

Day 7: October 28

- Operation and Maintenance (The North Luzon Expressway)
- Project Monitoring and Post- Evaluation of Project Impacts

The North Luzon Expressway

Pilot Training
28 October 2010

We present to you
**the North Luzon Expressway
Operations and Maintenance**

...Toll Management

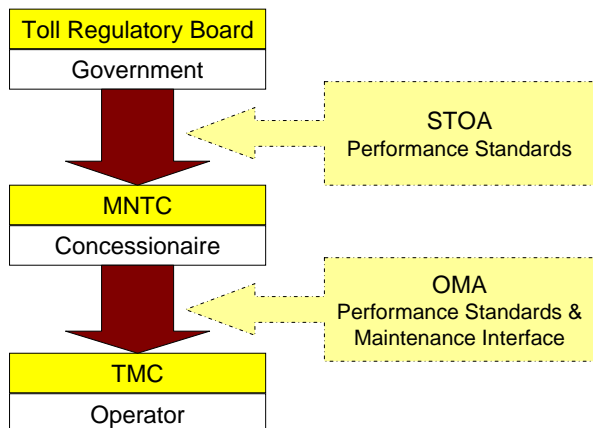
...Traffic Management

...Roadway Maintenance

Presentation Outline

| | |
|--------------------|---------------------|
| O&M Brief | Raul L. Ignacio |
| Toll Collection | Glenn G. Campos |
| Traffic Management | Jennifer Jane T. Go |
| Road Maintenance | Romel C. Langcaunon |

O&M Contractual Framework



MNTC completed the project scope

- 295 lane kms. rehabilitated
- 138 lane kms. (Balintawak to Sta. Rita) expansion
- 433 lane kilometers total roadway
- 153 new toll lanes from a previous 99
- 16 interchanges including the recently opened Mindanao Ave Link
- 125 buildings (O & M Facilities)
- 92 bridges; At grade (include Candaba Viaduct), Secondary Roads & Farm Crossing, Pedestrian O/P and Underpass.



Operation & Maintenance Agreement Performance Indicators

TOLL COLLECTION OPERATION & MAINTENANCE

- **Queuing Limits** – Imposed on the Operator each time, for a given plaza, a vehicle queue in all toll lanes on that plaza occurs and continues for a certain duration.
- **Accuracy Targets** – Monitors Operator's efficiency and accuracy in the collection, handling, and accounting of toll receipts.
- **Scheduled Routine Maintenance Compliance** – To ensure that the Operator performs scheduled routine maintenance activities.
- **Prompt Corrective Maintenance Compliance** – To ensure that the Operator expeditiously corrects identified defects / failures on Facilities or the Fixed Operating Equipment.

Operation & Maintenance Agreement Performance Indicators

TRAFFIC MANAGEMENT

- **Traffic Management at selected Interchanges** – shall provide sufficient staff to manage traffic at peak hours on local roads adjacent to NLEX in order to minimize the waiting time for vehicles entering or exiting NLEX.
- **Minimum Staffing Levels** – service patrols at all times; at least 2 members of staff on duty at all times in the Traffic Control Room; a sufficient number of on-duty workers and management at all time (24 hours a day, every day of the year)
- **Response to Material Traffic Incident** – must provide on-site attendance to Material traffic incidents; response time shall not exceed 20 minutes in average over a calendar month and not longer than 30 minutes for each incident

Operation & Maintenance Agreement Performance Indicators

ROAD MAINTENANCE

- **Road Clearing** – To ensure removal of debris and safety hazard from the travelled lanes
- **Pavement Repair** – To ensure that the Operator promptly performs repair for safety and quality of rideability
- **Road Furniture**
- **Landscape** – To ensure that the Operator

Road maintenance works are performed with the motorist ____ in mind



Toll Collection Management System

Glenn G. Campos

Assistant Vice-President, Toll Collection and Systems

NLEX Configuration

- 16 Interchanges
- 5 Toll Barriers
BWK, MIN, BOC,
TAB, DAU
- 38 Entry / Exit
Plazas



Fixed Operating Equipment

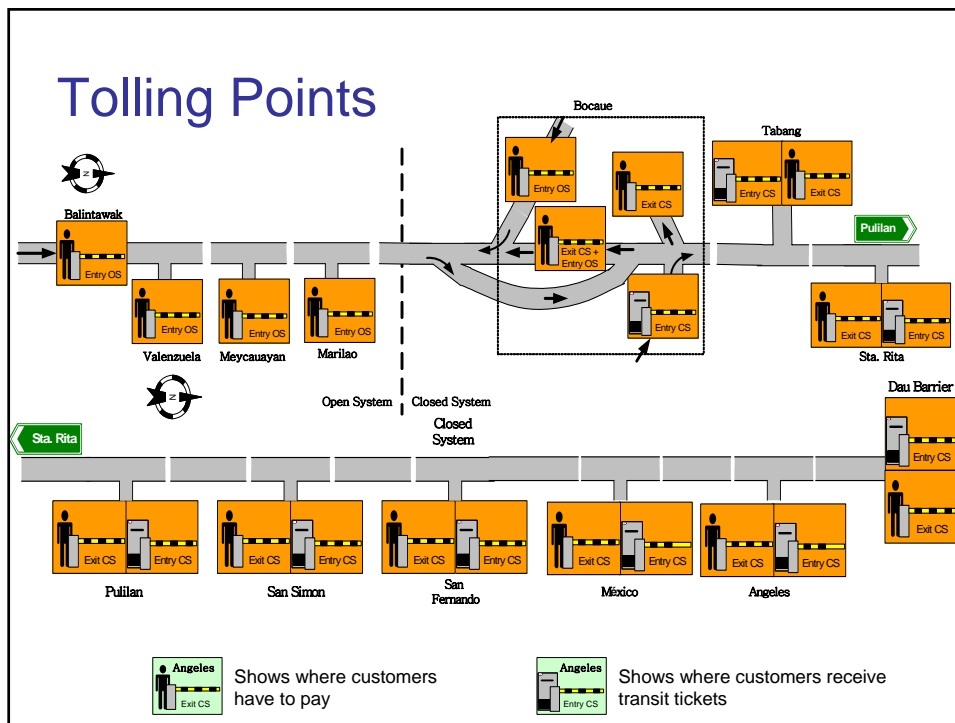
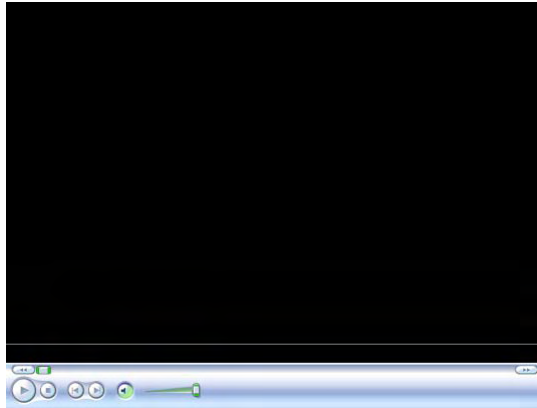
- Toll Collection System
- Telecommunications System
- Traffic Systems

Toll Collection System

- To automate toll collection and increase lane throughput
- To give a better service to the users
- To optimise collection
- To optimise plaza management
- To elaborate reports on traffic and revenue statistics

Toll System Architecture

- 1 Central Toll Computer System (CTCS)
- 22 Plaza Computer Systems (PCS)
- 5 Point of Sales (POS)
- 153 Toll lanes
 - 106 Manual Payment Lanes (42 Mixed MPL/ETC)
 - 36 Automatic Entry Lanes (25 Mixed AEL/ETC)
 - 11 Dedicated ETC Lanes

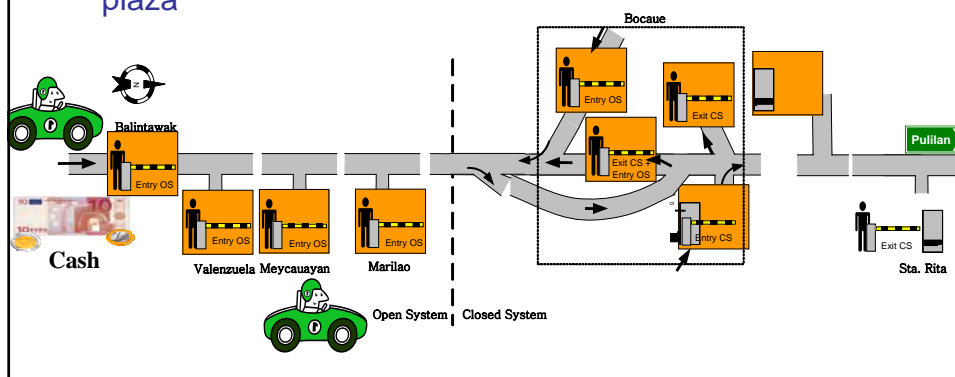


Tolling Points

- Toll collection is either manually or automatically by ETC. Manual toll collection takes place in manned toll booths at manual payment lanes or at mixed ETC/MPL lanes.
- Transit tickets are always dispensed automatically by an automatic entry lane (AEL).

Open System

- from Balintawak Barrier to the Bocaue Interchange
- Payment is made upon entry in an Open System
- A flat fee is applied to this system
- Exit in an Open System requires no stopping at the exit plaza

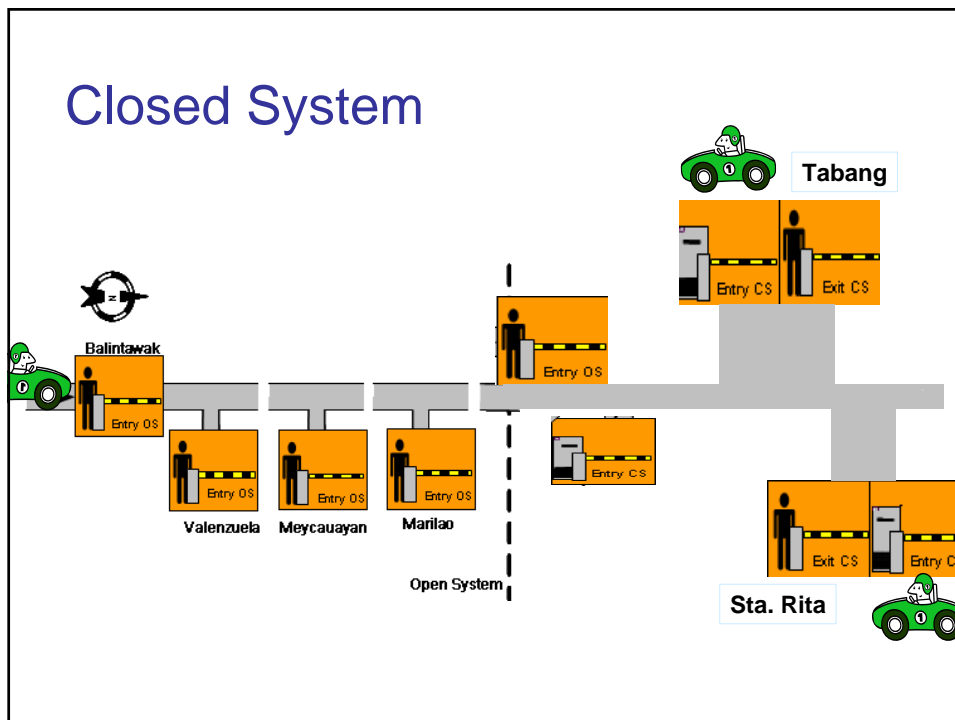


Closed System



- From Bocaue Barrier / Interchange to Dau Barrier
- Payment is made upon exit
- Toll fare is based on
 1. Distance traveled
 2. Vehicle class
 3. Specific commercial arrangement (for subscribers only)
- Traveling between two systems would mean adding the toll of both systems

Closed System



Transit Ticket

A credit card size machine readable paper ticket that an expressway user receives when entering the closed system of the NLEX. It serves as proof of entry point and shows entry time and entry plaza.

The diagram shows a sample transit ticket with the following labels and arrows pointing to specific fields:

- Ticket Mode**: Points to the first two digits of the machine-readable code (16303 03).
- Time**: Points to the date and time (07/20/05 14:21:10).
- Entry plaza**: Points to the entry point code (03).
- Date**: Points to the date (07/20/05).
- Serial No.**: Points to the serial number (1421 101 3337).
- Network No.**: Points to the network identifier (16303).
- Lane No.**: Points to the lane identifier (03).
- Level**: Points to the level identifier (03).

The ticket also features the slogan "Drive safely.", a map of the North Luzon Expressway with various plazas marked (e.g., San Antonio, San Fernando, Marikina, etc.), and logos for NRTC and Tollways Management Corporation. A disclaimer on the right states: "This transit ticket is only valid for 24 hours and is the property of Tollways Management Corporation. It must be rendered at the end of the trip to justify origin and therefore allow to calculate the toll fare between the entry Toll Plaza and the Exit one. Whether a client is unable to give his ticket back or the validity is over, he/she has to pay the most expensive trip. The comprehensive toll fares are available upon request."

Vehicle Classification

Class 1: Vehicles with a height less than 7 ft. and 2 axles

Class 2: Vehicles with a height more than 7 ft. with 2 axles or height less than 7 ft. with more than 2 axles

Class 3: Vehicles with a height more than 7 ft. & more than 2 axles

What is an Axle?



A metal rod that holds and supports a pair of wheels of a vehicle.

Class 1



Class 1

- Height: Less than 7 ft. (2.13 m)
- Axles: 2
- Examples: Cars, vans, Jeepneys, motorcycles



Class 2



Class 2



Class 2



Class 2

- Height / Axles:
- Less than 7 ft. (2.13 m) with more than 2 axles
- Higher than 7 ft. with 2 axles
- Examples:
- Trucks, buses, class 1 with trailer, class 1 above 7 ft.



Class 3



Class 3

- Height: Higher than 7 ft. (2.13 m)
- Axles: More than 2
- Examples: Trucks & buses with more than 2 axles & height is above 7 ft.



FUSO WIP



6x6 MILITARY TRUCK

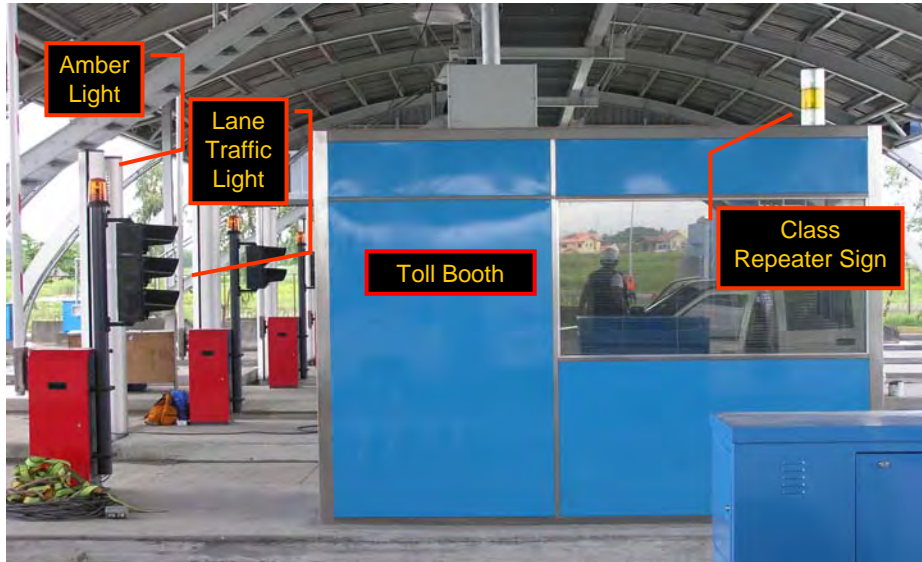


ISUZU CXM REFRIGERATED VAN

Toll Lanes



Toll Lane Equipment



Lane Traffic Light



- A red-green or red-orange-green traffic light attached to the traffic control gate
- **Red** for STOP
- **Orange** for GO, indicating low balance of an EC Tag account
- **Green** for GO

Amber Light

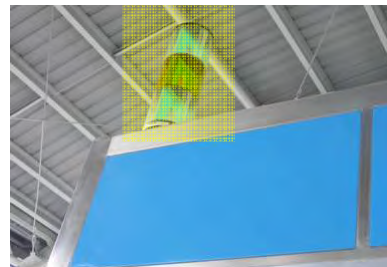


- A violation alarm on top of lane traffic light
- Lights up whenever there is an abnormal passage of vehicle through the toll lane

Class Repeater Sign



- Shows what vehicle class the teller have just entered
- Audit tool for the Toll Supervisor and Toll Auditor



Traffic Control Gate (TCG)



- A boom gate at a toll lane



Lane Status Indicator



Lane is open



Lane is closed



A large indicator panel at the top of every toll lane that shows to approaching cars if the lane is open or closed.

Toll Booth



outside



inside

A room where the Toll Teller works, collects toll and gives assistance to customers

Toll Booth Equipment

Customer Intercom a device used to communicate with toll supervisor.

Customer Display - indicates the class, toll and a welcome note to customers. For mixed, it also displays the account balance of an EC Tag.



POSTER HOLDER

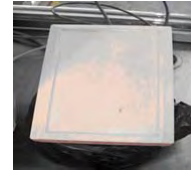
Toll Booth Equipment



Toll Booth Keyboard



Video Display Unit (VDU)



Contactless Card Reader



Technical Drawer



Toll Booth Intercom

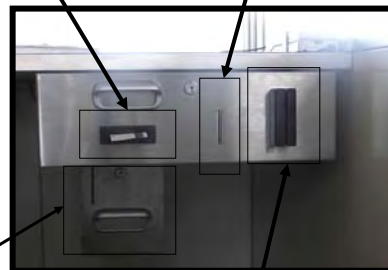
Toll Booth Equipment



Transit Ticket Bin

Motorized Card Reader

Receipt Dispenser



Manual Card Reader

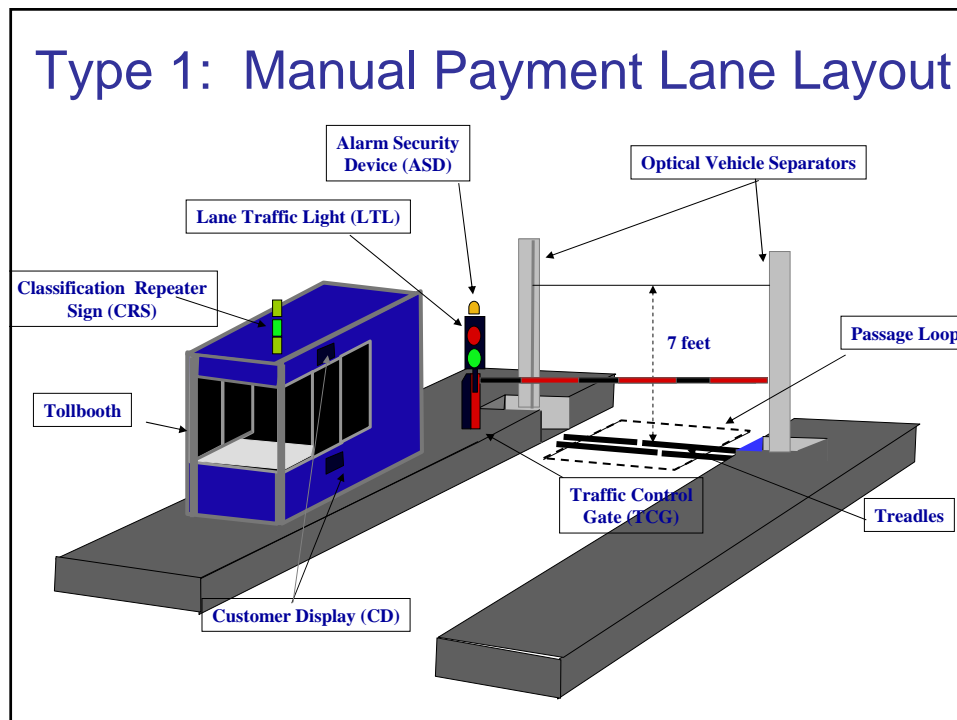
Type of Payment Lanes

Payment lanes are lanes where the customer pays toll

- entry lanes of the open system
- exit lanes of the closed system

There are two types of payment lanes:

- 1) Manual Payment Lane
- 2) Dedicated EC Lanes



Type 1: Manual Payment Lane

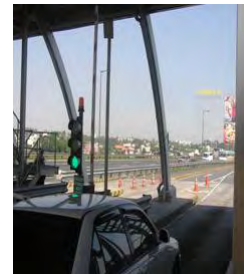


This is where customers pay in cash, Pass-ada Card, Tsuper Card and NLE Badge. It is manned by a Toll Teller.

Type 2: Dedicated EC Lane Layout

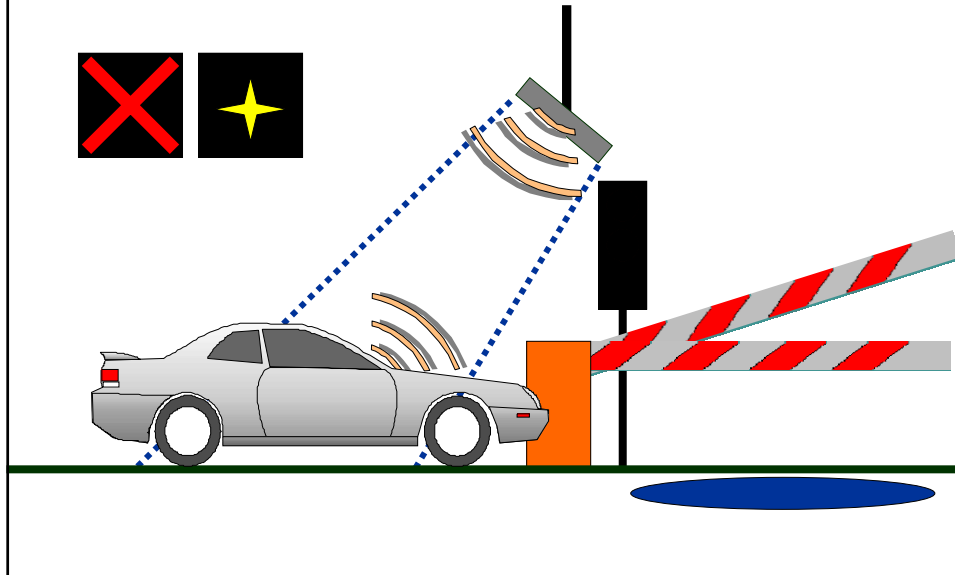


Beacon – transmits and receives data to and from EC Tag



These lanes are for EC customers only. They are fully automatic, cash payment is not allowed.

Type 2: Dedicated EC lane



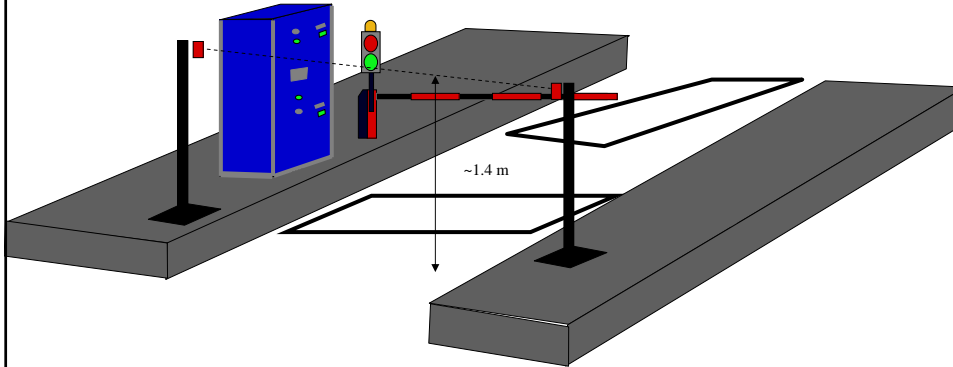
ENTRY Lanes

These are lanes where customers get their tickets when entering the closed system.

There are two types of entry lanes:

- 1) Automatic Entry Lane
- 2) Dedicated EC Lane (EC Tag)

1. Automatic Entry Lane Layout



1. Automatic Entry Lanes

Automatic Ticket Dispenser Machine (ATDM)

Height Detector



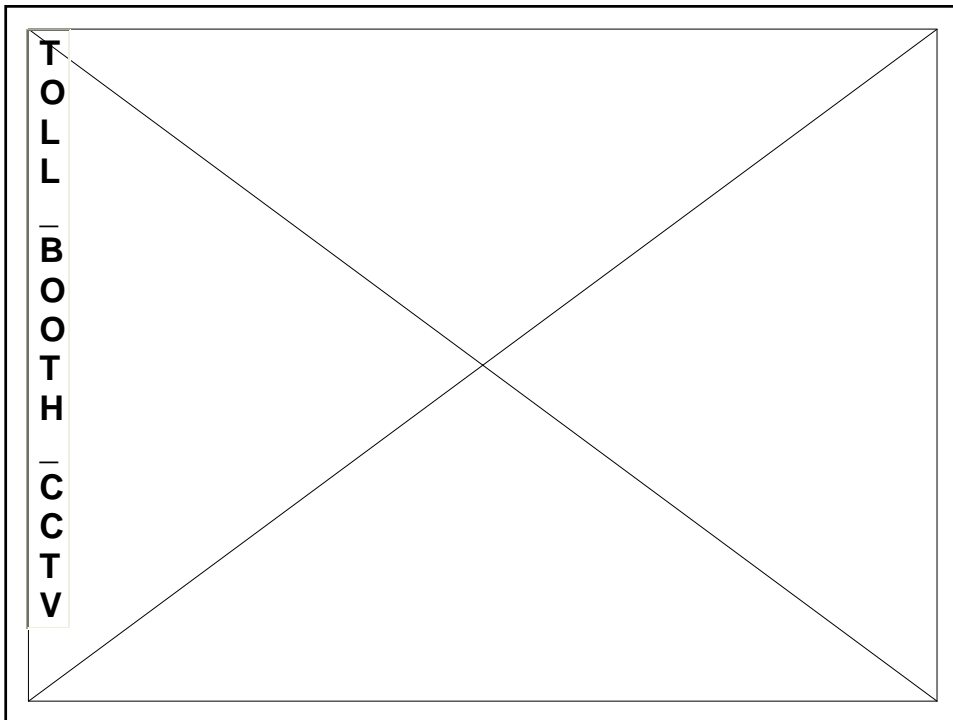
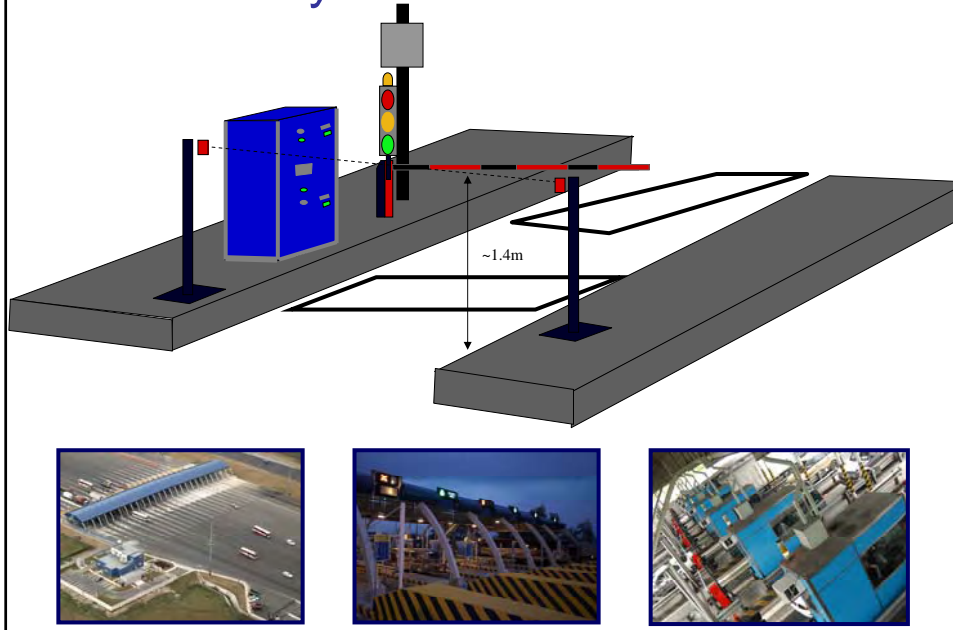
Push button to change dispense level

Push button to talk to Toll Supervisor



Lanes where a machine automatically dispenses transit tickets for non- EC customers.

2. ETC Layout

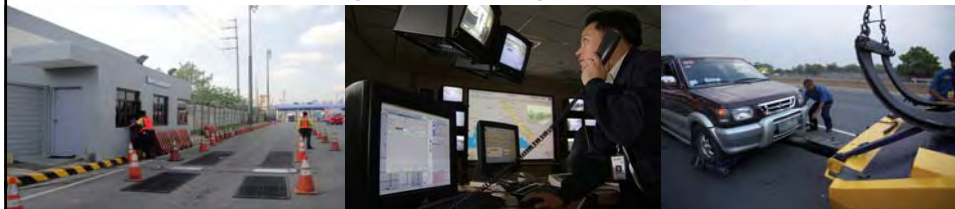




Traffic Management

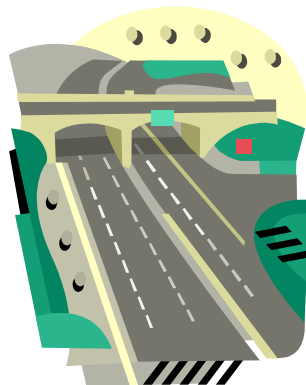
Jennifer Jane T. Go

Senior Manager, Traffic Management and Security



Key Elements

1. Road Closures
 - a. during maintenance works
 - b. emergency
2. Patrolling and Enforcement
 - a. Speed Management
 - b. Lane Management
 - c. Anti-overloading Vehicle Program
3. Traffic Information System



Road closures during maintenance

NOTE:
 - The actual number of cones and concrete/2 plastic barriers will vary depending on the length of the Incident/Danger area.
 - However, the number of cones and concrete/2 plastic barriers should not vary before the Incident/Danger area.

Legend:

- Traffic Cone
- Directional Arrow
- Traffic Hazard Ahead
- Incident/Danger Area
- One Lane Closed
- Distance sign (200m)
- Speed restriction (60km/h)
- No passing
- Approximate distance to incident/danger area
- Flashing arrow light

100m
 - 10 cones @ 10m interval

100m
 - 10 cones @ approx. 10m interval
 - Flashing arrow usually installed during heavy lane closure for accident or road repair

start of closed hazard area
 - 1 Directional arrow sign

100m to closed hazard area
 - Traffic Hazard Ahead sign
 - 100m distance

200m to closed hazard area
 - No passing lane sign
 - 200m distance

300m to closed hazard area
 - No passing lane sign
 - 300m distance sign

400m to closed hazard area
 - 60 high speed restriction
 - 400m distance sign

600m to closed hazard area
 - No to one lane sign
 - 600m distance sign

800m to closed hazard area
 - 1 Traffic Hazard Ahead sign
 - 800m distance sign

D-6

Road closures during an emergency

Re-routing traffic with single entry on the other lane and no entry on the same lane - 1+1 and 0
 (Duration of Incident is 3 days or Less)

NOTE:
 - The actual number of cones and concrete/2 plastic barriers will vary depending on the length of the Incident/Danger area.
 - However, the number of cones and concrete/2 plastic barriers should not vary before the Incident/Danger area.

Legend:

- Traffic Cone
- Directional Arrow
- Incident/Danger Area

2000m (overage)

- 200 cones @ 10m interval
 - 2 Directional arrow signs

10m x 2
 - 20 cones @ approx. 10m interval

- Follow procedures for Right Lane Closure 2+2 (Refer to D-4)

Equipment Summary:
 - 25 traffic cones
 - 7 traffic signposts

10m x 2
 - 20 cones @ approx. 10m interval

- Follow procedures for Right Lane Closure 2+2 (Refer to D-4)

Equipment Summary:
 - 25 traffic cones
 - 7 traffic signposts

D-9

Patrolling and Enforcement Speed Management

- Manpower
- Appropriate warning through signage
- Procedures
- Strategy
- Logistics – speed radar



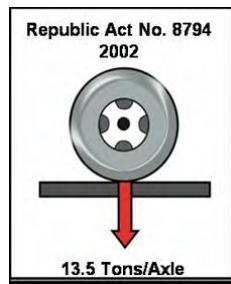
Patrolling and Enforcement Lane Management

- Manpower
- Appropriate warning through signage
- Procedures
- Strategy
- Logistics – vehicle, camera recorder, etc.

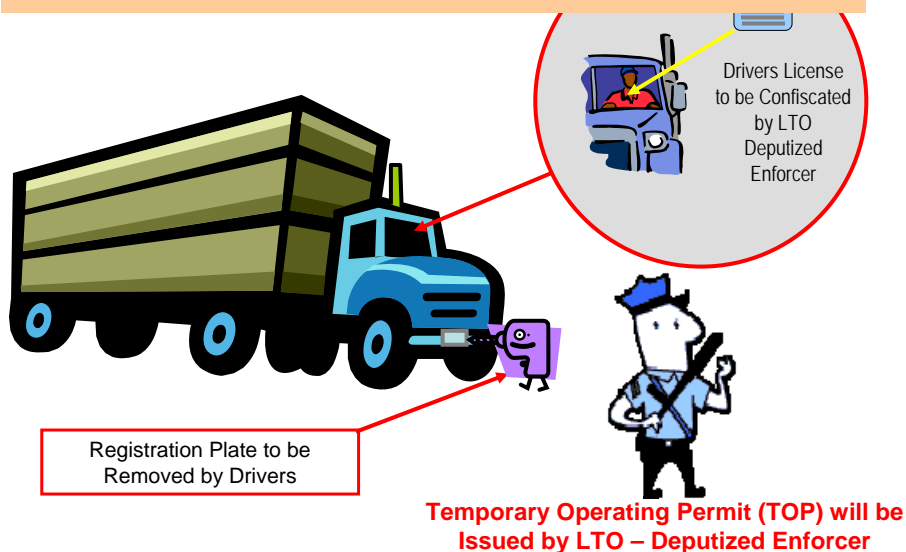


Patrolling and Enforcement Anti-overloading Vehicle Program

- Manpower
- Weighing facility strategically located
- Procedures
- Strategy
- Logistics – vehicle, weighing device, traffic cones/signage



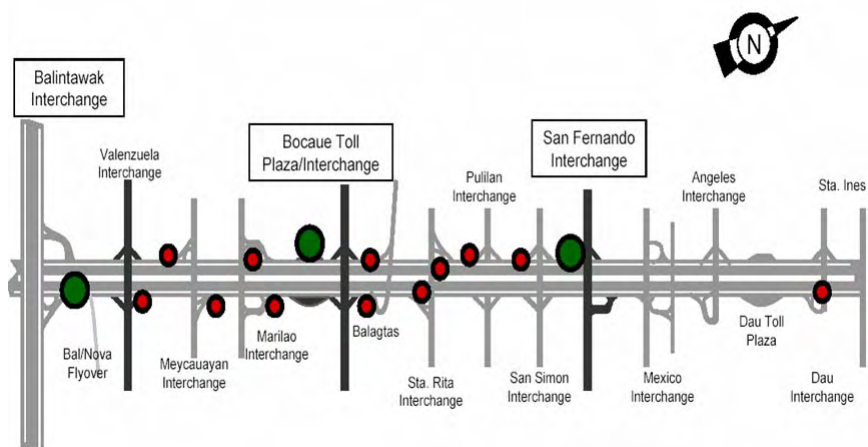
AOVP Operation



Retrieval Procedure



NLEX Weightsites



Fixed Weightsites

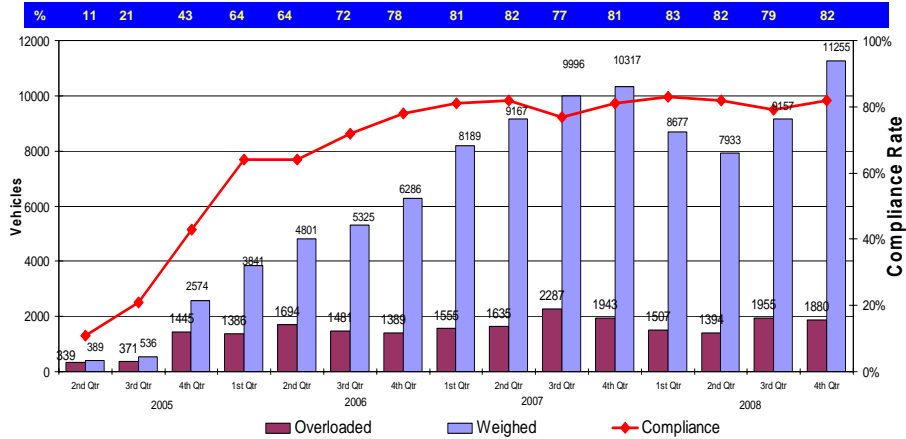


Mobile Unit



Apprehension data

AOVP Quarterly Compliance



Traffic Information System Traffic Control Room



- Manpower for 24/7 operation
- Roadway monitoring
- Recording of Events
- Dispatching of Emergency Services
- Centralized Communication via Customer Service Hotline (632) 3-5000

Traffic Information System Dispatching

EMERGENCY SERVICES

- Motorist Assistance
- Emergency Medical
- Roadside Towing

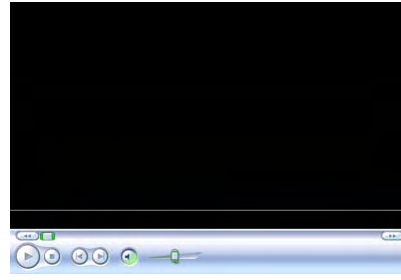
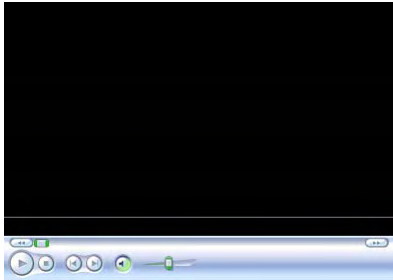


Emergency Call Boxes (ECB)



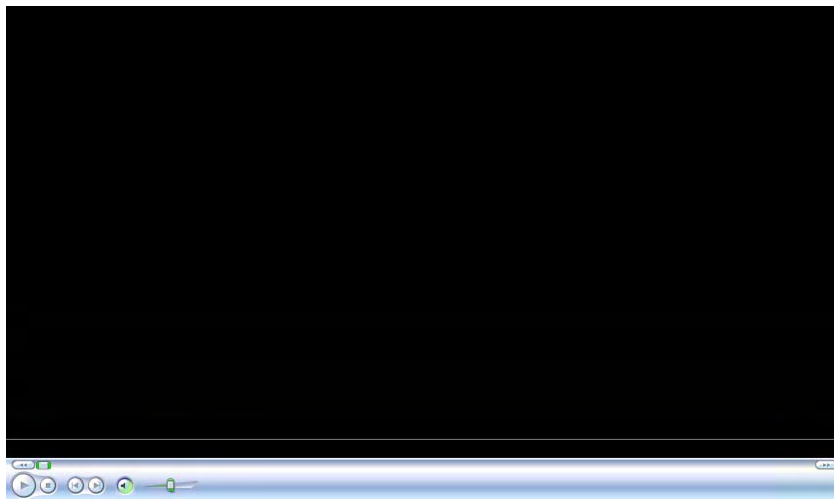
ECBs connect motorists to the Traffic Control Room. They are 1-2 kilometers apart.

Variable Message Signs



Digital outdoor signs flash safety reminders and timely traffic updates.

Traffic Surveillance Cameras



- To monitor traffic and render proper response or assistance
- For recording and documentation

Roadway Maintenance

Romel C. Langcauon
Manager, Civil Works



Roadway Maintenance

Routine Maintenance

Heavy Maintenance

Inspection Regime

Repair Programme

Routine vs. Heavy Maintenance

ROUTINE MAINTENANCE, by TMC

- carried out routinely to prolong the service life of an infrastructure
- examples: sealing of pavement cracks, minor repair on pavement defects/potholes, routine maintenance on traffic devices-guardrail/barriers, routine landscape maintenance etc.

HEAVY MAINTENANCE, by MNTC

- performed after a predetermined period of time to replace or enhance existing infrastructure
- examples: pavement rehabilitation, bridge structures retrofitting/bearing pad replacement etc.

Routine Maintenance



Our Operator, Tollways Management Corporation (TMC) is responsible for carrying out Routine Repair & Maintenance Works as follows:

- Pavement:
 - crack sealing and pothole/patching works – yearly & as necessary
 - cleaning, sweeping and washing oil spill, stains, mud, dirt etc. – as necessary & during incident
- Drainage:
 - drainage structures cleaning – yearly & as necessary
 - drainage declogging & desiltation – once every five years & as necessary
- Landscaping Green Areas:
 - grass cutting/mowing along landscape median areas / interchanges and mainline roadside – bi-monthly
 - trimming of trees and removal of dead / decaying trees – yearly & as necessary

Routine Maintenance



- ❑ Fencing:
 - spot repair and replacement - as necessary
 - removal of vines – twice a year
- ❑ Earthslope and Roadside Areas:
 - repair of potholes/blowups / depressions – as necessary
- ❑ Bridges and Walls:
 - minor repairs to concrete and steel structures – as necessary
 - removal of graffiti and water flow obstructions – as necessary
 - washing and cleaning of river bridge parapet walls – yearly & as necessary
- ❑ Traffic Devices:
 - removal of obstructions and graffiti / minor repairs to fixed signs, guardrail and concrete barriers / local repairs to pavement markings – as necessary
 - cleaning and washing of metal beam guardrails and concrete barriers –yearly or as necessary

Heavy Maintenance

MNTC is responsible for the heavy maintenance program & works:

- Asphalt pavement overlay
- Pavement & Bridge rehabilitation
- Structural retrofitting
- Drainage upgrade and rehabilitation

A priority list of repair & maintenance plans and programs is produced by MNTC in collaboration with the Operator

In addition, MNTC engages third party consultants to carry out the detailed engineering designs and condition surveys as part of the heavy maintenance program evaluation.

Inspection Regime

Routine inspection is carried out by the Operator:

- Windshield inspection (associated with walkover) on Weekly, Sectional Basis and
- Detailed Inspection, As Necessary:
 - Pavement / Drainage / Landscaping & Green Areas / Fencing / Earth slopes & Roadside areas / Bridges and walls
 - Traffic Devices: Pavement Markings / Signages / Guardrail and Concrete Barriers / Toll Plaza Chariot Nosing.

MNTC likewise carries out independent random inspections to:

- validate TMC's reported defects
- prioritize and program works

Joint annual inspections are carried out with MNTC and the Operator

- periodically through walkthrough inspections
- for the pavement, bridges, drainage, earth slopes and roadside furniture, fencing, buildings, etc.

Repair Programme



Rotomilling of existing asphalt wearing course



Overlay Area



Deep Patch Repair Area

Repair Programme

Deep Patch Pavement Repair



Repair Programme

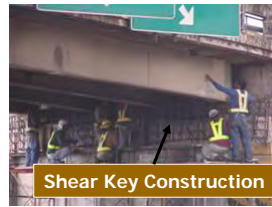
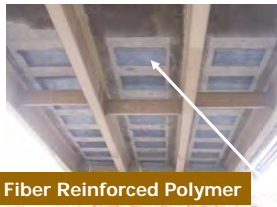


1-Day Pavement Repair by Square Patching on Localized Areas

Repair Programme



Installation of Carbon Fiber Reinforced Polymer

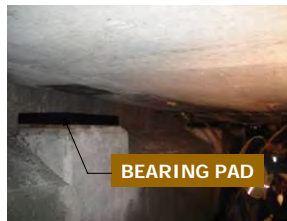


Shear Key Construction

RETROFITTING OF BRIDGE STRUCTURE



2-50 Tons Jack
Link Slab



BEARING PAD

BRIDGE LINK SLAB LIFTING & REPLACEMENT OF BEARING PAD

Thank you!



PREPARATORY SURVEY
for
**Public Private Partnership (PPP) Infrastructure
Development Projects
in the Republic of the Philippines**

PILOT TRAINING
**Project Monitoring and
Post-evaluation of Impacts**

October 28, 2010

MR. MITSUO KIUCHI

Team Leader

JICA Study Team



National Economic Development Authority
(NEDA)



Japan International Cooperation
Agency (JICA)



Department of Public Works and Highways
(DPWH)

1

OUTLINE OF PRESENTATION

1. Project Monitoring
2. Post-evaluation of Impacts

2

1. Project Monitoring

1.1 Responsibility of the Project Proponent (or Special Purpose Company)

- The Project Proponent shall be responsible for providing the following transport service in accordance with a toll concession agreement (TCA);
 - To provide **fast** travel.
 - To provide **safe** travel.
 - To provide **comfortable** travel.
 - To provide traffic and other **information** to travelers.
- TRB is responsible to monitor Project Proponent's performance as well as its financial condition.

3

1. Project Monitoring

1.2 Monitoring Items

a) If the Project Proponent is providing **fast travel** to travelers?

- Is appropriate travel speed attained?
- Is traffic queues at toll gates/barrier within an acceptable range (number of toll booths and toll collecting speed)?
- Are traffic lanes provided during peak-hours (maintenance work activities are planned during off-peak hours)?
- Are traffic accidents promptly responded?
- Are broken-down vehicles promptly responded?

4

1. Project Monitoring

1.2 Monitoring Items

b) If the Project Proponent is providing safe travel to travelers.

- Are occurrence of number of traffic accidents, particularly fatal accidents and their causes recorded and analyzed?
- Are possible measures to reduce traffic accidents implemented?
- Are pavement markings, traffic regulatory sign boards, guide signs, lighting facilities, etc., well maintained?
- Is traffic well guided when an accident occurred?

5

1. Project Monitoring

1.2 Monitoring Items

c) If comfortable travel is provided to travelers.

- Is smoothness of pavement surface to assure comfortable riding quality provided?
- Is proper travel speed attained?
- Is enough information provided?
- Are rest areas well operated/maintained?

6

1. Project Monitoring

1.2 Monitoring Items

d) If enough information is provided to travelers.

- Traffic congestion information
- Traffic accident information
- Maintenance activities information
- Traffic lane closure information

7

1. Project Monitoring

1.2 Monitoring Items

e) Other information to be monitored.

- Number of traffic
- Toll revenue
- Financial condition of the Project Proponent

8

2. Post-evaluation of Impacts

(1) Direct Impact

- No. of Trips attracted to an Expressway
- Traffic congestion reduction of the corridor
- Travel time reduction
- Transport cost reduction
- Traffic accident reduction
- Air quality improvement along the corridor
- Noise reduction along the corridor

9

2. Post-evaluation of Impacts

(2) Indirect Impact

- Contribution to regional growth center development (activities transferred from Metro Manila, more migrants, etc..)
- Expansion of daily activity sphere (expansion of commuting sphere and reduction of overnight travel)
- Contribution to Access Improvement to related transport facilities (ports and airports) and better transshipment from one mode to another.

10

2. Post-evaluation of Impacts

(2) Indirect Impact (continuation)

- Contribution to Industrial Development
 - More locators at eco-zones
 - New eco-zone development
 - Just-in-time delivery system adopted
 - Increased tourists
 - More production of agri-fishery products (particularly time-sensitive products such as vegetables and fruits)
- Reduction of regional disparity
- Reduction of poverty incidence

11

Maraming Salamat Po!

12

Day 8: October 29

Assessment of Pilot Training

QUESTIONNAIRE ON OPINIONS/SUGGESTIONS FOR PPP CAPACITY

- What do you need to know more?
- Any opinions/suggestions for the next step training course.

Name: (Optional) _____

Position: _____

Your Specialized Fields/Profession: _____

Office & Agency Name: _____

| 1. About Basic Principles of PPP | | |
|------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| a. Experiences/examples of PPP projects in other countries to be presented for better understanding of PPP | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Please describe any other needs. | | |

| 2. Laws and Regulations | | |
|----------------------------------------------------------------------------|-------------------------------|------------------------------|
| a. Past and current legal issues and their interpretation to be presented. | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Please describe any other needs. | | |

3. Institutional Framework

a. Please describe any needs.

4. Project Identification

a. Some case studies to be presented.

Yes.

No.

b. Please describe any other needs.

5. Business Case/Feasibility Study

| | | |
|---------------------------------------|-------------------------------|------------------------------|
| a. Some case studies to be presented. | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Please describe any other needs. | | |

6. Tollway Planning & Design

| | | |
|--------------------------------------------------------------|-------------------------------|------------------------------|
| a. Design Standards | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Interchange, On-, Off-Ramps, Rest Areas Planning & Design | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| c. Operation System Planning and Design | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| d. Please describe any other needs | | |

7. Traffic Demand Forecast

| | | |
|------------------------------------|-------------------------------|------------------------------|
| a. Traffic Survey | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Preparation of Present OD Table | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| c. Traffic Demeand Model Buildings | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| d. Preparation of Future OD Tables | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| e. Traffic Assignment | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| f. How to use JICA-STRADA Software | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| g. Please describe any other needs | | |

8. EIA and Resettlement Plan

| | |
|----------------------------|--|
| Please describe any needs. | |
|----------------------------|--|

9. ROW Acquisition

Please describe any needs.

10. Economic Evaluation

a. Examples to be presented

Yes.

No.

b. Please describe any other needs.

11. Financial Evaluation

| | | |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| a. Meaning of various indicators to be presented. | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Case studies for various PPP modalities to be presented. | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| c. Some practices to be exercised during the training (Necessary conditions are given and trainees calculate various indicators) | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| d. Please describe any other needs. | | |

12. Risk, Risk Management, Risk Allocation

| | | |
|-----------------------------------------------|-------------------------------|------------------------------|
| a. Some examples of projects to be presented. | <input type="checkbox"/> Yes. | <input type="checkbox"/> No. |
| b. Please describe any other needs. | | |

13. Project Procurement

Please describe any needs.

14. Project Implementation

Please describe any needs.

15. Operation and Maintenance

Please describe any needs.

16. Project Monitoring & Post Evaluation

Please describe any needs.

17. For Better and Practical Training

Please describe your opinions/suggestions for better and practical training.

Thank you very much for your cooperation!!!