COURSE TITLE: ROAD MAINTENANCES.

COURSE OBJECTIVE: "This training program aims at capacity development of the technical officials responsible for road planning & construction , management and maintenance and also helping them cope with the issues in respective countries."

PRESENT BY: Ane Tauki'uvea.
Country: KINGDOM OF TONGA

Good afternoon everyone, My name is Ane Tauki'uvea, I am from the beautiful Kingdom of Tonga. As shown here are the Course Title and Course Objective

These are the outline of my Presentation (Summary report & Action Plan) that I will talk about.

1. Course outline: All the lecture that we have cover in the past few weeks.
2. Learning Outcomes: I will talk about the Knowledge that I have learn in this training AND Technologies that were very impressive and interested in it and wish to implemented it in Tonga.
3. Tonga Major Issues: I will talk about the current status of the Road Maintenance in Tonga.
4. Lastly my Conclusion.

- Basic Concept of Infrastructure.
- Basic Road Maintenance in Japan.
- Natural Disaster Prevention System.
- Operating / Maintaining National Highways.
- Bidding and Contract System in Japan.
- History of Road Maintenance in Okinawa / Future Road Plan.
- Road Administration and Maintenance in Okinawa.
- Site Visit : Maintenance site of National Roads.
- Asphalt Pavement Maintenance Technologies including colour pavement.
- Pavement Design and Damages in JICA Projects & Roadside Landscape in Okinawa.
- Environment Conservation Technology for Road Maintenance.
- Visit the Utility tunnel of electric cables, Irabu bridge, Ikema Bridge, disaster recovery and Port.
- Community-based road maintenance program.
- Bridge Management, Application to steel bridge.
- Soil Science in Road Maintenance & Slope Protection.
- Construction Techniques Unique to Okinawa.
- Technologies & product developed by private companies.
- Infrastructure tour & Road Facility Regular Inspection.
- Concrete Maintenance Engineering.
- Measurement Techniques with UAV and Flight Exercise.
- Daily Road Maintenance & Recycling Material.
- Facility Visiting: Asphalt Plant & Industrial Waste Treatment & Recycling.

1. Participants will be able to understand critical points of road administration / Maintenance system to develop infrastructure effectively and efficiently.

2. Participants will be able to understand the necessary concepts of construction technologies and construction design techniques for maintaining qualitative uniformity of infrastructure in harsh natural environments.

3. Participants will be able to understand critical points of road construction and management system for road maintenance for quality maintenance and improvement of infrastructures.

4. Participants will be able to understand approaches and measures for managing social issues caused by road administration such as urbanization, environment protection, disaster management and citizen participation.

5. Participants will be able to analyse administrative /maintenance challenges related to the organization to which they belong and prepare proposals for their solutions

- The training Course Outline (in Black). These are all the lectures that we have cover in the past few weeks and many site Visit to different Facility.
- The side note (IN RED). These are my outline for these course so far throughout the many lectures that we have. For us participant to understand, learn, identify Road & Bridge problems, know the right treatment to perform, have the right equipment to use in rural and urban area, Improvement of technologies to use for maintenance, Create a long term plan for road Maintenance….etc

1. LEARNING OUTCOMES

1.1 Long Term Planning

- PLAN UP TO 20 YEARS OF ROAD INFRASTRUCTURE DEVELOPMENT.
- MOTIVATES AND INSIGHT TYPE OF PERFORMANCE NECESSARY TO MEET OBJECTIVES OF ROAD INFRASTRUCTURE DEVELOPMENT.

1.2 Rural Planning

- USING LOCAL EQUIPMENT AND MATERIAL AVAILABILITY RATHER THEN RELY ON GOVERNMENT TO TAKE ACTION (MAINTENANCE AND REPAIR ROAD).
- MOTIVATE YOUTH FOR SELF EMPLOYMENT.
- EMPOWER GENDER EQUALITY IN ROAD CONSTRUCTION FIELD.
- REDUCE COSTING AND EXPENSES.

For long term Planning: So far I have learn here how Okinawa – Japan Planning Road and Bridges as to consider the design life to withstand the nature of Climate changes and for the safety of Road User. Making a long term Planning will help to prevent the costing in Maintenance and repair. Road administration in Okinawa is a collaborative effort involving various government bodies and private construction consultants to manage the existing network and plan future development.

Planning for rural area as to depend on the availability equipment they have to use it rather then rely and wait for the government to maintenance and repair Road. In Tonga one of the major economy income are agriculture as many of our people main source of income are farming, plantation, selling vegetable...etc

1.3 Technology and Method.

- THE OODA PROCESS (OBSERVE, ORIENTATION, DECISION & ACTION. THIS HELP TO IMPROVE OUR SYSTEM ESPECIALLY AS MANY OF OUR ROAD MAINTENANCE WORKS ARE OUTSOURCING CONTRACT.
- DO – NOU METHOD.
- BIOLOG FILTER.
- GROUND GEOCELL
- RECYCLING OF MATERIAL TO MAKE A NEW MATERIAL.
- PDCA CYCLE: TO MAKE SURE THE SAFETY OF THE SCHOOL COMMUNITING ROAD.
- TECH-FORCE.
- THE USING OF UAV. THESE HELP OUT WHEN DOING INSPECTION IN ORDER OF COLLECTING DATA.

1.4 Traffic Congestion Control

- IMPROVE THE ROAD CAPACITY BY WIDENNING ROAD WIDTHS TO ACCOMMODATE TRAFFIC VOLUME WITHOUT BOTTLENECK FLOW.

- IMPROVE THE ROAD NETWORK BY ADDING NEW ROADS OR UPGRADE ROAD CONDITIONS TO DISTRIBUTE TRAFFIC FLOWS / VOLUME WHILST SPEEDS LIMITS MAINTAIN.

- PROMOTE PUBLIC TRANSPORTATION SYSTEM

- PROMOTE RANGE OF WORKING TIME FOR GOVERNMENT EMPLOYEES.

- PROMOTE PUBLIC PARKING AREA, EVERY REGISTERED VEHICLE SHOULD BE ABLE TO HAVE A SPACE FOR PARKING.

- However, there are many Technology and method that I have learn so far in this training course but let me focus on the Technology and method that I think it will be possible to implement in my country. In order on how address risk management especially in natural disaster. The using of OODA Process is very useful in Tonga not only that but it will help to improve our system in everyday road works as many of our Road maintenances works are outsource contract.
- DO – NOU Method will be very useful in Tonga especially at our agriculture Road (Rural Area). Its doesn't cost much. This method will help our local people on the rural area to maintain the road on their own rather then waiting for the government to take action.
- BIOLOG FILTER is one of the technology that will or mostly to use in Tonga. It doesn't cost much as these are made from coconut. The design and features of biolog filter will help at some area in Tonga (Flooding time).

- GROUND GEOCELL: Geocells are used to stabilize weak subgrades and sub-bases, improving their performance and preventing deformation and rutting under traffic loads. In these Technology I have learn three things about it (Features)**1. Increased Bearing Capacity:** The three-dimensional cellular confinement system significantly improves the load-bearing capacity of the soil, distributing weight uniformly and

reducing settlement. **2) Cost-Effectiveness:** It can reduce the required thickness of the pavement layer and enables the use of locally available, lower-quality aggregates, leading to significant material and cost savings. **3). Durability and Longevity:** The stabilization provided by geocells results in longer-lasting roads with reduced maintenance needs, even under heavy traffic conditions.

- Recycling of Material to make new material: We have visit OCTC Facility and have learn more about the Recycling of glass, plastic, asphalt and many more as to make new material for the road works.
- PDCA CYCLE: To improve the School zone comminuting Road. The inspection, collecting data, designing, educating and implemented to secure the safety of School zone area. Tonga has a TRAFFIC & ROAD SAFETY TASK FORCE COMMITTEE which are they provide awareness, school visit, community consultant, Provide Short video ads, provide radio talk back show with the public, TV Program, Doing Road Safety Audit….etc. However this PDCA Cycle will help to add on some upgrade ideology to our Traffic & Road Safety Task Force Committee.
- TECH – FORCE: (Technical Emergency Control FORCE) : Emergency Disaster Response Team is part of Japan's road disaster prevention and response measures. They are involved in the emergency response to natural disasters, such as typhoons, which can cause significant damage to roads in Okinawa. Their work ensures that roads remain safe and functional during and after such events. These giving an ideology for us in Tonga especially as we have learn from the volcano eruption and Tsunami in 2022 that disconnected Tonga from the rest of the World for almost 2 months before all the connection were back to normal. Still nowadays the government are still working on construction new houses for some of the families that were badly affected by these eruption and tsunami.

- TRAFFIC CONGESTION CONTROL: (refer to slide)

1.5 Quality Control & Assurance

- TO CREATE A SYSTEM THAT INDICATES THE TRUE CAPACITY OF EACH CONTRACTORS AND WHO WILL BE ELIGABLE FOR LAND TRANSPORTATION PROJECTS.
- CONTRACTORS CAN BE CLASSIFIED INTO CATEGORIES TO LIMIT OVERLAPPING OF POWERS, ALLOW SMALL CONTRACTORS TO DEVELOP, ENHANCE THE DECREASE OF HIGH BIDS SUBMISSION AMOUNTS AND INFLUENCE THE COMPETITIONS FOR FUTURE PROJECTS BY DELIVERING WORKS AT HIGH QUALITY
- UPGRADE WORKING EQUIPMENT INORDER TO OBTAIN ACCURATE DATA DURING SURVEY FOR DESIGNS AND TO IMPLEMENT DESIGN ACCORDINGINGLY
- UPGRADE SPECIFICATION TO MEET CURRENT SITUATIONS & CONTINUOUS TESTING OF MATERIALS.
- CREATE A DATA RECORDING SYSTEM.

1.6 Environmental & Social Management

- TO CARRY OUT ENVIRONMENTAL ASSESSMENT BEYOND THE ACTUAL PROJECT AREA TO DEFINE POSSIBLE IMPACTS MAY CAUSES, SPECIAL PLANTS, ANIMAL SHELTERS AND IMPORTANTS THINGS THAT ARE ESSENTIAL TO SAVE. THE BOUNDRIES FOR THE ASSESSMENTS CAN ONLY LIMITED IF THERES NO CONCERNS.
- PLANNING TO CONSTRUCT NEW ROADS SHOULD CONSIDER A PUBLIC ANNOUNCEMENT TO HAVE RESIDENTS AWARE OF THE PROJECT SHCEDULE, BENEFITS AND PURPOSE. THEREFORE IT IS BEST TO ENGAGE AGREEMENTS WITH THE COMMUNITY PRIOR TO DETAIL DESIGN AND SO ON.
- FOR ROAD PROJECTS THAT REQUIRES LAND AQUISISTIONS, A CONSULTATIONS SHALL BE CLEARLY MADE WITH THE LAND OWNERS AND ENGAGE AGREEMENTS.

Quality Control & Assurance:

- There are so many lesson learn from the previous lecture that we have been cover in the past few weeks. In developing system, software, technology using to improve the road and Bridges both in New construction and existing road / Bridges, prevention and Maintenance. (Refer to slide)

- So far we have learn about many of the Okinawa – Japan standard and legal specification regarding road works and bridges. Our standard and legal Specification are needed to upgrade as to align with the condition & nature of the road in Tonga.
- There are many equipment introduce in the lecture that use for inspection, maintenance of Road and Bridges here in Okinawa.
- The selecting of Contractor to perform the road Work. Throughout the lecture I've learn that Japan's administrative divisions consist of three levels, with the broad-based prefectural agencies and basic municipal agencies operating under the national government agencies

Environmental & Social Management.

- Okinawa Prefecture manages the environmental and social impacts of the road network through a comprehensive framework that includes regular maintenance,

specific environmental laws, and community collaboration. The goal is to balance an effective transport system with the preservation of the region's unique natural and cultural identity.

Environmental management of roads in Okinawa is governed by national and prefectural laws, including the Environmental Impact Assessment Act, Air Pollution Control Act, Water Pollution Control Act, Noise Regulation Act, and Vibration Regulation Act. Social management focuses on creating a safe, secure, and harmonious traffic environment for all citizens, including the elderly and disabled.

1.7 Recycling

- REUSE OF DEMOLISHED AND EXCAVATED CONSTRUCTION MATERIALS SUCH AS GROUND SOIL, CONCRETE, GRAVELS, ASPHALT, GLASS BOTTLE…ETC
- RECYCLING SLOWS DOWN THE CONSUMPTION OF RAW MATERIALS.
- SAVE MORE LAND FOR WASTE DISPOSAL WHILST MITIGATE ENVIRONMENTAL POLLUTION.
- VEHICLE IMPORTED TO TONGA MUST HAVE DISPOSE METHODS.

1.8 Others

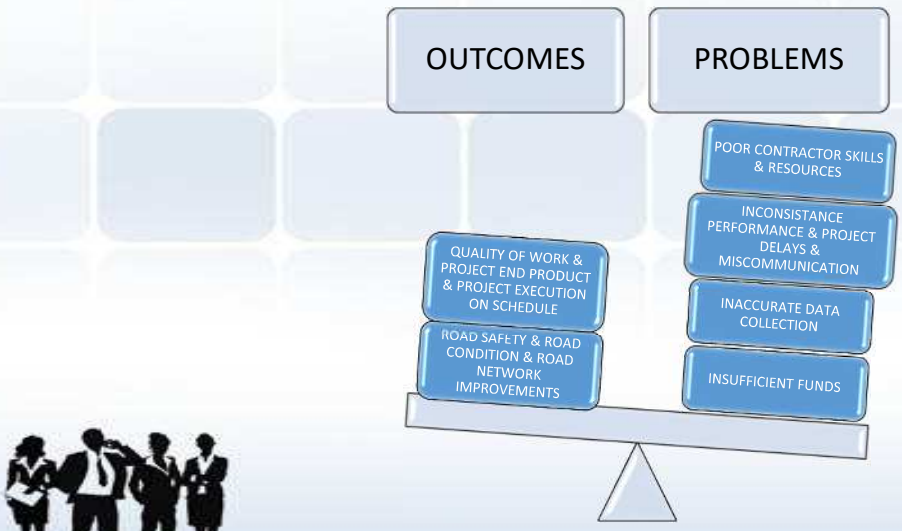
COUNTRY NATURE: JAPAN PEOPLE ARE VERY SPECIAL BECAUSE IN MY OPINION THEY HAVE FAITH TO THEIR HONESTY. THIS IS SOMETHING THAT REQUIRES IN THE DEVELOPMENT OF ROAD INFRASTRUCTURE. I BELIEVE IF EVERY PERSONNEL EITHER IN GOVERNMENT ORGANISATION OR PRIVATE SECTORS HAVE FAITH IN THEIR HONESTY, EVERYTHING GOES WELL.

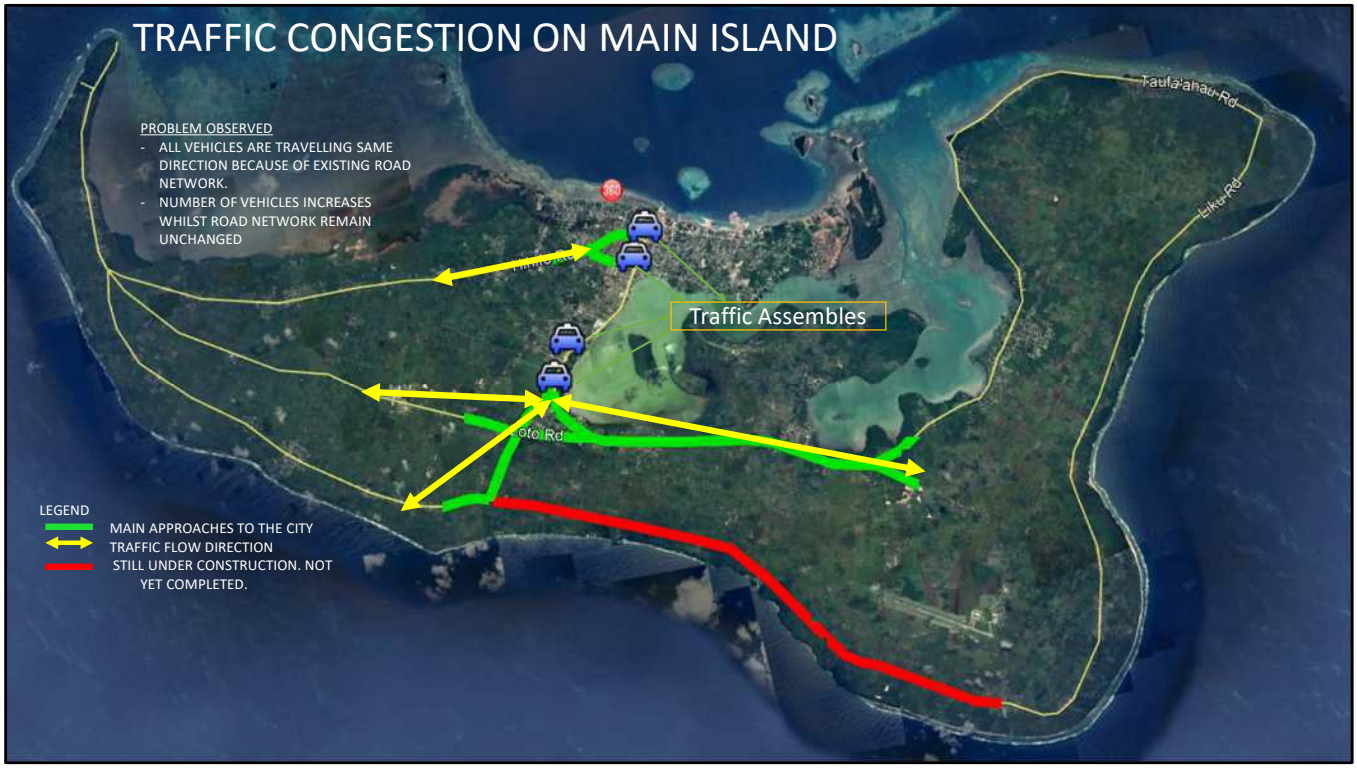
Recycling

We have visit facility that they do recycling here in Okinawa. The Equipment using and process of the product are very impressive. They recycle wasted from construction Site, raw material, Plastic, Glass Bottle, damage pipe line material.


TONGA MAJOR ISSUES
SLOW WET TAR
NEW SEAL
SHOULDER CLOSED

QUALITY ISSUES




TRAFFIC CONGESTION ON MAIN ISLAND
PROBLEM OBSERVED
- ALL VEHICLES ARE TRAVELLING SAME DIRECTION BECAUSE OF EXISTING ROAD NETWORK.
- NUMBER OF VEHICLES INCREASES WHILST ROAD NETWORK REMAIN UNCHANGED
Traffic Assembles
Taufa'ahau Rd
Eiki Rd
LEGEND
MAIN APPROACHES TO THE CITY
TRAFFIC FLOW DIRECTION
STILL UNDER CONSTRUCTION. NOT YET COMPLETED.

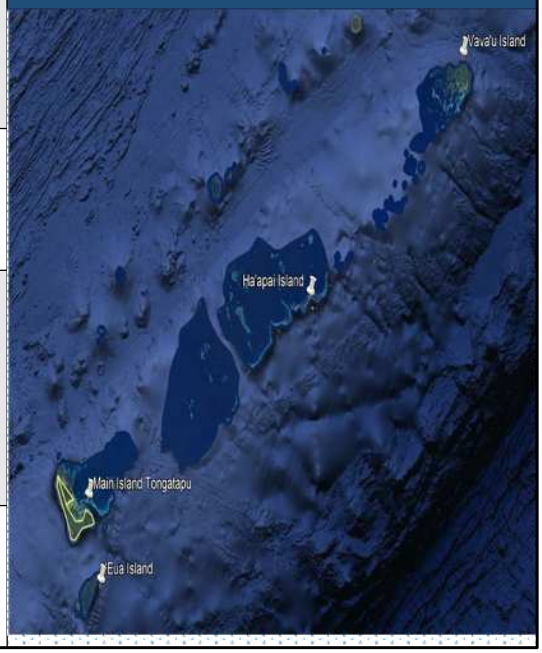
TRAFFIC CONGESTION ON MAIN ISLAND

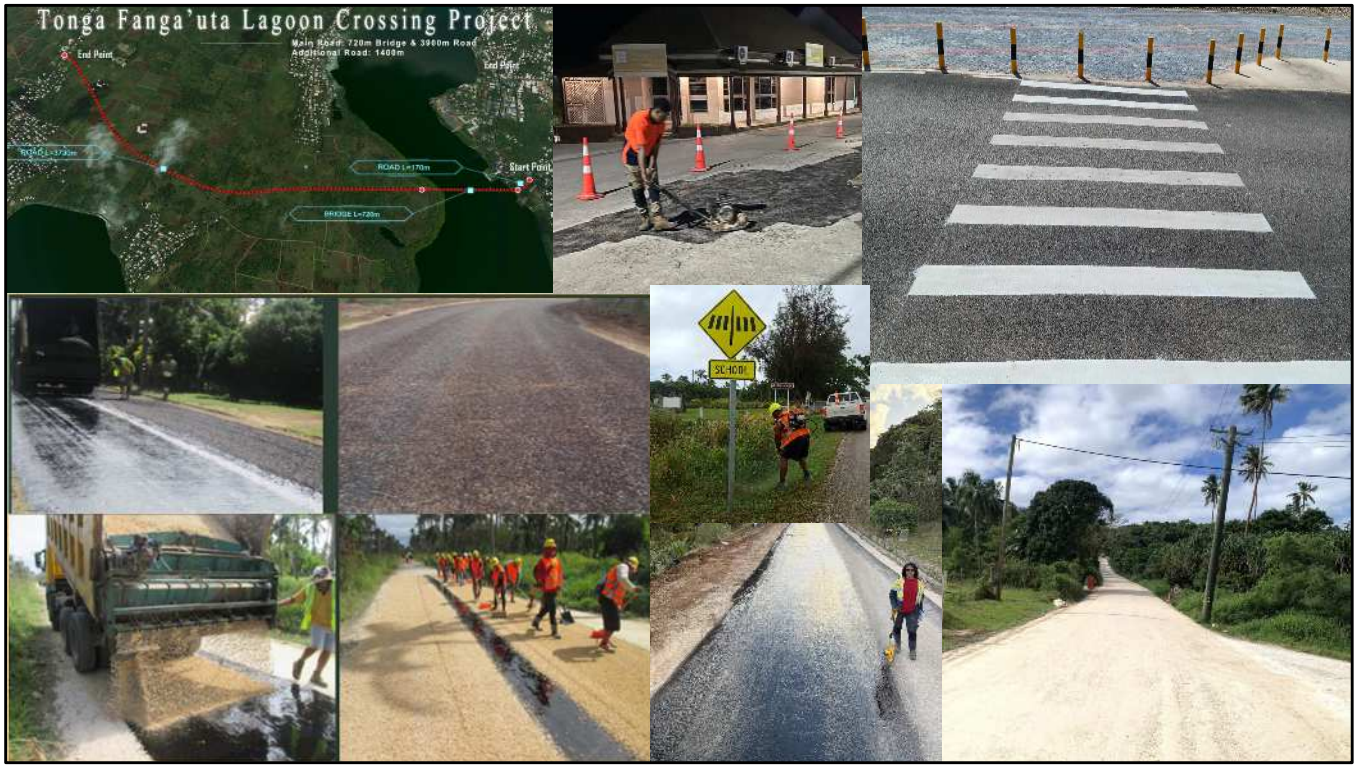
THIS IS URBAN AREA: SHOPS, FIRMS, MARKETS, GAS STATIONS…ETC. HIGH VOLUME OF TRAFFIC APPROCHING THIS AREA

BOTTLENECK

RESOURCES AVAILABILITIES

Islands	Description	Distance	Remarks
EUA	Distance from Tongatapu – Eua Island	40km	1 Road Work Contractor, 1 Aggregate Supplier, Insufficient Equipment for Road Works, Cost for shipments is fair.
HA'APAI	Distance from Tongatapu – Ha'apai Island	170km	No local Road Works Contractor, 1 Quarry but not accepted for road pavement works, Cost for shipment is expensive.
VAVA'U	Distance from Tongatapu – Vava'u Island	302km	3 Local Road Works Contractor, Have few Quarries but not operational only one Quarry is acceptable to be use for a specific type of pavement surfacing, Insufficient Equipment for Road Works, Cost for shipment is expensive.
TONGATAPU	Main Island	N/A	5 Road Works Contractor, 3 Contractor with sufficient equipments, 2 Certified Quarries for road pavement works.





ROAD WORKS IN TONGA.

- Routine Maintenance.
- Line marking.
- Periodic Works
- Road sign Maintenance.

MINISTRY OF INFRASTRUCTURE

POTUNGAUE KI HE NGAAHI NGAUE LALAHI

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CIVIL AVIATION DIVISION

CIVIL ENGINEERING DIVISION

MARINE AND PORTS DIVISION

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LAND TRANSPORT DIVISION

BUILDING CONTROL DIVISION

CONCLUSION

- ROAD MAINTENANCE IS ESSENTIAL FOR ENSURING SAFETY, VALUABLE PUBLIC ASSESTS, ACHIEVING LONG-TERM COST SAVING AND SUPPORTING OVERALL ECONOMIC AND SOCIAL DEVELOPMENT.
- “IF EVERYONE IS MOVING FORWARD TOGETHER, THEN SUCCESS TAKES CARE ITSELF” (HENRY FORD)

“Whatever you do, work heartily, as for the Lord and not for men. “ Colossian 3:23

どうも ありがとう ございます

MALO ‘AUPITO.