APPENDIX 8.1

Environmental Impact Assessment

Appendix 8.1(1) Socio-economic Survey Form

Questionnaire for Environmental and Social Survey
on Affected Units and Affected People, the Losses, Income and Livelihood of the Affected People

This questionnaire is used for the **Environmental and Social Survey** in..... in which the detailed information about the affected units, affected people, the losses, income and livelihood of those affected people are to be collected in their houses..

The following two main subjects are focused in this questionnaire.
Part (A) Analysis on Affected Units, Affected People, and the Losses
Part (B) Survey on Income and Livelihood of the Affected People

Survey Sr. Number _____ Survey Date: _____

Enumerator Signature _____ Name _____ Position/Org. _____

Inspector Signature _____ Name _____ Position/Org. _____

Name of PAP _____ PAU Location _____

Part (A) Analysis on Affected Units , Affected People, and the Losses

No.	Affected Unit	No. of Unit	Legal Status	Size of the Land (Sq. Feet)	Housing Structure				Estimate market Price of Building (to get from other sources, not from PAP)	Remark
					No. of Story	Roof	Wall	Post/ Beam		
1	House 1									
2	House 2									
3	Shop									
4	Stall									
5	Community owned Building									
6	Religious Building									
7	Other									

NOTE: In the remark column, mention the specific name and significant information; if they are different form the former descriptions.

- Type of ownership (a) legally owned (b) MR's Tenant (c) Illegal
- No. of Storey (a) One Storey (b) Two Storey (c) more than Two Storey
- Roof (a) Bamboo /Leaf /Tarpaulin (b) Zinc Sheet (c) Brick Roofing
- Wall (a) Bamoo (b) Wood (c) Brick
- Post /Beam (a) Bamboo (b) Wood (c) Brick/RC

Part (B) Survey on Income and Livelihood of the Affected People

1. Information of the Household Head

Household Head/ Asset Owner		Respondent (on behalf of HH)	
Name	_____	Name	_____
NRC. No.	_____	NRC No.	_____
Age	_____	Age	_____
Sex	_____	Sex	_____
Education	_____	Education	_____
Occupation	_____	Occupation	_____
Ethnicity	_____	Ethnicity	_____
Religion	_____	Religion	_____

Origin _____ Relation to Household Head _____

Duration of living _____

2. Household Structure

- To collect only the people who are actually living at the present time.

1. No. of Household Member	2. Sex	3. Age	4.Relation to Household Head	5.Education	6.Origin	7. Occupation/Livelihood
M 1						
M 2						
M 3						
M 4						
M 5						
M 6						
M 7						
Total HH Member =						

Sex : (a) Male (b) Female
Age : (a) 5 yr and below (b) from 6 yr to 17 yr (c) from 18 yr to 60 yr (d) 61 yr and above
Relating to HH Head : (a) HH Head (b) Spouse (c) Son/Daughter and those in law (d) Other Relatives (e) Others
Education : (a) Monastery Education (b) Primary School (c) Middle School (d) High School (e) University (f) Graduate School
Occupation : (a) Total Dependent (b) Student (c) Assistant to HH Head (d) Shop Owner (e) Stall Owner/Vendor (f) Skilled Labour (g) Casual Labour (h) Farmer (i) Livestock/Fishery (j) MR Staff (k) Other Gov. Staff (l) Company or Other Staff (m) Others

3. Household Assets

(3.1) Ownership of a house in other place ---------- [(a) No (b) Yes]

3.2 Ownership of HH Assets

Kinds of HH Facilities	(1) Bicycle	(2) Motorbike	(3) Car	(4) Tube-well
Number				

3.3 Ownership of Livestock animals ---------- [(a) No (b)Yes] if Yes,

Kind of Livestock Animals	(1) Chicken	(2) Duck/Goose	(3) Pig	(4) Sheep	(5) Goat	(6) Buffalo	(7) Cow/Ox	(8) Others
Number								

3.4 Situation in Using the Toilet ---------- [(a) Not using the Toilet (b) Shared Toilet (c) HH owned Toilet]

3.5 Situation in Using the Electricity ---------- [(a) No Electricity (b) Shared Electricity (c) Own Generator (d) Gov. Electricity]

4. MR Tenant Information (if the tenant is doing any particular business)

4.1 Date of start heiring .....

4.2 Type of Business .....

4.2 No. of Employee .....

4.3 Annual Turnover .....

5. Household Income To discuss about the **average annual** income during the last 12 months.

No.	Type of Occupation	Unit	Rate	Quantity	Amount	Remark
5.1	Shop Owner					

5.2	Stall Owner/ Vendor					
5.3	Skilled Labor					
5.4	Casual Labor					
5.5	Farmer					
5.6	Livestock Farmer/Fishery					
5.7	MR Staff					
5.8	Other Government staff					
5.9	Company and Other Staff					
5.10	Others					
	Total					

6. **Monthly Expenditures** during the last 12 months (at least) ---------- Kyat.

Appendix 8.1(2) Results of Water Quality Analysis

Result of Water Quality Analysis (W-1)

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Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

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WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 1)
Location	Nay Pyi Taw Township (Lat: 19.854728, Long: 96.200254)
Date and Time of collection	5.8.2017 (11:30 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.6		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	38	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
(a division of WEG Co.,Ltd) ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

W0817 190

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 1)
Location	Nay Pyi Taw Township (Lat: 19.854728, Long: 96.200254)
Date and Time of collection	5.8.2017 (11:30 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

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Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 1

M0817 009

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 1)
Location	Nay Pyi Taw Township (Lat: 19.854728, Long: 96.200254)
Date and Time of collection	5.8.2017 (11:30 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	8.8.2017
Date and Time of completing	9.8.2017

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Total Coliform Count	12	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	7	CFU/100ml	Not detected
pH	7.6		6.5 - 8.5
Turbidity	29	NTU	5 NTU
Colour (True)	20	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

Remark : Unsatisfactory for drinking purpose.
: This certificate is issued only for the receipt of the test sample.
: < - Less than

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

ANALYSIS REPORT

ORIGINAL

Job Ref: 6088/2017
Date : 12 August 2017

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 11, Air Port Street, Insein Township, Yangon, Myanmar
Project Name	:	-
Sample Brought By	:	Client
Sample Marks	:	STREAM 1
Location	:	NAY PYI TAW
Sample Received Date	:	08.08.17
Analysed Date	:	09.08.2017
Lab Code No.	:	162/2017

No.	Test Parameter	Unit	Result	Method	LOQ
1.	Total Nitrogen(organic)	mg/l	<1	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} B.Macro Kjeldahl Method	1
2.	Total Phosphorus	mg/l	0.019	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01
3.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5

End Of Report

SGS (Myanmar) Limited

(Nu Nu Yi)
Manager

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t +95(1) 654 795, 654 796, 654 864, 654 865 e sgs.myanmar@sgs.com

Taungoo ↔ MDY NPT Depart

Project: Railway (upgrading)	Date: 5.8.017
Client: JICA	Surveyor: Sai Khan T, PPK
Location: Naypyitaw	Time: 11:30
Lat: 19.854728	Long: 96.200254
Evaluation:	Barometer Pressure: 261 mbar
Weather:	Sample/Location ID: NPT-1 GPS Waypoint no: 1 Temperature: @ 34° C Time: 11:30
Turbidity by Sechi Depth (cm):	
NTU converted from chart:	

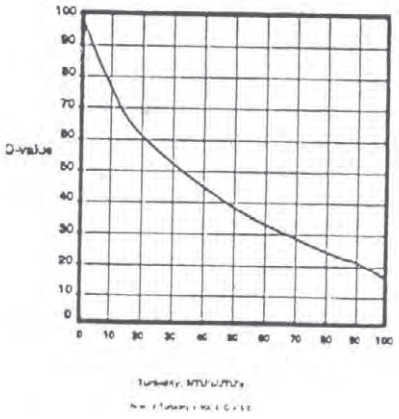
Surface/Ground/Effluent Water

Sr. No.	pH	Electrical Conductivity			DO (ppm)	Flow Rate (m/sec)	Depth (m)	Remark
		EC (µS/cm)	TDS (ppm)	Salinity (ppt)				
	7.71	320	321 mg/L	0.1	9.15 mg/L		6in	

Length to Turbidity Conversion Chart

cm	NTU
< 6	> 240
6 to 7	240
7 to 8	185
8 to 9	150
9 to 10	120
10 to 12	100
12 to 14	84
14 to 16	60
16 to 19	48
19 to 21	40
21 to 24	35
24 to 26	30
26 to 29	27
29 to 31	24

cm	NTU
31 to 34	21
34 to 36	19
36 to 39	17
39 to 41	15
41 to 44	14
44 to 46	13
46 to 49	12
49 to 51	11
51 to 54	10
54 to 57	9
57 to 60	8
60 to 70	7
70 to 85	6
> 85	< 5



Result of Water Quality Analysis (W-2)

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Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0817 191

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 2)
Location	Nay Pyi Taw Township (Lat: 19.7447967, Long: 69.2034)
Date and Time of collection	5.8.2017 (1:25 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.7		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	67	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer

(a division of WEG Co.,Ltd.) ISO TECH Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0817 191

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 2)
Location	Nay Pyi Taw Township (Lat: 19.7447967, Long: 69.2034)
Date and Time of collection	5.8.2017 (1:25 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	22	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

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Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

M0817 010

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	E-Guard
Nature of Water	Stream Water (Point - 2)
Location	Nay Pyi Taw Township (Lat: 19.7447967, Long: 69.2034)
Date and Time of collection	5.8.2017 (1:25 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	8.8.2017
Date and Time of completing	9.8.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Total Coliform Count	22	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	10	CFU/100ml	Not detected
pH	7.7		6.5 - 8.5
Turbidity	88	NTU	5 NTU
Colour (True)	60	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

Remark : Unsatisfactory for drinking purpose.
: This certificate is issued only for the receipt of the test sample.
: < - Less than

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

ANALYSIS REPORT

ORIGINAL

Job Ref: 6088/2017
Date : 12 August 2017

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 11, Air Port Street, Insein Township, Yangon, Myanmar
Project Name	:	-
Sample Brought By	:	Client
Sample Marks	:	STREAM 2
Location	:	NAY PYI TAW
Sample Received Date	:	08.08.17
Analysed Date	:	09.08.2017
Lab Code No.	:	163/2017

No.	Test Parameter	Unit	Result	Method	LOQ
1.	Total Nitrogen(organic)	mg/l	<1	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} B.Macro Kjeldahl Method	1
2.	Total Phosphorus	mg/l	0.012	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01
3.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5

End Of Report

SGS (Myanmar) Limited

(Nu Nu Yi)
Manager

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eguard ENVIRONMENTAL SERVICES	Operation Department WQ Baseline Sampling/Survey Field Notes	E Guard-OD-EQ-F-010 Version :00	Approved by MD On Date: 02/24/2016 Page 2 of 3

Bridge 393

Project: Taung00 ↔ MDY	Date: 5.8.017
Client: JICA	Surveyor: Sai Kham Ti , PPK
Location: Nay Pyi Taw	Time: 1:25 Pm
Lat: 19.7447967	Long: 69.2034
Evaluation:	Barometer Pressure: 190.9 mbar
Weather:	Sample/Location ID: NPT - P2 GPS Waypoint no: Temperature: 31.6 Time:
Turbidity by Sechi Depth (cm):	
NTU converted from chart:	

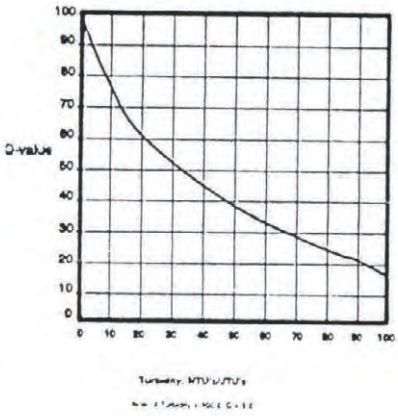
Surface/Ground/Effluent Water

Sr. No.	pH	Electrical Conductivity			DO (ppm)	Flow Rate (m/sec)	Depth (m)	Remark
		EC (µS/cm)	TDS (ppm)	Salinity (ppt)				
	7.99	335	333mg	0.1	6.9		1½feet	
		µS/cm	/L		mg/L			

Length to Turbidity Conversion Chart

cm	NTU
< 6	> 240
6 to 7	240
7 to 8	185
8 to 9	150
9 to 10	120
10 to 12	100
12 to 14	84
14 to 16	60
16 to 19	48
19 to 21	40
21 to 24	35
24 to 26	30
26 to 29	27
29 to 31	24

cm	NTU
31 to 34	21
34 to 36	19
36 to 39	17
39 to 41	15
41 to 44	14
44 to 46	13
46 to 49	12
49 to 51	11
51 to 54	10
54 to 57	9
57 to 60	8
60 to 70	7
70 to 85	6
> 85	< 5



Result of Water Quality Analysis (W-3)

ISO TECH LABORATORY

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Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

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WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 3)
Location	Kyaukse Township (Lat: 21.3600, Long: 96.08)
Date and Time of collection	6.8.2017 (11:37 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.8		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	44	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer

(a division of WEG Co.,Ltd.) ISO TECH Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

W0817 192

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 3)
Location	Kyaukse Township (Lat: 21.3600, Long: 96.08)
Date and Time of collection	6.8.2017 (11:37 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	10	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

ISO TECH LABORATORY

TRACE CERTIFIED

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 1

M0817 011

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 3)
Location	Kyaukse Township (Lat: 21.3600, Long: 96.08)
Date and Time of collection	6.8.2017 (11:37 AM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	8.8.2017
Date and Time of completing	9.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Total Coliform Count	16	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	8	CFU/100ml	Not detected
pH	7.8		6.5 - 8.5
Turbidity	35	NTU	5 NTU
Colour (True)	20	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

Remark : Unsatisfactory for drinking purpose.
: This certificate is issued only for the receipt of the test sample.
: < - Less than

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

ORIGINAL

ANALYSIS REPORT

Job Ref: 6088/2017
Date : 12 August 2017

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 11, Air Port Street, Insein Township, Yangon, Myanmar
Project Name	:	-
Sample Brought By	:	Client
Sample Marks	:	STREAM 3
Location	:	KYAUK SE
Sample Received Date	:	08.08.17
Analysed Date	:	09.08.2017
Lab Code No.	:	164/2017

No.	Test Parameter	Unit	Result	Method	LOQ
1.	Total Nitrogen(organic)	mg/l	<1	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} B.Macro Kjeldahl Method	1
2.	Total Phosphorus	mg/l	<0.01	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01
3.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5

End Of Report

SGS (Myanmar) Limited
(Nu Nu Yi)
Manager

Taungoo - MDY Bridge 498

Project: Railway (upgrading)	Date: 6.8.017
Client: JICA	Surveyor: PPK
Location: Kyauk Se	Time: 11:367
Lat: 31° 36'00.6"N	Long: 96 08' 14.8"E
Evaluation:	Barometer Pressure: 189.0mbar
Weather:	Sample/Location ID: W3 GPS Waypoint no: 3 Temperature: 29°C Time:
Turbidity by Sechi Depth (cm):	
NTU converted from chart:	

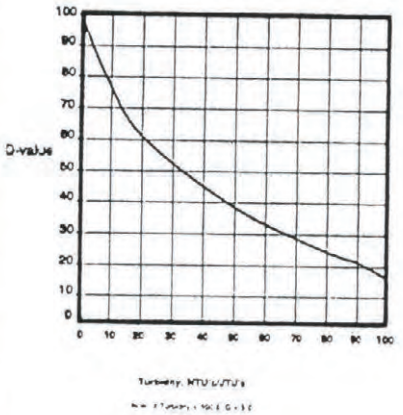
Surface/Ground/Effluent Water

Sr. No.	pH	Electrical Conductivity EC (µS/cm)	TDS (ppm)	Salinity (ppt)	DO (ppm)	Flow Rate (m/sec)	Depth (m)	Remark
	8.20	299	297 mg/L	0.1	7.22 mg/L			

Length to Turbidity Conversion Chart

cm	NTU
< 6	> 240
6 to 7	240
7 to 8	185
8 to 9	150
9 to 10	120
10 to 12	100
12 to 14	84
14 to 16	60
16 to 19	48
19 to 21	40
21 to 24	35
24 to 26	30
26 to 29	27
29 to 31	24

cm	NTU
31 to 34	21
34 to 36	19
36 to 39	17
39 to 41	15
41 to 44	14
44 to 46	13
46 to 49	12
49 to 51	11
51 to 54	10
54 to 57	9
57 to 60	8
60 to 70	7
70 to 85	6
> 85	< 5



Result of Water Quality Analysis (W-4)

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0817 193

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 4)
Location	Myit Nge Bridge
Date and Time of collection	6.8.2017 (12:30 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.9		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	27	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer

(a division of WEG Co.,Ltd.)

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

W0817 193

WATER QUALITY TEST RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 4)
Location	Myit Nge Bridge
Date and Time of collection	6.8.2017 (12:30 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	9.8.2017
Date and Time of completing	14.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

TRACE CERTIFIED

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 1

M0817 012

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	E-Guard
Nature of Water	River Water (Point - 4)
Location	Myit Nge Bridge
Date and Time of collection	6.8.2017 (12:30 PM)
Date and Time of arrival at Laboratory	8.8.2017
Date and Time of commencing examination	8.8.2017
Date and Time of completing	9.8.2017

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Total Coliform Count	10	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	4	CFU/100ml	Not detected
pH	7.9		6.5 - 8.5
Turbidity	18	NTU	5 NTU
Colour (True)	5	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

Remark : Unsatisfactory for drinking purpose.
: This certificate is issued only for the receipt of the test sample.
: < - Less than

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co. Ltd.)

ANALYSIS REPORT

ORIGINAL

Job Ref: 6088/2017
Date : 12 August 2017

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 11, Air Port Street, Insein Township, Yangon, Myanmar
Project Name	:	-
Sample Brought By	:	Client
Sample Marks	:	STREAM 4
Location	:	MDY (Myint Nge)
Sample Received Date	:	08.08.17
Analysed Date	:	09.08.2017
Lab Code No.	:	165/2017

No.	Test Parameter	Unit	Result	Method	LOQ
1.	Total Nitrogen(organic)	mg/l	<1	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N_{org} B.Macro Kjeldahl Method	1
2.	Total Phosphorus	mg/l	<0.01	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01
3.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5

End Of Report

SGS (Myanmar) Limited

(Nu Nu Yi)
Manager

Yangon ⇔ MDY Bridge 826

Project: Railway upgrading	Date: 6.8.017
Client: JICA	Surveyor: PPK, Sai Khan T
Location: Myit Nge bridge	Time: 12:30
Lat:	Long:
Evaluation:	Barometer Pressure:
Weather:	Sample/Location ID: W4 GPS Waypoint no: 4 Temperature: 28.3°C Time:
Turbidity by Sechi Depth (cm):	
NTU converted from chart:	

Surface/Ground/Effluent Water

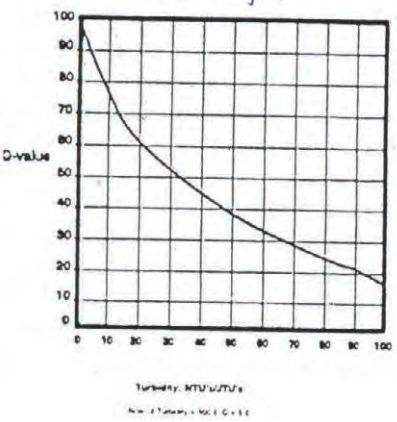
Sr. No.	pH	Electrical Conductivity			DO (ppm)	Flow Rate (m/sec)	Depth (m)	Remark
		EC (µS/cm)	TDS (ppm)	Salinity (ppt)				
1	8.22	306	306	0.1	7.15		1m	

TDS 171

Length to Turbidity Conversion Chart

cm	NTU
< 6	> 240
6 to 7	240
7 to 8	185
8 to 9	150
9 to 10	120
10 to 12	100
12 to 14	84
14 to 16	60
16 to 19	48
19 to 21	40
21 to 24	35
24 to 26	30
26 to 29	27
29 to 31	24

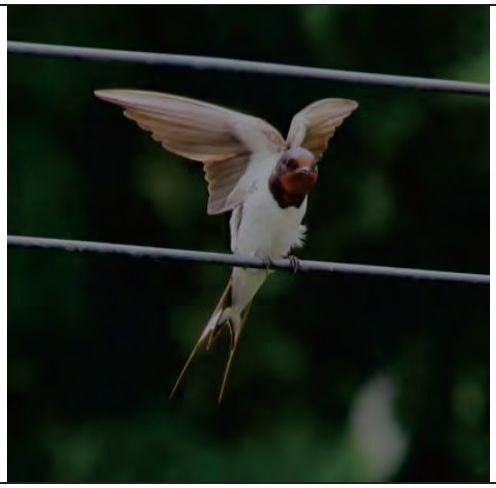
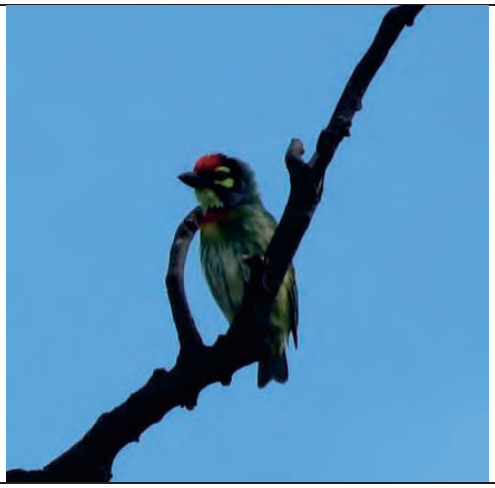
cm	NTU
31 to 34	21
34 to 36	19
36 to 39	17
39 to 41	15
41 to 44	14
44 to 46	13
46 to 49	12
49 to 51	11
51 to 54	10
54 to 57	9
57 to 60	8
60 to 70	7
70 to 85	6
> 85	< 5

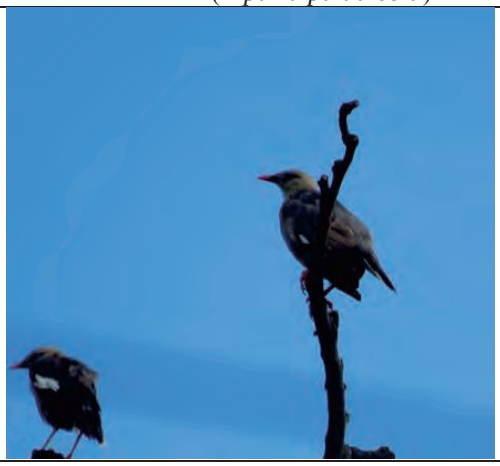


Appendix 8.1(3) Photographs of Bird, Butterfly and Dragonfly Species in the Project Area

Photographs of Bird Species in Taungoo

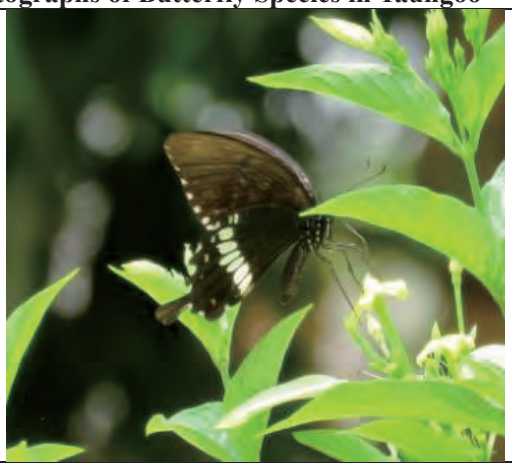
	
Large-billed Crow (*Corvus macrorhynchos*)	Common Myna (*Acridotheres tristis*)
	
Eurasian Tree Sparrow (*Passer montanus*)	Spotted Dove (*Streptopelia chinensis*)
	
Little Egret (*Egretta garzetta*)	Great Egret (*Casmerodius albus*)

	
Barn Swallow (*Hirundo rustica*) (Male)	Coppersmith Barbet (*Megalaima haemacephala*)
	
Pied Bushchat (*Saxicola caprata*) (Male)	Scaly-breasted Munia (*Lonchura punctulata*)
	
House Sparrow (*Passer domesticus*)	Eurasian Tree Sparrow (*Passer montanus*)

	
Plain Martin (*Riparia paludicola*)	House Crow (*Corvus splendens*)
	
Vinous-breasted Starling (*Sturnus burmannicus*)	Rock Pigeon (*Columba livia*)
	
Oriental Magpie Robin (*Copsychus saularis*) (Juvenile)	Grey-breasted Prinia (*Prinia hodgsonii*)

Spotted Dove (*Streptopelia chinensis*)

Photographs of Butterfly Species in Taungoo

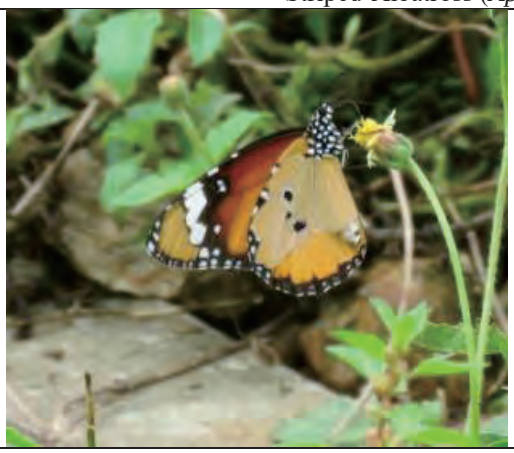
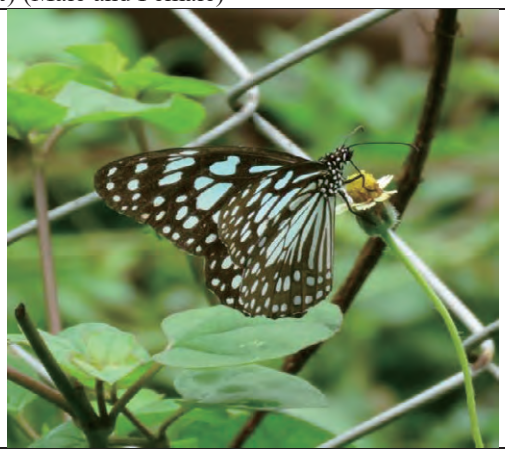


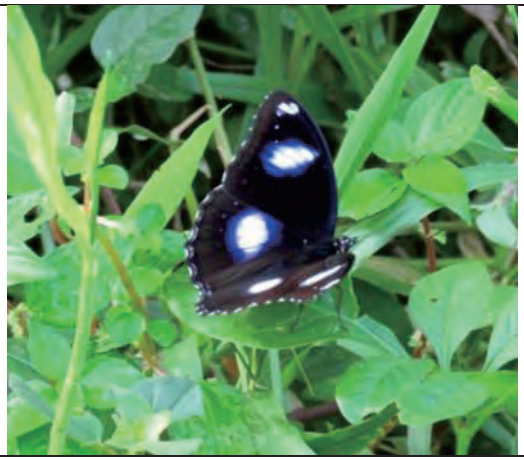
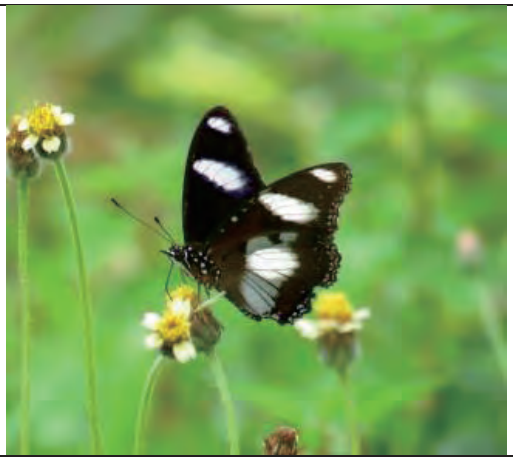
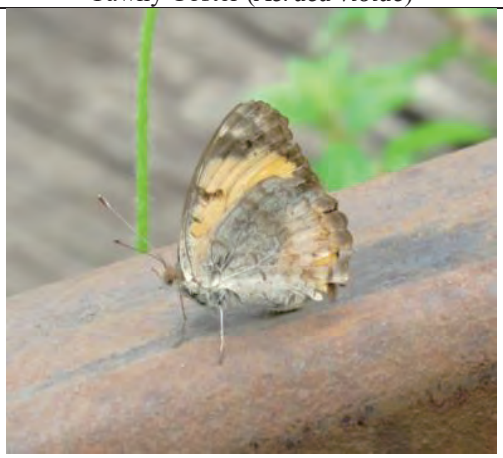
Common Mormon (*Papilio polytes*)

Lime Butterfly (*Papilio demoleus*)

Common Rose (*Pachliopta aristolochiae*)

Common Emigrant (*Catopsilia Pomona*)

	
Mottled Emigrant (*Catopsilia pyranthe*)	Psyche (*Leptosia nina*)
	
Striped-Albatross (*Appias libythea*) (Male and Female)	
	
Plained Tiger (*Danaus chrysippus*)	Blue Tiger (*Danaus limniace*)

	
Great Eggfly (*Hypolimnas bolina*) (Male)	Danaid Eggfly (*Hypolimnas misippus*) (Male)
	
Common Sailor (*Neptis hylas*)	Tawny Coster (*Acraea violae*)
	
Peacock Pansy (*Junonia almanac*)	Yellow Pansy (*Junonia hierta*) (Male)

	
Gray Pansy (*Junonia atlites*) (Male)	Lemon Pansy (*Junonia lemonias*)
	
Common Bush Brown (*Mycalesis perseus*)	Common Pierrot (*Castalius rosimon*)
	
Lime Blue (*Chilades lajus*)	Striped Pierrot (*Tarucus nara*)

Swift (*Caltoris spp*)

Photographs of Bird Species in Nay Pyi Taw Depot Site

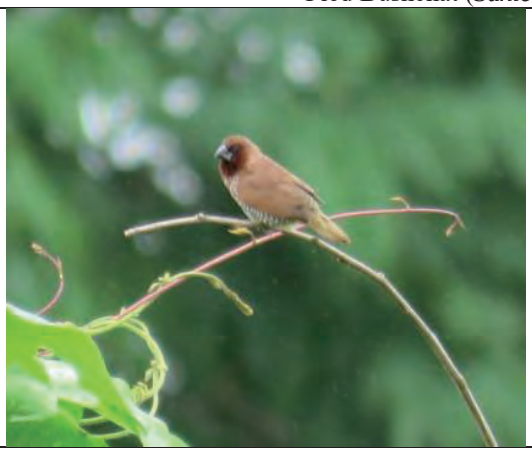
Yellow-eyed Babbler (*Chrysomma sinense*)

Australasian Bushlark (*Mirafra javanica*)

Plain Prinia (*Prinia inornata*)

Grey-breasted Prinia (*Prinia hodgsonii*)

Pied Bushchat (*Saxicola caprata*) (Male and Female)



Scaly-breasted Munia (*Lonchura punctulata*) (Adult and Juvenile)

Common Myna (*Acridotheres tristis*)

House Sparrow (*Passer domesticus*)

Eurasian Tree Sparrow (*Passer montanus*)

Blue-throated Bee Eater (*Merops viridis*) (Juvenile, no tail-prongs)

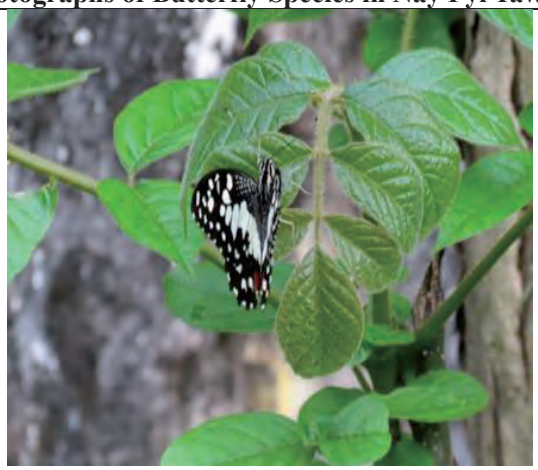
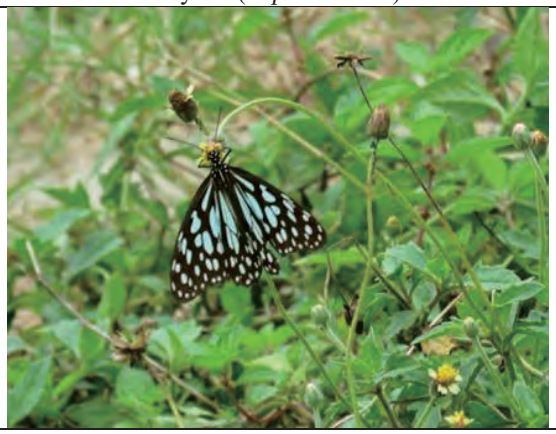
Blue-tailed Bee Eater (*Merops philippinus*) (Adult and Juvenile, no tail-prongs)

Red-vented Bulbul (*Pycnonotus cafer*)

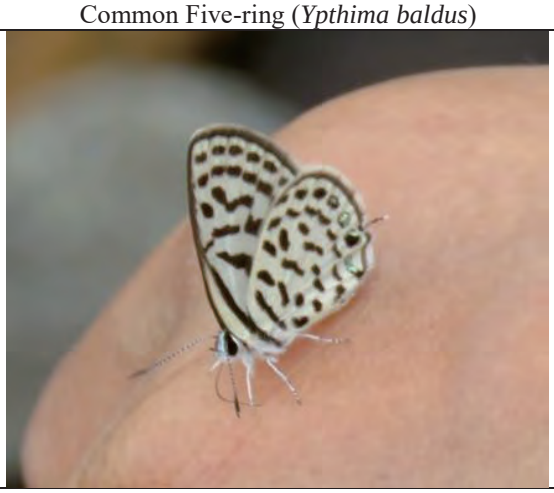
Streak Eared Bulbul (*Pycnonotus blanfordi*)

	
White-throated Babbler (*Turdoides gularis*)	Spotted Dove (*Streptopelia chinensis*)
	
Red Collared Dove (*Streptopelia tranquebarica*)	Lesser Whistling Duck (*Dendrocygna javanica*)
	
Greater Coucal (*Centropus sinensis*)	Black-shouldered Kite (*Elanus caeruleus*)

Photographs of Butterfly Species in Nay Pyi Taw Depot Site

	
Lime Butterfly (*Papilio demoleus*)	Common Rose (*Pachliopta aristolochiae*)
	
Common Grass Yellow (*Eurema hecabe*)	Psyche (*Leptosia nina*)
	
Plained Tiger (*Danaus chrysippus*)	Blue Tiger (*Danaus limniace*)

	
Great Eggfly (*Hypolimnas bolina*) (Male)	Tawny Coster (*Acraea violae*)
	
Lemon Pansy (*Junonia lemonias*)	Common Bush Brown (*Mycalesis perseus*)
	
Dark-branded Bushbrown (*Mycalesis mineus*)	Common Four-ring (*Ypthima huebneri*)

	
Common Five-ring (*Ypthima baldus*)	Lime Blue (*Chilades lajus*)
	
Striped Pierrot (*Tarucus nara*)	Common Pierrot (*Castalius rosimon*)
	
Small Blue (*Cupido* sp.)	Peablue (*Lampides boeticus*)

	
Swift (*Caltoris* sp.)	Yellow-veined Lancer (*Pyroneura Sp.*)

Photographs of Dragonfly Species in Nay Pyi Taw Depot Site

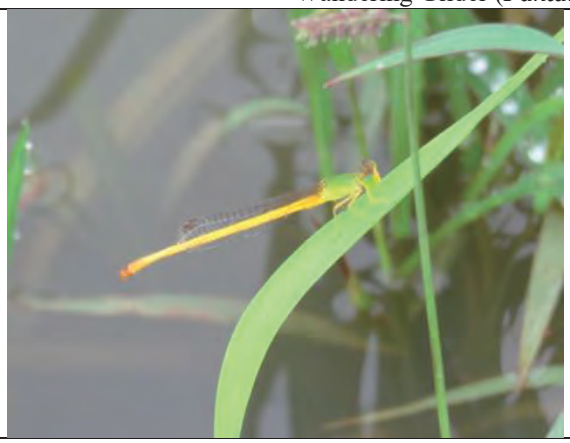
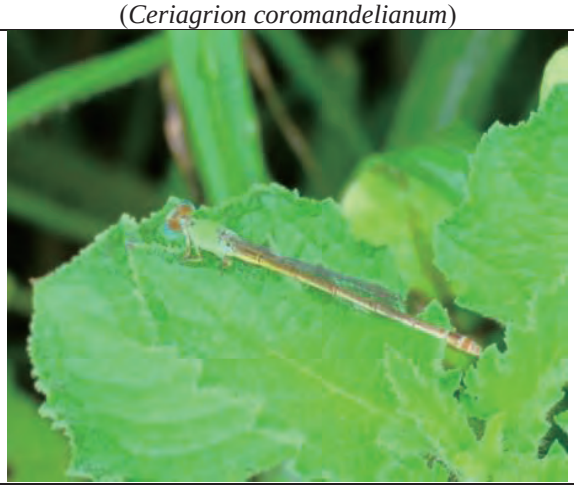
Ground Skimmer/Chalky Percher (*Diplacodes trivilis*) (Male and Female)

Dark (*Brachythemis fuscopalliata*)

Carmine Darter (*Crocothemis erythraea*)

Crimson-tailed Mash Hawk
(*Orthetrum pruinosum*) (Male)

Trumpet Tail (*Acisoma panorpoides*)

Wandering Glider (*Pantala flavescens*) (Male and Female)	
	
Coromandel Marsh Dart (*Ceriagrion coromandelianum*)	Yellow Bush Dart (*Copera marginipes*) (Female)
	
Orange-tailed Marsh Dart (*Ceriagrion cerinorubellum*)	Golden Dartlet (*Ischnura aurora*)

Photographs of Bird Species in Myohaung Depot Site

	
Spotted Dove (*Streptopelia chinensis*)	Vinous-breasted Starling (*Sturnus burmannicus*)

	
Large-billed Crow (*Corvus macrorhynchos*)	House Crow (*Corvus splendens*)
	
Eurasian Tree Sparrow (*Passer montanus*)	House Sparrow (*Passer domesticus*)
	
Blue-tailed Bee Eater (*Merops philippinus*)	Scaly-breasted (*Lonchura punctulata*)

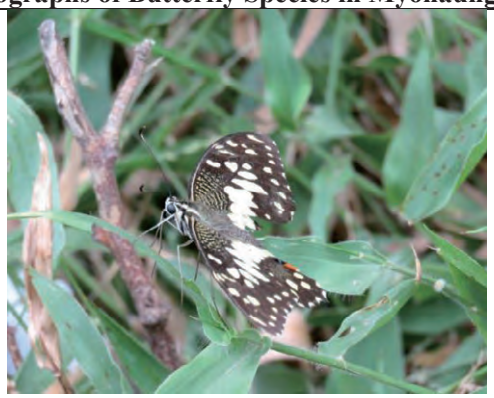
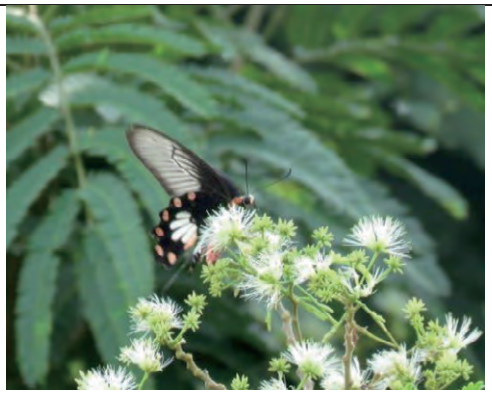
	
Common Myna (*Acridotheres tristis*)	Common Hoopoe (*Upupa epops*)
	
White-throated Babbler (*Turdoides gularis*)	Streak Eared Bulbul (*Pycnonotus blanfordi*)
	
Red-vented Bulbul (*Pycnonotus cafer*)	Rock Pigeon (*Columba livia*)

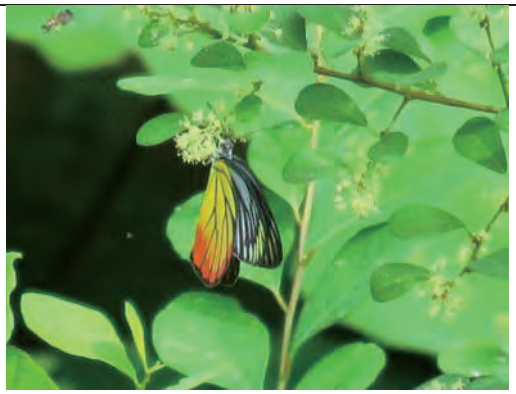
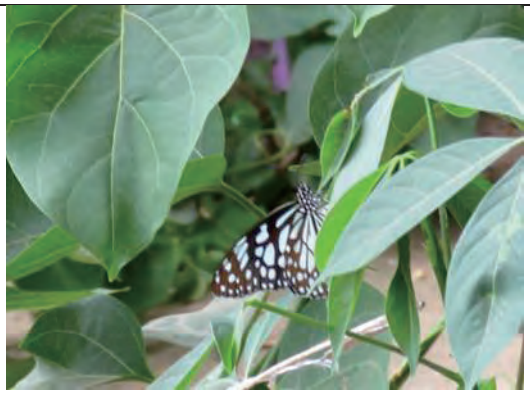
Asian Palm Swift (*Cypsiurus balasinensis*)

Oriental Magpie Robin
(*Copsychus saularis*) (Female)

Indian Pond Heron (*Ardeola* grayii)

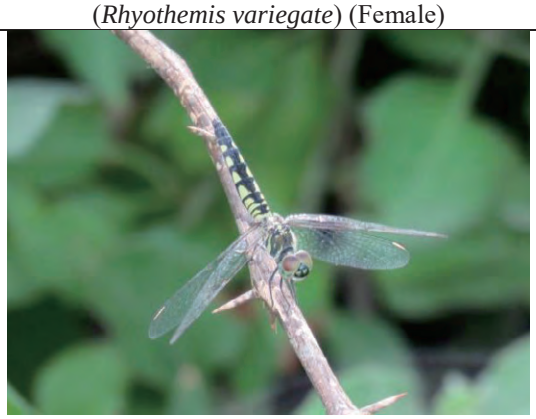
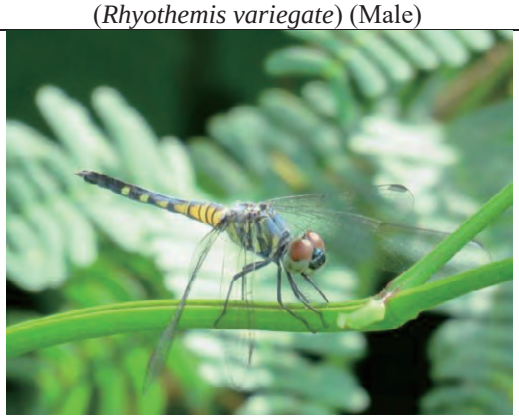
Photographs of Butterfly Species in Myohaung Depot Site

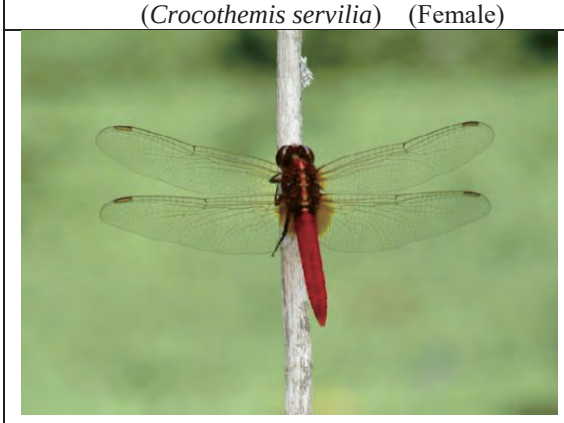
	
Lime Butterfly (*Papilio demoleus*)	Common Rose (*Pachliopta aristolochiae*)
	
Common Emigrant (*Catopsilia pomona*)	Mottled Emigrant (*Catopsilia crocale*)
	
Mottled Emigrant (*Catopsilia pyranthe*)	Yellow Orange Tip (*Ixias pyrene*)

	
Common Grass Yellow (*Eurema hecabe*)	Striped Albatross (*Appias libythea*)
	
Painted Jezebal (*Delias hyparete indica*)	Striped Tiger (*Danaus limniace*)
	
Blue Tiger (*Danaus limniace*)	Great Eggfly (*Hypolimnas bolina*) (Male)
	

Danaid Eggfly (*Hypolimnas misippus*) (Male)	Danaid Eggfly (*Hypolimnas misippus*) (Female)
	
Tawny Coster (*Acraea violae*)	Peacock Pansy (*Junonia almanac*)
	
Blue Pansy (*Junonia orithya*)	Angled Castor (*Ariadne ariadne*)
	
Plains Cupid (*Chilades pandava*) (Male)	Swift (*Caltoris* sp)

Darts (*Potanthus sp.*)

	
Slender Skimmer/Green Marsh Hawk (*Orthetrum Sabina*)	Ground Skimmer/Chalky Percher (*Diplacodes trivilis*) (Female)
	
Common Picture Wing (*Rhyothemis variegate*) (Female)	Common Picture Wing (*Rhyothemis variegate*) (Male)
	
Black Pennant (*Selysiothemis nigra*)	Blue Dasher (*Pachydiplax longipennis*)
	

Ruddy Marsh Skimmer (*Crocothemis servilia*) (Female)	Ruddy Marsh Skimmer (*Crocothemis servilia*) (Male)
	
Common Redbolt (*Rhodothemis rufa*)	Antillean Saddlebags (*Tramea insularis*)
	
Ditch Jewel (*Brachythemis contaminate*)	Coromandel Marsh Dart (*Ceriagrion coromandelianum*)

Appendix 8.1(4) Project Notification

Notification of
Yangon-Mandalay Railway Improvement Project (Phase 2)

1. Description of the Project

a) Name of the Project

Yangon Mandalay Railway Improvement Project (Phase 2)

b) Environmental Type of the Project

EIA Type Project (expected)

c) Objective of the Project

To improve and modernize old facilities and equipment in the Yangon - Mandalay Railway for the section between Taungoo and Mandalay and thereby realizing safer and faster train operation, expanding the transportation capacity; and contributing to socio-economic development of Myanmar

d) Main Components of the Project

i. Civil works including track works, civil structures and station buildings
ii. Upgrading of signaling and telecommunication system
iii. Introduction of new rolling stocks (DEMU)
iv. Improvement of freight facilities

e) Location of the Project

Section between Taungoo station and Mandalay station on the Yangon – Mandalay Railway

f) Schedule of the Project (tentative)

Construction is planned to start in 2021 and last for approximately 4.75 years.

2. Information Disclosure

Public consultation meetings will be held twice each time in four townships nearby the project area (i.e. Taungoo,Pyinmana Thazi and Amarapura).

3. Project Proponent and Contact Person

The project proponent is Myanmar Railways (MR) under the Ministry of Transport and Communications (MOTC).
<Address> Nay Pyi Taw Station Compound
<TEL/FAX> +95-67-77164
Comments about the project can be written and sent to the following person:
<Name> U Phyo Htet Kyaw
<Position> Assistant General Manager (Planning), Planning and Administration Department, International Relationship, Myanma Railways
<Email> kozin6893@gmail.com

Appendix 8.1(5) Record of the Stakeholder Meetings (scoping stage)

Record of the Stakeholder Meeting (Thazi)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/scoping stage)	**Date:** June 5, 2017
Venue: Thazi City Hall, Thazi City, Thazi Township, Mandalay District, Mandalay Division	**Time:** 9:00 AM to11:00 AM
Attendees: Total: 67 (local people: 28; government officials: 34; parliaments members: 3; media: 2) *male: 67; female: 0	

Agenda:

1) Opening Ceremony
2) Opening Remarks and Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
3) Presentation of Project Planning with a video
4) Presentation on Environmental and Social Considerations in Yangon-Mandalay Railway Improvement Project Phase (2) by U Tin Aung Moe, Director of E Guard Environmental Services Co., Ltd.
5) Question and Answers by Attendees
6) Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
7) Closing Ceremony

Opening Ceremony

Opening Remarks and Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Myo Win explained as follows:

The objective of today's meeting is to improve public awareness and their opinions about the project, to explain potential positive impacts and negative impacts caused by the project on environment and society, to explain what kind of survey is to be carried out and for what purpose, to take comments and suggestions of stakeholder and local people. The objectives of the project is to rehabilitate current railway related buildings, to promote the rail speed 62 mile per hour/100 kilometer, to offer safer and more time-efficient train operation to the passengers.

Presentation on Environmental and Social Considerations in Yangon-Mandalay Railway Improvement Project Phase (2) by U Tin Aung Moe, Director of E Guard Environmental Services Co., Ltd.

U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd explained the Environmental Impact Assessment Procedure (2015) and environmental impact assessment (EIA) as follows:

The EIA processing will be exposed twice to local people in compliance with the rules and regulations under the provision of Myanmar Government. Today meeting is the first public consultation and disclosure about EIA process. The objectives of this meeting are to give information about the project beginning, to explain what kinds of processes carried out in EIA and potential environmental and social impacts caused by the project. After screening of the project, the current stage of the project is scoping. Other alternatives have to be considered in EIA. There are three alternatives in this project, (1) avoiding the project, (2) rehabilitation of current project and

(3) implementation of new project. Social, economic and environmental considerations have to be taken into account in making decision of alternatives. The second one is the most suitable one. To reduce pollution, locomotive or engine will be replaced with better one. The project will develop local economy and job opportunities. Increasing the speed of train and number of trains can cause accidents. During rehabilitation of bridges, the quality of water and aquatic animals will be affected. In operation phase of the project, noise and vibration level may be increased due to higher speed of the train. Air quality measurement will be carried out in three places and water quality in four places. Soil survey, waste disposal and noise level measurements will be taken from secondary data collection. Any land acquisition will in principle not occur. Township data will be collected from respective General Administration Department.

Question and Answers by Attendees

(1) U Ohn Shwe (Local people, Thazi)

Question: *How will you improve this project and how will you solve for resettlement of local people living near railway?*

Answer (U Myo Win, MR):

We will rehabilitate the steel bridges and bridge structures. We will build panels and sub-grade for level crossings and install the distance posts. We will repair of present platform roofs and the signal/telecom huts. We will develop new buildings for signal control cabin and related equipment. We will renew better signaling system. We will install the Automatic Train Protection (ATP). We will also renew the telecommunication system and install the level crossing safety equipment. We will procure of Diesel Electric Multiple Unit (DEMU).

(2) U War Lar (Local people, Thazi)

Suggestion: *I suggest that this meeting be more transparent. Please inform the local people from Thazi more noticeable and more transparent.*

Answer (U Tin Aung Moe):
We have already invited local people and other related Departments and organizations by announcing in newspapers and project notifications. But most of the people do not want to attend this kind of meeting until they are affected by impacts even some transportation are provided to attend.

(4) U Thaw Gyi (Amyotha Hluttaw Representative Person)
Suggestion: *I suggest that railway staff and local people who living along the railway line be safer and more reliable.*

Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Myo Win said:

I thank all of the attendees who attended today's meeting. I warmly welcome the attendees who are parliament representatives, the staffs from government department, the reporters and local people from Myit Nge. I also thank for your questions and suggestions.

Closing Ceremony

Attendance List

Local Community

No.	Name	Occupation	Address
1	U War LAr	Local	Thazi
2	U Nay Win Tun	Local	Thazi
3	U Nyan Win	Local	Thazi
4	U Chit KAung Nyan	Local	Thazi
5	U Win Zaw Oo	Local	Thazi
6	U Kyin Htwe	Local	Thazi
7	U Ba Zan	Businessman	Thazi
8	U Khin Maung San	Local	Thazi
9	U Tun Myint	Ward Administrator	Thazi
10	U Moe Moe Kyaw	Local	Thazi
11	U Kyaw Thu Tun	Local	Thazi
12	U Win Thein Tun	Ward Administrator	Thazi
13	U Aung Ko Win	Local	Thazi
14	U Kyaw Swar	Local	Thazi
15	U Cho Lone	Local	Thazi
16	U Win Maw Thein	Local	Thazi
17	U Thant Zin	Local	Thazi
18	U Nay Linn Maung	Local	Thazi
19	U Hla Win	Local	Thazi
20	U Zaw Zaw Htike	Local	Thazi
21	U Moe Mg Mg Htay	Local	Thazi
22	U Myo Winn Hlaing	Local	Thazi
23	U Myint Naing	Local	Thazi
24	U Ohn Shwe	Local	Thazi
25	U Tun Tun Linn	Local	Thazi
26	U Tin Mg Soe	Local	Thazi
27	U Myint Swe	Local	Thazi
28	U Tin Kyaw	Photographer	Thazi

Government Officials

No.	Name	Position	Organization/Department
1	U Myint Tun	Deputy Director	District Administration
2	U Soe Nyut Aung	Clerk	District Administration
3	U Soe Lwin Kyaw	Clerk	Myanma Railways
4	U Soe Min Zaw	Officer	Railway Police
5	U Soe Tint	Station Master	Myanama Railways
6	U Tun Tun	Officer	Thazi
7	U Mg Mg Lwin	Officer	Transportation Department, Thazi
8	U Kyaw Nyi Nyi Tun	Upper Divisional Clerk	Transportation Department, Thazi
9	U Soe Min	Clerk	Myanma Railways
10	U Kyaw Moe	Staff Officer	Irrigation Department
11	U Min Naing	Officer	Railway Police
12	U Than Win	Officer	Myanma Railways
13	U Nan Lin	Deputy Staff Officer	Myanma Railways
14	U Than Zaw	Junior Assistant Engineer	Myanma Railways
15	U Thein Htike	Junior Assistant Engineer	Myanma Railways
16	U Aung Zin	Commander	Railway Police
17	U Kyaw Zaw Oo	Upper Divisional Clerk	Myanma Railways
18	U San Winn	Engineer	Railway Workshop
19	U Than Zin Aung	Deputy Staff Officer	Fire Department
20	U Aung Kyi	Deputy Staff Officer	Fire Department
21	U Aung Kyaw Hein	Assistant Director	City Development Communities
22	U Myo Aung	Assistant Central Superviser	Myanma Railways
23	U Kyaw San Lin	Junior Assistant Engineer	Myanma Railways
24	U Ohn Yin	Chief Engineer	Myanma Railways
25	U Myint Aung	Manager	Transportation Department (MR)
26	U Nyut Aung	Chief Engineer	Myanma Railways
27	U Kyi Oo	Central Supervisor	Transportation Department (MR)
28	U Min Htwe Hlaing	Assistant Central Supervisor	Transportation Department (MR)
29	U Kyaw Min Oo	Station Master	Transportation Department (MR)
30	U Aung Kyaw Soe	Station Master	Transportation Department (MR)
31	U Myo Win	General Manager	Myanma Railways
32	U Khin Maung Kyaw	Assistant General Manager	Myanma Railways
33	U Swe Yin	Assistant General Manager	Myanma Railways
34	U Zaw Naung Soe	Deputy Central Supervisor	Myanma Railways

Parliament Members

No.	Name	Position	Organization/Department
1	U Thaw Gyi	Amyotha Hluttaw Parliament Member	NLD
2	U Mg Mg Tun	Amyotha Hluttaw Parliament Member	NLD
3	U San Tun	Parliament Member	NLD

Media

No.	Name	Position	Organization/Department
1	U Mg Ko	Reporter	Myanmar Alin
2	U Mg Mg Lin	Reporter	D.V.B

Photographs

Participants' Registration

Presentation by Myanma Railways

Presentation by EIA Consultant

Question and Answers with Local People

Closing Remarks by Myanma Railways

Record of the Stakeholder Meeting (Myint Nge)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/scoping stage)	**Date:** June 6, 2017
Venue: Zay Ta Wun Dhamma Hall, Myint Nge City, Amarapura Township, Mandalay District, Mandalay Division	**Time:** 10:00 AM to12:00 AM
Attendees: Total: 50 (local people: 14; government officials: 28; media: 8) *male: 44; female: 6	

Agenda:

1) Opening Ceremony
2) Opening Remarks and Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
3) Presentation of Project Planning with a video.
4) Presentation of Environmental Impact Assessment by U Tin Aung Moe, Director, E Guard Environmental Services Co.,Ltd.
5) Question and Answers by Attendees
6) Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
7) Closing Ceremony

Opening Ceremony

Opening Remarks and Presentation on the Project (Introduction)by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Myo Win explained as follows:
The objective of today(s meeting is to improve public awareness and their opinions about the project, to explain potential positive impacts and negative impacts caused by the project on environment and society, to explain what kind of survey is to be carried out and for what purpose, to take comments and suggestions of stakeholder and local people. The objectives of the project is to rehabilitate current railway related buildings, to promote the rail speed 62 mile per hour/ 100 kilometer, to get better safe and to save time taken for passengers.

Presentation of Project Planning with a video

Presentation on Environmental Impact Assessment by U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd.

U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd explained the Environmental Impact Assessment Procedure (2015) and environmental impact assessment (EIA) as follows:

The EIA processing will be exposed twice to local people in compliance with the rules and regulations under the provision of Myanmar Government. Today's meeting is the first public consultation and disclosure about EIA process. The objectives of this meeting are to give information about the project beginning, to explain what kinds of processes carried out in EIA and potential environmental and social impacts caused by the project. After screening of the project, the current stage of the project is scoping. Other alternatives have to be considered in EIA. There are three alternatives in this project: (1) avoiding the project, (2) rehabilitation of current project and

(3) implementation of new project. Social, economic and environmental considerations have to be taken into account in making decision of alternatives. The second one is the most suitable one. To reduce pollution, locomotive or engine will be replaced with better one. The project will develop local economy and job opportunities. Increasing the speed of train and number of trains can cause accidents. During rehabilitation of bridges, the quality of water and aquatic animals will be affected. In operation phase of the project, noise and vibration level may be increased due to higher speed of the train. Air quality measurement will be carried out in four places and water quality in three places. Soil survey, waste disposal and noise level measurements will be taken from secondary data collection. Land acquisition will in principle not occur. Township data will be collected from respective General Administration Department.

Question and Answers by Attendees

No Question and Comment was made at this session.

Closing Ceremony

Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

Thanks for all the attendees for coming today meeting and I hope this project will assist in developing the transportation system of the local people.

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Maung Maung	Administrator	Myit Nge
2	U Aung Maung	Administrator	Myit Nge
3	U Tin Htun	Administrator	Myit Nge
4	U Cho Cho	Quarter Head	Myit Nge
5	U Chit Kaung	Quarter Head	Myit Nge
6	U Kan Shwe	Quarter Head	Myit Nge
7	U Htun	Administrator	Myit Nge
8	U Tin Myint	Local	Myit Nge
9	U Min Din	Local	Myit Nge
10	U Tin Maung Win	Local	Myit Nge
11	U Aung Thin	Local	Myit Nge
12	U Aung Myint Than	Local	Myit Nge
13	U Aung Kyi	Local	Myit Nge
14	U Myo Myint	NLD Chairman	Myit Nge

Government Officials

No.	Name	Position	Organization/Department
1	U Zaw Naing	Deputy Staff Officer	Agricultural Department
2	U Kyi Oo	Police Officer	Myanmar Police Force
3	Daw Khin Ma Ma	Staff Officer	Transportation Department
4	U Thura Zaw	Police	Myanmar Police Force
5	U Khin Maung Htoo	Police	Myanmar Police Force
6	U Aye Maung	Assistant General Manager	Myanma Railways
7	U Htay Hlaing	Assistant General Manager (Civil)	Myanma Railways
8	U Nyo Aung	Electrical Engineer	Myanma Railways
9	U Win Myint	Range Office	Forest Department
10	Dr. Tin Cho Cho Ko	Divisional Medical Officer	Myit Nge Hospital
11	Daw Kyawt Kyawt Khaing	Clerk (1)	Transportation Department
12	U Aung Ko Lat	Upper Divisional Clerk	Transportation Department
13	U Myo Min Thu	Security	Transportation Department
14	U Htay Kyaw	Driver	Myanmr Railways
15	U Tin Maung Tun	Police Officer	Myanma Railways
16	U Myo Min Oo	Township Administrator	General Administrative Department
17	U Swe Yin	Assistant General Manager	Myanma Railways
18	U Maung Maung Pyone	Officer	Myanma Railways
19	U Phyo Min Htun	Head of Labors	Myanma Railways
20	U Nyein Aung	Station Master	Myanma Railways
21	U Mya Htay	Police Officer	Myanma Railways
22	U Aung Myo Than	Police Officer	Myanmar Police Force
23	U Tin Maung Than	General Manager	Myit Nge Workshop
24	Daw Thin Thin Sein	Lower Divisional Clerk	General Administrative Department
25	U Zaw Hein	Officer	Myanma Railways
26	U Aung Kyaw Myint	Police Officer	Myanma Railways
27	U Aung San Myint	Corporal	Myanma Railways
28	U Pyae Sone Aung	Police	Myanma Railways

Media

No.	Name	Position	Organization/Department
1	U San Lwin Maung	Reporter	Madala Daily
2	Daw Theint Thu Thu Win	Reporter	MRTV
3	Daw Kyi Pyar Win	Reporter	MRTV
4	U Aung Kyaw Htun	Reporter	MRTV
5	U Nay La Min	Reporter	MRTV
6	U Aung Myat Soe	Reporter	Sky Net
7	U Sithu Zaw	Reporter	Sky Net
8	U Zin Linn Htun	Reporter	Sky Net

Photographs

Participants' Registration

Participants' Registration

Presentation by Myanma Railways

Presentation by Myanma Railways

Presentation by EIA Consultant

Presentation by EIA Consultant

Record of the Stakeholder Meeting (Pyinmana)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/scoping stage)	**Date:** June 15, 2017
Venue: Pyinmana Station (VIP Hall)	**Time:** 9:00 AM to11:00 AM
Attendees: Total: 73 (parliament member: 2; local people: 27; government officials: 37; private company: 5; media: 2) *male: 69; female: 4	

Agenda:

1) Opening Ceremony
2) Opening Remarks (1) by U Tin Htut, Member of Nay Pyi Taw Council.
3) Opening Remarks (2) by U Tin Htun, Chairperson of Nay Pyi Taw Council.
4) Presentation of Project Planning by U Htun Aung Thin, General Manager, Lower Myanmar, Myanma Railways, Ministry of Transportation and Communication.
5) Presentation of Project Planning with a video.
6) Presentation on Environmental and Social Considerations in Yangon - Mandalay Railway Improvement Project Phase (2) by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.
7) Question and Answers by Attendees
8) Closing Remarks by U Tin Htut, Chair member of Nay Pyi Taw Council.
9) Closing Ceremony¥

Opening Ceremony

Opening Remarks by U Tin Htut, Member of Nay Pyi Taw Council

Today's meeting is the stakeholder meeting for Yangon – Mandalay Railway Improvement Project Phase 2. The objective of the meeting is to implement the initial purpose of the Ministry of Transport and Communications and to initiate the policy of the country. In implementing the developments, the environmental and social considerations are essential. I request the attendees to give some advices for the project and ask questions for the project.

Opening Remarks by U Tin Htun, Chairperson of Nay Pyi Taw Council

Today's meeting is the stakeholder meeting for Yangon – Mandalay Railway Improvement Project Phase 2. In this project, social survey will be implemented to minimize the impacts of socioeconomic matters. This meeting is the public disclosure about the project.

Presentation of Project Planning by U Htun Aung Thin, General Manager, Lower Myanmar, Myanma Railways, Ministry of Transportation and Communication.

U Htun Aung Thin explained about the Yangon-Mandalay Railway Improvement Project (phase-2) as follows:
Today meeting is the preparatory survey for Yangon – Mandalay Railway Improvement Project Phase 2. This meeting includes Environmental Impact Assessment (scoping) and introduction of the project. The objective of this meeting are to raise stakeholders' awareness and understanding towards the project including its necessity and possible positive/negative impacts, to ensure stakeholders understand what kind of survey is planned to be

carried out under the environmental impact assessment (EIA) study and for what purposes and to collect and adequately reflect the views and concerns of the stakeholders to the EIA study. The objectives of this project are to rehabilitate and modernize railway infrastructure and relevant equipment and facilities, to achieve maximum train running speed of 100 km/h (62mph) for passenger trains, to achieve train operation time from Yangon to Mandalay of 8 hours or less and to provide safer, more reliable and more punctual train operation services.

Presentation of Project Planning with a video

Presentation on Environmental Impact Assessment by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd explained as follows.

The EIA process will be exposed twice to local people in compliance with the rules and regulations under the provision of Myanmar Government. The current state of the project is the scoping stage. Understanding positive and negative impacts, avoiding and minimizing negative impacts to the extent feasible, proceeding with the project in close communication with project-affected persons (PAPs) and other stakeholders are important. There are three project alternatives to consider before implementing the project: no project, new construction and rehabilitation. The alternatives are considered according to the social wellbeing, economy and ecology. Therefore, from a social, economic and ecological point of view, rehabilitation is considered the best project alternative. Initial impact assessments will be considered based on the geography, topography, hydrology, protected areas, ecosystem, land use, infrastructure, land acquisition, resettlement, local economy, employment opportunities, accidents, water quality, noise, vibration, air pollution, soil contamination, waste disposal, odor, protected areas, ecosystem, underground sediments, social institutions, cultural heritage, ethnic groups, poverty groups and so on.

Question and Answers by Attendees

(1) U Thet Khine (local people, Thawithti)

Question*: How will the residents along the railway line, also shops and restaurants at the related stations be resettled? How will the retired people from Myanma Railway who are now living in the railway area be resettled? How will the right of way be demarcated?*

Answer (U Htun Aung Thin, MR)

We will survey the residents along the railway line and will also describe the resettlement action plan. We will implement in balancing with the division, state and region by surveying. The shops and restaurants at the related stations are all one year contract and they will be resettled in other railway areas. The retired people from Myanma Railways who are now living in the railway area will be surveyed and resettled. The right of way will be demarcated 30 feet or 50 feet or 70 feet according to the region and the condition of the railway line.

(2) Daw Nam Cham Eain (Yun Long Company)

Question: *How do we propose to implement the project as a foreign company?*

Answer (U Htun Aung Thin)

The project will be implemented with the tender according to the railway line and railway mile. The information will also be announced in the newspaper. You can ask any question and information at the Nay Pyi Taw Office and Yangon Office.

(3) U Tun Linn (Railway staff, Pyinmana)

Question: *What will you provide the railway staffs in implementing the construction works?*

Answer (U Htun Aung Thin)

The responsible person from Myanma Railway will provide rain coats and footwear to the railway staffs during construction period.

(4) Tin Maung Oo (Railway Police Officer, Pyinmana)

Question: *Are there safety plans for the animals and the residents living along the railway line?*

Answer: (U Aye Thiha)

Myanma Railways and JICA are conscerned of safety. In some places, the notifications about the safety plans are already announced. The educational plans are also implementing at the level crossing areas and the stations.

(5) Daw Thae Nu Tun (Deputy Staff Officer, Environmental Conservation Department)

Question: *How about the plan of grievance mechanism? How do you expose the project activities and environmental procedures to public?*

Answer: (U Htun Aung Thin)

We will negotiate about the grievance mechanism according to the needs of the local people. The information will be exposed through the media.

Answer: (U Aye Thiha)

The project notification has already been announced at the stations along the Taungoo – Mandalay railway line. The executive summary will be announced from the related website and additional links.

(6) U Tar Naing (Reporter, Myeik Island Journal)

Question*: Is there a plan to construct crossover bridges at the level crossing?*

Answer: (U Htun Aung Thin)

No, there is no plan to construct crossover bridges at the level crossing. We will only upgrade this current state of railway line.

(7) U Myint Oo (Representative Person, Mandalay Regional Hluttaw)

Suggestion: *Please support the local people for safety living in crossing the railway line by constructing the underpass or crossover bridges. Please implement the project simultaneously as soon as the project commence.*

Answer: (U Htun Aung Thin)

Both technical works and Environmental Impact Assessment Procedures are now implementing. Although fences are constructing along the railway line, there are some problems in construction period because of the budgets. This railway improvement project will completely be implemented by 2023.

Closing Remarks by U Tin Htut, Chair member of Nay Pyi Taw Council.

U Tin Htut said:

I thank all of the attendees today SHM. I warmly welcome the attendees from the private companies. I also thank for your questions and suggestions.

Closing Ceremony

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Kyaw Zay Ya	Business Person	Pyinmana
2	U Myo Aung	Local	Pyinmana
3	U Hlaing Ko Ko Aung	Local	Pyinmana
4	U Sein Hlaing	Local	Pyinmana
5	U Aung Kyaing	Business Person	Pyinmana
6	U Kyaw Sein	Business Person	Pyinmana
7	U Phoe La Pyae	Business Person	Pyinmana
8	U Chit Aung	Business Person	Pyinmana
9	U Soe Lwin	Business Person	Pyinmana
10	U Chit Min Thu	Business Person	Pyinmana
11	U Nay Myo Oo	Business Person	Pyinmana
12	U Aung Htun Hla	Business Person	Pyinmana
13	U Than Tun Aung	Business Person	Pyinmana
14	U Myint Maung Maung	Business Person	Pyinmana
15	U Kyaw Tint	Business Person	Pyinmana
16	U Saw Aung	Business Person	Pyinmana
17	U Aye Ko	Local	Pyinmana
18	U Aung Myo Win	Local	Pyinmana
19	U Hla Myo Tun	Local	Pyinmana
20	U Naing Win	Local	Pyinmana
21	U Thet Swe Oo	Local	Pyinmana
22	U Aung Thu Naing	Local	Pyinmana
23	U Myo Aung	Administrator	Pyinmana
24	U Thet Khine	Administrator	Pyinmana
25	U Aung Naing Tun	Local	Pyinmana
26	U Aung Lwin	Administrator	Pyinmana
27	U Aye Ko	Hundred Household Head	Pyinmana

Government Officials

No.	Name	Position	Organization/Department
1	U Htun Aung Thin	General Manager	Myanma Railways
2	U Thaung Htike Win	Assistant General Manager	Myanma Railways
3	U Moe Kyaw	Assistant Manager	Myanma Railways
4	Daw Khine Zar Myint	Assistant Manager	Myanma Railways
5	U Myo Si Thu	Assistant Engineer	Myanma Railways
6	U Aung San Oo	Assistant Engineer	Myanma Railways
7	U Hlwan Thu	Assistant General Manager	Myanma Railways
8	U Soe Hein Aung	Chief Engineer	Myanma Railways
9	U Thant Zin Tun	Manager	Myanma Railways
10	U Kyaw Shwe	Chief Engineer	Myanma Railways
11	U Aung Naing	Assistant Director	General Administrative Department
12	U Tin Htut	Nay Pyi Taw Council Member	Nay Pyi Taw Council
13	U Tun Linn Aung	Assistant Director	General Administrative Department
14	U Tin Maung Oo	Police Officer	Railway Police
15	U Myint Thu	Assistant General Manager	Myanma Railways
16	U Myint Kyaw Thu	Central Supervisor	Planning Department
17	U Zaw Min Htwe	Station Master	Transportation Department
18	U San Htay	Station Master	Transportation Department
19	U Khin Maung Hla	Police Officer	Railway Police
20	U Aung Soe Linn	Lower Divisional Clerk	Transportation Department
21	U Myint Thein	Station Master	Pyinmana Station
22	U Khin Maung Aye	Officer	Pyinmana Station
23	Daw Thae Nu Tun	Staff Officer	ECD
24	U Khine Hein	Deputy Staff Officer	General Administrative Department
25	U Kaung Zaw Soe	Assistant Manager	Transportation Department
26	U Tin Tun	Central Supervisor	City Development Communities
27	U Aye Ko	Central Supervisor	City Development Communities
28	Daw Ni Lar Aung	Deputy Staff Officer	General Administrative Department
29	U Myint Oo	Administrator	General Administrative Department
30	U Aung Moe	Officer	Transportation Department
31	U Yin Soe	Manager	Myanma Railways
32	U Than Hla	Officer	Transportation Department
33	U Yan Aung Soe	Officer	Transportation Department
34	U Kyi Lwin Oo	Central Officer	City Development Communities
35	U Tin Tun	Member	Nay Pyi Taw Council
36	U Nay Win	Officer	Myanma Railways
37	U Ko Gyi	Officer	Myanma Railways

Private Company

No.	Name	Position	Organization/Department
1	U Yun	Staff	Yun Long Company
2	Daw Nann Kham Eain	MD	Yun Long Company
3	U Min Lwin Oo	Staff	Yun Long Company
4	U Wei Lung	Staff	Yun Long Company
5	U Ne Win Maung	Environmental Engineer	JICA Study Team

Media

No.	Name	Position	Organization/Department
1	U Tar Naing	Editor	Myeik Kyun Su News
2	U Kyaw Kyaw	Assistant Editor	Myeik Kyun Su News

Parliament Member

No.	Name	Position	Organization/Department
1	U Myint Soe	Pyi thu Hluttaw Parliament Member	Pyaw Bwe
2	U San Tun Kyaw	Regional Parliament Member	Leway

Photographs

Participants' Registration

Presentation by Myanma Railways

Presentation by EIA Consultant

Question and Answers with Attendees

Closing Remarks by U Tin Htut

Record of the Stakeholder Meeting (Taungoo)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/scoping stage)	**Date:** June 16, 2017
Venue: Taungoo Railway Station, Taungoo Township, Taungoo District, Bago Division	**Time:** 3:00 PM to5:00 PM
Attendees: Total: 68 (local people: 13; government officials: 41; private company: 6; media: 2; parliament members: 6) *male: 50; female: 18	

Agenda:

1) Opening Ceremony
2) Opening Remarks by U Kyi Zin, Vice President, Bago District Parliament
3) Presentation of Project Planning by U Htun Aung Thin, General Manager, Lower Myanmar, Myanma Railways, Ministry of Transportation and Communication
4) Presentation of Project Planning with a video
5) Presentation on Environmental and Social Considerations in Yangon-Mandalay Railway Improvement Project Phase (2) by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.
6) Question and Answer Session
7) Closing Remarks by U Kyi Zin, Vice President, Bago District Parliament
8) Closing Ceremony

Opening Ceremony

Opening Remarks by U Kyi Zin, Vice President, Bago District Parliament

Today's public consultation is to let the stakeholders know about the study environmental and social considerations, plan to minimize impacts of Yangon-Mandalay Railway Improvement Project (Phase 2).

Presentation of Project Planning by U Htun Aung Thin, General Manager, Lower Myanmar, Myanma Railways, Ministry of Transportation and Communication

There are two phases: Yangon – Taungoo (Phase 1) and Taungoo – Naypyidaw (Phase 2). This meeting is for the Yangon-Mandalay Railway Improvement Project (Phase 2). This meeting aims to describe the impacts and to get the advices from stakeholders and report to ECD. Myanma Railways had collaborated with ADB once. This time, they will collaborate with JICA. The objectives of this project is to deliver comfortable trips for the passengers, to achieve safer transportation system and to develop socio-economic conditions along Yangon to Mandalay by installing, repairing and upgrading of Yangon-Mandalay Railway Line's applied instruments and new railway cars. It will reduce total travel time from 6 hours to 3 hours 20 minutes for Yangon – Taungoo Phase. Myanma Railway has to repair and improve the deformed rails, damaged piers of bridges and antiqued facilities. Current rolling stock operating speed is approximately 50 km per hour. After the improvement project, it will double the current speed. It will reduce the half of travel time. Total numbers of daily passengers, speed which is included in time schedule, frequency of daily transportation, daily distance of passenger coaches, time gaps between two trains, allowed maximum speed will be improved and total time taken of passenger coaches for one circular operation will be reduced. We will repair rusting, low platforms, unsystematic building of brick poles, decomposing wooden sleepers. New signaling system will also be installed. We will install new automatic systems

for level crossing. Fnally, I request the attendees to give some advices for the project and ask questions for the project.

Presentation of Project Planning with a video

Presentation on Environmental and Social Considerations in Yangon-Mandalay Railway Improvement Project Phase (2) by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd explained as follows:

Potential impacts of the projects and mitigation measures. JICA and Myanmar Government chose E Guard Environmental Services Co., Ltd. to carry out EIA and we will serve as third party. The scoping report was submitted to MONREC (Ministry of Natural Resources and Environmental Conservation) on 2nd June 2016. Following the scoping report, the EIA report is being prepared. The key output in draft will be presented in today's SHM. We will monitor the noise and vibrations of the project. There are no trees to be removed and will be identified prior to construction. We will survey air quality, water quality, soil quality, noise level and biodiversity by using surveying instruments. There may also be some land acquisition. We will carry out together with Myanmar Police and Public Health Organizations.

Question and Answer Session

(1) Dr. Ni Ni Aung (Director, Environmental Conservation Department, Bago Region)

Question: *I would like suggest that all written in this report should be practical. And I am very welcome to this project.*

Answer (U Htun Aung Thin, General Manager (Lower Myanmar):

Yes. We will follow all the rules from ECD and are ready to explain for the weakness and needs. Bago Governmental Organization also helps to reach the news to people. We will further try to give satisfactory.

(2) U Aye Min Win (Representative Person, Taungoo District Hluttaw)

Question: *How would you do the land of local people which is crossed by the railway lines?*

Answer (U Htun Aung Thin, General Manager (Lower Myanmar), Myanma Railways, Ministry of Transports and Communication):

In our basic design, the land which is located along constructed area is relocated or paid back. We have to discuss with Government and senators to carry out to make them satisfied.

(3) U Aye Min Win (Representative Person, Taungoo District Hluttaw)

Question: *How do you do to let the people who live along the railway lines know about the advantages and disadvantages of people?*

Answer (U Aye Thiha)

As first stage, we stick project notifications at all the railway stations and publish until villages and small town. There are some difficulties to reach some places. But we published about the meetings from the newspapers like the New Light of Myanmar and The Mirror. Also invited to parliaments and Governmental departments.

(4) Dr. Kyaw Kyaw (Representative Person, Yedashe Township Hluttaw)

Question*: I would like to know the plan about the improvement of railway stations after railway lines.*

Answer (U Htun Aung Thin)

In improvement sectors, all the trains, rails, platforms and stations are included in this project.

(5) U Aung Than Tun (Township Administrator, Oaktwin Township)

Question: *To handle the problems from the local people, how do Myanma Railways' staffs could help with it? And there is no train is stopped at our town except two times and our people encounter a lot of troubles with rail transportation.*

Answer (U Htun Aung Thin):

We have public relation centers at every station. You can contact and talk on there. For another question, we also have problems to brake and accelerate the train. So, if there are a lot of people demands to travel with train, we will discuss and carry out as much as we can.

(6) Dr. Ni Ni Aung (Director, Environmental Conservation Department, Bago Region)

Question: *I would like to recommend you to invite the people living along railway lines. So, it will be follow this topic of meeting.*

Answer (U Aye Thiha):

Yes, we have already invited the people by announcing from newspaper and project notifications. As being project proponent, Myanma Railway also provided the invitation lists. But most of the people do not want to attend this kind of meeting until they are affected by impacts. We have experienced about that sometimes they did not come even when they are supported by transportation.

(7) U Tun Linn (Township administrator, Swa Township)

Question: *How will you manage the railway line which will not be used anymore near our town? It is splitting with aggregates and soils. That can bring accidents very often. There is no responsible person in that station. A market at that Swa Raiway station cause the rubbish and pollute the environment. Both Myanma Railways and City Development committee charge from that market but no one takes responsibility for cleansing the environment. So, I just want know who is exactly responsible for this?*

Answer (U Htun Aung Thin):

The railway line which is not used anymore will be removed permanently. You can inform with letter head to head of railway department or Ministry of Transport and Communications. There would be no responsible person for illegal gates but we can provide warning board on that place. You can also inform about Swa market to Manager of that region.

Closing Remarks by U Kyi Zin, Vice President, Bago District Parliament

Thank u all for your attending today and also for your suggestions and recommendations. Today ceremony is well accomplished and thanks again for all of your kind attentions.

Closing Ceremony

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Tin Moe Aye	Government staff	Taungoo
2	Daw Thin Nu Shan	Government staff	Taungoo
3	Daw San Win Maw	Ward Leader (*hundred household head leader*)	Taungoo
4	Daw Thae Moh Moh	Village Head	Taungoo
5	Daw Mya Thae Mon	Local	Taungoo
6	Ko Arkar Hein	Local	Taungoo
7	U Win Hlaing	Quarter Head	Taungoo
8	Daw Hnin Yi Oo	Administrator	Taungoo
9	Daw Chaw Chaw	Local	Taungoo
10	Daw Po Po Chaw	Local	Taungoo
11	Daw Thandar Soe	Local	Taungoo
12	Daw Hnin Yi Tun	Local	Taungoo
13	Ko Yan Naung Latt	Local	Taungoo

Government Officials

No.	Name	Position	Organization/Department
1	U Htun Aung Thin	General Manager	Myanma Railways
2	U Moe Kyaw	Assistant General Manager	Myanma Railways
3	Daw Khine Zar Myint	Assistant General Manager	Myanma Railways
4	U Thant Zin Tun	Manager	Myanma Railways
5	U Thaung Htike Win	Officer	Myanma Railways
6	U Yin Soe	Manager (Economy)	Myanma Railways
7	U Kyaw Shwe	Chief Engineer	Myanma Railways
8	Daw Moe Aye	Upper Divisional Clerk	Myanma Railways
9	Daw Win Win Khaing	Upper Divisional Clerk	Myanma Railways
10	Daw Baby	Upper Divisional Clerk	Myanma Railways
11	Daw Khine Khine Oo	Head Officer	Myanma Railways
12	U Kyaw Kyaw	Upper Divisional Clerk	Myanma Railways
13	U San Tun Aung	Headmaster	Education Department
14	U Chit Ko Ko	Police Officer	Myanmr Railways
15	U Maung Maung Tar	Police Officer	Myanma Railways
16	Daw Yamin Thidar	Police Officer	Myanma Railways
17	U Myo Nyi Nyi	Assistant Director (District)	General Administrative Department
18	U Myo Win	Assistant Officer	Transportation Department
19	U Khin Maung Myint	Deputy Staff Officer	Agriculture
20	U Kyaw Thein	Assistant Director	Myanma Railway
21	U Min Thu	Assistant General Manager	GAD (Yedashe)
22	U Myo Myint Aung	District Staff Officer	Meteorological Department (District)
23	U Kyaw Win Hla	Assistant Manager	Myanma Railway
24	U Saw Myo Aung	Assistant Director	Myanma Railway
25	U Thein Swe	Officer	Myanma Railway
26	U Nyunt Shwe	Officer	Myanma Railway
27	U Thiha Chit Swe	Officer	Myanma Railway
28	U Kyin Thein	Officer	Myanma Railway
29	U Aung Thein Tun	Township Administrator	General Administrative Department
30	U Htay Paing	Officer	Myanma Railway
31	U Myint Than	Officer	Myanma Railway
32	U Htet Lwin Oo	Clerk	Myanma Railway
33	U Sein Than	Clerk	Myanma Railway
34	U Lwan Thu	Officer	Myanma Railway
35	U Than Nyunt	Officer	Myanma Railway
36	U Hlaing Win Tun	Officer	Myanma Railway
37	U Tun Tun Lin	Township Administrator	General Administrative Department (Swa)
38	Dr. Ni Ni Aung	Director	Environmental Conservation Department
39	U Aung Yan Htet	Deputy Staff Officer	Environmental Conservation Department
40	U Than Tun	Officer	Myanma Railway
41	U Sun Win	Chief Engineer	Municipal

Parliament Members

No.	Name	Position	Organization/Department
1	U Kyi Tin	Representative person	Parliament
2	Dr. Kyaw Kyaw	Representative person	Parliament
3	U Aye Min Win	Representative person	Parliament
4	U Moe Ma Kha	Representative person	Parliament
5	U Htay Lwin	Representative person	Parliament
6	U Khin Maung Than	Representative person	Parliament

Private Company

No.	Name	Position	Organization/Department
1	Daw Thidar Cho	Director	Yoon Nadi Company
2	U Aung Kaung Zaw	Projector Director	UMBA Co., Ltd.
3	U Arkar Thant Zin	Director	Yoon Nadi Company
4	U Aung Kyaw Khant	Secretary	Khit Thit Myanmar Company
5	U Kyaw Kyaw Oo	Business man	
6	Daw Thin Thin Wai	Business man	

Media

No.	Name	Position	Organization/Department
1	U Zaw Htet	Reporter	IPRD
2	U Zay Yar Ko	Reporter	The Voice

Phtographs

Participant's Registration

Participant's Registration

Opening Remarks by U Kyi Zin (Bago District Parliament)

Presentation by U Htun Aung Thin (MR)

Presentation by EIA Consultant

Question and Answers by Attendees

Question and Answers by Attendees

Question and Answers by Attendees

MR Answering Questions

Closing Remarks by U Kyi Zin (Bago District Parliament)

Appendix 8.1(6) Material used at the Stakeholder Meetings (scoping stage)

<Introduction>

Preparatory Survey for Yangon-Mandalay Railway Improvement Project Phase II in the Republic of the Union of Myanmar

Environmental Impact Assessment (scoping)

-Introduction to the Project-

Japan International Cooperation Agency

Objective of Public Consultation (scoping stage)

In order to

- Raise stakeholders' awareness and understanding towards the project including its necessity and possible positive/negative impacts
- Ensure stakeholders understand what kind of survey is planned to be carried out under the environmental impact assessment (EIA) study and for what purposes
- Collect and adequately reflect the views and concerns of the stakeholders to the EIA study

Japan International Cooperation Agency

Background of Yangon-Mandalay Railway Line

- Large potential for economic and social development accrued from its connection between the two largest cities in Myanmar (i.e. YGN and MDY) via the capital (i.e. NPT)
- Deformed alignment of railway tracks and aging of the tracks and bridges making safe, comfortable and stable train operation difficult

Rehabilitation and modernization of the existing railway line is expected to raise living standards among the people and enable Myanmar to better exploit its potential for sustainable development

Japan International Cooperation Agency

Current State of Yangon-Mandalay Railway Line (1/4)

1. Roadbed

Deformed Roadbed
(Kyedaw Station – Taungoo Station)

2. Track

Unmaintained tracks

Japan International Cooperation Agency

Current State of Yangon-Mandalay Railway Line (2/4)

3. Bridge

Ngalike (Bridge No.393)

Piers with Cracks
(Bridge No.739)

Damaged Piers
(Swa Bridge)

Current State of Yangon-Mandalay Railway Line (3/4)

4. Level Crossing

Level Crossings damaged by Heavy Trucks

5. Track Maintenance

Workers removing Mud from Railway Tracks

Japan International Cooperation Agency

Current State of Yangon-Mandalay Railway Line (4/4)

6. Railway Crossing

Students (above) and People/Cattle (below) Crossing/Walking on Railway

Farmers and Animals Walking on Railway

Japan International Cooperation Agency

Objective of the Project

In order to

- rehabilitate and modernize railway infrastructure and relevant equipment and facilities
- achieve maximum train running speed of 100 km/h (62mph) for passenger trains
- achieve train operation time from Yangon to Mandalay of 8 hours or less
- provide safer, more reliable and more punctual train operation services

Japan International Cooperation Agency

Location

Project covers the section between Taungoo and Mandalay as the 2nd phase of the project

**Design has been completed for 1st phase (YGN-TGO) and construction is planned to commence in 2018*

<Outline of the Project (Phase II)>
- Distance: approx. 350 km
- Number of stations: 56
- Number of bridges: approx. 1,200
- Electrification: Non-electrified
- Number of lines: Double-track lines

Japan International Cooperation Agency

Project Components (1/2)

Items	Description
Roadbed Works	• Standard formation for embankment • Slope protection • Earthwork on bridge relocation • Procurement, supply and installation of sub-ballast
Bridge Works	• Rehabilitation of steel bridges • Rehabilitation of bridge substructures (abutments and piers) • Renewal of bridges
Track Works	• Procurement, supply and installation of new rail (50kg/m rail) in main line • Installation of rail (37.5kg/m rail) in side rail • Renewal of turnout • Installation of PC sleepers and fastening system • Installation of ballast • Procurement of track maintenance machines
Other Civil Works	• Panel and sub-grade for level crossings • Installation of distance posts etc.

Japan International Cooperation Agency

Project Description (2/2)

Items	Description
Station and Depot	• Repair of present platform roofs • Repair of signal/telecom huts • Development of new buildings for signal control cabin and related equipment as well as relay facilities in station areas
Signalling and Telecommunication	• Renewal of signalling system • Installation of Automatic Train Protection (ATP) • Renewal of telecommunication system • Installation of level crossing safety equipment
Rolling Stock	• Procurement of Diesel Electric Multiple Unit (DEMU)

Japan International Cooperation Agency

Schedule for Implementation

Tasks	2017	2018	2019	2020	2021	2022	2023	2024
Survey								
Detailed Design								
Tender								
Construction								

Japan International Cooperation Agency

Project Proponent and Contact Person

Project Proponent

Myanma Railways (MR) under the supervision of the Ministry of Transport and Communications (MOTC)

Contact Person

U Phyo Htet Kya (Assistant General Manager, International Relationship, MR)
Address: Naypyitaw Station Compound, Nay Pyi Taw, Myanmar
Tel: +95-6777164／Fax: +95-67-77164
Email: kozin6893@gmail.com

Japan International Cooperation Agency

Thank you for you kind attention

Japan International Cooperation Agency

Q & A

Japan International Cooperation Agency

<Environmental and Social Considerations>

Preparatory Survey for Yangon-Mandalay Railway Improvement Project Phase II
in the Republic of the Union of Myanmar

Environmental Impact Assessment (scoping)

Japan International Cooperation Agency

Introduction

Project will:

- Contribute largely to people's wellbeing in Myanmar as a whole
- Also entail some negative impacts (as in any development project)

Important to:

- Correctly understand the positive and negative impacts
- Avoid and minimize negative impacts to the extent feasible
- Proceed with the project in close communication with project-affected persons (PAPs) and other stakeholders

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EIA Process

Screening → Scoping → EIA Survey → Reporting → EIA report submission

- EIA
- IEE
- Non IEE/EIA

- identify and disclose likely environmental impacts and content of EIA survey
- receive confirmation, comments and info from SHs and reflect to EIA survey
- better identify SHs

Public consultation meetings will be held twice: before the EIA study (now) and before finalizing the EIA study at/near the following four places

- Taungoo
- Nay Pyi Taw
- Amarapura
- Thazi

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Environmental Type of Project (expected)

- The project area extends for a length of approximately 350 km
- While no notable adverse environmental, social or economic impact is expected to be generated by the project, in accordance with Annex 1 of the EIA Procedure (2015), the project is considered to be categorized as:

EIA Type Project

Categorization of Economic Activities for Assessment Purposes

No.	Type of Economic Activity	Criteria for IEE Type Economic Activities	Criteria for EIA Type Economic Activities
Infrastructure and Service Development			
123	Railways and Tramways (construction and maintenance of rail infrastructure and operation of rolling stock)	Length < 5 km	Length > 5 km

EIA Procedure - Annex 1

Japan International Cooperation Agency

Project Alternatives

	No Project	New Construction	Rehabilitation
Economy	2 •no construction cost yet large and growing maintenance cost •no additional contribution to economy	1 •significant cost for construction/compensation •significant contribution to economy	4 •moderate construction and maintenance cost •significant contribution to economy
Ecology	4 •no pollution, contamination and vegetation clearance •greater GHG emission in absence of modal shift	1 •significant vegetation clearance affecting wildlife and ecosystem •significant waste generation •less GHG emission due to modal shift to railway	3 •limited pollution, contamination, vegetation clearance and waste generation •less GHG emission due to modal shift
Social Wellbeing	2 •no resettlement or land acquisition •low satisfaction level with high opportunity cost	1 •significant resettlement and loss of assets •major change in lifestyle living near stations etc. •faster, safer and more comfortable railway	4 •resettlement and loss of assets (within ROW) •no land acquisition •faster, safer and more comfortable railway
Total	8	3	11

*1 (least preferable) - 5 (most preferable)

Initial Impact Evaluation (summary)

Environmental Items	PC	C	O	D	Environmental Items	PC	C	O	D
Air pollution	D	B-	B-	B-	Social institution	C	C	C	C
Water pollution	D	B-	D	B-	Social infrastructure	D	B+	D	B+
Soil pollution	D	B-	D	B-	Cultural heritage	D	C	C	C
Waste disposal	D	B-	D	B-	Landscape	D	D	D	D
Noise and vibration	D	B-	D	B-	Ethnic minorities	C	C	D	C
Ground subsidence	D	D	D	D	Misdistribution of benefit/ damage	D	D	D	D
Offensive odour	D	B-	D	D	Working condition	D	B-	D	D
Protected area	D	D	D	D	Water use/rights	D	C	D	C
Ecosystem	D	D	B-	B-	Poverty group	D	B+	C	B+
Hydrology	D	D	D	D	Sanitary condition	D	B	B+	B
Topography and geology	D	B-	D	D	Gender	D	C	C	D
Bottom sediment	D	D	D	D	Rights of children	D	C	C	D
Involuntary resettlement /land acquisition	B-	D	D	D	Transmitted diseases	D	B-	D	B-
Local economy	D	B+	B+	B+	Accidents	D	B-	B-	B-
Land use	D	B-	B-	B-	Transboundary impacts	D	B-	B+	B-

*PC: pre-construction; C: construction; O: operation; D: decommission stage
*A+/-: significant positive/negative impact; B+/-: some positive/negative impact; C+/-: extent of positive/negative impact is unknown; D: no impact

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Baseline Condition and Initial Impact Evaluation (1/3)

Items	Environmental Condition and Potential Impacts
Geography/ Topography	Elevation is below 250m. Geologically, mainly alluvium (flood sediment). No change is expected by the project since it is a rehabilitation project.
Hydrology	Railway runs across some rivers. Hydrology could be temporarily affected during construction at these rivers where bridges are rehabilitated. However, its impact is expected to be minor and manageable by adopting ordinary measures (e.g. development of temporary drainage canal (culvert)).
Protected Areas/ Ecosystem	Railway does not pass any natural/protected areas. Impact on wildlife will be confirmed during EIA survey.
Land Use/ Infrastructure	Agricultural land (e.g. rice field) spreads along the corridor except in urban areas. Temples and schools can be spotted in urban and sub-urban areas.
Land Acquisition/ Resettlement	It is a rehabilitation project and project-affected area has been set to be narrower than the ROW of MR. Therefore land acquisition is not expected. Further, alignment changes have been kept to the minimum to avoid resettlement. However, limited number of houses and structures may need to be relocated and some farmland affected. The extent of impact will be confirmed during EIA/ARAP survey.

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Baseline Condition and Initial Impact Assessment (3/3)

Items	Environmental Condition and Potential Impacts
Local Economy/ Job Opportunity	During construction, some people will likely be employed for construction. Also supplemental services such as trading, selling and buying, and repairing are expected to expand.
Traffic Accident/ Community Division	Higher speed and number of trains can induce traffic accidents. Inappropriate railway passing will aggravate this risk. The project will also make it difficult for local communities to cross the railway especially in areas where fences are set up for safety reasons.
Water Quality	During construction, turbid water may be discharged by civil works or loading/unloading of sand materials. Also limited amount of domestic wastewater could be generated by workers' activities.
Noise and Vibration	Noise and vibration level could temporarily increase during construction due to construction vehicles and equipment but a limited number of people live along the railway and its impact can be considered to be insignificant. In the operation phase, noise and vibration level could increase due to heightened frequency and speed of train operation.

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Terms of Reference of the EIA Survey (draft) (1/3)

Environmental Items	Methodology
Air pollution	(1) Site measurement: 4 points (2) Item: NO2, SO2, PM (PM10 and PM2.5) and Ozone, Micro climate (temperature, humidity, wind speed and direction etc. for reference) (3) Frequency: Once
Water pollution	(1) Site measurement: 3 points (2) Item: BOD, COD, oil & grease, pH, Total coliform, Total nitrogen, Total phosphorus and TSS (3) Frequency: Once
Soil pollution	Analysis based on secondary data collection, visual observation etc.
Waste disposal	Analysis based on secondary data collection, visual observation etc.
Noise	Analysis based on secondary data collection, visual observation etc.
Vibration	(1) Site measurement : 3 points (2) Item: LV10 (3) Frequency: Once
Ground subsidence	Analysis based on secondary data collection, visual observation etc.
Offensive odour	Analysis based on secondary data collection, visual observation etc.

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Terms of Reference of the EIA Survey (draft) (2/3)

Environmental Items	Methodology
Protected area	Analysis based on secondary data collection, visual observation etc.
Ecosystem	(1) Site survey (2) Item: fauna and flora, ecosystem, considerable species such as listed species on IUCN list (3) Frequency: Once
Hydrology	Analysis based on secondary data collection, visual observation etc.
Topography and geology	Analysis based on secondary data collection, visual observation etc.
Bottom sediment	Analysis based on secondary data collection, visual observation etc.
Involuntary resettlement /land acquisition	Interview survey and secondary data collection, visual observation etc.
Local economy	Interview survey and secondary data collection, visual observation etc.
Land use	Analysis based on secondary data collection, visual observation etc.

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Terms of Reference of the EIA Survey (draft) (3/3)

Environmental Items	Methodology
Social institution	Interview survey and secondary data collection, visual observation etc.
Social infrastructure	Interview survey and secondary data collection, visual observation etc.
Cultural heritage	Analysis based on secondary data collection, visual observation etc.
Landscape	Analysis based on secondary data collection, visual observation etc.
Ethnic minorities	Interview survey and secondary data collection, visual observation etc.
Misdistribution of benefit/damage	Interview survey and secondary data collection, visual observation etc.
Working condition	Analysis based on secondary data collection, visual observation etc.
Water use/rights	Interview survey and secondary data collection, visual observation etc.
Poverty group	Interview survey and secondary data collection, visual observation etc.
Sanitary condition	Analysis based on secondary data collection, visual observation etc.
Gender	Analysis based on secondary data collection, visual observation etc.
Rights of children	Analysis based on secondary data collection, visual observation etc.
Transmitted diseases	Analysis based on secondary data collection, visual observation etc.
Accidents	Collection of traffic accident data from police station
Transboundary impacts	Interview survey and secondary data collection, visual observation etc.

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Thank you for you kind attention

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Q & A

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Appendix 8.1(7) Record of the Stakeholder Meetings (draft EIA reporting stage)

Record of the Stakeholder Meeting (Thazi)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/draft final report stage)	**Date:** September 6, 2017
Venue: City Hall, Thazi Township, Meiktila District, Mandalay Division	**Time:** 9:00 AM to 11:00 AM
Attendees: Total: 62 (local people: 21; government officials: 36; parliament members: 3; media: 2) *male: 59; female: 3	

Agenda:

1) Opening Ceremony
2) Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
3) Presentation on Environmental Impact Assessment by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.
4) Question and Answers by Attendees
5) Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
6) Closing Ceremony

Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Myo Win said that he will explain briefly about the project as follows:

According to the order of Environmental Conservation Department, we are doing Environmental Impact Assessment for this project. Out of the total railway network mileage of 6114.65 kilometers, Yangon-Mandalay railway mileage is 620.65 kilometers which is mainly connected to commercial city of Myanmar: Yangon, Nay Pyi Taw and the cultural city, Mandalay. Moreover, there are 96 railway stations along the Yangon-Mandalay railway network and the total of 37 percentage of population from Yangon, Bago, Taungoo, Thazi and Mandalay has been using this railway line. The total coverage area of this project is 350 kilometers between Taungoo and Mandalay. The project duration is from 2017 to 2023. The main purpose of this project is to use the Japanese train technology (e.g. rail network, pairs, locomotives and the signal communication system); to upgrade the current deterioration in railway infrastructure and related equipment modification; to speed up the travel time of train to 100 kilometers per hour and to achieve safe access to destinations on time.

This project will include repair of railway lines, construction of railway stations, installation of modern signaling and communication systems and advanced navigation technology. Aside from this, modern new locomotives, improvement of logistics equipment and the automated ticketing machine, consultation and receiving opinions and suggestions from the citizen will also be included.

Presentation on Environmental Impact Assessment by U Aye Thiha, Managing Director, E Guard

Environmental Services Co., Ltd.

U Aye Thiha said that E Guard Environmental Services Co., Ltd. analyzed positive and negative impacts of the project on the natural and social environment in the project area.

We will proceed with this project according to related laws and regulations. With regards to this, the project affected persons and other stakeholders must have transparent communications. We also announced this stakeholder meeting in the newspaper.

We analyzed the environmental baseline conditions such as geography, topography, hydrology, protected areas, ecosystem, land use, infrastructure, land acquisition, resettlement, local economy, employment opportunities, accidents, water quality, noise, vibration, air pollution, soil pollution, waste disposal, odor, underground sediments, involuntary resettlement, social institutions, cultural heritage, ethnic groups, poverty groups, health conditions, gender, rights of children, trans-boundary impacts, infectious diseases and others.

The railway doesn't pass through any protected area. Therefore, it will not have a significant impact on vegetation and wild animals. During the construction stage, noise and vibration will increase temporarily due to the construction equipment and machinery. However, it will not have significant impact partly since the population living near the railway line is very few. The railway crosses some rivers. Therefore, the river water quality will be affected during replacement of the bridges. However, these effects are limited and can be solved by normal methods. Since this is a rehabilitation project, there is in general no land acquisition. However, some houses and buildings are to be resettled and some farmland affected. The topography will not change significantly due to the project since this project is just upgrading project.

Except in the urban area, agricultural land exists along the rail roadside. Pagodas and schools were found in town and cities but they will not be affected by the project. The results of the impact assessment were compared with the National Environmental Quality (Emission) Guidelines in Myanmar for impact assessment. A number of possible impacts have been evaluated in this project, which was divided into five stages of the project: pre-construction; construction; operation; decommissioning; and closure and post-closure. Impacts were classified to be either positive or negative, with a degree that ranges from A+/- (significant positive/negative impact is expected), B+/- (positive/negative impact is expected to some extent), C (extent of the impact is unknown at this stage) and D (no impact is expected).

Question and Answers by Attendees

(1) U Myint Thein (GAD Staff Officer, Thazi Township)
Question: *I want to know about compensation. The farmland near Pyawbwe to Payangar Zu railway line has been impounded in the past but the farmers didn't get any compensation for this. Can the farmers receive compensation or reuse the farmland?*

Answer (U Myo Win): *According to the policy, we return the farmland or land to the owner if we didn't use for proposed projects. However, we cannot give compensation. Since this section is not included in the subject project area or in the area of Upper Myanmar, you can ask about land compensation to U Htun Aung Thin, General Manager (Lower Myanmar Administration) for more details.*

(2) U Myint Htay (Advocate, Thazi Township)
Question: *I want to know when the project will start and it will end? What should we do to fix the current situation of railway because it's not safe and vibrate up and down for traveler?*

Answer (U Myo Win): *It will start in 2018 and has been expected to finish in 2023. Since the current railroad situation is worse and the condition of the frames is damaged, we will use modern locomotives and will upgrade the current deterioration railway infrastructure. All the damage will be repaired and modern forms will be considered to make it safe. The train's travel time will speed up to 100 kilometers per hour and safe and on-time access to the destination will be realized.*

(3) U Myint Thein (Parliament Member, NLD)
Question: *We really appreciate for this kind of transparent communications. We warmly welcome this kind of project and this kind of public hearings. Is there any plan to increase the train tickets circulation sales?*

Answer (U Myo Win): *We already have a plan to increase the train tickets circulation sales as long as the number of customers increases. We will use modern new locomotives and advanced navigation technology.*

(4) U Nay Win
Question: *in the last five years, many holes have been created along the railway of Thazi Township due to construction. So, is this issue considered in impact assessment?*

Answer (U Myo Win): *We already arranged to prevent creating such holes near the railway line. So, no need to worry about this issue.*

(5) U Ohwn Shwe
Question: *Since the high school is located near the railway, students always pass through it. Can we know the train pass-by time since it is dangerous for the student? We don't want to remove silk cotton tree, neem tree near Nyaung Yan railway station. How about Ngaleik dam and Samong creek? Is there any impact due to this project?*

Answer (U Myo Win): *JICA will use the new signaling system and has already taken into account safety for this project. Based on the finding of this project, there was no endangered or rare animal or plant species along the project area. Therefore, there will not be any significant impact due to this project.*

(6) U Henry
Question: *I want to request to consider the situation of schools existing near the railway since this is dangerous for the pass-by students near Nyaung Yan station.*

Answer (U Myo Win): *We will set up fences near the railway station. Therefore, it will be a little bit difficult for the pass-by passengers.*

Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

Local citizen should participate and ask questions in this meeting. This project could be considered beneficial to the people particularly in the transportation sector and hence should be supported by the local people for implementation.

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Soe Nyut Soe	Business person	Thazi
2	U Khin Maung Linn	Business person	Thazi
3	U Tun Tun	Business person	Thazi
4	U Nay Minn Thein	Business person	Thazi
5	U Win Hlaing	Business person	Thazi
6	U Win Maung Win	Ward Administrator	Thazi
7	Daw Sandi Aung Aung	Vendor	Thazi
8	U Hla Win	Business person	Thazi
9	U Henry	Teacher	Thazi
10	U Aung Aung	Local	Thazi
11	U Thant Zin	Local	Thazi
12	U Kyaw Zwar	Local	Thazi
13	U Ohn Shwe	Local	Thazi
14	Daw Hla Myaing	Vendor	Thazi
15	U Htain Linn	Local	Thazi
16	U Maung Maung Lin	Local	Thazi
17	U Soe Nyut Aung	Local	Thazi
18	U Soe Winn	Local	Thazi
19	U Soe Lwin	Local	Thazi
20	U Htain Min	Local	Thazi

Government Officials

No.	Name	Position	Organization/Department
1	U Myo Win	General Manager	Myanma Railways
2	U Tun Thein	Assistant Secretary	Myanma Railways
3	U Myint Aung	Staff	Myanma Railways
4	U Yan Naung Soe	Deputy Secretary	Myanma Railways
5	U Aung Minn Thu	Coachman	Myanma Railways
6	U Hla Tin	Coachman	Myanma Railways
7	U Myint Htway	Coachman	Myanma Railways
8	U Aung Naing Moe	Coachman	Myanma Railways
9	U Aik Lan	Ranger	Forest Department
10	U Min Naing	Police Commander	Myanmar Police Force
11	U Thein Htike	Staff	Myanma Railways
12	U Kyi Oo	Staff	Myanma Railways
13	U Win Zaw Moe	Central Supervisor	Myanma Railways
14	U Hla Ko	Deputy Central Supervisor	Myanma Railways
15	U Soe Tin	Station Master	Myanma Railways
16	U Thein Zaw	Staff	City Development Communities
17	U Minn Thein Soe	Police Commander	Myanmar Police Force
18	U Minn Minn Htet	Deputy Assistant Secretary	Myanma Railways
19	U Min Htway Hlaing	Deputy Assistant Secretary	Myanma Railways
20	U Than Soe Oo	Health Staff	Public Health Department
21	U Htin Linn	Township Administrator	General Administrative Department
22	U Myint Htay	Advocate	NLD
23	U Win Kyaw Oo	Police Commander	Myanmar Police Force
24	U Thant Zin Aung	Deputy leading Commander	Fire Station Department
25	U Aung Kyi	Deputy Battalion Commander	Fire Station Department
26	U Than Tin	Battalion Commander	Fire Station Department
27	U Win Lwin	Staff	Myanma Railways
28	Daw Khin San Maw	Deputy Township Administrator	General Administrative Department
29	U Nobal Aung	Clerk	General Administrative Department
30	U Ko Lat	Staff	Myanma Railways
31	U Aung Zaw Linn	Staff	Myanma Railways
32	U Soe Maung Maung Htay	Coachman	Myanma Railways
33	U Myo Lwin	Coachman	Myanma Railways
34	U Nyein Thu Aung	Coachman	Myanma Railways
35	U Yaung Win	Ward Administrator	General Administrative Department
36	U Kyaw Thiha	Assistant of the Parliament Member	NLD

Parliament Members

No.	Name	Position	Organization/Department
1	U Myint Thein	Parliament Member	NLD
2	U Myint Htay	Parliament Member	NLD
3	U Min Naing	Parliament Member	NLD

Media

No.	Name	Position	Organization/Department
1	U Maung Ko	Reporter	Myanmar Times
2	U Nay Win	Reporter	Unity

Photographs




Participants' Registration


Presentation on the Project (Introduction) by U Myo Win (Myanma Railways)

Presentation on Environmental Impact Assessment by U Aye Thiha (EIA Consultant)

Record of the Stakeholder Meeting (Myint Nge)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/draft final report stage)	**Date:** September 7, 2017
Venue: Zay Ta Wun Dhamma Hall, Myint Nge City, Amarapura Township, Mandalay District, Mandalay Division	**Time:** 9:00 AM to11:00 AM
Attendees: Total: 44 (local people: 17; government officials: 18; private company: 2; media: 7) *male: 41; female: 3	

Agenda:

1) Opening Ceremony
2) Opening Remarks and Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
3) Presentation of Environmental Impact Assessment by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.
4) Question and Answers by Attendees
5) Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
6) Closing Ceremony

Opening Ceremony

Opening Remarks and Presentation on the Project (Introduction) by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
Today is the Public Consultation and Disclosure Meeting about Environmental Impact Assessment for Yangon–Mandalay Railway Improvement Project (Phase-2). In implementing projects, it is essential to make public consultation and disclosure. This meeting is the second time in Myit Nge. The Yangon–Mandalay Railway Improvement Project (Phase-1) is from Yangon to Taungoo and Phase-2 is from Taungoo to Mandalay. The period of the project is from 2017 to 2023. The purpose of this project is to obtain the Japanese train technologies by implementing together with Japan, to rehabilitate current railway related buildings, to realize railway speed of 62 miles (i.e. 100 kilometers) per hour and to improve safety and to save time for passengers. The main components of the project are civil works, upgrading of signaling and telecommunication system, introduction of new rolling stocks, improvement of freight facilities, improvement of passenger service equipment, consulting services and public consultation and disclosure. In implementing the project, environmental and social considerations are essential. I request attendees to give advices for the project and ask questions for the project.

Presentation on Environmental Impact Assessment by U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd.

U Aye Thiha, Managing Director, E Guard Environmental Services Co., Ltd explained the Environmental Impact Assessment Procedure (2015) and environmental impact assessment (EIA) as follows:

Environmental Impact Assessment is required in every project in Myanmar. Correctly understanding the positive and negative impacts, avoiding and minimizing negative impacts to the extent feasible, proceeding

with the project in close communication with project-affected persons (PAPs) and other stakeholders are important. Environmental qualities such as air and water quality, noise and vibration, waste disposal and ecology have been surveyed in the project area in compliance with the National Environmental Quality (Emission) Guidelines in Myanmar. 44 tree species, 20 butterfly species, 12 dragon fly species and 16 bird species were identified in the project area. Initial evaluations of possible project impacts were conducted to predict what could happen to the social and natural environment as a result of the project. A number of possible impacts have been evaluated against the project, which was divided into five stages of the project: pre-construction; construction; operation; decommissioning; and closure and post-closure. Impacts were classified to be either positive or negative, with a degree that ranges from A+/- (significant positive/negative impact is expected), B+/- (positive/negative impact is expected to some extent), C (extent of the impact is unknown at this stage) and D (no impact is expected).

Initial impact assessments are considered based on the geography, topography, hydrology, protected areas, ecosystem, land use, infrastructure, land acquisition, resettlement, local economy, employment opportunities, accidents, water quality, noise, vibration, air pollution, soil pollution, waste disposal, odor, underground sediments, involuntary resettlement, social institutions, cultural heritage, ethnic groups, poverty groups, health conditions, gender, rights of children, trans-boundary impacts, infectious diseases and others.

Question and Answers by Attendees

(1) U Thaung Kyaw (Local people, Zalun Village, Myit Nge)

Question: *Are there safety plans for the railway line behind Myit Nge Workshop? I want to request to construct the gate at the level crossing of that railway line.*

Answer (U Myo Win, MR): *We will go to that railway line to know whether the gate can be constructed or not. If the gate can be constructed, we will consider the security of that gate. If the gate cannot be constructed, we will reply with the letter.*

Closing Remarks by U Myo Win, General Manager (Upper Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Myo Win said:

I thank all of the attendees who attended today's meeting. I warmly welcome the attendees who are parliament representatives, the staffs from government department, the reporters and local people from Myit Nge. I also thank for your questions and suggestions.

Closing Ceremony

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Than Htike Aung	Businessperson	Myit Nge
2	U Maung Maung	Administrator	Myit Nge
3	U Pauk Nyaunt	Ward Leader (*hundred household head leader*)	Myit Nge
4	U Thaung Kyaw	Village Head	Myit Nge
5	U Myo Myint	Local	Myit Nge
6	U Thaung Tin	Local	Myit Nge
7	U Cho Cho	Quarter Head	Myit Nge
8	U Tin Htun	Administrator	Myit Nge
9	U Tin Myint	Local	Myit Nge
10	U Han Thein	Local	Myit Nge
11	U Sat Cho	Local	Myit Nge
12	U Chit Kaung	Local	Myit Nge
13	U Khin Maung Nyunt	Local	Myit Nge
14	U Min Din	Local	Myit Nge
15	U Chit Ko	Businessperson	Myit Nge
16	U Chit Ko	Village Head	Myit Nge
17	Daw Khin Shwe Wah	Local	Myit Nge

Government Officials

No.	Name	Position	Organization/Department
1	U Aye Maung	Assistant General Manager	Myanama Railways
2	U Lwan Thu	Assistant General Manager (Civil)	Myanama Railways
3	Daw Kyi Kyi Moe	Clerk 1	GAD, Myit Nge
4	U Htay Lwin	Police Officer	Railway Police
5	U Myint Aung	Officer	Myanama Railways
6	U Tin Maung Than	General Manager	Myit Nge Workshop
7	U Myo Min Oo	Town Administrator	GAD, Myit Nge
8	U Soe Htut Aung	Upper Divisional Clerk	GAD, Myit Nge
9	U Han Htet Paing	Office-Boy	GAD, Myit Nge
10	U Kyi Naing	Police Officer	Police Office, Myit Nge
11	U Aung Myint Thein	Industry Head	Myit Nge Workshop
12	U Maung Maung Pyone	Chief Engineer	Myanma Railways
13	U Aung Aung Kyaw	Assistant Manager	Myanma Railways
14	U Swe Yin	Assistant General Manager	Myanmr Railways
15	U Saw Aung	Assistant Engineer	Myanma Railways
16	Dr. Tin Cho Cho Ko	Divisional Medical Officer	Myanma Railways
17	U Tin Maung Tun	Police Officer	Railway Police
18	U San Lwin	Corporal	Railway Police

Private Company

No.	Name	Position	Organization/Department
1	U Naing Naing Lin	Director	JL Group of Company
2	U Myo Thant	General Manager	JL Group of Company

Media

No.	Name	Position	Organization/Department
1	U Pyae Phyo Aung	Reporter	Yadanarpon Daily
2	U Kyaw Ko Ko	Reporter	Myanmar Times Daily
3	U Kyaw Myo Htut	Reporter	Myitmakha
4	U Sithu Linn	Reporter	7 Days News
5	U Nanda	Reporter	Madala Daily
6	U San Lwin Maung	Reporter	Madala Daily
7	U Khine Mye	Reporter	Democratic Voice of Burma

Photographs

Participants' Registration

Presentation by Myanma Railways

Presentation by EIA Consultant

Question and Answers with Local People

Closing Remarks by Myanma Railways

Media Interviewing Myanma Railways

Record of the Stakeholder Meeting (Pyinmana)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon-Mandalay Railway Improvement Project (Phase-2/draft final report stage)	**Date**: September 11, 2017
Venue: Mingalar Kan Taw Hall, Pyinmana Township, Nay Pyi Taw Council Region	**Time**: 9:00 AM to 11:00 AM
Attendees: Total: 35 (local people: 15; government officials: 16; parliament members: 4) *male: 33; female : 2	

Agenda:

1) Opening Ceremony
2) Opening Remarks by U Kyaw Tint, Pyithu Hluttaw Representative, Tetkone Constituency
3) Presentation on the Project (Introduction) by U Htun Aung Thin, General Manager (Lower Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
4) Presentation on Environmental Impact Assessment of the Project by U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd.
5) Question and Answers by Attendees
6) Closing Remarks by U Yi Mon, Pyithu Hluttaw Representative, Pobbathiri Constituency
7) Closing Ceremony

Opening Ceremony

Opening Remarks by U Kyaw Tint, Pyitthu Hluttaw Representative, Tetkone Constituency

U Kyaw Tint said:

Today's ceremony is to inform you of results of the socio-economic field visit along the Taungoo-Mandalay railway to the stakeholders. In addition, suggestions and recommendations will also be received from the participants based on the information presented. Before the Environmental Impact Assessment (EIA), public meeting for the scoping report was held in June in Pyinmana. With regards to EIA, holding public meetings is mandatory for large-scale projects. For national development, the transport sector development such as international rail transportation is in need. The project like Yangon-Mandalay Improvement Project will be undertaken in the country for its socio-economic development and the transport sector. Moreover, it can increase the employment opportunities of local people. Due to the large-scale project, there could be some damages to the environment. Therefore, government has published environmental laws and regulations in accordance with international standards in 2015 to conduct environmental impact consideration in government investment and ongoing businesses. That is why in this meeting, all those attending participants are requested to discuss and suggest to minimize environmental impact for this national development project.

Presentation on the Project (Introduction) by U Htun Aung Thin, General Manager (Lower Myanmar Administration) Myanma Railways, Ministry of Transport and Communications

U Htun Aung Thin explained about the Yangon-Mandalay Railway Improvement Project (phase-2) as follows:

There is about 220 miles from Taungoo to Mandalay which section is proposed to make improvement. This stakeholder meeting is held for three main reasons. To understand the positive impacts and negative impacts that can be generated from the proposed project. To understand ways to reduce the negative impacts and to understand the monitoring plan. And to receive suggestions on the final environmental impact assessment report. High standard of living and sustainable development can be achieved from renovation and modernization of the railway.

Nowadays, railway situation has become worse and the frames are damaged. We also found damaged bridges and the road where level crossing crashes lesions. To improve safety, all of the damages need to be repaired and replaced to modern forms. We plan to increase the speed of the train up to 100 kilometers per hour (i.e. 62 miles per hour). And we also expect the travel time of the train not to exceed 8 hours from Yangon to Mandalay. We will upgrade more secure, reliable and safe railway network.

There are 56 railway stations and about 1,200 bridges along the Taungoo and Mandalay railway route. As a content of this project, we will lay the foundation for enterprises. We will also replace damaged bridges and repair rail equipment. The railway sleeper and system will also be upgraded. Moreover, other construction-related projects such as the obstacles at the junction of road and railway and the renovation of railway stations will also be done. The new signaling system and the installation of automatic train protection systems are also included. The complete surveys were undertaken during 2017 and the detailed design will be drafted in 2018 and 2019. As a conclusion, the project is expected to finish in 2023.

Presentation on Environmental Impact Assessment of the Project by U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd.

U Tin Aung Moe explained about the impacts of the proposed project based on the results of environmental and social assessments as follows:

We will proceed with this project according to related laws and regulations. As a development project, it can either be beneficial to the local citizens or cause negative impacts. Therefore, it is important to understand all positive and negative impacts of the project. The impact must be reduced as much as possible or avoided. With regards to this, the project-affected persons and other stakeholders must have transparent communications. We also announced this stakeholder meeting in the newspaper.

We analyzed the environmental baseline conditions such as geography, topography, hydrology, protected areas, ecosystem, land use, infrastructure, land acquisition, resettlement, local economy, employment opportunities, accidents, water quality, noise and vibration levels, air pollution, soil pollution, waste disposal, odor, underground sediments, involuntary resettlement, social institutions, cultural heritage, ethnic groups, poverty groups, health conditions, gender, rights of children, trans-boundary impacts, infectious diseases and others. The results were compared with the National Environmental Quality (Emission) Guidelines in Myanmar for impact assessment. A number of possible impacts have been evaluated in this project, which was divided into five stages of the project: pre-construction; construction; operation; decommissioning; and closure and post-closure. Impacts were classified to be either positive or negative, with a degree that ranges from A+/- (significant positive/negative impact is expected), B+/- (positive/negative impact is expected to some extent), C (extent of the impact is unknown at this stage) and D (no impact is expected).

The railway doesn't pass through any protected area. Therefore, it will not have a significant impact on the vegetation and wild animals. During the construction stage, noise and vibration will increase temporarily due to the construction equipment. However, it will not have significant impact partly since the population

living near the railway line is very few. The railway crosses some rivers. Therefore, the river water quality will be affected during replacement of the bridges. However, these effects are limited and can be solved by normal methods. Since this is a rehabilitation project, there is in general no land acquisition. However, some houses and buildings are to be resettled and some farmland affected.

Question and Answers by Attendees

(1) U Than Soe Aung (Pyithu Hluttaw Representative Person, Pyinmana Constituency)

Question: *According to the Environmental Impact Assessment of the project, I'm glad there are little negative impacts on the environment and the public can be convenient. But nowadays, there are the places where the highway road and the railways crossed and there can be accidents. So as the railways improvement project, I want to know how will be convenient for the cars, motor cycles and the public people.*

Answer (U Htun Aung Thin, MR):

The design of this project is still ongoing but in the basic design, we consider it to be safe and secure for all the people.

(2) U Htin Aung Kyaw (Assistant Director, Environmental Conservation Department)

Question: *I think there can be mistakes because of making analysis of the environmental impact assessment before the basic design comes out. If the basic design changes, the impacts can change. So I want to know is there a solution for it? And also want to know is there the noise and vibration measurements at the railway stations?*

Answer (U Htun Aung Thin, MR):

The basic design is carried out at the same time as this field study including the EIA and it is almost done. I will also make sure to reduce the noise and vibration levels for the railways stations.

(3) U Aung Naing (Assistant Director, General Administrative Department, Ottarathiri District)

Question: *This project can affect to not only the natural environment but also social environment. I want to know about the compensation for land along the project area as the railway line passes through.*

Answer (U Tin Aung Moe, EIA Consultant):

According to the constitution of Myanmar laws, the Social Impact Assessment (SIA) involves the Environmental Impact Assessment (EIA). So we had been considered for the impacts on the socio-environment and not only the natural environment.

Answer (U Htun Aung Thin, MR):

According to the laws and regulations, Myanma Railways had already solved for all of the lands along the railways which is affected by this project.

Answer (U Bo Bo Han, local consultant of JICA Study Team):

As an improvement, there can be fewer effects on land situated near the railway line. The area where land is mainly affected is Myo Haung.

Closing Remarks by U Yi Mon, Pyithu Hluttaw Representative, Pobbathiri Constituency

U Yi Mon said:

Before implementing the project, the Environmental Impact Assessment should be performed. I am glad to know that it has been and for taking advices from the public and also thank you for explaining about the proposed project. I also welcome this project as this project can improve the local people and I will give helps for this project of my limits.

Closing Ceremony

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Aung Lwin	Administrator	0943016536
2	U Thaung Kyi	Ward Leader (*hundred household head leader*)	06722165
3	U Soe Naing	Ward Leader (*hundred household head leader*)	-
4	U Bo Bo Han	-	Yan Aung 2 quarter
5	U Ye Wint Aung	-	Yan Aung 2 quarter
6	U Htet Thu Soe	-	Yan Aung 2 quarter
7	U Yan Aung Swe	-	Yan Aung 2 quarter
8	U Thaung Naing	-	Yan Aung 2 quarter
9	U Kyaw Thein	-	Yan Aung 2 quarter
10	U Chit Aung	-	Yan Aung 2 quarter
11	U Myo Thant	-	Yan Aung 2 quarter
12	Daw Kyu Kyu Lwin	-	Yan Aung 2 quarter
13	U Kyaw Thura	-	Yan Aung 2 quarter
14	U Htwe Ko Ko	-	Yan Aung 2 quarter
15	U Ko Ko Gyi	-	Yan Aung 2 quarter

Government Officials

No.	Name	Position	Organization/Department
1	U Yin Soe	Manager	Myanma Railways
2	U Aung Naing	Assistant Director	GAD (Ottarathiri district)
3	U Thant Zin Tun	Divisional Traffic Manager (Div. 5)	Myanma Railways
4	U Kyaw Tint	Assistant Mechanical Engineer (Div. 5)	Myanma Railways
5	U Maung Maung Tar	Assistant Engineer	Myanma Railways
6	U Kyaw Zin Thet	Chief worker	Myanma Railways
7	U Soe Myint Aung	Divisional Engineer (Div. 5)	Myanma Railways
8	Daw Lay Seint Seint	Staff Officer	Planning Department
9	U Phyo Htet Kyaw	Assistant General Manager (Planning)	Myanma Railways
10	U Thaung Htike Win	Deputy General Manager	Myanma Railways
11	U Htin Aung Kyaw	Assistant Director	Environmental Conservation Department
12	U Myint Thein	-	Myanma Railways
13	U Than Hla	-	Myanma Railways
14	U Sein Maung Win	-	Myanma Railways
15	U Htun Aung Thin	General Manager	Myanma Railways (Lower Myanmar)
16	U Yan Aung Soe	-	Myanma Railways

Parliament Members

No.	Name	Occupation	Constituency
1	U Kyaw Tint	Pyithu Hluttaw Representative Person	Tetkone Constituency
2	U Yi Mon	Pyithu Hluttaw Representative Person	Pobbathiri Constituency
3	U Than Soe Aung	Pyithu Hluttaw Representative Person	Pyinmana Constituency
4	U Hlaing Min Htet	NLD	Pyinmana Constituency

Phtographs

Participants' Registration

Scene at the Stakeholder Meeting

Record of the Stakeholder Meeting (Taungoo)

E Guard Environmental Services Co., Ltd. **Meeting Minutes**	
Subject: Stakeholder Meeting for Yangon–Mandalay Railway Improvement Project (Phase-2/draft final report stage)	**Date:** September 12, 2017
Venue: Kay Tu Yadanar Hall, Taungoo Township, Taungoo District, Bago Division (East)	**Time:** 9:00 AM to11:00 AM
Attendees: Total: 70 (local people: 20; government officials: 49; parliament members: 1) *male: 43; female: 27	

Agenda:

1) Opening Ceremony
2) Opening Remarks by U Than Winn, Minister of Industry, Electricity and Transportation, Bago Region Government
3) Opening Remarks by Daw Cho Cho, Pyithu Hluttaw Representative, Oktwin Constituency
4) Presentation on the Project (Introduction) by U Htun Aung Thin, General Manager (Lower Myanmar Administration), Myanma Railways, Ministry of Transport and Communications
5) Presentation on Environmental Impact Assessment of the Project by U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd.
6) Question and Answers by Attendees
7) Closing Remarks by U Than Winn, Minister of Industry, Electricity and Transportation, Bago Region Government
8) Closing Ceremony

Opening Remarks by U Than Winn, Minister of Industry, Electricity and Transportation, Bago Region Government

U Than Winn said:

Today's event is to inform socio-economic field visit result along the Taungoo-Mandalay railway to the related stakeholders. In addition, suggestion and recommendation will also be received from the participants based on the information presented. In Taungoo, public meeting of Environmental Impact Assessment (EIA) on scoping report was held in June. With regards to an EIA, holding public meetings is mandatory for large-scale projects. For national development, transport sector development such as international rail transportation development is in need. The project like Yangon-Mandalay Improvement Project will be undertaken in the country for its socio-economic development and the transport sector. Moreover, it can increase the employment opportunities of local people. Due to the large-scale project, there could be some damages to the environment. Therefore, government has published environmental laws and regulations in accordance with international standards in 2015 to conduct environmental impact consideration in government investment and ongoing businesses. That is why at this meeting, all those attending participants are requested to discuss and suggest to minimize environmental impact of this national development project.

Opening Remarks by Daw Cho Cho, Pyithu Hluttaw Representative, Oktwin Constituency

Daw Cho Cho said:

Yangon-Mandalay railway upgrading project is running with the help of JICA. In the west Bago region, JICA gave loans to the farmers one hundred thousand kyats per acre to purchase agricultural machines. In eastern Bago region, farmers do not have access to such credit because of this railway improvement project. The project therefore needs to be beneficial to the farmers. Only then, it can improve the local transportation. In Oktwin Township, there has invaded railway area residents. Before starting project, the invaders should be removed systematically. If not resolved this issue, it can create problems as the minister said. As a conclusion, Yangon-Mandalay railway upgrading project with assistance from JICA needs to follow international good practices.

Presentation on the Project (Introduction) by U Htun Aung Thin, General Manager (Lower Myanmar Administration), Myanma Railways, Ministry of Transport and Communications

U Htun Aung Thin said that he will explain briefly about Yangon-Mandalay Railway Improvement Project (Phase-2) as follows:

The total mileage from Taungoo to Mandalay is approximately 220 miles and this whole area is subject to improvement under this project. There are three main purposes for this project: to understand all major positive and negative impacts of the project; to understand ways to reduce negative impact and monitoring programs; and to receive suggestions on the final environmental impact assessment report. High standard of living and sustainable development can be achieved from the renovation and modernization of the railway. Nowadays, railroad situation is bad and the frames are damaged. We also found damaged bridges and the road where the level crossing crashes lesions. All the damages will be repaired and modern forms considered to make train operation safer. To this end, railway structures and appropriate railway equipment will be modernized.

Travel speed will increase up to 100 kilometers per hour and safer and on-time access to the destination will be realized. We will upgrade more secure, reliable and safe railway network. There are 56 railway stations and 1,200 bridges along the Taungoo and Mandalay railway route. As a content of this project, we will lay the foundation for enterprises. We will also replace damaged bridges and repair of rail equipment. The railway sleeper and system will also be upgraded. Moreover, other construction-related projects such as the obstacles at the junction of road and railway and the renovation of railway stations will also be done. The new signaling system and the installation of automatic train protection systems are also included. The surveys have been undertaken in 2017 and the detailed design will be drafted in 2018 and 2019. As a conclusion, the project is expected to finish in 2023.

Presentation on Environmental Impact Assessment by U Tin Aung Moe, Director, E Guard Environmental Services Co., Ltd.

U Tin Aung Moe said that E Guard Environmental Services Co., Ltd. analyzed positive and negative impacts on the natural and social environment in the project area.

We will proceed with this project according to related laws and regulations. As a development project, it can either be beneficial to the local citizens or cause negative impacts. Therefore, it is important to understand all major positive and negative impacts of the project. The impact must be reduced as much as possible or have to be avoided. With regards to this, the project-affected persons and other stakeholders must have transparent communications. We also announced this stakeholder meeting in the newspaper.

We analyzed the environmental baseline conditions such as geography, topography, hydrology, protected areas, ecosystem, land use, infrastructure, land acquisition, resettlement, local economy, employment opportunities, accidents, water quality, noise, vibration, air pollution, soil pollution, waste disposal, odor, underground sediments, involuntary resettlement, social institutions, cultural heritage, ethnic groups, poverty groups, health conditions, gender, rights of children, trans-boundary impacts, infectious diseases and others. The results were compared with National Environmental Quality (Emission) Guidelines in Myanmar for impact assessment. A number of possible impacts have been evaluated in this project, which was divided into five stages of the project: pre-construction; construction; operation; decommissioning;

and closure and post-closure. Impacts were classified to be either positive or negative, with a degree that ranges from A+/- (significant positive/negative impact is expected), B+/- (positive/negative impact is expected to some extent), C (extent of the impact is unknown at this stage) and D (no impact is expected).

The railway does not pass through any protected area. Therefore, it will not have a significant impact on vegetation and wild animals. During the construction stage, noise and vibration will increase temporarily due to the construction equipment and machinery. However, it will not have significant impact partly since the population living near the railway line is very few. The railway crosses some rivers. Therefore, the river water quality will be affected during replacement of the bridges. However, these effects are limited and can be solved by normal methods. Since this is a rehabilitation project, there is in general no land acquisition. However, some houses and buildings are to be resettled and some farmland affected.

Question and Answers by Attendees

(1) U Nyi Tin (Oktwin Township)
Question: *Will the land that was situated on the back side of Taungoo railway station be affected?*

Answer (U Htun Aung Thin, MR): *Since this project is not the construction of new railway line and it is just the upgrading, it will not be affected.*

Closing Remarks by U Than Winn, Minister of Industry, Electricity and Transportation, Bago Region Government

Projects like this Yangon-Mandalay Railway Improvement Project can expect to increase the employment opportunities of the local people. That is why the citizen needs to participate in these kinds of national development projects and give feedback to minimize the environmental impact. We ask for local people to support us.

Attendance List

Local Community

No.	Name	Occupation	Address
1	U Than Lwin	Local People	Taungoo
2	U Htike Thu Zaw	Local People	Taungoo
3	U Than naing	Local People	Taungoo
4	U Phyo Naing Kyaw	Local People	Taungoo
5	U Soe Myint	Village Administrator	ZeeDaing
6	U Atar Oo	Local People	Taungoo
7	U Pyae Phyo	Local People	Taungoo
8	U That Zin Oo	Local People	Taungoo
9	U Zaw Zaw	Local People	Taungoo
10	U That Tin	Ward Administrator	Taungoo
11	U Than Minn	Local People	Taungoo
12	U Khun Paing Soe Tun	Local People	Taungoo
13	U Aung Lwin	Ward Administrator	Taungoo
14	U Hla Sein	Administrator	PoeNiSate
15	U Nyi Tin	Local People	Taungoo
16	U Aye Minn	Local People	Taungoo
17	U Tun Hla	Local People	Taungoo
18	U Hla Aye	Local People	Taungoo
19	Daw Thein Winn	Local People	Taungoo
20	U Htay Kyaw	Local People	Taungoo

Government Officials

No.	Name	Position	Organization/Department
1	U Than Win	Minister	Bago Region Government
2	U Thein Aung	Chief Engineer	Myanma Railways
3	U Aye Lwin	Value Expert	Myanma Railways
4	U Soe Win	Deputy Assistant Secretary	Myanma Railways
5	U Myat Thu	Deputy Assistant Secretary	Myanma Railways
6	U Thein Swe	Assistant Director	Myanma Railways
7	U Sein Pan	Senior Assistant Engineer	Taungoo Municipality
8	Daw Poe Poe Chaw	Staff	Myanma Railways
9	Daw Aye Aye Mar	Staff	Taungoo Municipality
10	Daw Khine New Win	Staff	Taungoo Municipality
11	Daw San Win Maw	Deputy Assistant Secretary	Taungoo Municipality
12	Daw Than Than Hla	Staff	Taungoo Municipality
13	Daw Win Win Kyi	Staff	Taungoo Municipality
14	U Kyaw Swe	Divisional Mechanical Engineer	Myanma Railways
15	U Thein Oo	Director	General Administration Department
16	U Ye Minn	Central Superviser	Myanma Railways
17	U San Aye	Deputy Staff officer	General Administration Department
18	U Soe Oo	Deputy Assistant Secretary	Myanma Railways
19	U Moe Aung	Staff	Myanma Railways
20	U Than Win	Staff	Myanma Railways
21	Daw Aye Aye Win	Senior Clerk	Myanma Railways
22	Daw Hnin Yee Oo	Staff	Taungoo Municipality
23	Daw Aye Aye Hlaing	Junior Clerk	Taungoo Municipality
24	Daw Mya Thae Mon	Staff	Taungoo Municipality
25	Daw Tin Mode Aye	Junior Clerk	Taungoo Municipality
26	Daw Thinn Nu Shan	Junior Clerk	Taungoo Municipality
27	U Myint Lwin	Forester	Forest Department
28	Daw Yee Yee Thinn	Officer	Myanma Railways
29	Daw Thae Moe Moe	Staff	Myanma Railways
30	Daw Chaw Chaw	Junior Clerk	Myanma Railways
31	Daw Aye Aye Thwe	Senior Clerk	Myanma Railways
32	Daw Mu Mu	Senior Clerk	Myanma Railways
33	Naw Mu Tu	Junior Clerk	Myanma Railways
34	Daw Zin Zin Win	Junior Clerk	Myanma Railways
35	Daw Aye Moe	Senior Clerk	Myanma Railways
36	U Kyaw Kyaw	Senior Clerk	Myanma Railways
37	U Aung Zaw Thu	Junior Clerk	Myanma Railways
38	Daw New Ni Oo	Deputy Central Supervisor	Myanma Railways
39	Daw Baby	Senior Clerk	Myanma Railways
40	Daw Win Win Khine	Senior Clerk	Myanma Railways
41	U Hun Aung Thin	General manager	Myanma Railways
42	U Thaung Htike Winn	Senior Clerk	Myanma Railways
43	U Soe Myint Aung	Divisional Engineer	Myanma Railways
44	U Yin Soe	Divisional Commercial Manager	Myanma Railways
45	U Thant Zin Oo	Divisional Traffic Manager	Myanma Railways
46	U Yan Naung Lat	Staff	Myanma Railways
47	U Kyaw Thein	Deputy Central Supervisor	Myanma Railways
48	Daw Khine Khine Oo	Clerk	Myanma Railways
49	Daw Wine Thinzar Aung	Senior Clerk	Myanma Railways

Parliament Members

No.	Name	Occupation	Constituency
1	Daw Cho Cho	Representative of Pyithu Hluttaw	Oktwin Constituency, NLD

Photographs




Participants' Registration


Opening Remarks by U Than Winn
(Minister of Industry, Electricity and Transportation, Bago Region Government)

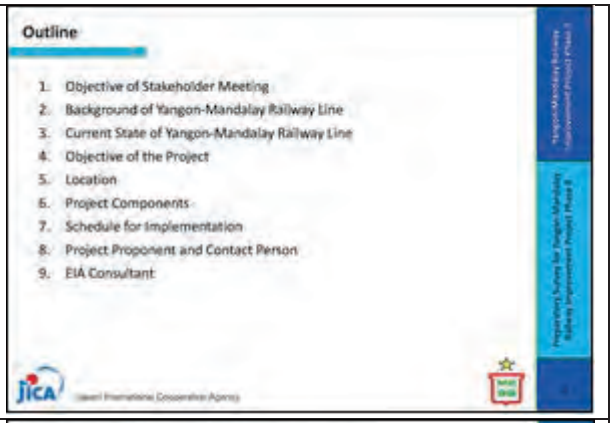

Opening Remarks by Daw Cho Cho
(Pyithu Hluttaw Representative, Oktwin Constituency)

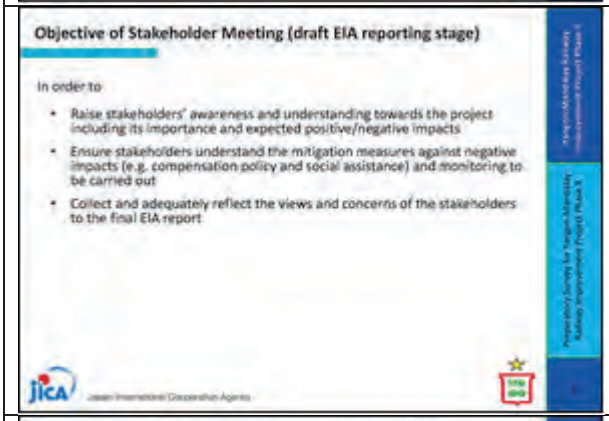
Presentation on Project (Introduction) by U Htun Aung Thin (Myanma Railways)

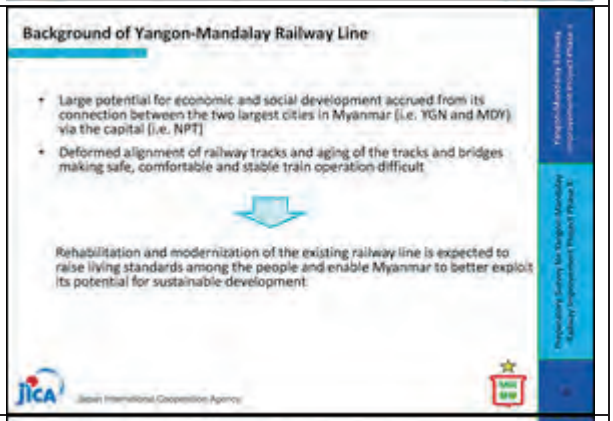
Presentation on Environmental Impact Assessment by U Tin Aung Moe
(EIA Consultant)

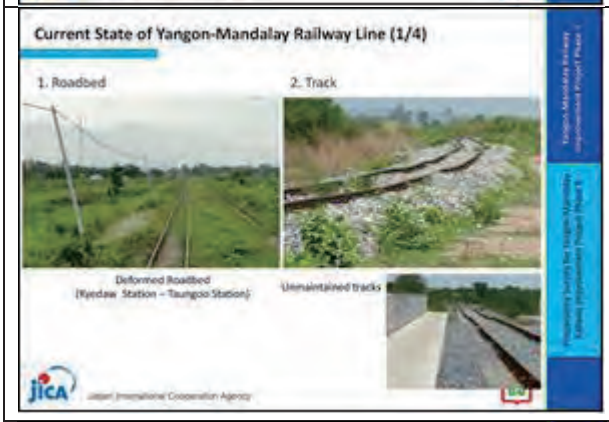
Appendix 8.1(8) Material used at the Stakeholder Meetings (draft EIA reporting stage)

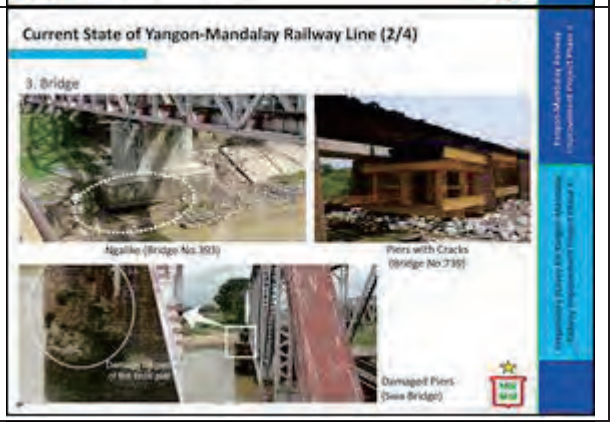
<Introduction>

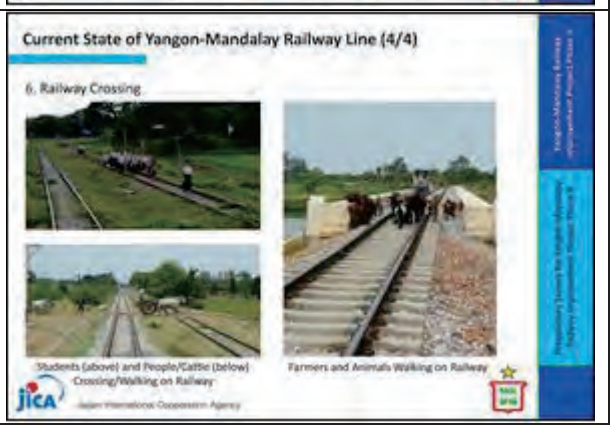












Objective of the Project

In order to

- rehabilitate and modernize railway infrastructure and relevant equipment and facilities
- achieve maximum train running speed of 100 km/h (62mph) for passenger trains
- achieve train operation time from Yangon to Mandalay of 8 hours or less
- provide safer, more reliable and more punctual train operation services

Location

Project covers the section between Taungoo and Mandalay as the 2nd phase of the project

**Design has been completed for 1st phase (YGN-TGO) and construction is planned to commence in 2018*

<Outline of the Project (Phase II)>
- Distance: approx. 350 km
- Number of stations: 56
- Number of bridges: approx. 1,200
- Electrification: Non-electrified
- Number of lines: Double-track lines

Project Components (1/2)

Items	Description
Roadbed Works	• Standard formation for embankment • Slope protection • Earthwork on bridge relocation • Procurement, supply and installation of sub-ballast
Bridge Works	• Rehabilitation of steel bridges • Rehabilitation of bridge substructures (abutments and piers) • Renewal of bridges
Track Works	• Procurement, supply and installation of new rail (50kg/m rail) in main line • Installation of rail (37.5kg/m rail) in side rail • Renewal of turnout • Installation of PC sleepers and fastening system • Placement of ballast • Procurement of track maintenance machines
Other Civil Works	• Panel and sub-grade for level crossings • Installation of distance posts etc.

Project Components (2/2)

Items	Description
Station and Depot	• Repair of present platform roofs • Repair of signal/telecom huts • Development of new buildings for signal control cabin and related equipment as well as relay facilities in station areas
Signalling and Telecommunication	• Renewal of signalling system • Installation of Automatic Train Protection (ATP) • Renewal of telecommunication system • Installation of level crossing safety equipment
Rolling Stock	• Procurement of Diesel Electric Multiple Unit (DEMU)

Schedule for Implementation

Tasks	2017	2018	2019	2020	2021	2022	2023	2024
Survey								
Detailed Design								
Tender								
Construction								

Project Proponent and Contact Person

Project Proponent

Myanma Railways (MR) under the supervision of the Ministry of Transport and Communications (MOTC)

Contact Person

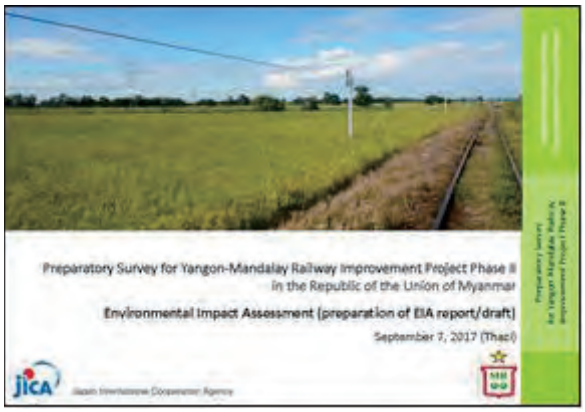
U Phyo Htet Kyaw (Assistant General Manager, International Relationship, MR)
Address: Naypyitaw Station Compound, Nay Pyi Taw, Myanmar
Tel: +95-6777164 / Fax: +95-67-77164
Email: [redacted]

EIA Consultant

The EIA study has been carried out by **E Guard Environmental Services Company Limited** under the supervision of the Japan International Cooperation Agency (JICA) Study Team on approval of the Ministry of Natural Resources and Environmental Conservation (MONREC)

Thank you for you kind attention

<Environmental and Social Considerations>



Preparatory Survey for Yangon-Mandalay Railway Improvement Project Phase II in the Republic of the Union of Myanmar

Environmental Impact Assessment (preparation of EIA report/draft)

September 7, 2017 (Thazi)

Outline

1. Introduction
2. EIA Process
3. Environmental Type of Project
4. Baseline Condition and Initial Impact Assessment
5. Project Alternatives
6. TOR of the EIA Survey
7. Social Characteristics of the PAPs
8. Economic Characteristics of the PAPs
9. Results of Environmental Survey
10. Impact Evaluation
11. Mitigation Measures and Monitoring Plan

Introduction

Project will:

- Contribute largely to people's wellbeing in Myanmar as a whole
- Also entail some negative impacts (as in any development project)

Important to:

- Correctly understand the positive and negative impacts
- Avoid and minimize negative impacts to the extent feasible
- Proceed with the project in close communication with project-affected persons (PAPs) and other stakeholders

EIA Process

Screening → Scoping → EIA Survey → Reporting → EIA Report Submission

- EIA
- IEE
- Non IEE/EIA

- identify and disclose likely environmental impacts and content of EIA survey
- receive confirmation, comments and info from SHs and reflect to EIA survey
- better identify SHs

Stakeholder meetings are held twice: before the EIA study (i.e. June, 2017) and before finalizing the EIA study in the following four places

- Taungoo
- Nay Pyi Taw
- Amarapura
- Thazi

Environmental Type of Project

- The project area extends for a length of approximately 350 km
- While no notable adverse environmental, social or economic impact is expected to be generated by the project, in accordance with Annex 1 of the EIA Procedure (2015), the project is considered to be categorized as:

EIA Type Project

Categorization of Economic Activities for Assessment Purposes

No.	Type of Economic Activity	Criteria for I/T Type Economic Activities	Criteria for E.A Type Economic Activities
Infrastructure and Service Development			
1.2.1	Railways and Tramways (construction and maintenance of rail infrastructure and operation of rolling stock)	Length < 5 km	Length ≥ 5 km

EIA Procedure – Annex 1

Baseline Condition and Initial Impact Assessment (1/2)

Items	Environmental Condition and Potential Impacts
Geography / Topography	Elevation is below 250m. Geologically, the area consists of 5 types of soil (i.e. alluvial soil, meadow soil, meadow alluvial soil, yellow brown dry forest and indaing, and dark compact soil) No change is expected by the project since it is a rehabilitation project.
Hydrology	Railway runs across some rivers (e.g. Zawgyi River and Dokhtawaddy/Myingyan River). Hydrology could be temporarily affected during construction at these rivers where bridges are replaced. However, its impact on hydrology is expected to be minor, as it is not a new construction.
Protected Areas / Ecosystem	Railway does not pass any natural/protected areas.
Land Use / Infrastructure	Agricultural land (e.g. rice field) spreads along the corridor except in urban areas. Monasteries, pagodas and schools can be spotted in suburban and sub-urban areas.
Land Acquisition / Resettlement	Project affected area is generally confined to the ROW of NR. Land acquisition and alignment changes have been kept to minimum level to reduce negative impacts and avoid resettlement. However, limited number of houses and structures may need to be relocated and some farmland affected.

Baseline Condition and Initial Impact Assessment (2/2)

Items	Environmental Condition and Potential Impacts
Local Economy / Job Opportunity	During construction, people are expected to be employed for construction. Also supplemental services such as trading, selling and buying, and repairing are expected to expand.
Traffic Accidents / Community Division	Higher speed and number of trains can induce traffic accidents. Inappropriate railway passing will aggravate the risk. The project will also make it difficult for local communities to cross the railway especially in areas where fences are set up for safety reasons.
Water Quality	During construction, turbid water may be discharged by civil works or loading/unloading of sand materials. Also limited amount of domestic wastewater could be generated by workers' activities. During operation, waste water from depot may contaminate the river stream.
Noise and Vibration	Noise and vibration level could temporary increase during construction due to construction vehicles and equipment. In the operation phase, noise and vibration level could increase due to heightened frequency and speed of train operation.

Project Alternatives

	No Project	New Construction	Rehabilitation
Economy	2 •no construction cost yet large and growing maintenance cost •no additional contribution to economy	1 •significant cost for constructor/compensation •significant contribution to economy	4 •moderate construction and maintenance cost •significant contribution to economy
Ecology	4 •no pollution, contamination and vegetation clearance •greater GHG emission in absence of modal shift	1 •significant vegetation clearance affecting wildlife and ecosystem •significant waste generation •less GHG emission due to modal shift to railway	3 •limited pollution, contamination, vegetation clearance and waste generation •less GHG emission due to modal shift
Social Wellbeing	2 •no resettlement or land acquisition •low satisfaction level with high opportunity cost	1 •significant resettlement and loss of assets •major change in lifestyle living near stations etc. •faster, safer and more comfortable railway	3 •resettlement and loss of assets (within ROW) •no land acquisition •faster, safer and more comfortable railway
Total	8	3	11

*1 (least preferable) - 5 (most preferable)

TOR of the EIA Survey (site survey and measurements)

Env. Items	Methodology
Involuntary Resettlement/ Land Acquisition	(1) Site survey: where land and assets are to be affected (2) Item: affected people, land and assets (3) Frequency: Once
Air Pollution	(1) Site measurement: 3 points (2) Item: NO2, SO2, PM10 and PM2.5, ozone, micro climate (3) Frequency: Once
Water Pollution	(1) Site measurement: 4 points (2) Item: BOD, COD, oil & grease, pH, total coliform, nitrogen, phosphorous and TSS (3) Frequency: Once
Noise and Vibration	(1) Site measurement: 3 points (2) Item: LAeq (noise), LV10 (vibration) (3) Frequency: Once
Ecosystem	(1) Site survey: 6 points (2) Item: fauna and flora, ecosystem, species listed on IUCN red list (3) Frequency: Once

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Social Characteristics of the PAPs

Age				Gender		Number of Project-affected Household (Number of PAPs)
[illegible]	[illegible]	18-60	60+	Male	Female	
8	38	51	8	54	65	24 (120)

*Age of two PAPs could not be identified

Religion	Number
Buddhism	23
Hinduism	1
(Total	24)

Educational Level	Number
Monastery Education	5
Primary School	2
Middle School	10
High School	4
Unidentified	2
(Total	24)

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Economic Characteristics of the PAPs

Occupation	Number
Stall Owner	5
Casual Labor	5
Farmer	2
Skilled Labor	2
Shop Owner	1
Company Staff	1
Vendor	1
Livestock Owner	1
MR Staff	1
Others	3
Unidentified	2
(Total	24)

Annual Household Income (MMK)	Annual Household Expenditure (MMK)
2,401,000	1,868,000

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Results of Environmental Survey (air quality)

Parameter	Location			WHO GL Values	Unit	Averaging Period
	A-1	A-2	A-3			
PM 10	[illegible]	[illegible]	21.24	50.00	µg/m3	24hr
PM 2.5	[illegible]	17.83	[illegible]	25.00	µg/m3	24hr
NO2	[illegible]	[illegible]	134.12	200.00	µg/m3	1hr
SO2	**48.93**	[illegible]	13.52	20.00	µg/m3	24hr

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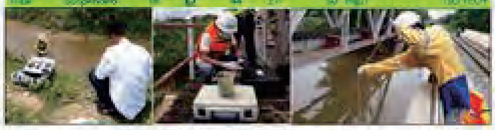
Results of Environmental Survey (water quality)

Parameter	Location				WHO GL Values	Unit	Range of Laboratory
	W-1	W-2	W-3	W-4			
BOD	8	22	10	8	50	mg/l	ISO TECH
COD	[illegible]	64	32	[illegible]	125	mg/l	ISO TECH
Oil & Grease	[illegible]	<5	<5	<5	10	mg/l	SGS
pH	7.6	7.7	7.8	7.9	6-9	Standard Unit	ISO TECH
Total Coliform	12	22	16	10	400	100ml	ISO TECH
Total Nitrogen	[illegible]	[illegible]	<5	<1	10	mg/l	SGS
Total Phosphorus	0.019	0.012	<0.05	<0.01	2	mg/l	SGS
Total Suspended	16	**62**	44	27	50	mg/l	ISO TECH



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Results of Environmental Survey (noise level)

Location	Period	L_{Aeq} (dB)	WHO Guideline Values (dB)
A-1	Daytime (7:00-22:00)	**59.7**	55
	Nighttime (22:00-7:00)	**55.5**	45
A-2	Daytime (7:00-22:00)	45.1	55
	Nighttime (22:00-7:00)	**53.7**	45
A-3	Daytime (7:00-22:00)	54.5	55
	Nighttime (22:00-7:00)	**60.7**	45

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Results of Environmental Survey (vibration level)

Location	Average Vibration Level			Guideline Values (Japan)*	
	X-axis	Y-axis	Z-axis	Day Time	Night Time
A-1	30.1	32.4	32.4	65 dB	60 dB
A-2	30.8	31.0	34.1		
A-3	26.6	31.0	33.6		

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Results of Environmental Survey (ecosystem)

No.	Genus	Species	Common Name	Family Name	IUCN Status	Habit
1	Acacia	lakeiha	Sha	Fabaceae	NE	T
2	Acacia	leucophloea	Tanaung	Fabaceae	NE	T
3	Acalypha	indica	Kyaung-yo-the	Euphorbiaceae	NE	S
⋮						
63	Typha	angustifolia	Shal-thaw-kon	Typhaceae	NE	Aquatic
64	Ziziphus	jujuba	Zi	Rhamnaceae	NE	ST

No species has been found t be on the IUCN Red List

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Impact Evaluation (summary)

Environmental impact is considered to be insignificant, in general because:

- project-affected area is confined to the right of way (ROW) of MR
- involuntary resettlement has been minimized
- no animal, plant or ecosystem that requires special care has been identified

Environmental Items	PC	C	O	De	Environmental Items	PC	C	O	De
Air Pollution	C-	B-	B+/-	B-	Local Economy	D	B+	B+	B+
Water Pollution	C-	B-	B-	B-	Ethnic Minority	D	B-	B-	D
Soil Contamination	C-	B-	B-	B-	Land Use	D	B+	B+	D
Waste Disposal	C-	B-	B-	B-	Water Usage	D	B-	B-	D
Noise and Vibration	C-	B-	B-	B-	Existing Social Infrastructure	D	B+	B+	D
Ground Subsidence	D	B	D	D	Social Institution	D	D	B-	D
Offensive odours	D	B-	D	D	Misdistribution of Benefit	D	D	D	D
Sediment Quality	D	D	D	D	Local Conflict of Interests	D	D	D	D
Protected Areas	D	D	D	D	Cultural Heritage	D	D	D	D
Ecosystem	D	B-	D	D	Landscape	D	D	B-	D
Hydrology	D	B-	D	D	Gender	D	D	B+	D
Topography and Geology	D	B-	D	D	Rights of Children	D	D	B+	D
Cross-boundary Impacts	D	B-	B+/-	B-	Infectious Diseases	D	B-	D	B-
Involuntary Resettlement	B-	D	B-	D	Labour Environment	D	B-	D	D
Poverty	B-	B+	B+	B+	Accidents	D	B-	B-/B+	B-

*PC: pre-construction; C: construction; O: operation; De: decommission stage
*A+/-: significant positive/negative impact; B+/-: some positive/negative impact;
C+/-: extent of positive/negative impact is unknown; D: no impact

Mitigation Measures and Monitoring Plan (1/5)

Impacts	Major Mitigation Measures	Methods of Monitoring
Air Pollution	Construction materials (e.g. sand) shall be covered to reduce the release of dust Water should be frequently sprayed on the ground at construction site and near residential areas Railway equipment and devices should be regularly checked and maintained well	Same as baseline survey (Biannually)
Water Pollution	Turbid waste water from construction sites shall be disposed at designated sites after treated at sedimentation ponds and wastewater treatment plant Toilet waste water from depot should be treated properly using sedimentation ponds and wastewater treatment tanks	Same as baseline survey (Biannually (*once during dry season and once during rainy season))
Soil Contamination	All waste including oil and grease shall be stored and disposed in designated sites in a way that minimizes the risk of soil contamination	• Confirmation of voices and complaints • Visual observation (Quarterly and when complaints are heard in this regard)

Mitigation Measures and Monitoring Plan (2/5)

Impacts	Mitigation Measures	Methods of Monitoring
Waste Disposal	Waste generated from construction should be disposed only after considering reducing, reusing and recycling them. Night soil shall be collected and treated properly using wastewater treatment tanks	• Confirmation of waste generated • Confirmation of voices and complaints • Visual observation (Quarterly and when complaints are heard in this regard)
Noise and Vibration	Construction works during night and early time should be avoided as much as possible if there are sensitive receptors nearby. Content and schedule of the construction shall be made public to the surrounding communities in advance. Train speed shall be controlled when passing by residential area located adjacent to the railway track	Same as baseline survey (Biannually)

Mitigation Measures and Monitoring Plan (3/5)

Impacts	Mitigation Measures	Methods of Monitoring
Offensive Odors	Mitigation measures will be considered depending on the source of odor	• Confirmation of voices and complaints • Visual observation (monthly and when complaints are heard in this regard)
Ecosystem	Tree cutting and natural vegetation clearance shall be minimized. Sedimentation ponds shall be used to avoid waste water from flowing directly into the aquatic ecosystem	Visual observation of the volume of trees cut and other natural vegetation cleared (Whenever works that involve vegetation clearance take place)
Topography and Geology	Cutting and filling shall be kept to minimum level	Visual observation of the extent and necessity of cutting and filling (Whenever works that involve cutting and filling take place)
Cross-boundary Impacts and Climate Change	Generators and other equipment that generate gases must be turned off when not in use. Rolling stocks should be maintained well and regularly checked in order to reduce GHG emission	Same as "Air Pollution"

Mitigation Measures and Monitoring Plan (4/5)

Impacts	Mitigation Measures	Methods of Monitoring
Involuntary Resettlement	Consultation meetings shall be held for those people subject to involuntary resettlement to understand their status, concerns and needs and to relieve their stress. Appropriate compensation and social assistance shall be provided to PAPs in accordance with the ARAP.	• Consultation meeting and/or other means of communication with the PAPs • Confirmation of records of payment • Site observation (Quarterly and when complaints are heard in this regard)
Poverty	Grievance redress mechanism shall be established in order to respond to any impact on poverty.	Same as "involuntary resettlement"
Existing Social Infrastructure and Services	Contents and schedule of construction work shall be made public prior to construction. Education shall be provided to construction workers and drivers on traffic safety. Watchmen should be designated at crossings. Staff in charge of public communication and complaints should be designated.	• Confirmation of voices and complaints • Visual observation (Quarterly and when complaints are heard in this regard)

Mitigation Measures and Monitoring Plan (4/5)

Impacts	Mitigation Measures	Methods of Monitoring
Infectious Diseases	In order to prevent spreading of infectious diseases such as HIV/AIDS, awareness training shall be provided to workers.	• Confirmation of health check list of workers (and preferably of local community) • Confirmation of voices and complaints (Monthly and when complaints are heard in this regard)
Accidents	Trainings shall be provided and adequate notice put up for workers and local residents to prevent accidents. Cases and causes of accidents shall be record and analyzed. Fences shall be installed along the railway track (e.g. in stations, near level crossings, and in urban areas) and villages.	Confirmation of records of accidents (Monthly)

Thank you for you kind attention

Q & A