

Public Private Partnership
for Operation and Maintenance (O&M)
Bang Khun Thian – Ban Phaeo Motorway M82 Project



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Motorway
M82



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

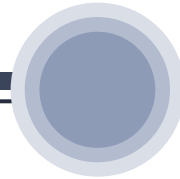
Disclaimer



The content in this document, including any clarifications provided by the Department of Highways or consultants during the market sounding meeting, shall serve solely as preliminary information aimed at incorporating the viewpoints of the private sector into the project. It does not establish any boundaries or conditions pertaining to the selection of private party.

Additionally, the information and explanations mentioned may be subject to modifications or additions in the future. The Department of Highways does not provide certification or guarantees and disclaims responsibility for the completeness and accuracy of the information and explanations provided.

Findings of the Study and the Project Concept



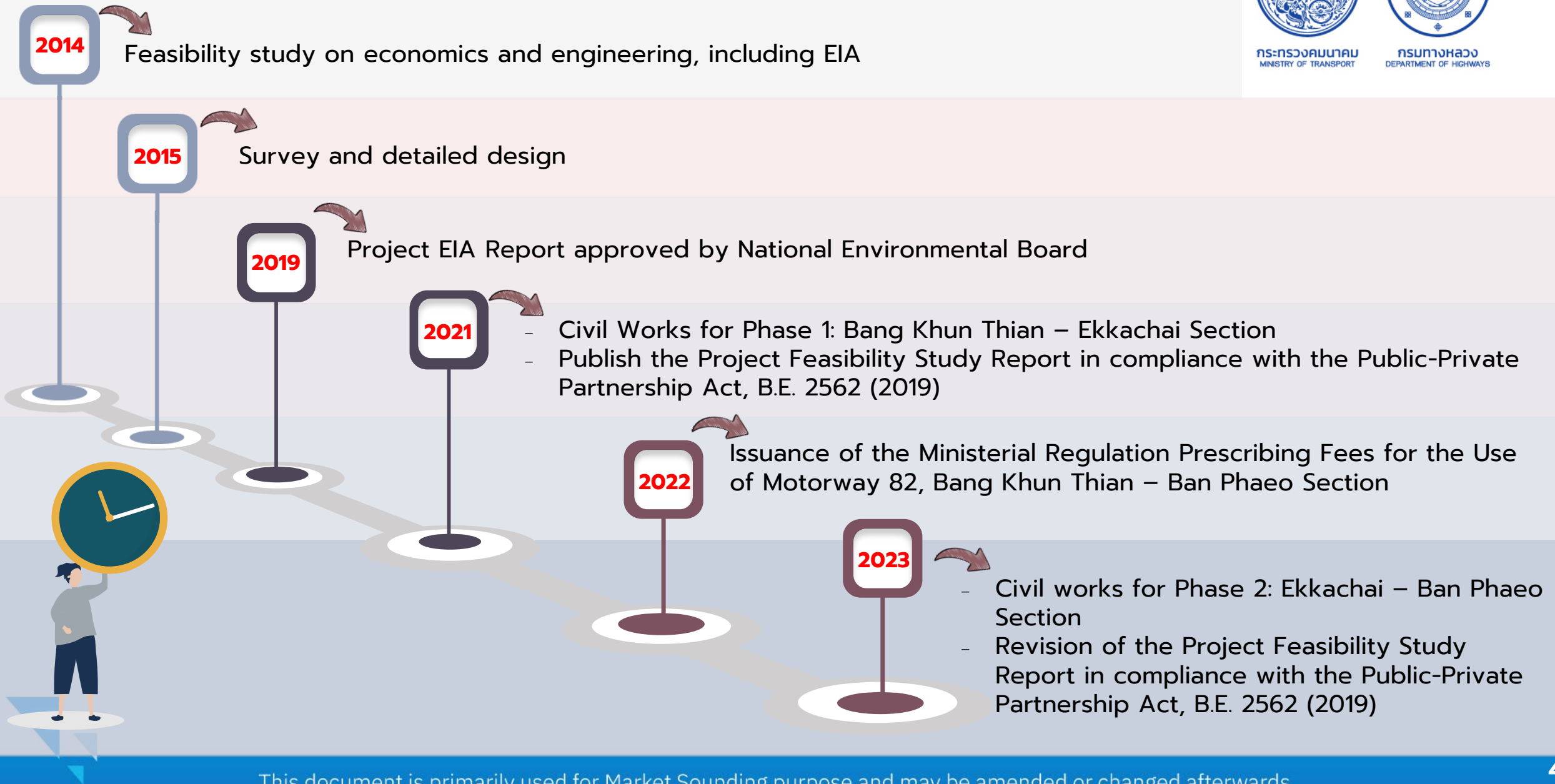
Project Background



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Objectives



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



- **To alleviate the traffic congestion** on Highway 35 (Rama II Road)
- **To expand the major road network** in lower Bangkok areas and nearby provinces. In the future, when the project has been implemented further, from Ban Phaeo to Pak Tho, a connection to Motorway 8, Nakhon Pathom – Cha-Am, will make it even more convenient for transportation and logistics.
- **Directly extend the transport network** from Bangkok downtown to the southern region, enabling smooth, convenient, rapid and safe trips.
- Promote **logistics activities and national economy**

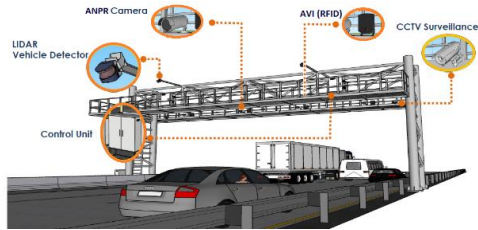
Project Alignment



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



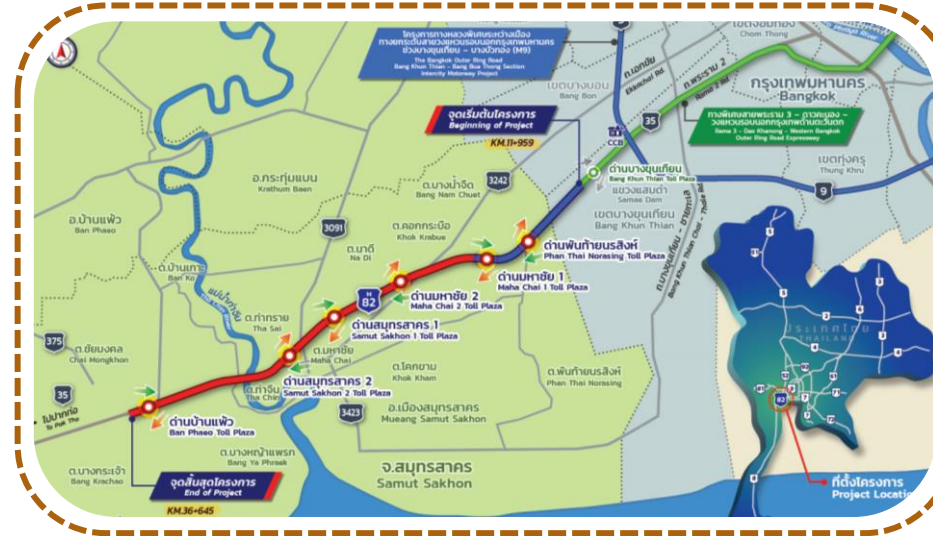
กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Distance-based fee collection
(Close System), using **M-Flow or barrier-free toll collection system**.



The project starts from the point where it **connects to the EXAT's Rama III - Dao Khanong - Western Bangkok Outer Ring Expressway**.



The project **starts at km. 11+959, and terminates at km. 36+645** (of Highway 35), covering 24.7 km. in total.



On-off ramps are provided in 6 locations, most of which are designed not only to function as entrances and exits but also elevated U-turns.



It is in the form of **6-lane elevated toll road** (3 lanes per direction) over the street isle of Highway 35 based on motorway standards.

Scope of Work



DOH

The DOH shall handover the following infrastructures along with the construction site to the private party



- elevated structures and on-off ramps
- drainage system
- lighting system
- traffic signs
- other related stuffs



Scope of Work



Private Party

The private party shall be responsible for the design and construction of system works and related facilities, including operation and maintenance services of the entire project.



CCB



**Highway
Police
Station**



**O&M
Unit**



**O&M
Center**

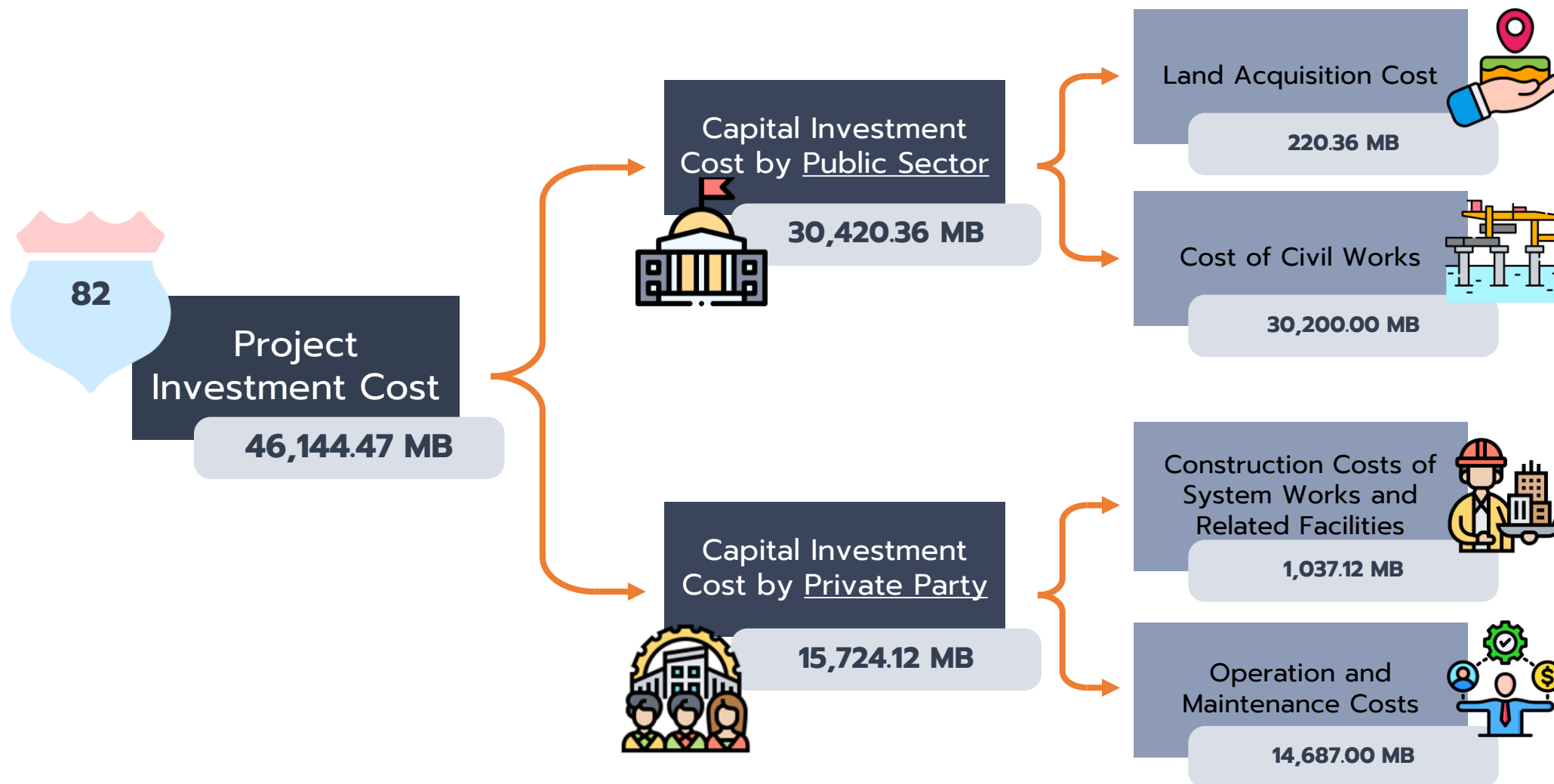
Project Investment Cost



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Remark: Refer to the prices revised in 2021 as proposed for Cabinet's approval

Traffic Volume



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Structure and Rates



4-Wheeled Cars:

Baht 10.00 + Baht 2.00/km.



6-Wheeled Cars:

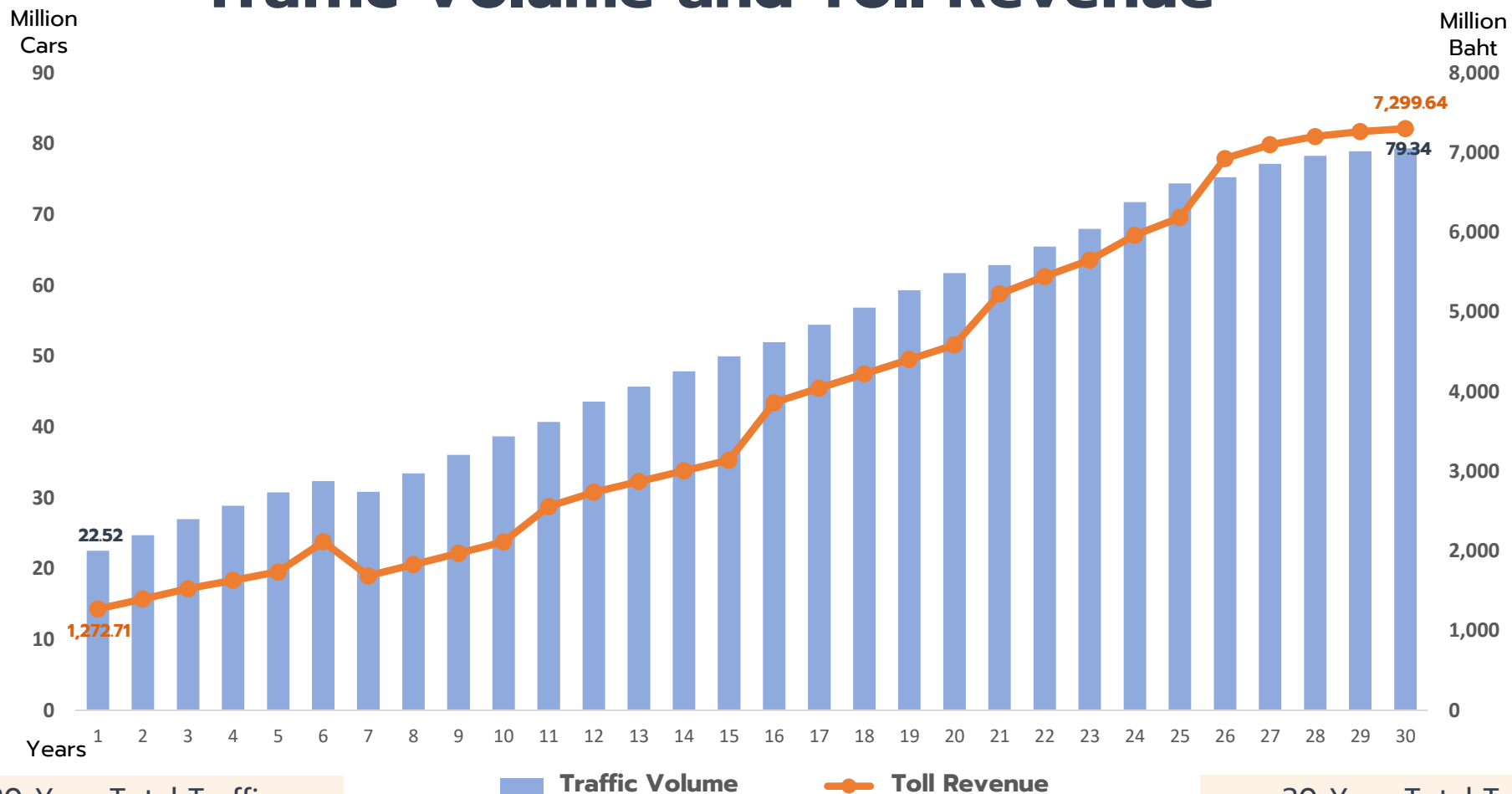
Baht 16.00 + Baht 3.20/km.



Over 6-Wheeled Cars:

Baht 23.00 + Baht 4.60/km.

Traffic Volume and Toll Revenue



30-Year Total Traffic Volume Using M82 System:
1,548.54 Million Cars

30-Year Total Toll Revenue
116,954.15 Million Baht

Economic and Financial Analysis



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Economic Internal Rate of Return (EIRR) and Financial Internal Rate of Return (FIRR)

Indicator	Economic	Financial
Net Present Value (NPV)	11,759.49 MB	22,170.09 MB
Rate of Return	EIRR 15.16 %	FIRR 6.14 %
B/C Ratio	1.58 Times	1.75 Times
Payback Period	-	17 th Year

Analysis Result based on the Private Party's and the Public Sector's Perspectives

Availability Payment (AP) for the Service Provided, with NPV not Exceeding
11,340.28 MB

Rate of Return for the Private Party

Equity IRR = 8.00%

Rate of Return for the Public Sector

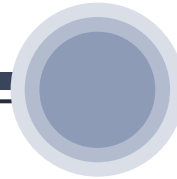
NPV = 21,145 MB



Remark:

- Refer to the prices revised in 2021 as proposed for Cabinet's approval
- The discount rate for economic analysis is 12%
- The discount rate for financial analysis is 3% (the discount rate applied for NPV was in the year the construction was commenced by the DOH).

Project Implementation Plan



Implementation Plan



Current Status of Civil Works



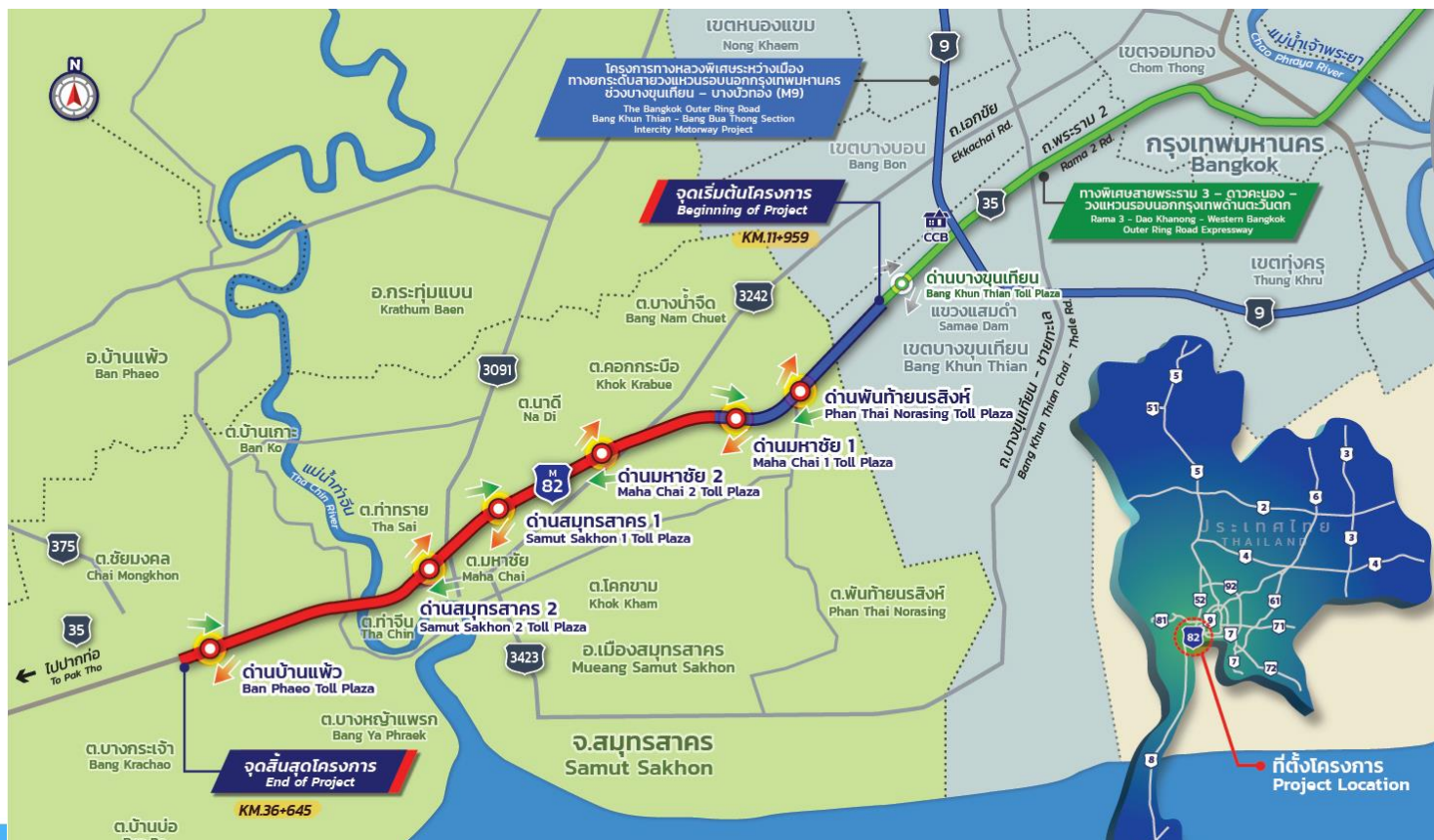
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Construction Works

- Construction works are divided into 13 contracts, all of which have been awarded, with works currently in progress. It is expected that all the construction works will be completed by **early 2025**.



Bang Khun Thian – Ekkachai Section (3 Contracts)

Progressive Rate (Dec., 2023)

88.35%

Plan = 100%

Delay = 11.65%

Ekkachai – Ban Phaeo Section (10 Contracts)

Progressive Rate (Dec., 2023)

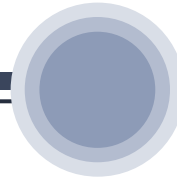
39.09%

Plan = 47.67%

Delay = 8.58%

Information updated as of December, 2023

Essential Information of the Draft Invitation to Bid, Draft RFP and Draft PPP Contract



Outline Technical Specifications

Outline Technical Specifications



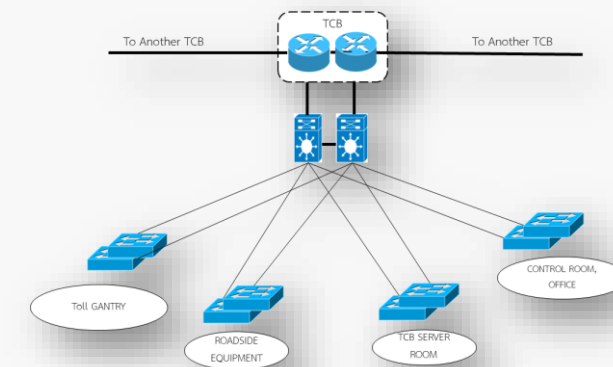
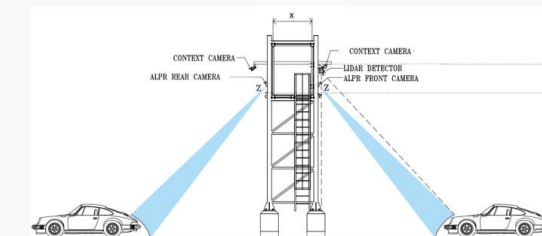
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



- **Toll Collection System**
- **Traffic Management and Control System**
- **Power Distribution System**
- **Communication Network System**
- **Buildings**



Outline Technical Specifications

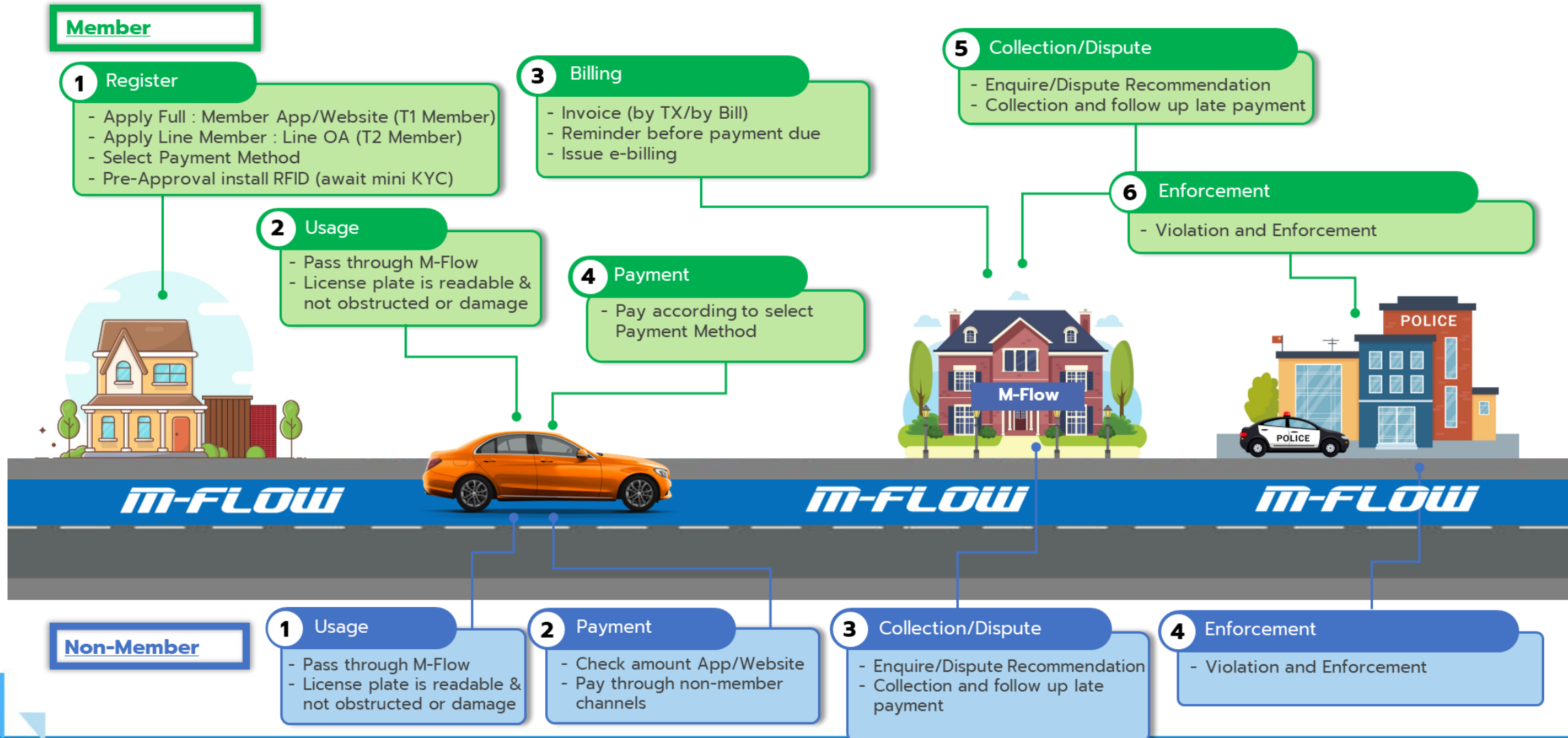


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – M-Flow Operation Flow Overview



Outline Technical Specifications

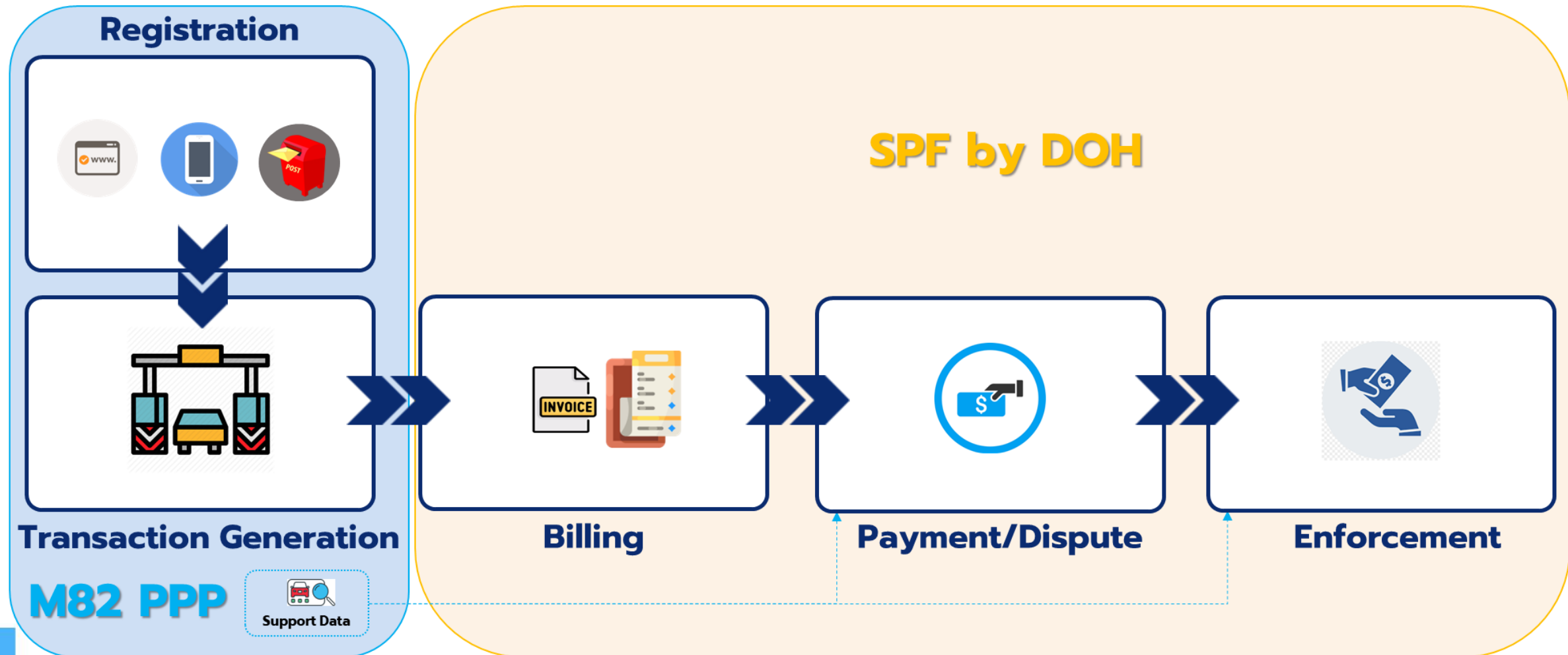


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – Stakeholders R&R



Outline Technical Specifications

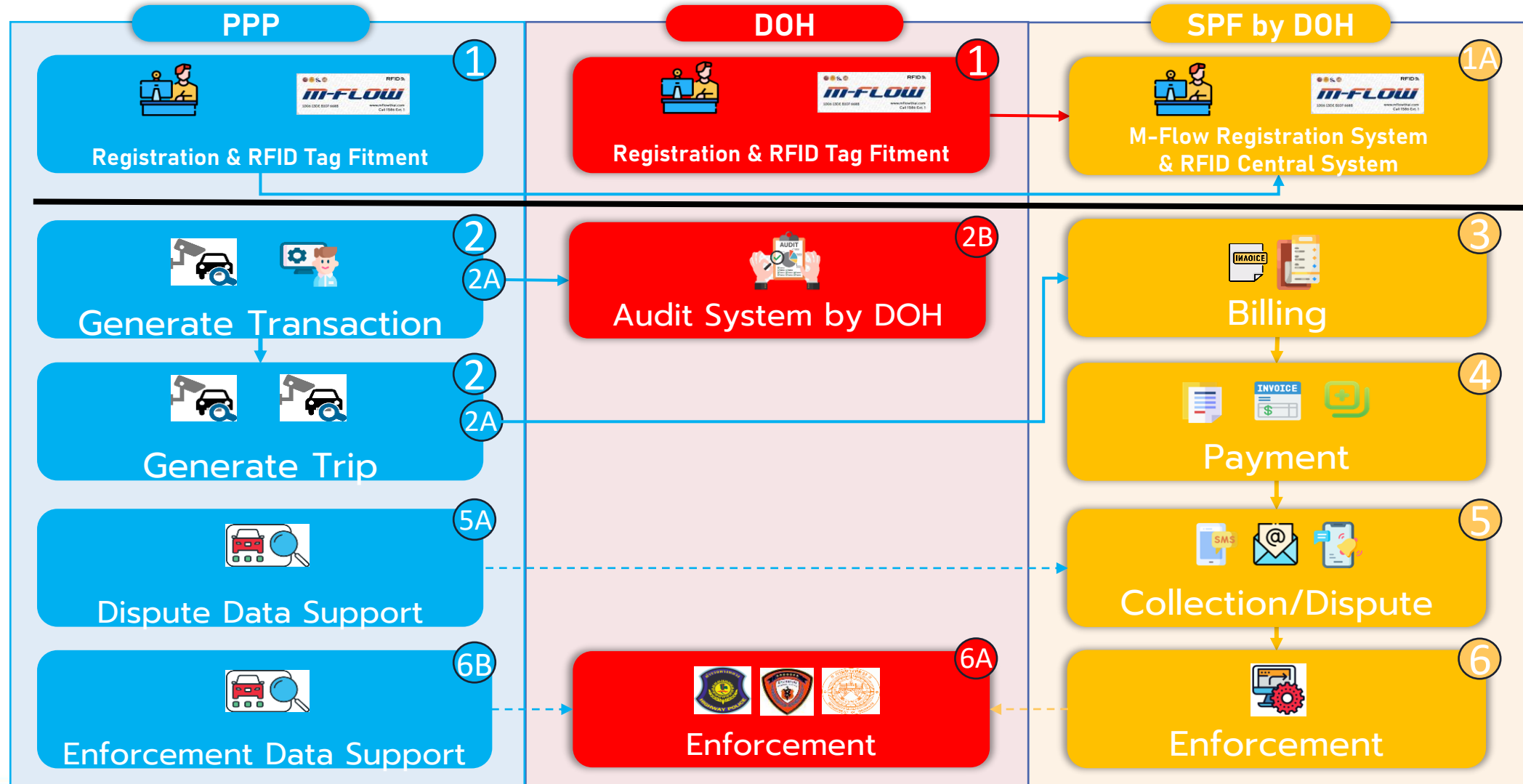


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – Operation Workflow



Outline Technical Specifications

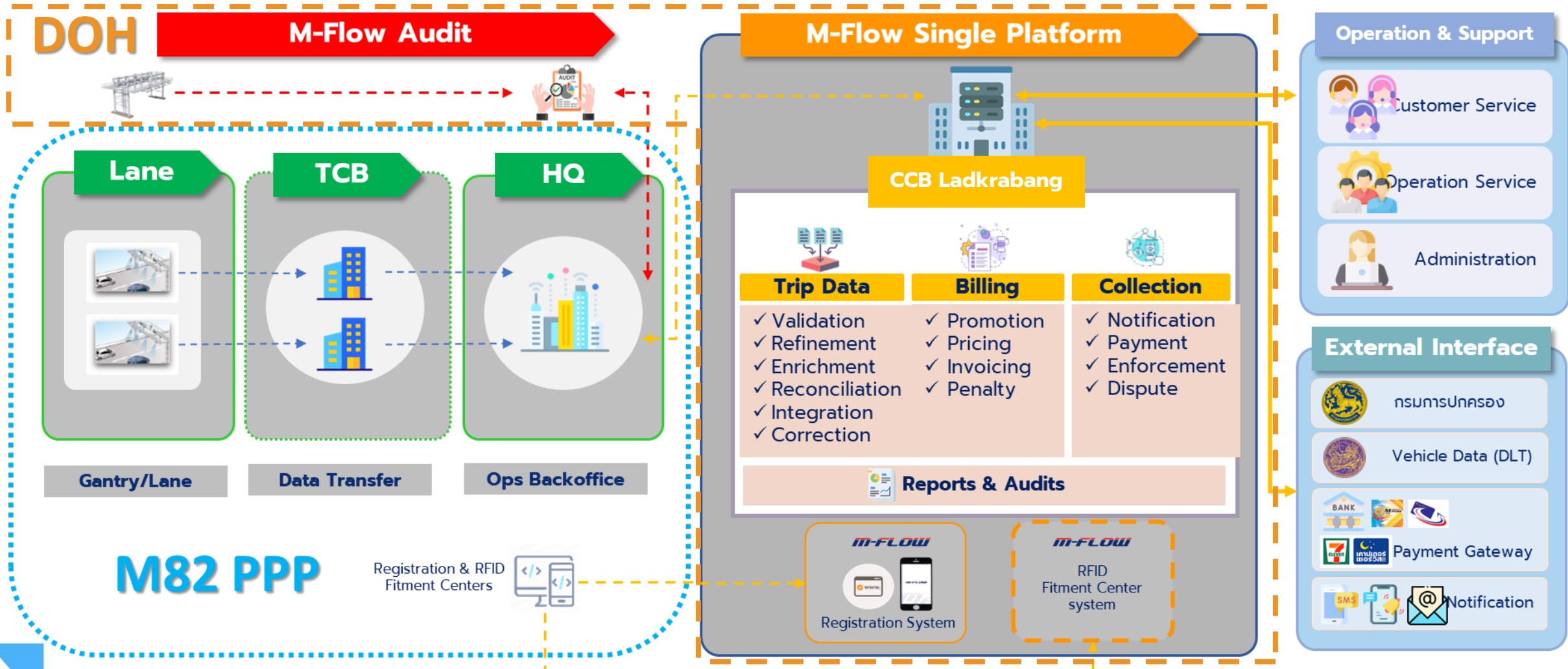


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – System Diagram for PPP



Outline Technical Specifications

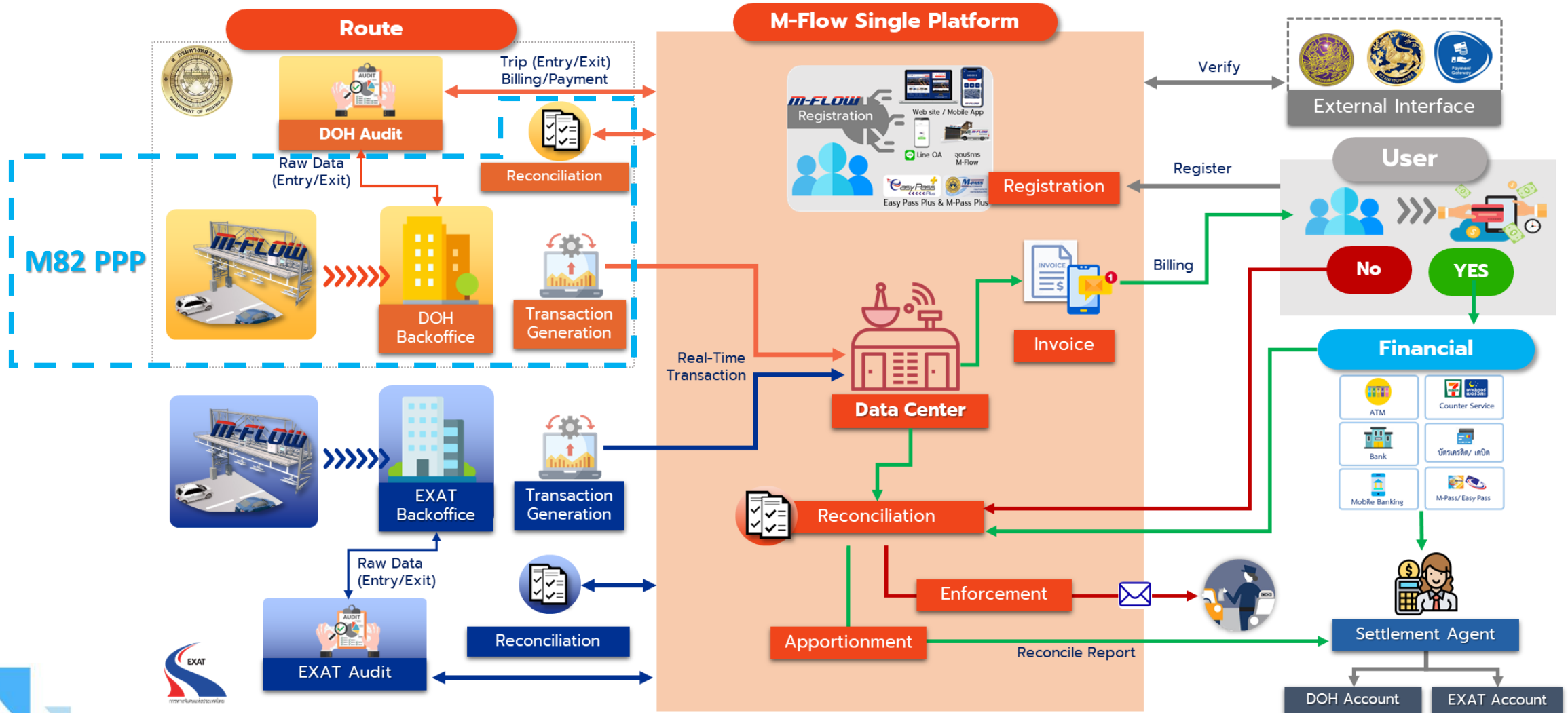


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – System Diagram for Multi Operator



Outline Technical Specifications

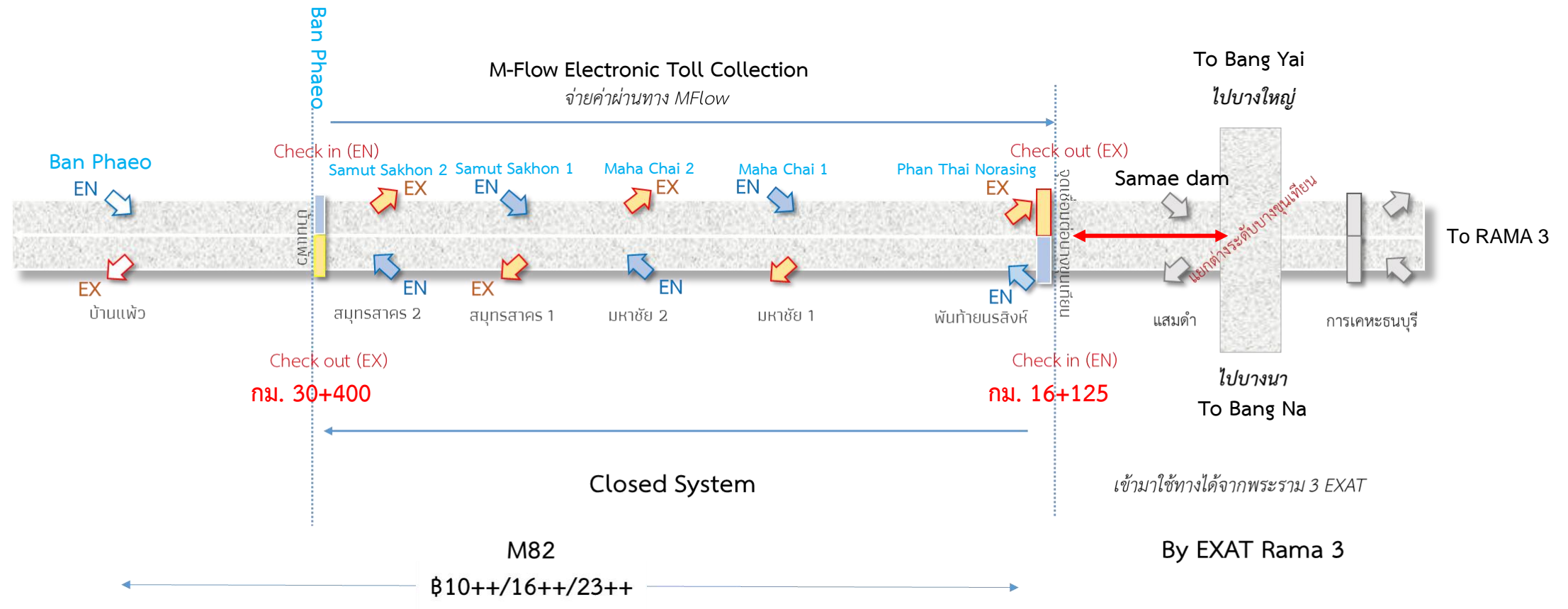


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System - Entry & Exit Points



Outline Technical Specifications



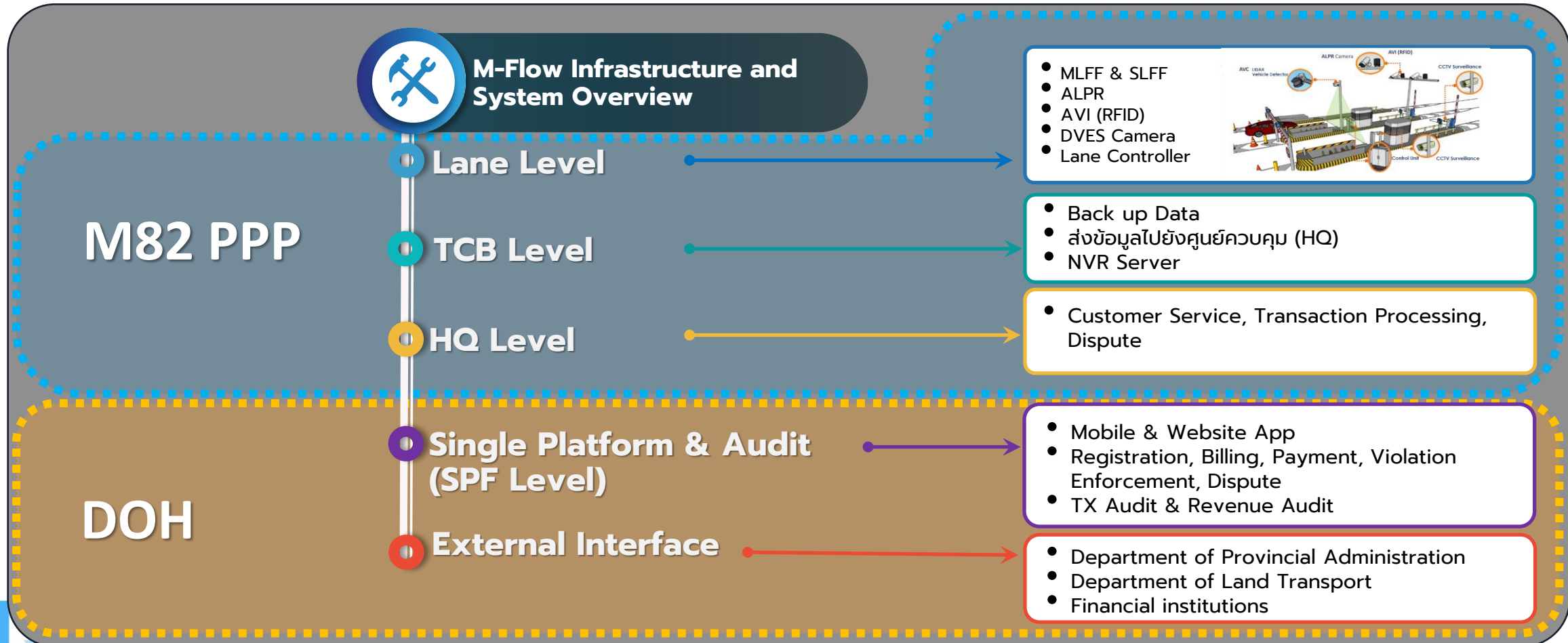
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – System Level

M-Flow Infrastructure and System Overview



Outline Technical Specifications



กรมทางหลวง
PARTMENT OF HIGHWAYS

Toll Collection System – Gantry & Equipment



AUTOMATIC LICENSE PLATE RECOGNITION

อุปกรณ์ระบบอ่านป้ายทะเบียนรถอัตโนมัติ
ทำหน้าที่อ่านข้อมูลบนแผ่นป้ายทะเบียนรถ

Dual Lens 75 FPS
160Km/hr.
IP65 -30 to 60c



AUTOMATIC VEHICLE CLASSIFICATION (AVC)

อุปกรณ์จำแนกประเภทยานพาหนะอัตโนมัติ

4 Classes @98.0%
160Km/hr.
IP65 -30 to 60c



RFID ANTENNAS

อุปกรณ์เสาอากาศ ทำหน้าที่อ่านข้อมูลจาก
RFID Tag ที่ติดตั้งในยานพาหนะที่วิ่งผ่าน
ช่องทาง



RFID CONTROLLER

อุปกรณ์ตรวจสอบยานพาหนะอัตโนมัติทำหน้าที่
ควบคุมและรับข้อมูลจากอุปกรณ์ RFID
Antenna เพื่อตรวจสอบจำนวนยานพาหนะที่
ติดตั้ง RFID Tag ที่วิ่งผ่านช่องทาง

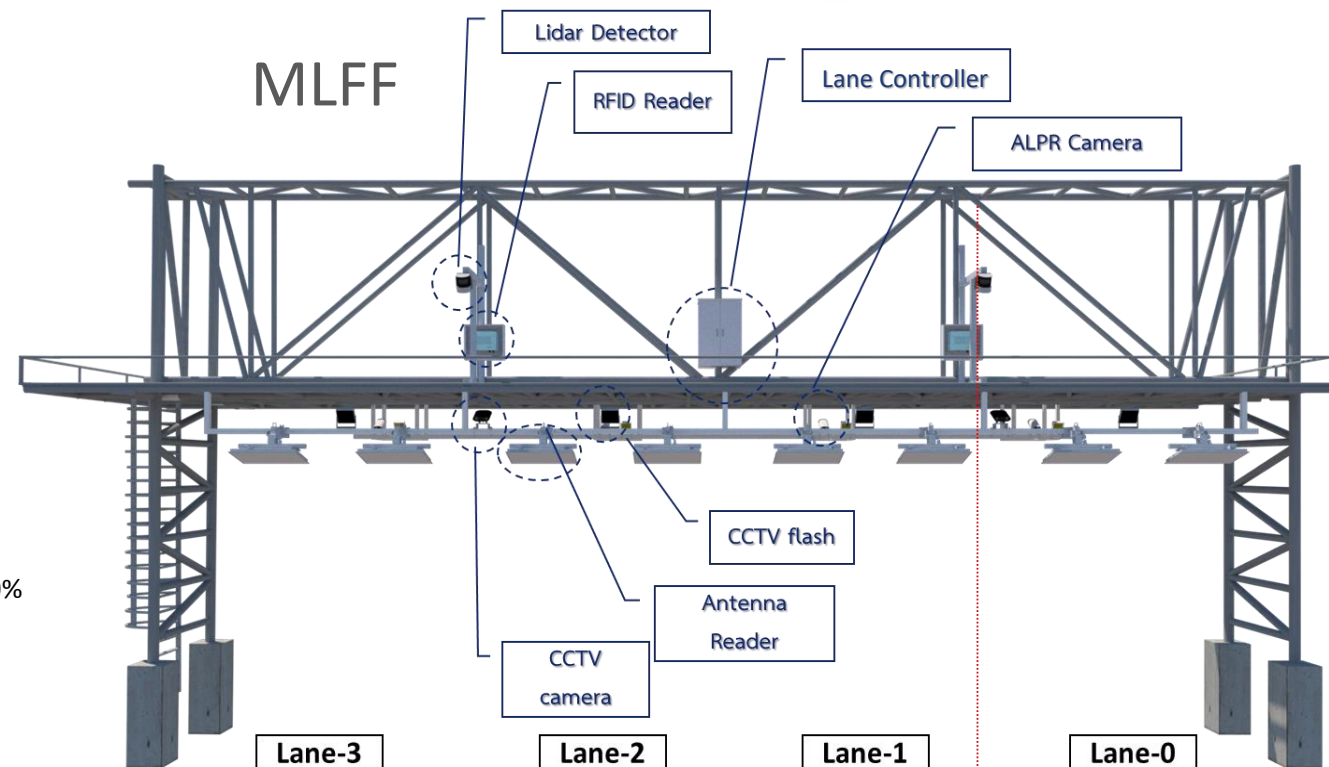
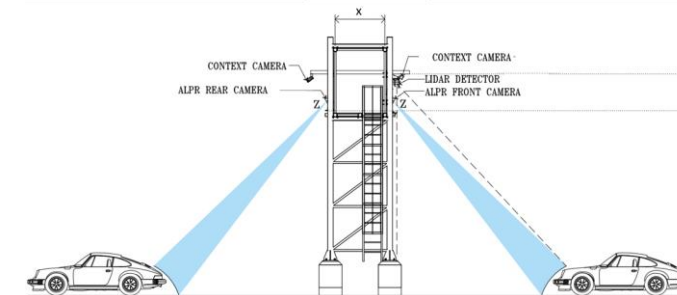
ISO/IEC 18000-63
EPC Class 1 Gen 2
@ 100%
IP65 -30 to 60c



LANE CONTROLLER

อุปกรณ์คอมพิวเตอร์ควบคุมช่องทาง

RFID + ALPR @99.0%
IP54
+
MLPR @ 100%



Outline Technical Specifications

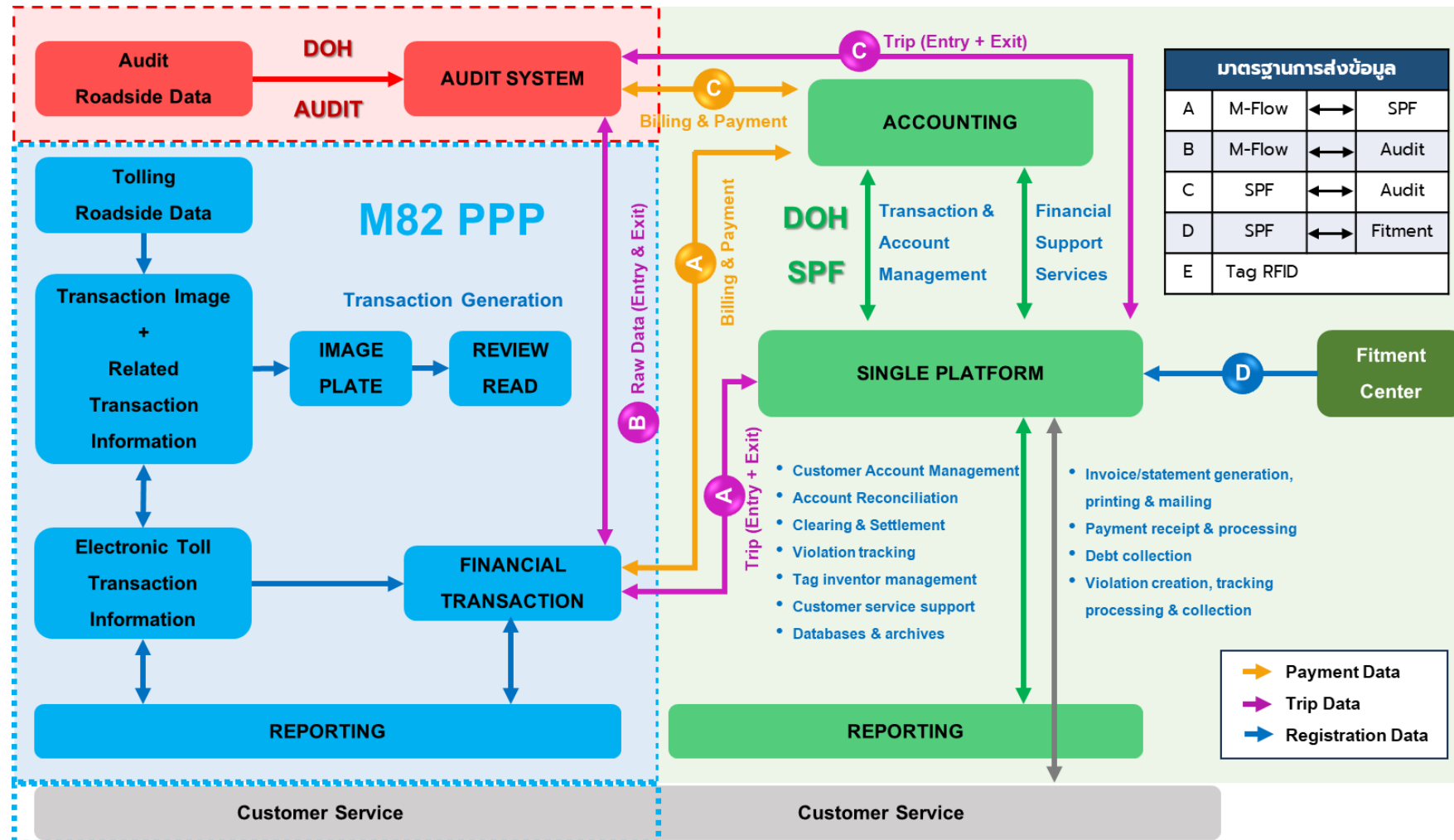


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – System Interface



Outline Technical Specifications

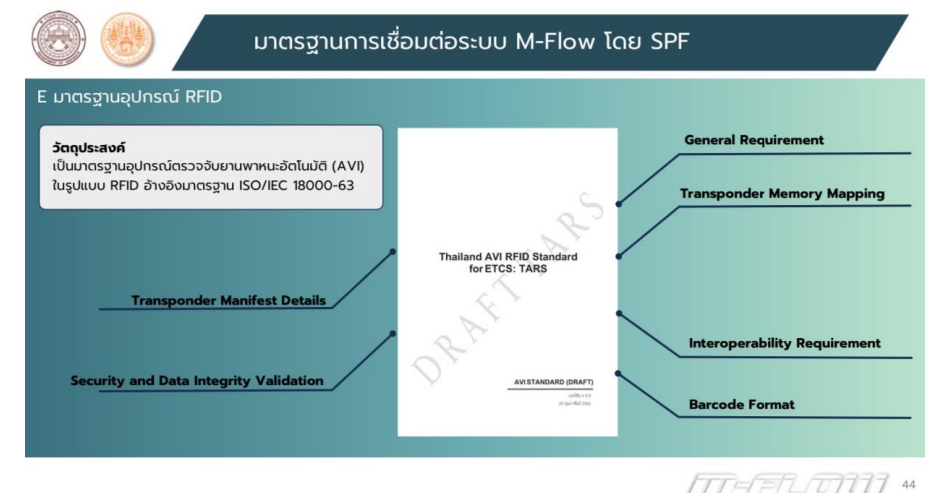
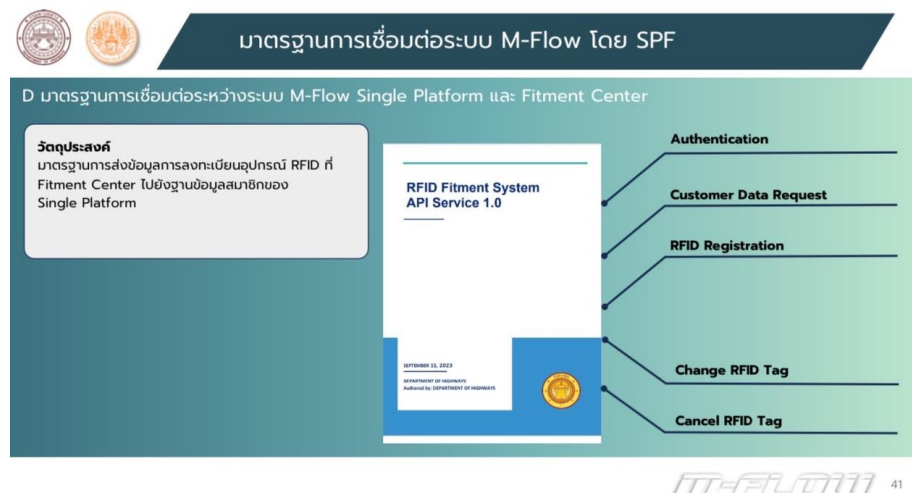
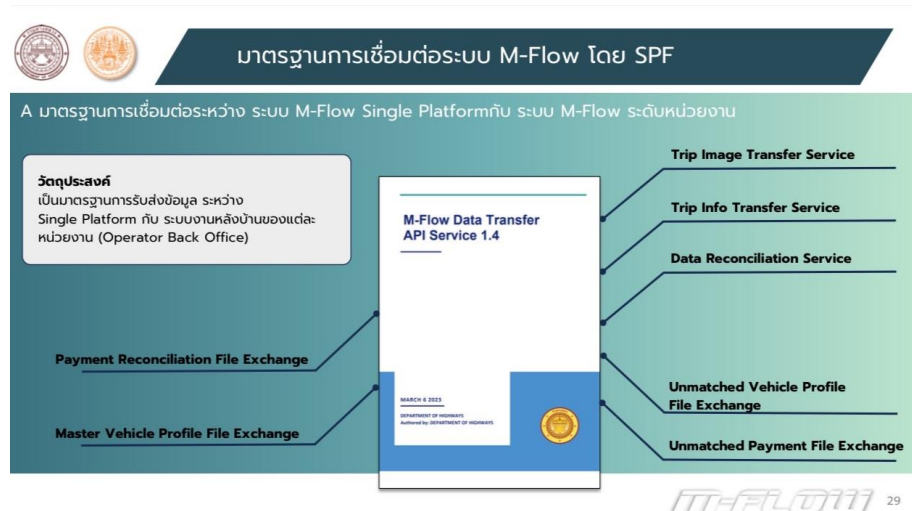


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Toll Collection System – Interfacing documents



Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Traffic Management and Control System



- Traffic CCTV System
- Automatic Traffic Incident Detection System
- Automated Speed Enforcement System
- Emergency Telephone System
- IP Telephone System
- Variable Message Sign System
- Integrated Speed and Lane Use Sign System
- Radio Communication System
- Traffic Detection System
- Graphic Wall Display System

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Traffic Management and Control System



Traffic CCTV System



Automated Speed Enforcement System



Variable Message Sign System



Automatic Traffic Incident Detection System



Emergency Telephone System



IP Telephone System

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



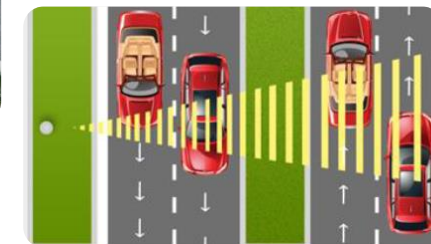
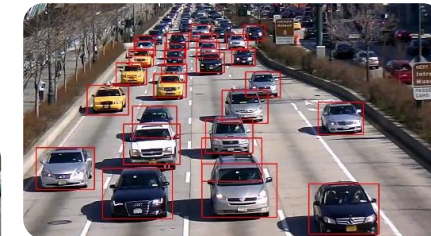
กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Traffic Management and Control System

Integrated Speed and Lane Use Sign System



Traffic Detection System



Graphic Wall Display System



Radio Communication System

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Asset Management System



Asset Database and Reporting

Decision Support and Analysis



Maintenance Management

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT

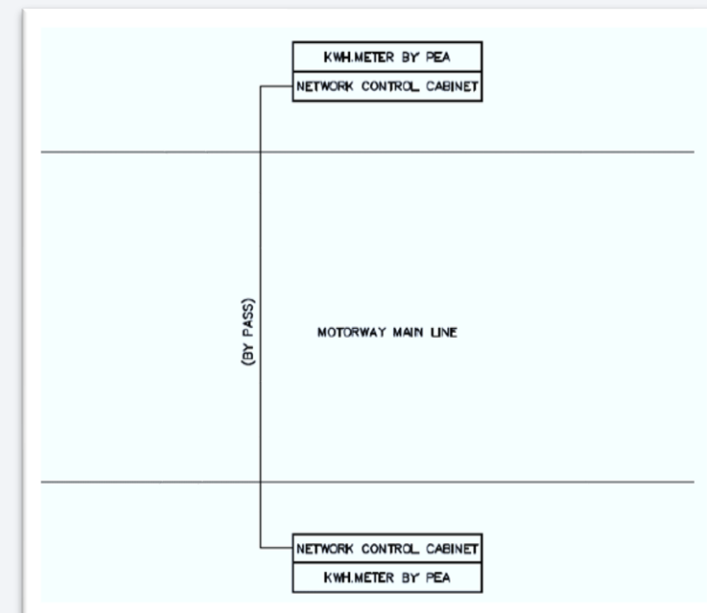
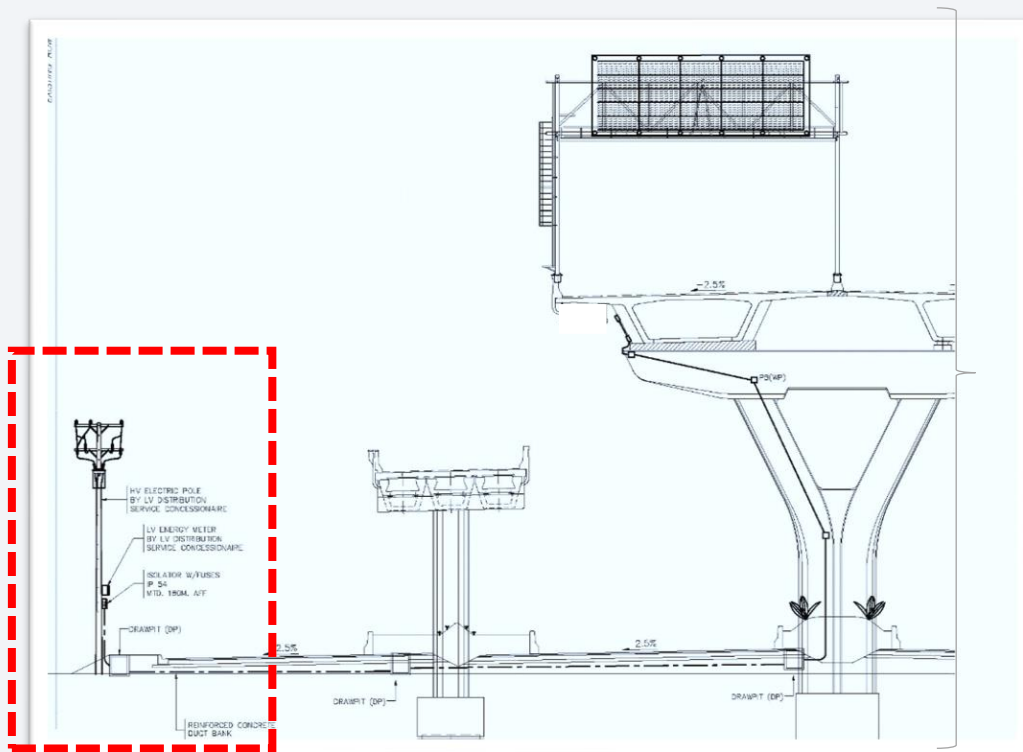


กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Power Distribution System

Power Distribution System for TMCS

- Receive a low voltage power from the PEA and MEA.
- Redundant Power Supply (Network Control Cabinet).



Outline Technical Specifications

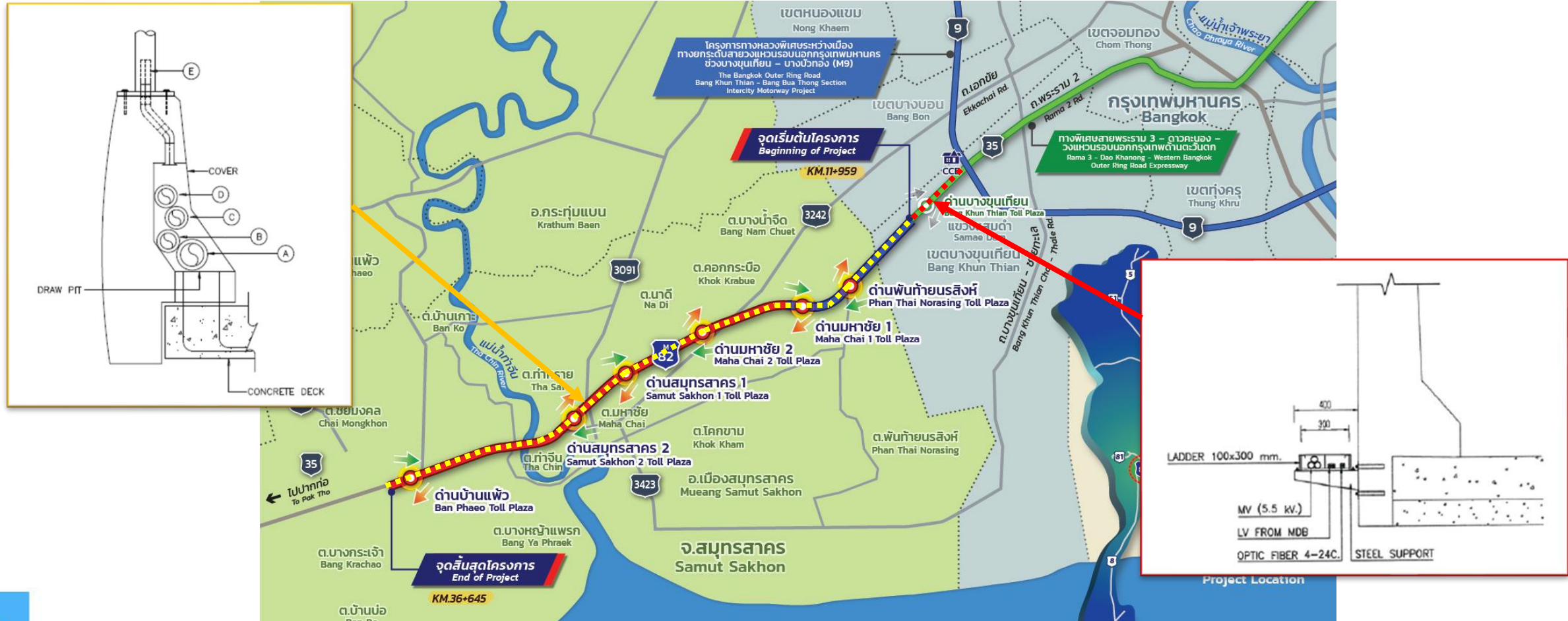


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Power & Communication Cable Installation



Outline Technical Specifications



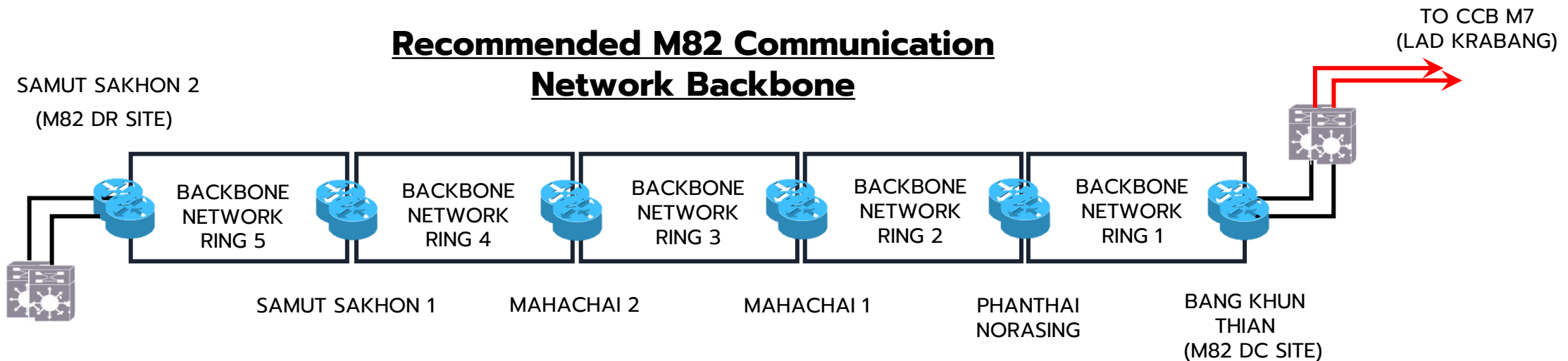
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Communication Network System

Recommended M82 Communication Network Backbone



Backbone Router (MPLS)



Core Switch



Access Switch



10 Gbps Link

- 2 Sets of Backbone Router shall be installed at CCB and TCBs
- 2 Sets of Core Switch shall be installed at DC Site และ DR Site
- 2 Paths of Fiber Optic Cable shall be installed for connecting Core Routers between CCB and TCBs (at leased 10 Gbps bandwidth)
- Communication System shall be designed and installed to accommodate the redundancy requirement. (without Single Point of Failure)
- CCB of M82 shall connect to the existing Lad Krabang CCB with at leased 2 rental of separated network lines of 2x1 Gbps each.

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

TCB



1

TCB Phan Thai Norasing Toll Area

- O&M Toll collection system/GANTRY
- Patrol unit

2

TCB Maha Chai 1 Toll Area

- O&M Toll collection system /GANTRY
- Audit M-Flow

3

TCB Maha Chai 2 Toll Area

- O&M Toll collection system /GANTRY
- M-FLOW / Fitment

4

TCB Samut Sakhon 1 Toll Area

- O&M Toll collection system /GANTRY
- Sub-Police station

5

TCB Samut Sakhon 2 Toll Area

- O&M Toll collection system /GANTRY
- Patrol unit

Outline Technical Specifications



Building Work



HIGHWAY POLICE STATION



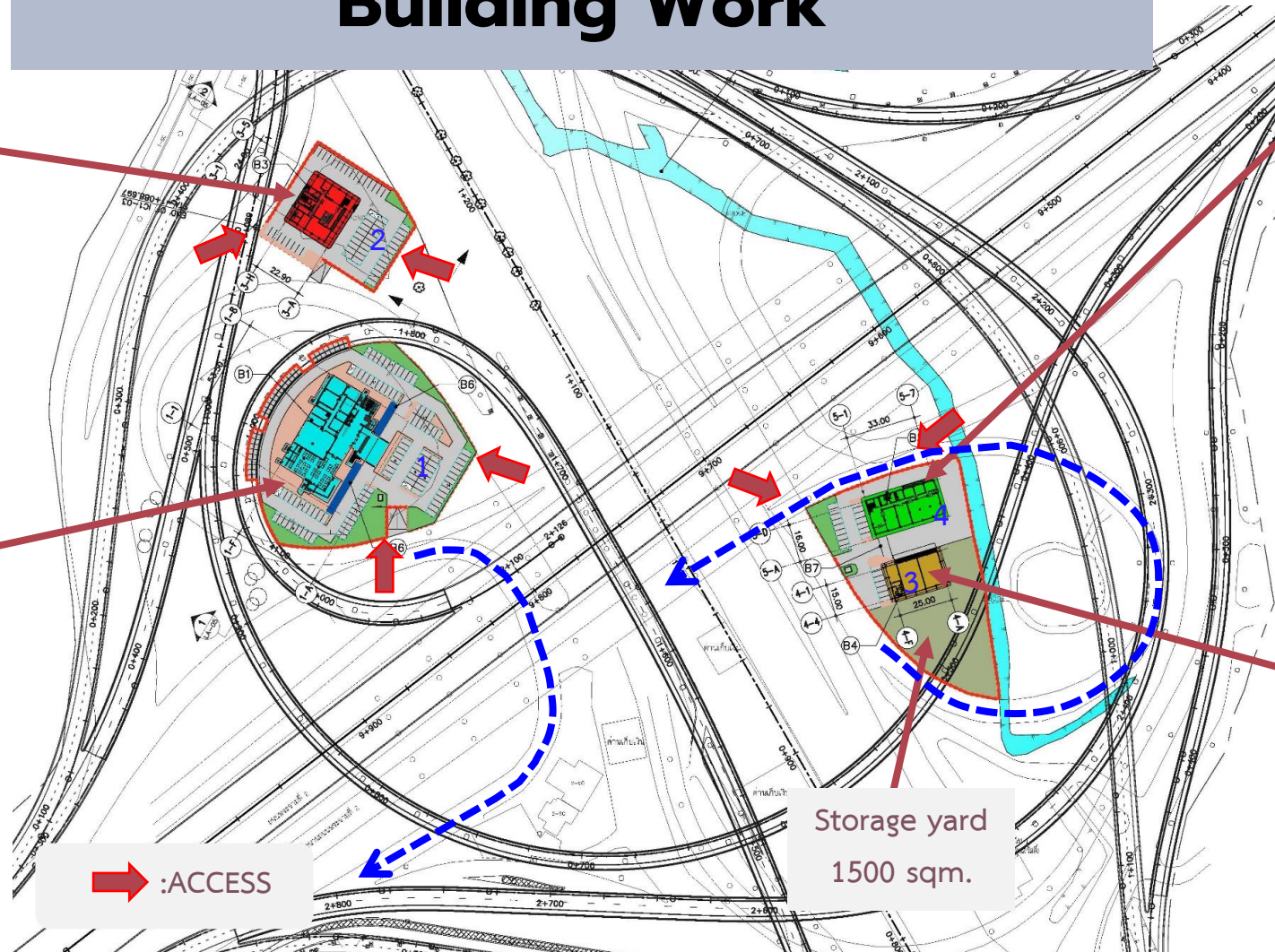
**Central Control Building and
DOH'S
Superintendent office**



**OPERATION AND
MAINTENANCE
CENTER**



**OPERATION AND
MAINTENANCE UNIT**



Layout of Building work at Bang Khun Thian Interchange

Outline Technical Specifications



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Central Control Building and DOH'S Superintendent office

- Reinforced concrete building
- Traffic operation center
- Speed Enforcement control room
- Toll operation center
- Asset Management
- MLPR , NOC Room
- SERVER Rm. TMCS,TCS system Rm, UPS Rm.
- Meeting Rm.
- DOH Superintendent office.
- Toll audit room
- M&E supporting rooms
- Customer Service Center



HIGHWAY POLICE STATION

- Reinforced concrete building
- Clerical room for a fine payment/ amount of a fine determination
- Legal clerical room
- Operating room , Commissioned duty officer room
- Inspector General and Deputy Inspector, Detention rooms for men and women
- Administrative Office



Operation & Maintenance Unit

- Reinforced concrete building
- Administrative office
- Workshop
- Safety & Maintenance Equipment Warehouse
- Material Storage Space
- Maintenance Equipment and Truck Parking



Operation & Maintenance Center

- Reinforced concrete building
- Administrative office
- Road maintenance center
- Building maintenance center - meeting rm.
- M&E maintenance center



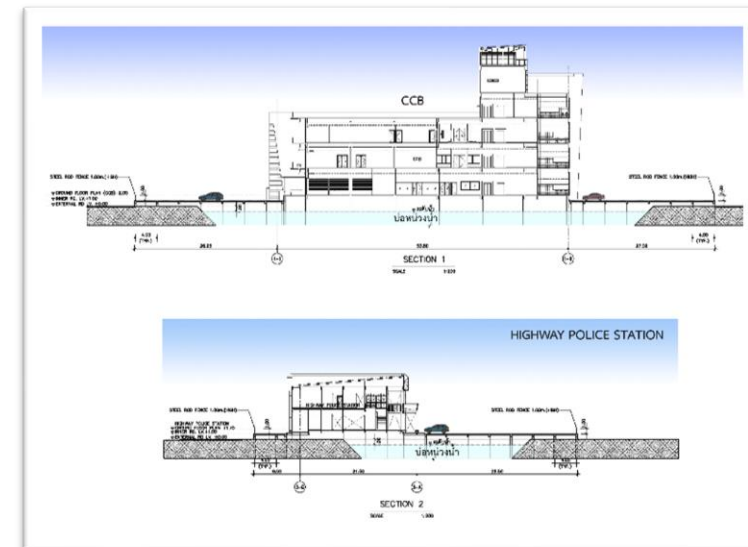
TOLL CONTROL BUILDING

- Reinforced concrete building
- Server, UPS, Battery Rm. Gantry System
- Gantry Equipment Storage
- Staff Rm.
- Etc.

The design concept of area around the CCB building

The CCB is situated on a pond and employs a structure on pile for foundation.

The superstructure utilizes precast plank girders on reinforced concrete beams. This design choice ensures optimal construction efficiency.



Outline Technical Specifications



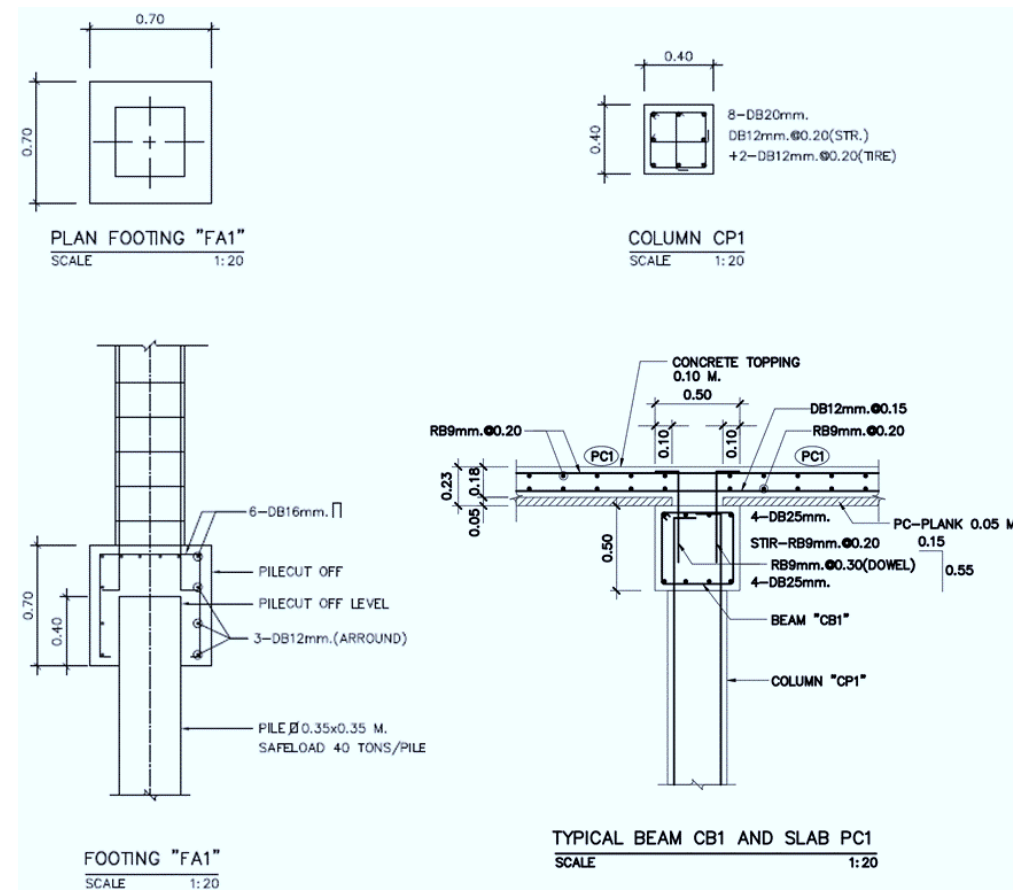
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Structure of CCB Building

- Driven Pile Foundation
- Precast Plank Girder on RC. Beam



Outline Operation & Maintenance Specifications



Operation & Maintenance Requirements:

- General Requirements
- Operation & Maintenance Plans
- Maintenance Requirements
- Operation Requirements
- Asset Management Systems
- Corridor Management
- Environmental Management
- Service Level Agreement
- Handback
- Key Performance Indicator (KPI)
- O&M Limit Drawings

General Requirements



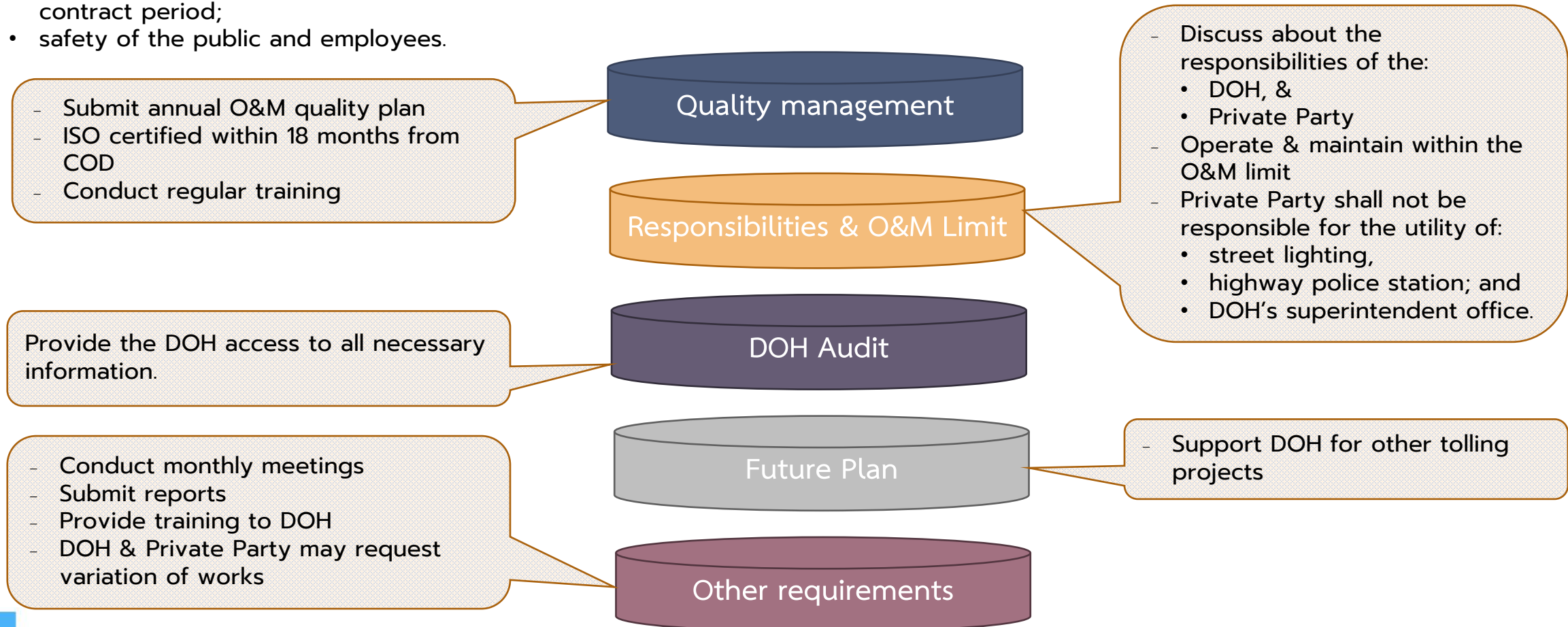
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

This Section discusses about the:

- operation and maintenance requirements for the M82 assets;
- day-to-day operations from COD until the end of the contract period;
- safety of the public and employees.



General Requirements



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

DOH Section Works

Constructed by the **DOH** and handed over to the Private Party such as:

- Bridge,
- Pavement,
- Bridge drainage,
- Delineation,
- Median barrier and parapet,
- Street light and signages, etc.

Re-
measurement

- Replacement of bridge finger type expansion joint and bearing
- Negotiation (Bridge NBI rating 0-6)

Lumpsum

All maintenance works not mentioned in re-measurement works.

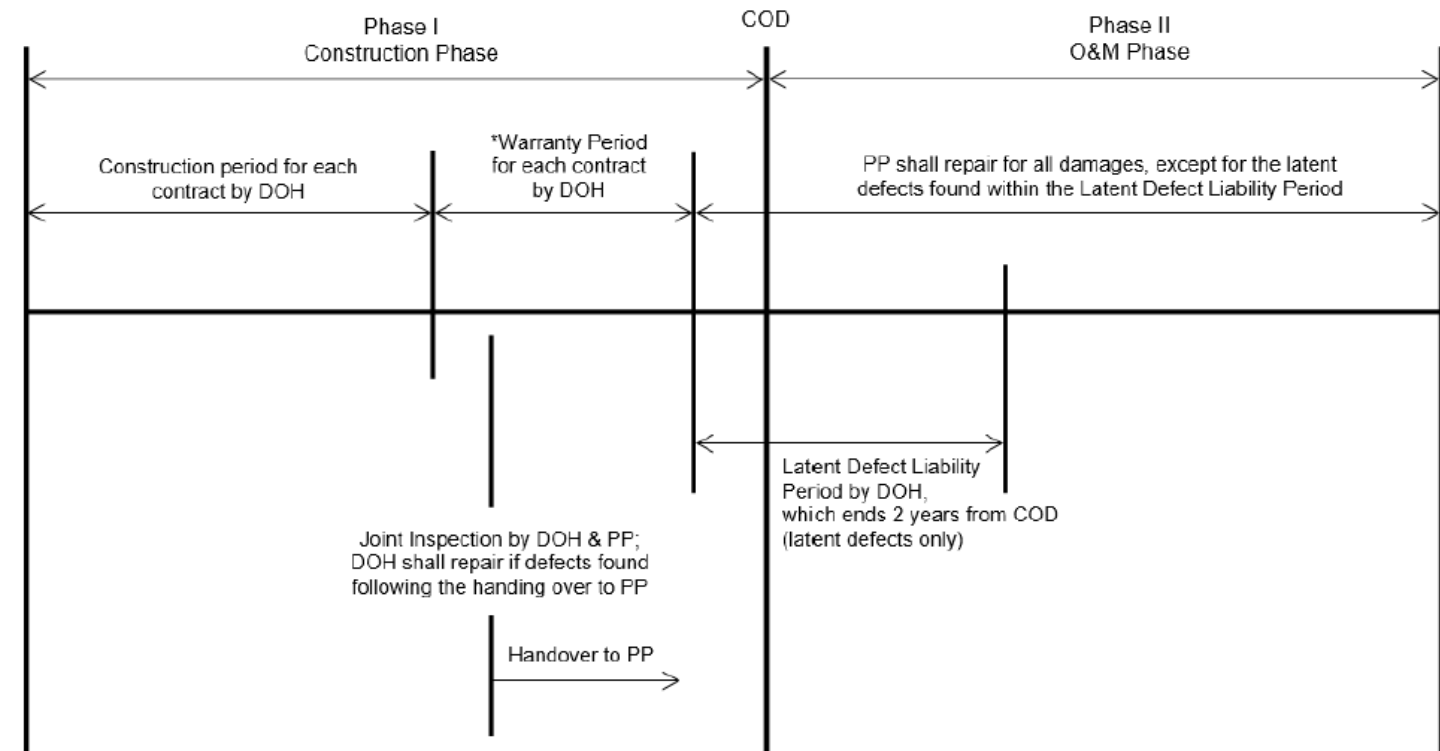
PPP Section Works

Constructed & installed by the **Private Party** such as:

- Toll collection system,
- Traffic management system,
- Network communication system,
- Buildings,
- Landscaping, etc.

Lumpsum

DOH Section Works Handover to Private Party



Operation & Maintenance Plan



กระทรวงคมนาคม
MINISTRY OF TRANSPORT

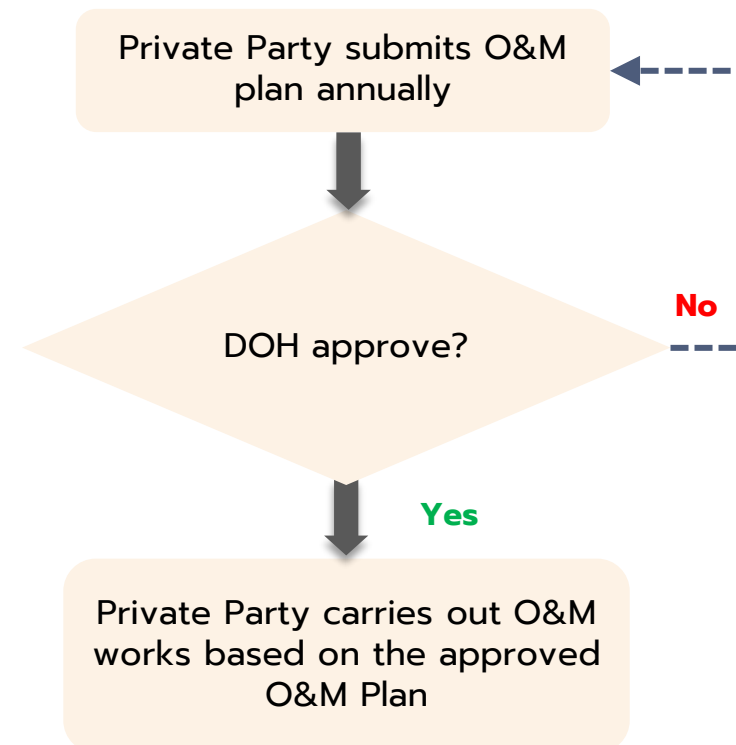


กรมทางหลวง
DEPARTMENT OF HIGHWAYS

O&M Plan:

- Safety Plan
- Equipment Plan
- M-Flow Transaction Data Collection and Operations Plan
- Traffic Management and Control Plan
- Customer Service Plan
- Emergency Management and Operations Plan
- Facilities Operations Plan
- Maintenance Plan

O&M Plan submission flow chart



Maintenance Requirements

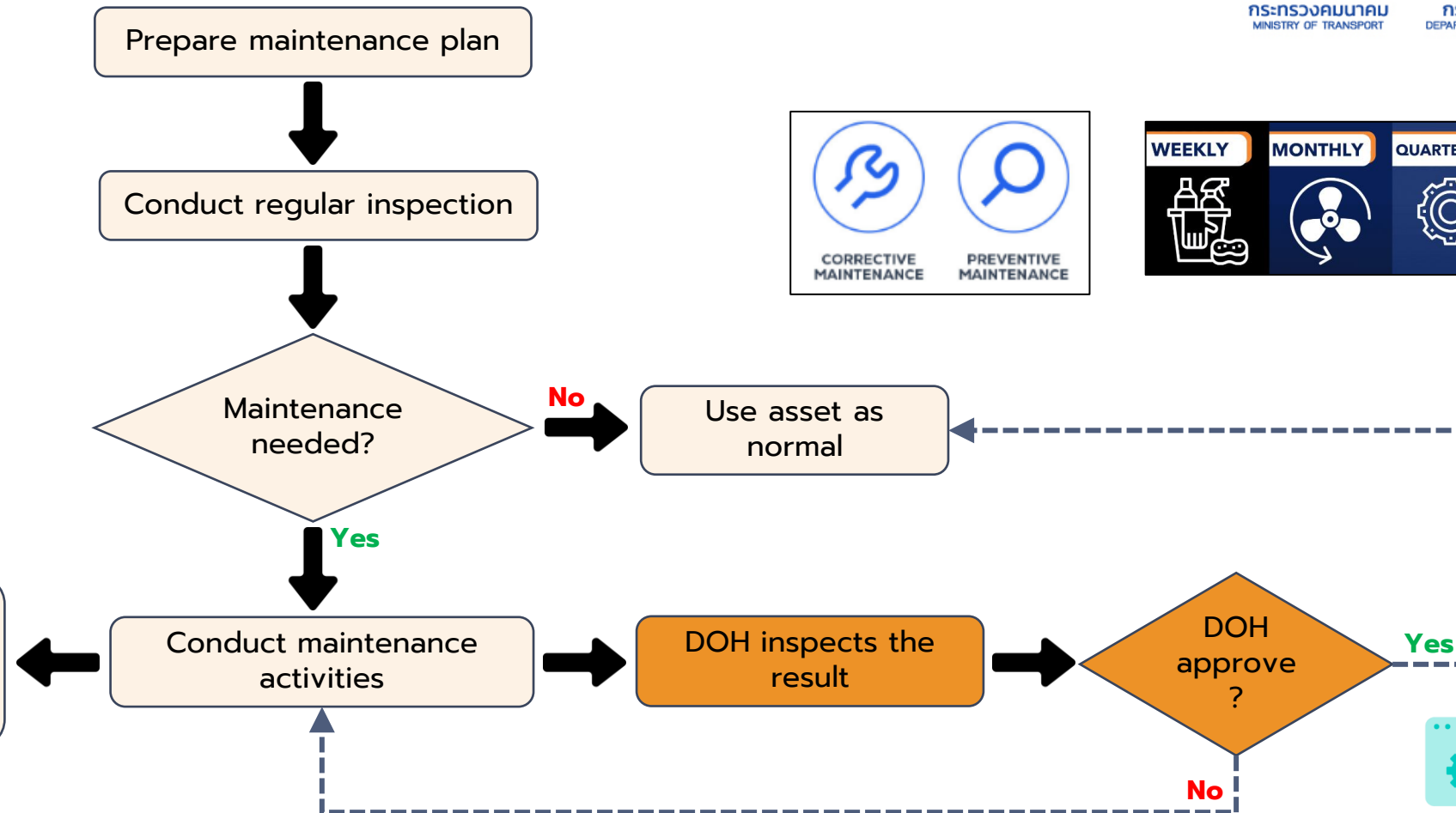
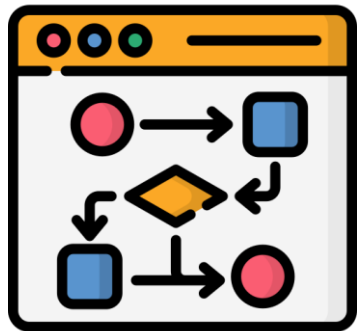


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Maintenance Flow Chart



Maintenance Requirements



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Maintenance Activities

General Information

- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- DOH Section Works warranty period (DOH will repair damages)
 - ❖ 1 year (pavement markings, painting works)
 - ❖ 3 years (electrical lighting & traffic light except bulbs)
 - ❖ 2 years (all items not mentioned in Year 1 & 3 warranty)
- Re-measurement works:
 - ❖ Unit Price
 - Improvement (new installation of rumble strip, traffic sign & pavement markings)
 - Maintenance & Rehabilitation (replacement of bridge finger type expansion joint and bearing)
 - ❖ Negotiation (Bridge NBI rating 0-6)
- Lumpsum works:
 - All maintenance works not mentioned in re-measurement works.

Key Performance Indicator

- Quarterly maintenance work report (submit on time)

Maintenance Requirements



Maintenance Activities

General Information

Roadway Maintenance

Pavement Delineation Maintenance

Drainage Maintenance and Slope Repair

Landscape & Roadside Maintenance

Roadway Safety Features And Systems Maintenance

Bridge & Structure Maintenance

Third Party Damages Repair & Maintenance

Signs And Sign Systems Maintenance

Roadway Lighting and Power Distribution System Maintenance

Toll Collection System Maintenance

Traffic Management And Control System Maintenance

Network Communication Maintenance

Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Replace concrete pavement joint for access road once every 5 years
- IRI and IFI shall be measured twice a year

Responsibilities

DOH Section Works

Warranty Period

DOH

- Mainline IRI & IFI
- Mainline maintenance

After Warranty Period

Lump Sum AP

- Mainline IRI & IFI
- Mainline maintenance

PPP Section Works

Lump Sum AP

Access road maintenance

Key Performance Indicator

- Ride quality (maintain condition of IRI & IFI)
- Pavement damages (not present)
- Debris and litter (not present)

Maintenance Requirements



Maintenance Activities

General Information

Roadway Maintenance

Pavement Delineation Maintenance

Drainage Maintenance and Slope Repair

Landscape & Roadside Maintenance

Roadway Safety Features And Systems Maintenance

Bridge & Structure Maintenance

Third Party Damages Repair & Maintenance

Signs And Sign Systems Maintenance

Roadway Lighting and Power Distribution System Maintenance

Toll Collection System Maintenance

Traffic Management And Control System Maintenance

Network Communication Maintenance

Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Apply new pavement marking within 1 year after COD for the entire roadway surface

Responsibilities

DOH Section Works

Warranty Period

DOH

- Mainline delineation

After Warranty Period

Lump Sum AP

- Mainline delineation

PPP Section Works

Lump Sum AP

Access road delineation

Key Performance Indicator

- Pavement markings (maintain retroreflectivity level)
- Marker and delineator (clean and visible)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair**
- Landscape & Roadside Maintenance**
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance

Responsibilities

DOH Section Works

Warranty Period

DOH

- Bridge drainage
- Noise barrier

After Warranty Period

Lump Sum AP

- Bridge drainage
- Noise barrier

PPP Section Works

Lump Sum AP

- Building drainage
- Building fence
- Landscape

Key Performance Indicator

Drainage Maintenance and Slope Repair

- Bridge drainage (clean and no obstruction)

Landscape & Roadside Maintenance

- Noise Barrier (good condition)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance**
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance

Responsibilities

DOH Section Works

Warranty Period

DOH

- Barrier walls
- Impact attenuators

After Warranty Period

Lump Sum AP

- Barrier walls
- Impact attenuators

Key Performance Indicator

- Safety concrete barrier (good condition)
- Impact attenuator (good condition)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance**
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance (Lump sum AP)
- Corrective maintenance (Re-measurement)
- Employ third party bridge & inspectors
- Repaint the entire bridge concrete parapet and median barrier once every 5 years
- Overseas bridge training once every 5 years

Responsibilities

DOH Section Works

Warranty Period	After Warranty Period
DOH	Re-measurement
NBI Code: 0–6 Maintenance	NBI Code: 0–6 Maintenance
Lump Sum AP	Lump Sum AP
NBI Code: 7–9 Maintenance	NBI Code: 7–9 Maintenance

Key Performance Indicator

- Bridge structure (preventive maintenance)
- Bridge expansion joint (strip seal type) (good condition)
- Graffiti (not present)

Maintenance Requirements



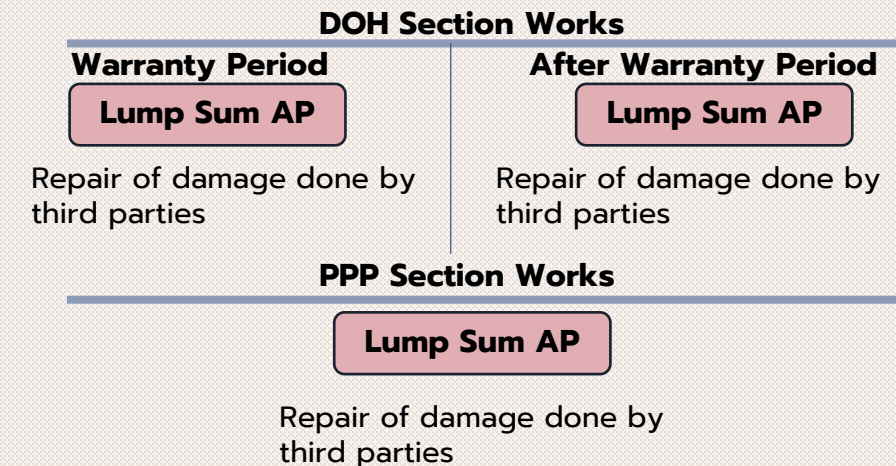
Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance**
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Emergency maintenance

Responsibilities



Key Performance Indicator

None

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance**
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Re-paint all components including its gantry, steel frames and posts once every 5 years.

Responsibilities

DOH Section Works

Warranty Period

DOH

- Sign maintenance

After Warranty Period

Lump Sum AP

- Sign maintenance

Key Performance Indicator

- Traffic sign panel (good condition)
- Traffic sign structure (good condition)
- Traffic sign retroreflecivity (maintain retroreflecivity)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance**
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Replace fully the power distribution line at least once within the O&M period

Responsibilities

DOH Section Works

Warranty Period

DOH

- Roadway lighting
- Sign lighting
- Power distribution

After Warranty Period

Lump Sum AP

- Roadway lighting
- Sign lighting
- Power distribution

PPP Section Works

Lump Sum AP

- Access road lighting & power distribution

Key Performance Indicator

- Road lighting and illuminance (good condition, maintain illuminance)
- Systems unavailability (available at all time)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance**
- Traffic Management And Control System Maintenance**
- Network Communication Maintenance**
- Building And Related Facility Maintenance

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Software maintenance

Responsibilities

PPP Section Works

Lump Sum AP

- Toll collection system maintenance
- Traffic management and control system maintenance
- Network communication maintenance

Key Performance Indicator

Toll Collection System Maintenance & Network Communication Maintenance

- Systems unavailability (available at all time)

Traffic Management And Control System Maintenance

- Display of VMS, ISLUS (present and visible)
- Systems unavailability (available at all time)

Maintenance Requirements



Maintenance Activities

- General Information
- Roadway Maintenance
- Pavement Delineation Maintenance
- Drainage Maintenance and Slope Repair
- Landscape & Roadside Maintenance
- Roadway Safety Features And Systems Maintenance
- Bridge & Structure Maintenance
- Third Party Damages Repair & Maintenance
- Signs And Sign Systems Maintenance
- Roadway Lighting and Power Distribution System Maintenance
- Toll Collection System Maintenance
- Traffic Management And Control System Maintenance
- Network Communication Maintenance
- Building And Related Facility Maintenance**

Maintenance Requirements

- Preventive maintenance
- Corrective maintenance
- Building painting once every 8-10 years (at least 3 times)
- Replacement of sanitary wares once every 14 years (at least 2 times)

Responsibilities

PPP Section Works

Lump Sum AP

- Building and related facility maintenance

Key Performance Indicator

- Systems unavailability (UPS & generator) (available at all time)

Operation Requirements

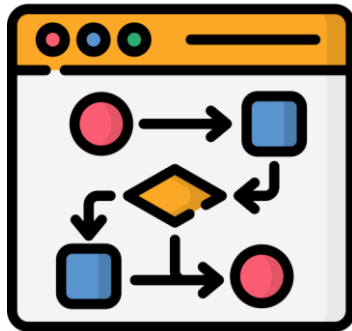


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Operation Flow Chart



Prepare operation plans



Conduct operation activities



Work with affected operators (adjoining motorway operator, local road operators, etc.)



Prepare and submit operation reports





Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- M-Flow transaction data collection
- M-Flow Audit
- M-Flow Violation
- Accuracy of toll charges
- Distribution of RFID transponders

Key Performance Indicator

- M-Flow operation
 - ❖ counting, reading and classification accuracy
 - ❖ transaction generation time
- Systems unavailability (available at all time)



Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- Observation and detection (CCTV or other devices)
- Data processing and response formulation
- Information dissemination and sharing (to other agencies and motorists) (VMS)
- Traffic operation and control (VMS, ISLUS)

Key Performance Indicator

- Unavailability of traffic lane (available at all time)
- Systems unavailability (available at all time)
- Incident management (respond within the time limit)
- Accident & fatality rate (better than the previous years)



Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- Provide information to motorists to ensure safe and orderly journey.
- Provide safe working area for workers.

Key Performance Indicator

- None



Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- Effectively manage Planned and Unplanned Events
- Provide up to date incident advice to motorists
- Assist and manage emergency and incident response
- Develop a traffic management plan and put it into place.

Key Performance Indicator

- None



Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- Allow oversize vehicles to use the M82 in accordance with any approvals by the DOH.
- Facilitate the safe, efficient and convenient passage of these oversize vehicles.

Key Performance Indicator

- None



Operation Activities

- M-Flow Operation and Management
- Traffic Management and Control
- Work Zone Traffic Management
- Management of Planned Events and Unplanned Events
- Road Freight Management
- Call Center Services**
- Data Collection, Analysis and reporting
- IT Disaster Recovery Management
- Customer Service Center
- Public Relation

Operation Requirements

Customer service center shall be open 24/7 to respond to:

- customer's questions,
- complaints, or
- any other matters.

Key Performance Indicator

- Systems unavailability (available at all time)
- Call center waiting (answer within 10 seconds)



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Operation Activities

M-Flow Operation and Management

Traffic Management and Control

Work Zone Traffic Management

Management of Planned Events and Unplanned Events

Road Freight Management

Call Center Services

Data Collection, Analysis and reporting

IT Disaster Recovery Management

Customer Service Center

Public Relation

Operation Requirements

- Collect and analyze operational data
- Data must be kept for at least 2 years (except for CCTV data to be kept for at least 1 year)

Key Performance Indicator

- None



Operation Activities

- M-Flow Operation and Management
- Traffic Management and Control
- Work Zone Traffic Management
- Management of Planned Events and Unplanned Events
- Road Freight Management
- Call Center Services
- Data Collection, Analysis and reporting
- IT Disaster Recovery Management**
- Customer Service Center
- Public Relation

Operation Requirements

Disaster recovery shall be able to:

- recover the M82 electronic information and
- bring data and applications back online immediately

Key Performance Indicator

- Disaster recovery site (recover & restore data immediately)
- Systems unavailability (available at all time)



Operation Activities

- ☐ M-Flow Operation and Management
- ☐ Traffic Management and Control
- ☐ Work Zone Traffic Management
- ☐ Management of Planned Events and Unplanned Events
- ☐ Road Freight Management
- ☐ Call Center Services
- ☐ Data Collection, Analysis and reporting
- ☐ IT Disaster Recovery Management
- ☒ **Customer Service Center**
- ☐ Public Relation

Operation Requirements

- Account Management and Maintenance Services
- Mailroom Operations
- Customer Communications
- Transponder Management
- Violation Management

Key Performance Indicator

- Customer satisfaction level (DOH conducts survey)
- Systems unavailability (available at all time)

Operation Requirements



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Operation Activities

- M-Flow Operation and Management
- Traffic Management and Control
- Work Zone Traffic Management
- Management of Planned Events and Unplanned Events
- Road Freight Management
- Call Center Services
- Data Collection, Analysis and reporting
- IT Disaster Recovery Management
- Customer Service Center
- Public Relation**

Operation Requirements

- Design communications campaigns.
- Write news releases and other content for news.
- Prepare for press conferences and media interviews.
- Write website and social media content.

Key Performance Indicator

- None

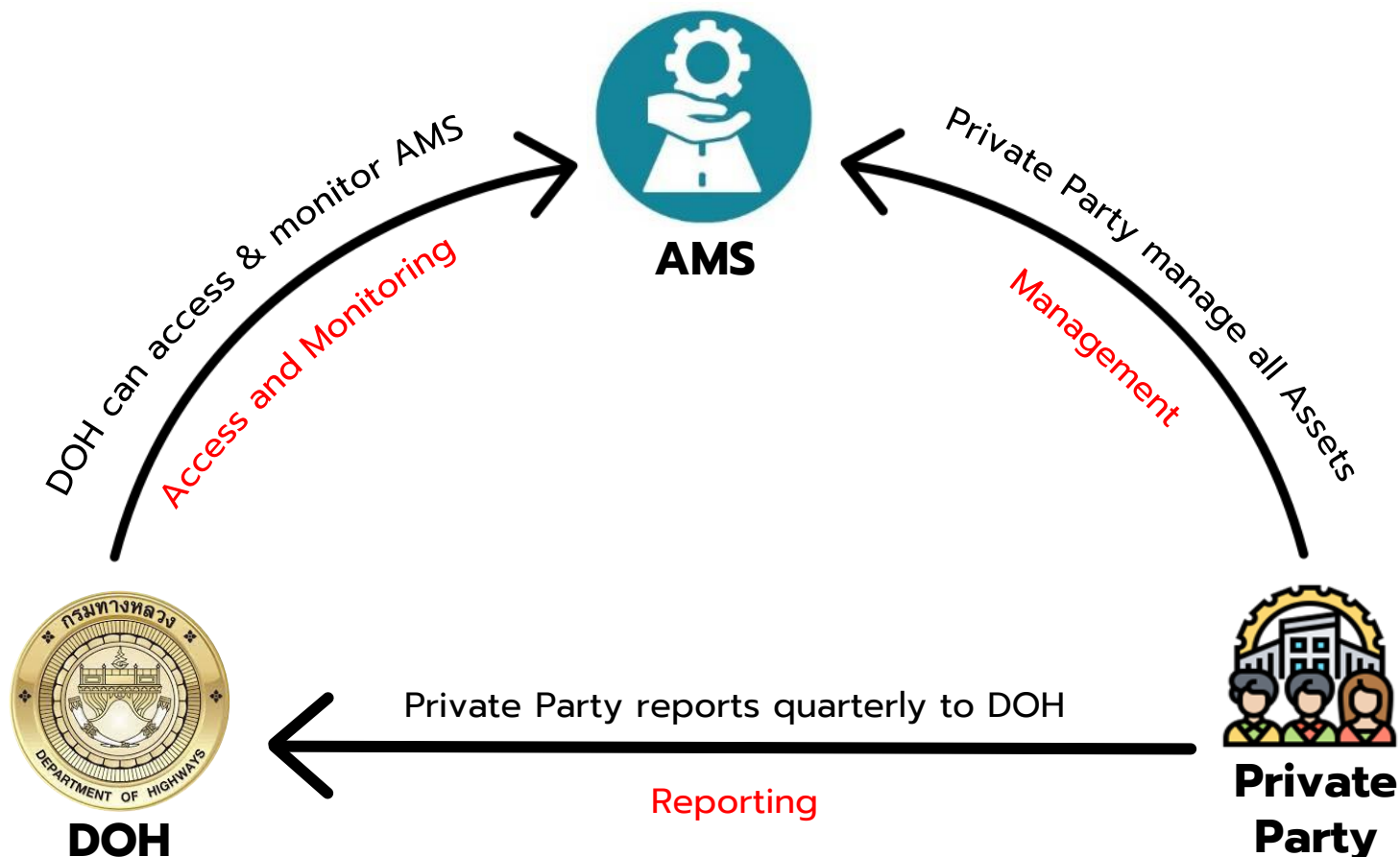
Asset Management Systems



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Asset Management System (AMS):

Record:

- ❖ current,
- ❖ historical and
- ❖ projected future condition of each asset

Link any

- ❖ inventory,
- ❖ defect database, and
- ❖ testing and inspection plan

System Components

- ❖ Asset Database and Reporting;
- ❖ Decision Support and Analysis;
- ❖ Maintenance Management; and
- ❖ Structures Management;

Corridor Management



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



DOH

Access and Interface
by third party to gain access in
M82 to:

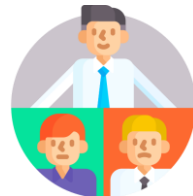
- construct,
- operate or
- maintain facilities.

Third party:

- Internet provider (True, AIS, etc.)
- PEA
- PWA
- DOH contractor
- Others

Agreement

Comply agreement
between DOH and
3rd party



Third Party



Private Party

Manage, coordinate and monitor
third party activities in M82



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Private Party shall:

- comply with all Government Acts and regulations;

- follow measures in the EIA report to:

- ❖ prevent,
- ❖ correct and
- ❖ reduce

environmental impacts.



Service Level Agreement



กระทรวงคมนาคม
MINISTRY OF TRANSPORT

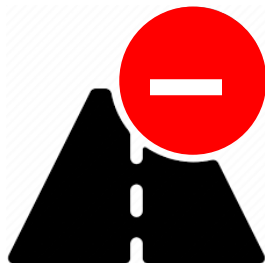


กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Unavailability
of Traffic
Lane

1

- Lane(s) Closure
- AP Deduction Penalty



Unavailability
of System

2

- System Downtime
- Demerit Point Penalty



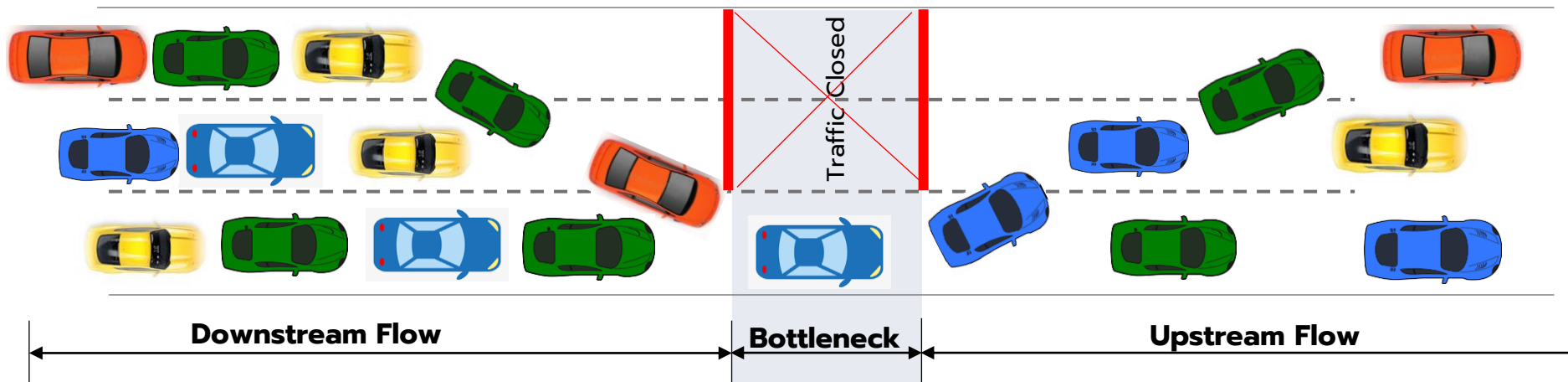
O&M
Violation

3

- Key Performance Indicator (KPI)
- Demerit Point Penalty



Unavailability of Traffic Lane



AP Deduction of Lane Closure shall be applied when;

- Unpermitted Lane Closure
- Unplanned Maintenance

Calculation of AP Deduction based on

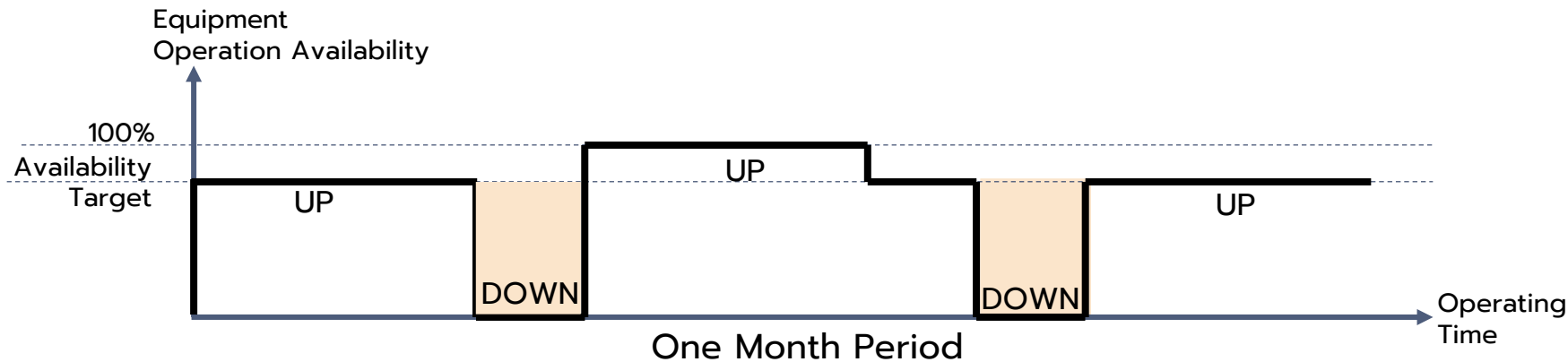
- Traffic volume at the time of lane closure
- Duration of lane closure
- Number of traffic lane(s) closed

Example: AP Deduction for One Lane Closure on a Three-Lane Carriageway

Traffic Volume per Direction (pcu/h)	Duration of Lane Closure			
	1-15 minutes	16-30 minutes	31-45 minutes	46-60 minutes
2,000 or less	None	None	None	None
2,500	1,000	3,700	8,200	14,500
3,000	6,300	25,100	56,300	100,000
3,500	13,200	52,600	118,200	210,100
4,000 and more	32,800	131,100	294,800	524,000



Unavailability of System



Availability of System (%)

=

Total Time of Unavailability (Downtime)

/

Total Operating Time – Scheduled Downtime for Maintenance

SYSTEM DOWNTIME

System to be assessed the availability

- (1) M-Flow Gantry System
- (2) Traffic Management and Control System
- (3) Power supply to all the systems at Toll Gantry, Toll Control Buildings, Central Control Building, including UPS and power generator
- (4) Communication Network System
- (5) Disaster Recovery Site
- (6) Maintenance Online Managements System
- (7) Toll Gantry Computer System (TGCS)
- (8) Headquarter Operational Back Office System (HBOFS)
- (9) Project website
- (10) Call center telephone equipment
- (11) Call Center Private Automatic Branch Exchange (PABX)



Key Performance Indicator (KPI)



KPI OPERATION

Cure Period

No Cure Period

1. Quality Management



Report Submission



QA ISO9001 Certified

2. Traffic Management & Control



Call Center Call Waiting



Incident Response Time Including Scene Clearance and Site Traffic Management



Dynamic Message Sign Posting Time

4. Traffic Safety



- Accident Rate per Vehicle-Kilometers Traveled (VKT) 5 years avg.
- Fatality Rate per VKT 5 years avg.
- 5 years average

5. Environmental Management



ISO 14001 Certified

3. M-Flow



Capture Accuracy of Vehicles w/RFD both AVI & ALPR



Capture Accuracy of Vehicles with RFID by ALPR



AVC Counting & Classification Accuracy



Toll Charging



Toll Entry Transaction Generation and Transmission



Toll Exit Transaction Generation and Transmission



Toll Entry and Toll Exit Transaction Matching and Transmission

M-FLOW

6. Customer Satisfaction



- Level of Customer Satisfaction

Key Performance Indicator (KPI)



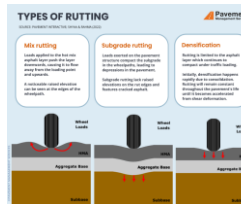
KPI MAINTENANCE

7. Ride Quality



- International Roughness Index (IRI) – Asphaltic Concrete Pavement
- Pavement Surface – Skid Resistance

8. Pavement Damages



- No pavement damage (rutting, depression areas, potholes & etc.)

9. Pavement Markings

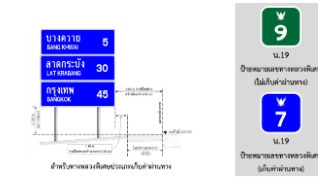


- Nighttime Visibility of White Color Pavement Markings based on 30 m geometry
- Nighttime Visibility of Yellow Color Pavement Markings based
- General Conditions of Pavement Markings
- Unused Pavement Markings

Cure Period

No Cure Period

11. Traffic Signs (Panel & Structure)



- Sign panel & Structure must be present, complete, clean, structurally sound and work properly.

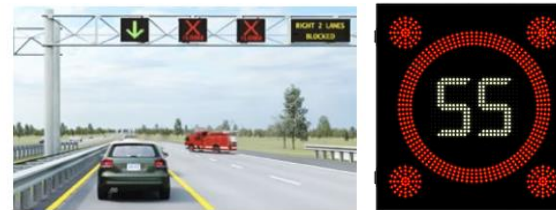
10. Road Furniture



Safety concrete barriers, Impact Attenuator, Noise Barrier, Safety Fence, Marker & Delineator & etc. must be present, complete, clean, structurally sound.



12. Display of Dynamic Message Sign



- The display of VMS, MS & ISLUS shall be present and visible. In case of any damage or defect, the display of VMS shall be repaired within the cure period

13. Road Lighting & Illuminance



- Luminaires must be present, complete, clean and work properly.
- Average illuminance must be 21.5 lux as a minimum. Lighting Pole.
- Average illuminance must be 21.5 lux as a minimum.

14. Vegetation Control



- No vegetation affects the traffic lane(s) or causes sight obstruction

15. Bridge Preventive Maintenance



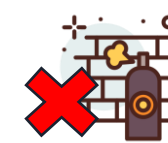
- Bridge structure
- Bridge expansion joint: strip seal type (Preventive Maintenance & Rating Condition Maintain)

16. Bridge Drainage



- Drainage shall be clean and without obstruction.

17. Other Indicators



- No presence of any debris and litter on roadway.
- No presence of graffiti on bridge structure, building, fence, barrier, and other structures.

Key Performance Indicator (KPI)

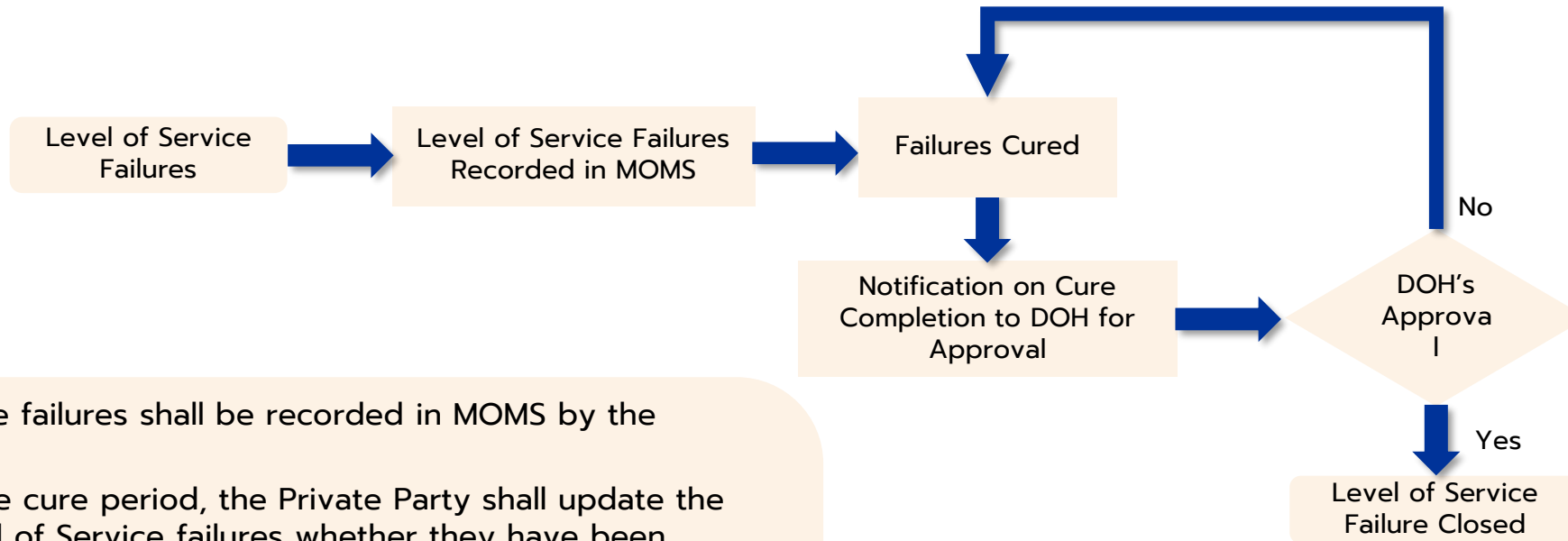


กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

NOTIFICATION AND RECORD PROCEDURE ON LEVEL OF SERVICE FAILURE



- The Level of Service failures shall be recorded in MOMS by the Private Party.
- Upon the end of the cure period, the Private Party shall update the status of such Level of Service failures whether they have been completely cured or are under execution
- The DOH shall perform a physical inspection on the completed remedy of the Level of Service failures as notified by the Private Party. Upon the DOH's approval of such completion on MOMS, the cure of Level of Service failures shall then be deemed completed.
- All the Level of Service failure records shall be updated and retrievable by both the DOH and the Private Party at any time via MOMS.



Cure Period



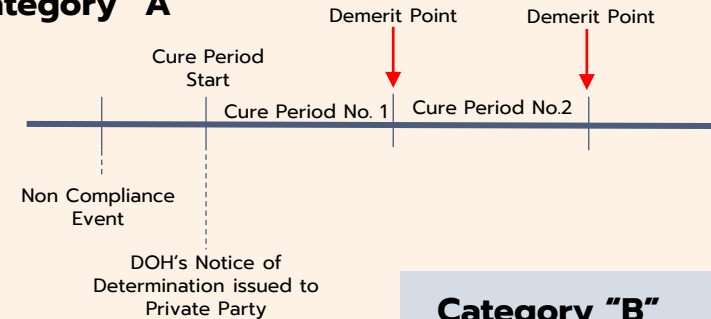
กระทรวงคมนาคม
MINISTRY OF TRANSPORT



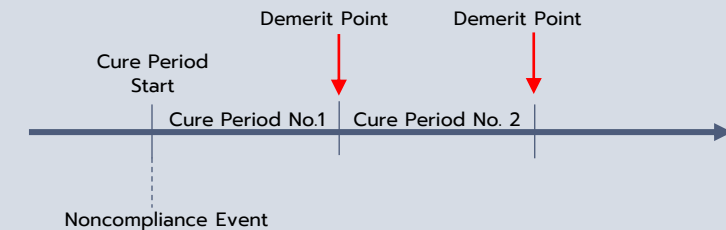
กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Category	Cure Periods	Assessment of Demerit Point
A	The Cure Period shall be deemed to start upon the date and time the Private Party first obtained knowledge of, or reason to know of, the noncompliance event. For this purpose, the Private Party shall be deemed to first obtain knowledge of the noncompliance event not later than the date of delivery of the Notice of Determination to the Private Party.	If a category "A" or "B" noncompliance event is not fully and completely cured within the Cure Period, <u>Demerit Points shall first be assessed at the end of the first Cure Period, and shall be assessed again at the end of each subsequent Cure Period (of duration equal to the prior Cure Period).</u>
B	The Cure Period shall be deemed to start upon the date and time on which the noncompliance event occurred, <u>regardless of whether the Notice of Determination has been released by the DOH or not.</u>	
C	No Cure Period applicable.	<u>Noncompliance points shall first be assessed on the date of the initial Notice of Determination.</u> A further instance of a breach or failure having the same assessment category shall be treated as a new noncompliance event.

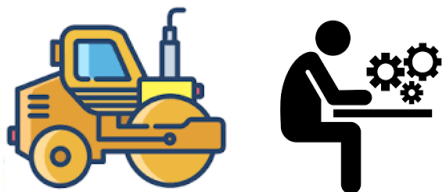
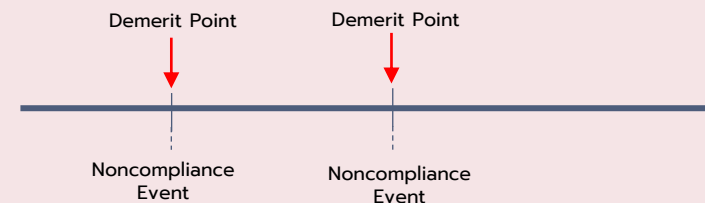
Category "A"



Category "B"



Category "C" (No Cure Period)



O&M Limit



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

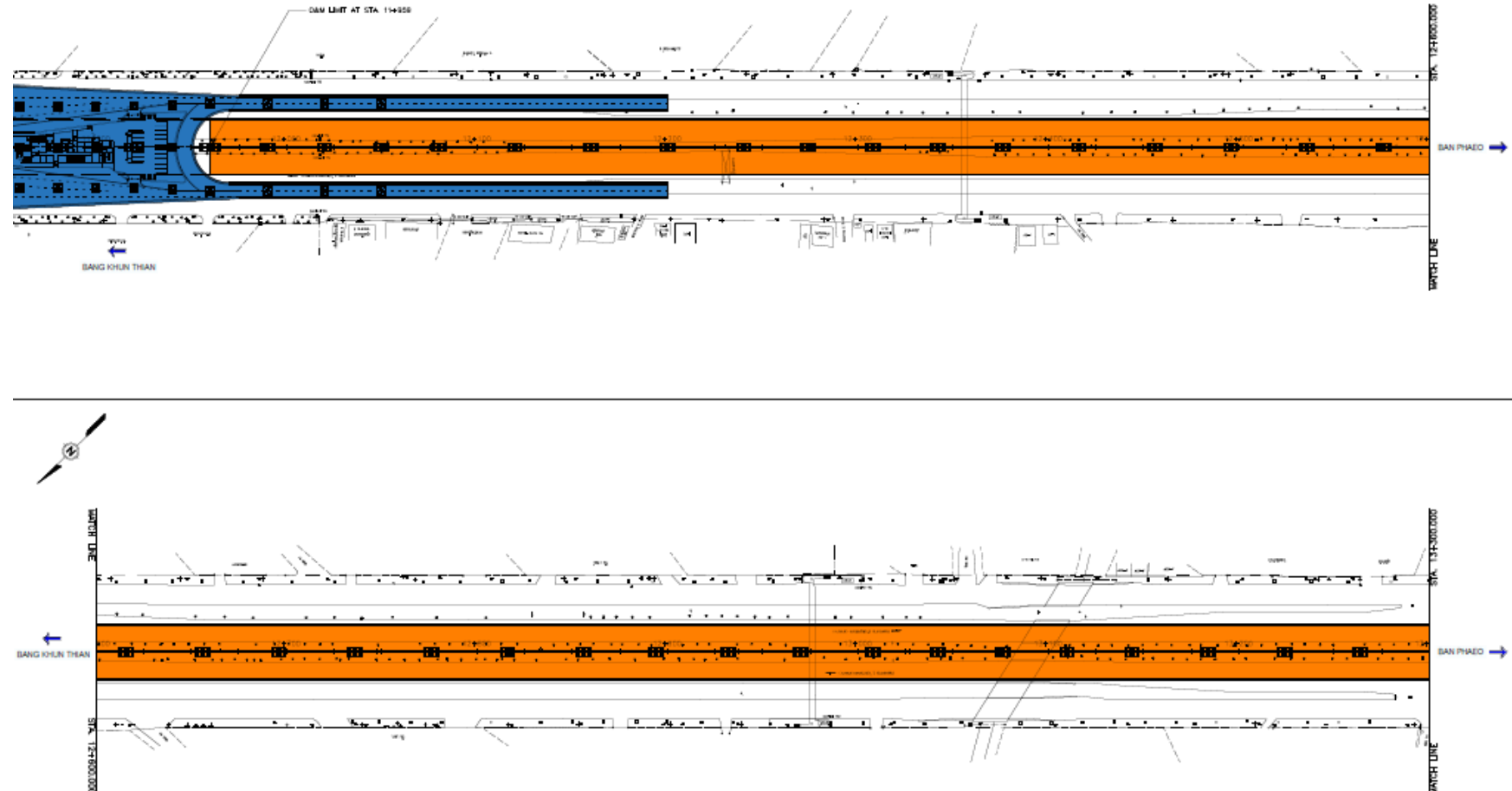
O&M Limit - boundary of areas where O&M works are the responsibilities of the Private Party such as:

- Bridge,
- Ramps,
- M&E Systems,
- Buildings,
- Landscape,
- Street light, etc.

Outside of O&M Limit

Private Party is not responsible to operate and maintain such as:

- Connecting elevated highway,
- At grade roads,
- Mainline at grade drainages,
- Local overpass,
- Interchanges, etc.



O&M Limit Plan at the Start of Project

- EXAT
- Private Party

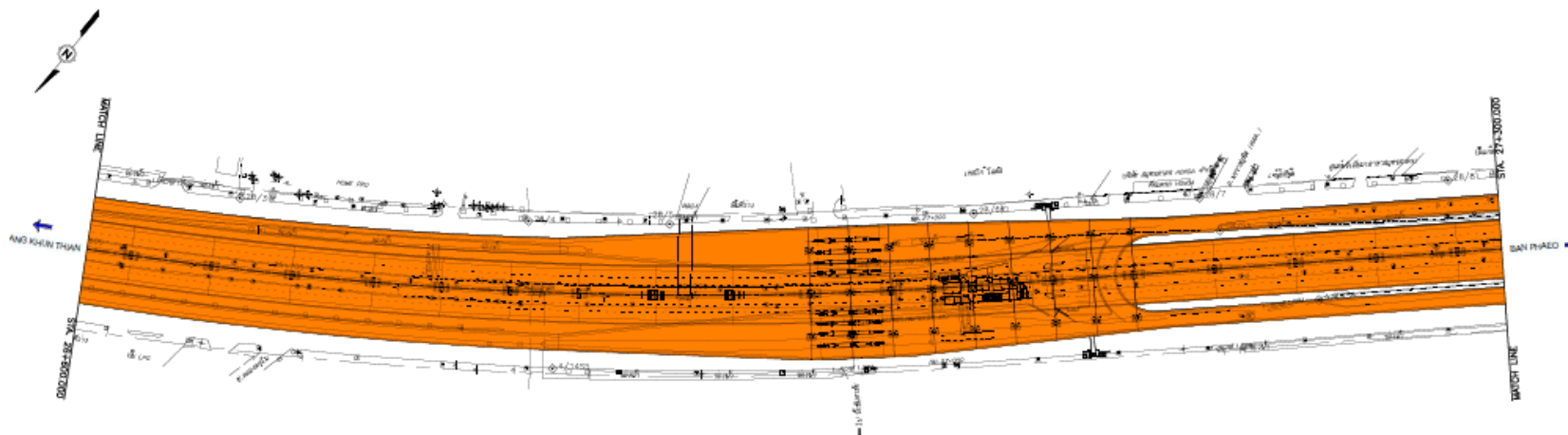
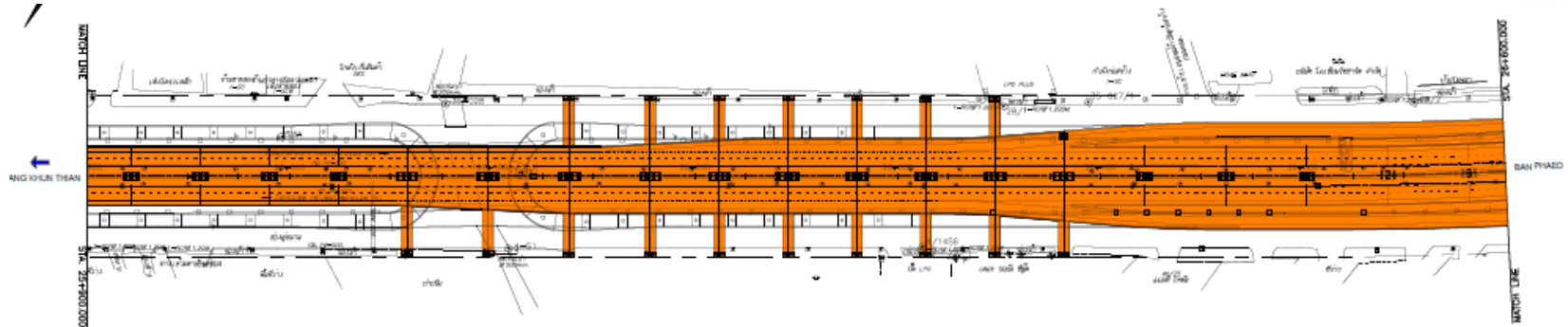
O&M Limit



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Typical O&M Limit Plan

DOH PARTY
PRIVATE PARTY

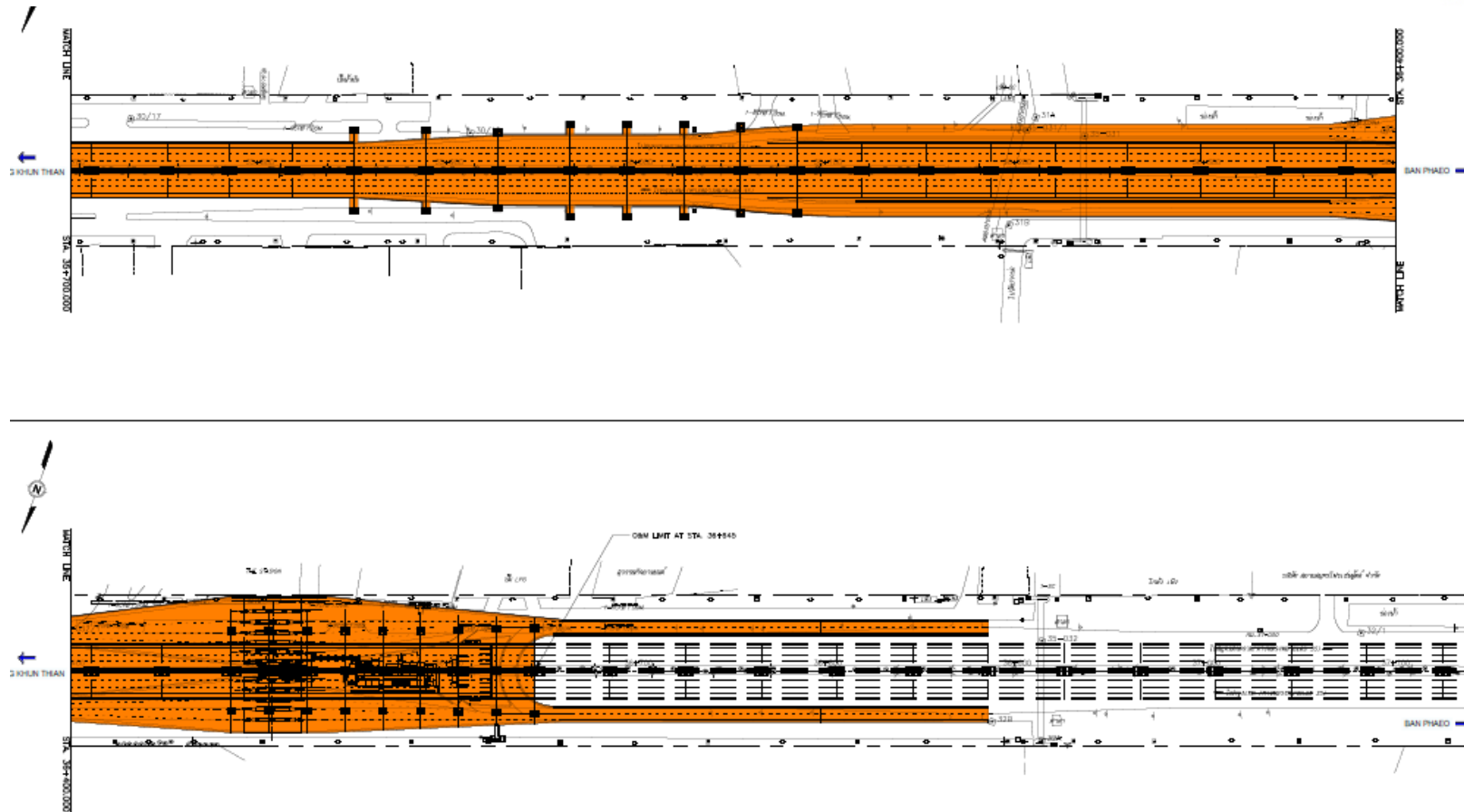
O&M Limit



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



O&M Limit Plan at the End of Project

DOH PARTY
PRIVATE PARTY



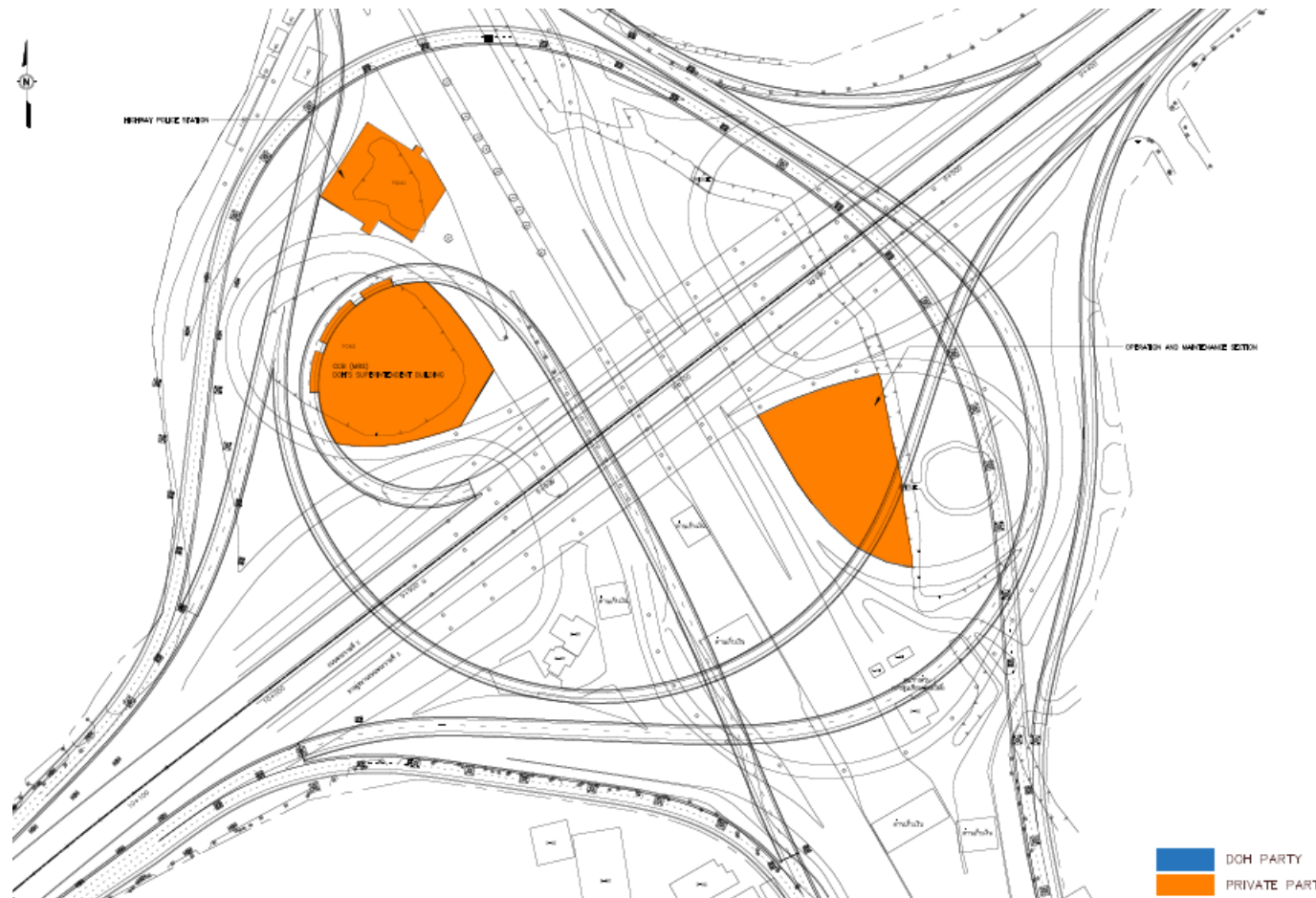
81



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



O&M Limit at Bang Khun Thian Interchange

Draft Public-Private Partnership Contract

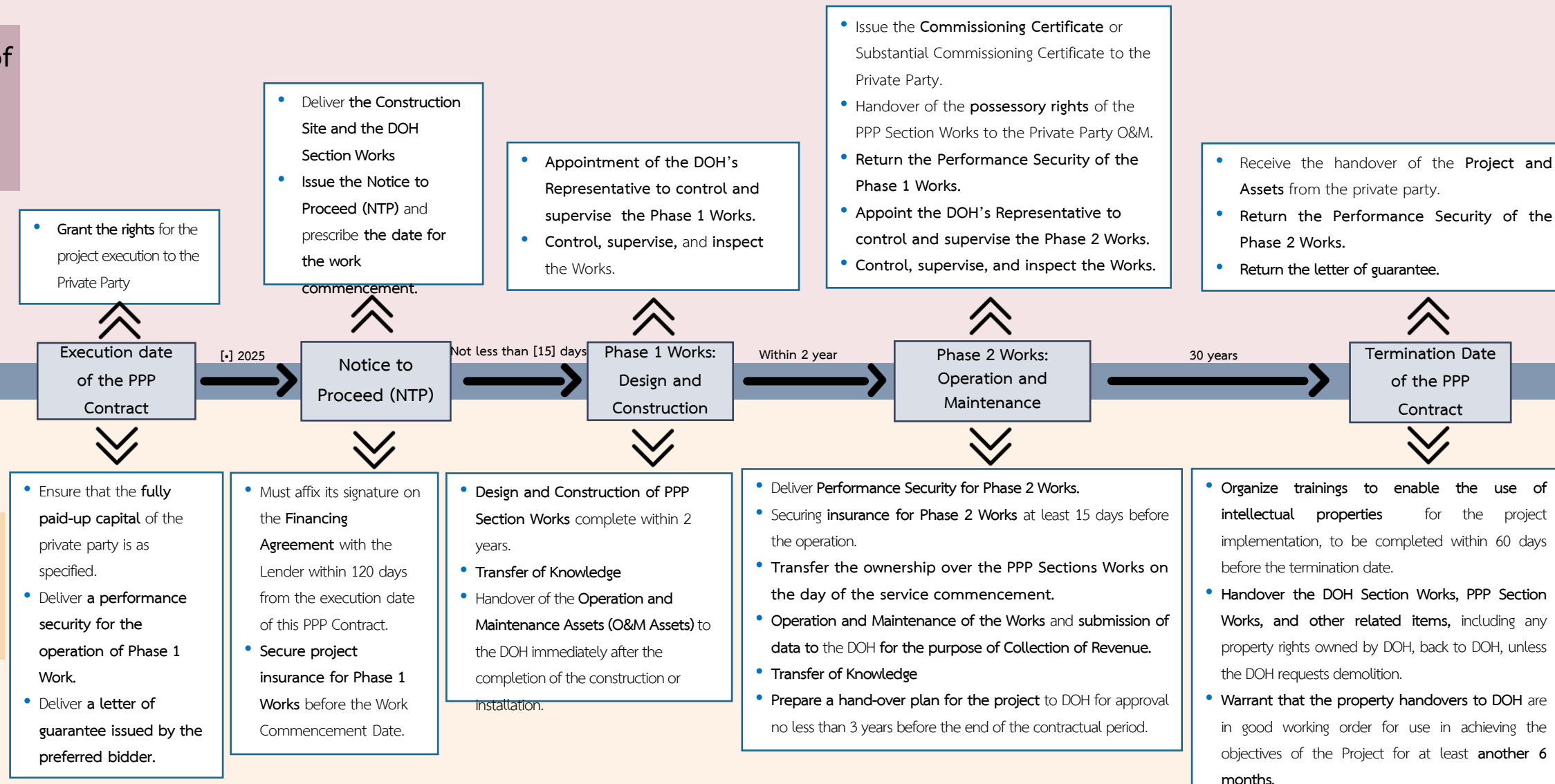
Overview and Timeline of the PPP Contract



Department of
Highways
(DOH)



Private Party



1. Public-Private Partnership, Scope of Works, and Scope of Investments

The Department of Highways (“DOH”) agrees to allow the Private Party to operates the Works of the Project. The Private Party agrees to operates the Works of the Projects under the terms and conditions of the Public-Private Partnership Contract (“PPP Contract”).

Scope of Works

Scope of Works: the Works are divided into two phases:



(1) Phase 1 Works: Design and Construction



(2) Phase 2 Works: Operating and Maintenance

Scope of Investments



Scope of Investments

- (1) The DOH will be the investor of the DOH’s Section Work including the procurement of all the land and project site, except the PPP Section Works which the Private Party will be the investor and has the duty as prescribed in this PPP Contract.
- (2) The Private Party agrees to seek all funding for the financing of Phase 1 Works and Phase 2 Works, whereby the Private Party must execute a Financing Agreement with the Lender within one hundred and twenty (120) days from the execution date of this PPP Contract.
- (3) On the execution date of this PPP Contract the Private Party shall maintain its fully paid-up registered capital of [•] Baht.

2. Rights and Duties of the Parties

Granting of Rights by the DOH



Granting of rights by the DOH

The DOH agrees to grant the rights to Design and Construct and Operate and Maintenance of the Motorway System as prescribed by the DOH's Requirement from the execution date until the termination of this PPP Contract to the Private Party.

Responsibilities of the Private Party

Responsibilities of the Private Party

- (1) The Private Party have the duty and responsibilities to execute the Design and Construction in accordance with Phase 1 Scope of Work within the specified timeframe. Additionally, the duty and responsibilities to Operate and Maintain in accordance with the Phase 2 Scope of Work with the expenses borne by the Private Party.
- (2) The Private Party must organize training sessions and transfer technology to DOH's officials, including DOH's Employee, and any another individual involved in the project after the Private Party in compliance with the DOH's Requirement.
- (3) Prior to the expiry of the Operation and Maintenance Period of not less three (3) years, the Private Party has the duty and responsibilities to prepare a hand-over plan for the Project, including the DOH Section Works, the PPP Section Works, and the Operation and Maintenance Assets, for the DOH's approval, as detailed in the DOH's Requirements.
- (4) The Private Party must hand-over and return the rights of the Motorway System on the termination date of this PPP Contract under any circumstances.



3. Operating Period and term of the Project

Term of the Project: a period of not more than 32 years counting from the date which the DOH specified in the Notice to Proceed (NTP) with the details as follows:

Design and Construction Period



Phase 1 Works

- (1) The Design and Construction Period is a period no longer than 2 years starting from the Commencement Date in the NTP.

Operation and Maintenance Period



Phase 2 Works

- (2) The Operation and Maintenance Period (O&M Period) is a period of 30 years in total from the Commercial Operation Date (the date that the DOH specifies in the Commissioning Certificate or the Substantial Commissioning Certificate). There will be no extension of time for the O&M Period by the DOH, even if the Private Party is able to complete the Design and Construction and commence the operations before the 2 years Design and Construction period ends. However, in any case, the O&M Period will end within 32 years counting from the date that the DOH specified in the NTP.



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

4. The DOH's Representative and the Steering Committee

DOH's Representative



DOH's Representative

- The DOH will appoint the DOH's Representative to perform the duties in relation to the control and supervision of the Works performance of the Private Party in respect of the Phase 1 as specified in the DOH's Requirements. The Private Party will be responsible for the wages and expenses related.
- The DOH may appoint or delegate an agent of the DOH's Representative to perform the duties under this PPP Contract on behalf the DOH in relation to Phase 2 Works, at the DOH's own expense.

Steering Committee



Steering Committee

The DOH shall ensure that a steering committee be appointed to perform the duties as specified in the Public-Private Partnership Act B.E. 2562 (2019) and the applicable law.



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

5. Performance Security, Cash Guarantee for the operation of the Phase 2 Works, and Guaranteeing the Private Party's Performance of Work

Performance Security

(1) Performance Security for the operation of Phase 1 Works

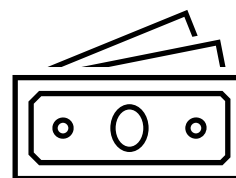
- **Delivery:** during this PPP Contract (on the execution date of this PPP Contract)
- **Return:** (a) the Private Party has completed all the Phase 1 Works and is ready to commence the operations of Motorway Services and (b) the DOH has received the Performance Security for Phase 2 Works from the Private Party.

(2) Performance Security for the operation of Phase 2 Works

- **Delivery:** on the date that the DOH has issued the Commissioning Certificate or the Substantial Commissioning Certificate for the operation and maintenance period and the commencement of Phase 2 Work.
- **Return:** after the Private Party is released from all obligations under the PPP Contract

In the case that the DOH exercises its right to claim any compensation from the performance security the Private Party agrees to provide additional performance security to be restored to the full amount within 15 days from the date of such claim by the DOH.

Cash Guarantee for the operation of the Phase 2 Works



Cash Guarantee for the operation of the Phase 2 Works (as guarantee in the case the Private Party does not construct and submit data for the accuracy of collection of revenue).

- **Delivery:** on the date that the DOH has issued the Commissioning Certificate or the Substantial Commissioning Certificate for the operation and maintenance period and the commencement of Phase 2 Work.
- **Return:** after the Private Party is released from all obligations under the PPP Contract

In the case that the DOH deducts amount from the guarantee, the Private Party agrees to provide additional guarantee to be restored to the full amount within 15 days from the date of such claim by DOH.

Performance Guarantee of the Private Party



Delivers a letter of guarantee issued by the preferred bidder (as guarantee for the performance of this PPP Contract by the Private Party)

- **Delivery:** on the execution date of this PPP Contract
- **Return:** on the termination of this PPP Contract



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

6. Availability Payment

Details



The DOH shall pay the Availability Payment to the Private Party at the end of each quarter, starting from the Commercial Operation Date, using the calculation method detailed in the document on the pricing terms as detailed in the Annex of this PPP Contract as follows:

- (a) **The Construction Repayment**, which funds the construction of the PPP Section Works funded by the Private Party for the operation of the Phase 1 Works; and
- (b) **The Operation and Maintenance Payment**, which is the consideration for the operation of the Phase 2 Works that the DOH shall pay the Private Party, as detailed in the Annex of this PPP Contract.



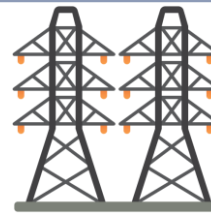
7. Properties and Ownership

DOH Section Works



The DOH will hand over the possessory right in respect of the DOH Section Works, whether in whole or in part, which is the DOH's right, to the Private Party for the Design and Construction and Operation and Maintenance during the Contract Period.

PPP Section Works



- The Private Party must handover the ownership of the PPP Section Works, as well as any other assets procured as part of Phase 1 Works which the Private Party has funded to the DOH on the Commercial Operation Date.
- The DOH will have over the possessory rights over the PPP Section Works to the Private Party on the same day, such that the Private Party can then commence the operation of the Phase 2 Works.
- The Private Party shall warrant that the PPP Section Works, with respect to the electrical and mechanical systems, computer system, and all information systems, are in good working order for use in achieving the objectives of the Project for at least another six (6) months from the expiry date of this PPP Contract.

Operation and Maintenance Assets (O&M Assets)



- The Private Party must handover the ownership of the O&M Assets comprising immovable properties or structures, as well as the component parts and equipment attached to the DOH Section Works, PPP Section Works, as well as existing roadwork equipment or the same provided in the Motorway System, in the interests of the roadwork or of the end users, will be transferred to the DOH immediately after the completion of the construction or installation.
- Other than those specified above, the Private Party shall immediately demolish all O&M Assets and remove from the Project upon the termination of this PPP Contract.
- The DOH has the right to purchase other O&M Assets from the Private Party under a price as agreed by the Parties. In the case that the Parties fail to agree on the price, the price shall be based on the Book Value of the O&M Assets.



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

8. Project Insurance

Details



The Private Party shall take out insurance which shall be in effect during the Contract Period as follows:

Phase 1 Works

- All Risks Insurance
- Third Party Liability

Phase 2 Works

- All Risks Insurance
- Third Party Liability

The Private Party shall procure that the insurance policy names the Private Party the insured person and names the DOH the co-insured and co-beneficiary with the Private Party, and the Private Party shall solely be responsible for payments of the insurance premium.

9. Fines

Phase 1 Works: Design and Construction

Fines for the Phase 1 Works: Design and Construction \$

- In the case that the Detailed Design Drawings are not completed within [•] months from the commencement date of the Phase 1 Works, the party agrees to pay a fine to the DOH at the rate of THB 15,000 per day.
- In the case that the Design and Construction works are delayed from the date provided in the PPP Contract. The Private Party shall pay a fine to the DOH at the rate of THB [•] per day (0.25% of the contract value for the Phase 1 Works).
- If the damage is greater than the fine amount the Private Party agrees to indemnify for the actual damages incurred.
- In the event that delay is caused by Force Majeure, Relief Event, or any other reason not attributable to the fault of the Private Party and the DOH has not terminated this PPP Contract, no fines will be charged.
- The Private Party agrees that the DOH is entitled to immediately deduct the fine and/or damages from the Availability Payment, the performance security, or any other monies that it is entitled to receive from the DOH.
- If the total accrued fined exceed 10% of the Contract Value of the Phase 1 Works, the DOH shall be immediately entitled to terminate this PPP Contract and to forfeit the performance security, which shall be deemed a part of the damages, without waiving the DOH's rights to claim other damages (if any).

Phase 2 Works: Operation and Maintenance

Deductions for the Operation and Maintenance in Phase 2 Works

- In the case where the Private Party is unable to provide service in accordance with the Service Level Agreement and its performance does not meet the Key Performance Indicators (KPIs). The Private Party agrees that the DOH deducts the Operation and Maintenance Payment.
- In the case that the damages exceed the agreed value of reduction, the Private Party will pay the damages in the amount that the actual damage incurred.
- The Private Party agrees that the DOH deduct the availability payment, contract guarantee, or other funds to receive from the DOH immediately.
- Fine for the Private Party not creating and handing over data for the Collection of toll and/or other information used for the collection of toll in a complete and accurate manner.

The Private Party agrees to pay the fine in the amount of [•] to the DOH within [•] days or allows the DOH to deduct fines from the Cash Guarantee for the operation of the Phase 2 Works or any other funds to receive from the DOH.



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

10. Termination of the PPP Contract

1 Termination of the PPP Contract by Operation of Laws

2 Termination Due to the Expiry of the Contract Period

3 Termination Prior to the Expiry of the Contract Period

Termination by the DOH

- The private party fails to execute the Financing Agreement, fails to meet the conditions precedent under the Financing Agreement, or fails to withdraw the first installment of the loan amount from the Lender.
- The Private Party have the total accrued fines surpass 10% of the Contract Value of the Phase 1 Works
- The Private Party does not pass the five (5) year evaluation and unable to comply with the conditions prescribed in the DOH's Requirements.
- The Private party violates the representation and warranties.
- The Private Party fails to comply with this PPP Contract or is in breach of a single or multiple provisions of this PPP Contract.
- In accordance with the orders of the DOH, in the interests of the provisions of public services, national security, economic security, or any other public benefit

Parties agreed to terminate
the PPP Contract

- Force Majeure or Relief Event
- Change in Law causing the performance of duties by the Private Party to be illegal or impossible

Availability Payment & Evaluation Approach



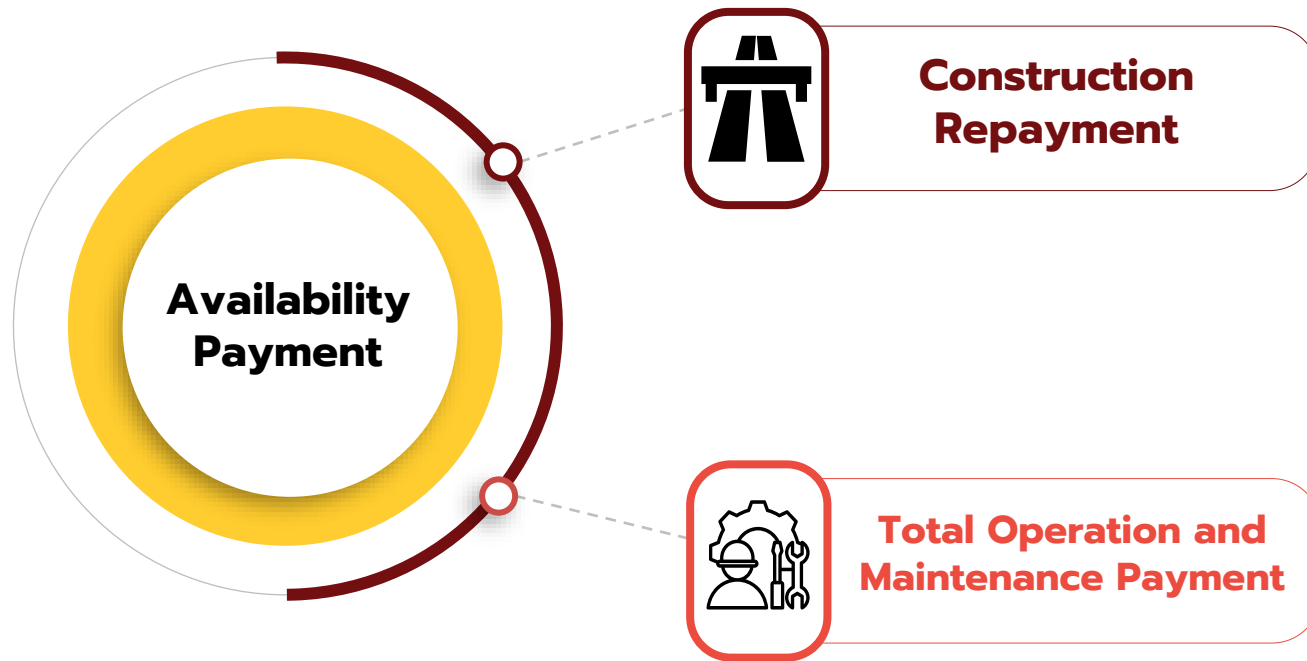
Payment Mechanism



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Total Construction Repayment shall be paid equally on a quarterly basis after the Commercial Operation Date as per Repayment Period proposed by the Successful Bidder.

Operation and Maintenance Payment comprises of

- Operation and Maintenance Lump Sum Payment
- Operation and Maintenance Re-Measurement Payment.

It shall be paid on quarterly basis and adjusted in each quarter.

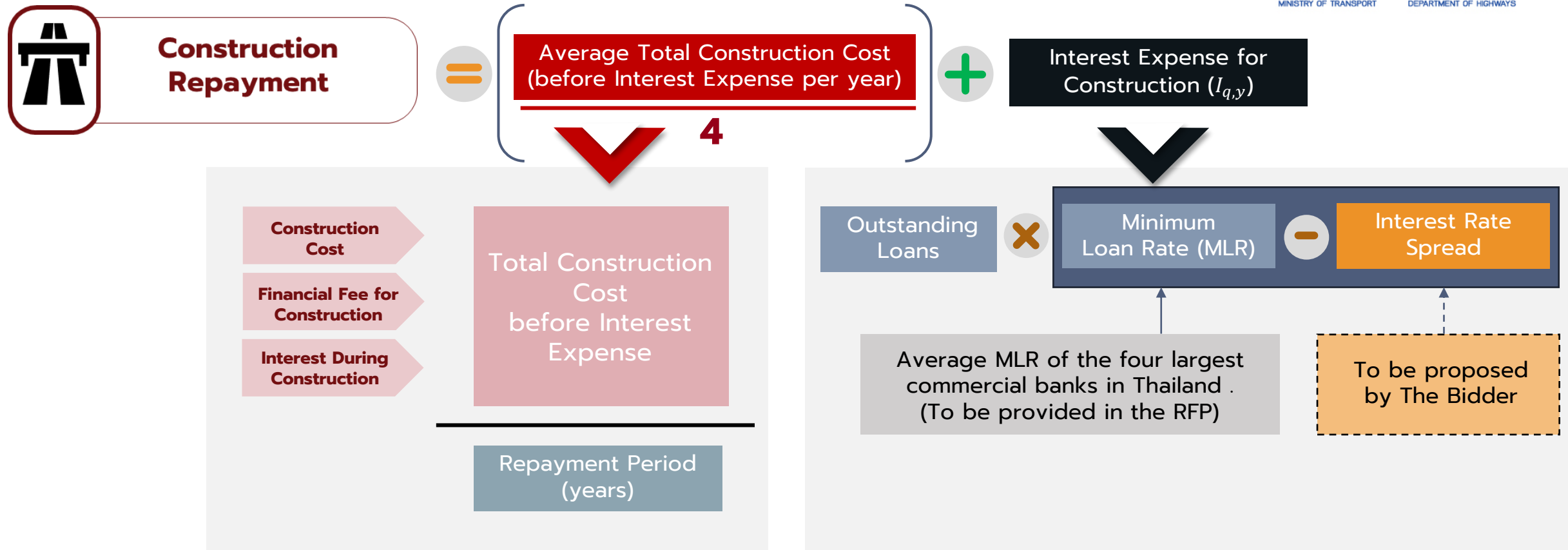
Payment Mechanism



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



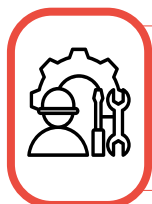
Payment Mechanism



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



**Total Operation and
Maintenance Payment**



**Operation and
Maintenance
Lump Sum Payment**



**Operation and
Maintenance
Re-Measurement
Payment**

- 1 Manpower Cost
- 2 Utilities Cost
- 3 Administration Cost
- 4 Systems Maintenance Cost
- 5 Civil Works Maintenance Cost
- 6 Building Maintenance Cost

Operation and Maintenance Lump Sum Payment shall be paid on quarterly basis and shall be adjusted according to change in the CPI.

- Details of the works to be performed by the Private Party during Phase 2 of the PPP Contract, in accordance with the DOH's instruction on the works to be executed by the Private Party.
- The Bidder shall not modify or add any BOQ items in this bill
- Percentage discount for each specific work shall be proposed by the Bidder.
- Operation and Maintenance Re-Measurement Payment shall be paid upon the invoice of each work being placed to the DOH at each period of time.

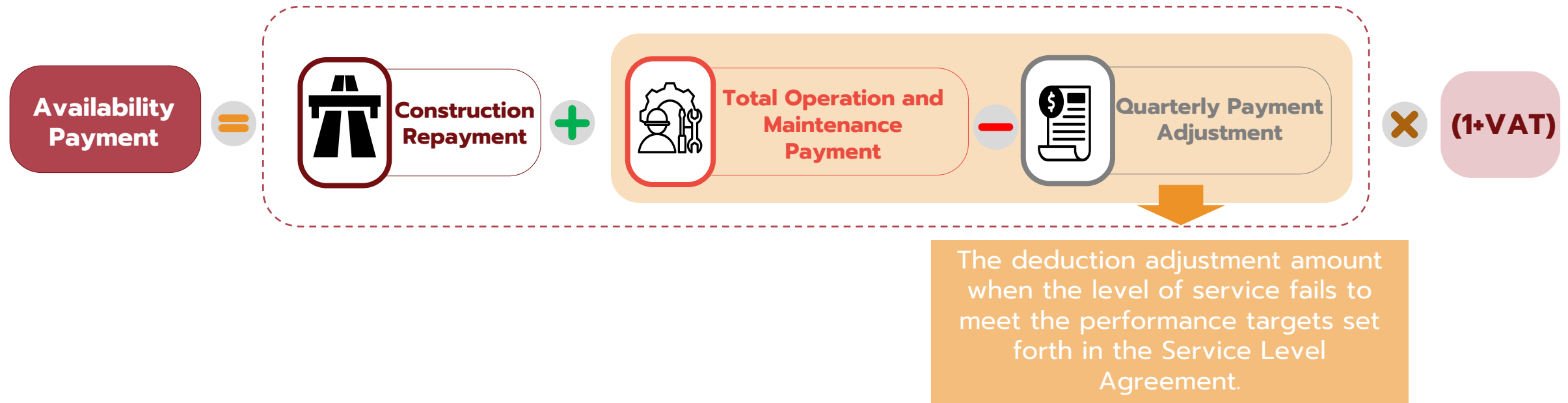
Payment Mechanism



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS





RFP Volume 3 Pricing Documents : Part 4

The Bills of Quantities consists of 4 Bills :

Bill No. 1

**Total Construction Cost
before Interest
Expense**

Bill No. 2

**Breakdown of Loan
Repayment and
Interest for
Construction**

Bill No. 3

**Total Operation and
Maintenance Lump Sum
and
Re-Measurement Cost**

Bill No. 4

Availability Payment

Availability Payment & Evaluation Approach



Bill No. 1

Total Construction Cost
before Interest Expense

Bill No. 2

Breakdown of Loan
Repayment and
Interest for
Construction

Bill No. 3

Total Operation and
Maintenance Lump Sum
and
Re-Measurement Cost

Bill No. 1 : Key Data Inputs

- Construction Cost
- Financial Fee for Construction
- Interest During Construction
- Repayment Period (Years)

Bill No. 2 : Key Data Inputs

- Total Loan Amount
- MLR Spread

Bill No. 3 : Key Data Inputs

- Operation Cost
- Maintenance Cost
- Margin on O&M Activities (%)
- Total O&M Re-Measurement Cost

Bill No. 4

Availability
Payment

Bill No. 4 : Key Data Input

- Total Present Value of Availability Payment

Availability Payment & Evaluation Approach



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

BUSINESS AND FINANCIAL PLAN

The Bidder shall require to prepare business and financial plan for the implementation which at least comprises of :

1

**Traffic
Demand
Forecast**

2

**Income
Statement**

3

**Statement
of Cash
Flow**

4

**Statement
of
Financial
Position**

5

**Free
Cashflow,
Investment
Return, and
Financial Ratio**

6

Assumptions

Availability Payment & Evaluation Approach



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Topic		Assumptions
1	Discount Rate	<ul style="list-style-type: none">The discount rate of 3.00% shall be used in calculation of PV of availability payment on an annual basis. <hr/> <ul style="list-style-type: none">For the purpose of evaluation, The Bidder shall apply<ul style="list-style-type: none">Inflation of 2% per yearMLR of (6.93%)VAT of 7% in the proposed AP calculation <hr/> <ul style="list-style-type: none">The terminal value of any investment during the entire period of the contract for the purpose of calculation of Availability Payment shall be deemed as zero or no market value or no residual value at the end of Operation and Maintenance Period <hr/> <ul style="list-style-type: none">The first Availability Payment shall be calculated at the end of fiscal quarter (three months period) after the Commercial Operation Date and every quarter thereafter throughout the Operation and Maintenance Period of 30 years.
2	Key Financial Factor	
3	Terminal Value	
4	Payment Period	

Issues for Discussion



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Range of Investment Returns (Equity IRR) considering project risk



Key Assumption Validation

- Financial Fee : 2% of Total Construction Cost
- D/E Ratio : 3:1
- Loan Term Period : 10 Years
- Grace Period : 2 Years



ETC.

Guidelines for Bid Submission

Guidelines for Bid Submission



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Qualifications of Bidders



Bidding Documents



PPP Contract Signing Conditions



Securities



Fees

Qualifications of Bidders



General Qualifications

History of litigation

Financial Qualifications

Experience Requirements



- The term “private party” will be as defined in the Public-Private Partnership Act
- Company registration ≥ 3 years
- In case of a group bidder, the following will apply:
 - Thai lead member’s shareholding $\geq 35\%$
 - Each juristic member’s shareholding $\geq 5\%$
 - Total shareholding of Thai juristic members combined $\geq 51\%$
- Foreign juristic persons intending to participate in the bid shall join with Thai juristic persons to form a group bidder



Bidders shall not be those with joint benefit sharing, either directly or indirectly, in the following manner:

- 1) **Management Connection** – (A manager, partnership manager, managing director, executive or authorized person, who has the power of administration and management over another person(s) or juristic person(s) and submits a similar bid for the DOH’s work.)
- 2) **Investment Connection** – (One or many partner(s) or major shareholder(s), who is(are) the partner(s) or major shareholder(s) in another company and submit(s) a similar bid for the DOH’s work.) The term “major shareholder” means the one who holds the shares in an enterprise $\geq 25\%$.
- 3) **Cross Connection of 1) and 2)**
- 4) Occupation as a partner or a shareholder by the spouse or son or daughter not achieving legal age of person in (1), (2) or (3).



Evidence of the guarantee and granting of line of credit issued by a Thai commercial bank or a foreign bank which has branches in Thailand shall be presented.



Bidders shall not be those who have the Thai Court’s special privileges or immunity whereby they can refuse to be brought before a Thai court.

Qualifications of Bidders



General
Qualifications

History of
litigation



Financial
Qualifications

Experience
Requirements



Litigation

History of litigation or arbitration resulting from contracts executed in the last 5 years

- Completed Works
- Ongoing Works



Evidence of the guarantee and granting of line of credit, in the amount not less than that specified, shall be presented.

Qualifications of Bidders



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

General
Qualifications

History of
litigation

Financial
Qualifications

Experience
Requirements



The bidder who is a single juristic person and all members of a group bidder shall present the evidence showing its annual net worth over the last 3 years, with the average net worth being positive.



Evidence of the guarantee and granting of line of credit, in the amount not less than that specified, shall be presented.

Qualifications of Bidders



General
Qualifications

History of
litigation

Financial
Qualifications

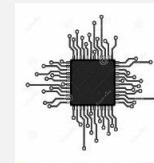
Experience
Requirements



Civil Works Construction or Construction Management



System Supply or Installation



Operation & Maintenance



1) Work Achievements:

- Experiences in civil construction or construction management (Infrastructure of Transportation)
- Experiences in systems supply or installation (Motorway / Expressway)
- Experiences in operation and maintenance (Motorway / Expressway)

2) Evaluation shall be based on the following criteria:

- The work achievements proposed may be either ongoing or completed.
- The work achievements proposed shall be the government-owned project performed either in Thailand or abroad.
- Past work achievements as a sub-contractor of the private party, who entered into contract with the public sector, may be proposed.
- In case the bidder is a member of a joint venture or consortium, the proportion of the bidder's work value under its responsibility shall not be less than the amount specified.

Bidding Documents



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS



Unsealed
Envelope

- (1) Form of Bid
- (2) Power of Attorney
- (3) Bid Security
- (4) RFP Purchase Evidence



Sealed Envelope
Envelope 1
Qualifications and Technical
Proposal

- (1) Financial Readiness,
Support and Capability
- (2) Past Experiences and Work
Achievements
- (3) Approach and Methodology
for the Works in Phase 1
- (4) Approach and Methodology
for the Works in Phase 2



Sealed Envelope
Envelope 2
Investment and Availability
Payment Proposal

- (1) Estimated Cost of
Investment and Bills of
Quantities
- (2) Business and Financial Plans
- (3) The Availability Payment
Required by the Bidder



Sealed Envelope
Envelope 3
Other Proposals

Other Proposals that May Benefit
the DOH's Service and Operation

PPP Contract Signing Conditions

- The private partner selection result is consented by the Cabinet.
- The Letter of Acceptance is issued by the DOH to notify the successful bidder of the PPP Contract signing.
- The successful bidder pays the contract signing fee and furnishes the performance security to the DOH on the contract signing date.



An approval is obtained from the Cabinet.



The Letter of Acceptance is issued to the successful bidder.



The Successful Bidder

- Establish a Special Purpose Vehicle (SPV)
- Pay the contract signing fee
- Furnish the performance security



Sign the PPP Contract



The DOH shall establish a steering committee to monitor and follow up the project progress.

Guidelines for Bid Submission



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

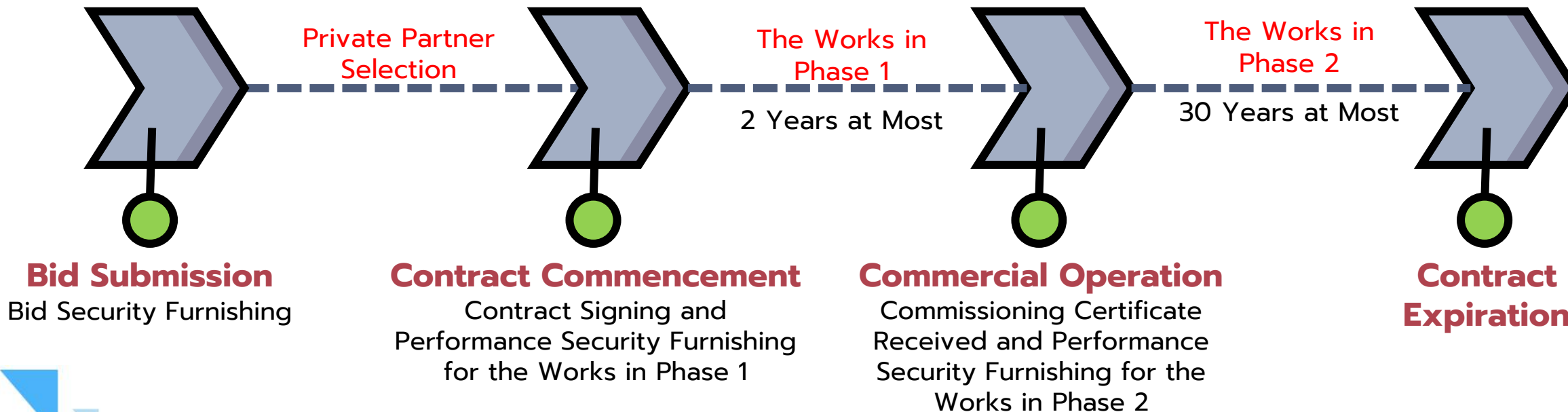
Securities

> Bid Security

> Performance Security for the Works in Phase 1

> Performance Security for the Works in Phase 2

Total Period – 32 Years at Most



Guidelines for Bid Submission



กระทรวงคมนาคม
MINISTRY OF TRANSPORT



กรมทางหลวง
DEPARTMENT OF HIGHWAYS

Fees

- For a single juristic person, those who purchase the RFP shall be eligible for bid submission.
- For a group of juristic persons, all the group members shall be required to purchase the RFP in order to be eligible for bid submission.



First Set

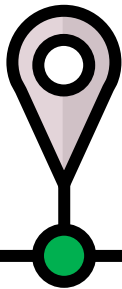


Additional
Set(s) (If Any)

RFP Selling Fee

Bid Evaluation Fee

PPP Contract Signing Fee



RFP Selling Date



Bid Submission Date



Contract Signing Date

