The Republic of the Union of Myanmar
Ministry of Construction
Department of Highways

Construction Project Management in DOH, MOC

Course - Construction Project Management

Prof. Chunho Yeom

Presenter
Soe Hlaing Tun
Assistant Director (Civil)
DOH, MOC
MIPD3, ISUS, UoS

13th October 2020

Outline

- Component of Construction Management
- Construction Management System

I. Planning and Design
   - A. Feasibility Study (FS)
   - B. Detail Design (DD)

II. Procurement of Contractor

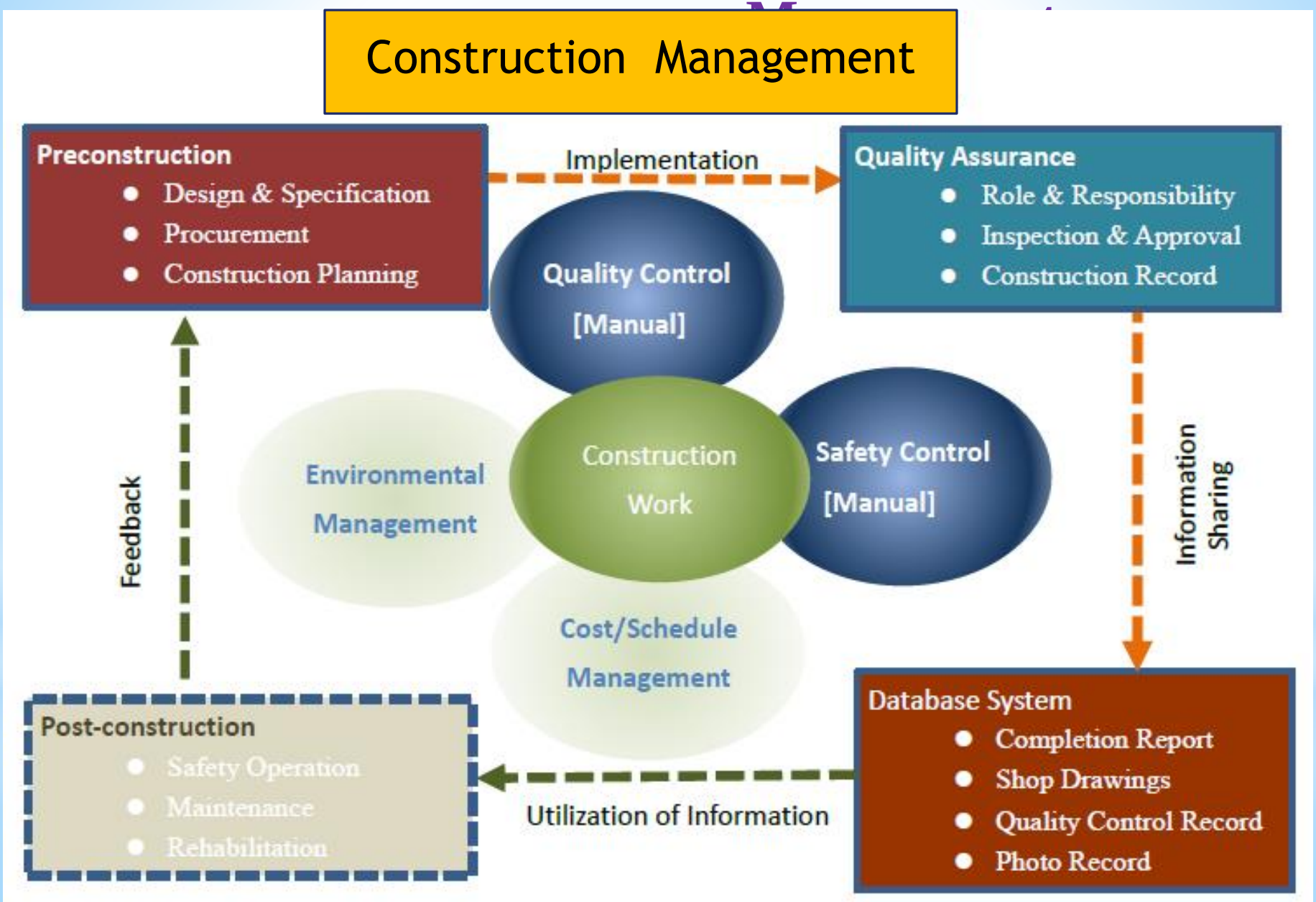
III. Construction Supervision
   - A. Construction Management
   - B. Quality Assurance
   - C. Inspection

IV. Completion and Taking Over

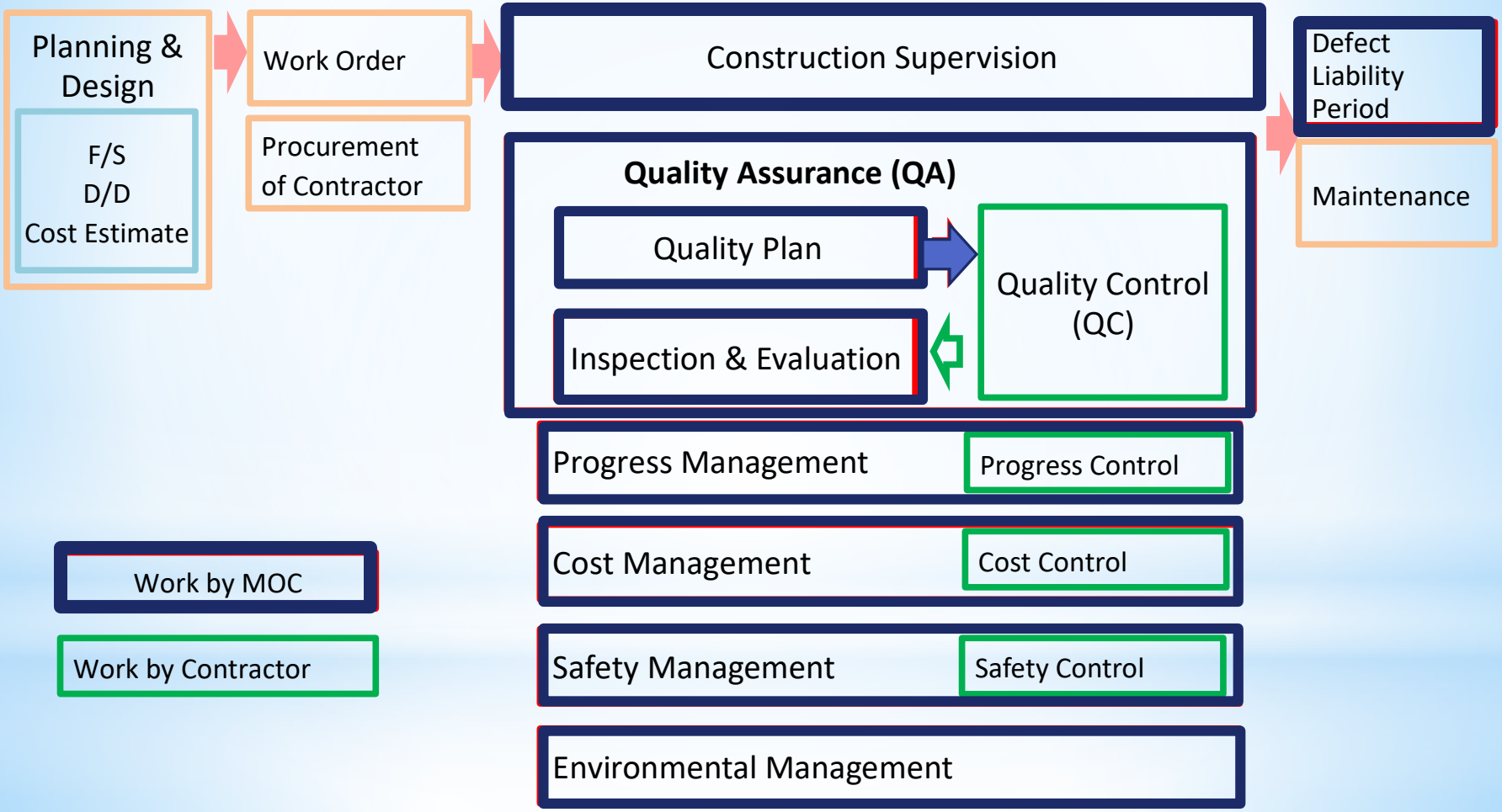
V. On going Project (MOC & NEDA)

Source : CONSTRUCTION MANAGEMENT GUIDELINE FOR ROAD & BRIDGE (1st Edition) MOC , Myanmar

Component of Construction



Construction Management System



I. Planning and Design

I. Planning and Design

A. Feasibility Study (FS)

B. Detail Design (DD)

A. Feasibility Study (FS)

a) Traffic Study

b) Fundamental Investigation

c) Engineering Study

d) Project Cost Estimate

e) Preliminary Environmental And Social Consideration

a) Traffic Study

* General Traffic Environment of Myanmar
* Traffic Condition
* Development Plan
* Estimation of Future Traffic Volume

b) Fundamental Investigation

- Road Investigation
  - Topography
  - Road survey
    - Present status of the existing road
    - Horizontal alignment
    - Vertical alignment
    - Cross section
  - Hydraulic and Hydrological Survey
  - Existing Drainage Facilities
  - Existing Pavement
  - Miscellaneous Facilities
- Existing Bridge Survey
- Geologic And Geological Investigation

c) Engineering Study

- Road Design Criteria
  - Classification of Roads
  - Design Speed
  - Geometric Design Criteria
  - Cross Section
  - Alignment Design
- Selection of Routes
- Intersection Planning
- Earth Work Design
- Drainage Design
- Pavement Design
- Bridge Design
- Miscellaneous Facility Design

d) Project Cost Estimate

- Assumptions For Cost Estimates
- Applied Unit Cost
- Construction Quantities
- Project and Indirect Project Cost Estimate
- Total Project Cost
- Project Cost Comparison of Alternative Routes

e) Preliminary Environmental And Social Consideration

- Present Environmental Status
- Impact Factors Effecting On Environment
- Environmental Impact Review And Mitigation
- Resettlement Plan

B. Detailed Design (DD)

a) Alignment Selection

b) Geometric Design

c) Pavement Design

d) Bridge Design

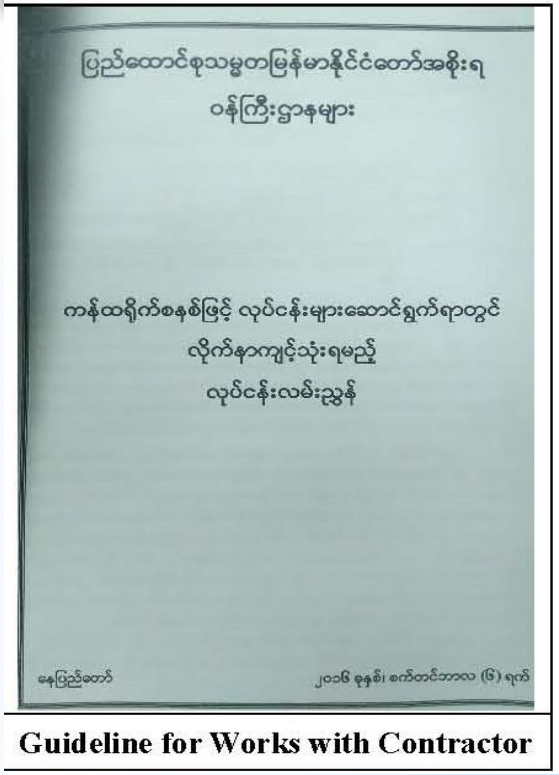
e) Earth Work Design

f) Drainage Design

II. Procurement of Contractor

Procurement of Contractor

Major Item	Details
Bidding	Advertisement for Bid
	Bid Bond
	Bidding Procedure
	Bid Form
	Bid Evaluation
Quality Inspection for Contractor Work	
Delay Damages	
Payment Method	
Penalty	



Guideline for Works with Contractor

Tendering Committee

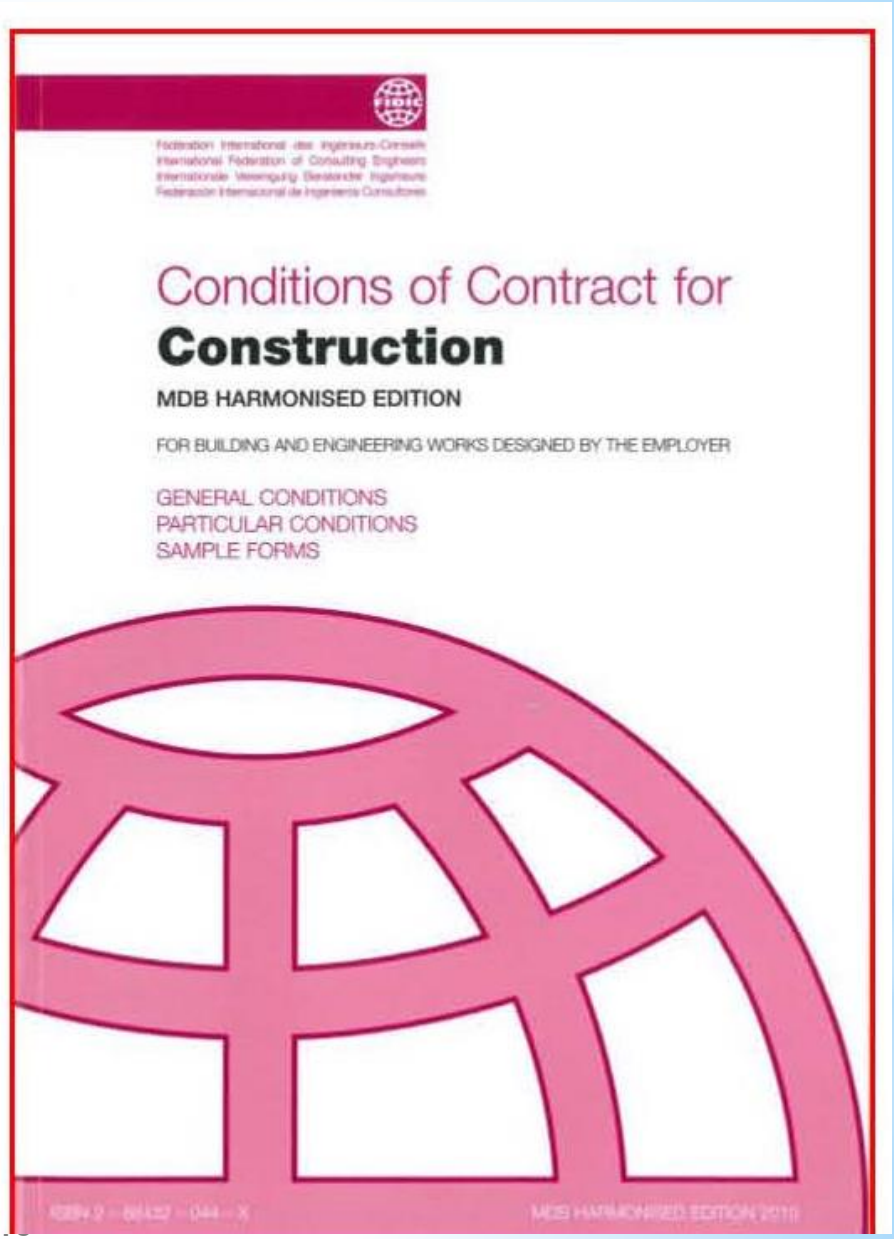
1/ Tender Committee 2/ Quotation price calculation committee

3/ Tender acceptation and evaluation committee

4/ Quality inspection and acceptance committee

International Practice

The construction contract of International Federation of Consulting Engineers(FIDIC) has been adopted as standard contract document for building and engineering works designed by employer or by his representative for international contracts



III. Construction Supervision

III. Construction Supervision

A. Construction Management

B. Quality Assurance

C. Inspection

A. Construction Management

- Study of Design Report
- Pre-Construction Survey
- Joint Site Inspection (Consultant + MOC + Contractor)
- Pre-construction Meeting
- Progress Management
- Cost Management
- Safety Management
- Environmental Management
- Recording and Reporting

B. Quality Assurance

a) Quality Control Plan

b) Quality Control Specification and Guides

c) Quality Control Activities

C. Inspection

- Materials Quality Control
- Workmanship
- Alignment and Dimensions
- Quality Measurement
- Work Progress Monitoring

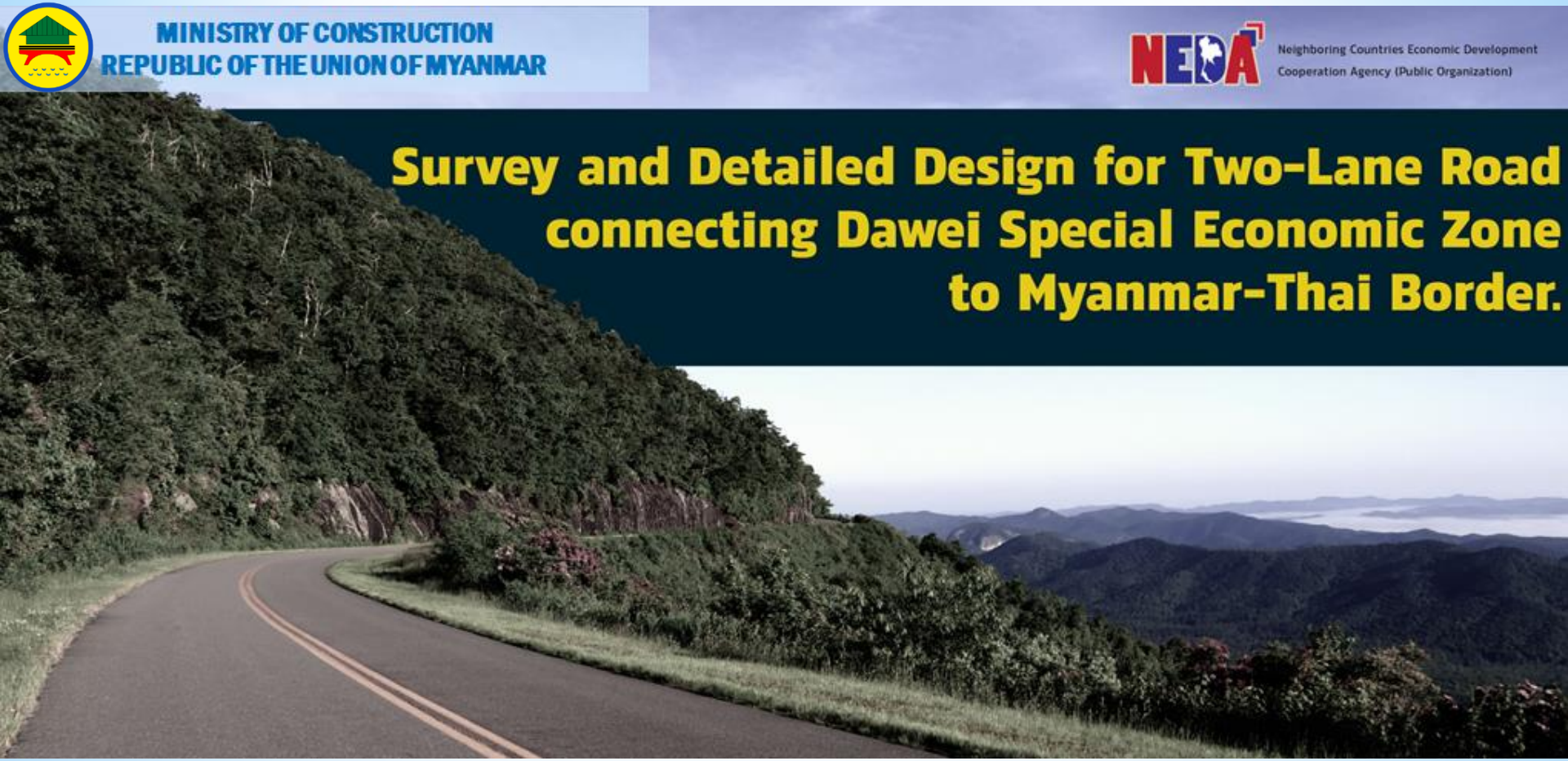
IV. Completion and Taking Over

IV. Completion and Taking Over

- Final Inspection
- Remedy
- Taking over certificates
- Release of Performance Security
- Completion Certificate
  - Completion Reports
  - As-build Drawing
  - Photographs at final inspection
  - Other construction record
  - Design report
  - Topographic data and geological data

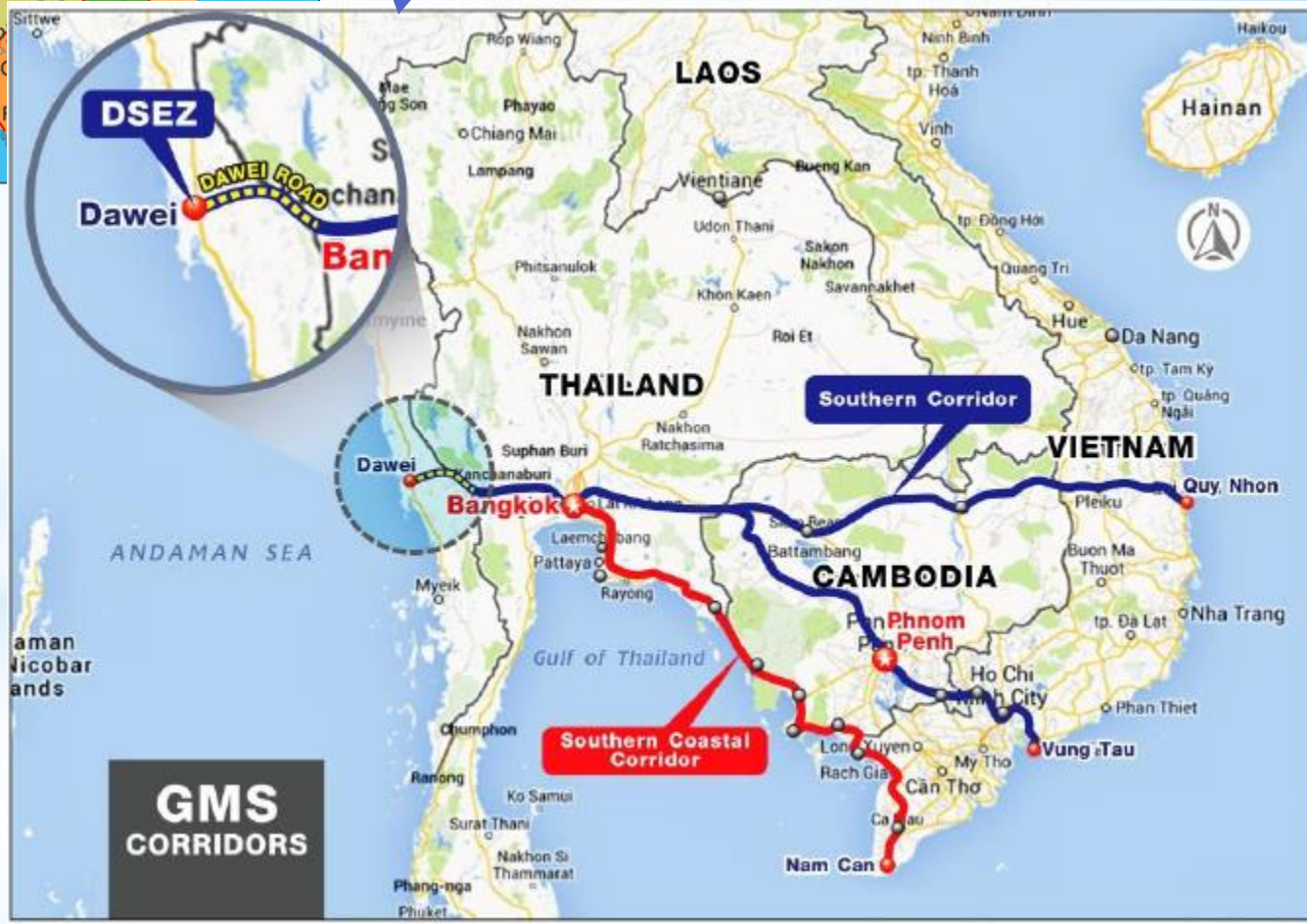
V. On going Project (MOC & NEDA)

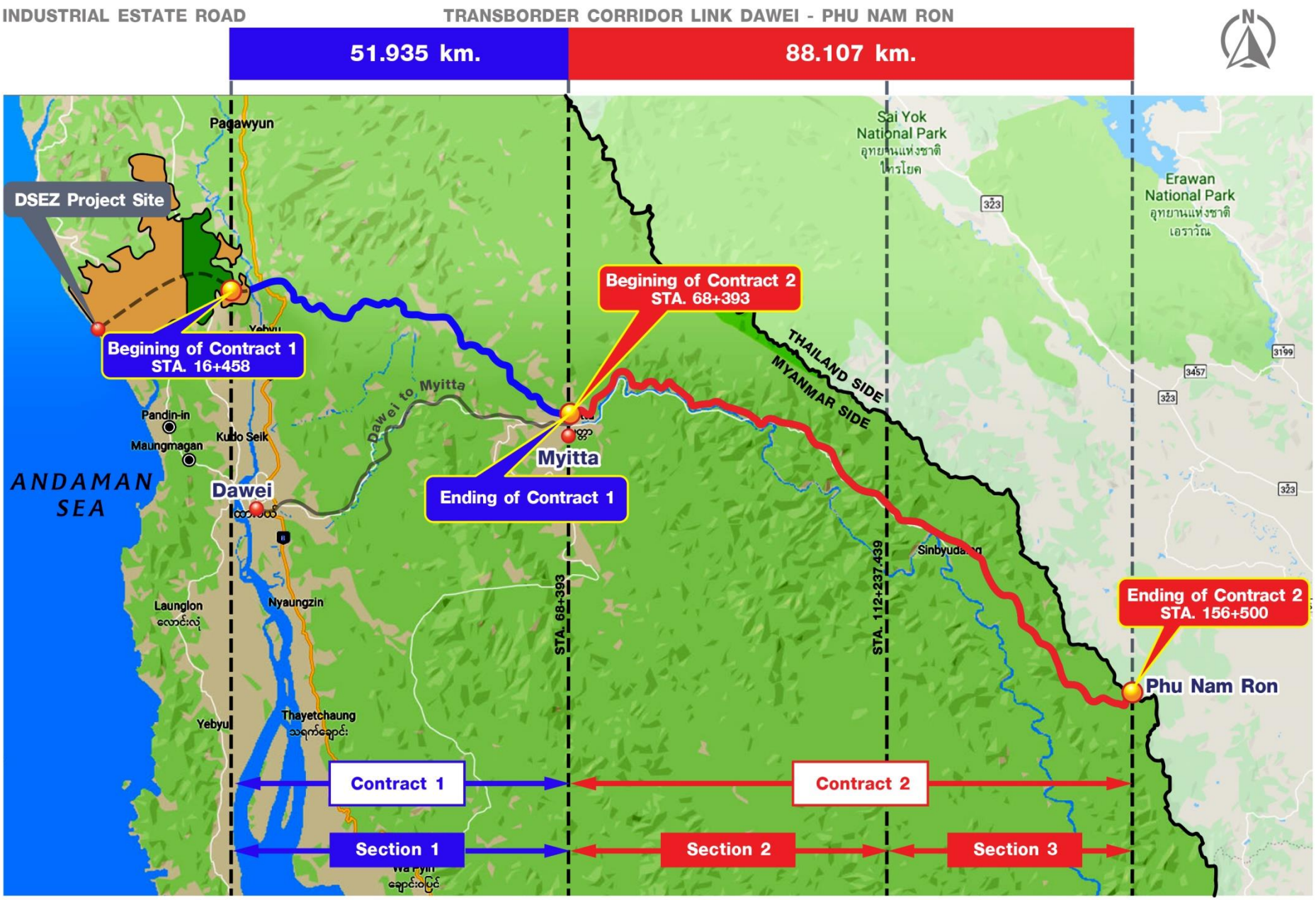
On going Project (MOC & NEDA)



Source : NEDA REPORT , MOC DATA & MEETING IN MYANMAR,2019-2020

Project Location




INDUSTRIAL ESTATE ROAD
TRANSBORDER CORRIDOR LINK DAWEI - PHU NAM RON
51.935 km.
88.107 km.
N
DSEZ Project Site
Begining of Contract 1
STA. 16+458
Begining of Contract 2
STA. 68+393
Ending of Contract 1
Ending of Contract 2
STA. 156+500
Pagawyun
Yebyu
Pandin-in
Maungmagan
Kudo Seik
Dawei
Dawei to Myitta
Myitta
ANDAMAN
SEA
Launglon
Nyaungzin
Thayetchaung
Yebyu
Sai Yok
National Park
Erawan
National Park
THAILAND SIDE
MYANMAR SIDE
Sinbyuda
Phu Nam Ron
STA. 68+393
STA. 112+237.439
Contract 1
Contract 2
Section 1
Section 2
Section 3

1. PART 1 : ACTIVITIES AND COORDINATION
2. PART 2 : THE SUMMARY OF PROGRESS
3. PART 3 : ENVIRONMENT STUDY
4. PART 4 : ENGINEERING STUDY

PART 1 :
ACTIVITIES AND COORDINATION

PROJECT STEERING COMMITTEE (PSC)

Initial Coordination and site visit FEB 14

INCEPTION REPORT (15th March, 2019)

PSC 1ST 4th April, 2019 MOM 1

INTERIM REPORT (28th JUN, 2019)

PSC 2ND 26th July, 2019 MOM 2

DRAFT FINAL REPORT (29 AUG 2019)

PSC 3rd 16th SEP, 2019 MOM 3

FINAL REPORT (27 SEP 2019)

The meeting room @ the Ministry of Construction, Nay Pyi Taw

MOM 1 4th APR 2019

- Scope of work
- 70 m. Width of ROW.
- Pavement Stucture
- Contract

MOM 2 26 JUL 2019

- Environmental study
- Recheck Geometry Designed
- the emergency truck parking area

MOM 3 16 SEP 2019

- Project design summary

MOM 1
4th APR 2019

SITE SURVEY
5th APR 2019

COMPLETED THE 1st PUBLIC RELATION-PUBLIC PARTICIPATION ON 17 MAY, 2019





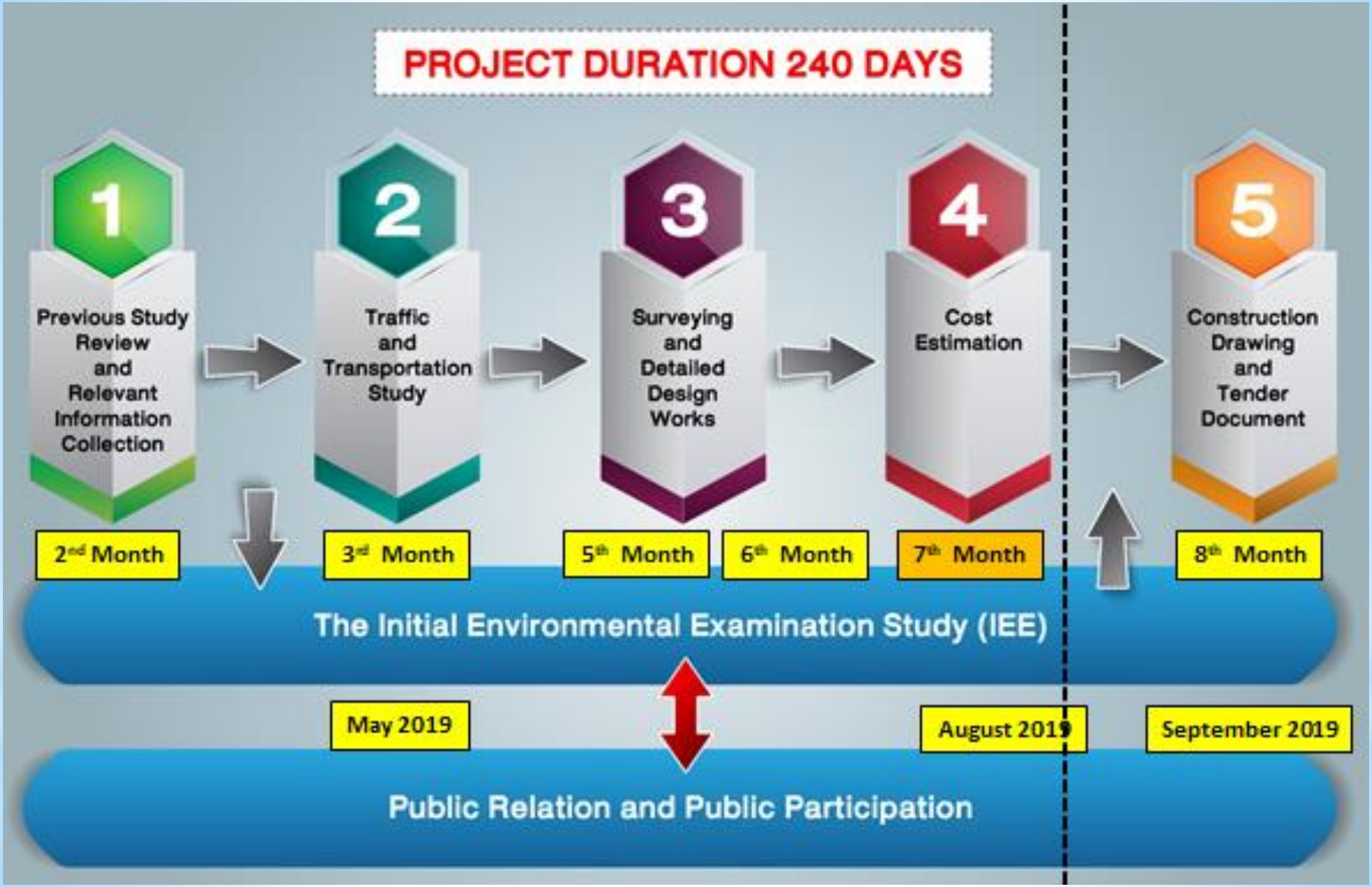

PP1
17 May
2019






MOM 2
26 JUL 2019

PART 2 :
THE SUMMARY OF PROGRESS

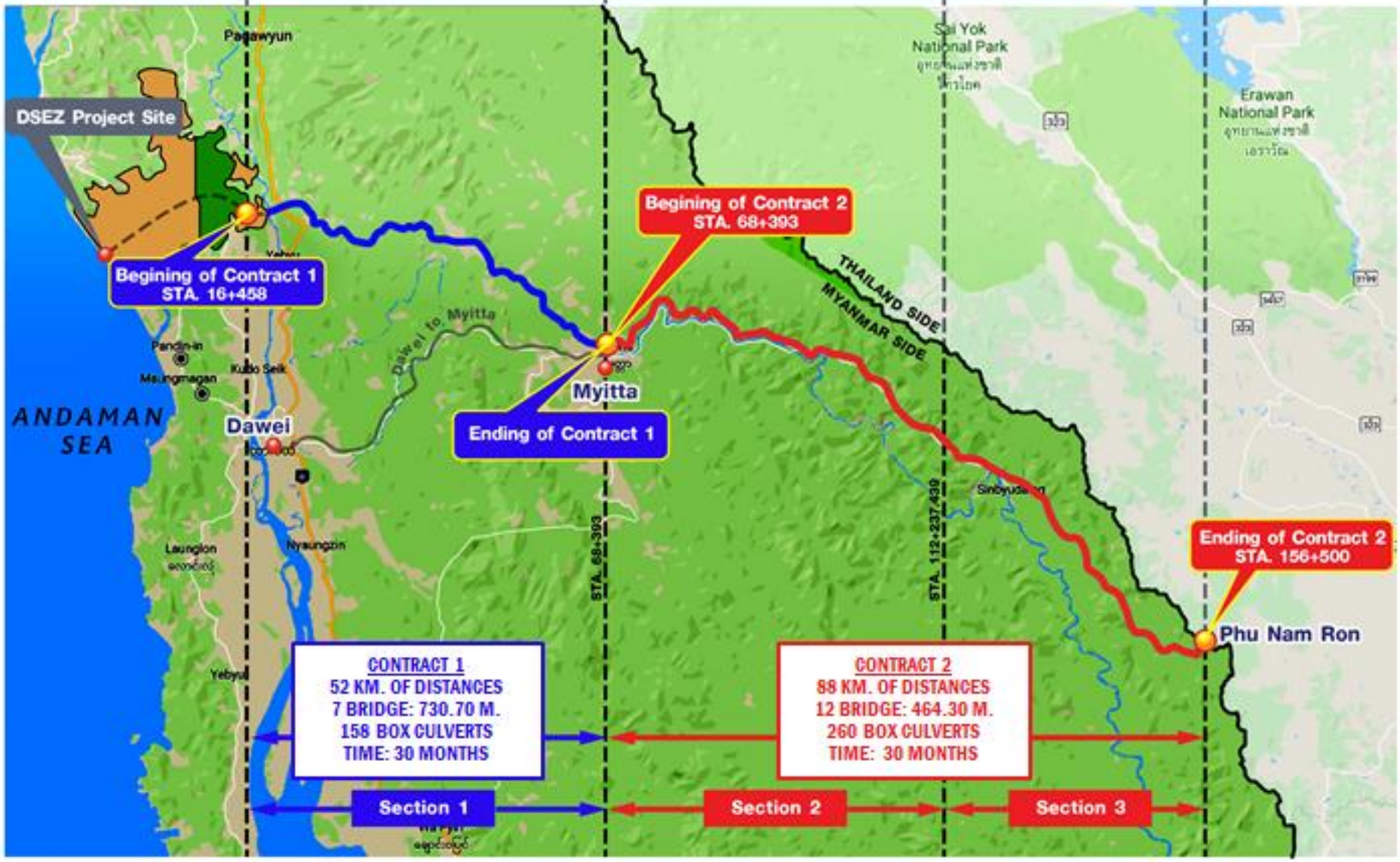

PROJECT DURATION 240 DAYS
1
Previous Study Review and Relevant Information Collection
2
Traffic and Transportation Study
3
Surveying and Detailed Design Works
4
Cost Estimation
5
Construction Drawing and Tender Document
2nd Month
3rd Month
5th Month
6th Month
7th Month
8th Month
The Initial Environmental Examination Study (IEE)
May 2019
August 2019
September 2019
Public Relation and Public Participation

COST ESTIMATION

Item No.	Description	Amount Exc.factor F(Baht)	factor F	Amount Inc.factor F(Baht)	Provisional Sum (Baht)
1	GENERAL PROVISIONS	29,342,000.00	-	29,342,000.00	0.00
2	EARTHWORKS	1,615,629,890.00	1.1729	1,894,972,297.98	-
3	PAVEMENT	265,563,090.00	1.1729	311,478,948.26	-
4	DRAINAGE	64,795,730.00	1.1729	75,998,911.72	-
5	STRUCTURES	252,906,220.00	1.1441	289,350,006.30	-
6	MISCELLANEOUS	336,205,820.00	1.1729	394,335,806.28	0.00
7	PARTICULAR SPECIFICATIONS	18,510,500.00	1.1729	21,710,965.45	-
	TOTAL	2,582,953,250.00		3,017,188,935.99	0.00
	GRAN TOTAL			3,017,188,935.99	

*** THE COST INCREASED AROUND 3300 TO 3500 MILLION TH.BAHT , IN FINAL BECAUSE UPGRADED DESIGN AND VALUE SPECIAL PROVISIONAL SUM AND ETC. ***

TENDER DOCUMENTS PREPARATION



TENDER DOCUMENTS PREPARATION

No.	Topic
1	Pre-Qualification: PQ
2	Form of Tender
3	Instruction to Tenderers
4	General and Particular Conditions of Contract
5	Detailed Construction Specification
6	Contract Drawing
7	Equipment and Material Specification
8	Bill of Quantities
9	Cost Breakdown
10	Term of Reference: TOR
	*** The details in Tender & Bidding Document Report

PART 3 :
ENVIRONMENT STUDY

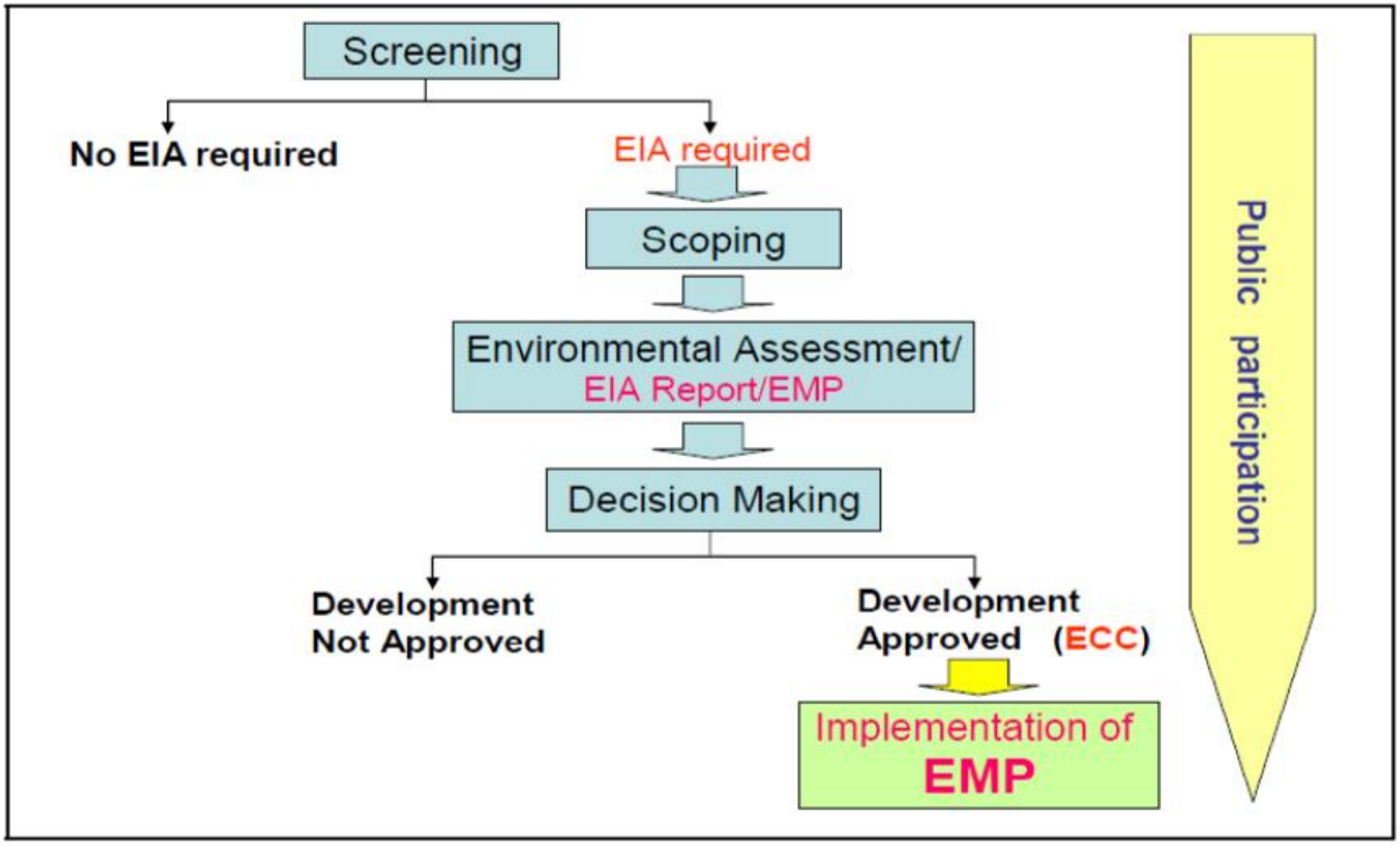
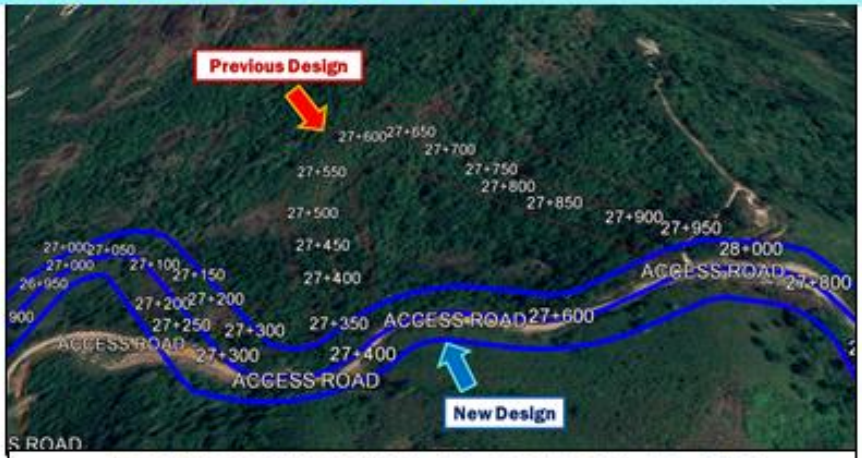


Figure 8.4-1 Common Environmental Consideration Process

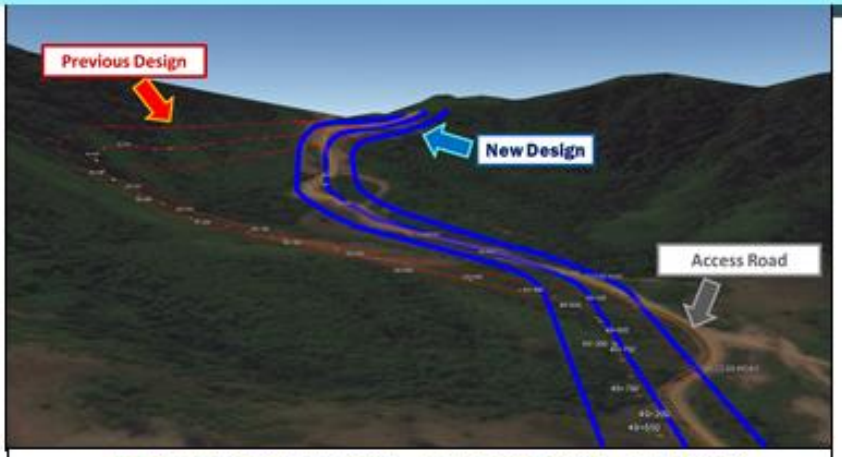
ALL MITIGATION MEASURES FOR THE PROJECT

2018EIA			2019EIA (Additional)
1. Certified the Environmental Mitigation Measures and Environmental Monitoring Program **Construction Phase : 16 Environmental and Social Issue**			**4. Additional Mitigation Measure** **General Mitigation (2)** **Construction Phase :** • **No additional mitigations** **Operation Phase : Biological Resource as** • **Forest Rehabilitation Activities (4)** • **Biodiversity Monitoring Activities (3)** • **Wildlife Corridor Construction (2)**
Air Quality **(17)**	**Biodiversity (22)** • Tree Species Transplanting activity **(2)** • Tree Clearing Activity **(8)** • Forest monitoring Activity **(2)** • Hunting Control and Other Measures for Wildlife Protection **(4)** • Deforestation Control Activity **(6)**	Solid Waste **(13)**	
Noise **(5)**		Hazardous Waste **(11)**	
Vibration **(5)**		Occupational Health **(24)**	
Surface Water Quality **(7)**		Chance find **(6)**	
Aquatic Ecology **(2)**		Compensation and Livelihood Restoration **(7)**	
Soil Erosion **(5)** and Soil Contaminant **(2)**		Land Use **(3)**	
Transportation **(11)**		Socio-Economic **(6)**	
Water Use **(3)**			

PROJECT AMENDMENTS TO REDUCE TO CUT THE FOREST (POSITIVE IMPACT)



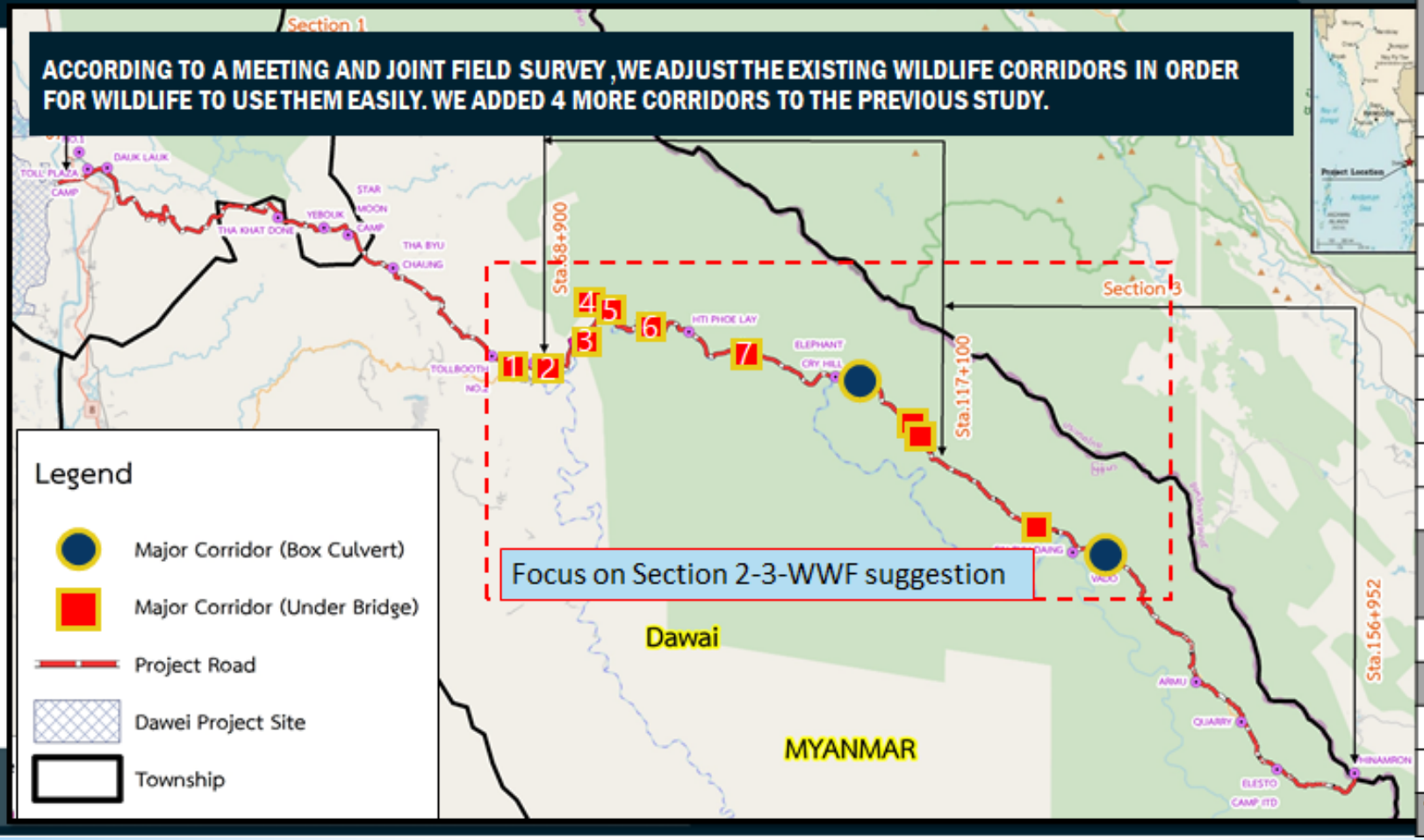
THE DEWADAH HILL (STA. 26+850 TO STA. 28+470)



THE SADDLES HILL (STA. 49+550 TO STA. 51+021)

THE POSITIONS OF WILDLIFE CORRIDORS

ACCORDING TO A MEETING AND JOINT FIELD SURVEY ,WE ADJUST THE EXISTING WILDLIFE CORRIDORS IN ORDER FOR WILDLIFE TO USE THEM EASILY. WE ADDED 4 MORE CORRIDORS TO THE PREVIOUS STUDY.



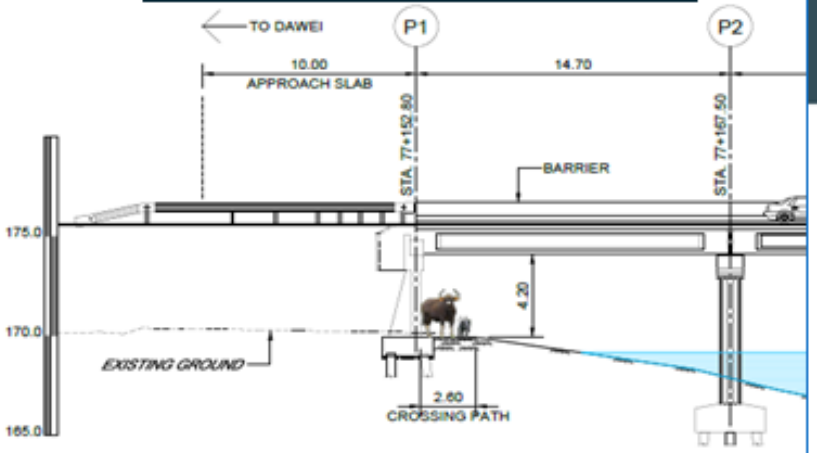
Under bridge.
66+397
68+596
72+914
76+513
77+162
81+454
90+906
106+956
107+956
120+248
Total 10 positions
Box culvert.
100+375
126+373
Total 2 positions

WILDLIFE CORRIDORS DESIGN

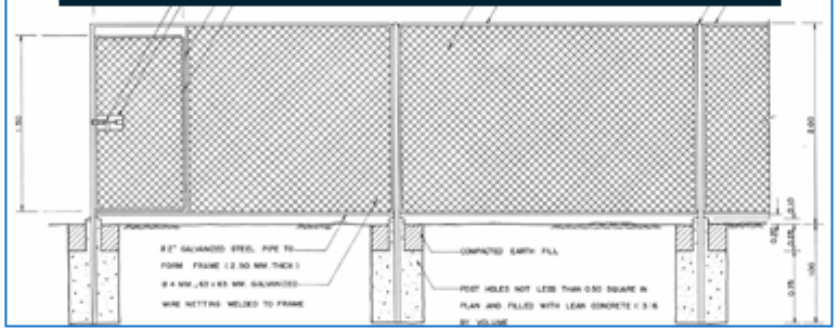
1. 10 Bridges for Wildlife
2. 2 Box culvert : sta. 100+375 and sta.126+373 for Wildlife
3. Wildlife crossing with Mesh Fence as a barriers and approach line from both sides of Box Culvert – Bridge

1. WILDLIFE CORRIDORS RC. CONCRETE BOX CULVERT

2. WILDLIFE CORRIDORS (UNDER BRIDGE)



3. WILDLIFE CROSSING WITH MESH FENCE AS A BARRIERS AND APPROACH LINE FROM BOTH SIDES OF BOX CULVERT – BRIDGE



PART 4 :
ENGINEERING STUDY

Traffic Survey

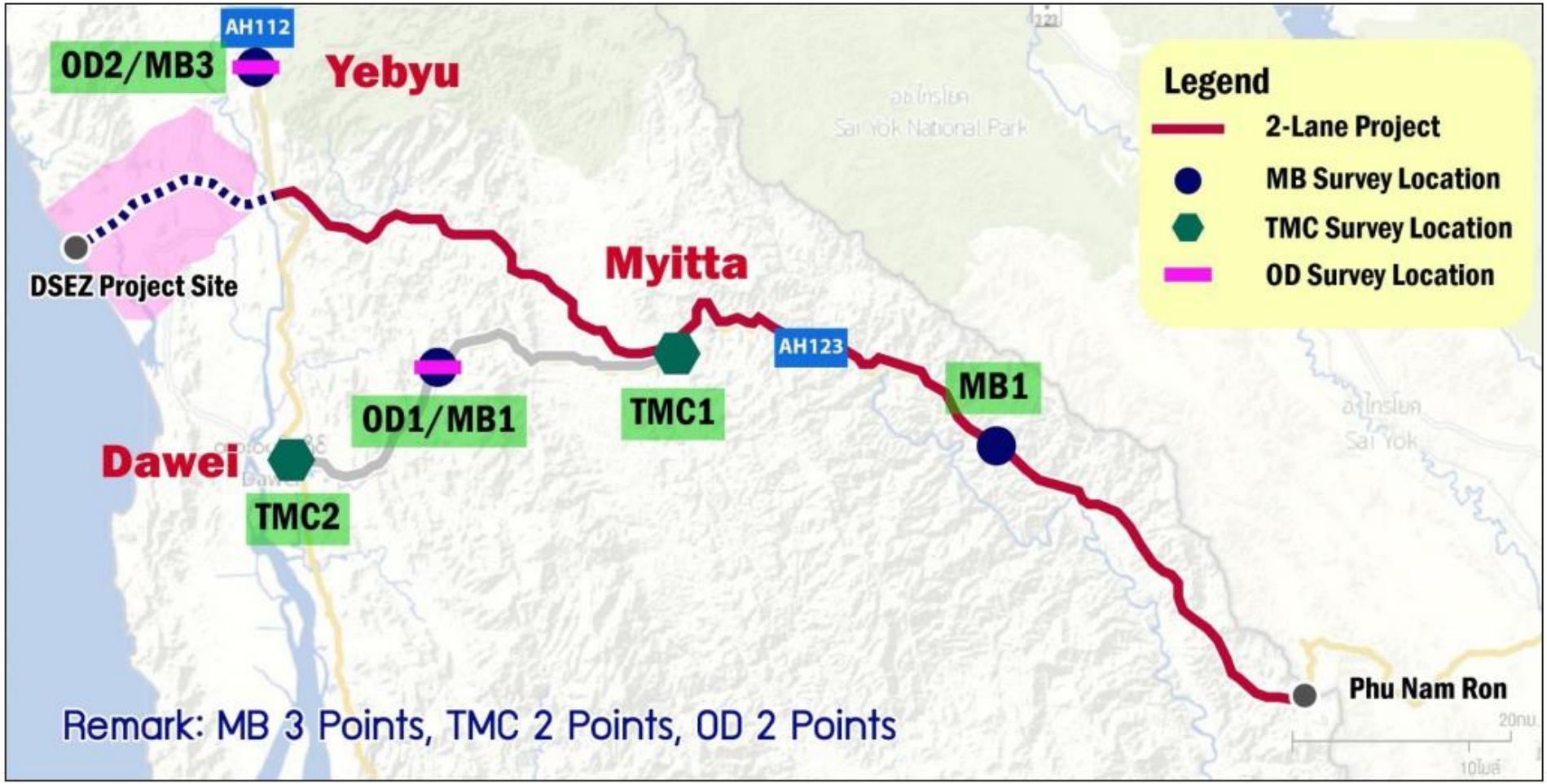


Figure 5.1-1 Mid-block Survey Points, Turning Movement Survey Points and Origin-Destination Survey Point

TRAFFIC SURVEY ON 25 MARCH TO 28 MARCH 2019 AT DAWEI

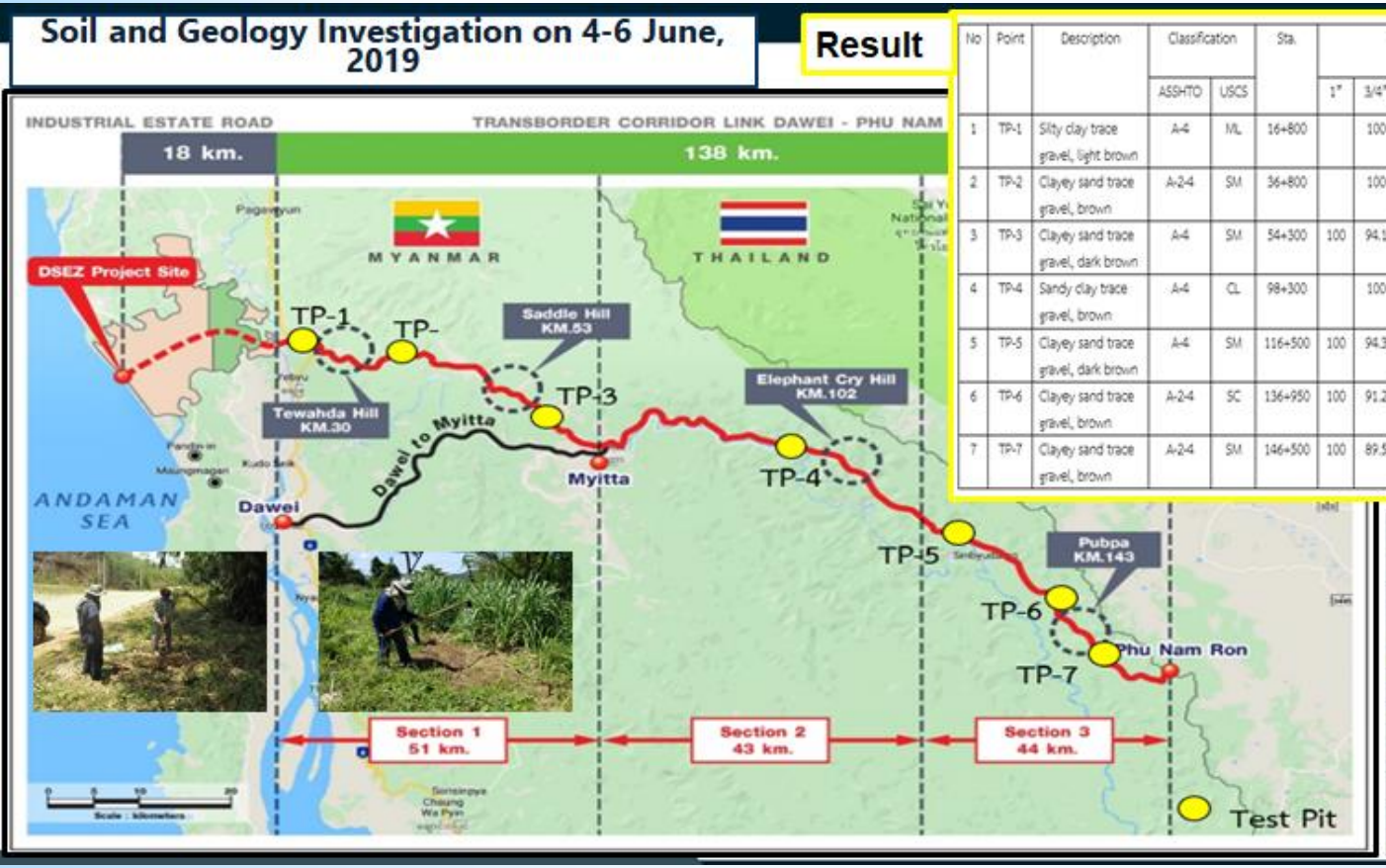





Soil & Geology Investigation

Soil and Geology Investigation on 4-6 June, 2019

Result



No	Point	Description	Classification		Sta.	Sieve Analysis % Passing							Atterberg Limits		compaction		CBR,	Swell,
			ASSHTO	USCS		1"	3/4"	3/8"	#4	#10	#40	#200	LL	PI	γ_{dmax}	OMC, %	%	%
1	TP-1	Silty clay trace gravel, light brown	A-4	ML	16+800		100	98.4	97.5	96.8	95.3	81.6	26.2	4.3	1.736	16.0	7.9	0.873
2	TP-2	Clayey sand trace gravel, brown	A-2-4	SM	36+800		100	96.2	94.1	77.4	47.9	29.7	33.2	7.8	1.764	16.2	11.0	0.219
3	TP-3	Clayey sand trace gravel, dark brown	A-4	SM	54+300	100	94.1	85.3	79.2	72.0	60.0	37.8	28.4	6.0	1.805	15.0	10.5	0.087
4	TP-4	Sandy clay trace gravel, brown	A-4	CL	98+300		100	95.3	92.5	89.2	78.9	55.3	24.9	5.1	1.797	15.4	5.97	0.395
5	TP-5	Clayey sand trace gravel, dark brown	A-4	SM	116+500	100	94.3	91.4	88.5	88.1	71.4	39.6	19.5	2.8	1.882	13.0	9.6	0.218
6	TP-6	Clayey sand trace gravel, brown	A-2-4	SC	136+950	100	91.2	83.0	71.8	58.3	44.2	32.5	24.1	7.4	2.035	10.7	13.7	0.220
7	TP-7	Clayey sand trace gravel, brown	A-2-4	SM	146+500	100	89.5	72.4	56.8	44.0	36.0	25.8	23.7	2.9	1.959	12.4	19.0	0.177

COMPLETED THE SOIL AND GEOLOGY INVESTIGATION ON 4-6 JUNE, 2019






CONDUCT THE MATERIAL INVESTIGATION

- The consultant surveys the locations of material and found that are Cover in the previous report.
- Recheck 5 Main Material Resources

No.	Description	Sta.	Coordinate (UTM : 47 P)	
			N	E
1	Sand (S-1) Laterite (L-1)	22+200	1579761.64	416854.36
2	Rock (R-0)	24+900	1578478.15	418379.39
3	Crushed Rock (R-1)	42+850	1576829.98	429381.36
4	Laterite (L-2)	102+400	1564843.13	472581.83
5	Crushed Rock (R-2)	145+300	1539598.38	500705.00

Topographic Surveying and Leveling

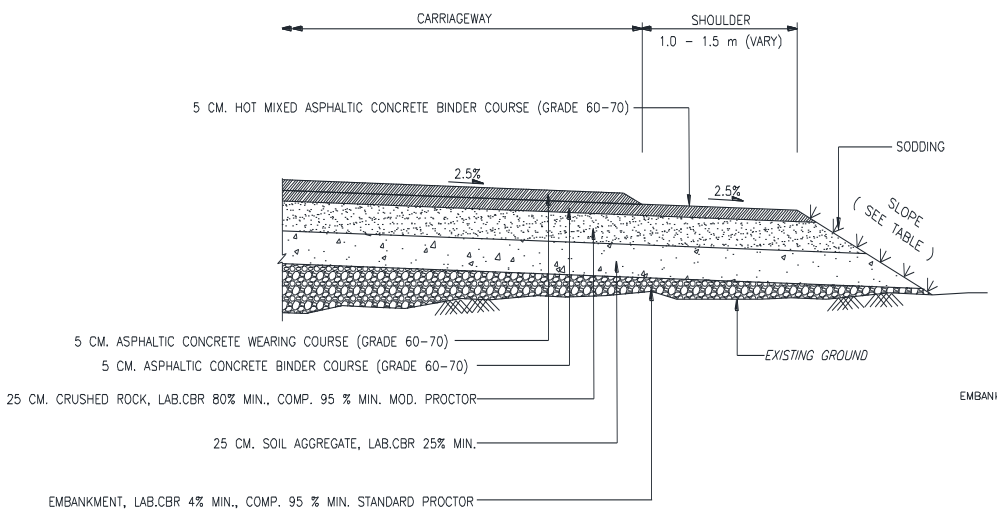
- ✓ Unmanned Aerial Vehicle (UAV) is completed for Aerial Photograph to create Base Map
- ✓ Between 29 April - 3 May 2019 by attaching the camera to the UAV
- ✓ Taking a vertical image for at least 60 percent overlapping
- ✓ which will provide the most detailed and current information
- ✓ After that, the picture was taken together as an aerial photo map to create Base Map

No.	Contents	Previous Study	This Study
1	GPS Control Points	61 GPS Primary Control Points (permanent)	Reviewed and No Revision
2	Traverse	102 Traverse Monument (permanent)	Reviewed and No Revision
3	Primary Vertical Control Points (BM)	Completed	Reviewed and No Revision
4	Right of Way	40 m	70 m *(Refer to Comment of Committee of Inception report 4th May 2019)*
5	Topographic Map	Ground Survey	Conducted by UAV (29 April - 3 May 2019)

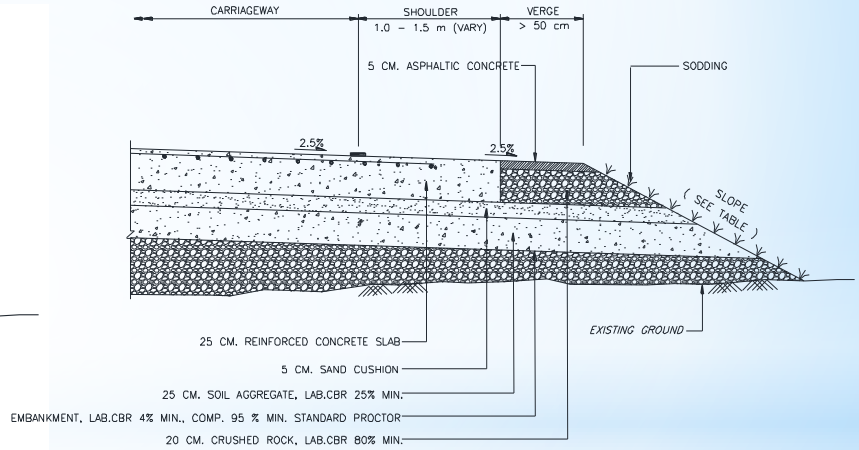

EX: AERIAL PHOTOGRAPH BY UAV
AROUND STA.19+275

Pavement Structure Design

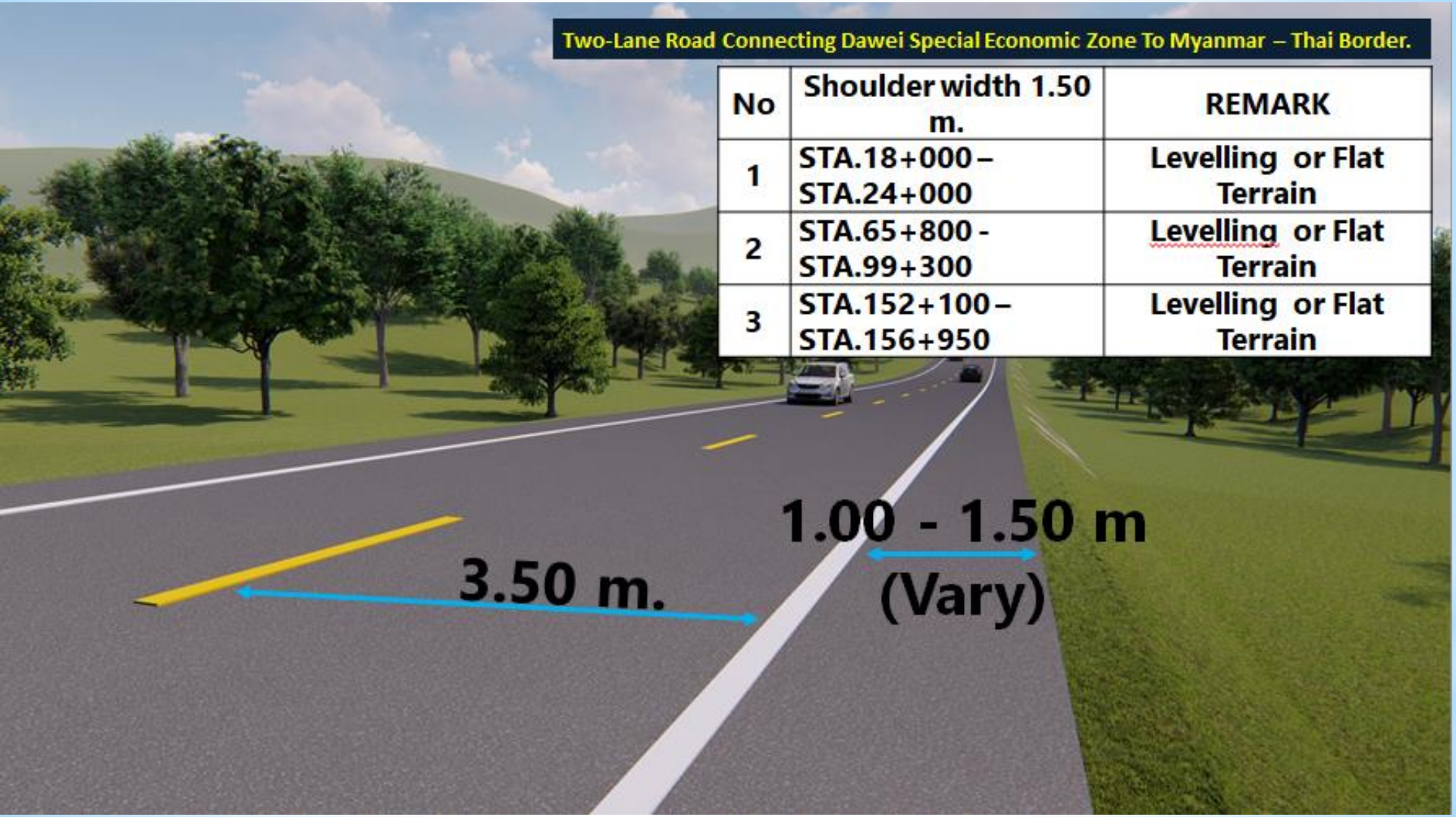
No	Types of Pavement	Location	Distance
1	Asphaltic concrete pavement	Almost along the route	≈ 116 KM.
2	Concrete pavement	The steep slope, rest area, Toll Plaza and the Intersection	≈ 24 KM.



DETAIL - ASPHALTIC CONCRETE PAVEMENT



DETAIL - REINFORCEMENT CONCRETE PAVEMENT


Two-Lane Road Connecting Dawei Special Economic Zone To Myanmar – Thai Border.
No
Shoulder width 1.50 m.
REMARK
1
STA.18+000 – STA.24+000
Levelling or Flat Terrain
2
STA.65+800 - STA.99+300
Levelling or Flat Terrain
3
STA.152+100 – STA.156+950
Levelling or Flat Terrain
3.50 m.
1.00 - 1.50 m
(Vary)

RIGHT OF WAY PLAN 70.00 M.

DESIGN OF 19 BRIDGES

No	Station	Total Width (m)	No. of Span	Span Arrangement	Total Length (m)	Substructure	Upper Structure	
							slab	beam
1	16+885.787	11.00	7	(1x32.25)+(5x35.00)+(1x32.25)	239.50	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
2	19+271.168	11.00	5	(1x29.65)+(3x30.00)+(1x29.65)	149.30	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
3	21+933.446	11.00	5	(1x29.65)+(3x30.00)+(1x29.65)	149.30	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
4	22+680.669	11.00	3	(1x14.70)+(1x15.00)+(1x14.70)	44.40	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
5	45+904.237	11.00	3	(1x14.70)+(1x15.00)+(1x14.70)	44.40	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
6	49+159.614	11.00	3	(1x14.70)+(1x15.00)+(1x14.70)	44.40	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
7	66+397.180	11.00	4	(1x14.70)+(2x15.00)+(1x14.70)	59.40	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
8	68+596.000	11.00	5	(1x29.65)+(3x30.00)+(1x29.65)	149.30	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
9	72+914.808	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
10	76+512.788	11.00	3	(3x15.00)	45.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
11	77+175.806	11.00	3	(3x15.00)	45.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
12	81+454.206	11.00	3	(3x15.00)	45.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
13	90+901.487	11.00	3	(3x15.00)	45.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
14	106+956.450	11.00	3	(3x15.00)	45.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
15	107+951.157	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
16	120+248.408	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
17	140+081.438	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
18	150+591.392	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder
19	154+755.965	11.00	1	(1x15.00)	15.00	Reinforced Concrete	Reinforced Concrete	Prestressed I-Girder

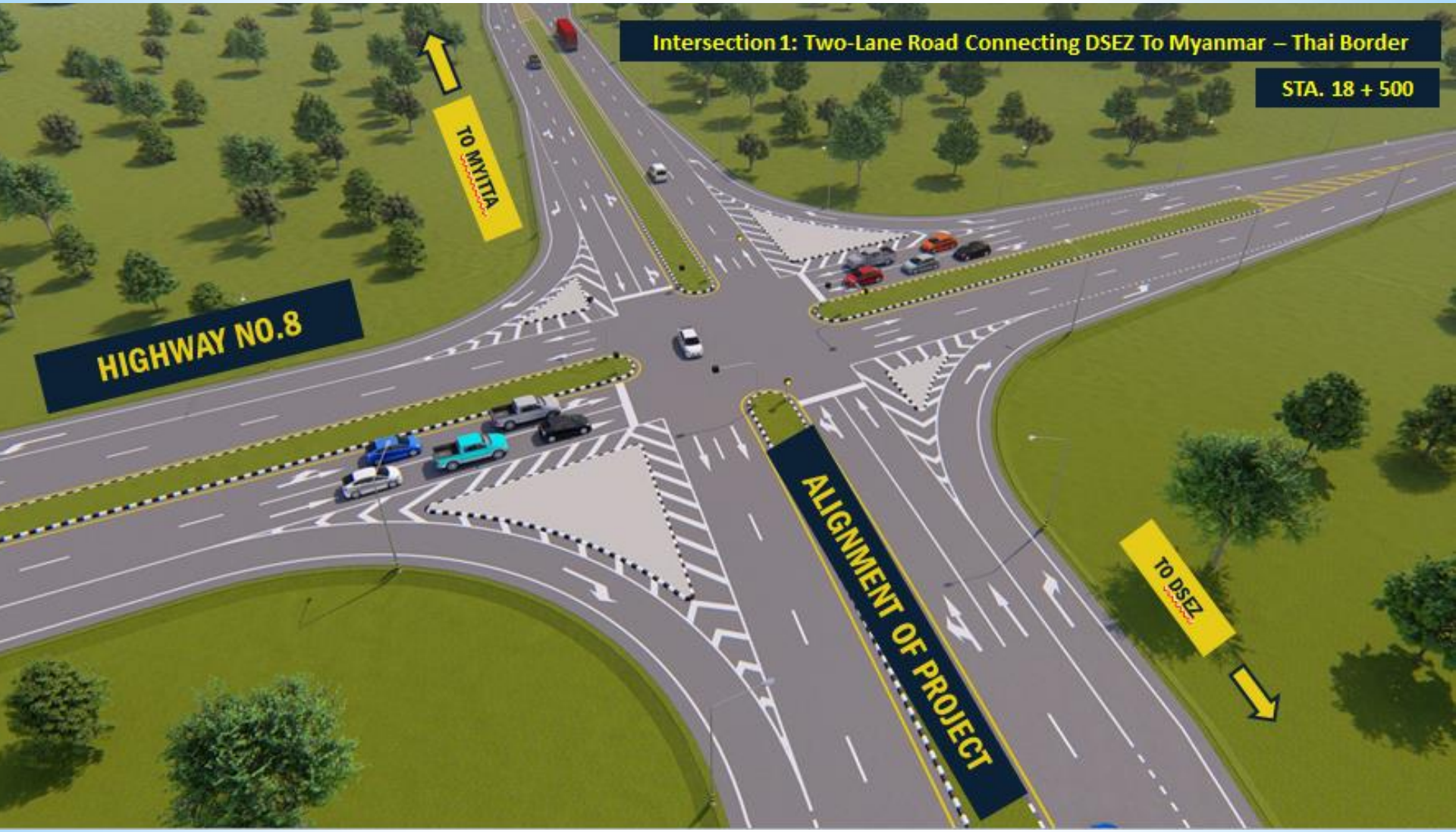

Bridge No.1 (Two-Lane Road Connecting DSEZ To Myanmar – Thai Border)
STA. 16+885.787


Bridge No.1 (Two-Lane Road Connecting DSEZ To Myanmar – Thai Border)
STA. 16+885.787

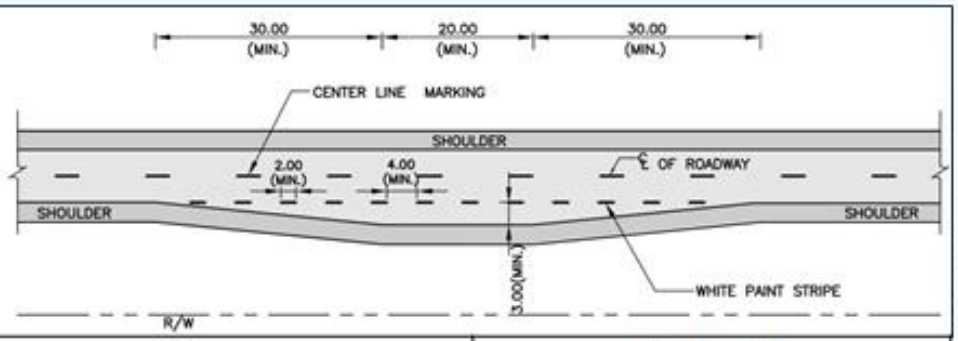
CONCLUDE ROAD LIGHTING AND TRAFFIC SIGNALS

No.	Contents	Remark
1	Marking	Along Route and Intersection
2	Road Lighting	Intersection (STA. 18 + 500 / STA. 54 + 354 /STA. 68 + 400) And Toll Booth
3	Flashing Yellow Light (Solar Cell)	Intersection (STA. 18 + 500 / STA. 54 + 354 /STA. 68 + 400) And Traffic Change Over


Traffic Marking: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border


Intersection 1: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
STA. 18 + 500
TO MYITTA
HIGHWAY NO.8
ALIGNMENT OF PROJECT
TO DSEZ

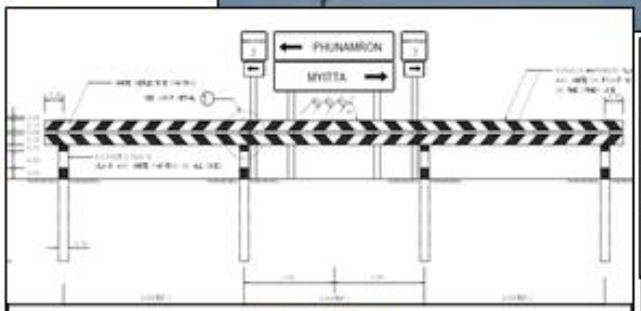
SAFETY DEVICES



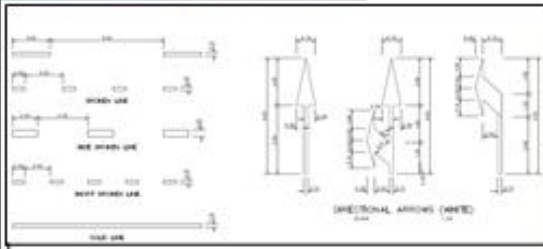
EMENGENCY STOP BAY STATION
STA. 32+750
STA. 98+600
STA. 128+500

RUMBLE STRIP	
STA.	SIDE
18+594	RT
18+615	LT
25+656	RT
31+487	LT
32+489	RT
33+050	LT
47+691	RT
47+818	LT
48+108	LT
54+273	RT
54+298	LT
59+151	RT
59+279	LT
67+655	RT
67+678	LT
72+829	RT
144+609	LT
146+373	RT
156+200	RT
155+964	RT

ROAD STUDS AT INTERSECTION
STA. 18+600
STA. 54+300
STA. 67+667



TRAFFIC SIGN

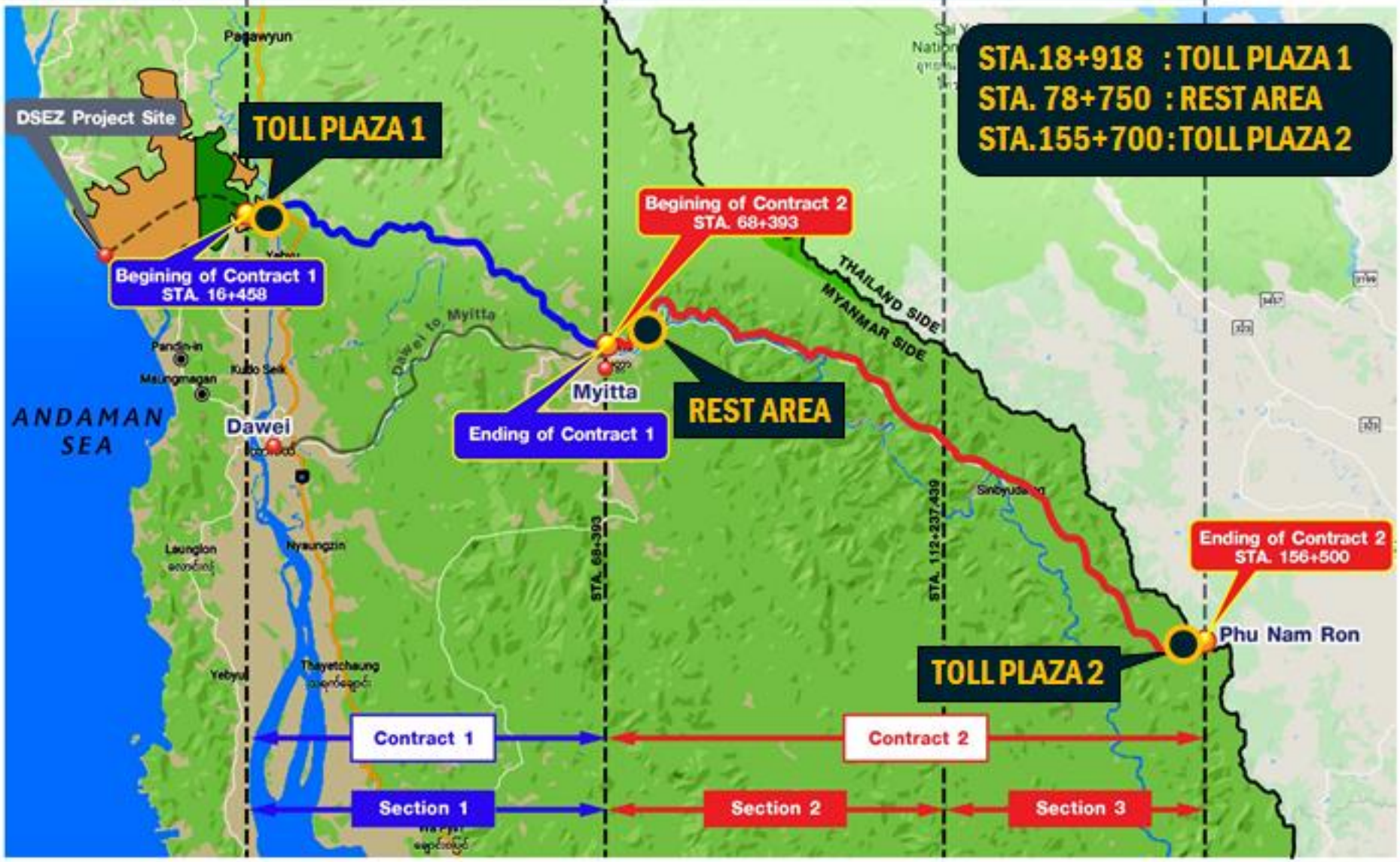


TRAFFIC MARKING

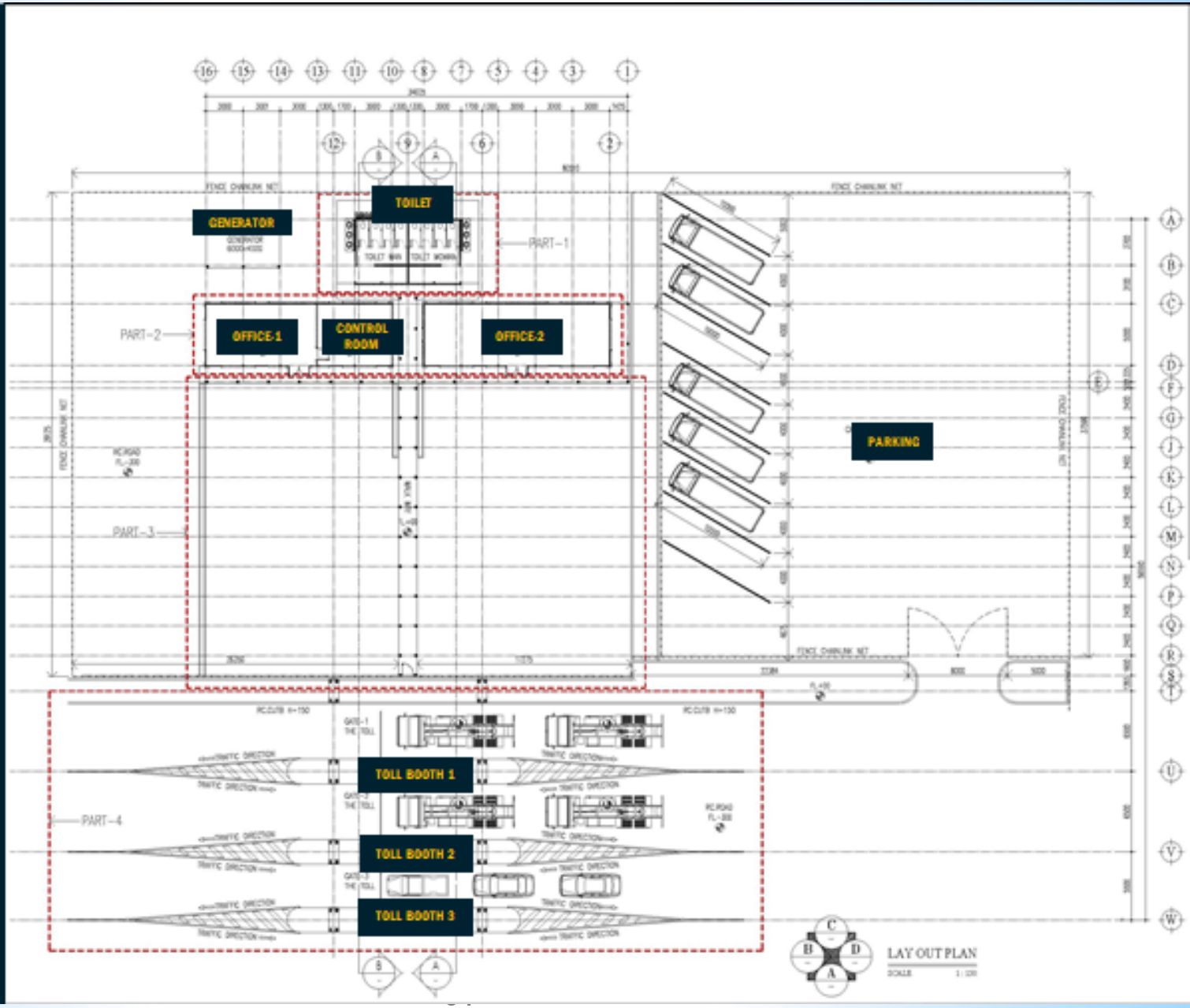

Traffic Change Over: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
STA.156+075


Traffic Change Over: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
STA.156+075

CONSIDER THE LOCATION OF TOLL PLAZA AND REST AREA



TOLL PLAZA PLAN & KEY MAP



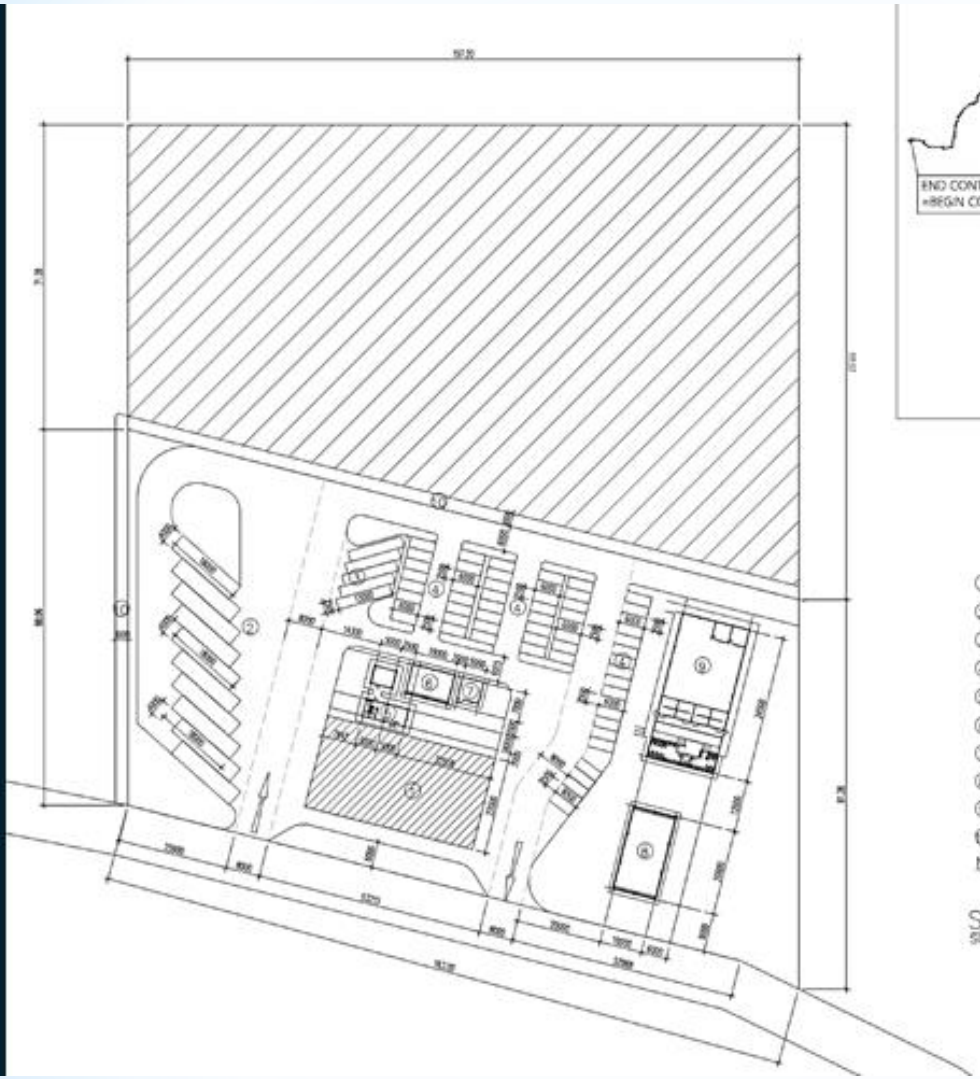

Toll Collection Lanes: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border

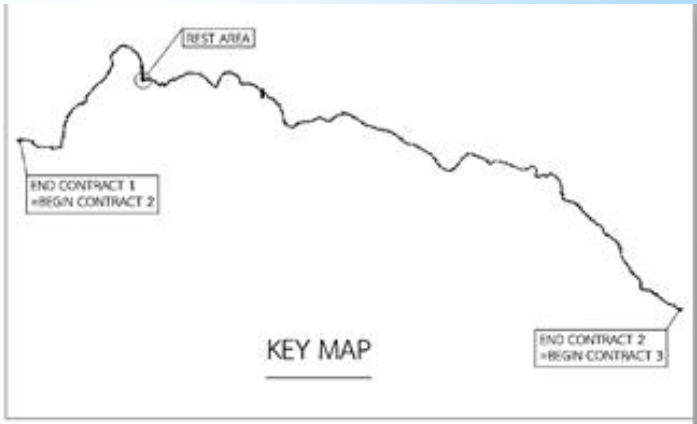

Toll Collection Lanes: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border


Toll Plaza Component: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
OFFICE1
GENERATOR
OFFICE2
TOILET
PARKING

Solar Cell on Office Roof: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border

REST AREA PLAN & KEY MAP





① Fuel Pump Area 1000 m²
② Parking Area 2500 m² for 10 Trucks
③ Parking Area 300 m² for 5 Buses
④ Parking Area 1500 m² for 60 Cars
⑤ Office Area 50 m²
⑥ Service Area 70 m²
⑦ Police Office 25 m²
⑧ Shop Area 200 m²
⑨ Canteen,shop & Toilet Area 800 m²
⑩ VIEW POINT
Note: Cut the tree as nessessary fot clearing area

SITE PLAN
SCALE 1:1000


Rest Area Component: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border


Rest Area Component: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
Parking
Future Gas Station
Canteen
Shop


Office, Police, Service: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border
Future Gas Station
Service Building
Office Building
Police


View Point: Two-Lane Road Connecting DSEZ To Myanmar – Thai Border

Thank you for your attention