

APPENDIX 2
PRELIMINARY STUDY FOR EXTENSION LINE
CONNECTING TO 6TH OF OCTOBER CITY

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2.1 General

The Metro Line 4 Phase 1 is planned as a 16.091-km route connecting M4W Sta. No. 1 (El Malek El Saleh) with M4W Sta. No. 15, close to the site chosen for the workshop/depot. Although Phase 2 is planned to be extended northwards from El Malek El Saleh, a western extension from M4W Sta. No. 15 also has a substantial demand potential due to the expected very rapid increase in the population of 6th of October City. For this reason, a preliminary study to connect M4W Sta. No. 15 with 6th of October City has been conducted and is presented in this section of Feasibility Study Report 3/4.

2.2 Alternative Route Setting

Alternative routes were considered for “Access to 6th of October” and “Inside 6th of October City” separately.

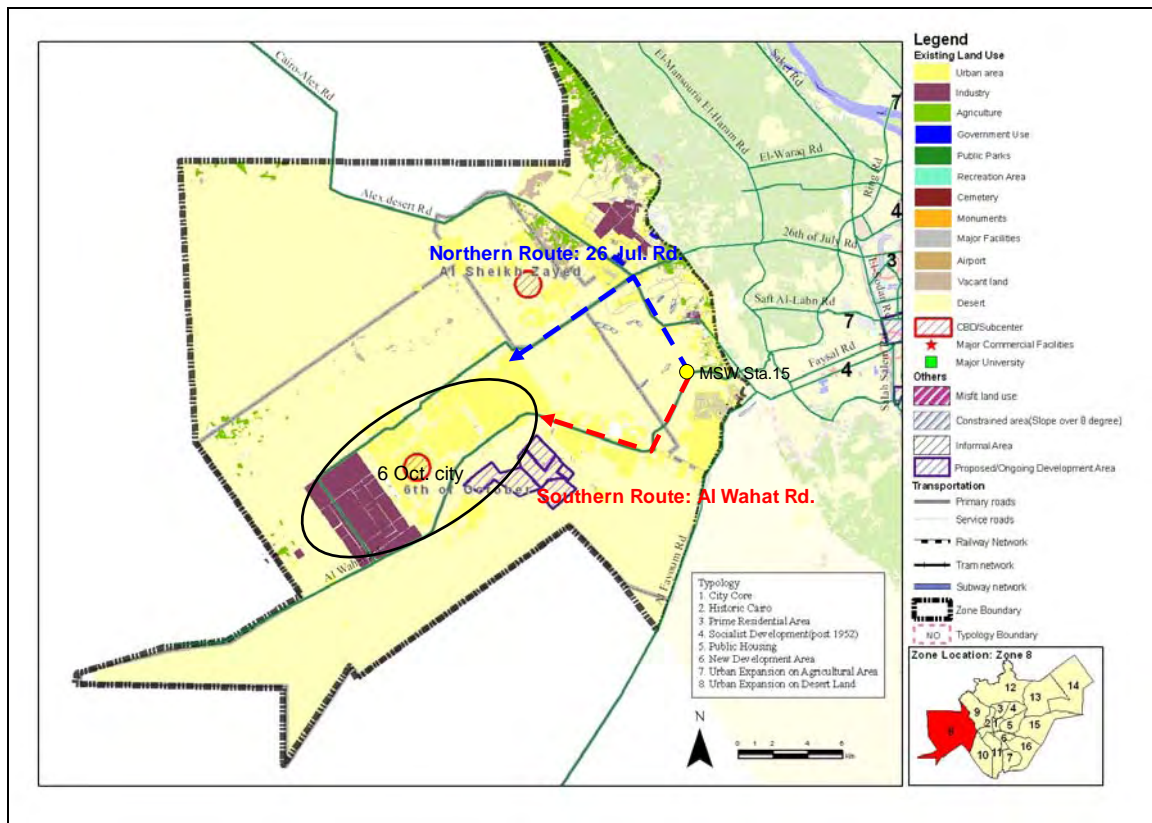
2.2.1 Access to 6th October City

There are two access trunk roads from western Cairo to 6th of October City, as shown below:

- Northern Route: 26th of July Road
- Southern Route: Al Wahat Road

Of the two alternatives, the **Southern Route** was selected as the access route to 6th of October City, for the following reasons:

- The direction of the alignment of the Phase 1 section at M4W Sta. No. 15 is southward, suggesting that it is unreasonable to select the Northern Route in terms of railway operation;
- According to the land use plan shown in the SDMP report (see Figure 2.1, below), the area along the Southern Route is specified as “urban area”. On the other hand, the area along the Northern Route is specified as “desert”. Therefore, from the viewpoint of conformity to the land use plan, the Southern Route is the preferred alternative.

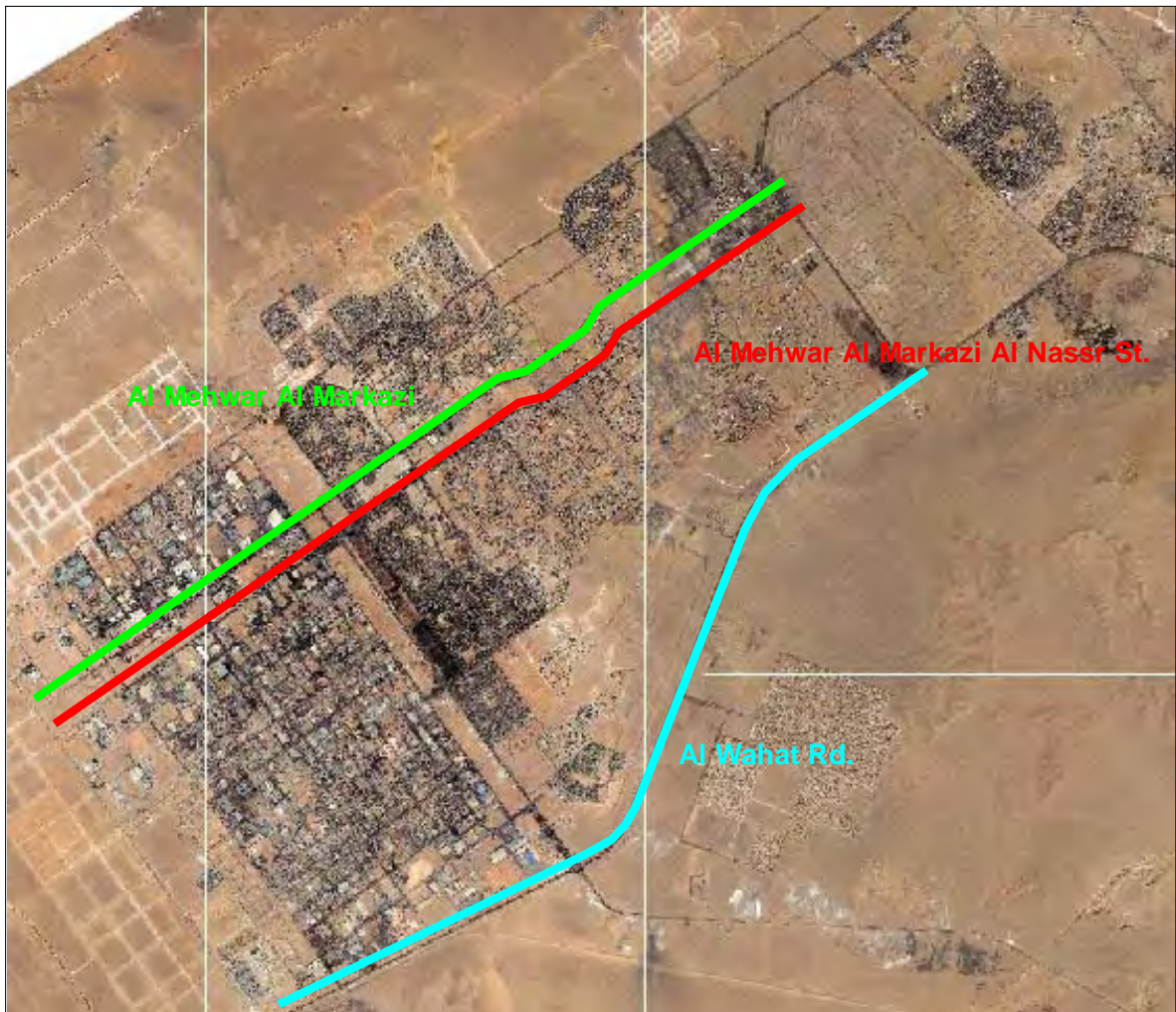


Source: SDMP

Figure 2.1 Land Use Map and Possible Access to 6th of October City

2.2.2 Inside 6th of October City

Although there are many roads inside 6th of October City, three roads: a) Al Mehwar Al Markazi, b) Al Mehwar Al Markazi Al Nassr St., and c) Al Wahat Rd., are trunk routes which run through the city from the east to the west (see Figure 2.2). These three roads were selected as the proposed mass transit routes in SDMP. In this study, the three routes are compared as alternatives.

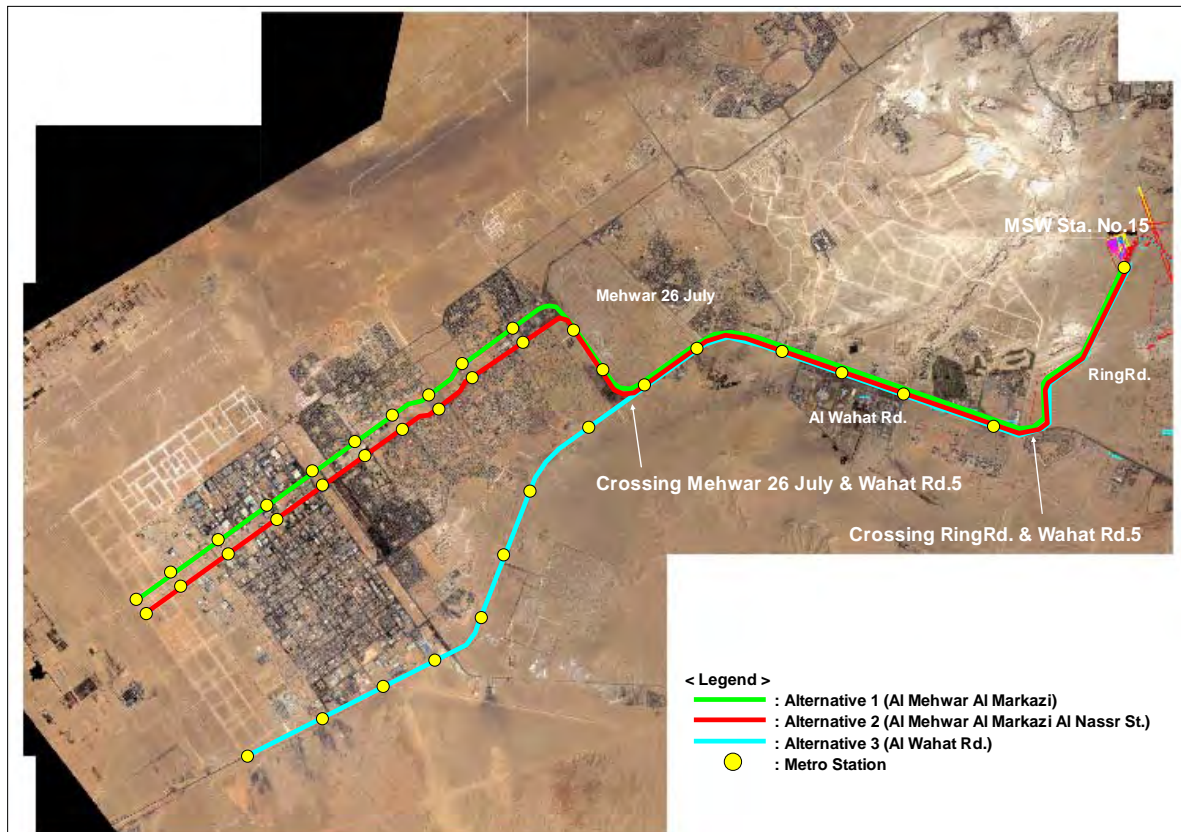


Source: JICA Study Team, 2009, Map: Quickbird

Figure 2.2 Three Trunk Roads Inside 6th October City

2.2.3 Alignment of Three Alternatives

Based on the results mentioned in sections 2.2.1 and 2.2.2, the following alternative routes are established.



Source: JICA Study Team, 2009, Map: Quickbird

Figure 2.3 Plan View of Three Alternative Mass Transit Alignments

Figure 2.3 shows the plan view, or horizontal alignment, of these three alternatives. The alignments were established in conformity with the following factors.

- Regarding all the alternatives, elevated route structures are preferred in order to prevent community severance and obstruction of the traffic flow after the city development in the future. However, between M4W Sta. No. 15 and Crossing Ring Rd. and Al Wahat Rd, an “at-grade (cut and embankment)” is proposed because the area is classified as desert in the land use map.
- Regarding all the alternatives, Where there is sufficient road width and accessibility from both sides of the road, the mass transit route should be within the road median strips, except where the road alignments are sharply curved (e.g. at intersections). Regarding Alternative1 and Alternative 2 which have two right angle road intersections, it may be necessary to demolish some existing buildings to maintain a 250-m minimum curve radius, but wherever possible demolitions should be avoided by shifting the alignment to the left or right side of the road.
- Regarding all the alternatives, long span bridges are required at some sites, for example where the alignment shifts from the median strip to the road side, or where there are intersections at right angles.
- All alternatives are forced to cross high voltage lines (HVL) three times.

These HVLs should be transferred or raised before the start of construction.

- Regarding all the alternatives, stations will be spaced at a distance of one kilometer generally. However, station intervals within and outside 6th of October City will be comparatively short and long, respectively.

2.3 Comparison of Alternative Routes and Selection of Recommended Route

The features of the three alternative routes are given in Table 2.1 below.

Table 2.1 Comparison of Alternative Routes for Connecting 6th October City

	Alternative 1	Alternative 2	Alternative 3
1. Route	Ring Rd. – Al Wahat Rd. – Melwar 26 th of July - Al Mehwar Al Markazi	Ring Rd. – Al Wahat Rd. – Melwar 26 th of July - Al Mehwar Al Markazi Al Nassr St.	Ring Rd. – Al Wahat Rd.
Total Length	28.4 km	28.1km	26.6 km
Elevated Section	(24.6 km)	(24.3km)	(22.8 km)
At-grade Section	(3.8 km)	(3.8 km)	(3.8 km)
No. of Stations	18	18	14
2. Demand Forecast			
[Year 2027]			
No. of pax per day.	576,600	576,600	487,000
PHPDT	27,920	27,920	24,730
[Year 2050]			
No. of pax. Per day	733,000	733,000	447,800
PHPDT	35,430	35,430	31,350
3. Features along Route	Both sides: urban and industrial areas	Both sides: urban and industrial areas	Northern side: urban and industrial areas Southern side: desert
4. Other Mass Transit Plan	BRT (Bus Rapid Transit) is planned	None	None
	-	Recommended	-

Source: JICA Study Team, 2009

Three alternatives would basically traverse the same route to 6th of October City. Therefore, the comparison between them is mainly on the routes they would follow inside 6th of October City.

Regarding the routes inside the city, Alternatives 1 and 2 have an advantage over Alternative 3, because Alternatives 1 and 2 run through the centre of 6th of October City, whereas Alternative 3 passes through the outskirts of the city.

In addition, Alternatives 1 and 2 have an advantage over Alternative 3 in terms of potential demand, as shown in the above table.

Based on the above reasons, Alternative 3 has been dropped out for further consideration as the preferred mass transit route.

The comparison of Alternatives 1 and 2 in terms of potential demand and features along the route shows that they are closely matched. However, as observed in the SDMP report, the GOPP plans to provide a BRT (Bus Rapid Transit) system along Al Mehwar Al Markazi,

which is passed by Alternative 1. This means that people along the route followed by Alternative 1 will have another mass transit alternative in the future.

Therefore, **Alternative 2** is recommended as the preferred route for connecting M4W Sta. 15 with 6th of October City.

2.4 Plan and Profile of the Selected Route

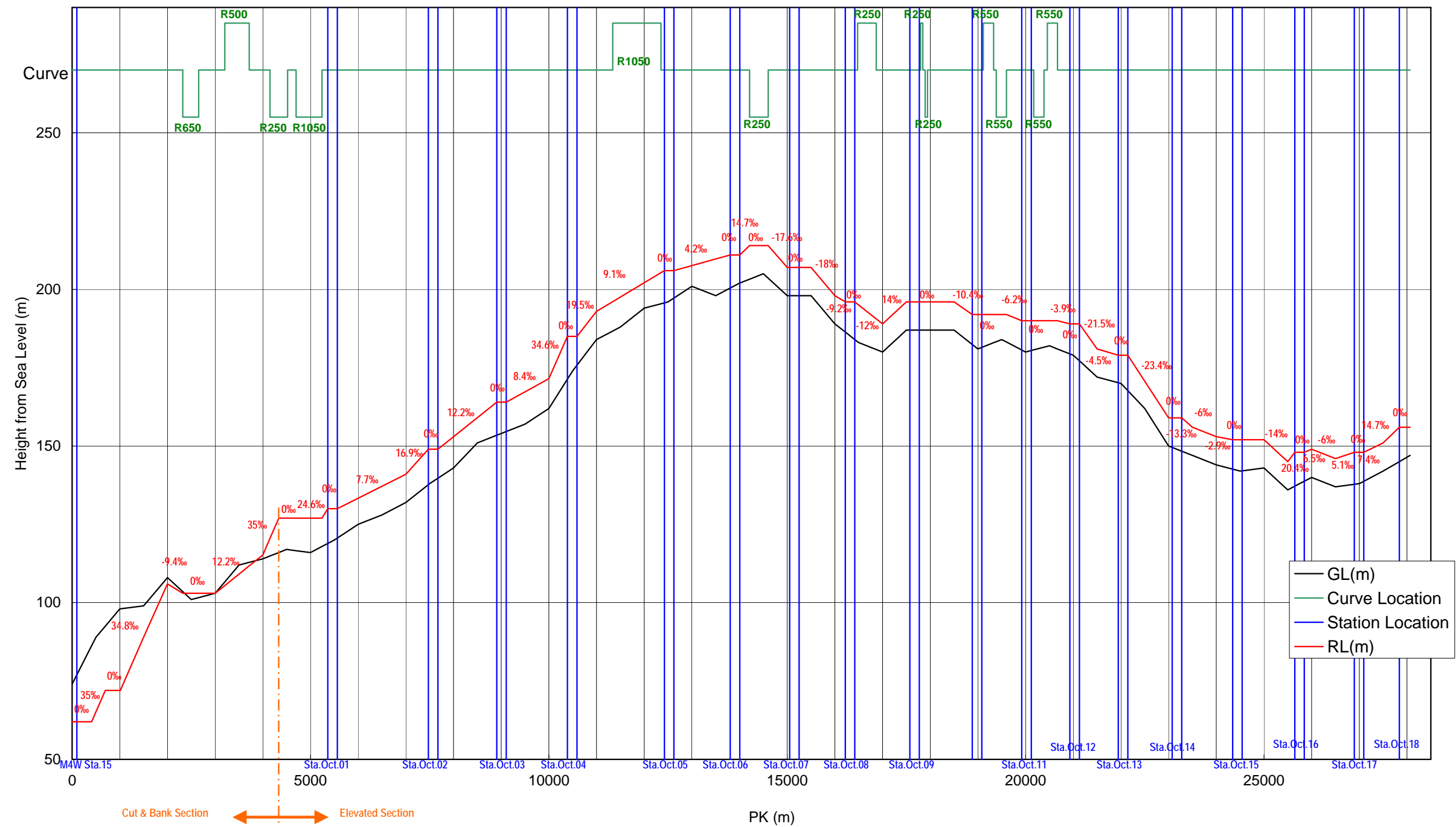
The plan and profile of the selected route are shown in Figure 2.4 and Figure 2.5, respectively. These are based on the same criteria which were applied to Phases 1 and 2 of Cairo Metro Line 4.



Source: JICA Study Team, 2009, Map: Quickbird

Figure 2.4 Horizontal Alignment of the Selected Route

Vertical Alignment (6Oct. Ext.)



Note: GL is obtained from the elevation data of Google Earth
Source: JICA Study Team, 2009

Figure 2.5 Vertical Alignment of the Selected Route

2.5 Railway System to be Applied

It is recommended that the type of railway system to be applied in the 6th of October extension should be the same with the railway system adopted in Phases 1 and 2 of Cairo Metro Line 4.

2.6 Train Operating Plan

2.6.1 General

The basic principles for planning the train operations, such as accident countermeasures and treatment of turn-back operations, etc. will be the same system applied to Cairo Metro Line 4.

2.6.2 Key Operation Data and Parameters

Key operation data and parameters related to the transportation plan is basically the same as that for Phases 1 and 2. The different data and parameters are shown in Table 2.2 below.

Table 2.2 Key Operation Data and Parameters

Items	Data / Parameter
Total route length (double tracks) of the main line	27.939km
Number of stations	
Stations on the elevated section	18
Stations on the at-grade section	0
Average interval between stations	1.45km
Train composition	
In year 2027	8 cars in a train-set
In year 2050	8 cars in a train-set

Source: JICA Study Team, 2009

2.6.3 Demand Forecast Results

The results of the traffic demand forecast for the 6th of October City mass transit line are given in Table 2.3 below.

Table 2.3 Traffic Demand Forecast for 6th October City Mass Transit Line

Year	2027		2050	
	Station Pax.	Max. Section	Station Pax.	Max. Section
Total passengers/day	576,600	398,800	733,000	506,200
PPHPD	-	27,920	-	35,430

Station No.	Station Pax	Section Pax.	Station Pax	Section Pax.
M4W Sta No. 15	36,500		85,700	
	↓ ↑	382,800	↓ ↑	472,600
STA 6Oct No. 01	29,300		38,100	
	↓ ↑	390,100	↓ ↑	489,700
STA 6Oct No. 02	29,300		38,100	
	↓ ↑	390,100	↓ ↑	489,700
STA 6Oct No. 03	39,000		50,800	
	↓ ↑	398,800	↓ ↑	506,200
STA 6Oct No. 04	28,300		36,700	
	↓ ↑	393,200	↓ ↑	498,900
STA 6Oct No. 05	28,300		36,700	
	↓ ↑	391,300	↓ ↑	496,500
STA 6Oct No. 06	37,700		48,900	
	↓ ↑	382,100	↓ ↑	492,200
STA Oct No. 07	64,900		116,100	
	↓ ↑	362,600	↓ ↑	457,400
STA 6Oct No. 08	48,600		87,100	
	↓ ↑	315,000	↓ ↑	359,200
STA 6Oct No. 09	48,600		87,100	
	↓ ↑	305,200	↓ ↑	341,800
STA Oct No. 10	107,500		79,200	
	↓ ↑	270,800	↓ ↑	315,500
STA 6Oct No. 11	75,100		99,500	
	↓ ↑	218,700	↓ ↑	243,200
STA 6Oct No.12	68,370		73,700	
	↓ ↑	162,740	↓ ↑	198,390
STA 6Oct No. 13	55,940		60,300	
	↓ ↑	109,600	↓ ↑	141,100
STA Oct No. 14	39,420		50,820	
	↓ ↑	67,120	↓ ↑	86,470
STA 6Oct No. 15	26,280		33,880	
	↓ ↑	42,150	↓ ↑	54,280
STA 6Oct No. 16	19,710		25,380	
	↓ ↑	23,430	↓ ↑	30,170
STA 6Oct No. 17	13,140		16,920	
	↓ ↑	10,950	↓ ↑	14,100

STA Oct No. 18	10,950		14,100
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Source: JICA Study Team

2.6.4 Train Operation Headway

The number of trains operating during the peak hour and the required minimum headway are calculated on the basis of the capacity of the rolling stock and maximum PPHPD (Passengers Per Hour Per Direction).

According to Table 2.3, the section between Sta. Oct. No. 3 and No. 4 has the maximum PPHPD (27,920 in 2027 and 35,430 in 2050).

Assuming 2,000 passengers per train, the number of trains required during the peak hour and the required minimum headway were estimated as shown in Table 2.4. The minimum headway was estimated at 4 minutes 17 seconds in 2027, reducing to 3 minutes 20 seconds in 2050.

Table 2.4 Calculation of Minimum Headway

Year		2027	2050
PHPDT at peak time	A	27,920	35,430
Capacity of a train-set	B	2,000	2,000
Number of trains per hour	$C=A/B$	14	18
Minimum Headway	$60/C$	4 min 17 sec	3 min 20 sec

Source: JICA Study Team, 2009

2.6.5 Calculation of Travel Time

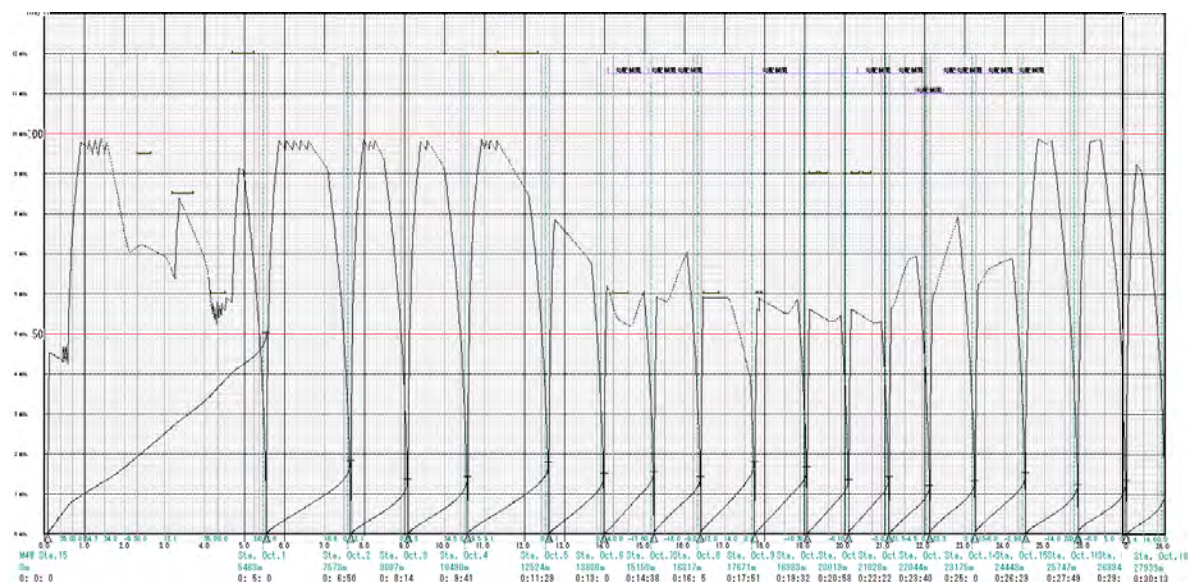
The travel time for the 6th of October extension was estimated on the basis of rolling stock performance, gradient, curve radius and the speed limitation at turnouts. The dwell time at intermediate stations was assumed as 30 sec.

The result of the travel time calculation is shown in Table 2.5. The train running curve is shown in Figure 2.6. The travel time for the extension line was calculated to be 41 minutes 15 seconds, rounded up to 42 minutes 00 seconds.

Table 2.5 Travel Time between M4W Sta. 15 and Sta. 6Oct. No. 18

Station	Distance from the previous station (km)	Travel time from the previous station	Dwell time at previous station	Arrival time
M4W Sta. No.15	0		—	—
Sta. 6Oct No.1	5.463	5 min 15 sec	30 sec	5 min 15 sec
Sta. 6Oct No.2	2.110	2 min 00 sec	30 sec	7 min 45 sec
Sta. 6Oct No.3	1.434	1 min 30 sec	30 sec	9 min 45 sec
Sta. 6Oct No.4	1.483	1 min 30 sec	30 sec	11 min 45 sec
Sta. 6Oct No.5	2.034	2 min 00 sec	30 sec	14 min 15 sec
Sta. 6Oct No.6	1.382	1 min 45 sec	30 sec	16 min 30 sec
Sta. 6Oct No.7	1.244	1 min 45 sec	30 sec	18 min 45 sec
Sta. 6Oct No.8	1.167	1 min 30 sec	30 sec	20 min 45 sec
Sta. 6Oct No.9	1.354	2 min 00 sec	30 sec	23 min 15 sec
Sta. 6Oct No.10	1.312	1 min 45 sec	30 sec	25 min 30 sec
Sta. 6Oct No.11	1.036	1 min 30 sec	30 sec	27 min 30 sec
Sta. 6Oct No.12	1.009	1 min 30 sec	30 sec	29 min 30 sec
Sta. 6Oct No.13	1.016	1 min 30 sec	30 sec	31 min 30 sec
Sta. 6Oct No.14	1.131	1 min 30 sec	30 sec	33 min 30 sec
Sta. 6Oct No.15	1.268	1 min 30 sec	30 sec	35 min 30 sec
Sta. 6Oct No.16	1.304	1 min 30 sec	30 sec	37 min 30 sec
Sta. 6Oct No.17	1.247	1 min 30 sec	30 sec	39 min 30 sec
Sta. 6Oct. No.18	0.945	1 min 15 sec	—	41 min 15 sec
Total	27.939	32 min 45 sec	8 min 30sec	
Average	1.55 km	1 min 49 sec	30 sec	

Source: JICA Study Team, 2009



Source: JICA Study Team

Figure 2.6 Train Operation Curve (From M4W-Sta. 15 to Sta. 6Oct No. 18)

2.6.6 Estimation of Rolling Stock Fleet Requirement

The required number of rolling stock was calculated in the same manner as for Cairo Metro Line 4.

Regarding turn back time at M4W Sta. No. 15 and 6 Oct. Sta. No. 18, headways of 4 min.17 sec and 3 min. 20 sec were applied respectively in 2027 and 2050.

The estimation of the required number of rolling stock is shown in Table 2.6 below. According to the table, the required number of train sets is 25 (or 200 cars) in 2027 and 31 (or 248 cars) in 2050.

Table 2.6 Estimation of Required Number of Train-Sets

Year	Headway	Distance (km)	Travel time	Spare time	Turn back time		Round trip time	No. of train-sets required	No. of spare train-sets	Total no. of train-sets	No. of Rolling Stock
					M4W Sta. No.15	Sta. 6Oct No.18					
	A	B	C	D	$E=A$ or $A/2$	$F=A$ or $A/2$	$G= (C + D) \times 2 + E + F$	$H=G/A$	$I \times$	$J=H+I$	$K=J \times 8$
2027	4min. 17sec.	27.939	42min. 00sec.	1min. 00sec	4min. 17sec	4min. 17sec	94min. 34sec.	23	2	25	200
2050	3min. 20sec.	27.939	42min. 00sec.	1min. 00sec	3min. 20sec	3min. 20sec	92min. 40sec.	28	3	31	248
Remarks			Average speed ; 39.9km/hr obtained by B/C					The number is rounded up to integer	10% of H		

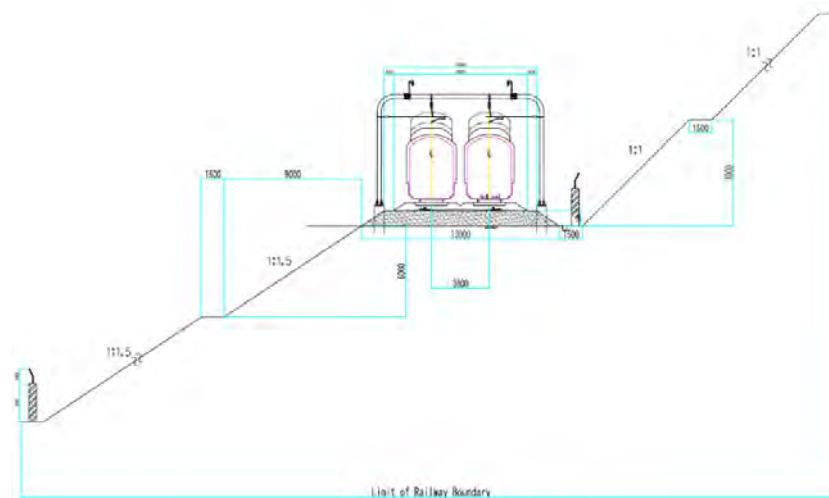
Source: JICA Study Team

2.7 Selection of Structure Type

The selected alignment will have two types of route section as shown below:

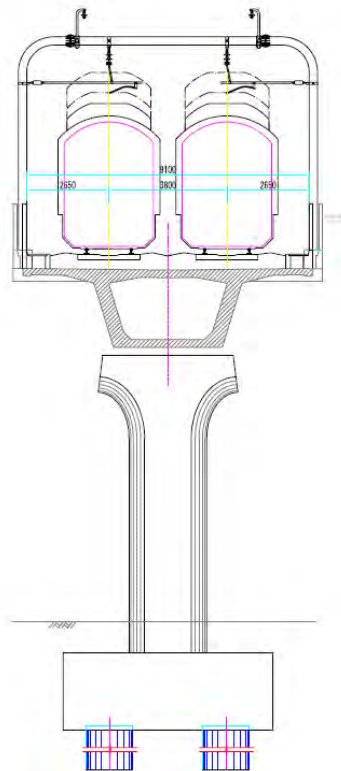
- PK0+000~PK4+300: At-grade section (cut and fill)
- PK4+300~PK28+064: Elevated section

The typical cross sections of these two types of route section are shown in Figures 2.7 and 2.8, respectively.



Source: JICA Study Team

Figure 2.7 Typical Cross Section for At-Grade Route Section



Source: JICA Study Team

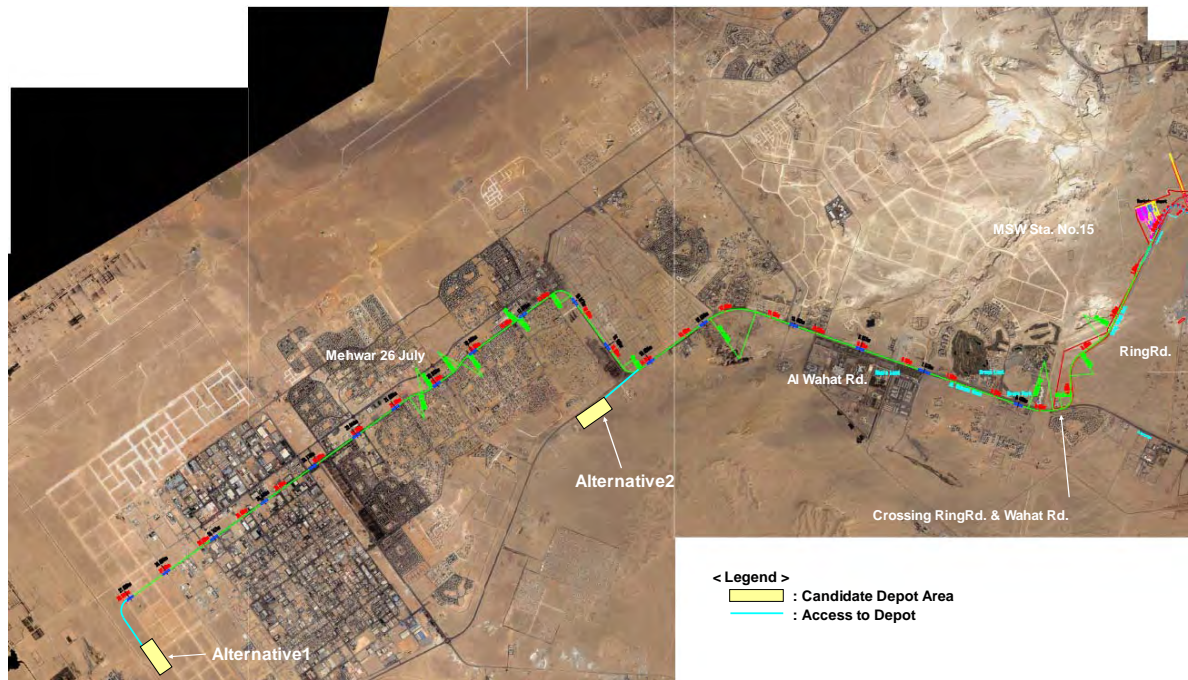
Figure 2.8 Typical Cross Section for Elevated Route Section

2.8 Depot and Workshop

An exclusive depot for stabling and light maintenance should be planned in the appropriate land along the route. It is assumed that the depot to be established will have the same scale as in the case for Phase 2 of Metro Line 4 because they have almost the same number of rolling stocks required to be serviced in the depot/workshop. The depot is planned on an at-grade vertical alignment in order to reduce the construction cost. From the site survey, it was established that there are two alternative areas along the route which may be suitable for depot sites. These are shown in Figure 2.9.

The results of the comparison of these two alternative sites (see Table 2.7) show that Alternative 1 is better than Alternative 2, except from the viewpoint of land availability. However, the issue is solved easily if the government officially reserves the area as the future depot site. Therefore, it is recommended to select Alternative 1 as the location of depot.

It should be noted that it is not planned to establish a workshop on the extension because the workshop for Phase 1 can be used for the extension line.



Source: JICA Study Team, 2009, Map: Quickbird

Figure 2.9 Alternative Areas for Depot Location

Table 2.7 Comparison of Alternative Depot Areas

	Alternative 1	Alternative 2
Land Availability	<u>Fair</u> There is some available land around the area at present. However, this land will be developed in the near future if it is not reserved as a depot site, because 6 th of October City is rapidly spreading to the west.	<u>Good</u> Huge undeveloped land area on the southern side of Wahat Rd.
Terrain	<u>Good</u> Plain.	<u>Good</u> Plain.
Convenience from the viewpoint of train operation	<u>Good</u> All trains can go to the depot from the terminal station.	<u>Poor</u> All trains should go back to an intermediate station to enter the depot. Trains from 6Oct Sta. No. 18 to the depot should pass through the entrance of the depot at once, go to the far station and turn back to enter the depot.
Conclusion	Recommended	

Source: JICA Study Team, 2009

2.9 Preliminary Cost Estimate for Construction and Procurement

The cost estimation was conducted in the same manner as for Phase 2 of Line 4 (please refer to the Feasibility Study Report 2); hence, there is no separate design for the extension line. Applied unit prices are shown in Table 2.8 below.

Table 2.8 Basic Unit Cost

Items	Unit	Unit Cost (mil. USD)	Remarks
Elevated civil works	km	10	
At-grade civil works	km	2	
Track	km	3.3	
Signal and telecom, power supply	km	16	
Elevated station	unit	13	
Rolling stock	car	2	
Depot	unit	20	

Source: JICA Study Team, 2009

According to the table above and the quantities calculated from the route length and the required number of rolling stocks, the construction and procurement cost is estimated as shown in Table 2.9.

Table 2.9 Construction and Procurement Cost for 6 Oct. Extension (as of 2009)

Items	Unit	Unit Cost (mil. USD)	Quantity	Total (mil. USD)	Remarks
Elevated civil works	km	10	21.204	212.04	incl. 0.5 km for depot access line; excl. the station length.
At-grade civil works	km	2	4.3	8.60	
Track	km	3.3	28.564	94.26	
Signal and telecom, power supply	km	16	28.564	457.02	
Elevated station	unit	13	18	234.00	
Depot	unit	20	1	20.00	
Rolling stock	car	2	200	400.00	
Sub-Total				1,425.93	

Source: JICA Study Team, 2009

2.10 Recommendations for Further Action

This study is only preliminary, and it is therefore recommended that the following actions be taken in order to realize the project:

- To secure the necessary Right-of-Way (ROW) along the alignment and depot area through official designation by the government of the land area as railway land in order to avoid difficult land acquisition in the future; and
- To conduct a full feasibility study including the necessary survey works.

APPENDIX 3
NAT COMMENTS WITH JST RESPONSE
ON DRAFT REPORT 3/4

APPENDIX 3 NAT COMMENTS WITH JST RESPONSE ON DRAFT REPORT 3/4

3.1 General

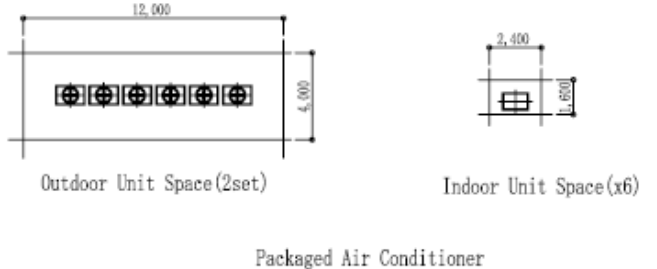
JST has received NAT comments on draft Report 3/4 in January and early February 2010, and has prepared the response on these comments in cooperation with each department/sector through several technical meetings as shown below.

NAT Comments			Date of Meeting
1	EMD	Letter No.EMD/3/, dated 18/1/2010	14/2/2010
2	EMD	Letter No.EMD/3/, dated 28/01/2010	15/2/2010 21/2/2010 28/2/2010
3	CWD	Letter No.CM4/CWD/239/880, dated 30/01/2010	16/2/2010 03/3/2010
4	TD	Letter No.TD/235/700, dated 31/01/2010	25/2/2010
5	TD	Letter No.TD/---/700, dated 04/02/2010	03/3/2010

Following JST responses are basically agreed as of March 2010. Further updated response will be made separately through official letter.

3.2 EMD Comments Letter No.EMD/3/ , dated on 18/1/2010

	Comment from NAT	Response from JST
General		
1	The catenary system is rejected. The traction power system should be via 3 rd rail.	Noted. JST will adopt 3 rd Rail system. No modification will be made in the Final Report 3/4. JST will provide general concept and drawings related to 3 rd rail system as much as possible, such as number and rough cost estimate of RS, tunnel diameter, workshop/depot layout and safety concerns, etc. in the Final Report 3/4. Detailed study will be carried out in the design stage.
2	You should take into consideration the use of hand car in emergency cases.	Noted. Detailed information will be provided in the design stage.
3	Abbreviation list should be completed. (e.g. USRT, RT, CMH,.....,etc.)	Noted. JST will check and updated abbreviation list in the Final Report 3/4.
4	Reference for all heat loads and equations used in the heat load calculation should be submitted.	The reference is "Plan and design guideline for logistics and transportation facility (The society of heating, air conditioning)". Summary in English is provided to EMD.
5	State the type of chiller, indoor or outdoor unit?	Chiller is indoor type and cooling tower is outdoor type.

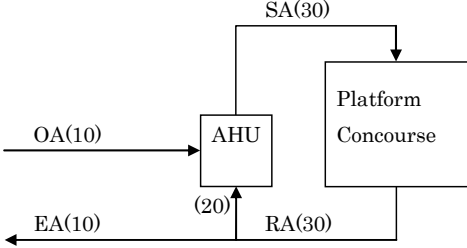
	Comment from NAT	Response from JST
6	Information for AHUs dimensions should be submitted.	<p>Dimension of AHU (air handling unit) is indicated in 4.10.6 (10), pp4-385. Dimension of package will be indicated in the Final Report 3/4.</p>  <p style="text-align: center;">Packaged Air Conditioner</p>
7	The information about the CCP is very poor. It should be more clear.	<p>Information about CCP is not described in a separate chapter, but in sections 4.10.1 "Signaling system", 6.2.2 "CCP Operation Plan" and 4.10.3 (11) "Power Supply, Power SCADA" provide sufficient information of the CCP.</p> <p>JST will add new separate section for CCP in the Final Report 3/4.</p>
8	The AFC system architecture and interface specifications should be open to accept multivendor equipment interfacing in line extensions.	<p>There are no international and common standard for the total AFC system. As for the interface, it is comparatively easy to specify the physical interface condition such as IC chip standard, LAN, etc. In contrast, it is realistically impossible to specify the specification of logical interface such as software (Program) including data structure, because the software (programming) depends on the contractor's technology. AFC system consists of lot of software. Modification of software will also be required when the AFC system will be extended in the future. (refer to attachment at last page of this comments for further information)</p>
9	The AFC centralized functions distribution between the metro CCU (level 4) and the LCU (level 3) should be designed to enable the PPP (Public-Private-Partnership) or BOT concept.	<p>In the draft Report No.3/4, JST recommend that CCU (level 4) will be prepared by the other project (foregoing project). If the NAT provide us the clear demarcation including scope works between Metro line No.4 and PPP project, and interface condition, it is technically possible. We consider that this matter could be discussed in the design stage.</p>
10	CIPF should have direct access to the database of the centralized system.	<p>Noted. JST will study in the design stage.</p>
11	Comparison between PMSM & induction motor concerning life time & difference in cost as percentage should be submitted.	<p>The additional initial cost from IM to PMSM is about 1% of the total train set cost. PMSM can reduce the traction power cost approximately 5%, because that power includes some electricity for service equipments. In Japan PMSM can save power cost much more than additional initial cost in life time. However the power cost in Egypt is so low that PMSM can offset less than 30% of the additional initial cost in life time. As far as cost efficiency is concerned, IM system is superior to PMSM and the top advantage of PMSM in Egypt is that sweeping dust in the motor is unnecessary.</p>

	Comment from NAT	Response from JST
12	Please define if the maintenance of PMSM needs special tools or not?	Usually the maintenance of PMSM is lubrication or replacement of the bearing. PMSM is designed that the bearing can be removed without any special tools.
13	Information for ventilation and/or air conditioning of rolling stock is needed.	JST will provide information in the Final Report 3/4.
14	What's the expected scenario in case of failure of air conditioning system of rolling stock?	Air conditioning system is not necessary for train operation and some or all windows can be opened. In case of failure of air conditioning, the passengers should open the windows to get fresh air. The troubled train-set should be changed as soon as possible.
15	Electromechanical workshop for ventilation, air conditioning, escalators, elevators, dewatering,.....etc. should be implemented.	General information of location for spare part stores will be shown in general drawing of workshop/depot in the Final Report 3/4 Drawings. Detailed study will be carried out in the design stage.
16	Electromechanical stores for ventilation, air conditioning, escalators, elevators, dewatering,....etc should be implemented.	Ditto
17	Water and fire pumping station and its related tanks should be implemented in the workshop.	Noted. JST will study in the design stage once depot layout and facilities are finalized.
18	The minimum length and radius of the test track should be mentioned.	JST will provide general plan of depot track layout and buildings with requested information in Final Report 3/4 Drawing.
19	Maneuvering of diesel locomotive through diesel workshop in case of hauling new train or defective one to workshop should be studied.	Noted. JST will consider and this study will be carried out in the design stage.
20	Chapter 2	
	You should classify stations according to the number of forecast entries and exits	The station passenger in the table 2.2 is summation of boarding and alighting passenger by each station respectively. The demand forecast is basically targeting daily passenger. Therefore the boarding and alighting passenger in each station is logically equal. The boarding passenger is 50 % of station passenger in the table 2.2, and also in alighting passenger. JST will add this note in the Final Report 3/4, and further detailed boarding and alighting passenger numbers will be reviewed in the design stage.
	You should classify stations according to inter-modality (The diversity of modes and number of lines stopping at the station)	The inter-modality of stations is studies in the Chapter 4 and 5. Off course, the inter-modality, the smooth connection with other mode, ENR, 6 th October Line, other Metro Lines are considered in the selection and planning the stations. JST will add definition of a classification for metro stations in the Final Report 3/4

	Comment from NAT	Response from JST
21	Table 2-6 (1&2) Page (2-9): These tables show no big difference between with/without project, does this means Line 4 is not feasible?	The difference of passenger km and hours between with and without cases feels small compared with that total of Greater Cairo Region. But the evaluation of that difference was done in the Chapter 12, Economic Analysis. From the result of economic evaluation, especially by EIRR, the project is feasible.
22	Item 3.2-10 Page (3-3) Is 5 RS sufficient for phase 1 (15 stations)?	Five RSs are sufficient according to our calculation under the condition of 1,500V DC system. As mentioned in pp. 4-335,336 and Annex 4-1 of draft Report 3/4, the major design criteria for voltage drop in contact line are following 1. One RS failure can be compensated by neighboring RSs 2. The voltage of contact line should not be under 1,100V. However, more RSs will be required because of its lower contact line voltage in the case of 750V DC 3 rd rail system. JST will study based on 3 rd rail system in the design stage. Preliminary (first simulation) Power Supply Simulation result based on 3 rd Rail will be provided in the Final Report 3/4.
23	Item 4.2.2. Page (4-31) Daily operation hours should be "6:01" (General comment)	Existing operation hours of Line 2 are "4:00 to 00:00" Some of trains arrives at their final destination after 0:00. Hence JST recommend that operation hours will be revised to "4:00 to 1:00". During the Meeting with NAT on 14/02/2010, based on the confirmation by NAT through ECM, daily operation hour is fixed from 5:00 to 01:00 for Line 4. JST will be modified Table 4.11 in the Final Report 3/4.
24	Table 4.11 page (4-32) Why the ticket vending machine will not be installed at the opening stage.	The condition of bank note is not good in Cairo and coins have only been introduced recently and are not yet in wide circulation. Hence it is assumed in this report that all tickets are sold manually, at least during the opening stage. Table 4.11 last column will be modified to "Common system in Cairo commuter lines and ticket vending machine as option."
25	Figure 4.20 page (4-33) You should take into consideration the trains in maintenance.	In "Spare ratio minimum two" on the Figure 4.20 the train-set number for maintenance are included. Principally accepted, final decision will be made in design stage by NAT.
26	Item "Type of platform" Page (4-37) This item should be rephrased to be more understood.	The side platform cannot be provided at WN-Sta.1 due to alignment and construction method. Further information is described in Section 4.7.4 (1) of draft Report 3/4.
27	Table 4.20 page (4-44) The spare time should be 5 sec/km	For establishment of train exchanges at terminals in train diagram, some of spare time may be required. Hence in this report, spare time is secured regardless the route length. Since for spare time during train operation, the estimated traveling time includes some

	Comment from NAT	Response from JST
		room (margin), therefore, extra spare time is not required. Principally accepted, final decision will be made in the design stage by NAT.
28	Item 4.2.9-2 page (4-47) The required hourly number of trains should be calculated from Line 4 hourly traffic regardless of line 2.	It is the formula with which total number of trains per day of Line 4 is calculated based on the peak demand at the peak section of Line 4. Figures of Line 2 are referred only to obtain the relationship between the peak demand and the daily total demand. JST will review this issue in design stage to provide accurate required hourly number of trains with consideration of Line 4 transportation study result mentioned in Item 20 above, latest Line 1 and Line 2 data which will be collected in the design stage.
29	Page (4-76) There is an overlap of equations.	Noted. JST will modify this in the Final Report 3/4.
30	Table 4.35 page (4-112) We strongly recommend you to revise the values of compression load at frame level, as 50 tons seems very small.	We are of the opinion that 50 tons is acceptable values in our experience for the car body. We will recommend the load case in accordance with Japanese standard (JIS-E 7106) or internationally recognized standard including 490 kN (50tf) longitudinal compressive load and 343 kN (35tf) longitudinal tensile load at the centerline of coupler without causing measurable permanent deformation to any part of the car structure. Please provide us the reason why it needs high values and we will consider this issue in the design stage. Comparison table of car material is attached at last page of this comment for your information. Further study and discussion will be held during the basic design stage.
31	Sub-item 4 page (4-113) All the study is based on 2.88 m wide so there's no meaning to change it now.	Noted. JST will adopt 2.88 m as Car Gauge. Detailed car body size and design will be studied in the next stage. JST will delete the 2 nd paragraph of (4) in page 4-113 in the Final Report 3/4.
32	Item 4.5.4 page (4-125) You should study the feasibility of connection between lines 1 & 4 at El Malek El-Saleh station.	As for the connection route between Line 1 and Line 4 at El-Malek El-Saleh as for the rolling stock transportation, there are no suitable location and alignment as an access. Moreover, connection with ENR at Giza is cancelled at the meeting on 07/02/2010, therefore we understood that this comments also can be canceled. During the Meeting with NAT on 14/02/2010, following new request was received from NAT. - Need passenger connection CG or perspective drawing at El Malek El Saleh station in the design stage. JST will consider this issue in the design stage.

	Comment from NAT	Response from JST
33	Item 4.9.3-3 page (4-296) The last paragraph needs to be explained in details.	Noted. JST will modify this paragraph and incorporate in the Final Report 3/4.
34	Item 4.10.4 page (4-346): You should clarify how could PSD system minimize the number of station staff, whereas this system needs a staff for operation.	 By the introduction of PSD, the risk of collision with person on tracks and collision with person on platform can be minimized. As the result, the number of staff (train attendant add/or station staff on platform) for supervising the boarding/alighting of passenger to/from train can be reduced with high level of safety train operation. Based on this condition, no station staff for supervising of boarding/alighting of passenger is proposed in draft Report 3/4 (Page 6-23, (2) Train Operation Tasks at Stations).
	There is a contradiction between the sentences which says "The Full-height PSD system will be introduced at underground station except the EI-Remayah station (M4W Sta. No. 12)" and table No., 4.89 while the table says half height will be used in stations 12 and 13.	Table No.4.89 is incorrect. JST will revise the table No.4.89 and incorporate in the Final Report 3/4.
35	Item 4.10.6 Multi chiller with air cooled condensers is recommended, because losing one unit means losing 50% of the capacity.	The air conditioning is divided into two systems in the station (see Figure 4.301, pp 4-384). Each system has two chillers (see Figure 4-378). Therefore, 4 chillers in two systems are used in one station. In the design stage, it will be considered to use more chillers in one system taking into consideration the high possibility of failure/maintenance in Egypt. Further study and discussion will be held in the design stage. JST will study to utilize an air cooling system, not water system.
36	Table 4.93 page (4-369) The reference of outside temperature and humidity should be given	Reference is comes from following website http://www2m.biglobe.ne.jp/~ZenTech/English/Climate/Egypt/Cairo.htm Outside temperature and humidity for calculation will be 40°C and 31% as discussed in the meeting on 10/03/2010.
37	Table 4.94 page (4-369) Reference for the design parameters used in station should be submitted.	It is quoted from the psychometric chart.
38	Table 4.95 page (4-369) Reference for the simulation of power consumption should be submitted.	The simulation (sensitive analysis) is not regulated in any standard. It is carried out by the JST to determine appropriate design temperature taking into power consumption. The heat load which is influenced and varied very much

	Comment from NAT	Response from JST
		by the design temperature is that of the outside air. On the other hand, heat load from the passenger and lighting are not influenced and varied by the design temperature (constant). Therefore, the simulation (sensitive analysis) is carried out taking into account the variation of the load of outside air and air brought by the train wind. 28°C is the minimum design temperature.
39	Table 4.96 page (4-370)	
	Is this table for inside or outside? Check and confirm.	It is condition of inside station. Title will be revised.
	The dry bulb temperature of station office should be 26° C.	It will be changed to 26°C.
	The dry bulb temperature of substation for electrical services (24° C) seems too low for such application.	Electrical substations will be changed to 35°C. (Electronics must be 25°C)
40	Table 4.97 page (4-370)	
	There is no hour called 25:00.	JST will revise to AM 1:00 instead of 25:00.
	Another column should be added for the number of working hours per day.	It will be added in the Final Report 3/4.
41	Table 4.98 page (4-370)	
	The returned air for platform and concourse should be 20%.	Image of air flow will be indicated in the Final Report 3/4. 
	Reference for minimum air requirement should be submitted. (Table 4.108 is the same).	Summary of the reference is submitted.
42	Table 4.99, 4.108 pages (4-372 and 4-386 respectively) The supply air should be equal to the outside air and return air.	See 41.
43	Sub-item e page (374) What's the impact of the PSD in this case?	Simulation will be submitted.
44	Table 4.103 page (4-376)	
	Escalators heat load are missing.	Heat load from the escalators is minor and it is included in the item of others in concourse.

	Comment from NAT	Response from JST
	For heat load in the platform, state what is advisement, etc?	Advertisement and other miscellaneous lighting.
	For the load on concourse, state what do you mean by others?	Escalator, elevator, automatic fare collection, vending machine.
45	Table 4.106 page (4-382)	
	Take into your consideration the required capacity of air conditioning facility the heat load by outside fresh air in both platform and concourse.	Load for outside air is included. It is not directly included in Table 4.106 on page 4-382. However, the blown air from the air conditioner which is 10°C lower than the design contains the load of the outside air. Please see Table 4.103 in page 4-376. Thus, the load for outside air is included and considered.
	What's the base of estimation the area of exhaust air shaft?	Cross section of the exhaust shaft is determined by the air speed in the duct. In order to avoid the noise from the duct, the air speed in the duct is recommended to be approximately 5 m/s according to the past experiences in Japan.
	Clarify the temperature difference of supplied air (10°C)	This is the temperature difference between the design temperature of platform/concourse and blown air from the air conditioner. If the difference is big, the air volume from air conditioner is reduced and it is good efficiency for power consumption. However, if it is too cool, it will be uncomfortable for the passenger on platform/concourse. The maximum allowable difference is 13 °C according to Japanese standard but 10°C difference is usually used taking into account both the efficiency and comfort for the passengers.
46	Table 4.107 page (4-383)	
	The power of cold water coil for platform and concourse should include the heat load from the outside air.	See 45. It is included when the cold water is made.
	The required supply air volume should include the outside air for the platform and the concourse.	It is included.
47	Table 4.109 page (4-386) The reference of these values should be given.	It is written in "Design Standard for Building Facilities, Ministry of Infrastructure, Land, Transportation and Tourism (MLIT) and Public Buildings Association, Ltd.". It will be mentioned in the Final Report 3/4.
48	Table 4.112 page (4-391) The measurement units are incorrect.	It will be revised in the Final Report 3/4.
49	Figure 4.306 page (4-392) See attached drawing.	The shaft in which the fan is not installed is the draft relief shaft. In case that the full height platform screen door is installed in the station, the wind brought by the train can not be blown through the platform. In order to release the wind, it is necessary to provide the shaft to release the air. If the full height PSD is not installed in the platform, this shaft is not provided.

	Comment from NAT	Response from JST
50	Sub-item 3 page (395) What's the reference of equipping station office with smoke exhaust system?	The requirement is regulated in "the Standard of Fire Safety Management for Subway Station, etc, Ministerial Ordinance of Ministry of Land, Infrastructure, Transportation and Tourism (MLIT)". The summary will be submitted and name of the reference will be indicated in the final report. Section 4.3 will be added some explanation related to this issue in the Final Report 3/4.
51	Item 4.10.9-1 page (396) Reference should be given for these values.	The reference will be indicated in the Final Report 3/4.
52	Item 4.11.7 page (4-410)	
	Rapid removal and replacement of bogie should be checked.	General information of rapid removal and replacement equipment will be studied and provided in the design stage.
	Implementation of providing bogie changing equipment should be studied.	Study will be carried out in the design stage.
53	Item 4.11.8 page (4-411) Arriving of trains under their own power on the fourth line of heavy maintenance & repair should be checked from the safety point of view and another method should be implemented.	Detailed study will be carried out in the design stage with consideration of 3 rd rail system..
54	Page 4-417 Number of jib crane (4) inside bogie shop should be checked & its function should be mentioned.	Ditto
55	Item 5.1.2 page (5-2) You should eliminate El Giza station from the outline of the route, as it is not in the alignment of phase 2.	Noted. JST will eliminate El Giza station from the outline of the route and incorporate in the Final Report 3/4.
56	Sub-item 3 page (6-20) ATP is not a driving mode, but it is automatic train protection for both driving modes: ATO and manual driving modes. It's preferable for the driving modes to be the same as per lines 2 and 3.	"Mode of ATP" will be modified to "Manual" in Final Report 3/4. Regarding the adjustment of driving mode name with current system, it will be discussed in the design stage.
57	Item 6.3 page (6-26) The second paragraph needs to be explained.	JST will delete the 2 nd paragraph of Section 6.3 in page 6-26 in the Final Report 3/4. "Some consideration" means that some modification to the proposed system will be required not to reduce the working staff number drastically

	Comment from NAT	Response from JST
58	Table 6.5 page (6-33) The number of train-sets to be inspected per day for modified case is 4.	Noted. This table will be modified in the Final Report 3/4.
59	Table 6.21 page (6-48) Allocating one station staff for each gate is too much.	Since in this report, the vending machines is planned not to be installed in the initial stage, therefore the staff number allocated is large. It is conservative estimation to allocate the staff for ticket sales, and it is possible to reduce them by introduction of the tickets vending machines. Further study for station staff number will be carried out in the design stage with consultation of NAT and ECM. JST will modify the sentence in Table 6.21 (2) right column "... One station staff will be allocated for each gate" to "... One station staff will be allocated for each <u>location of entrance/exit gate</u> "
60	Table 6.39 page (6-59) What's the meaning of others training?	"Others" means the period of test for drivers license and trial driving during waiting period for issuance of drivers' license
61	Item 7.1..4 page (7-4)	
	The cost of PSD constitutes 28% of the electromechanical equipment cost is very exaggerated. It needs clarification.	It will be submitted. Efficiency of Air Conditioning with/without the PSD is attached in the last page of this comments
	Please submit a comparison for number of chillers (air conditioning system) in case of using PSD system or not. And accordingly the cost for the two cases. (it is important for taking the decision of using PSD or not)	It will be submitted. Efficiency of Air Conditioning with/without the PSD is attached in the last page of this comments.
62	Clerical mistakes	
	Page (4-13): "On the other hand, it considerations...." should be amended to be "On the other hand, in considerations..."	This mistake will be modified in the Final Report 3/4.
	Item 4.2.8 page (4-44): "the required number of train sets is 19 in 2017..." Should be amended to be "the required number of train sets is 20 in 2020..."	This mistake will be modified in the Final Report 3/4.
	Table 4.20: "...from Table 8" should be amended to be "...from table 4-18"	This mistake will be modified in the Final Report 3/4.
	Sub-item 3 page (4-96): "...where the passenger	Noted. Modification will be made in the Final Report 3/4.

	Comment from NAT	Response from JST
	..."Should be amended to be "where the passenger"	
	Sub-item 3 page (4-96): "installed in the these rooms" should be amended to be "installed in these rooms"	Noted. Modification will be made in the Final Report 3/4.
	Sub-item b page (4-388): "single double track tunnel" should be amended to be "Single track double tube"	"Single double track tunnel" is unified (used) in this report.
	Item 6.5.8-1 page (6-52): "the workers are understood to be dispatched from ENR" should be amended to be "the workers are understood to be dispatched from ECM"	Section 6.5.8 (1) was prepared based on the obtained data and information from ECM during our study. If we amended from "ENR" to "ECM", related paragraphs makes no sense. Therefore JST will propose to keep this paragraph with no change. Otherwise it needs to be deleted from the report. (refer to attachment for your clarification and your decision on this issue)
	Item 6.3.4 page (6-35): "If these works are to done....." should be amended to be "if these works are to be done....."	This mistake will be modified in the Final Report 3/4.

Attachment

Comment No.8

The AFC system architecture and interface specification should be open to accept multivendor equipment interfacing in line extension.

As we explained (refer to letter no. GCM-NAT-159/211, dated 24 Sept 2009 and letter no. GCM-NAT-167/222, dated 19 Oct. 2009) that there are no international and common standard for the total AFC system. As for the interface, it is comparatively easy to specify the physical interface condition such as IC chip standard, LAN, etc. In contrast, it is realistically impossible to specify the specification of logical interface such as software (Program) including data structure, because the software (programming) depends on the contractor's technology. AFC system consists of lot of software. Modification of software will also be required when the AFC system will be extended in the future.

Under such situation, in order to secure the expandability in the future, following requirement are specified in the some of Tender document.

- Specify the required function that should be handled by the software
- Specify the **obligation of discloser** of all of the required interface condition for future expansion:
 - Physical interface condition
 - Data structure with data table
 - Meaning of data
 - Procedure of processing
 - Source code of software or limited area of source code for the data expansion
 - Other required interface condition

AFC system of Metro line No.4 is planned according to the specification of foregoing project (i.e Line1&2 and 3) and “Unification of the Technical Specifications” prepared by CMO in 2006, in order to secure the compatibility with other lines, secure the further expandability, etc. under the coordinated concept. We believe that these foregoing projects include the interface condition taking into account of future expansion.

If NAT provide us the interface conditions, we can reflect interface condition to our study. If the interface condition will not be finalized by the foregoing project before finalization of tender document for the Metro line No. 4, we recommend that the contractor’s obligation for discloser of required interface condition for future expansion will be specified in the tender document.

Comment No.30
Comparison of car body material

Material	Steel	Stainless Steel	Aluminum alloy
Welding technology	easy	difficult	most difficult
Manufacturing delicate design	possible	Impossible Use F.R.P if necessary	possible
Repairability in case of accident	easy	difficult	most difficult
Painting (& Facility in W.S)	need	need not	need not
Train weight : Tare (tonnes/ a train set)	290	266	258
Initial cost of a train set (Index)	100	107	120

Comment No.61
Efficiency of Air Conditioning with/without the PSD

The full height platform screen door (PSD) is high cost facility compared with other facilities and equipments. In order to

1. Basic Condition

The comparison of the power consumption and air conditioner facilities with/without PSD are studied based on the following condition and assumption. The result of the simulation is attached as Appendix.

	Items	Unit
1	Design Temperature	28 °C
2	Outside Temperature	35 °C
3	Operation Days per Year	240 days
4	Operation Hours per Day	19 hour
5	Average Effective Operation	80 %
6	Unit Electric Cost	0.068 LE/kWh

2. Comparison of Power Consumption and Electric Cost

According to the result of the simulation, the efficiency for the air conditioner will be enhanced very much by the installation of the full height PSD. According to the condition of the station (geometry, passengers, etc.), the efficiencies are different in each station. Compared with the power consumption of the air conditioner without the full height PSD, it will be saved approximately 30-40 % in each station.

The full height PSD is preferable for the environment because it saves 30-40% energy. However, the unit cost of electricity (0.068 LE/kWh) for the metro is very cheap because it is reimbursed by the governmental subsidy. Consequently, the save of electricity cost is at most a half million LE per year for all stations.

3. Comparison of Air Conditioner Cost

In case that the platform and track are not separated and segregated, the platform is influenced by the train wind from tunnel. As a result of the simulation, the cost increase of the air conditioner facilities is approximately 16,000 thousands LE higher than that of the air conditioner with PSD.

4. Cost for the PSD

Cost for the full height PSD for all stations (only No. 12 Remaya Sq. Station is half height) is approximately 440mil. LE to 550mil. LE.

Cost for the half height PSD is approximately half of the full height PSD.

5. Conclusion

The electric cost for the metro is quite cheap in Egypt because of the governmental subsidy. The effect of energy cost saving by the full height PSD is limited compared with high initial cost for installation, though it will save 30-40% power consumption. It is preferable to consider and compare with the half height PSD in aspect of cost and requirement of safety.

Comment No.62 (Item 6.5.8-1)

“Skilled staff per car” in the Table 6.28 shows big difference between Line1 and Line2 though maintenance works of both lines are outsourced and the working conditions of these lines are basically same with each other. Hence I intended to clarify the causes in the suggested paragraphs.

At that time, I heard that maintenance staffs of outsourcers for Line1 are dispatched from ENR. Then I understood that the maintenance staff number dispatched from ENR is not included in the staff number of ECM.

	Maintenance staff in ECM (A)	Maintenance staff for outsourcers (B)	Staff number of ECM (B in the Table6.28)	Remarks
Line1	A1	B1 from ENR	A1	Big difference between them can be explained
Line2	A2	B2 from ECM	A2+B2	

NAT Comment suggested that maintenance staff of both lines are belong to ECM. From these facts, I understand that the maintenance staffs of Line1 were transferred to ECM from ENR after the preparation of the figures in the Table 6.28.

If the maintenance staffs of Line1 belong to ECM at the timing of the preparation of the figures in Table6.28, the suggested paragraphs does not explain the difference of skilled staff per car.

	Maintenance staff in ECM (A)	Maintenance staff for outsourcers (B)	Staff number of ECM (B in the Table6.28)	Remarks
Line1	A1	B1 from ECM	A1+B2	Big difference between them cannot be explained
Line2	A2	B2 from ECM	A2+B2	

Therefore the Study Team proposes that the following sentences should be no change or erased from the final report though the cause of the difference cannot be explained.

“On both lines, rolling stock maintenance is outsourced. In the case of Line 2, the workers are dispatched from ECM and their number is counted in the number of maintenance staff of Line 2. In the case of Line 1, the workers are understood to be dispatched from ENR and their number is not counted in the maintenance staff of Line 1. These facts explain the difference between the two lines in terms of the ratio of staff to car fleet number.” (Page 6-52)

3.3 EMD Comments Letter No.EMD/3/ , dated on 28/01/2010

	Comment from NAT	Response from JST
1	You should distinguish between rolling stock and rolling stock vehicles to avoid misunderstanding (e.g. Tables 6.29, 6.38, 7.21, 7.25,.....,etc.)	In this report, for the meaning of rolling stock vehicles, “rolling stock” is used. For the description of the number of trains used/procured, “the number of train-sets” is used.
2	The workshop layout should be updated to match with the updated available area of the workshop.	Workshop layout will be updated based on your instruction. JST will prepare the general drawing of depot/workshop layout and incorporated in the Final Report 3/4. Further study will be carry out in the desig stage.
3	Item 4.1.1(Table 4.1) What do you mean by « Given Conditions » ? and what’s your recommendations ?	« Given Condition » meant decision made by NAT during feasibility study stage on the NAT and JST meeting. JST will delete the word « Given Condition » from the table in the Final Report 3/4 to avoid any confusion.
4	Table 4.2.4 Page(4-34) This table should match table 2.5, as the passengers demand is shifted and station 15 is missing.	Noted. Modification will be made in the Final Report 3/4.
5	Sub-item3 page(4-37) This paragraph contradicts with item 4.6.8 as it is mentioned here that line No.4 will be connected to Metro Line 1 from station No. 5 but in item 4.6.8 it states that the connection will be with ENR from station No.5	This mistake will be modified in the Final Report 3/4. “Metro Line1” will be replaced to “ENR”.
6	Item 4.3.9 page (4-97) Distance between hydrants should not exceed 50 m not 500 m as mentioned.	The basic principle of train operation on fire is to drive to the next station. It is quite low possibility that train on fire stops in tunnel. The hydrants in station have also reel hose for the initial fire fighting by the station staff before fire brigade

	Comment from NAT	Response from JST
		arrives. On the other hand, the hydrant will be used only by the professional fire brigade and reel hose is not equipped at hydrant (see the photo of report). From these reasons, the distance of 50 m is too short and excessive. However, the distance of the hydrant can be adjusted and determined in the design stage.
7	Item 4.4.4 page (4-110) The material of the car body "stainless steel" isn't finally approved and will be subject to more discussion during basic design.	Noted. Comparison table of car material is attached at last page for your information. Further study and discussion will be held during the design stage.
8	Tables 4.36 and 4.38 pages (4-113 and 4-121 respectively) The power of the traction motor of line No.4 trains is higher than the power of line No.2 motors although the weight of tare train of line No.2 is higher and they are nearly the same weight when cars are loaded and the motor efficiency is also higher. Please clarify.	The power of the motor is up-sized to 140kw so as to have the ability of 120km/h in case that Line 4 is extended to suburbs. If the maximum speed is designed as much as that of Line 2, 80km/h, 115kw will be enough for the motor power of Line 4. Motor efficiency doesn't contribute to the power capacity but to the reduction of electric power consumption.
9	Item 4.11.8 Page 4-411 The usage of the track between the light repair workshop and the general overhauling is not clear.	JST will provide general concept related to 3 rd rail system. Detailed study will be carried out in the design stage.
10	Table 6.24 page (6-50) The number of intermediate station staff in 2020 should be 180 and the total number of phase 1 should be 290 (table 6.38 is the same)	Noted. Modification of table will be made in the Final Report 3/4.
11	Pages 7-2, 7-3 and 7-4 There are contradictions in the percentage and explanation of the GC cost and physical contingencies between fig.7.1, text in page 7-3 and table 7.3, please revise	Noted. Modification will be made in the Final Report 3/4.
12	Sub-item 8 page (7-4) The price escalation percentage is total for the periods indicated or per year? And what's the reference for these percentage?	Price escalation percentage is "per year". Escalation rates are explained in Section 13.4.2 Assumptions underlying the DCF analysis, page 13-32 and 13-33.
13	Table 7.6 page (7-6) You should indicate if this table is for line 1, line 2, or both	Cost of ECM means both. Description will be improved in the Final Report 3/4.
14	Table 7.15, 7.18 pages (7-11 and 7-13 respectively) The formula of Total Cost" should be rephrased	Noted. Modification will be made in the Final Report 3/4.
15	Table 7.22 page (7-15) The initial cost of tracks, signal, telecom, power supply and workshop don't match with the initial cost mentioned in table 7.3	Noted. Modification of table will be made in the Final Report 3/4.

	Comment from NAT	Response from JST
16	Table 7.29 page (7-17) The formula for " The security cost for station. " is incorrect, please check.	Noted. Modification of table will be made in the Final Report 3/4.
17	Page (8-1) For sentence which says:" The basic design and tender documents preparation will be done by the consultant employed by JICA" should be replaced by "The basic design and tender document preparation will be done by the consultant employed by JICA. This consultant will be approved by NAT first.	Modification of sentence will be made in the Final Report 3/4. Concerning approval of consultant by NAT first, please discuss with JICA. JST could not answer this comment.
18	Table 10.13 page (10-25) The number of affected shop for station 3 is missing	JST will check and modification of table will be made in the Final Report 3/4.
19	Table 10.15 page (10-27) This table should match with table 10.13	Noted. JST will check and modification of table will be made in the Final Report 3/4.
20	Table 10.16 page (10-28) This table should match with table 10.14	Noted. JST will check and modification of table will be made in the Final Report 3/4.
21	Clerical mistakes <ul style="list-style-type: none"> • Page 4-38: Pattern A of table 5 "should be replaced by "Pattern A of table 4.15". • Table 6.26 page (6-51): Un Japan should be replaced by in Japan • Sub-item 2-a page (7-17): From table 4, should be replaced by "from table 7.9. • Table 4.25 page (4-49) The reference "from table 14" should be replaced by "from table 4.23" • Table 4.25 page (4-49): The reference "from table 15, should be replaced by "from table 4.24" 	Noted. Modification of mistakes will be made in the Final Report 3/4.

Comparison of car body material

Material	Steel	Stainless Steel	Aluminum alloy
Welding technology	easy	difficult	most difficult
Manufacturing delicate design	possible	Impossible Use F.R.P if necessary	possible
Repairability in case of accident	easy	difficult	most difficult
Painting (& Facility in W.S)	need	need not	need not
Train weight : Tare (tonnes/ a train set)	290	266	258
Initial cost of a train set (Index)	100	107	120

3.4 CWD Comments Letter No.CM4/CWD/239/880, dated on 30/01/2010

	Comment from NAT	Response from JST
General		
	-All drawings to be submitted in size A 1.	5 sets of A1 size and 15 sets of A3 size drawings will be submitted as Final Report 3/4 Drawing.
	-All stations Access should be on side walk way not on private properties.	<p>Minimum inner width of access is as follows. Case 1: in case of stair and escalator, 3.4 m Case 2: in case of minimum stair, 1.4 m Case 3: in case of desirable stair width, 2.4 m Total width of access including structural walls is as follows. Case 1: 4.0 m Case 2: 2.0 m Case 3: 3.0 m Minimum access space is 2.0 m (case 2). When setting up access on side walkway, necessary width of walkway is 3.5 m considering of access space 2.0 m and corridor space 1.5 m. So, when width of side walkway is less than 3.5 m, setting up access on private land is needed.</p> <p>The location of the station and its exits of Phase 1 section will be examined by site investigation with NAT and JST in February & March 2010.</p> <p>Based on the result of investigation, JST will update the street level of drawings during the basic design stage.</p> <p>In case of the sidewalk way is not enough width for exits, JST will study and propose the plan of widening of the sidewalk or other suitable solution.</p>

<p>case 1 stair & escalator case 2 minimum stair case 3 desirable stair</p>	
-Phase 3 is not included in this report.	Phase 3 (eastern route) was reported as route selection study in Chapter 4 of Report No.2.
• Phase 1 route drawings:	
-Route radius to be mentioned on the drawings and also the station Axis K.P. (it was mentioned in page 4-22 and page 4-21 respectively).	JST will indicate curve radius and kilometerage at the each station in Final Report 3/4 Drawings document. In addition to this, all the drawings will indicate street name, station name, main structure and buildings name in the Final Report 3/4 Drawings documents.
• Phase 1 station drawings:	
-Clarify the Abbreviations on drawings.	TVF ; tunnel ventilation fans TEF ; tunnel exhaust fans EC ; electrical room AHU ; air handling unit ECS ; environmental control system JST will add abbreviations list on the Final Report 3/4 Drawings document.
-Drawings of street level for station No.3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 to be submitted.)	Noted. JST will add the street level drawings which will be same as drawing No.M4/ST/L01003, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015.
• Phase 2 route drawings:	
-Streets Name and other important structures (Metro Line, ENR bridges ... etc) to be mentioned on drawings.	Noted. JST will be mentioned in the Final Report 3/4 Drawings documents Appendix 1 of Report 3/4 will be shifted into the end of Chapter 5.
- As per NAT previous instruction the routes in Port Said Street near the sewage tunnel to be modified.	JST has reported in Appendix 1 of draft Report 3/4. Drawings of alternative route will be added in Final Report 3/4 Drawings documents.
-Part of route parallel to Ismalya canal (Viaduct) need A detail plan Layout and cross section drawing showing the relation between viaduct structure and canal	This study is Feasibility Study. Therefore, we suggested only an image at this stage. We can not mention in detail at the moment because of less information. JST will add one typical cross section drawing

	embankment and roads.	indicates existing canal, road, fence, sidewalk, building and line 4 structure, etc.
Page 4-163		
4.6.7 Study of Technical Points of the TBM construction		
1- Study of the neighboring construction:		
	- The mentioned neighboring construction should be clearly located on the drawings.	Noted. Final Report 3/4 will be modified or added as requested.
	- Nominate and define clearly the hard points in phase 1.	Hard points are mentioned in P4-12 section 4.1.2 (2) , P4-163 section 4.6.7 and P4-213 section 4.7.5
Page 4-176		
	- Instruction of Defense Ministry to be taken in into consideration.	Noted. JST will consider in design stage.
EI Malek Al-Saleh Station		
1	Explain the construction methods to connect line 1, with the line 4 and the impact of the construction on line 1 station operation.	In FS stage, JST has considered minimize the impact on line 1 operation to support existing structure such as temporary support or Pre-shell method. Anyway, this station needs to be studied in consideration of future connection of phase 2 and 3. JST will carry out general concept plan of this station in this feasibility study stage.
2	Connection or extension of line 4 of Phase 2&3 to be carried out in Basic design stage according to be the consultant response to NAT comments by his letter GCM-NAT-200/259 on 17/1/2010.	JST will study in detail of EI Malek EI Saleh station as basic design level in design stage, in consideration of future connection of phase 2 and 3. However, JST will carry out general concept plan of this station in this feasibility study stage.
EI Rouda Station (Page 4-205)		
1	Study to reduce station width.	If demolish and re-build of the mosque is possible during construction period, it is clear to reduce EI Rouda station width. Further study will be carried out after the site investigation and in the design stage. JST will provide the reason why this station is 27m width.
2	Reduce the Accesses Length.	The depth of EI Rouda Station is determined by vertical alignment for crossing under the Nile river. To reduce the access length will be carried out after the site investigation and in the design stage.
3	Check the paragraph in page 4-206 regarding turn back section.	This paragraph will be deleted in the Final Report 3/4.
EI Nile Station (Page 4-208)		
1	Fig. 4.203 and 4.206 shows the station structure on both side of the fly over while fig. 4-202 shows the fly over Approach occupy one direction of the road. It means that the fly over Approach must be demolished	JST will provide more clear explanation in the Final Report 3/4.

	during construction and hence the traffic management submitted in page 4-238 is not correct.	
2	How will the supporting Girder be installed without traffic stopping?	Ditto
3	Correct the traffic direction in fig. 4-208.	Noted. JST will modified Fig. 4.208 to 4.210
El Giza Station (4-120)		
1	Explain how and why TBM will driven before the station excavation (Page 4-211)	JST will provide more clear explanation in the Final Report 3/4.
2	Detail of Connection with line 2 is required (to be shown on station plan drawing and section).	JST prepared the animated cartoon showing clearly transfer between line 2 and line 4. This animated cartoon will be submitted in the Final Report 3/4.
3	Explain the mean of "shorten the turn back action as much as possible" in the third paragraph of item (b) structure of station.	This paragraph will be deleted in the Final Report 3/4.
	- Route from Remaya Square to depot need to modify according to the last coordination's done with defence and Antiquities authority.	Noted. JST will prepare the outline alignment drawing and incorporate in Final Report 3/4. Further detailed study will be carried out in the design stage.
	- Traffic diversion drawing to be submitted in suitable scale for readable purpose and can be used in later stage for getting approval from concerned Authorities.	Further study needs to be carried out to complete the traffic diversion plan in the design stage. Suitable scale of drawings will be prepared in the design stage.
Outline design (Phase 2)		
1	Page 5-2 correct the out line of the route to (El Malek El Saleh – children cancer center – Sayeda Zeinab-....Etc)in table 5.2	Noted. To be revised.
2	Page 5-6 Correct the data of Ghamra Station (Line No.1)	Noted. To be revised.
	-Where the utility survey data for phases (1&2 and 3)	JST will submit utility survey data along the Phase 1A route at before or together with Final Report 3/4.
	-The Physical contingency rate in fig. 7.1 is different that items (4) – page 7-3.	Figure 7.1 is incorrect. Rate in figure will be modified to 5% instead of 10%.
	-How did the consultant estimate the initial cost for diversion of public utilities without completion of the data collection required for this	This is a first estimation based on the related projects such as Cairo Metro Line 3. Detailed cost estimation will be carried out in the design stage.

	phase.	
	-Page 7-21 (7.3 contract packing) and page 7-23 (7.3.3 comparison and recommendation for contract packing) need approval from NAT.	It will be discussed with NAT in the design stage.
	-Page 7-24 consultant services need approval from NAT.	It is also need approval from JICA.
	* Ghamra Station (Sta. No. 8) Location of Station need approval from NAT.	Noted. However, location of stations of phase 2 section will be finalized with NAT in future, when the further detail study or design of phase 2 section is carried out.
ENR (Access)		
1	Cross Sec drawings are required to show the implementation of the cut and cover for the connection of ENR.	Information is provided in Chapter 4 section 4.6.8 in draft Report 3/4. In addition, connection with ENR is cancelled at the meeting on 07/02/2010. Therefore, we understood that this comment can be canceled.
2	To Study the connection at workshop with Al-wahat Rail Track.	As mentioned above, we understood that this comment can be canceled.
	-The Approval of Environmental Ministry for EIA report is required.	Final EIA report was submitted in Feb 25 th with JST Letter No. GCM-NAT-203/263.

NAT / CWD Comments On Land Acquisition

General:

	-It is required a clear drawing showing the required land acquisition areas identified by street Name and Address (House No.) together with Metro Station boundaries.	<p>JST will provide better quality drawings in the final submission of this report.</p> <p>Street name and Address (House No.) will be provided in the basic design stage after the required land acquisition areas were fixed.</p> <p>Phase 1: The areas to be acquired for station construction are shown in the document attached herewith, which was submitted to NAT on 17th December 2009 ("the Attached Document" hereinafter). The names, addresses, and house Nos. should be surveyed by local authorities and/or Egyptian General Survey Authority (GESA) upon the request by NAT based on the Attached Document. In design stage, JST will conduct dilapidation survey along the route, and it will generate some information from this survey results.</p> <p>Phase 2: The Project stage of the Phase 2 is under conceptual design. The examination of areas to be acquired in the Phase 2 should be discussed in detail in further design stage. (The following of this response is related to the Phase 1.)</p>
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	-The area of each structure, land or area in M2 unit is required.	JST will reflect land acquisition area in M2 to Annex 3 of RAP report.
	-The areas for site installation (Permanent or Temporary used) must be included and defined in the report.	The areas to be occupied by site installation (station construction) will be reflected to Annex 3 of RAP report. Definition of area necessary for each station will be explained in RAP report.
	-Activity type in case of commercial to be mentioned if possible.	The type of commercial activities to be affected should be investigated by local authorities and/or EGSA upon the request by NAT based on the Annex 3 of RAP report.
	-A survey Maps for land Acquisition is required in the Basic design stage as a part of expropriation procedure.	It is no objection to prepare a survey map for land acquisition in the basic design stage by local authorities and/or EGSA upon the request by NAT based on the Attached Document.
EI Malek EI saleh:		
	-The closed shops to be added under item No 1 to be 5 shops in total.	JST will reflect such information to Annex 3 of RAP report.
	-No of street stall under item 6 is not mentioned.	JST will reflect such information to Annex 3 of RAP report.
EI Rouda Station:		
	-Change the Access location to be on side walkway to avoid expropriation of 3 shops under item NO.3.	The locations of exits of the station will be examined in detail at the design stage.
EI Nile Station:		
	-Explain in the report the reason for Acquisition of 5 shops under No.1 (is it for site installation).	The acquisition of 5 shops at El Nile station is necessary for construction work of cooling and ventilation towers.
	-Change the Access location to be on side walkway to avoid the expropriation of 3 shops under item No. 2 (the access can relocate at the opposite direction).	The locations of exits of the station will be examined in detail at the design stage.
	-Where is the garden in the private land to be acquired for cooling tower installation and study to locate the cooling tower in the area under item (1).	JST will reflect such information to Annex 3 of RAP report.
EI Giza Station:		
	-Relocate the access of station to avoid the expropriation under item NO.4.	The locations of exits of the station will be examined in detail at the design stage.
	-Under item NO.5 (Land Acquisition for Bus Terminal). Please define the Temporary and permanent expropriated area according to your design since a part of this land to be	JST will modify the data in Annex 3 of RAP report in order to minimize the land acquisition area, based on your request.

	used for site installation will be returned back to the bus company In case of it is feasible to reuse by them.	
	-the report pointed to open space at governmental hospital for exit construction but it is not shown on drawing please define the location on drawing and study to relocate All the Access on the sidewalk not on private properties.	There are no governmental hospitals of which the open space should be acquired for the construction of El Giza Station. The locations of exits of the station will be examined in detail at the design stage.
Station No. (6):		
	- Study to locate all access on side walk in case if is it not possible provide the drawing and specify the required area of the government hospital.	The locations of exits of the station will be examined in detail at the basic design stage. It is confirmed that necessary land to be acquired is open space in school, not governmental hospital. JST will modify the report accordingly.
Station No. (7):		
	-Land acquisition for empty land -the property (private or Government) should be identified.	The expected ownership of the land to be acquired will be reflected to Annex 3 of RAP report.
	- Study to locate the access on the side walkway to avoid the land Acquisition.	The locations of exits of the station will be examined in detail at the design stage.
Station No. (8):		
	- Same as previous item.	The locations of exits of the station will be examined in detail at the design stage.
Station No. (10 & 11):		
	-Study to relocate all the access on side walk.	The locations of exits of the station will be examined in detail at the design stage.
	-Required area is not defined inside the station boundaries.	JST will reflect such information to Annex 3 of RAP report.
	-The area property to be defined (Private or Government or sidewalk etc).	JST will reflect such information to Annex 3 of RAP report.
	-What you mean by open area and vacant area -who is the owner of these areas? the report talk about governmental hospital, at station No 10 what is the name of this hospital?	“Open Space” means a land on which there are no structure nor buildings, and “Vacant Area” is also used as the same meaning. JST will modify the report in order to have the unified expression as “Open Space”. The expected ownership of the land to be acquired will be reflected to Annex 3 of RAP report. The name of the hospital near Station No. 10 is “Al Haram Hospital”.
	-Also report talk about mini bus terminal at station No 11 -what is the area in M2 and who is the owner?	JST will reflect such information to Annex 3 of RAP report. The ownership of the area should be investigated by local authorities and/or EGSA upon the request of NAT based on the Attached Document.

Station No. (12):		
	-Relocate the access to be on side walk to avoid expropriation.	The locations of exits of the station will be examined in detail at the design stage.
	-What do you mean by facility installation, is it means Temporary site installation -if so, you should propose it as Temporary expropriation?	"Facility" means the existing facility of the existing parking area to be acquired.
Phase 2 Station 2 (cancer hospital) and station & (Ghamra):		
	-Clear drawing with suitable scale is required.	The Project stage of the Phase 2 is under conceptual design. The examination of areas to be acquired in the Phase 2 should be discussed in detail in further design stage.
	-Station boundary to be fixed on drawing to determine and classify all the building that required land acquisition.	-ditto-

Comment on Report 3-4 of line Feasibility Study		
	P 4-2 Correct cant calculation formula (eqn a) to $C = 11.8(V^2 / R)$ and change eqn b,c accordingly.	It is correct. Original formula is $C_m = GV^2 / (3.6)^2 / g / R \approx GV^2 / (127R)$ It difference is only considering of $G=1500\text{mm}$ or 1435mm . Generally, old text book shows this "G" means the distance of between the both rail centers in a gauge. However, it is only an assumption. It is actually logical that "G" equals the distance between wheel axis points. From this point, applying $G=1435\text{mm}$ is near the logicality as a safety side (JST proposal). Anyhow, there is not reflection such as occurring problem for rail track at all. If you prefer to adopt $G=1500$, please provide NAT decision in the design stage.
	P4-25&30 Study changing of Scissors and double slip switch into normal turnouts and/or crossovers.	It seems to be difficult. JST and NAT will discuss more detail of this issue at the design stage.
	P4-31 Daily operation hours to be adopted with Metro lines 1,2, and 3.	Operation hour was confirmed with NAT EMD, from am5:00 to am1:00
	P4-110 It is required to explain more detailed for track materials. Taking into consideration that maintenance casing requires to be compatible with the working line.	Noted. JST will add some description in the Final Report 3/4.
	P4-182 Check the dimensions of arrival shaft	JST will check and revised.
	P4-285 -What is the possibility to manufacture the plastic sleeper in	It depends on manufacturer. However, you can import. JST and NAT will discuss more detail of this issue at

	Egypt?	the design stage.
	-Is it possible to wide the track in small redii curves with PSC Sleeper? If not what is the recommendations?	Generally speaking, PSC sleeper is used in worldwide every permissible gauge and curve section. JST and NAT will discuss more detail of this issue at the design stage.
	P5-6 Correct line no. of Ghamra Station to (1).	Noted. JST will revised in Final Report 3/4
	P5-12 Explain how to drain the infiltration water (if any) in the leveled underground sections.	Generally, tunnel section will be considered a minimum slope for drainage at the design stage.
	P7-4& 13-3 There is a contradiction between the grand total of the project mentioned in table 7.3& table 13.2	JST will check and revised.

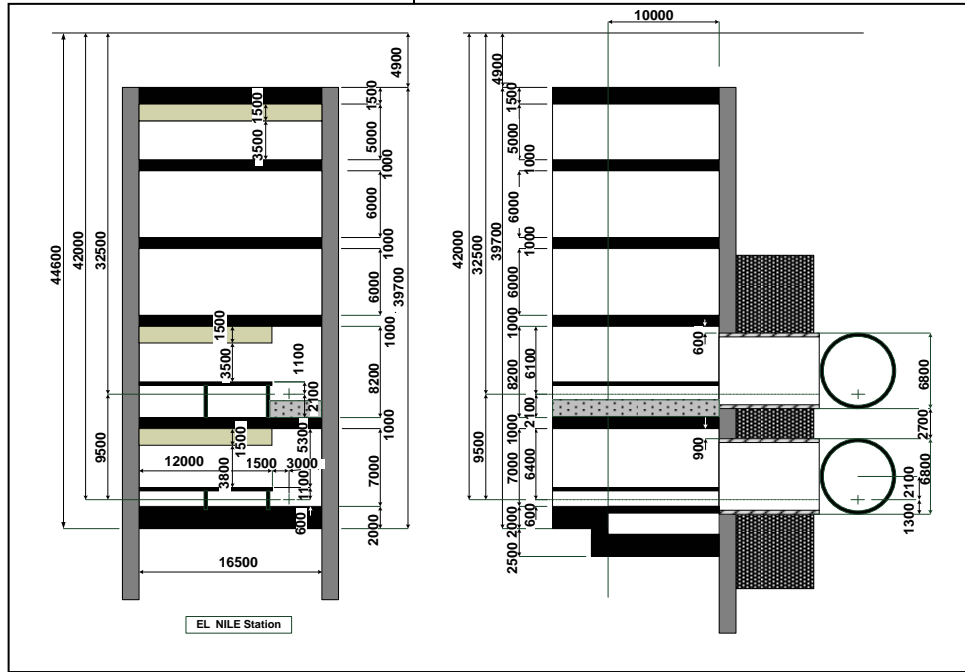
3.5 TD Comments Letter No.TD/235/700, dated on 31/01/2010

	Comment from NAT	Response from JST
General Comments for all documents submitted under Report 3/4		
1	Each document should have a coded number in a shape of abbreviated serial to indicate their contents. This serial should be inserted as footnote on every sheet inside the document to facilitate reference.	Noted. JST will indicate code, serial number, date. Sample of this has received from NAT at the meeting on 25/02/2010.
Resettlement Policy Framework Document		
2	Resolution of drawings and photos for land acquisition and property demolishing in the Annexes of this document. Should be of better quality.	JST will provide better quality in the Final Report.
Page 4		
3	Clarify what is meant by "low" ventilation shafts.	JST will modify the related sentence to "...consisting cooling towers, ventilation shafts and passenger entrance....." in the Final Report.
Page 15		
4	Referring to the figure 7, another graph should be provided to show percentage of buildings in relation to their different ages while governorates to be shown on the bars of the graph itself, so as to give an idea of the percentages of old buildings, it is preferable that this would be done for the buildings lying in the alignment of the line.	JST will carry out "Dilapidation Survey" in the design stage along the line 4 route. Information will be generated from the result of survey.
Drawings		
General Comments		
General Remarks on the alignment drawings M4/AL/W010001 to 23 and 2001 to 25		
5	-The submitted drawings could not be considered as alignment and profile drawings as the main data regarding the following are missing:	
	-Gradient of the rail	It is shown in Figure 4.10 (page 4-19) of main text. This Alignment Sketch will be added in to the Final Report 3/4 Drawings documents
	-Ground survey points on the plan	It is shown in drawings M4/ST/L01001 to L01015. The ground levels will be also included.
	-Names of streets and buildings	To be indicated
	-Kilo points of each station	To be indicated
	-The profile of the line showing both the ground and rail levels	It is shown in Figure 4.10 (page 4-19) of main text. This Alignment Sketch will be added in to the Final Report 3/4 Drawings documents.
	-The radii of the horizontal and vertical curves	To be indicated

	-All interfering structures	It is already Indicated as possible as we can.
	-Structure types such as tunnel, cut and cover....etc.	JST will not prepare the drawings of structures in this stage. It will be prepared in the design stage. Only the type of structure will be indicated.
6	A list of abbreviations included in the drawings should be at this beginning of this document.	JST will provide a list of abbreviations.
7	The key on each drawing should be directly related to what is presented on the drawing. (eg. See drawing No. M4/ST/W02003)	Noted.
Drawings from No. M4/ST/L01001 to M4/ST/L01015		
8	Drawings are illegible (very small scale-hatching should be more clear in different patterns-the legend should be completed)	JST will provide better quality drawings in the Final Report 3/4 Drawings documents.
9	Stations should be named by identifying names and not by coded numbers as proposed by you	Station name was basically fixed at the meeting on 11/03/2010. JST will use identified station name from the design stage.
10	Drawings from M4/AL/L02001 to M4/AL/L02025: a legend should be indicated	To be indicated
11	Differentiation between the metro tunnels and the sewer tunnel is necessary	This matter is printer ability. To be change the line types
12	These drawings which are for the refused principal alternative along Port Said Street are more legible than the alternatives required by NAT to avoid the SSWT submitted in appendix 1 in the text document	This is just one of the possible routes JST provided. Drawings of alternative route will be added in the Final Report 3/4 Drawings documents.
13	One plan for the whole line "phase 1&2 is to be provided with scale 1/2000	Unfortunately, JST can not do it. Because no 1/2000 topo survey has not carried out for phase 2 section.
Stations		
General		
M4/ST/W01001 to M4/ST/W15003		
14	For Stations with two platforms in different levels: study to provide stairs & escalators for each platform avoiding passing through the other one	Stations with two platforms in different levels are No.3 (El Nile Station) , No.4 (El Giza Station) and No.13 (GEM) . Stairs & escalators of each station are planned in plan and longitudinal arrangement due consideration to avoid passing through the other one. JST will study more detail in the design stage to finalize the arrangement and location of stairs & escalators.
15	Study to minimize the under platform height to be the minimum.	Stations with two platforms in different levels are No.3 (El Nile Station) , No.4 (El Giza Station) and No.13 (GEM) . Upper platform height from the intermediate slab is 3.2m in these stations. This height is necessary for launch or arrival of TBM, because every launch and arrival shaft is planned at both end of each station. Necessary

height for launch and arrival shaft of TBM is shown in following figure.

JST will consider the possibility to minimize the height in the design stage.



EI Rauda station

16	The stairs from B2 reach directly B4 as per sec. 1-1 or reach B3 as per plans.	B3 level is not necessary for passengers, only for stairs space and station facility rooms. Therefore stair between B4 level and B3 level is not necessary.
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17	Indicate the usage of the unhatched areas in B2&B3	The area non-colored in B2 level is spaces for passenger corridor with stairs, escalator & elevator. The area non-colored except stair space in B3 level is a spare room for station facility.
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EI Nile Station

18	The street level is not submitted	Plan of the street level will be attached in the Final Report 3/4 Drawings documents
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19	The plan B1 is not complying with M4/ST/L01003	The plan drawing is revised in the Final Report 3/4 Drawings documents.
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20	Study to have one elevator coming from the street level reaching the platforms	One access route by elevator is planned from street level to platform. Elevator from street level to B1 level is set up at entrance in free concourse area and elevator from B1 to platform is set up in paid concourse area. JST will study more detail in the design stage.
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EI-Giza Station

21	The commercial area in B1 is very wide, study to eliminate it.	The underground commercial area and station plaza on ground surface proposed by JST are another projects different from line 4 project. Construction cost of these another project is not
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		included in cost estimate. Further study should be carried out in the design stage. During the site visit on 22/02/2010, NAT and JST agreed to minimize the land acquisition.
Station No. 5		
22	A cross section is to be provided at Y01 to clarify the relation between the main tunnels and the ENR access tunnel, N.B. with reference to appendix 10 in your "response to NAT comments submitted through letter GCM-NAT-200/259 , the provided cross sections are not matching with the plan B2 in DWG. No M4/ST/WT 05002	The east end of the station is launch and departure shaft of three TBM, for two main line and for ENR access line. However, connection with ENR at Giza is cancelled at the NAT&JST meeting on 07/02/2010. In this regards, this comment was canceled by NAT in the meeting on 25/02/2010.
Station No. 13 (behind the GEM)		
23	The new location of the station at the other side of the GEM is to be updated	The new location of the station and study will be carried out in the design stage.
24	Justification is required for using 2 levels for platforms.	Because the road width behind GEM is narrow, it is difficult to set up island platform station under the narrow road. Anyway, station behind the GEM was canceled. Therefore this comment also canceled.
The Text Document		
Page 3-1 Table 3-1		
25	The headway in peak hour 4 minutes: justification for this figure is required, it is considered along headway and it is expected to affect station sizing mainly the platform and stairs width.	Four minutes headway is adopted just for the initial few years. In the ultimate stage, 2 minutes nine second headway will be adopted. Station size is decided based on the number of passengers at the ultimate stage and four minutes headway in 2020 does not affect the station design.
Page 3-2		
26	Daily operation hours: from 5:00 to 24 and not from 4:00	Basically the Study team thinks that daily operation hours should be same with that of the existing Cairo Metro lines. Table 4.22 shows that the initial trains depart from their origin stations in the four o'clock time zone on Line2. During the Meeting with NAT (EMD) on 14/02/2010, based on the confirmation by NAT through ECM, daily operation hour is fixed from 5:00 to 01:00 for Line 4. Therefore, Table 3.1 page 3-2 will be modified in the Final Report 3/4.
27	Location of CCP and in relation to page 6-6 and El-Malek El-Saleh station plans on DWGs No. M4/ST/W0 1002 & M4/ST/W01003: your study to locate CCP in this station is not complete.	CCP is planned at El Malek El Saleh Station. Location of CCP will be indicated in the Final Report 3/4 Drawings documents. Moreover, JST will provide separate section of CCP in the Final Report 3/4.
Page 4-19-figure 4-9		
28	It is illegible, its scale is too small	JST will modify to better quality.
Page 4-23 Table 4-9		

29	The disadvantage of the island type " it will require expansion of the distance between the mainlines " is not understood.	Line4 has two main lines. It means the distance between the "both" lines. Anyway, this comment was canceled by NAT in the meeting on 25/02/2010.
Page 4-27 Table 4-10		
30	Platform width for the three types is not justified.	There are many factors to be considered. However, JST studied under some conditions and assumptions. Anyway, this comment was canceled by NAT in the meeting on 25/02/2010, as it is discussed in the above items.
Page 4-28 figure 4-15		
31	What does the word "abutment" stand for?	The abutment means a structure that supports each end of the Giza Bridge. Anyway, this comment was canceled by NAT in the meeting on 25/02/2010.
Page 4-29 the first paragraph:		
32	Your explanation is not understood. Figure 4-16 is to be compared with plan B4 in DWG. No. M4/ST/WT 02003. Also you're your response in "Response to NAT comments submitted through your letter GCM-NAT-200/259 of 17/1/2010 page 3/13 item 3-8 needs more clarifications.	JST will add more information in the Final Report 3/4.
Page 4-69 2nd paragraph:		
33	A complete English version for the concerned Japanese standards should be provided and attached to this report.	JST will provide documents which is available in English.
Page 4-70-71		
34	What is meant by "fire/smoke compartment?"	JST will add some explanation in the Final Report 3/4.
Page 4-75		
35	What is meant by "Number of evacuator"?	Passengers to be evacuated.
Page 4-76		
36	The statement " If kiosk does not exist in platform, evacuation time (t) and smoke density (Cs) are treated as zero" needs more clarifications.	It is related to fire/evacuation scenario; information will be described in the documents of Item-33 above.
Page 4-78		
37	The last paragraph needs more clarification	Noted. JST will modify the paragraph in the Final Report 3/4.
Page 4-91		
38	The 2nd paragraph needs more clarification	Noted. JST will modify the paragraph in the Final Report 3/4.
Page 99 item 4.4-1 General Principles		
39	Diaphragm wall design should be done by advanced soil structure intersection finite element program. Which can choose the appropriate state of earth pressure according to	Diaphragm wall should be designed for temporary retaining wall and also permanent structural wall. Temporary retaining wall should be designed considering all excavation steps including top

	the D. wall deformation	<p>down construction method. Lateral load of diaphragm wall in design calculation should be chosen the active earth pressure.</p> <p>Permanent structural wall should be designed as rigid frame and lateral load of wall in design is chosen the static earth pressure.</p> <p>These detail design method will be determined in the design stage.</p> <p>JST will mentioned that “Finite Element Method will be used for the diaphragm wall design” in the Final Report 3/4.</p>
Page 100 item 4.4-2 Loads		
40	The reason for keeping minimum of 3.0 m backfill above the roof slab does not submitted despite of the previous comment from NAT	There are not strict reasons, but JST proposed desirable minimum backfill height due to consideration of utilities space under roads. Minimum 3.0 m is to be deleted from the report.
41	Traffic surcharge value should be verified	Traffic surcharge is important loads, but surcharge value will be decided in the design stage.
Page 100 item 4.4-3 Flotation		
42	The reference for the safety factor proposed are to be submitted for NAT revision and comment.	<p>The safety factor of 1.1 is used as preliminary design analysis based on the Japanese standards. The safety factor will be determined in the design stage with consideration of Japanese and/or international standards to meet the Egyptian regulations</p> <p>The reference written in English is not available now. JST will explain more detail in design stage.</p>
Page 104 item 4.4-5 Loads on TBM		
43	The design standards for railway structures and commentary of 2002 should be submitted for NAT comment on applying it or not	<p>The design standards applied in Line 4 will be defined in the design stage with consideration of Japanese and/or international standards to meet the Egyptian regulations.</p> <p>The design standards for “railway structures and commentary of 2002” written in English is not available now. JST will try to supply it in the design stage.</p>
44	What type of software are you planning to use in the tunnel design and why the self-weight is not calculated by the program.	Type and name of the software/program used in the design stage will be informed and explain at the stage of design.
45	For flotation safety factors, refer to comment on item 4.4-3.	<p>The safety factor of 1.1 is used as preliminary design analysis based on the Japanese standards. The safety factor will be determined in the basic design stage with consideration of Japanese and/or international standards to meet the Egyptian regulations</p> <p>The reference written in English is not available now. JST will explain more detail in the design stage.</p>

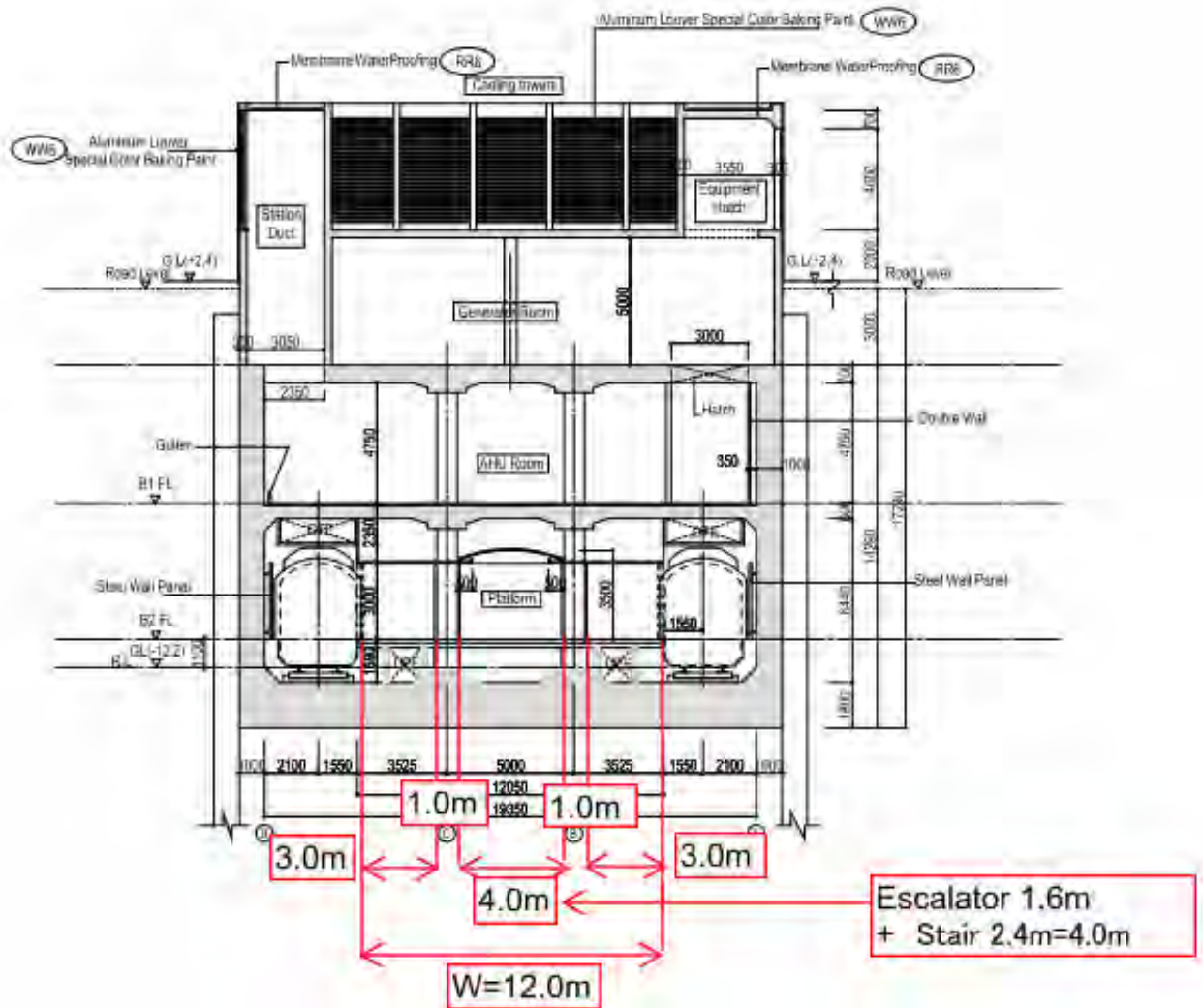
Page 4-107 item 4.4-2 Architectural Works		
46	Item (5) Design for the disabled : Design shall be performed in accordance with Egyptian code for the handicapped" Please provide us with the a.m. code or else, you are requested to refer to the American with Disabilities Act (ADA) or other.	JST will provide documents which is available in English. JST will study and compare with other code or standard (such as American, European etc.) in the design stage.
Page 127		
47	General: All soil data mentioned in the report will be verified after submitting the concerned Geo-technical reports.	Noted.
Page 135 item 4.6.2-1.b		
48	Fig. 4-88 is to be resubmitted with larger scale to show clearly the details of transmission strip & shear strip.	Noted. A3 size will be placed in the Final Report 3/4.
Pages 136-137 item 4.6.2-2		
49	Study of the waterproof: Only one waterproof defense line (i.e. gasket type) is proposed while gasket + swelling material have been used for lines 2&3, justification is required.	Noted. JST will study in the design stage.
50	Types of gaskets proposed are for information only. NAT approval will be in design stage after submittal of all the technical data from manufactures supported by tests and previous use in similar projects.	Noted. JST will provide technical data in the design stage.
Page 141 item 4.6-3-d		
51	Required more details such as length of trial section – depth – location – launching, receiving shafts, cost...etc.	JST will study in the design stage.
52	No data for monitoring plan of the tunnel & station works is included in the report	Basic idea of monitoring plan will be added in the Final Report 3/4. Further detailed plan will be studied in the design stage.
Page 163 item 4.6.7 Study of technical points of these shield TBM constructions		
Page 164-167 General Comments:		
53	Required to search for the precise foundations data of the flyovers piles near or above the line 4 tunnels	Noted. Until now, JST could not obtain this data. JST will add some countermeasure in case we could not obtained data in the Final Report 3/4.
54	The zones of effect for line 4 tunnels construction shown on the report has to be verified during the basic design stage. Accordingly the type of soil improvement or shorting will be defined and included in the basic design documents.	Noted. JST will carry out in the design stage.
Page 167 item 4.6.7-g		
55	No. 155 water supply bridges clarify which bridge is that. If it is the Magra	Name is Magra El-Eyoon JST will try to obtain the available information

	El-Eyoon fence, you should get its data from SCA and consider it in the design stage.	form SCA.
Page 168-item 4.6.7.2 Nile river crossing		
56	Cross sections at the line 4 two tunnels should be provided and accordingly checks for tunnel stability and design should be done.	Noted. JST will study in the design stage with the result of Nile River Survey.
57	The safety factor shown in table 4.44 should be verified in the basic design stage.	Noted. JST will verify in the design stage.
Page 176 item 4.6.9.2		
58	According to our experience in lines 2&3, the 6 years construction period for stations is long period, which needs to be verified especially it governs the number of TBMs to be used (calculated as 4 TBM for phase1	It has been shown in "4.7.6 Construction schedule of DFR3/4".
Page 178-item 4.6.9.3 Study of launch & arrival shaft		
59	Why don't let the above shafts inside the station instead of improve the soil before and after stations which is currently done in line 3 phases 1&2.	Shaft is inside the station.
60	For table 4.45, check the shield TBM length shown.	It will be checked and revised in the Final Report 3/4.
Page 182		
61	Kindly check the required dimension of arrival shaft with the data shown on tables 4.49, 4.50, 4.51	It will be checked and revised in the Final Report 3/4.
Page 194 item 4.7.2.1 structural gauge		
62	According to fig. 4.149 the required clear height is 6.70 m which is less than the TBM diameter, justify?	Clear height 6.7 m is required as standard space for platform level of station. On the other hand, according to the overall construction schedule, it is necessary for the shield TBM to pass some stations. In that case, feasible countermeasure should be selected considering of construction condition. For example, construction of intermediate slab is planned after passing TBM, or construction of bottom slab is planned after passing TBM. To enlarge the height of the platform level for the passing of the shield TBM is not feasible because of high construction cost.
Page 195		
63	What is the difference between "column" and additional column	"additional column" is deleted from the final report, because there is no difference.
Page 4-200 table 4.61		
64	Concerning the station length and with reference to page 11/13 in (letter GCM-NAT 200/259): a- Stations 3,4,12,15 are not mentioned within your table or in the main text concerning stations with	These stations with special requirement are mentioned in the Section 4.7.4 of draft Report 3/4. JST will add more information related to the station length and width with facility

	special requirements, it is clear that they are not standard stations	arrangement in the Table 4.59, which data was distributed in the meeting on 25/02/2010.
	b- What is meant by "the station facilities space" which is mentioned in 13-4 page 11/13 in the a.m. letter?	"the station facilities space" means several rooms and main rooms for tunnel ventilation fans, tunnel exhaust fans, electrical supply station, air handling unit, water tank & fire fighting equipment room, station office room, etc.
	c- Stations 5&9 are not standard stations with length of 280 m this statement should be corrected.	Noted. This statement will be revised in the Final Report 3/4 as follow. Station 5 & 9 are 2 stories station, but station length is longer than standard station length 280 m because of setting up head shunting line.
Page 4-287		
65	11th line "El malek El-Saleh station with a deep underground terminal" is to be modified.....deep underground temporary terminal	Noted. The statement is modified in the Final Report 3/4.
Page 4-295-4.9.3 Design standard – 1 stations		
66	the 4th paragraph concerning the platform width: a clear and well know regulations to determine the platform width is to be provided in this report	Platform width is a sum of the following dimensions. Stairway width + Escalator width + Passengers' walkway at the Stairway sides + Columns or Wall thicknesses. Stairway width is calculated in accordance with a formula of evacuation time of Ministerial Ordinance (MLITT) of Japan, and a sidewalk width is 1.5m (minimum)~3.0m generally. In case of NFPA (USA Standard), a calculation is also performed in order to determine the stairway width. A policy of 4-minute evacuation time from platform strictly impacts on the total stairway width.
67	An example for a station is to be provided in this report to show the application of the above mentioned regulations	Attached cross section in last page is an example of MRT underground station project in which above mentioned calculation has been performed. In this case a platform width is 12m (Stairway 2.4m+Escalator1.6m+Sidewalk 3m × 2+Column 1m × 2=12m), while only two sets of Stairway were planned in one Platform. On the other hand, in case NFPA is applied, the total stairway width shall be much bigger than above. Given the platform width 12m, number of stair way sets will be one half or more as many.
Page 4-302 – 4.9.10 Station Facilities		
68	Two police rooms (at least) should be provided in each station.	Noted. Police rooms will be provided in the design stage.
Page 7-3 GC Service Cost, Physical Contingency		
69	The GC service fees and the physical contingency cost figures assumed by you (7% & 5%) need details and clarifications about your reference	The percentage was assumed figure based on the similar project done by JST. Final percentage will be fixed by JICA and MOT(NAT) in the design stage. JST has proposed safety side (maximum) in the feasibility study stage.

Appendix 1 (appendix 14 in response to NAT comments submitted in letter GCM-NAT-200/259)

70	It is very difficult to understand your proposals or to follow your explanations due to a very poor presentation for the included maps which indicate the different alternatives	We will strive that the explanation and figure, maps in the Appendix.1 is revised as is clearly understandable.
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3.6 TD Comments Letter No.TD/---/700, dated on 04/02/2010

	Comment from NAT	Response from JST								
P4-145: 4.6.3.2 k										
1	More details about material (FFU) should be submitted.	More details about material (FFU) are attached at the last page of this comment.								
P4-159: 4.6.6.3 g										
2	What about the effect of the disposal materials and the additives on the environment?	The additive injection materials are made from minerals in nature such as Clay and Bentonite and thus the bad impact to the environment is nothing.								
P4-160: 4.6.6.4										
3	Table 4-43 and Figure 4-114 are not clear.	It will be replaced by clear or large one in the Final Report 3/4.								
P4-163: 4.6.7.1 Figure 4-117										
4	"dirapidation" is to be written "dilapidation".	Noted.								
P4-164										
5	The data about the piles depth should be submitted now.	JST could not obtain the piles depth information till now. JST will continue to search for this data.								
P4-243: Table 4.65 – Comparison table of construction method for Sta. No.2										
6	Submit the estimated cost of the land acquisition relative to the underpinning of the one building. Also, according to your experience for how long the inhabitants will have to leave their homes and does the entrance of this building will be free for their entrance and exit during the site works?	<p>The estimated costs of the land acquisition relative to the underpinning are followings;</p> <table border="0"> <tr> <td>Gas station</td> <td>2,795,000 LE</td> </tr> <tr> <td>Fast food shop</td> <td>4,868,000 LE</td> </tr> <tr> <td>Apartment</td> <td>13,690,000 LE</td> </tr> </table> <p>In Japan, it is not necessary that the inhabitants have to leave their homes. And also their entrance and exit is secured during the underpinning construction.</p> <p>JST will incorporate this information with breakdown of the cost of land acquisition and underpinning in the Final Report 3/4.</p>	Gas station	2,795,000 LE	Fast food shop	4,868,000 LE	Apartment	13,690,000 LE		
Gas station	2,795,000 LE									
Fast food shop	4,868,000 LE									
Apartment	13,690,000 LE									
P4-245: Table 4.66 – Comparison table of Soil Improvement Method for embed section of the diaphragm wall of Sta. No.2										
7	Submit a short technical note to clarify the difference between Jet grouting & Column-Jet grouting according to your experience.	Clarification and sketch (which is attached at the last page) will be added in the Final Report 3/4.								
P4-254: Table 4.67 – Comparison table of tunnel construction method for Turn Back Section behind Sta. No.1										
8	Refer to previous remark on Table 4.65, the cost of Pre-Shell Method relative to Cut & Cover Method is required to be submitted.	<p>The estimated costs of the land acquisition relative to the underpinning are followings;</p> <table border="0"> <tr> <td>Apartment1</td> <td>12,935,000 LE</td> </tr> <tr> <td>Apartment2</td> <td>14,708,000 LE</td> </tr> <tr> <td>Mosque</td> <td>3,213,000 LE</td> </tr> </table> <p>The cost of Pre-Shell Method relative to Cut & Cover Method are followings;</p> <table border="0"> <tr> <td>Pre-Shell Method (L=105m)</td> <td>Approx. 2,600,000,000 JPY</td> </tr> </table>	Apartment1	12,935,000 LE	Apartment2	14,708,000 LE	Mosque	3,213,000 LE	Pre-Shell Method (L=105m)	Approx. 2,600,000,000 JPY
Apartment1	12,935,000 LE									
Apartment2	14,708,000 LE									
Mosque	3,213,000 LE									
Pre-Shell Method (L=105m)	Approx. 2,600,000,000 JPY									

		(=161,280,000 LE) JST will incorporate this information with breakdown of the cost in the Final Report 3/4.
P4-274 – 281: Detailed Schedule for Stations & Tunnel Construction		
9	As the estimated construction period of some stations are 3 years, some 4 years and some 6 years. The schedule should consider maneuvering of main equipments between stations to lower the project cost.	It will be studied in the design stage.
10	Reflection of Tunnel construction schedule is to be revised with the stations construction schedule.	It will be studied in the design stage.
11	Chapter 5 Outline design (phase 2) and Drawings No.M4/AL/W02001 to M4/AL/W02025 are presenting the alignment and the stations locations from El Sayeda Zainab till Ghamra which is rejected by NAT letter No. PL/1010/700 of 30/7/2009, while Appendix 1 is presenting the required alternatives.	Drawings of alternative route will be added in Final Report 3/4 Drawings document.
12	You are requested to include "Appendix 1" in Chapter 5 as main part of your Report 3/4 taking into consideration an acceptable quality of presentation of all figures, maps and photos. Also the relevant drawings should be included in the "Drawings" document, then remove the rejected alignment from the main report and to be added as an appendix.	Noted. Appendix 1 of Report 3/4 will be shifted into the end of Chapter 5 with acceptable quality of presentation of figures, maps and photos. However, original text will not be shifted, will be kept in Chapter 5 as it is. This decision has been made in the meeting with CWD on 16/02/2010.
Appendix 2-1		
13	The last two paragraphs should be explained and shown on a legible map to proof the text.	Figures will be provided with acceptable size to read and check.
2.2.3 Alignment of 3 alternatives		
14	All your explanation can not be clearly understood because it is not related to a clear map.	JST will update Section 2.2.3 with consideration of relation between Figure 2.3 and text.
Figure 2-4 & 2-5		
15	These two figures should be related to each other (i.e. to be one figure) with a proper scale and presentation.	JST will show figures 2-4 & 2-5 in one figure and incorporate in to the Final Report 3/4 Drawings documents.

Appendix-1: More details about material (FFU)

Fiber-reinforced
Foamed
Urethane



“ESLON Neo Lumber FFU” is a light-weight, corrosion-resistant structural material made from fiber-reinforced foamed urethane.

FFU is a strong structural material, but it is as light as lumber and it has excellent working properties. Since FFU is a plastic material, it also has excellent durability and water resistance.

With these characteristics, FFU has a wide range of uses: in railroad, water and sewerage, civil engineering, architecture, factory facility and fish culturing fields. It is a reliable substitute for lumber, concrete and other plastics.

Appendix-2: Comparison of Jet grouting method and Column-jet grouting method

