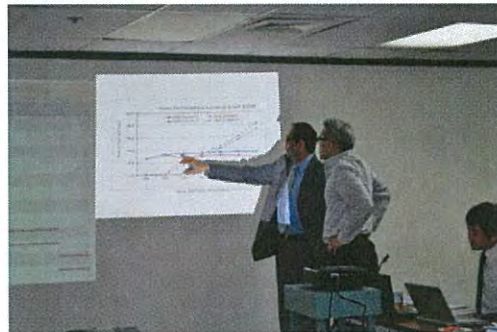
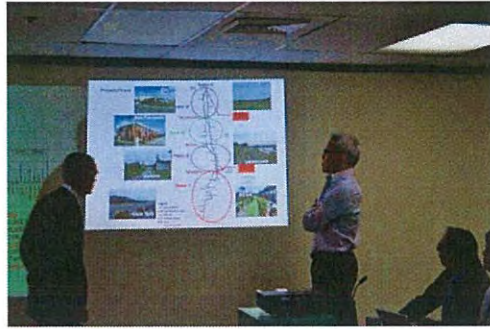

STUDY ON RAILWAY STRATEGY FOR CLARK-METROPOLITAN MANILA FOR THE GREATER CAPITAL REGION IN THE REPUBLIC OF THE PHILIPPINES


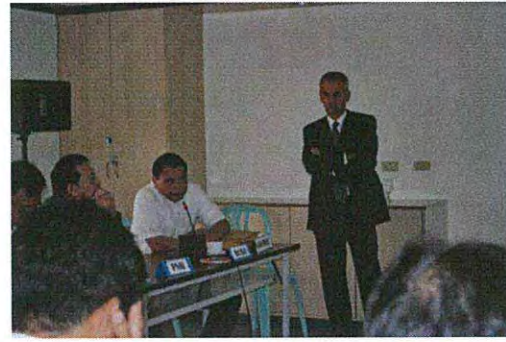
Subject: Joint Coordination Committee Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue: Room 167, DOTC Training Room

Date: 10th December 2012

Time: 10:00AM





Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

Joint Coordination Committee - Minutes of Meeting

Date : 14 February 2013
Place : Unit 156, DOTC Conference Room
Attendance : Please refer to attached list
Time : 10:00 hrs.

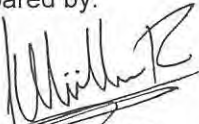
Items

- I. Meetings started at 10:40hrs with participants from DOTC, NEDA, BCDA, Northrail, PNR, EOJ, JICA and JICA Study Team (JST) and their counterpart.
- II. Introduction of Participants.
- III. Mr. Shinya Nakamura, Team Leader of JST, expressed the purposed of the JCC is to present the Final Draft of Pre-Feasibility Study connecting Clark International Airport and NCR with 45min . to inform the scope of next Feasibility Study.
- IV. Selected route plan of AER.
 - 1) JST explained the previous presentation of TWG which the Option C utilizes the existing PNR route is the most suitable DESPITE land acquisition and relocation issues. This option is the best because the cheaper cost and better ridership.
 - 2) Northrail pointed the differences of scale of the land acquisition, additionally 22ha necessary for high speed operation for AER..
 - 3) JICA explained that the reasons the Option C recommended: more demand and less cost.
 - 4) JST pointed out that the Northrail's assumption is based on the optimum operation scheme to maintain the maximal speed as long as possible. However, JST's recommendation is to adopt an adequate operation plan to maximize the benefit of the project, so cost, revenue, and serviceability are considered. Thus, it was considered that the AER on the existing PNR alignment would bring the lower cost with the maximal revenue and within the minimal requirement of 45 minute from NCR to CIA.
 - 5) Ms. Tina of Northrail introduced about Stakeholder Consultation Meetings held during this month of February. LGU's have no objections and agreed on the JST's recommendation in general.
 - 6) BCDA suggest to JST to consider the BCDA Master Plan which is regarding CDC to connect to the terminal up to Capas, Tarlac.
 - 7) BCDA recommends that schedule of commencement of the work should be shortened.
 - 8) Northrail suggested that the land acquisition matter should be settled before the preliminary design. It takes about 5 to 6 years and may require the budget approval. The detail of the land acquisition should be clarified in the further F/S stage and be justified with NEDA.

- 9) JST recommended the underground structure at the end point of EDSA assuming coexisting with PNR operation.
- 10) Usec. Limcaoco requested preparation material for presentation to Sec. Abaya for final decision of AER alignment.
- 11) Meeting with NLRC and JST will have a meeting on Feb. 19 (Tuesday) at 0900AM to discuss more on the issues of AER.

The meeting was adjourned at 12:30hrs.

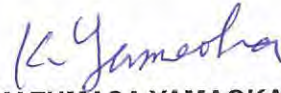
Prepared by:



JORGE MULLER

Team Member
JICA Study Team

Concurred by:



KAZUMASA YAMAOKA

Deputy Team Leader
JICA Study Team

Noted by:



RENE K. LIMCAOCO

Undersecretary for Planning

RLS 



**JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region**



ATTENDANCE SHEET

Subject : Joint Coordination Committee Meeting on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region

Venue : Room 156, DOTC Training Room

Date : 14 February 2013

Time : 10:00AM

NO.	NAME	COMPANY/OFFICE	CONTACT NO.
1	Rene K. Limcaoco/Undersecretary	DOTC	
2	Deo Leo Manalo	DOTC	0917-8320039
3	Atty. Arnel Casanova	BCDA	
4	Sheryl Sandigan	BCDA	
5	Gay Rosete	BCDA	
6	Tomas Macrohon	BCDA	
7	J.M. De Leon	NEDA	
8	Junio Ragrario	PNR	
9	Conrado Tolentino/President	Northrail	0917-5654297
10	Jesus Enrico Salazar	Northrail	0920-9089600
11	Aldrin Gatus	Northrail	0928-5005996
12	Luisito Constantino	Northrail	0927-3567169
13	Cristina Quinalayo	Northrail	
14	Bryan Paul Encarnacion	Northrail	
15	Rodel Lim Rañola	Northrail	0917-8533021
16	Simon Dabu	Northrail	0923-3497004
17	Voltaire Tila	Northrail	0918-5022801
18	Pio Asuncion	Northrail	
19	Jonor Ataat	Northrail	0919-8491425
20	Masayuki Harigai	EOJ	
21	Susumo Ito	JICA	889-7119
22	Ken Inoue	JICA	889-7119

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23	Eki Kakuta	JICA	889-7119
24	Joan Salapare	JICA	889-7119
25	Floro Adviento	JICA	889-7119
26	Ryuichi Kuwajima	JICA-DOTC	
27	Shinya Nakamura/Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
28	Kazumasa Yamaoka/Deputy Team Leader	JICA Study Team	945-7842/727-7960 loc. 285
29	Tetsuo Wakui	JICA Study Team	945-7842/727-7960 loc. 285
30	Mitsuyuki Osawa	JICA Study Team	945-7842/727-7960 loc. 285
31	Koyo Ogasawara	JICA Study Team	945-7842/727-7960 loc. 285
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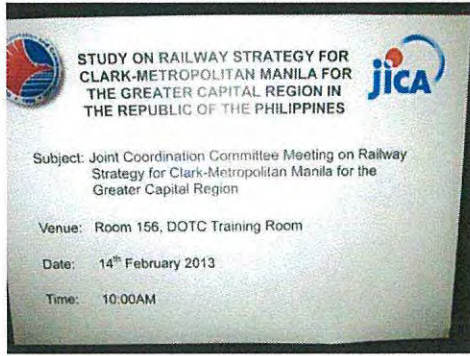
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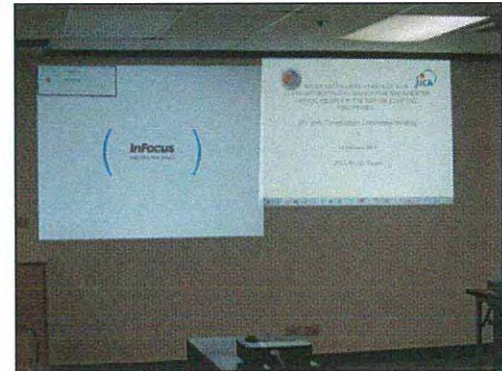
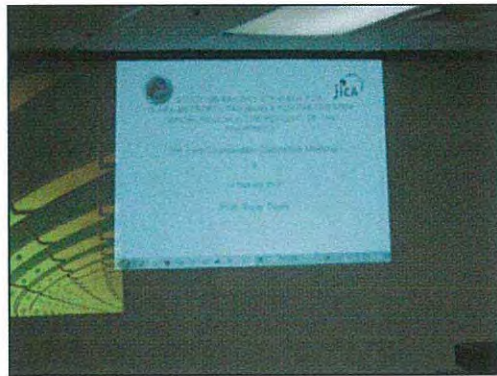
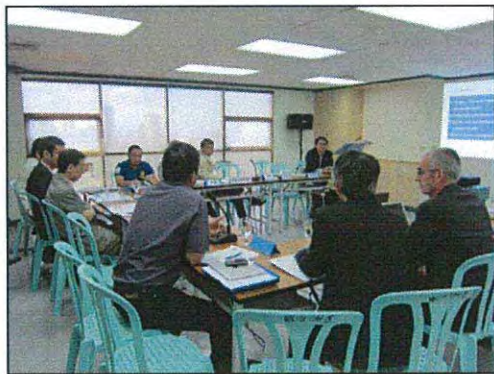


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Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

NGCP - Minutes of Meeting

Subject : The 2x25kV System for Airport Express Railway
Date : 15 January 2013
Place : NGCP Mexico Substation Meeting Room
Attendance : Please refer to attached list
Time : 50mins.

Items

- I. Meetings started at 14:50hrs with participants from NGCP, DOTC and JICA Study Team.
- II. Agenda and 2x25kV system proposal were provided from JICA study team.
- III. JICA study team introduced outline of AER.
- IV. Power Source.
 - 1) NGCP mentioned the following items.
 - NGCP is able to supply electric power to SAN FERNANDO substation. On the other hand MERALCO will supply to VALENZUELA substation.
 - MERALCO will supply 115 kV electric powers to VALENZUELA substation.
 - The distributed power of SAN FERNAND Area is 69kV.
 - 2) JICA study team inquired whether 115kV or 230kV power by double receiving line is able to be provided in SAN FERNANDU. NGCP replied that we have 2x230kV High-voltage line from BACOLOR.
 - 3) JICA study team asked where 2x230kV is able to receive and show us the route of connection line to SAN FERNANDO old station. NGCP showed that the receiving point is LAZATIN flyover and the distance of connection line is about 1 km until the station. They added that another route of connection line is the route along JOSE ABAD SANTOS AVE...
 - 4) JICA study team explained the required power demand of SANFERNANDO substation. The demand is 43.1 MVA at year 2025 in the phase 2. JICA team inquired whether 43.1 MVA is able to provide. NGCP replied that power supply of 43.1MVA is possible.
- V. Unbalance

- 1) Regarding unbalance, JICA study team explained that the limit of acceptable unbalance in Philippines is 1%, therefore the short circuit power is required more than 4310MVA. JICA team inquired whether NGCP have a capacity of 4310MVA. NGCP replied that NGCP calculate about the short circuit power, check, and reply to DOTC. Moreover NGCP mentioned that this capacity of electric power is too large and this issue is a national issue.

VI. Transformer for the traction power

- 1) JICA study team explained the following item regarding the transformer for the traction power.
 - The transformer of three types, Scott (66~187kV), Wood bridge and Roof delta (220~275kV) will be used. Wood bridge and Roof delta transformers are used by the SHINKANSEN.
 - All transformer are a transformer converted into 2 phase from 3 phase. The Chinese proposal was a transformer converted into single phase from 3 phases.
 - Chinese system generates an unbalance in the voltage of 3 phases. The proposal of JICA that 2 currents are distributed to up bound and down bound respectively balances the voltage of 3 phases.

VII. Required space of substation

- 1) JICA study team explained that approximately $250m \times 70m = 17,500sqm$ is required as space of substation.

VIII. Others

- 1) DOTC mentioned that DOTC and JICA study team will visit headquarters of MERALCO sometime soon about VALENZUELA substation.

The meeting was adjourned at 15:40hrs.

(Photo)



Prepared by:

HIROSHI UTSUGI
JICA Railway Engineer/
E&M system

Concurred by:

KAZUMASA YAMAOKA
JICA Deputy Team Leader



**JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region**



ATTENDANCE SHEET

Subject : The 2x 25kV System for the Airport Express Railway

Venue : NGCP (National Grid Corporation of the Philippines) Mexico Substation Meeting Room

Date : 15 January 2013

Time : 14:50 ~ 15:40

NO.	NAME	DESIGNATION	COMPANY/OFFICE	CONTACT NO.	SIGNATURE
	ALDWIN T. GAYUD	MANAGER	MANILA	0928 500 1996	[Signature]
2	JONOR M. ATAAT	SYSTEMS ENGR.	"	0919 819 1425	[Signature]
3	FREDY THATA JR.	OPS ENGR.	MANILA		[Signature]
4	K. Yamada		JICA-STUDY-TEAM		[Signature]
5	H. Utsugi		JICA-STUDY-TEAM		[Signature]
6	CARLITO L. SANTOS	Chief Engr.	NGCP	0917-8731776	[Signature]
7	Arturo C. Salvamento	Head, District	NGCP	0917 879 1752	[Signature]
8				acsalvamento@ngcp.ph	
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Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region In The Republic of The Philippines

SFELAPCO - Minutes of Meeting

Subject : The 2x25kV System for Airport Express Railway
Date : 15 January 2013
Place : SFELAPCO Office
Attendance : Please refer to attached list
Time : 20mins.

Items

- I. Meetings started at 15:50hrs with participants from SFELAPCO, DOTC and JICA Study Team.
- II. Agenda and 2x25kV system proposal were provided from JICA study team.
- III. JICA study team introduced outline of AER.
- IV. Power Source.
 - 1) SFELAPCO mentioned the following items.
 - The distributed power of SAN FERNAND Area is 69kV.
 - Several companies of electric power provider use electric power of SFELAPCO.
 - The maximum capacity of electric power of SFELAPCO is 86MVA. Required power demand 43.1MVA of your project is equal to 50% of the capacity. This value is a very too large quantity.
 - 2) SFELAPCO inquired about average of power consumption. JICA study team replied that average is anticipated to be about 50% of required power demand 43.1MVA. SFELAPCO estimated electric power charge of this project roughly. (about 5million pesos/month)
 - 3) DOTC inquired about electric rate of SFELAPCO. SFELAPCO replied electric rate. (6pesos/kWh major user such as industry)

The meeting was adjourned at 16:10hrs.

Prepared by:

Concurred by:

HIROSHI UTSUGI

JICA Railway Engineer/
E&M system

KAZUMASA YAMAOKA

JICA Deputy Team Leader



JICA Study on
Railway Strategy for Clark-Metropolitan Manila
for the Greater Capital Region



ATTENDANCE SHEET

Subject : The 2+25kV system for Airport Express Railway.

Venue : SFELAPCO (San Fernando Electric Light and Power Co., Inc)
office.

Date : 15 January 2013

Time : 15:50 ~ 16:10'

NO.	NAME	DESIGNATION	COMPANY/OFFICE	CONTACT NO.	SIGNATURE
	FIDEL AYALA JR	OPS ENGR.	NEPTUNIAN DOTC		
2	JONOR M. ARAJ	SYSTEMS ENGR	"	09198491425	
3	ALDRIN T. GATAS	MANAGER	NEPTUNIAN	09285005996	
4	K. Yamada		JICA STUDY TEAM		
5	H. Utsugi	ERM ENGINEER	JICA study team		
6	J. MANUNTAC	ENGR	SFELAPCO	09063327979	
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Study on Railway Strategy for Clark-Metropolitan Manila for the Greater Capital Region in the Republic of the Philippines

MERALCO - Minutes of Meeting

Subject : The 2x25kV System for Airport Express Railway

Date : 21 January 2013

Place : MERALCO Ortigas Meeting Room

Attendance : Please refer to attached list

Time : 65mins.

Items

- I. Meetings started at 11:00hrs with participants from MERALCO, DOTC and JICA Study Team.
- II. Agenda and 2x25kV system proposal were provided from JICA study team.
- III. JICA study team introduced outline of AER.
- IV. Power Supply
 - 1) JICA study team inquired whether 115kV or 230kV power by double receiving line is able to be provided in VALENZUELA. MERALCO replied that we are able to provide 2x115kV High-voltage.
 - 2) JICA study team asked where 2x115kV is able to receive. T.SANTIAGO Ave. was proposed by MERALCO. JICA team requested that we want to receive 2x115kV from MCARTHUR Highway near VALENZUELA substation. MERALCO said it is possible.
 - 3) MERALCO mentioned that we are supplying electric power from EDSA to APLIT and we are able to supply electric power to your whole main line.
- V. How to receive 2x115kV
 - 1) MERALCO mentioned the following items.
 - AER Project has to construct a road from MCARTHUR Highway to VALENZUELA substation for High-tension Voltage line.
 - The width of 6 to 10 m is required for the road.
 - Moreover AER Project has to provide land space in VALENZUELA substation for facilities of MERALCO. JICA asked a required area size but the reply could not be obtained.
 - MERALCO constructs high-tension voltage line and installs facilities for receiving electric power in VALENZUELA substation.
 - The cost of the construction and installation is estimated by MERALCO.

VI. Power Supply for Station facilities

- 1) MERALCO asked how electric power of station facilities would be got. JICA team explained that the power is distributed from VALENZUELA and SAN FERNANDO substation to all stations. The demand of power for station is included in the auxiliary power shown the table.

VII. Capacity of Short Circuit Power

- 1) JICA study team explained that according to Philippine standards, a capacity of short circuit power is required more than 4250 MVA (1% of unbalance limit), and asked whether MERALCO has a capacity of 4250 MVA in 2x25kV network. MERALCO replied that we have the capacity maybe and need to review about the capacity.
- 2) Moreover MERALCO explained that we need to implement a study of power distribution impact by Philippine standards because a lot of electric power is consumed by AER Project. If AER Project affects nearby districts, MERALCO has to reinforce the power facilities of MERALCO before and behind the receiving point of VALENZUELA substation.

The meeting was adjourned at 12:05hrs.

(Photo)



Prepared by:

HIROSHI UTSUGI
JICA Railway Engineer/
E&M system

Concurred by:

KAZUMASA YAMAOKA
JICA Deputy Team Leader



JICA Study on
 Railway Strategy for Clark-Metropolitan Manila
 for the Greater Capital Region



ATTENDANCE SHEET

Subject : The 2x25kV system for the Airport Express Railway

Venue : MERALCO Ortigas

Date : 21 January 2013

Time : 11:00 ~ 12:05

NO.	NAME	DESIGNATION	COMPANY/OFFICE	CONTACT NO.	SIGNATURE
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2	Hiroshi Utsugi	ENGINEER	JICA study team		
3	Jay Sanfido III	Rel. Mgr	Meralco	09229493122	
4	GREGORY GENE A. MINA	MERALCO	TECHNICAL SUPPORT	09088980632	
5	JONOR M. ATAT	ENGINEER	MDOT/RAIL	09198491425	
6	GERALYN A. SOLIDUM	Head	Meralco SBG Public	0908-897-3536	
7	DODIE E. DELA CRUZ	Officer	Meralco	0934-9152295	
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Oriental Consultants Co., Ltd.



ALMEC Corporation



Katahira & Engineers International

付屬資料 G : 收集資料一覽

1.1 Northrail Project

1.1.1 Feasibility Study (FS)

No.	Title	Date	Prepared by
1	Feasibility Study for Northrail Project vol. 1	Nov. 2008	North Luzon Railways Corp.
2	Feasibility Study for Northrail Project vol. 2	Dec. 2008	North Luzon Railways Corp.
3	Feasibility Study for Caloocan-Malolos Section I Final Draft Report	Jan. 2003	North Luzon Railways Corp.
4	Feasibility Study for Manila-Clark Rapid Railway System Project	Feb. 2000	North Luzon Railways Corp.
5	Draft Final Report		Northrail-BCDA
6	Revised Feasibility Study of Manila-Clark Rapid Railway System Project	Mar. 1998	Northrail-BCDA
7	Feasibility Study for Northrail Project Draft Final Report	Feb. 2003	Pacific Consultants Int'l
8	Feasibility Study for Manila-Clark Rapid Railway System Project (Monumento – Calumpit)	Feb. 2000	North Luzon Railways Corp.
9	Feasibility Study for Caloocan-Malolos Section I, Final Draft Report	Jan. 2003	North Luzon Railways Corp.
10	Feasibility Study for Northrail Project Section I (Caloocan-Malolos)	Mar. 2003	North Luzon Railways Corp.
11	Feasibility Study for Northrail Phase I Section I (Caloocan-Clark)	Sept. 2006	North Luzon Railways Corp.

1.1.2 Design Reports

No.	Title	Date	Prepared by
1	Preliminary Engineering Design Vol. I (General Description)	Feb. 2006	CNMEG
2	Preliminary Engineering Design Vol. II (Economy, Traffic Volume & Transport Organization)	Feb. 2006	CNMEG
3	Preliminary Engineering Design Vol. III (Engineering Geology)	Feb. 2006	CNMEG
4	Preliminary Engineering Design Vol. IV (Permanent Way, Track and Subgrade)	Feb. 2006	CNMEG
5	Preliminary Engineering Design Vol. V (Bridges and Culverts)	Feb. 2006	CNMEG
6	Preliminary Engineering Design Vol. VI (Preliminary Design)	Feb. 2006	CNMEG
7	Preliminary Engineering Design Vol. VII (Stations & Yards & Comprehensive Maintenance Center)	Feb. 2006	CNMEG
8	Preliminary Engineering Design Vol. VIII (DMU, Depot & Gauges)	Feb. 2006	CNMEG
9	Preliminary Engineering Design Vol. IX (Water Supply and Drainage)	Feb. 2006	CNMEG
10	Preliminary Engineering Design Vol. X (Communication and Signaling)	Feb. 2006	CNMEG
11	Preliminary Engineering Design Vol. XI (Power Supply)	Feb. 2006	CNMEG
12	Preliminary Engineering Design Vol. XII (Buildings)	Feb. 2006	CNMEG
13	Preliminary Engineering Design Vol. XIII (Environmental Protection & Water-and-Soil Conservation)	Feb. 2006	CNMEG

1.1.3 Survey Reports

No.	Title	Date	Prepared by
1	Composite Foundation of CMP and JGP – Construction Project	Oct 2009	CNMEG
2	Engineering Geological Report for Subgrade (Part II)	Sept 2005	CNMEG
3	Survey Report, Sub-Vol.III – Engineering Geological Report for Subgrade (Part I)	Sept 2005	CNMEG
4	Survey Report, Sub-Vol.I of Vol. III – Synthetical Engineering Geological Report	Mar. 2007	CNMEG
5	Survey Report, Sub-Vol.I of Vol. III – Synthetical Engineering Geological Report	Sept. 2005	CNMEG
6	Survey Report, Sub-Vol.II of Vol. III – Engineering Geological Report for Bridges	Mar. 2007	CNMEG
7	Survey Report, Sub-Vol.III of Vol. III – Engineering Geological Report for Subgrade	Mar. 2007	CNMEG
8	Survey Report, Sub-Vol.IV of Vol. III – Engineering Geological Report for Buildings	Mar. 2007	CNMEG
9	Survey Report, Sub-Vol.V of Vol. III – Engineering Geological Report for Building and Roads (I Southrail Depot)	Sept. 2005	CNMEG
10	Survey Report, Sub-Vol. VI of Vol.III – Prospecting Pictures	Sept. 2005	CNMEG
11	Survey Report, Vol.VI – Bridges and Culverts	Sept 2005	CNMEG
12	Survey Report, Vol.I – General Description	Sept 2005	CNMEG
13	Survey Report, Vol.II – Permanent Way Subgrade	Sept 2005	CNMEG
14	Survey Report Vol. VII – Construction Condition and Investigation	Sept 2005	CNMEG
15	Survey Report Vol. VI – Water, Supply and Drainage and Environmental Projection	Sept 2005	CNMEG
16	Survey Report, Vol. V – Station and Yard	Sept 2005	CNMEG
17	Geotechnical Investigation Report Elevated Pile Slab (RDK123+900~RDK124+520)	July 2010	China National Industry Corp.
18	Geotechnical Investigation Report Elevated Pile Slab (RDK125+160~RDK125+550)	Jan. 17, 2010	SINOMACH

1.1.4 Design Drawings

No.	Title	Date	Prepared by
1	Preliminary Engineering Design Drawing Volume I Permanent Way Plan Drawing between Caloocan and Malolos, 0-30 sheets	Nov. 2010	SINOMACH
2	Section 1 Phase 1 Construction Design Drawing Revision C (Permanent Way)	Dec. 2008	SINOMACH
3	Section 1 Phase 1 Construction Design Drawing Revision D (Subgrade)	Dec. 2008	SINOMACH
4	Preliminary Design Drawings (Vol. III) Plan and Profile Drawing of Engineering Geology	Dec. 2008	SINOMACH
5	Alignment Plan & Status Section I-Caloocan-Malolos	Sept 2005	NORTHRAIL
6	Alignment Plan & Status Section II- Malolos-Angeles	Sept 2005	NORTHRAIL
7	Plan and Profile Drawing of Engineering Geology (Vol III)	Sept 2005	CNMEG
8	Northrail Project Phase I section 1&2 (Caloocan-Malolos-Clark)	Jan.2005	CNMEG
9	Clark to NLEX North Segment	Sept 2005	CNMEG

No.	Title	Date	Prepared by
10	Clark to Trinoma Alignment	Sept 2005	CNMEG
11	NLEX North to NLEX South Segment	Sept 2005	CNMEG
12	NLEX South to Trinoma Segment	Sept 2005	CNMEG
13	Proposed Northrail AER Alignment to DMIA (Master plan)	Sept 2005	CNMEG
14	Elevated Piled Slab Modified design for Section I	Sept 2005	CNMEG
15	Permanent Way Alignment and ROW Preliminary Engineering Design Proposed Modified Design for Section I	Sept 2005	CNMEG
16	Permanent Way Profile Caloocan – Malolos Preliminary Engineering Design Proposed Modified Design for Section I	Sept 2005	CNMEG
17	U-Shaped Retaining Wall Proposed Modified Design for Section I	-	CNMEG
18	Designed Width Color Drawing	Sept 2005	CNMEG
19	Construction Design I, 32 sheets 24m T-Girder Drawing	Sept 2005	CNMEG
20	Construction Design II, 33 Sheets 20m Assembly PC T-Beam	Sept 2005	CNMEG
21	Construction Design III, 33 Sheets 16m Assembly PC T-Beam	Sept 2005	CNMEG
22	Copping Beam	Sept 2005	CNMEG
23	Dakila Minor Bridge	Sept 2005	CNMEG
24	Frame Culverts for Caloocan-Malolos Construction Design	Feb. 2009	CNMEG
25	Frame Culverts for Caloocan-Malolos Construction Design	Jan 2008	CNMEG
26	Frame Bridges for Caloocan-Malolos Construction Design	Dec 2008	CNMEG
27	Frame Bridges for Caloocan-Malolos Construction Design	Feb 2009	CNMEG
28	Guiguinto Viaduct RDK 147+506.75	Nov. 2008	CNMEG
29	Guiguinto Viaduct Abutment	June 2008	CNMEG
30	Guiguinto River Medium Bridge	June 2008	CNMEG
31	Malolos Viaduct and Abutment A1	June 2008	CNMEG
32	Malolos Viaduct (Abutment) RDK147+506.75	Dec. 2008	CNMEG
33	Santol River Major Bridge	-	-
34	Subgrade 132900-148337	-	-
35	Valenzuela Viaduct RDK 120+373.61	Sept. 2010	CNMEG
36	Waterproof Drawing	Dec. 2008	CNMEG
37	Engineering Geological Profile Construction Design RDK 116+540 – RDK 148+337.55	Mar 2007	CNMEG
38	Engineering Geological Profile Permanent Way Vertical Section Drawing (Caloocan-Malolos)	Mar 2007	CNMEG
39	Final ROW – Northrail Section 2 PNR ROW	-	Certeza
40	Northrail Plan metric_whole_pnr ROW Section 2	-	Certeza
41	Shear Key on Alignment	Mar 2008	CNMEG
42	Tracks (Seamless Track Layout Drawing)	Mar 2009	CNMEG

1.1.5 Other Documents

No.	Title	Date	Prepared by
1	Baseline Environment Study for the Proposed Northrail Caloocan Depot Draft Final Report	Dec.2005	DOTC
2	Metro Manila Subway (Feasibility Study)	Feb. 05, 2013	DOTC

No.	Title	Date	Prepared by
3	Manila-Clark Rapid Railway System Caloocan-Fort Bonifacio Section Vol. III	-	DOTC
4	Northrail Rapid Railway System	Aug.1996	Santander Investment
5	Northrail Ridership and Revenue Forecasts (Final Report)	Mar. 1998	Halcrow Fox
6	Northrail Project P1S1 PED. VOL.XIII – Noise Barrier	Feb. 2006	Beijing, China
7	Monthly Progress Report No. 69	Feb. 2012	SINOMACH
8	Monthly Accomplishment Report No. 10	Oct. 2011	SES-Joint Venture
9	Commuter and Airport Express Alignments	-	-
10	Accomplishment Report for FY 2009	2009	SINOMACH
11	Summary of Relocation and Resettlement Operations	Mar. 2010	DOTC
12	An Update Report on Housing Cost & Relocation	May 2009	DOTC
13	Accomplishment Report on Relocation and Resettlement Operations	Jul. 2010	DOTC
14	Activities-Process for ROW Acquisition (Northrail ROWA, Phase I Section I)	-	-
15	Construction of Various Community Facilities Northrail-SouthRail Linkage Project	Aug. 06, 2010	DOTC
16	Northrail Project Phase 1 Section 1- Calculation Note for Pier Column(Valenzuela Viaduct	Jan. 17, 2010	NORTHRAIL
19	Factual Soil Report for Proposed NLEX-SKYWAY/SLEX Connector Road in Metro Manila	Jan. 17, 2010	NORTHRAIL
20	Metro Manila Skyway-Stage1(Buendia-Bicutan) Final Log of Borehole and Soil Test Result	Jan 21, 2013	NORTHRAIL
21	List of Soil Survey/Geotechnical Investigation Reports	Jan 29, 2013	CNMEG/SINOMACH
22	Bill of Quantities (Caloocan-Malolos)	Sept 2005	NORTHRAIL
23	New Land Acquisition for Design ROW (Standard Gauge)	Sept 2010	NORTHRAIL
24	Construction Design Drawing List	Sept 2010	NORTHRAIL
25	Inter Office Memorandum to DLNM (Deo Leo N. Manalo) Regarding Overpasses Across NLEX from Mindanao Avenue Cloverleaf Interchange to Clark Depot	Sept 20, 2012	NORTHRAIL
26	Environmental Compliance Certificate no. 0706-014-7110	Sept 25, 2012	Issued by DENR (Northrail)
27	Environmental Compliance Certificate no. CC 9907-036-120D	Sept 25, 2012	Issued by DENR (Northrail)
28	Environmental Impact Statement	2004	NORTHRAIL
29	Standard Entitlement	Sept 25, 2012	DOTC
30	Summary of Relocation Plan	Sept 25, 2012	DOTC

1.1.6 Other Drawings, Photographs, Maps and Attachments

No.	Title	Date	Prepared by
1	Manila-Clark Rapid Railway System Final Report Vol. 2, Drawings and Photographs	Sept 2006	NORTHRAIL
2	Alignment Study Reference Link	Sept 2010	NORTHRAIL
3	List of Construction Design Drawings	Sept 2010	NORTHRAIL
4	Guagua-Bataan Inundation Map	Sept 25, 2012	NORTHRAIL
5	Malolos Inundation Map	Sept 25, 2012	NORTHRAIL

1.2 DPWH

No.	Title	Date
1	C-5 Northern Line Expressway Project (Segment 8.1 – Mindanao Ave. to NLEX)	Sept. 2010
2	Segment 1 Balintawak-Burol Plan & Profile	Sept. 2010
3	Segment 2 Burol-San Fernando Plan & Profile	Sept. 2010
4	Segment 3 San Fernando to Sta. Ines	Sept. 2010
5	MNTC NLEX Plans and Drawings	Sept. 20, 2010
6	NLEX – SLEX Connector Road Project Preliminary Design	Nov. 28, 2010
7	Typical Cross Section for on/off ramps – south bound (NLEX Connector)	-
8	MNTC Project - Harbor Link Segment 10 MacArthur Highway – C3 Vol.1 Engineering Drawings	Sept 25, 2012
9	MNTC Project – Harbor Link Segment 10 MacArthur Highway – C3 Vol.2 Cross Sectioned	Sept 25, 2012
10	NLEX-SLEX Presentation Connector Road & High Speed Rail	Dec 10, 2012
11	Typical Cross Section (Buendia Ramp) of B-01	Nov 06, 2012
12	Typical Cross Section (Buendia Ramp) of B-04	Nov 06, 2012
13	Typical Cross Section (Buendia Ramp) of B-08	Nov 06, 2012
14	Typical Cross Section (Buendia Ramp) of B-14	Nov 06, 2012
15	Plan and Profile (Buendia Ramp) of C-01	Nov 06, 2012
16	Plan and Profile (Buendia Ramp) of C-2533	Nov 06, 2012
17	Segment 10 McArthur Highway Connector Road	Nov 23, 2012
18	Manila-Calabarzon Expressway (MCX) Project-Plan for Relocation of Informal Settlers	-
19	Magallanes Skyway Plan and Profile	Nov 05, 2012
20	NAIA-CLARK Strategy Vol. 9	-
21	Factual Soil Report for Proposed NLEX-SKYWAY/SLEX Connector Road in Metro Manila	Jan. 17, 2010

1.3 PNR

No.	Title	Date
1	Annual Results of Operations Commuter Service	-
2	DMU Kick-off Meeting	March 2007
3	Layout Plan of Rail Commuter Maintenance Depot	-
4	PNR Ridership and Technical Specification	-
5	PNR Ridership February 2012	-
6	PNR Right of Way	-
7	PNR Timetable New	-
8	Project Management Plan	-
9	PNR Ridership	-
10	PNR Rolling Stock	-
11	Alignment and Profile from Tutuban – Caloocan and Caloocan–Nichols Station	-

1.4 LRT Line 1 and Line 2

No.	Title	Date
1	Preparatory Study for LRT Line 2 Extension Project (Final Report)	Oct 2011
2	Depot Plan for EDSA LRT Line 3 Phase I	-
3	Typical Cross Section of viaduct 01-03-08 LRT Line-1 North Extension Project	Nov 06, 2012
4	Typical Cross Section of viaduct 01-03-08 Pier _11-48	Nov 06, 2012
5	Typical Cross Section of viaduct 01-03-08 Pier_P-179	Nov 06, 2012
6	Typical Sections LRT – Line 1 North Extension	Nov 05, 2012
7	Typical Section LRT – Line 2	Nov 05, 2012

1.5 MRT Line 3

No.	Title	Date
1	North Avenue Station As-Built Drawing of MRT Line 3	Dec 1998
2	Ayala Station As-Built Drawing of MRT Line3	Jun 1997

1.6 Other

No.	Title	Date
1	Clark Airport Complex (Topographic Map)	Sept 2010
2	Clark International Airport Complex Master Plan	Sept 2010
3	Quezon City Business District (QCBD) Master Plan	June 2010