5-5　テクニカルメモランダム

Technical of Memorandum
on the Preparatory Survey for
the Project for Improvement of Presidente Nicolau Lobato International Airport
in the Democratic Republic of Timor-Leste

The Preparatory Survey Team for the Outline Design (hereinafter referred to as "the JICA Survey team") of the Preparatory Survey for the Project for Improvement of Presidente Nicolau Lobato International Airport in the Democratic Republic of Timor-Leste (hereinafter referred to as "the Project"), headed by Mr. Teruo HANADA, Chief Consultant of the JICA Survey team, conducted the survey between 1st April to 7th May, 2018. The Study team held a series of discussions with the officials of the Government of the Democratic Republic of Timor-Leste on the technical results of the survey. In the course of the discussions, both sides have agreed and confirmed the main items described in this Technical Memorandum.

Dili, 7th May, 2018

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Chapter 1 Introduction

This Technical memorandum has been prepared to establish mutual understandings between JICA Survey team and Implementation agency and other relevant organizations in the Democratic Republic of Timor-Leste (hereinafter referred to as "Timor-Leste side") on the technical and engineering aspects for the Project. This memorandum was prepared by JICA Survey team based on the results of the first field survey and discussions with the Timor-Leste side.

It is also noted that all the information as described in this technical memorandum will be decided after further studies, analysis and discussions in Japan with JICA, JICA Survey team and relevant organizations of the Government of Japan. JICA will submit the draft final report, which describes the final component of the Project to Timor-Leste side in November 2018 as stated in the Minutes of Discussions (M/D) signed by both parties on 16th April, 2018.

Chapter 2 Present Situation of the Project

2-1 Present conditions and issues of civil aviation sector

Since the Democratic Republic of Timor-Leste is an island country, air transport plays an important role for passenger and cargo transport in the international traffic as well as domestic traffic. There are in total 9 airports of which three are international airports and one, Oecussi, will soon be upgraded to international airport. All the airports in Timor-Leste are administrated by Air Navigation Administration of Timor-Leste (hereinafter referred to as "ANATL"), which was established as a public company by DECREE-LAW.

Table 2-1.1 Airport in Timor-Leste

No	Airport	Category	Remarks
1	Presidente Nicolau Lobato International Airport	International	The airport in the capital city. Necessity of improvement is mentioned in National Strategic Development plan 2011-2030 and other sector plans. Priority is high among other infrastructure projects in Timor-Leste.
2	BAUCAU Airport	International	International airport with 2500m-long runway
3	SUAI Airport	International	Substantial improvement was recently completed
4	OECUSSI Airport	Domestic	Improvement project is underway to be completed by 2019
5	FUILORO Airport	Domestic	No regular flight
6	VIQUEQUE Airport	Domestic	No regular flight
7	SAME Airport	Domestic	No regular flight
8	MALIANA Airport	Domestic	No regular flight
9	ATAURO Airport	Domestic	No regular flight

2-2 Present conditions and issues of Presidente Nicolau Lobato International Airport

At present international flights are operated from Presidente Nicolau Lobato International Airport (hereinafter referred to as "Dili International Airport") to 3 destinations, namely Singapore, Denpasar in Indonesia and Darwin in Australia. The following table shows the number of passengers and aircraft movements in the last 12 years. The number of passengers is steadily increasing and reached 246.7 thousand in 2017, while the volume of cargo shows a significant decrease between 2013 and 2014, then is recovering.

Table 2-2.1 Record between 2006 and 2017

CY	Aircraft Movements (times)						Passengers (thousand persons)						Cargoes (tons)	
	International		Domestic		Total		International		Domestic		Total		International	
	Number	Change	Number	Change	Number	Change	Number	Change	Number	Change	Number	Change	Number	Change
2006	2,902				2,902		62.7				62.7		276.4	
2007	2,538	-12.5%			2,538	-12.5%	76.5	22.2%			76.5	22.2%	267.2	-3.3%
2008	2,366	-6.8%	962		3,328	31.1%	91.5	19.5%	6.3		97.8	27.8%	326.4	22.1%
2009	2,356	-0.4%	1,700	76.7%	4,056	21.9%	113.3	23.8%	10.4	64.7%	123.7	26.5%	391.6	20.0%
2010	2,566	8.9%	2,414	42.0%	4,980	22.8%	133.2	17.6%	16.7	60.5%	150.0	21.2%	415.7	6.2%
2011	2,306	-10.1%	1,912	-20.8%	4,218	-15.3%	143.7	7.8%	7.8	-53.1%	151.5	1.0%	426.0	2.5%
2012	2,834	22.9%	2,460	28.7%	5,294	25.5%	168.7	17.4%	10.1	29.0%	178.8	18.0%	471.5	10.7%
2013	2,680	-5.4%	2,702	9.8%	5,382	1.7%	192.0	13.8%	12.9	27.2%	204.9	14.6%	239.6	-49.2%
2014	2,896	8.1%	3,302	22.2%	6,198	15.2%	189.5	-1.3%	17.4	35.0%	206.8	0.9%	171.0	-28.6%
2015	2,982	3.0%	3,266	-1.1%	6,248	0.8%	193.0	1.8%	19.0	9.4%	212.0	2.5%	246.6	44.2%
2016	3,232	8.4%	2,712	-17.0%	5,944	-4.9%	212.7	10.2%	16.4	-13.6%	229.2	8.1%	284.0	15.2%
2017	2,698	-16.5%	3,674	35.5%	6,372	7.2%	216.4	1.7%	30.3	84.7%	246.7	7.7%	326.1	14.8%

source: Airport Operation Department and General Directorate of Statistics

The following figure shows the history transition of the number of passengers from between 2006 to 2017. The international passenger movements account for more than 90% of the total passengers.

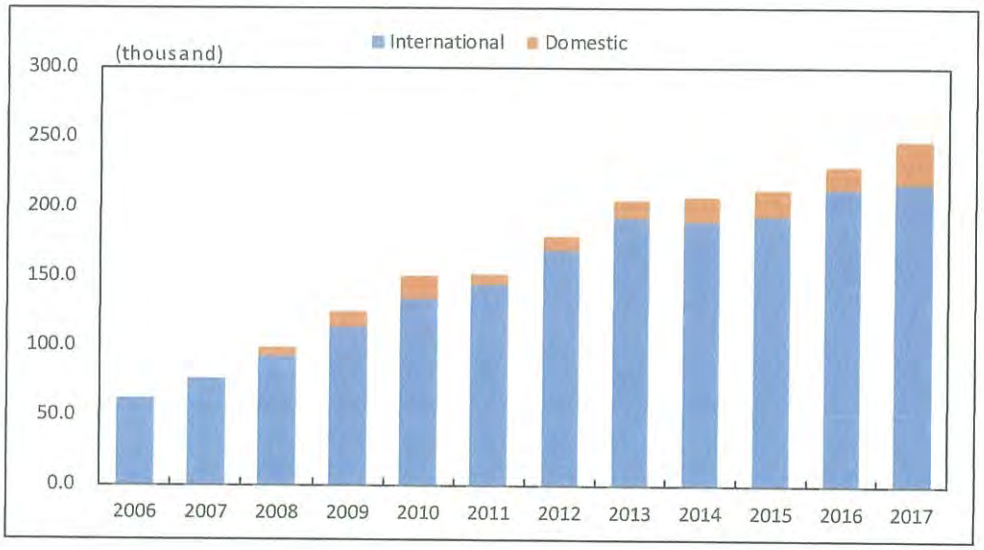


Figure 2-2.1 Transition of number of passenger

The following figure shows the past record of the volume of cargo between 2006 and 2017. There is a significant drop in 2013 due to the suspension of flight by Merpati Nusantara Airlines and withdrawal of the United Nations Integrated Mission in Timor-Leste (UNMIT) in 2012.

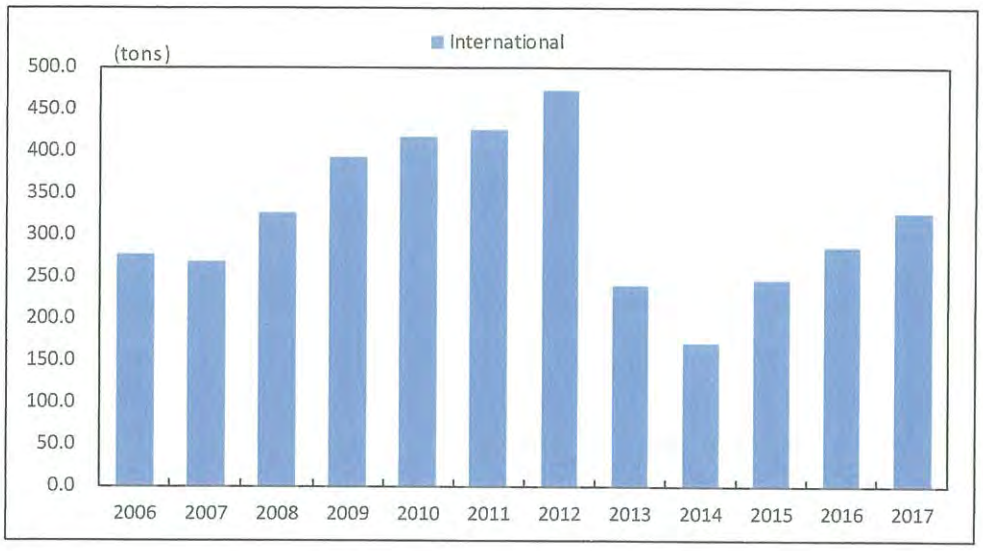


Figure 2-2.2 Transition of volume of cargo

The following table shows the past record of the number of flight in each destination. While Denpasar shows a steady increase in the number of passengers, Singapore and Darwin are flat or show gradual decrease.

Table 2-2.2 Transition of flight number in each destination

(times)

CY	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
South-Eastern Asia	696	830	922	936	835	854	1,024	1,563	2,020	2,793
CGK : Soekarno-Hatta					12	4				
DPS : Denpasar Bali	626	626	626	626	436	464	730	1,263	1,734	2,583
SIN : Singapore	70	204	296	310	387	386	294	300	286	210
Australia and New Zealand	962	821	682	834	857	904	952	966	856	814
DRW : Darwin	962	821	682	834	857	904	952	966	856	814
Total	1,658	1,651	1,604	1,770	1,692	1,758	1,976	2,529	2,876	3,607

source: OAG Schedule Analyzer

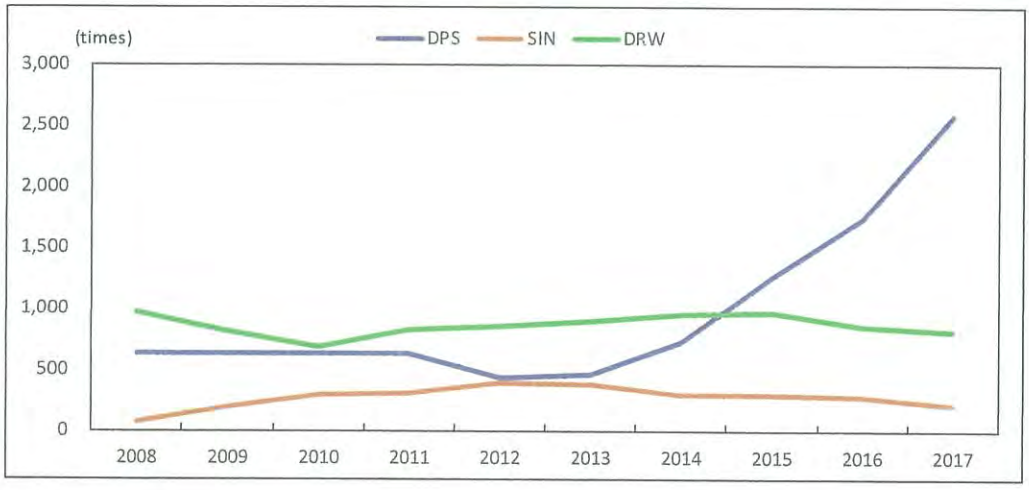
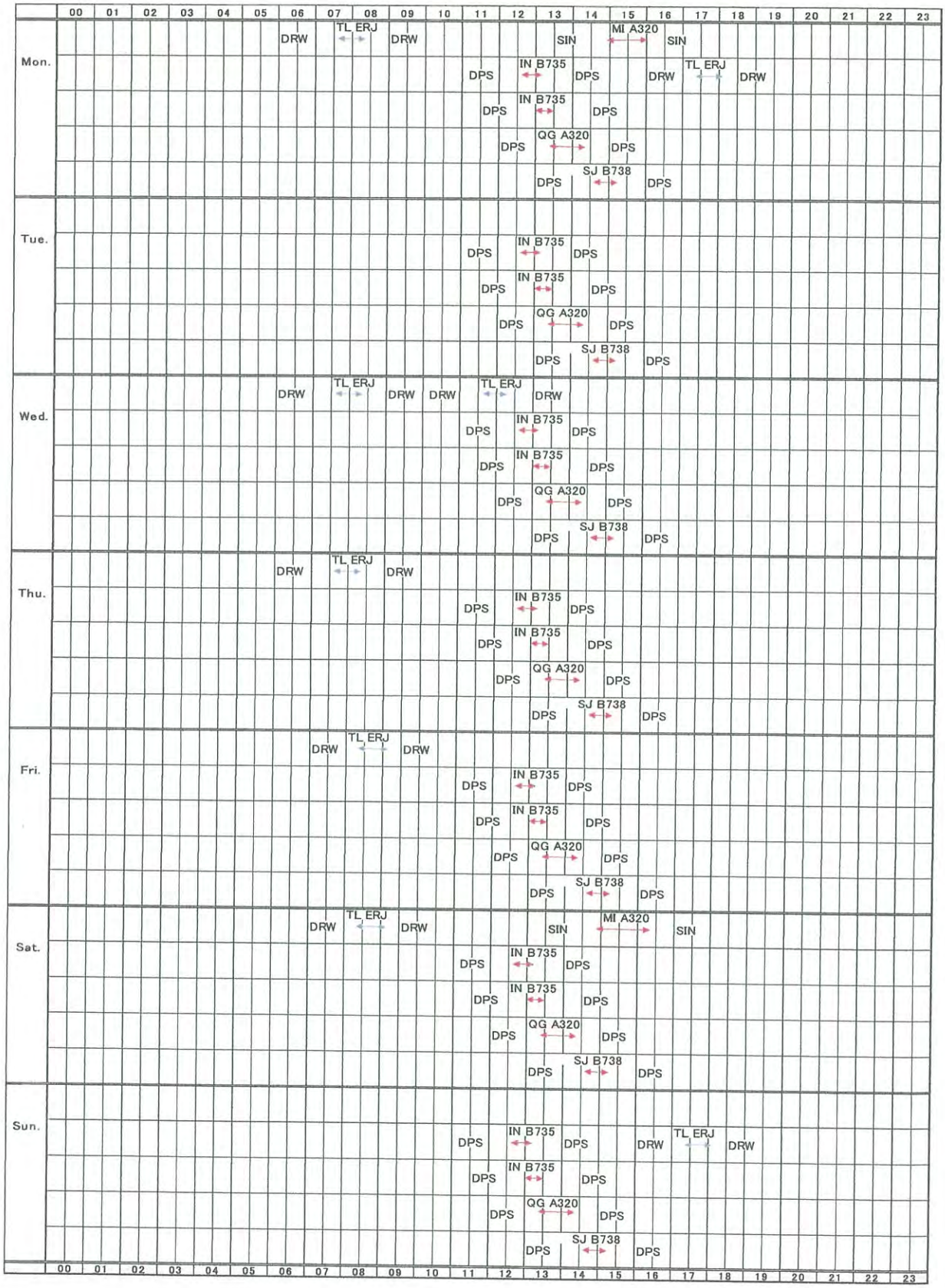


Figure 2-2.3 Transition of flight number in each destination

The following table shows the weekly schedule of Dili International Airport. Flights are concentrated between 12:00 and 15:00 because all the flights depart the origin airport in the morning time

convenient for the passengers and return after passenger disembarkation/embarkation. No more flights are possible because Dili International airport does not permit night time operation.

Table 2-2.3 Weekly schedule in Dili International Airport



Dili International Airport is in poor condition and requires substantial improvement and development to meet increasing passenger numbers and to operate safely. Passenger terminal building was built more than 35 years ago and is already deteriorated. The passenger handling capacity was originally designed to accommodate 100,000 passengers per year, while to the current number of passengers reached 246,700, resulting in significant congestion. The number of passengers is expected to increase steadily in the future. The government of Timor-Leste plans to develop tourism for socio-economic development of the country and regard the present international passenger terminal as bottleneck due to its incapacity to handle passengers. Therefore, the government of Timor-Leste has put high priority on development of new passenger terminal among other infrastructure development program.

2-3 Request by the Government of Timor-Leste

The government of Timor-Leste requested Japanese Grant Aid Project with the following components.

Table 2-3.1 Requested Components of the Project

	Requested Components of the Project	Status
1	Construction of a new international passenger terminal building (with equipment)	Agreed in M/D
2	Construction of a new international air cargo terminal building (with equipment)	
3	Construction of a new terminal apron (A320/B737: 4 aircraft stands)	
4	Construction of new taxiways	
5	Installation of aeronautical ground lights for new apron and taxiways	
6	Construction of roads and car park for new terminal facilities	
7	Construction of a new air traffic control tower building (with equipment)	
8	Construction of electric power substation with emergency generator (for new terminal facilities)	
9	Construction of VVIP building	It was confirmed that the new VVIP building is constructed by the Timor-Leste side, while the Project prepared VIP room in CIP lounge in the new international passenger terminal building.

Chapter 3 Basic Concept of the Project

3-1 Aviation Demand Forecast

According to the study of JICA survey team, the future aviation demand in Dili International Airport is expected to grow as shown in Table 3-1.1 The target year of the Project is set in 2027 in 5 years after the expected completion date of the Project.

Table 3-1.1 Aviation Demand Forecast

	CY	GDP (million USD) (2010 constant prices)		Air Passengers (thousand persons)						Air Cargoes (tons)	
				International		Domestic		Total		International	
		Value	Change	Number	Change	Number	Change	Number	Change	Volume	Change
Actual	2010	894	10.1%	133.2	17.6%	16.7	60.5%	150.0	21.2%	415.7	6.2%
	2011	965	7.9%	143.7	7.8%	7.8	-53.1%	151.5	1.0%	426.0	2.5%
	2012	1,014	5.0%	168.7	17.4%	10.1	29.0%	178.8	18.0%	471.5	10.7%
	2013	1,041	2.6%	192.0	13.8%	12.9	27.2%	204.9	14.6%	239.6	-49.2%
	2014	1,083	4.1%	189.5	-1.3%	17.4	35.0%	206.8	0.9%	171.0	-28.6%
	2015	1,127	4.0%	193.0	1.8%	19.0	9.4%	212.0	2.5%	246.6	44.2%
	2016	1,186	5.3%	212.7	10.2%	16.4	-13.6%	229.2	8.1%	284.0	15.2%
	2017	1,165	-1.8%	216.4	1.7%	30.3	84.7%	246.7	7.7%	326.1	14.8%
Forecast	2018	1,191	2.2%	222.9	3.0%	31.2	2.9%	254.1	3.0%	340.1	4.3%
	2019	1,241	4.2%	235.6	5.7%	32.9	5.5%	268.5	5.7%	367.4	8.0%
	2020	1,303	5.0%	251.3	6.7%	35.0	6.4%	286.3	6.6%	401.2	9.2%
	2021	1,368	5.0%	267.8	6.6%	37.3	6.3%	305.1	6.5%	436.8	8.9%
	2022	1,433	4.8%	284.5	6.2%	39.5	6.0%	324.0	6.2%	472.6	8.2%
	2023	1,502	4.8%	301.9	6.1%	41.8	5.9%	343.8	6.1%	510.2	7.9%
	2024	1,571	4.6%	319.5	5.8%	44.2	5.6%	363.7	5.8%	547.9	7.4%
	2025	1,643	4.6%	337.8	5.7%	46.7	5.6%	384.5	5.7%	587.3	7.2%
	2026	1,716	4.4%	356.1	5.4%	49.1	5.3%	405.3	5.4%	626.8	6.7%
	2027	1,791	4.4%	375.3	5.4%	51.7	5.2%	427.0	5.4%	668.0	6.6%
	2028	1,867	4.2%	394.4	5.1%	54.3	5.0%	448.6	5.1%	709.1	6.1%
	2029	1,945	4.2%	414.2	5.0%	57.0	4.9%	471.2	5.0%	751.8	6.0%
	2030	2,023	4.0%	434.0	4.8%	59.6	4.7%	493.6	4.8%	794.3	5.6%
	2031	2,104	4.0%	454.5	4.7%	62.4	4.6%	516.9	4.7%	838.5	5.6%
	2032	2,188	4.0%	475.8	4.7%	65.3	4.6%	541.1	4.7%	884.4	5.5%
	2033	2,275	4.0%	498.0	4.7%	68.3	4.6%	566.3	4.7%	932.2	5.4%
	2034	2,366	4.0%	521.1	4.6%	71.4	4.6%	592.5	4.6%	981.8	5.3%
	2035	2,461	4.0%	545.1	4.6%	74.6	4.5%	619.7	4.6%	1,033.5	5.3%
	2036	2,559	4.0%	570.1	4.6%	78.0	4.5%	648.0	4.6%	1,087.2	5.2%
	2037	2,662	4.0%	596.0	4.6%	81.5	4.5%	677.5	4.5%	1,143.1	5.1%
	2038	2,768	4.0%	623.0	4.5%	85.1	4.5%	708.1	4.5%	1,201.2	5.1%
	2039	2,879	4.0%	651.1	4.5%	88.9	4.4%	740.0	4.5%	1,261.6	5.0%
	2040	2,994	4.0%	680.3	4.5%	92.8	4.4%	773.1	4.5%	1,324.5	5.0%

The planning parameters hour for the passenger and cargo terminals as well as the new apron are summarized in Table 3-1.2.

Table 3-1.2 Planning figure Summary

	Phase 1 (CY 2027)
Passenger Terminal Building	340 passengers/peak-hour (for each of arrival & departure)
Cargo Terminal Building	2.5 tons/ peak-day (total of loading & unloading)
Aircraft Parking Stands	S-J (code C) x 4 (including one reserve stand)

3-2 Priority of component

Because of the limited budget available for the Project, not all of the components may be included in the scope of the Project and components may need to be screened based on their priority to achieve the target of the Project. JICA survey team explained that the main component of the Project is the construction of the International Passenger terminal building that is recognized as a national priority in the infrastructure development in the Democratic Republic of Timor-Leste. The inappropriate capacity and inconvenience becomes the bottle neck to the development of tourism and social economic development of the country.

The components of the Project have been prioritized as shown below taking into account of the following descriptions.

Table 3-2.1 Priority of the Project Components

Components	Priority
New International Passenger terminal building	1
New International aircraft parking apron	1
New Taxiways	1
Substation	1
ATC tower and ATC equipment	1
Access Road and Parking	2
Apron floodlights	3
Aeronautical ground Lighting system	4
International Cargo Terminal Building	5

Priority 1 components are those essential for the international passenger terminal building.

The international aircraft apron and new taxiways are definitely necessary for operation of the International passenger terminal building. Priorities of those are considered to be high. Substation is also an essential component since the current power house needs to be demolished for construction of the new international terminal facilities.

ATC tower and ATC equipment is also the first priority. The existing ATC tower building must be demolished since the area is utilized as the new international aircraft parking apron. The airport is under operation, having an aerodrome control zone. Therefore new ATC tower must be built to continue to operate the airport before demolishing the existing ATC tower.

Access road and parking is also considered to be important for the operation of new international passenger terminal building. However the technical skills and costs for the construction is not high. Those could be built by the Timor-Leste side so that the priority is lowered.

Aeronautical ground lighting of the Project includes taxiway edge light and apron floodlighting. In

order to enable nighttime aircraft operations, ANATL is planning to install new runway lights as the existing lighting system is not functioning. However design therefor has not been conducted and the schedule of implementation is unclear. Installation of taxiway edge light only does not enable nighttime operations at the airport. Therefore the priority of the taxiway edge lights was given priority 4. Apron flood light was given priority 3 since it is technically difficult to install later after the apron pavement was completed.

Since International terminal area is moved to the west side of the current area, a new international cargo terminal building also needs to be built in the new area for convenience. However, since the building is an independent facility and cargo demand is not high, a lower priority of 5 has been given thereto.

3-3 Facility Layout Plan

JICA Survey team explained the preliminary layout plan of the Project components as the following figure.

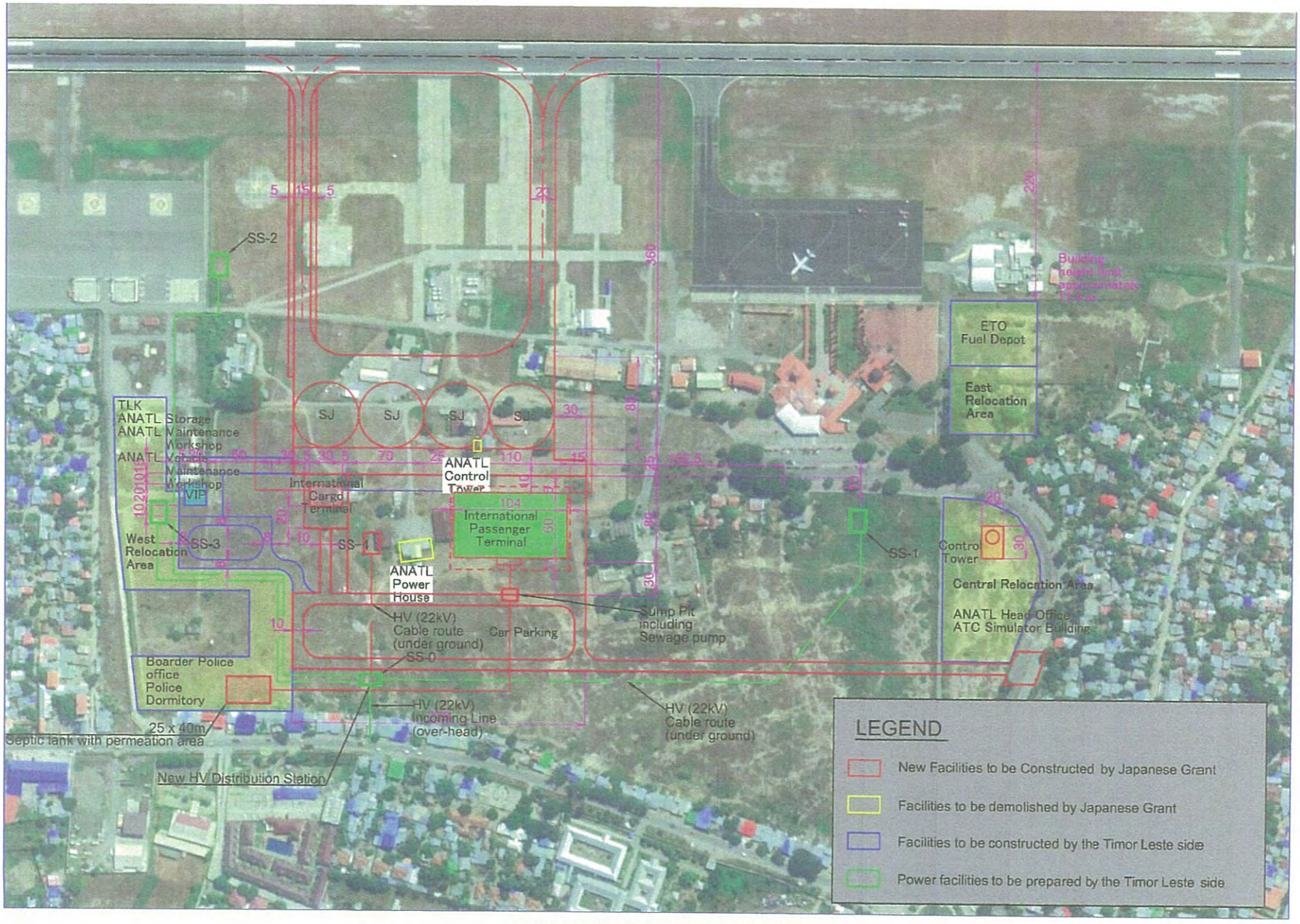


Figure 3-3.1 Facility Layout Plan

3-4 Basic Concept and Plan of each Component of the Project

3-4-1 International Passenger Terminal Building

The International Passenger Terminal (PTB) is located to follow official Annex site plan (Figure 3-3.1) attached to meeting minutes on 13rd April 2017. It is one story flat building with 116m x 58m footprint. This covers 6700m2 floor size. Combined with the other miscellaneous facilities 300m2, the total floor size remains under 7000m2.

6700m2 includes 3 functional blocks. They are Departure (blue), Arrival (red), and Service (yellow). Departure, and Arrival blocks are located at both ends of building. This considers future expansion in west and east direction. They are designed with one-room concept, which simplifies passenger movement. Service block includes WC, departure baggage handling system (BHS), mechanical, and other functional rooms, and remains unchanged in future expansion.

Table 3-4-1.1 presents Facility Requirements, which meets peak hour passenger number 340 as per Table 3-1-2. Official meeting on 24th April 2017 discussed each functional unit numbers such as counters, and control units. All attended stakeholders agreed with these planned figures.

With regard to the hold baggage screening, we proposed to adopt an inline screening system. Nonetheless, we were requested by ANATL to install X-lay machines at the entrance of the terminal building because baggage containing unlawful goods and products such as drug and coral have been frequently found out and in such cases ANATL proposed system allows easy identification of a passenger who carries the baggage.

Baggage screening is to be conducted from two different viewpoints; aviation security and control of unlawful goods.

From the aviation security viewpoint, ICAO Annex 17 states "*4.5.2 Each Contracting State shall ensure that all hold baggage to be carried on a commercial aircraft is protected from unauthorized interference from the point it is screened or accepted into the care of the carrier, whichever is earlier, until departure of the aircraft on which it is to be carried.* ***If the integrity of hold baggage is jeopardized, the hold baggage shall be re-screened before being placed on board an aircraft.***"

To comply with this international standard, installation and operation of the proposed inline screening system is imperative and higher priority should be given thereto than installation of X-lay machines at the entrance to the terminal building. ANATL should assign appropriately trained personnel to ensure that the baggage screening should be properly conducted in accordance with ICAO Annex 17 aviation security standard.

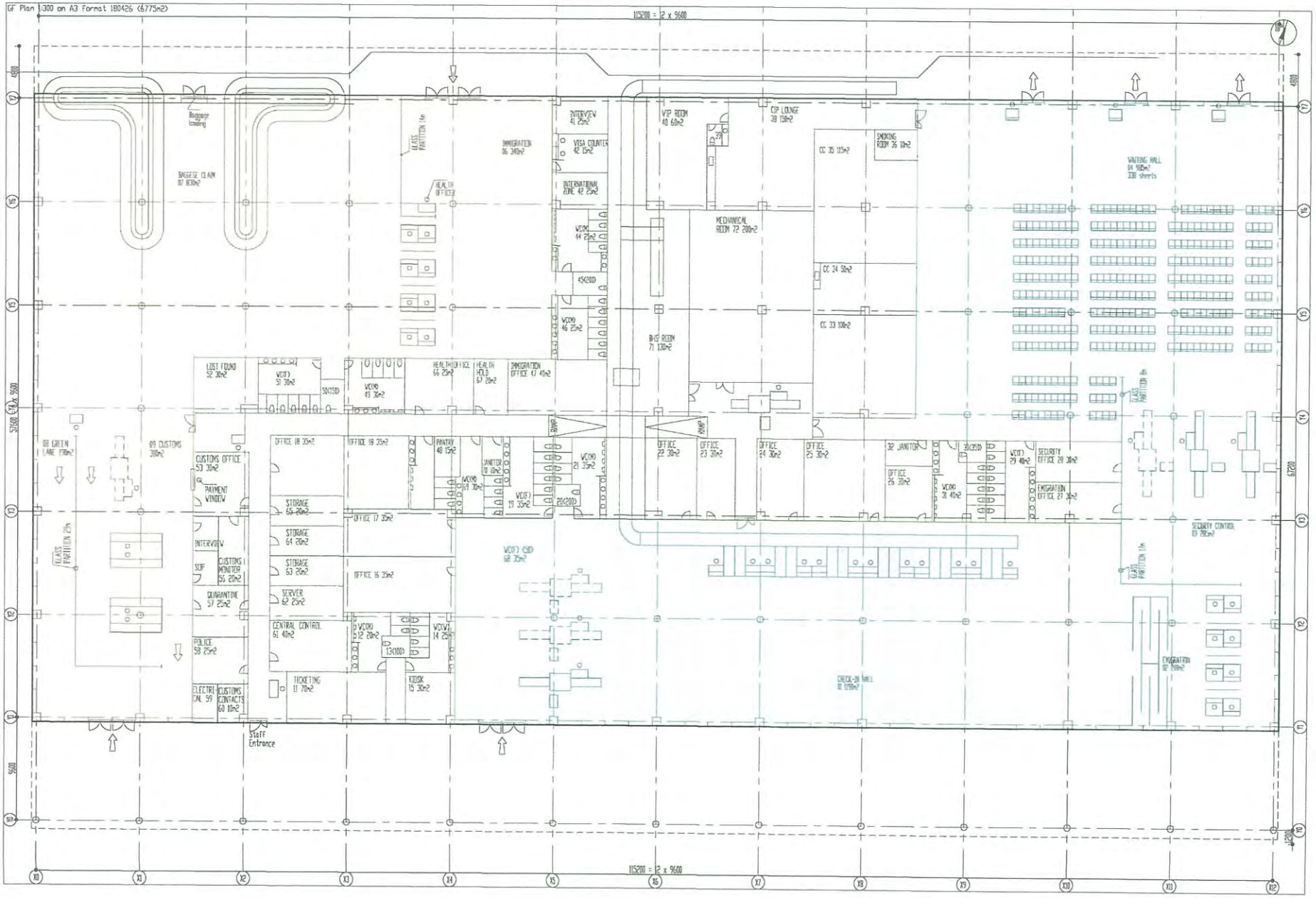


Figure 3-4-1.1 Draft Layout Plan for International Passenger Terminal Building

Table 3-4-1.1 Draft Facility Requirement of PTB

1.	**Departure Passenger Terminal Facilities**			Planned Figure
1-b (1)	Check-in Hall (check-in counters) Formula Position of units NC = P*(t/60)*b Area A = NC*SI SI : Space required per gate counter P : Peak hour originating departing passengers t : Average processing time per passenger b : Contingency ratio (10%)	 (77 m2) (340 pax) (1.25 min) (1.1)	8 units 600 m2	12 units 1,185 m2
1-c	Emigration (Passport Control Counters) Formula Number of desks NPD = P*(t/60)*b+1 Area A = NPD*SD NPD : Number of passport control desks. P : Peak hour originating departing passengers t : Average processing time per passengers b : Contingency ratio (0%) SD : Space required per channel (incl. queuing space)	 (340 pax) (0.5 min) (1) (50 m2)	4 units 192 m2	8 units 200 m2
1-d	Security Control Formula Number of security units NS = P*t/60 Area A = NS*SS Ns : Number of security units P : Peak hour departing passengers t : Average processing time per passengers SS : Space required per unit (incl. queuing space)	 (340 pax) (0.5 min) (120 m2)	3 units 340 m2	2 units 285 m2
1-e	Waiting Hall Formula (PP*(TP/60)+PT2*(TT/60))*a PP : Peak hour originating departing passengers. PT : Peak hour number of departing transits TP : Average occupancy time per passenger TT : Average occupancy time per transits a : Space required per parson. *Including concession (shop, bar, restaurant, etc.) area	 (340 pax) (0 pax) (60 min) (90 min) (2.5 m2)	850 m2	985 m2
	Sub-total (A)		1,996 m2	2,655 m2

2.	**Arrival Passenger Terminal Facilities**			
2-a	Immigration (Arrival Passport Control units)			
	Formula Number of units NPA = P/0.7*(t/60)+1		6 units	8 units
	Area A = NPA*SC		360 m2	340 m2
	NPA : Number of passport control units.			
	P : Peak hour terminating passenger.	(340 pax)		
	t : Average processing time per passenger.	(0.5 min)		
	SC : Space required per channel.(incl. queuing space)	(60 m2)		
2-b	Baggage Claim			
(1)	Formula Number of Device Bw+Bn		1 units	2 units
	Area A = (NW*SDW+NN*SDN)		600 m2	835 m2
	NW : Number of units for wide-body aircraft MFW*(tw/60)	(0 units)		
	NN : Number of units for narrow-body aircraft MFN*(tn/60)	(1 units)		
	MFW : Peak hour arriving flights of wide-body aircraft	(0 flights)		
	MFN : Peak hour arriving flights of narrow-body aircraft	(3 flights)		
	tw : Average claim device occupancy time per wide-body aircraft	(45 min)		
	tn : Average claim device occupancy time per narrow-body aircraft	(20 min)		
	SDW : Space required per device of wide-body aircraft	(900 m2)		
	SDN : Space required per device of narrow-body aircraft	(600 m2)		
(2)	Formula (IATA Method)			
	Number of units NW+NN		1.4 units	2 units
	Area A = (SDW*NW+SDN*NN)		1,200 m2	m2
	NW : Number of units for wide-body aircraft (P*fw)/NPW*(tw/60)	(0 units)		
	NN : Number of units for narrow-body aircraft (P*fn)/NPN*(tn/60)	(1.416667 units)		
	P : Peak hour arriving passengers	(340 pax)		
	fw : Proportion of passengers arriving by wide-body aircraft	(0%)		
	fn : Proportion of passengers arriving by narrow-body aircraft	(100%)		
	tw : Average claim device occupancy time per wide-body aircraft	(45 min)		
	tnv : Average claim device occupancy time per narrow-body aircraft.	(30 min)		
	NPW : Number of passengers per wide-body aircraft at 80% load factor	(350 pax)		
	NPN : Number of passengers per narrow-body aircraft at 80% load factor	(120 pax)		
2-c	Customs			
(1)	Custom X-ray Control for Non-declare			
	Formula Number of units NC = 1 (fixed)		1 units	1 units
	Area SCN*NCD		120 m2	m2
	SCN : Space required per counter	(60 m2)		
(2)	Custom Control Area for Declare			
	Formula Number of units NCD = (NW+NN)*4		4 units	4 units
	Area SC*NCD		200 m2	500 m2
	NW : Number of units for wide-body aircraft	(0 units)		
	NN : Number of units for narrow-body aircraft	(1 units)		
	SCD : Space required per counter	(50 m2)		
	Sub-total (B)		2,480 m2	1,675 m2

3.	**Other Terminal Facilities**			
3-a	Business Launge (WC, VIP Room included) Formula			210 m2
3-b	Concessions Formula (Sub-total(A) + Sub-total(B))*0.3		1,343 m2	410 m2
3-c	Airline and Other Office Formula 100*NC NC : Number of Check-in units	(12 units)	1,200 m2	290 m2
3-d	CIQ Office Formula (NPD+NPA+NCD)*50 NPD : Number of departure passenger passport control units NPA : Number of arrival passenger passport control units NCD : Number of arrival customs units for declare	(8 units) (8 units) (2 units)	900 m2	255 m2
3-e	Central Control (Server Room included)			65 m2
3-f	WC in 6 locations			370 m2
3-g	BHS Room			180 m2
3-h	Mechanical / Electrical Room			210 m2
3-j	Storage			85 m2
3-k	Other (corridor, the other technical premises) Formula (Sub-total (A) + Sub-total (B) + Sub-total (C))*0.3		1,200 m2	370 m2
	Sub-total (C)		4,643 m2	2,445 m2
	Grand total (A+B+C)		9,119 m2	6,775 m2

Table 3-4-1.2 Draft Electrical and Mechanical Systems to be installed in the International PTB

Category	Item	Qty
Mechanical System	Water supply system	1 lot
	Sewage drainage system	1 lot
	Plumbing and sanitary system	1 lot
	Rain water drainage system	1 lot
	Air conditioning system	1 lot
	Mechanical ventilation systems	1 lot
	Internal fire hydrant system	1 lot
	Fire extinguishing system	1 lot
Electrical System	Lighting	1 lot
	Telephone (PBX)	1 lot
	CCTV	1 lot
	Public address	1 lot
	Fire alarm system	1 lot
	Master antenna system	1 lot
Special equipment	Flight information display system	1 lot
	Dual view X-ray system	1 set in-line 2 sets departure gate 1 set for standalone
	Single view X-ray system	1 for service loading

Category	Item	Qty
	Baggage handling system	2 in arrival 1 in check-in

3-4-2 International Air Cargo Terminal Building

The international cargo terminal building (CGO) is designed as single-storied building. Floor area size is 400m2 to double existing 200m2 Cargo Terminal. It has import and export storage areas Each of them has two entrances towards airside, and curbside. These 4 openings is cover with rolling shutter to meet loading with cargo track. Canopies are provided on both side as weather cover.
Main support system is RC. Roof and canopy has steel structure.

3-4-3 Construction of a New Terminal Apron

The new terminal apron is designed in front of the new international passenger terminal building. Four parking spots for small jet aircraft such as B737 and A320 are provided. The area of the apron is studied with the tracking of the aircraft and the separation distances set by ICAO regulations into consideration. The pavement of area by the concrete asphalt in the apron area is studied with taking cost, serviceability and ease of maintenance into account.

The new terminal apron is located and sized with the following criteria

- Apron edge line is determined parallel to the runway centerline at 360m to the South, to be consistent with Phase2 Apron for Code E aircraft such as B777-200 and A330-300, whose fuselage length is up to 68 m.
- Separation distances comply with proposed amendment of Annex 14.
- Aircraft stand configuration: self-maneuvering
- Design aircraft for geometry: B737-900ER with winglet
- Design aircraft for pavement: B737-900ER, full ramp load
- GSE road, staging area, and connection road to the existing Apron D are provided.

Table 3-4-3.1 Separation Distances Criteria

Item	Minimum	Remarks
Runway Width	45 m	for future Code 4D
Runway Strip	140 m	for future precision approach
Distance between RWY and parallel TWY	172.5 m	Phase 2 / future development
Distance between two parallel Taxiways	76 m	Phase 2 / future development
Distance between parallel TWY and object	43.5 m	Phase 2 Code E aircraft stands
	26 m	Phase 1 Code C aircraft stands
Clearance distances on aircraft stands	7.5 m	Phase 2 Code E aircraft stands
	4.5 m	Phase 1 Code C aircraft stands

Item	Minimum	Remarks
Taxiway width	23m	East taxiway for Code E
	15m	West taxiway for Code C
Taxiway shoulder width including taxiway	38 m	Phase 2
	25m	Phase 1

Aircraft parking stand numbering has been proposed as "01", "02", "03" and "04".

Name of the new international apron has been proposed as "West Apron".

3-4-4 Construction of New Taxiways

The new taxiways are designed at the both sides of the new terminal apron. The west side of taxiway is designed according to the design criteria of ICAO Aircraft Category of C and Code C aircraft with 15m width and 5m shoulder at one side. The east side of taxiway is designed for the design criteria of ICAO Aircraft Category of E for future expansion of the airport with no shoulder.

Design criteria for new taxiways are as follows.

- Code C for geometric design. Proposed amendment of Annex 14 is complied.
- B737-900ER, full taxi load for pavement design

Name of the new taxiways has been proposed as "B" at west side ,"C" at east side.

3-4-5 Installation of Aeronautical Ground Lights (AGL) for New Apron and Taxiways

The following aeronautical ground lighting is installed in the Project

(1) Taxiway edge light

Taxiway edge light is installed according to ICAO standards with 1.5m from the edge of taxiway and apron.

(2) Taxiway guidance sign

Runway exit sign is provided at the same side of runway where taxiways are connected. Runway designation signs are provided at each side of runway holding position marking.

(3) Apron floodlighting

Apron floodlighting with 5 poles of 20m is installed. LED type of light is employed.

(4) Aerodrome beacon

Aerodrome beacon is installed at the top of the new tower.

(5) Power system

CCR is provided for taxiway edge light and taxiway guidance sign

(6) Control and monitoring system

Control and monitoring system is renewed by ANATL with the renewal of runway lighting system. AGL installed by the Project is connected to this system.

3-4-6 Construction of Roads and Car Park for New Terminal Facilities

Access road is designed from the roundabout close to the existing passenger terminal building to the new international passenger terminal building via south side of Pertamina petro company area with two-lane at one side in total 4 lanes. Road lighting system is provided.

Access and circular road, carpark are planned in the following concept.

- To preserve the existing entrance promenade from main roundabout
- Compact circular road and carpark, to reserve more land area for commercial development
- Layout to harmonize with and future expansibility.

Parking is designed with about 300 cars. Main carpark has centralized gate and internal pathway, to be ready for toll collection. Taxi pool is provided near to passenger terminal.

Access Road and Car Parking

Access Road and Car Parking (Alternative 1)

Figure 3-4-6.1 Conceptual Terminal Road Layout

3-4-7 Construction of a New Air Traffic Control Tower Building (with Equipment)

(1) Location of the new Air traffic tower

The location of the new air traffic tower was discussed with the following criteria

- The location and height considered the future extension of the runway to 2500m
- The location of the tower be equidistant from the runway ends as much as possible
- The height of the tower shall not infringe obstacle limitation surfaces with 150 runway strips on both sides taking the future introduction of instrument and precision approach runway into account
- The location will not be affected when the new terminal building is expanded in the future
- The height is determined based on the FAA standards of at least 0.8 degree angle of incidence
- The less construction work for access road and utility facilities

As the result of the above considerations, the location was agreed in the Central Relocation Area. The precise location to be determined after the plane survey under this Survey is completed.

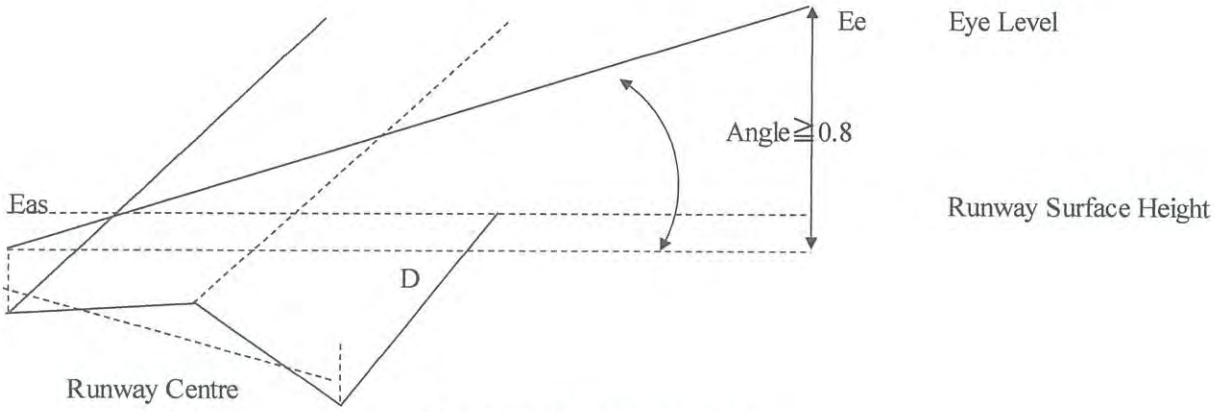
The height of the new ATC tower is determined with the following criteria and calculations, considering the runway extension project up to 2500m.

Table 3-4-7.1 Calculation of ATC Tower Height

Item		Runway East side Northern Part
The Height of Ruwany Surface (MSL)	Eas	7.6 m
Distance with New Traffic Control Tower (m)	D	1506 m
The Minimum Angle Necessary for Controller (Degree)	θ	0.8
	tanθ	0.0139635
Necessary Eye Level (MSL)	Ee	28.629031 m
Eye Level above Ground=Necessary Height above Ground (Ee-11.6m (MSL at Tower location))	Ed	17.03 m
VFR Room Floor Height (Ed-1.2m)	Ef	15.83 m
ATC Toewr Height (Ef+4.0m)	Er	19.83 m
Lightning rod and Antennas (Er+3m)	Ea	22.83 m
(Reference) Horizontal Surface		45 m
(Reference) Transitional Surface ((400-140)/7)		37 m

Meanwhile ANATL requested to build a tower of maximum allowable height (below the transitional surface) of 37m considering future development of the runway and environmental difficulty (preservation of trees, etc.), and ANATL will submit a request letter to JICA describing any basis of their request before departure of the Survey Team.

Note) MSL is from AIP East side of Runway 25ft(7.6m)
Airport Reference Point 25ft(7.6m)



Concept of Necessary Angle

It was proposed that the height of eye level for the new ATC tower is at least 17m above ground level.

Draft design of the tower is proposed as follows.

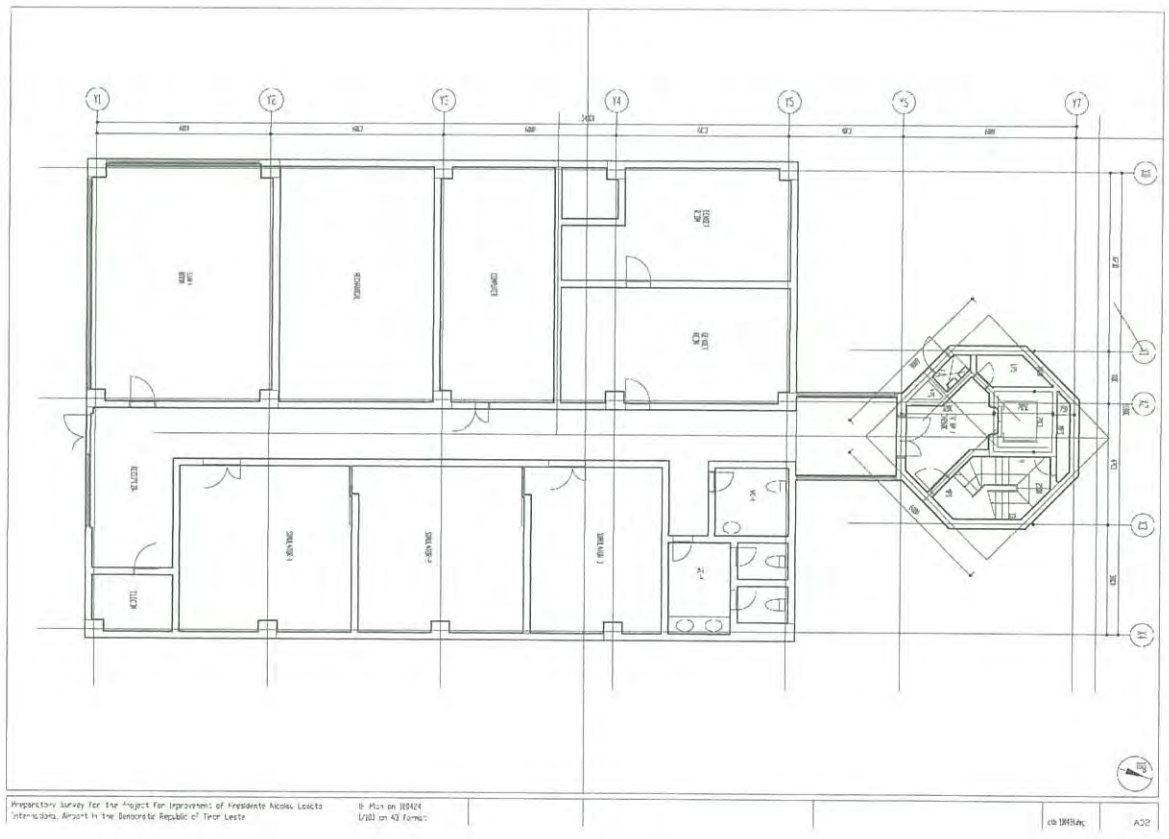


Figure 3-4-7.1 Draft design of ATC tower

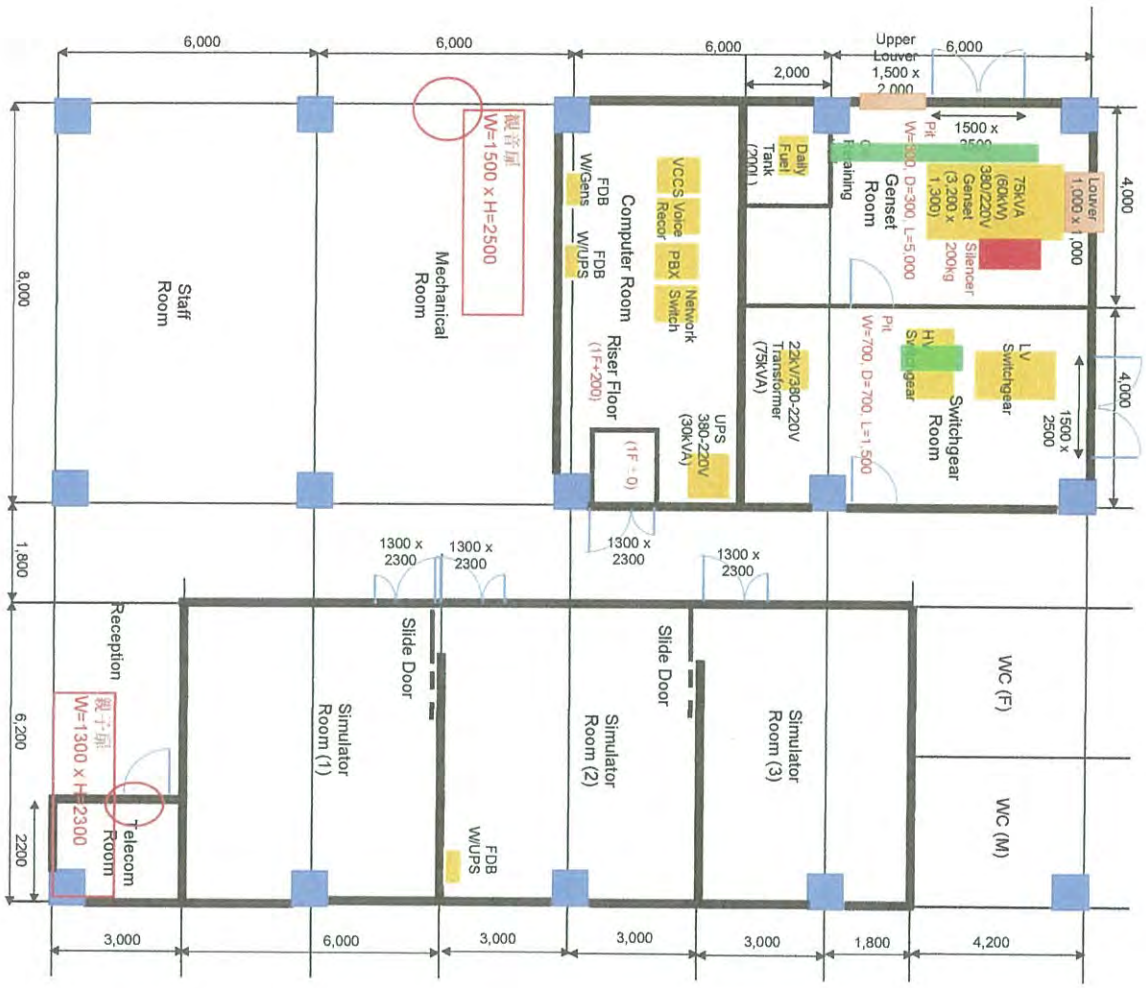
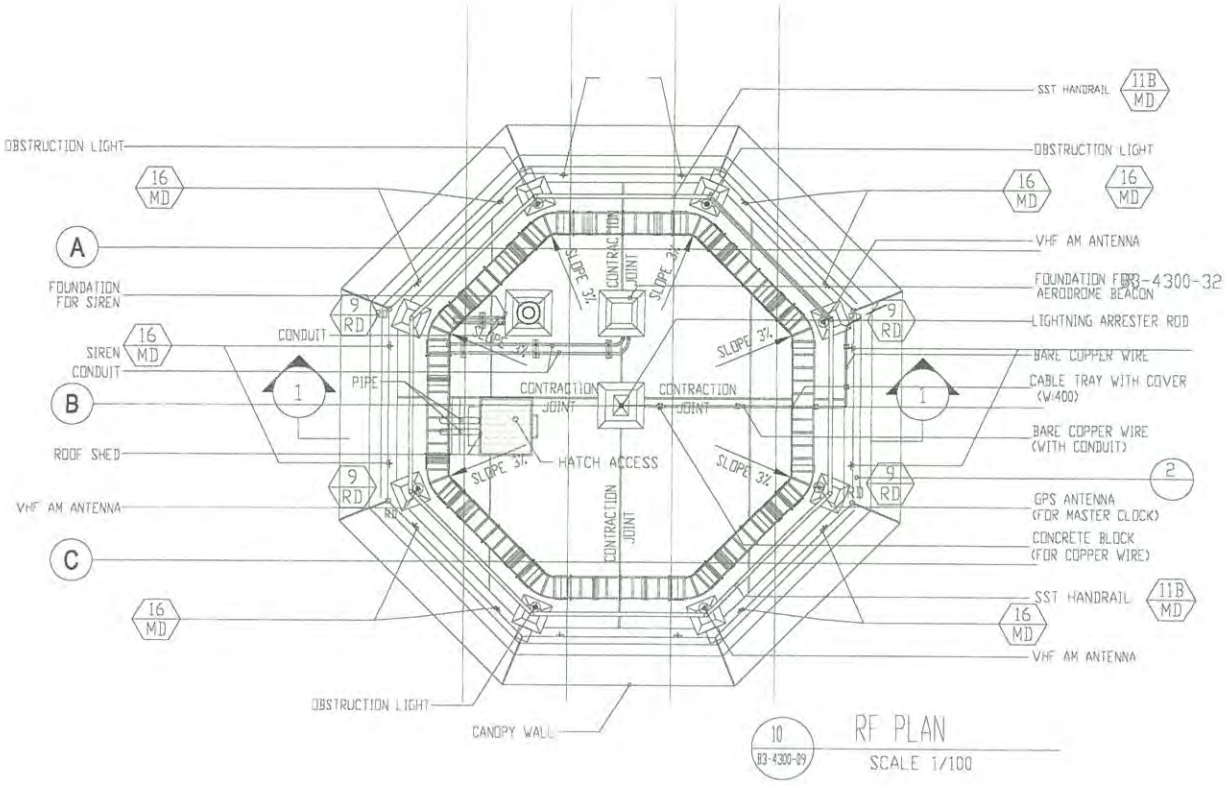


Figure 3-4-7.2 Draft layout plan of the ATC tower office building



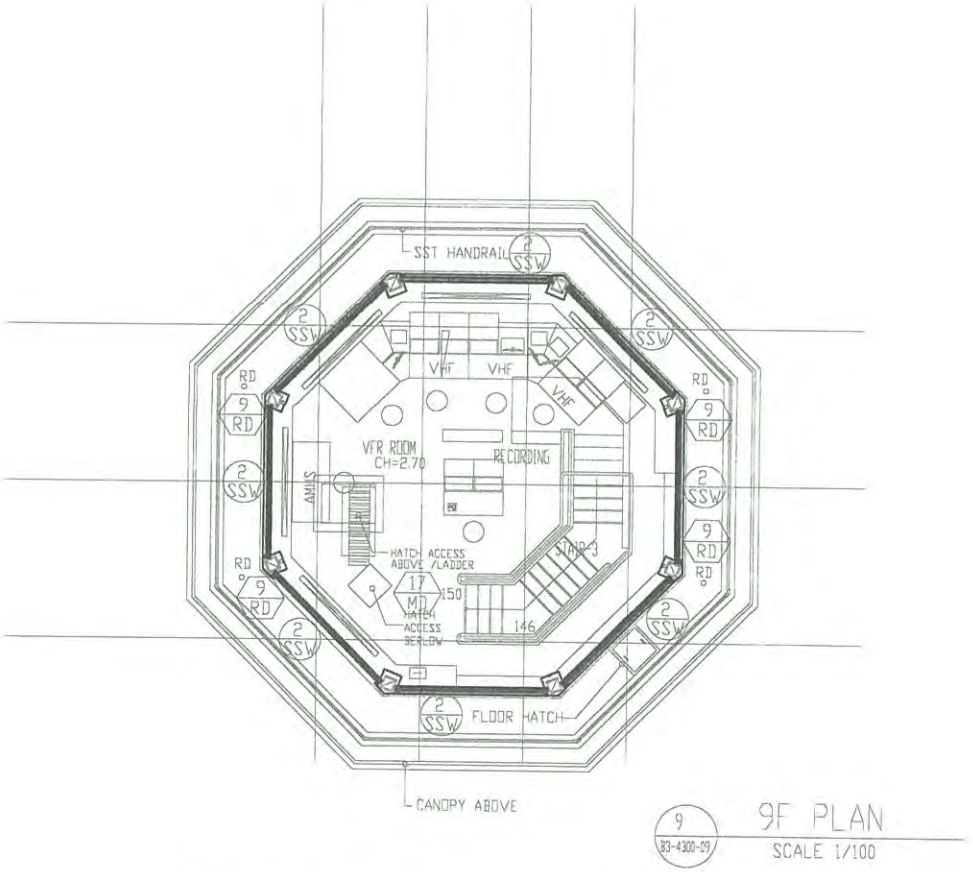


Figure 3-4-7.3 Draft layout plan of ATC Room

(2) ATC Equipment for the new ATC tower.

Dili control tower currently provides aerodrome control and approach control services. Dili control tower also has terminal area control for broadcasting of the air traffic information. The equipment to be procured for the new ATC tower is based on this operational requirements. The following is the draft list of ATC equipment to be procured by the Project.

Table 3-4-7.2 Draft list of ATC equipment

No.	Item	Qty	Reuse of existing
1	Air Traffic Control Console	3 sets	
1.1	Head set	3 sets	
1.2	Microphone	3 sets	
1.3	Speaker	3 Sets	
1.4	Foot switch	3 sets	
1.5	Clock	3 sets	
1.6	GPS receiver with antenna system	1 set	
1.7	VCS touch panel	3 sets	
1.8	Miscellaneous computer screen	6 sets	
1.9	Flight strip holder	3 sets	
2	VCS	1 set	
2.1	VCS Server	1 Set	
2.2	VCS Recorder	1 set	
2.3	Radio Server	1 set	
2.4	19 inch Rack	1 set	
3	Light gun		1 set
4	Binocular		1 set
5	VOR/DME monitoring system		1 set
5.1	VOR/DME monitoring computer		1 Set
5.2	Modem		1 set
5.3	Antenna systems		1 set
6	NDB monitoring system		1 set
6.1	NDB monitoring system		1 Set
6.2	Antenna system		1 set
7	VHF Ground to Air communication system	1 set	
7.1	VHF transmitter (Aerodrome control , Approach control, Emergency)	6 sets	
7.2	VHF receiver	6 sets	
7.3	VHF antenna systems	6 sets	
7.4	19 inch Rack	2 sets	
8	VHF transceiver	1 Set	
8.1	VHF transceiver	1 Set	
8.2	VHF antenna systems	1 set	
9	FM transceiver		2 set
9.1	FM transceiver		2 set

No.	Item	Qty	Reuse of existing
9.2	FM antenna systems		2 set
10	Clash alert system	1 set	
10.1	Clash alert	1 set	
10.2	Direct speech with fire station	1 set	
11	Weather and aeronautical information Computer	1 set	
12	Telephone	4 sets	
13	Power system	1 set	
13.1	Power distribution board	1 set	
13.2	UPS	1 set	
14	Spear parts	1 Set	
15	Consumable parts	1 Set	

3-4-8 Construction of Electric Power Substation with Emergency Generator (for New Terminal Facilities)

Since the current Power house is demolished, Substation is constructed to provide power to International passenger terminal building, International cargo terminal building, Apron floodlighting, and road lighting. In order to maintain the level of services during the power cut, back-up generator of its capacity is 24 hours with 100 percentage loads is provided.

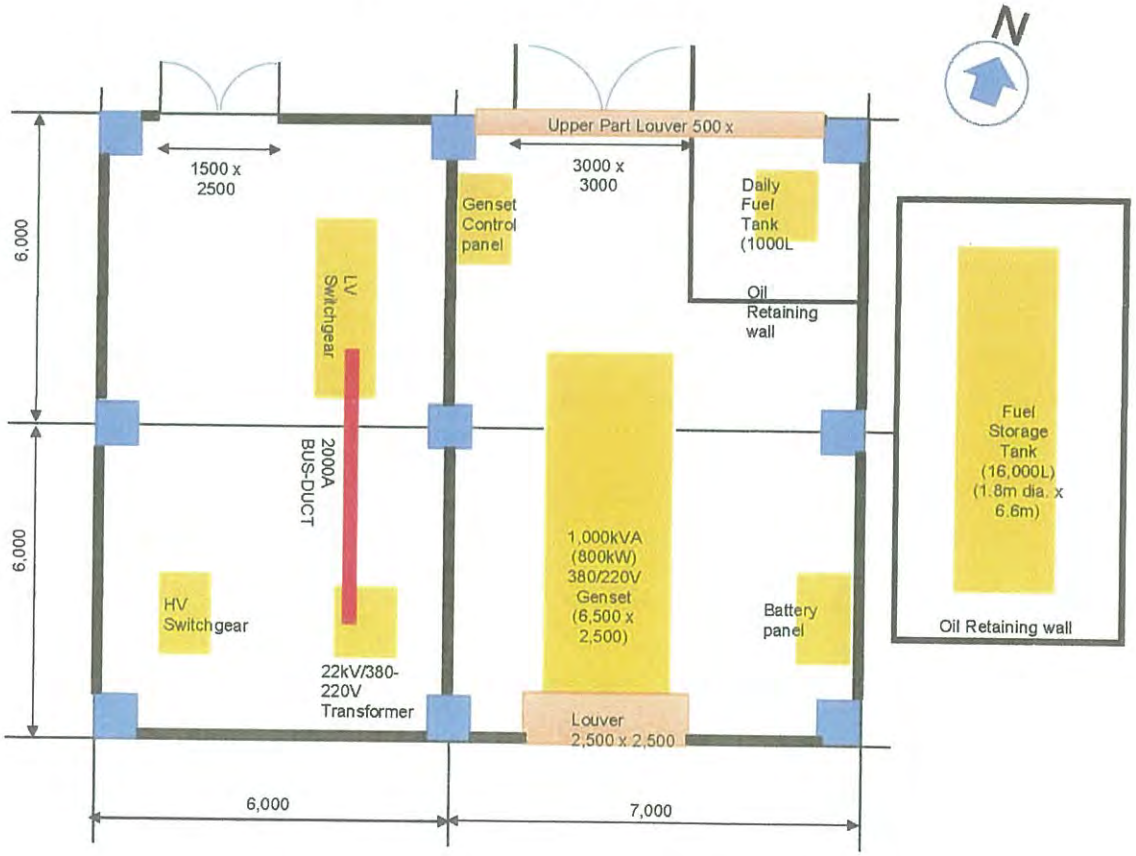


Figure 3-4-8.1 Draft layout of Substation

3-5 Project evaluation indicators

The success of the project is evaluated in 3 years after the completion of the Project. The evaluation indicator is used to measure the success of the Project. The number of international passenger, the volume of international cargo, the volume of air traffic and the number of foreign visitors are considered to be appropriate as the Project evaluation indicators of the Project.

3-6 Technical cooperation

ANATL and JICA survey team discussed about the needs of technical cooperation for effective operation and maintenance of the facilities provided by the Grant aid project. Among the requested items, following observations and discussions were made. In addition to the operation and maintenance capability, ANATL would like to develop a commercial capability.

Table 3-6.1 Requested Items by ANATL

	Items	observation and discussion
1	Airport operation	Though ANATL has manuals for the operations of the airport, the applications of those manuals are not effectively implemented. ANATL requested assistance on how those manuals are to be updated for the new terminal building and effectively implemented.
2	Maintenance of airport facilities	Maintenance of basic facilities, mechanical and electrical equipment is not effectively executed. ANATL needs assistance for improvement of manuals and its implementation to the maintenance works of the facilities.
3	Commercial management	ANATL needs to make profits as a company. However, it lacks the knowledge and know-how on how to house shops and retailers in the terminal building and how to make a system to manage those retailers. ANATL needs assistance on improvement of commercial management.
4	Airport security operations	ANATL needs to improve security manual and operations for new passenger terminal building and requested the assistance.
5	Air traffic control services	ANATL already sends their staff members for training of traffic controllers to Indonesia at basic and aerodrome control level Future development of air traffic controller requires training in approach control, PBN implementation procedures and air traffic control development manual.
6	Aeronautical information services	This would be trained internally by ANATL. ANATL requires AIS management advance level training in Indonesia.
7	Maintenance of Air	Same with 2

	Items	observation and discussion
	navigation systems	
8	Rescue and firefighting operations	ANATL already sends their staff members for training of fire fighters to Indonesia.

According to ANATL, approximate cost to cover all the above mentioned areas, Table 3-6.1, is 500,000 US$.

3-7 Implementation Schedule

Draft schedule of the implementation of the Project is shown in Figure 3-7.1

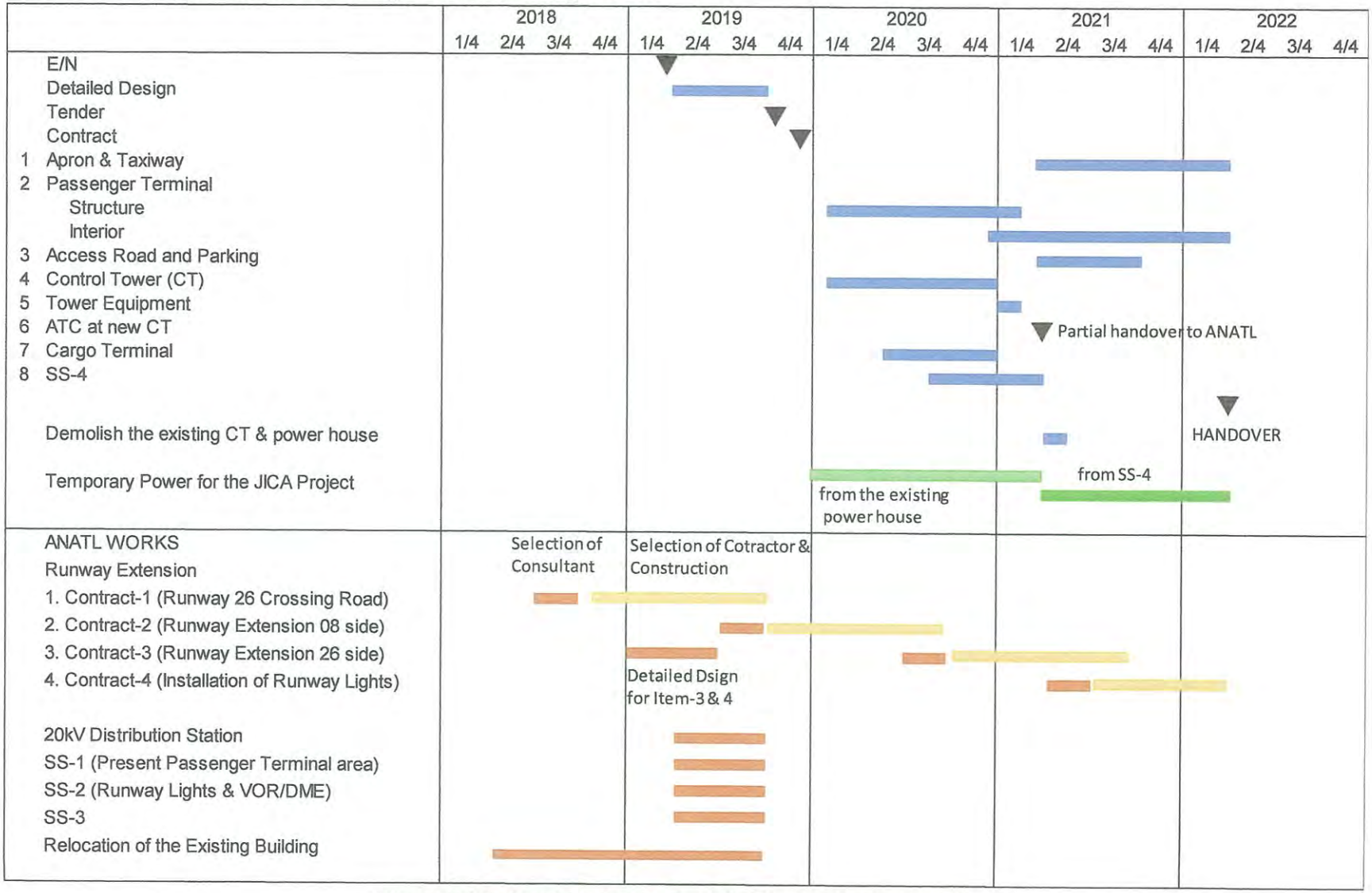


Figure 3-7.1 Tentative Schedule of the Project Implementation

3-8 Non-Military Use

The Timor-Leste side understood the principle of the Japan's Development Cooperation Charter, which stresses that ODA must not be utilized for military purpose or promoting international conflicts, and agreed to ensure that the facilities and equipment to be procured in the Project will never be used for any military purposes.

Chapter 4 Work Demarcation

In addition to the items agreed in the M/D, the details of the items and additional items are discussed as the followings

4-1 Tax exemption

ANATL needs to bear the cost, which is equivalent to the customs duties, internal taxes and other fiscal levies which may be imposed in Timor-Leste, instead of tax exemption system, without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

In the practices of Timor-Leste in the past, corporate tax and personal income tax for Japanese contractors, suppliers and consultants including their employees are exempted based on E/N and G/A, customs duties and other related fiscal charges with respect to the import of materials and equipment were born by the implementation agency. ANATL needs to take appropriate measures and bear those taxes on behalf of the contractors.

4-2 Demolition and Removal of the Site

In addition to the demolition works agreed in the M/D signed on 16th April, ANATL also needs to remove other objects in the site such as containers, aircraft engines, fire engine, trees and other obstructive objects to clear the land for new construction works.

4-3 Construction of HV distribution station and Substation

ANATL shall complete the construction of new power supply system before the announcement of the tender of the Project around September 2019. Draft diagram is shown in the following figure.

Idamado

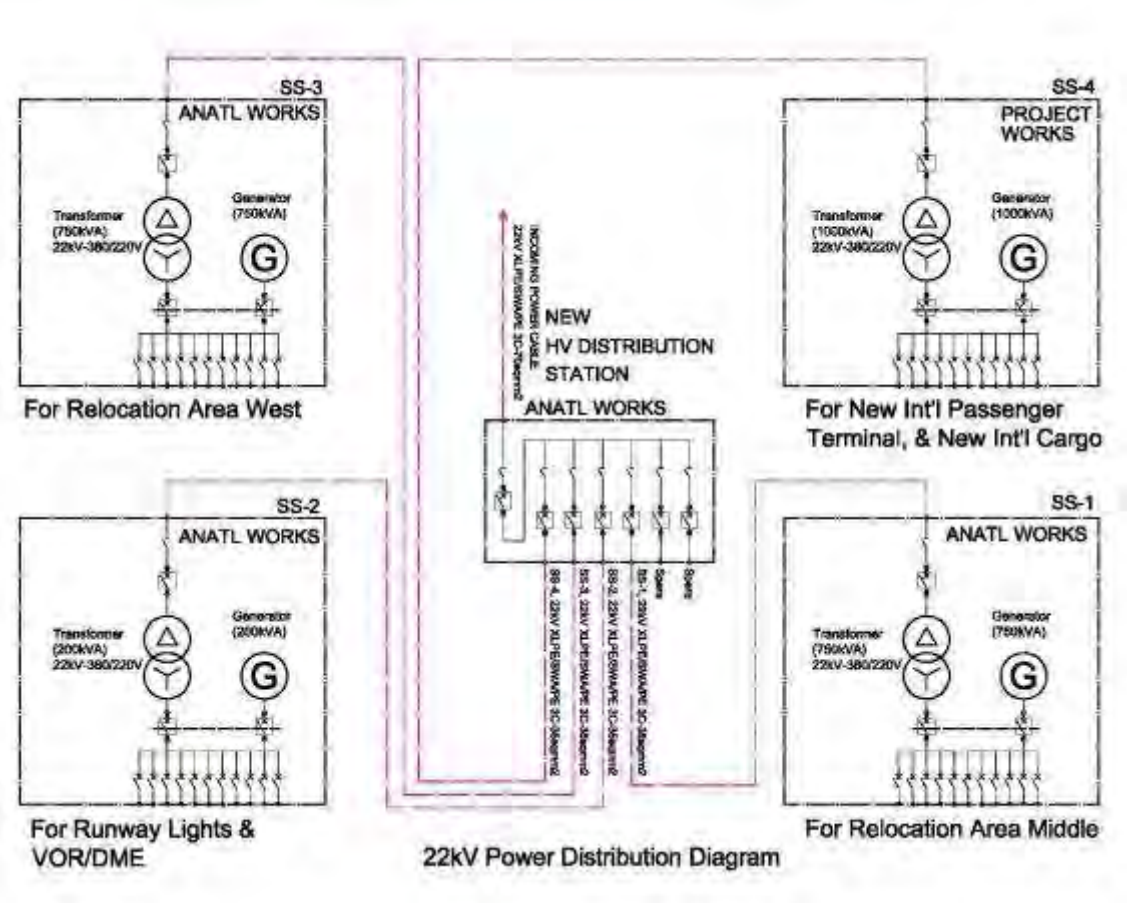


Figure 4-3.1 New Power Supply System

4-4 Obtaining Environmental Approval of the Project

ANATL needs to inform the result of Project Documents submitted to National Directorate for Environment for screening to JICA survey team and the environmental category of the Project. And take further necessary measures to obtain environmental approval of the Project with assistance by JICA survey team. In case the category is identified as "B", Simplified Environmental Impact Statement (SEIS), and Environmental Monitoring Plan shall be submitted for the technical assessment by December 2018 so that IEE/EIA approval is obtained before the Project approval by Japanese cabinet. In case the category is "A", further discussion will need to be held with JICA survey team on how to proceed to the next steps.

4-5 Transfer of ATC simulator, ATC equipment, Backup Generator

ANATL needs to transfer ATC simulator to the new ATC tower office building upon completion of the building immediately in order not to disrupt the construction schedule. And backup generators in the existing power house and ATC equipment in the existing ATC tower shall be transferred to an appropriate places before demolition of those buildings.

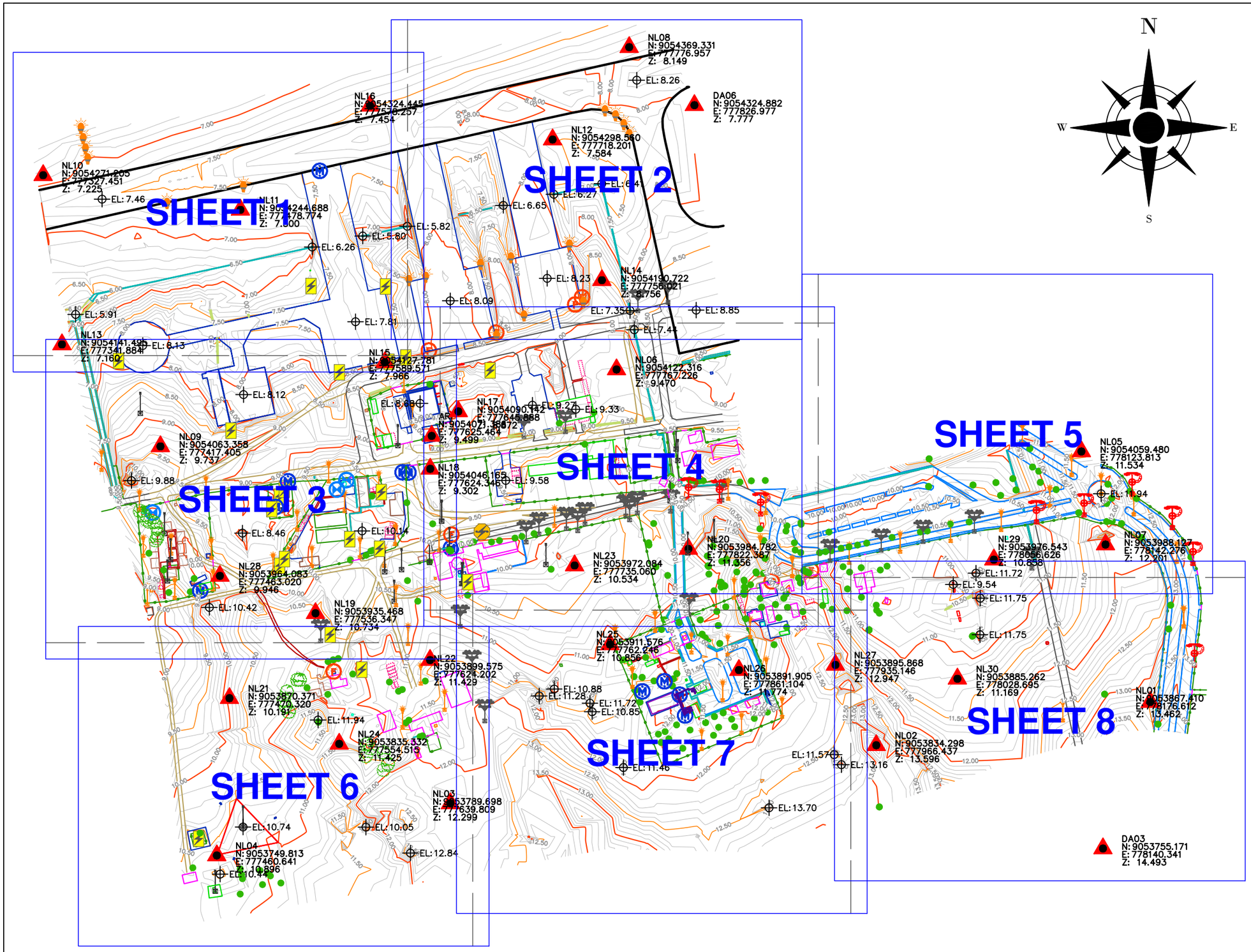
4-6 Clear the site for the sight of the new air traffic control tower

It was found that the trees in the south east side of the airport block the line of sight of the runway east side from the new ATC tower. ANATL needs to make arrangements to remove those obstructs to secure the line of sight to the east end of the runway.

[END]

5-6　その他資料

1. 測量図
2. 地質調査結果



LEGEND

- Topographic Map Sheets
- Match Lines
- Major Contour
- Minor Contour
- Supplementary Contour
- Control Point
- Electric Box
- Electric Manhole
- Manhole
- Fire Point
- Runway Light
- Water Valve
- Tree
- Bush
- Electric Post
- Telephone Post
- Lamp Post
- Post
- Concrete Building
- Wooden Building
- Concrete Structure
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- Container Van
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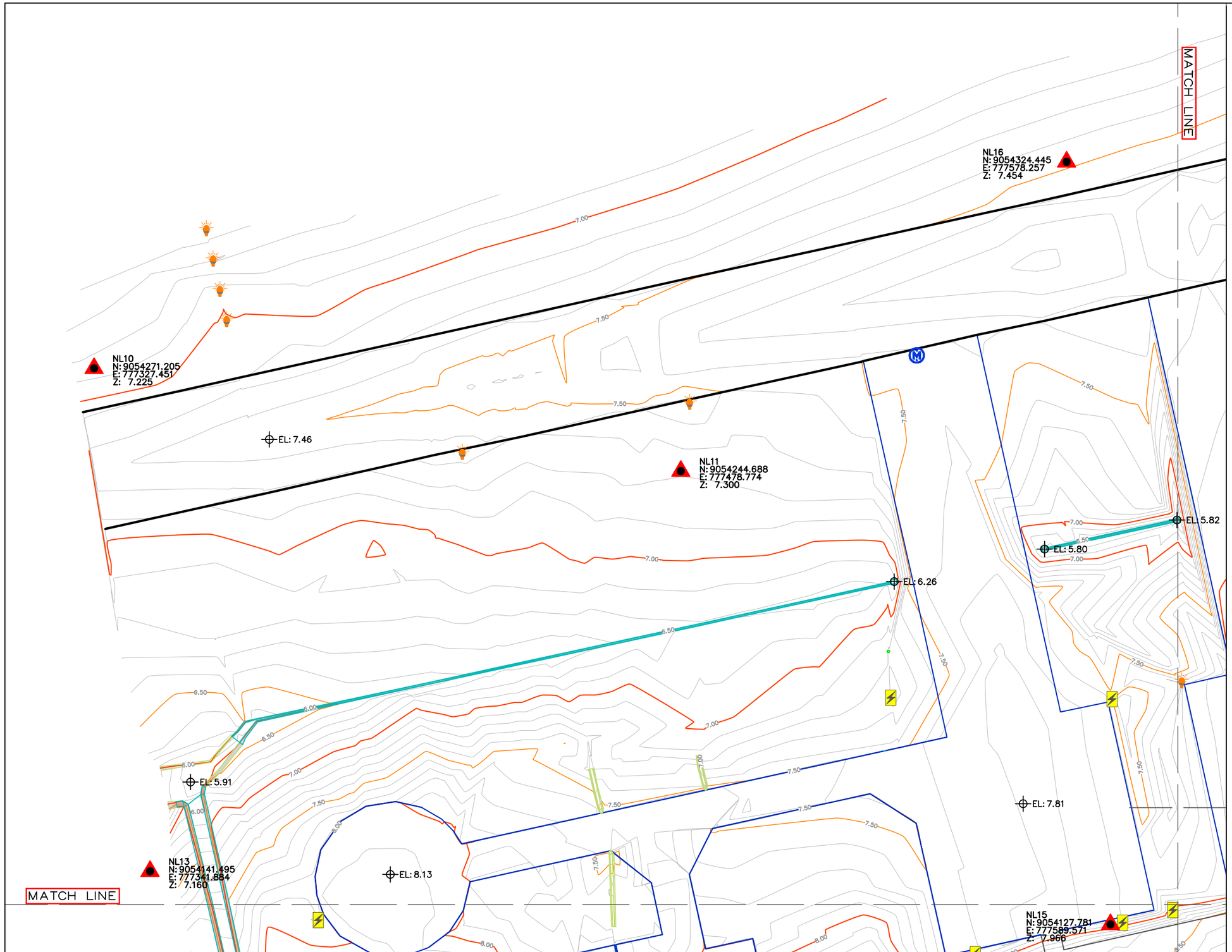
- Gas Tank
- Water Tank
- Septic Tank
- Transformer
- Runway
- Paved Road
- Dirt Road
- Footpath
- Gutter / Sidewalk
- Edge of Pavement
- Concrete Ditch
- Earth Ditch
- Steel Fence
- Gate
- Gas Pipe

CONTRACTOR	**GRAPHIC SCALE:** 1:3000	**PROJECT NAME:**	**CLIENT:**	**REVISIONS:**		SRDP Project / Dwg. No. 20180522_Topographic Map
SRDP CONSULTING INC. No. 40 Langka St. Bray. Quirino 2-C Project 2, Quezon City, 1102 Tel.No. (632) 433-3086 / 745-4088 website: www.srdp.com.ph Email: support@srdp.com.ph *Integrated Mapping, GIS, & Engineering*	0 100 150 Meters	JICA (JAPAN INTERNATIONAL COOPERATION AGENCY) AIDED PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE	JAPAN INTERNATIONAL COOPERATION AGENCY CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC. ORIENTAL CONSULTANTS GLOBAL CO., LTD.,	ITEM / DESCRIPTION / DATE		SCALE 1:3000
	COORDINATE SYSTEM: ELLIPSOID ..... WORLD GEODETIC SYSTEM; ZONE ..... UTM ZONE 51S; VERTICAL DATUM ..... MEAN SEA LEVEL; HORIZONTAL DATUM ..... WORLD GEODETIC SYSTEM 1984	**SHEET CONTENTS:** TOPOGRAPHIC INDEX MAP				SHEET NO. T-1
						DRAWING FORMAT
						REV. NO.



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LEGEND

- Major Contour
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CONTRACTOR

SRDP CONSULTING INC.
Integrated Mapping, GIS, & Engineering

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Website: www.srdp.com.ph
Email: support@srdp.com.ph

GRAPHIC SCALE: 1:1000

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Meters

COORDINATE SYSTEM:

ELLIPSOID .....WORLD GEODETIC SYSTEM
ZONE .....UTM ZONE 51S
VERTICAL DATUM.....ORTHOMETRIC HEIGHT
HORIZONTAL DATUM.....WORLD GEODETIC SYSTEM 1984

PROJECT NAME:

PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE

SHEET CONTENTS:

TOPOGRAPHIC MAP

CLIENT:

JAPAN INTERNATIONAL COOPERATION AGENCY

CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC.

ORIENTAL CONSULTANTS GLOBAL CO., LTD.,

REVISIONS:

ITEM	DESCRIPTION	DATE

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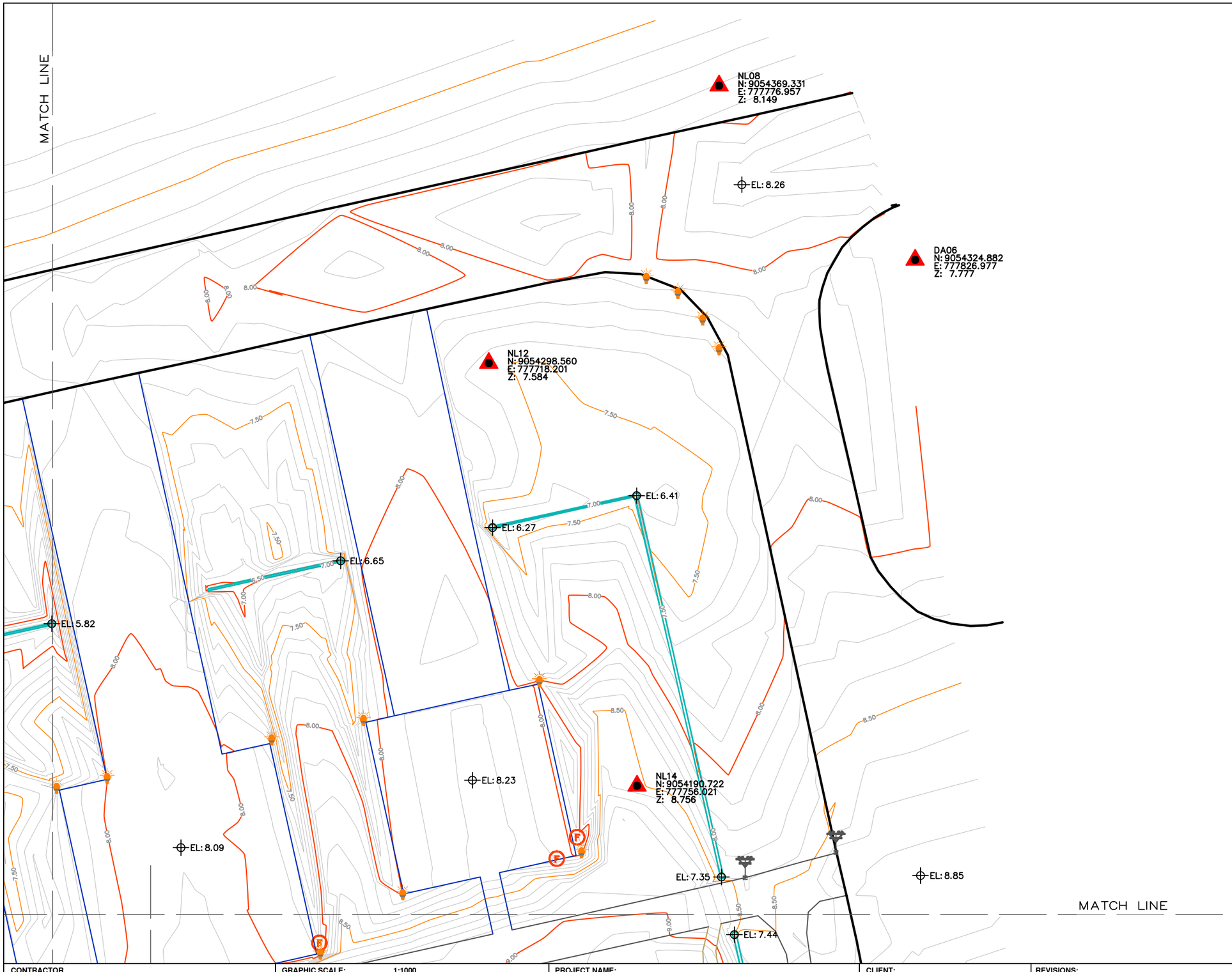
REV. NO.	



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CONTRACTOR	GRAPHIC SCALE: 1:1000	PROJECT NAME:	CLIENT:	REVISIONS:	SRDP Project / Dwg. No.	2018-05_Dili_TopographicSurvey
SRDP CONSULTING INC. No. 40 Langka St. Brgy. Quirino 2-C Project 2, Quezon City, 1102 Tel.No. (632) 433-3086 / 745-4088 Website: www.srdp.com.ph Email: support@srdp.com.ph *Integrated Mapping, GIS, & Engineering*	0 25 50 Meters COORDINATE SYSTEM: ELLIPSOID ..... WORLD GEODETIC SYSTEM ZONE ..... UTM ZONE 51S VERTICAL DATUM ..... ORTHOMETRIC HEIGHT HORIZONTAL DATUM ..... WORLD GEODETIC SYSTEM 1984	PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE SHEET CONTENTS: TOPOGRAPHIC MAP	JICA JAPAN INTERNATIONAL COOPERATION AGENCY CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC. ORIENTAL CONSULTANTS GLOBAL CO., LTD.,	ITEM / DESCRIPTION / DATE	SCALE	1:1000
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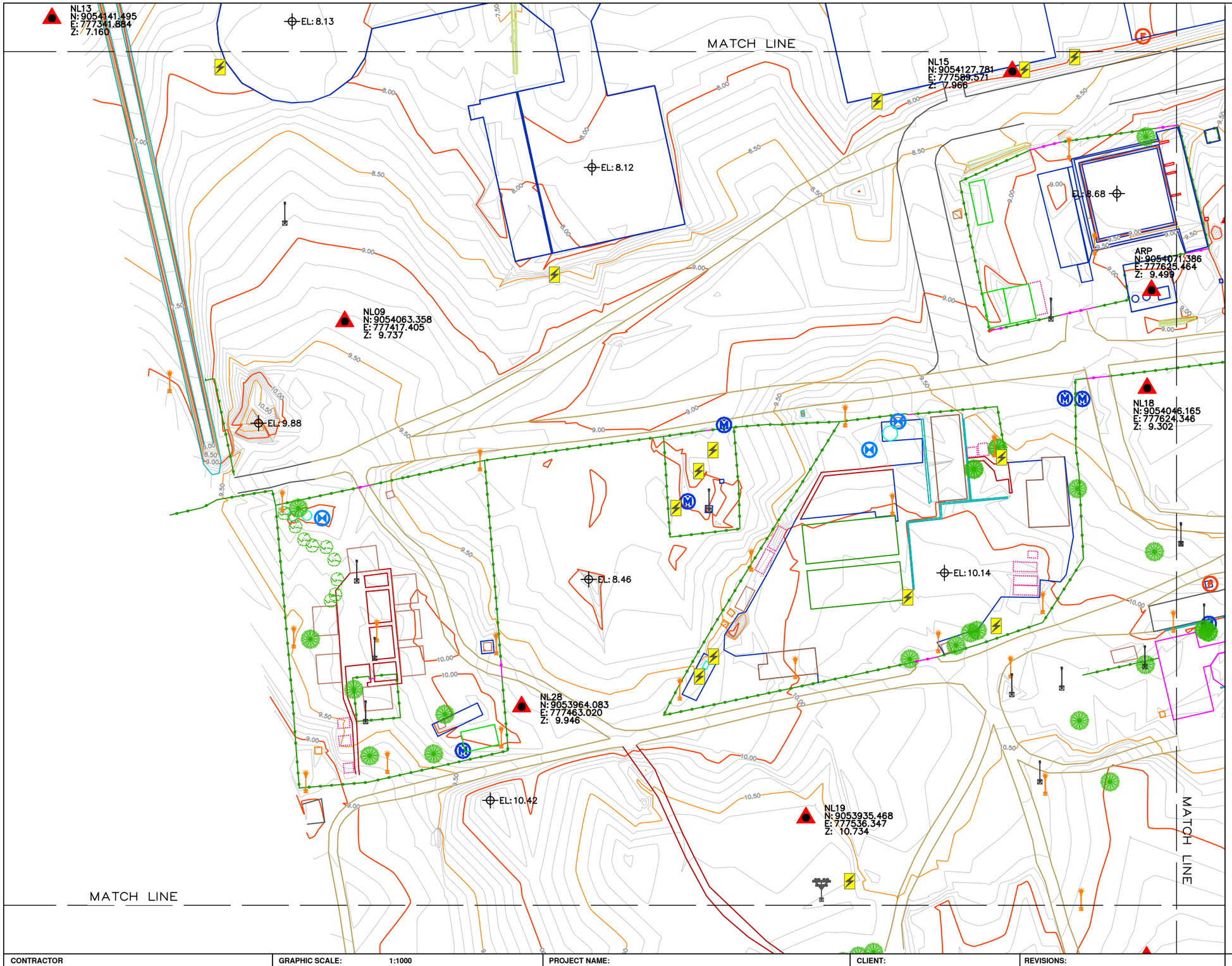

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- Steel Structure
- Container Van
- Wooden Structure
- Gas Tank
- Water Tank
- Septic Tank
- Transformer
- Runway
- Paved Road
- Dirt Road
- Footpath
- Gutter / Sidewalk
- Edge of Pavement
- Concrete Ditch
- Earth Ditch
- Steel Fence
- Gate
- Gas Pipe

CONTRACTOR

SRDP CONSULTING INC.
No. 40 Langka St. Brgy. Quirino 2-C
Project 2, Quezon City, 1102
Tel.No. (632) 433-3086 / 745-4088
Website: www.srdp.com.ph
Email: support@srdp.com.ph
Integrated Mapping, GIS, & Engineering

GRAPHIC SCALE: 1:1000

0 25 50
Meters

COORDINATE SYSTEM:

ELLIPSOID .....WORLD GEODETIC SYSTEM
ZONE .....UTM ZONE 51S
VERTICAL DATUM.....ORTHOMETRIC HEIGHT
HORIZONTAL DATUM.....WORLD GEODETIC SYSTEM 1984

PROJECT NAME:

PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE

SHEET CONTENTS:

TOPOGRAPHIC MAP

CLIENT:

JAPAN INTERNATIONAL COOPERATION AGENCY

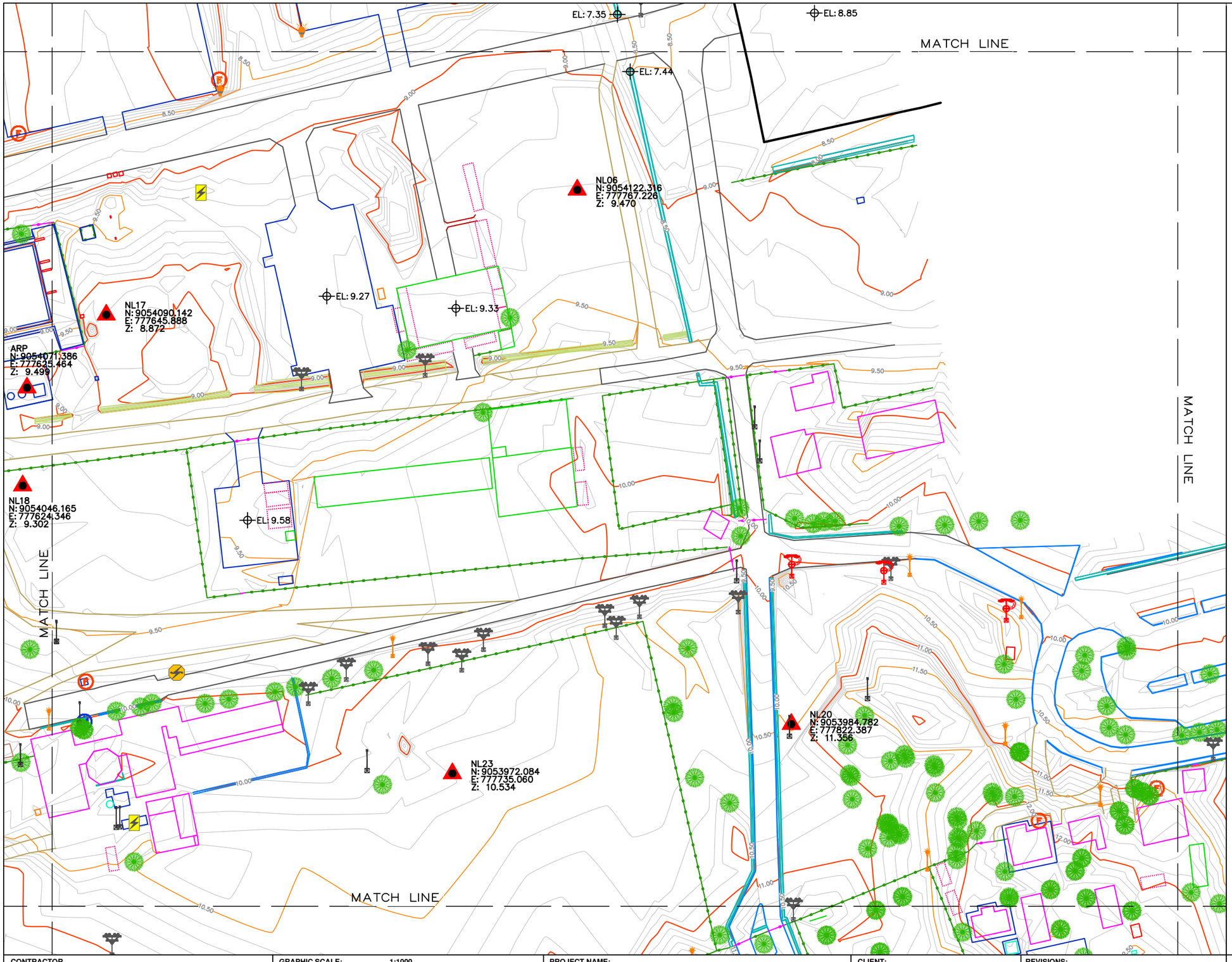
CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC.

ORIENTAL CONSULTANTS GLOBAL CO., LTD.,

REVISIONS:

ITEM	DESCRIPTION	DATE

SRDP Project / Dwg. No.	2018-05_Dili_TopographicSurvey
SCALE	1:1000
SHEET NO.	T-1C
DRAWING FORMAT	
REV. NO.	



N

W E

S

LEGEND

- Major Contour
- Minor Contour
- Supplementary Contour
- Control Point
- Electric Box
- Electric Manhole
- Manhole
- Fire Point
- Runway Light
- Water Valve
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- Bush
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CONTRACTOR	GRAPHIC SCALE: 1:1000	PROJECT NAME:	CLIENT:	REVISIONS:			SRDP Project / Dwg. No.	2018-05_Dili_TopographicSurvey
SRDP CONSULTING INC. No. 40 Langka St. Brgy. Quirino 2-C Project 2, Quezon City, 1102 Tel.No. (632) 433-3086 / 745-4088 Website: www.srdp.com.ph Email: support@srdp.com.ph Integrated Mapping, GIS, & Engineering	0 25 50 Meters	PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE	JAPAN INTERNATIONAL COOPERATION AGENCY	ITEM	DESCRIPTION	DATE	SCALE	1:1000
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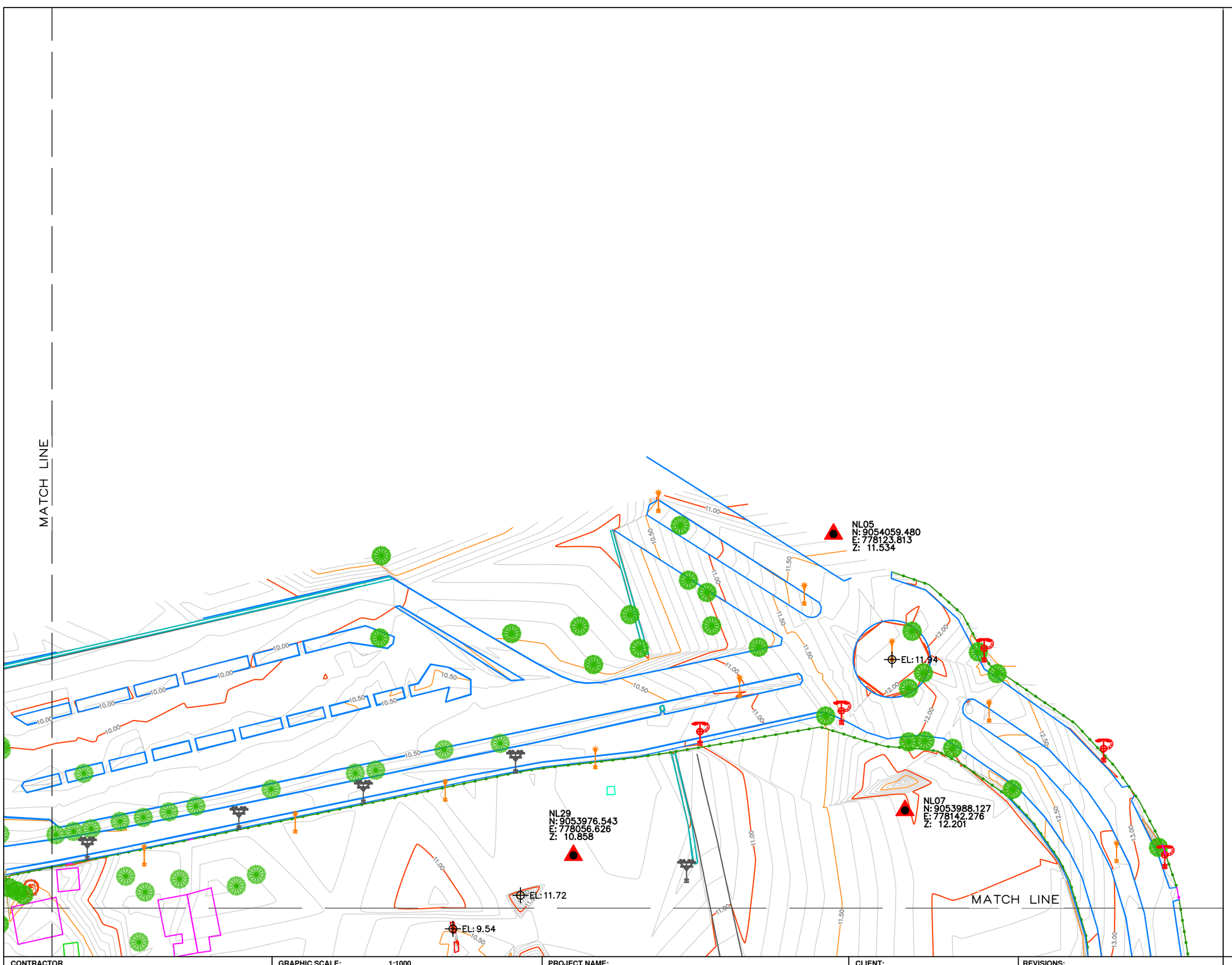
	ELLIPSOID ..... WORLD GEODETIC SYSTEM ZONE ..... UTM ZONE 51S VERTICAL DATUM..... ORTHOMETRIC HEIGHT HORIZONTAL DATUM..... WORLD GEODETIC SYSTEM 1984	TOPOGRAPHIC MAP	ORIENTAL CONSULTANTS GLOBAL CO., LTD.,				DRAWING FORMAT	
							REV. NO.	



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CONTRACTOR	**GRAPHIC SCALE:** 1:1000	**PROJECT NAME:**	**CLIENT:**	**REVISIONS:**	SRDP Project / Dwg. No. 2018-05_Dili_TopographicSurvey
SRDP CONSULTING INC. No. 40 Langka St. Brgy. Quirino 2-C Project 2, Quezon City, 1102 Tel.No. (632) 433-3086 / 745-4088 Website: www.srdp.com.ph Email: support@srdp.com.ph *Integrated Mapping, GIS, & Engineering*	0 25 50 Meters	PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE	JICA JAPAN INTERNATIONAL COOPERATION AGENCY	ITEM / DESCRIPTION / DATE	SCALE 1:1000
	COORDINATE SYSTEM: ELLIPSOID ..... WORLD GEODETIC SYSTEM ZONE ..... UTM ZONE 51S VERTICAL DATUM ..... ORTHOMETRIC HEIGHT HORIZONTAL DATUM ..... WORLD GEODETIC SYSTEM 1984	**SHEET CONTENTS:** TOPOGRAPHIC MAP	CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC. ORIENTAL CONSULTANTS GLOBAL CO., LTD.,		SHEET NO. T-1E
					DRAWING FORMAT
					REV. NO.

MATCH LINE

NL21
N: 9053870.371
E: 777470.320
Z: 10.191

NL22
N: 9053899.575
E: 777624.202
Z: 11.429

NL24
N: 9053835.332
E: 777554.515
Z: 11.425

NL03
N: 9053789.698
E: 777639.809
Z: 12.299

NL04
N: 9053749.813
E: 777460.641
Z: 10.896

EL: 11.94
EL: 10.74
EL: 10.05
EL: 12.84
EL: 10.44

MATCH LINE

N
W E
S

LEGEND

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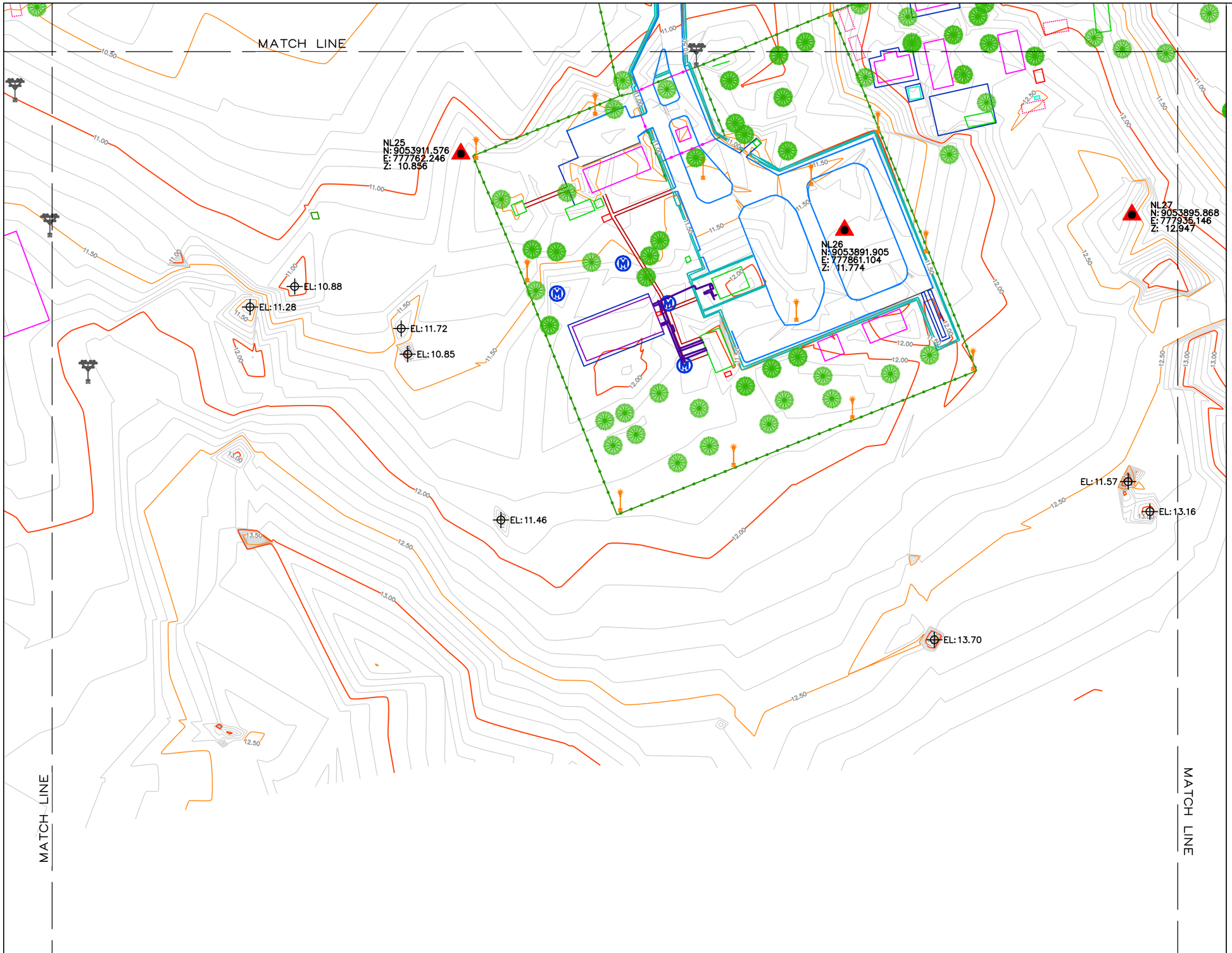
CONTRACTOR SRDP CONSULTING INC. No. 40 Langka St. Brgy. Quirino 2–C Project 2, Quezon City, 1102 Tel.No. (632) 433–3086 / 745–4088 Website: www.srdp.com.ph Email: support@srdp.com.ph *Integrated Mapping, GIS, & Engineering*	**GRAPHIC SCALE:** 1:1000 0 25 50 Meters **COORDINATE SYSTEM:** ELLIPSOID .....WORLD GEODETIC SYSTEM ZONE .....UTM ZONE 51S VERTICAL DATUM.....ORTHOMETRIC HEIGHT HORIZONTAL DATUM.....WORLD GEODETIC SYSTEM 1984	**PROJECT NAME:** PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE **SHEET CONTENTS:** TOPOGRAPHIC MAP	**CLIENT:** JAPAN INTERNATIONAL COOPERATION AGENCY CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC. ORIENTAL CONSULTANTS GLOBAL CO., LTD.,	**REVISIONS:** ITEM / DESCRIPTION / DATE	SRDP Project / Dwg. No. 2018–05_Dili_TopographicSurvey SCALE 1:1000 SHEET NO. T–1F DRAWING FORMAT REV. NO.



LEGEND

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CONTRACTOR

SRDP CONSULTING INC.
Integrated Mapping, GIS, & Engineering

No. 40 Langka St. Brgy. Quirino 2-C
Project 2, Quezon City, 1102
Tel.No. (632) 433-3086 / 745-4088
Website: www.srdp.com.ph
Email: support@srdp.com.ph

GRAPHIC SCALE: 1:1000

0 25 50
Meters

COORDINATE SYSTEM:

ELLIPSOID .....WORLD GEODETIC SYSTEM
ZONE .....UTM ZONE 51S
VERTICAL DATUM.....ORTHOMETRIC HEIGHT
HORIZONTAL DATUM.....WORLD GEODETIC SYSTEM 1984

PROJECT NAME:

PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE

SHEET CONTENTS:

TOPOGRAPHIC MAP

CLIENT:

JAPAN INTERNATIONAL COOPERATION AGENCY

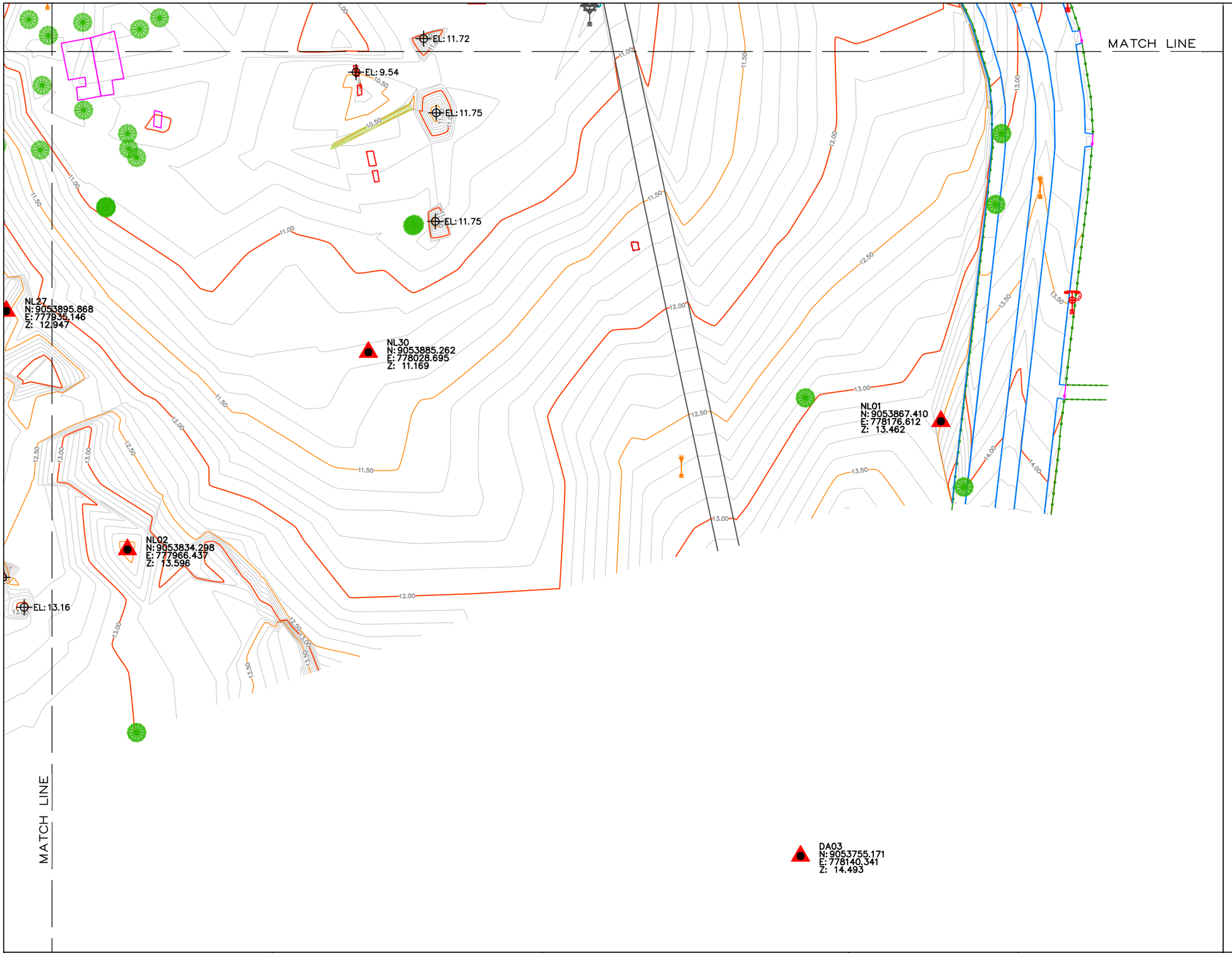
CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC.

ORIENTAL CONSULTANTS GLOBAL CO., LTD.,

REVISIONS:

ITEM	DESCRIPTION	DATE

SRDP Project / Dwg. No.	2018-05_Dili_TopographicSurvey
SCALE	1:1000
SHEET NO.	T-1G
DRAWING FORMAT	
REV. NO.	



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CONTRACTOR	GRAPHIC SCALE: 1:1000	PROJECT NAME:	CLIENT:	REVISIONS:			SRDP Project / Dwg. No.	2018-05_Dili_TopographicSurvey
SRDP CONSULTING INC. No. 40 Langka St. Brgy. Quirino 2-C Project 2, Quezon City, 1102 Tel.No. (632) 433-3086 / 745-4088 Website: www.srdp.com.ph Email: support@srdp.com.ph *Integrated Mapping, GIS, & Engineering*	0 25 50 Meters COORDINATE SYSTEM: ELLIPSOID ..... WORLD GEODETIC SYSTEM ZONE ..... UTM ZONE 51S VERTICAL DATUM..... ORTHOMETRIC HEIGHT HORIZONTAL DATUM..... WORLD GEODETIC SYSTEM 1984	PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT IN THE DEMOCRATIC REPUBLIC OF TIMOR LESTE SHEET CONTENTS: TOPOGRAPHIC MAP	JICA JAPAN INTERNATIONAL COOPERATION AGENCY CONSORTIUM OF JAPAN AIRPORT CONSULTANTS INC. ORIENTAL CONSULTANTS GLOBAL CO., LTD.,	ITEM / DESCRIPTION / DATE			SCALE	1:1000
							SHEET NO.	T-1H
							DRAWING FORMAT	
							REV. NO.	

ENGINEERING AND CONSTRUCTION

JICA STUDY TEAM

Geotechnical Investigation at presedent Nicolau Lobato Int. Airport, in Democratic Republic of Timor leste

PLAN OF FIELD TESTS

TEST POINT	GEOTECHNICAL INVESTIGATTION WORK ITEM	EASTING	NORTHING
TP-1	Test Pits Points -1	777503.55	9054203.00
TP-2	Test Pits Points -2	777544.62	9054054.16
TP-3	Test Pits Points -3	777629.38	9053995.06
TP-4	Test Pits Points -4	777690.49	9053769.00

Test-pit Logs
Plates 3 to 6

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client:Oriental Consultants Global Co., ltd.,	**TEST PIT LOG: TP** # 1 (STA: 9054203.00S , 777503.55E)
Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE	**DATE OF EXCAVATION TP:** 26-09-2018
SIZE: 1.0X2.0X1.1 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Moisture Content (%) [Specific Gravity]	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5		Brownish brown **SILT** with fine Sand **(ML)** with low plasticity		82.8	7.4 [2.34]	1539 (1715) {17.2}	LL=29.4 PL=24.6 PI=4.8 ML
1.0		1.10 m					
1.5							
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client:Oriental Consultants Global Co., ltd.,	**TEST PIT LOG: TP** # 2 (STA: 9054054.16S , 777544.62E)
Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE	**DATE OF EXCAVATION TP:** 26-09-2018
SIZE: 1.0X2.0X1.15 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Moisture Content (%) [Specific Gravity]	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5		Light brown **SILT (ML)** with low plasticity		93.9	2.3 [2.32]	1573 (1670) {19.5}	LL=40.1 PL=27.5 PI=12.6 ML
1.0		1.00 m Light greyish Silty, Gravelly fine to coarse **SAND (SM)**		22.3	1.3 [2.61]		Non-Plastic
1.5							
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client:Oriental Consultants Global Co., ltd.,	**TEST PIT LOG: TP #** 3 (STA: 9053995.06S , 777629.38E)
Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE	**DATE OF EXCAVATION TP:** 24-09-2018
SIZE: 1.0X2.0X1.15 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Moisture Content (%) [Specific Gravity]	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
		Light greyish grey Silty, Gravelly fine to coarse **SAND (SM)**					
			0.17 m				
		Light brown **SILT** with fine Sand **(ML)** with low plasticity		84.8	16.1 [2.04]	1338 (1554) {19.0}	LL=39.2 PL=27.4 PI=11.8 ML
0.5							
1.0							
			1.15 m				
1.5							
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client:Oriental Consultants Global Co., ltd.,	**TEST PIT LOG: TP #** 4 (STA: 9053769.00S , 777690.49E)
Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE	**DATE OF EXCAVATION TP:** 25-09-2018
SIZE: 1.0X2.0X1.1 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

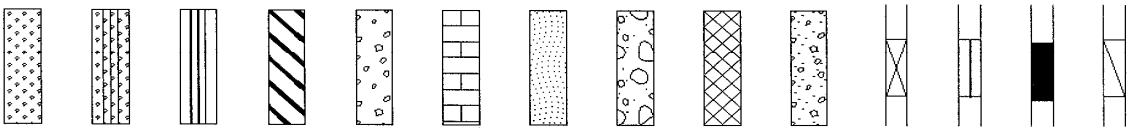
DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Moisture Content (%) [Specific Gravity]	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5		Light brown **SILT** with little Sand & Gravel **(ML)** with low plasticity		84.1	4.1 [2.25]	1648 (1745) {11.8}	LL=40.6 PL=30.2 PI=10.4 ML
1.0		1.10 m					
1.5							
2.0							

Symbols and Terms Used
Plate 7

MATERIALS TESTING CENTRE

SYMBOLS AND TERMS USED ON BORING LOGS

SOIL AND ROCK TYPES
(SHOWN IN SYMBOL COLUMN)



Predominant type shown heavy

SAMPLER TYPES
(SHOWN IN SAMPLES COLUMN)

TERMS DESCRIBING DENSITY CONDITION FOR CONSISTENCY

The condition of coarse grained soils may be obtained by performing sampler penetration tests or cone penetrometer tests. Approximate correlation between these tests and the density condition are given below:

DENSITY CONDITION	SPT VALUES, N	CONE TIP RESISTANCE, MPa
Very loose	< 4	< 2
Loose	4 to 10	2 to 4
Medium dense	10 to 30	4 to 12
Dense	30 to 50	12 to 20
Very dense	> 50	20

Density versus SPT value relationship is after Terzaghi and Peck, 1968. See Lacroix and Horn, 1973 if non-standard samplers are used. Density versus cone tip resistance relationship given above, after Meyerhof 1965; is a function of depth also; see Schmertmann, 1978.

The consistencies of cohesive soils may be obtained by performing undrained shear strength tests. Degrees of consistency are given below:

CONSISTENCY	UNDRAINED SHEAR STRENGTH, kPa
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200

TERMS CHARACTERIZING SOIL STRUCTURE

Parting	- horizontal inclusion of different soil type less than 3-mm thick
Seam	- horizontal inclusion of different soil type 3 to 75-mm thick
Layer	- horizontal inclusion of different soil type greater than 75-mm thick
Pocket	- inclusion of different soil type that is smaller than the diameter of the soil sample
Fissured	- containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical
Interbedded	- composed of alternate layers of different soil types
Silty	- containing 12 to 50 percent silt size particles
Calcareous	- containing 12 to 50 percent carbonates
Carbonate	- containing more than 50 percent carbonates

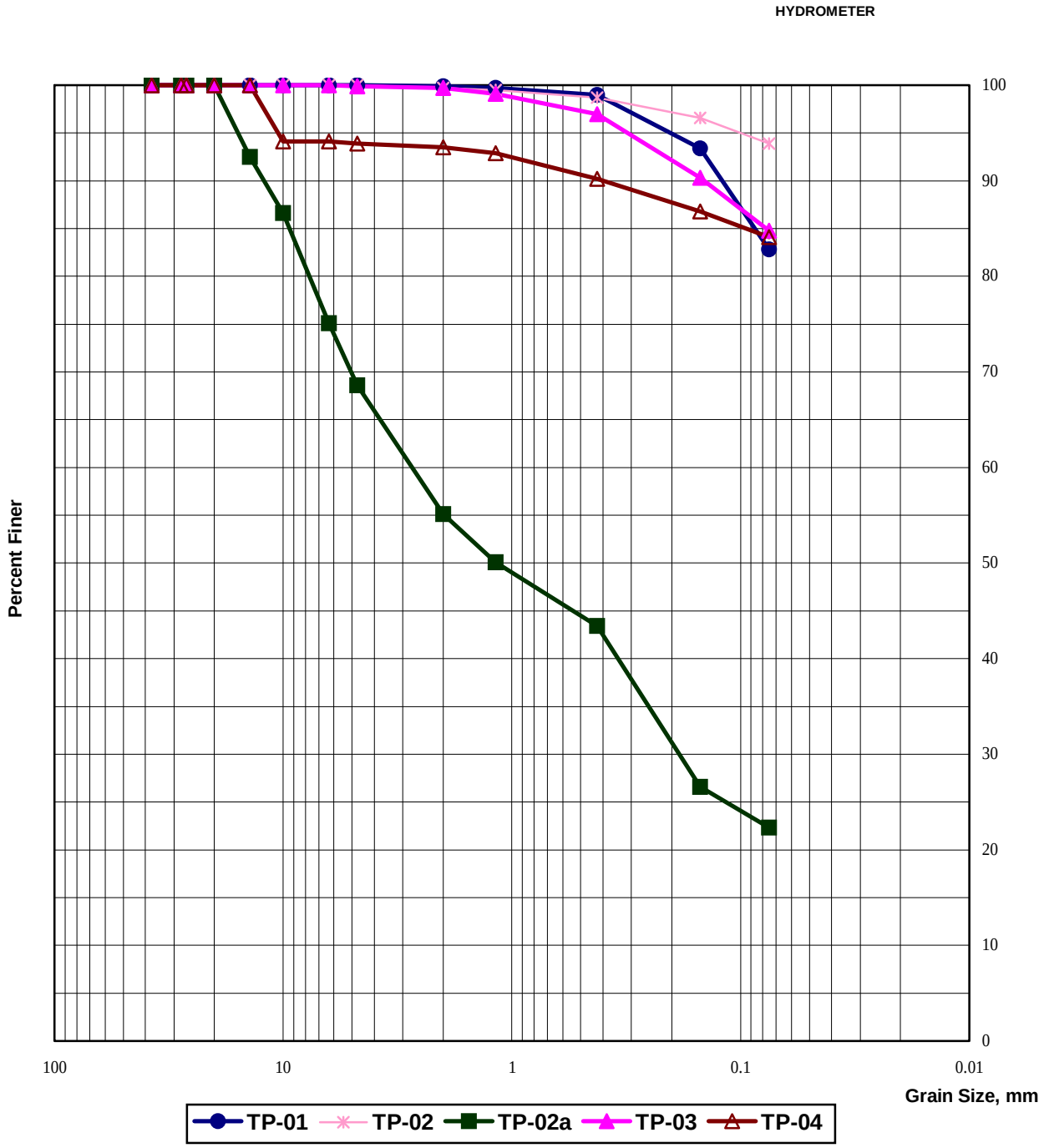
Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with ASTM D 2487-90 and D 2488-90

Grain Size Curves
Plate 8

RMS Engineering & Construction Unipessoal Lda

GRAIN SIZE ANALYSIS

Report No. GET 18-8002B



GRAVEL / KANKAR		SAND			SILT / CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

Specimen Identification		Classification	-0.075
●	TP # 01	SILT with fine Sand (ML) with low plasticity	82.8
→←	TP # 02	SILT (ML) with low plasticity	93.9
■	TP # 02a	Silty, Gravelly fine to coarse SAND (SM)	22.3
▲	TP # 03	SILT with fine Sand (ML) with low plasticity	84.8
△	TP # 04	SILT with little Sand & Gravel (ML) with low plasticity	84.1

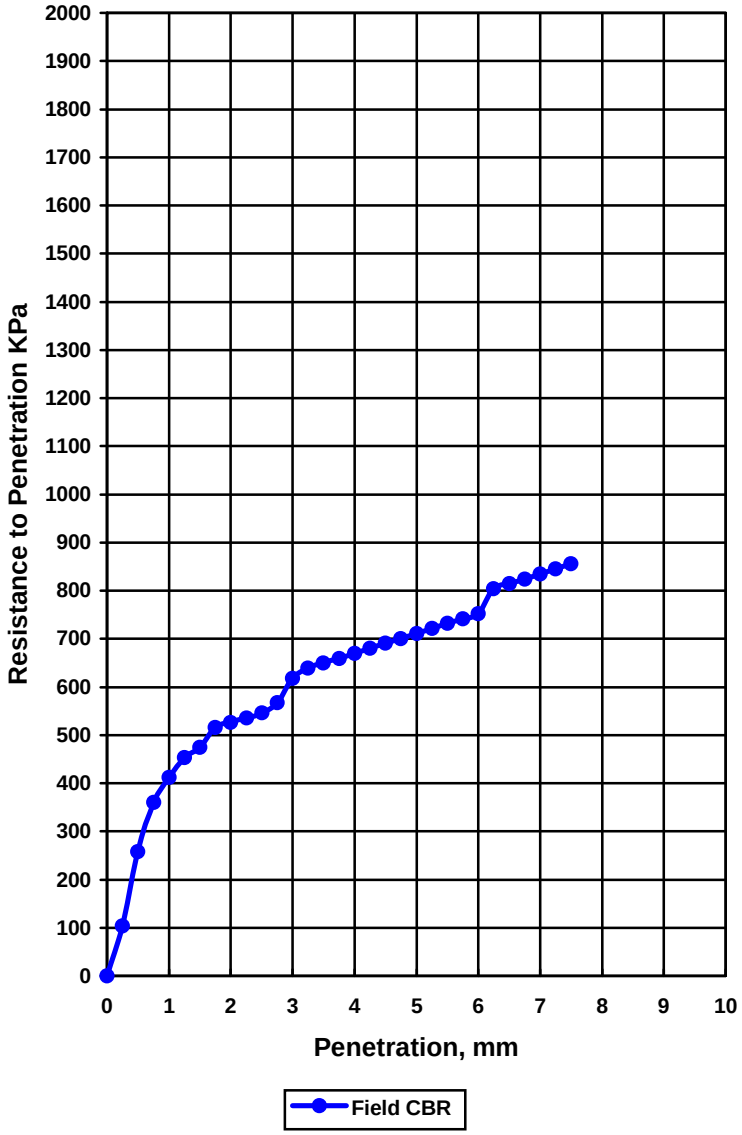
Field CBR Test Results
Plates 9 to 12

RMS Engineering & Construction Unipessoal Lda

FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Field CBR
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	**Test Pit No. 1** **Depth: 1.1 meter** **(STA: 9054054.16S ,777544.62E)** **Date: 26.09.2018**



Moisture Content (%)	CBR at	
	2.5 mm	5.08 mm
8.1	7.92	6.90

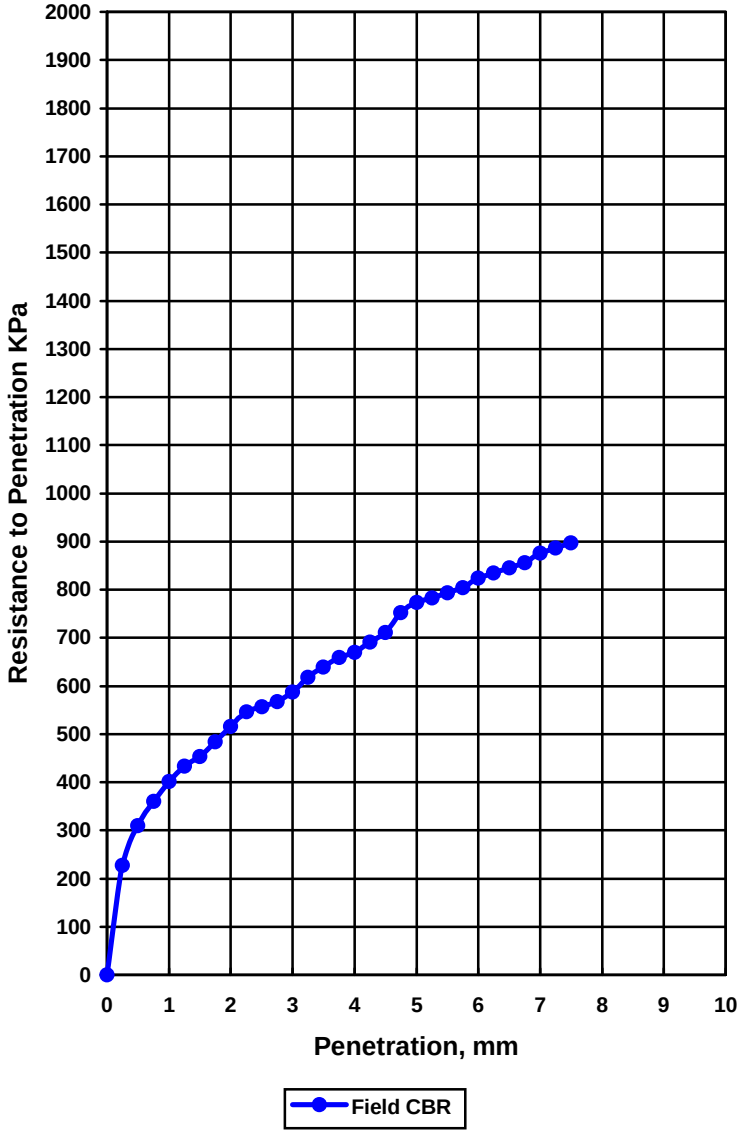
C.B.R. TEST RESULTS
Geotechnical Investigation

RMS Engineering & Construction Unipessoal Lda

FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Field CBR
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	**Test Pit No. 2** **Depth: 1.15 meter** **(STA: 9054054.16S ,777544.62E)** **Date: 26.09.2018**



Moisture Content (%)	CBR at	
	2.5 mm	5.08 mm
2.0	8.06	7.50

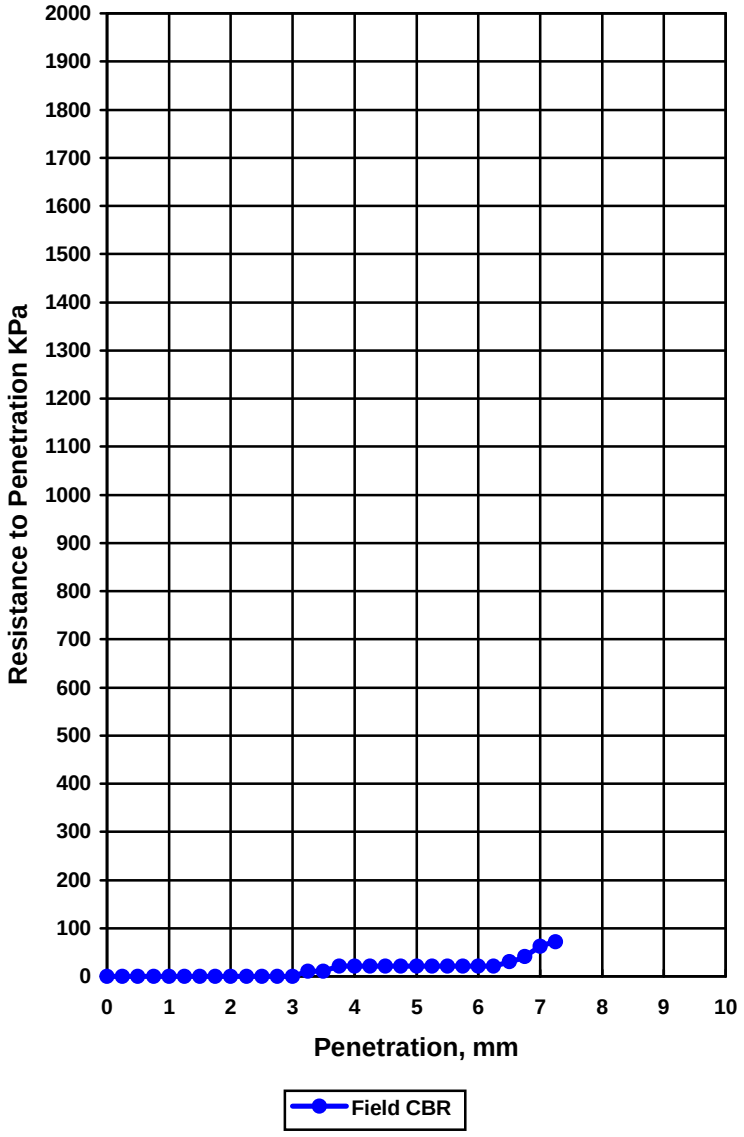
C.B.R. TEST RESULTS
Geotechnical Investigation

RMS Engineering & Construction Unipessoal Lda

FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Field CBR
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	**Test Pit No. 3** **Depth: 1.15 meter** **(STA: 9053995.06S , 777629.38E)** **Date: 24.09.2018**



Moisture Content (%)	CBR at	
	2.5 mm	5.08 mm
12.5	0.30	-

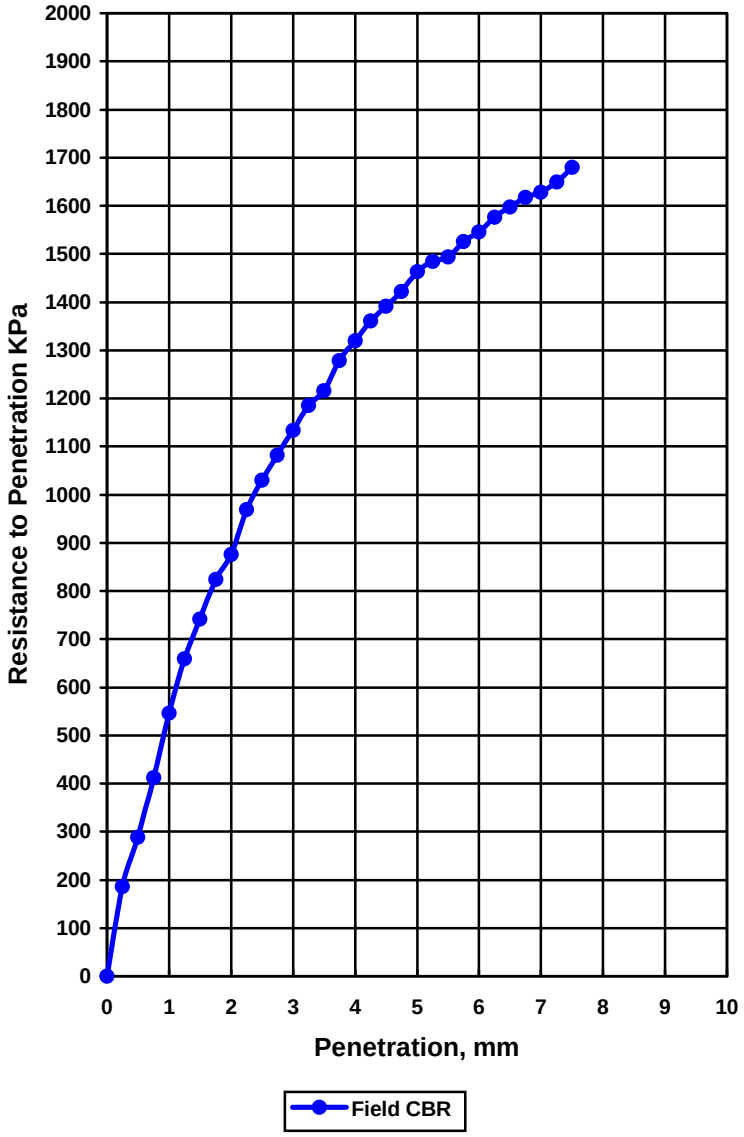
C.B.R. TEST RESULTS
Geotechnical Investigation

RMS Engineering & Construction Unipessoal Lda

FIELD CBR Test Results (ASTM-D4429)

Report No. GET 18-8002B

CLIENT: **JICA STUDY TEAM**	**Field CBR**
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	**Test Pit No. 4** **Depth: 1.1 meter** **(STA: 9053769.00S , 777690.49E)** **Date: 25.09.2018**



Moisture Content (%)	CBR at	
	2.5 mm	5.08 mm
3.1	7.92	8.00

C.B.R. TEST RESULTS
Geotechnical Investigation

Multiple Point Compaction Test Results
Plates 13 to 16

RMS Engineering & Construction Unipessoal Lda

COMPACTION TEST (Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

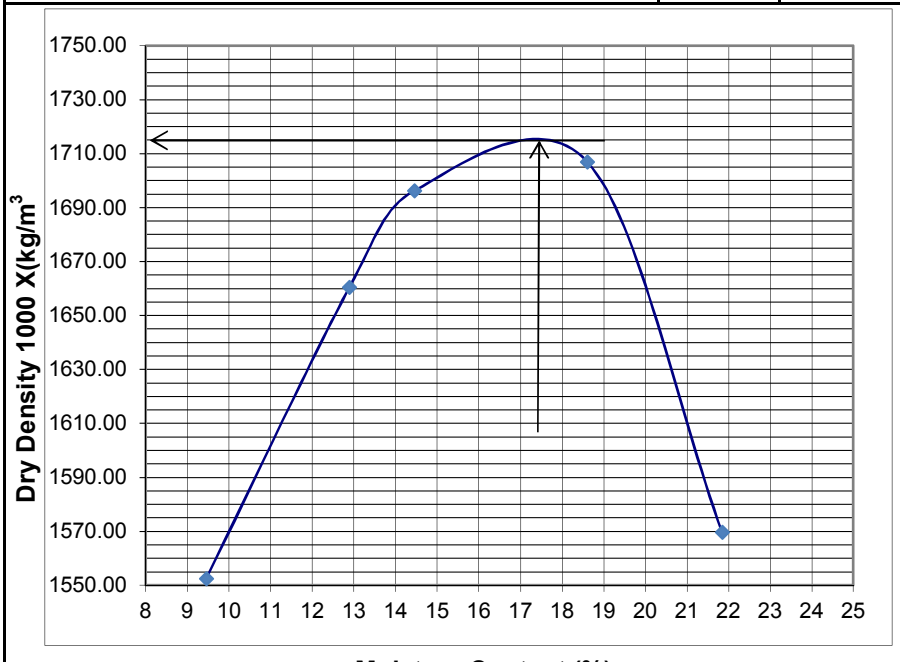
CLIENT: **JICA STUDY TEAM**	DATE: **28/9/2018**
PROJECT: **GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE**	LAB NO. : **GET-18-8002b**
	TESTING METHOD: AASHTO T-180D

LOCATION : **TP # 01 (STA: 9054203.00S , 777503.55E)**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5161.20** **g** **VOLUME OF MOULD (V) :** **2117** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)		8758.5	9129.5	9271.4	9447.4	9209.9
Mass of Soil ($m_2 - m_1$)	g	3597.3	3968.3	4110.2	4286.2	4048.7
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1699.24	1874.49	1941.52	2024.66	1912.47
Moisture Content, Container No.		A-5	A-6	A-7	A-8	A-9
Mass of Wet Soil + Container (A)	g	230.4	201.9	191.3	257.1	236.4
Mass of Dry Soil + Container (B)	g	215.6	185.8	174.5	226.5	205.2
Mass of Container (C)	g	59.0	60.9	58.3	62.1	62.4
Mass of Moisture (D = A - B)	g	14.8	16.1	16.8	30.6	31.2
Mass of Dry Soil (E = B - C)	g	156.6	124.9	116.2	164.4	142.8
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	9.5	12.9	14.5	18.6	21.8
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1553	1660	1696	1707	1570



Maximum Dry Density	**1715**
Optimum Moisture Content	**17.2%**

Remarks:

Plate-TP-01

RMS Engineering & Construction Unipessoal Lda

COMPACTION TEST (Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

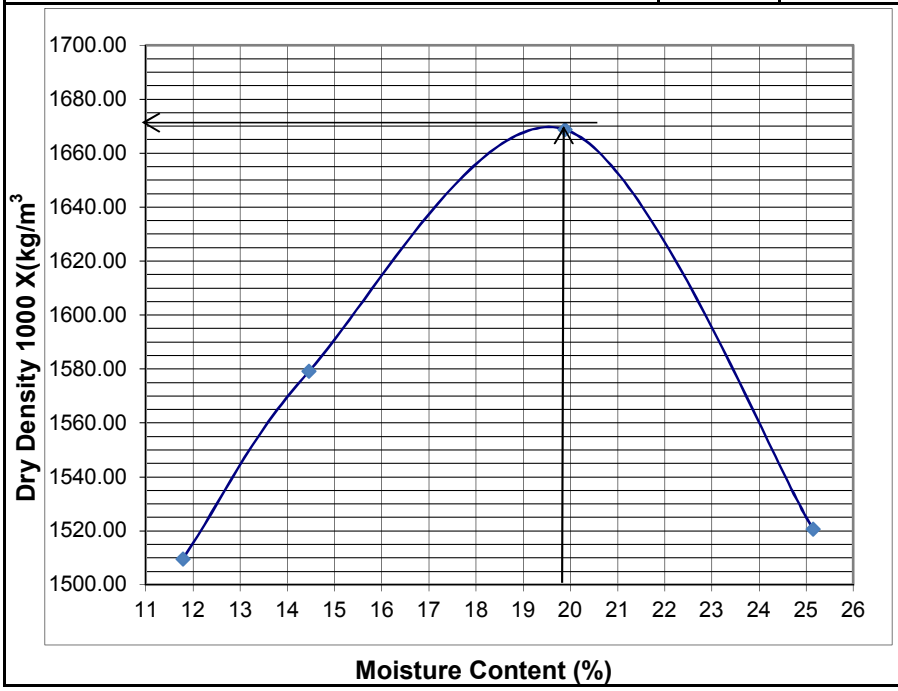
CLIENT: JICA STUDY TEAM	DATE: **28/9/2018**
PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE	LAB NO. : **GET-18-8002b**
	TESTING METHOD: AASHTO T-180D

LOCATION : **TP # 02 (STA: 9054054.16S , 777544.62E)**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5161.20** **g** **VOLUME OF MOULD (V) :** **2117** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)		8733.6	8987.6	9396.6	9189.7	
Mass of Soil ($m_2 - m_1$)	g	3572.4	3826.4	4235.4	4028.5	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1687.48	1807.46	2000.66	1902.93	
Moisture Content, Container No.		A-1	A-2	A-3	A-4	
Mass of Wet Soil + Container (A)	g	230.4	163.0	252.1	316.2	
Mass of Dry Soil + Container (B)	g	212.7	149.8	220.6	264.7	
Mass of Container (C)	g	62.5	58.5	62.2	59.9	
Mass of Moisture (D = A - B)	g	17.7	13.2	31.5	51.5	
Mass of Dry Soil (E = B - C)	g	150.2	91.3	158.4	204.8	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	11.8	14.5	19.9	25.1	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1510	1579	1669	1521	



Maximum Dry Density	**1670**
Optimum Moisture Content	**19.5%**

Remarks:

Plate-TP-02

RMS Engineering & Construction Unipessoal Lda

COMPACTION TEST (Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

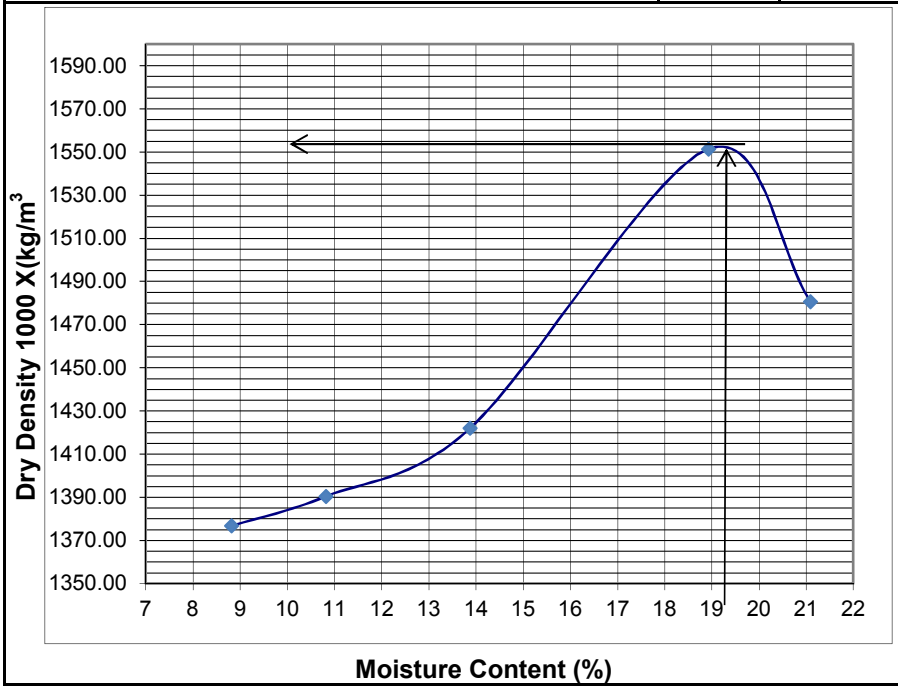
CLIENT: JICA STUDY TEAM	DATE: **28/9/2018**
PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE	LAB NO. : **GET-18-8002b**
	TESTING METHOD: AASHTO T-180D

LOCATION : **TP # 03 (STA: 9053995.06S , 777629.38E)**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) 5161.20 g | **VOLUME OF MOULD (V) : 2117 cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)		8332.9	8423.3	8589.3	9067.0	8956.7
Mass of Soil ($m_2 - m_1$)	g	3171.7	3262.1	3428.1	3905.8	3795.5
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1498.21	1540.91	1619.32	1844.97	1792.87
Moisture Content, Container No.		D-2	D-3	D-4	D-5	D-6
Mass of Wet Soil + Container (A)	g	166.9	221.5	223.7	217.2	174.2
Mass of Dry Soil + Container (B)	g	158.6	206.3	203.9	191.8	153.4
Mass of Container (C)	g	64.5	65.8	61.2	57.6	54.8
Mass of Moisture (D = A - B)	g	8.3	15.2	19.8	25.4	20.8
Mass of Dry Soil (E = B - C)	g	94.1	140.5	142.7	134.2	98.6
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	8.8	10.8	13.9	18.9	21.1
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1377	1390	1422	1551	1481



Maximum Dry Density	**1554**
Optimum Moisture Content	**19.0%**

Remarks:

Plate-TP-03

RMS Engineering & Construction Unipessoal Lda

COMPACTION TEST (Dry Density/Moisture Content Relationship)

Report No. GET 18-8002b

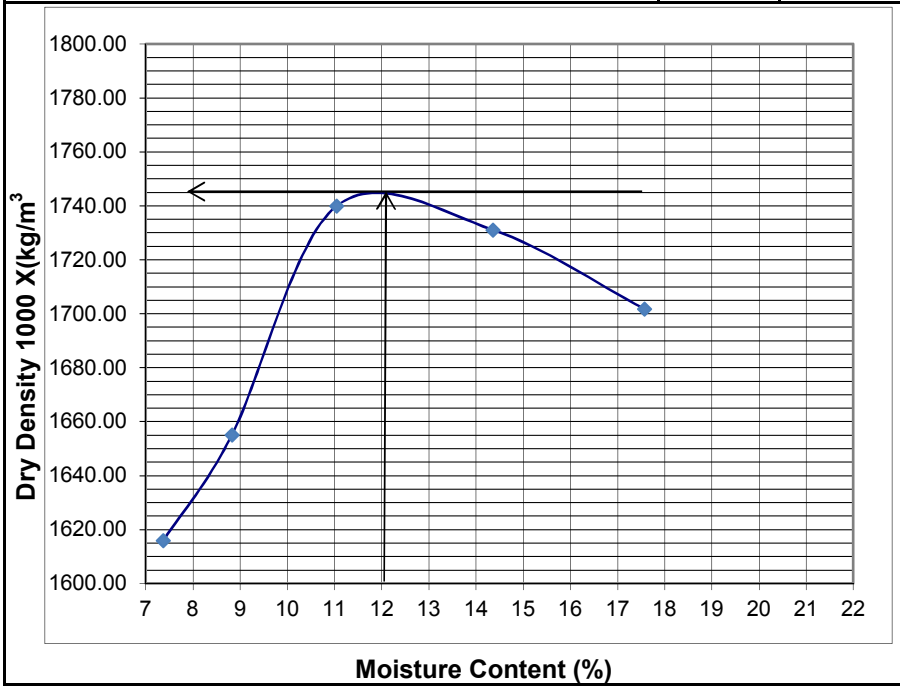
CLIENT: JICA STUDY TEAM	DATE: **28/9/2018**
PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, DILI, TIMOR LESTE	LAB NO. : **GET-18-8002b**
	TESTING METHOD: AASHTO T-180D

LOCATION : **TP # 04a (STA: 9053769.00S , 777690.49E)**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5161.20** **g** **VOLUME OF MOULD (V) :** **2117** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)		8834.2	8974.1	9251.4	9352.2	9397.2
Mass of Soil ($m_2 - m_1$)	g	3673.0	3812.9	4090.2	4191.0	4236.0
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1735.00	1801.09	1932.07	1979.69	2000.94
Moisture Content, Container No.		C-4	C-5	C-6	C-7	C-8
Mass of Wet Soil + Container (A)	g	235.8	230.4	162.0	206.0	185.8
Mass of Dry Soil + Container (B)	g	222.4	215.1	149.6	184.3	163.0
Mass of Container (C)	g	40.6	41.7	37.3	33.2	33.3
Mass of Moisture (D = A - B)	g	13.4	15.3	12.4	21.7	22.8
Mass of Dry Soil (E = B - C)	g	181.8	173.4	112.3	151.1	129.7
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	7.4	8.8	11.0	14.4	17.6
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1616	1655	1740	1731	1702



Maximum Dry Density	**1745**
Optimum Moisture Content	**11.8%**

Remarks:

Plate-TP-04a

Soaked and Un-Soaked Laboratory CBR
Plates 17 to 32

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE	Test no. TP# 1
	Sample No. S-1
Location: TP # 1 , S-1	Layer Depth 1.10 (m)
Sampling Procedure: JIS1211	Station. -
Prooving Ring KN/DIV 0.02 KPa/Div 10.30511	Date of sampling: 26.09.2018
Area of Pistion 1940.785 mm2	Date of Testing: 02.09.2018

Density Determination	**17 Blows**	**42 Blows**	**92 Blows**
Mould No.	**A-1**	**A-2**	**A-3**
Wt. of sample + mold (gms)	10244.1	10417.7	10585.5
Wt. of mold (gms)	6376.8	6438.5	6318.5
Wt. of Sample (gm/cm³)	3867.3	3979.2	4267
Wet Density (Kg/m³)	1836	1889	2026
Dry density (kg/m³)	1566	1622	1744
% Compaction	91.31%	94.60%	101.69%
Moisture Determination	**Before Compaction**	**Before Compaction**	**Before Compaction**
Can No.	**C-9**	**C-10**	**C-11**
Wet Soil + can (gms)	260.6	208.6	237.3
Dry soil + can (gms)	232.0	187.5	212.4
Wt. of moisture (gms)	28.6	21.1	24.9
Wt. of can (gms)	66.2	59.2	58.4
Wt. of dry soil (gms)	165.8	128.3	154
Moisture content (%)	**17.2**	**16.4**	**16.2**

SWELL	**17 Blows**	**42 Blows**	**92 Blows**
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	416	307	265
Swell (%)	3.58%	2.64%	2.28%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	Blows			**Blows**		
	17	**42**	**92**	**17**	**42**	**92**
0.64	4	5	6	41.2	51.5	61.8
1.27	5	7	11	51.5	72.1	113.4
1.91	6	9	14	61.8	92.7	144.3
2.54	6	12	20	61.8	123.7	206.1
3.17	7	16	23	72.1	164.9	237.0
3.80	8	21	29	82.4	216.4	298.8
5.08	9	25	37	92.7	257.6	381.3
6.35	10	31	49	103.1	319.5	505.0
7.62	11	35	59	113.4	360.7	608.0
8.90	12	38	67	123.7	391.6	690.4
10.16	13	41	76	134.0	422.5	783.2

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**0.90**	**1.79**	**2.99**
5.08mm	**0.90**	**2.50**	**3.70**

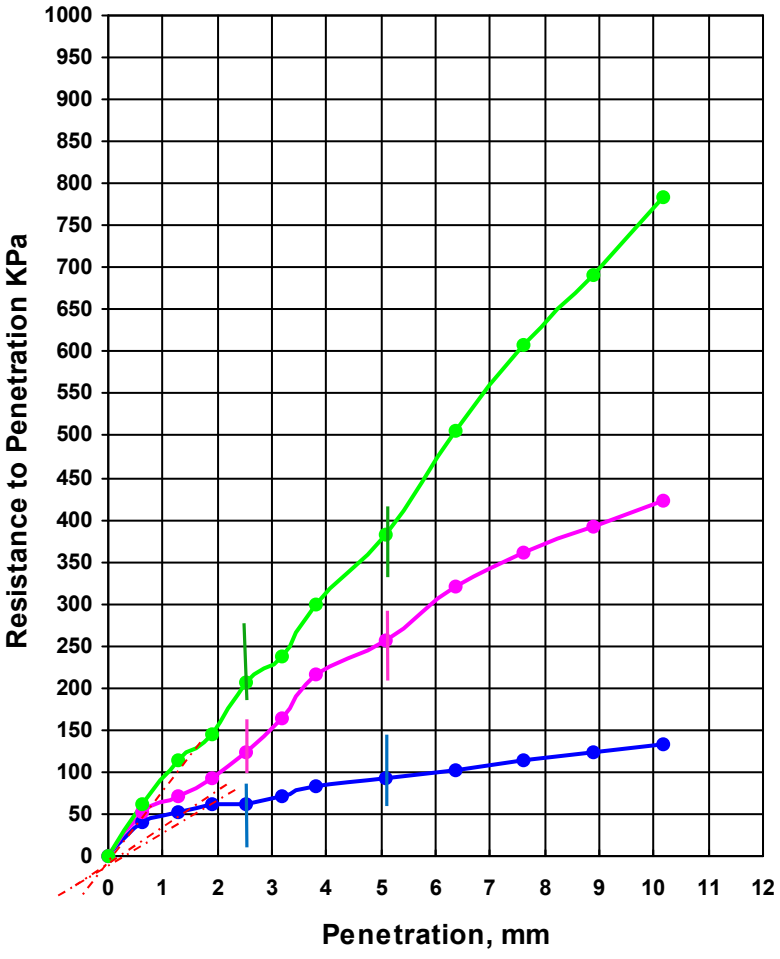
Plate -17 TP-1 - SOAKED

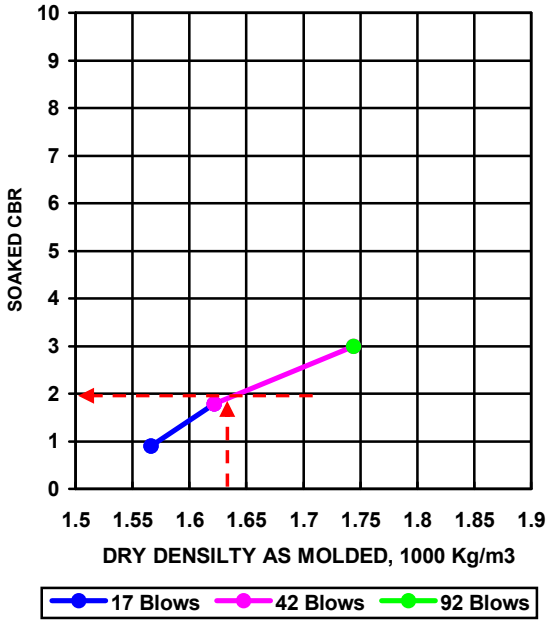
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked(JIS1211)
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 1 (STA: 9054203.00S , 777503.55E) Date: 10.10.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1715 kg/m^3 = 1629 kg/m^3.
2. At 1629 kg/m^3, the CBR is 1.9 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
17	1566	91	0.90	0.90	3.58
42	1622	95	1.79	2.50	2.64
92	1744	102	2.99	3.70	2.28

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-1/SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	
PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE	Test no. TP# 2
	Sample No. S-1
Location: TP # 2	Layer Depth 1.15 (m)
Sampling Procedure: JIS1211	Station. -
Prooving Ring KN/DIV 0.02 KPa/Div 10.30511	Date of sampling: 26.09.2018
Area of Pistion 1940.785 mm2	Date of Testing: 03.09.2018

Density Determination	17 Blows	42 Blows	92 Blows
Mould No.	A-4	A-5	A-6
Wt. of sample + mold (gms)	11460.6	11793.3	11709.7
Wt. of mold (gms)	7752.7	7835.1	7492.0
Wt. of Sample (gm/cm³)	3707.9	3958.2	4217.7
Wet Density (Kg/m³)	1760	1879	2003
Dry density (kg/m³)	1480	1588	1678
% Compaction	88.61%	95.10%	100.50%

Moisture Determination	Before Compaction	Before Compaction	Before Compaction
Can No.	C-15	C-16	C-17
Wet Soil + can (gms)	193.2	201.9	191.7
Dry soil + can (gms)	168.9	176.1	166.4
Wt. of moisture (gms)	24.3	25.8	25.3
Wt. of can (gms)	40.8	35.4	35.4
Wt. of dry soil (gms)	128.1	140.7	131
Moisture content (%)	**19.0**	**18.3**	**19.3**

SWELL	17 Blows	42 Blows	92 Blows
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	593	433	385
Swell (%)	5.10%	3.72%	3.31%

Penetration (mm)	Dial Reading, Blows			Resistance to Penetration, KPa, Blows		
	17	42	92	17	42	92
0.64	2	4	5	20.6	41.2	51.5
1.27	3	5	7	30.9	51.5	72.1
1.91	4	7	10	41.2	72.1	103.1
2.54	5	9	12	51.5	92.7	123.7
3.17	6	11	15	61.8	113.4	154.6
3.80	6	13	17	61.8	134.0	175.2
5.08	8	16	23	82.4	164.9	237.0
6.35	9	19	27	92.7	195.8	278.2
7.62	11	21	31	113.4	216.4	319.5
8.90	12	24	35	123.7	247.3	360.7
10.16	14	26	38	144.3	267.9	391.6

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**0.75**	**1.34**	**1.79**
5.08mm	**0.80**	**1.60**	**2.30**

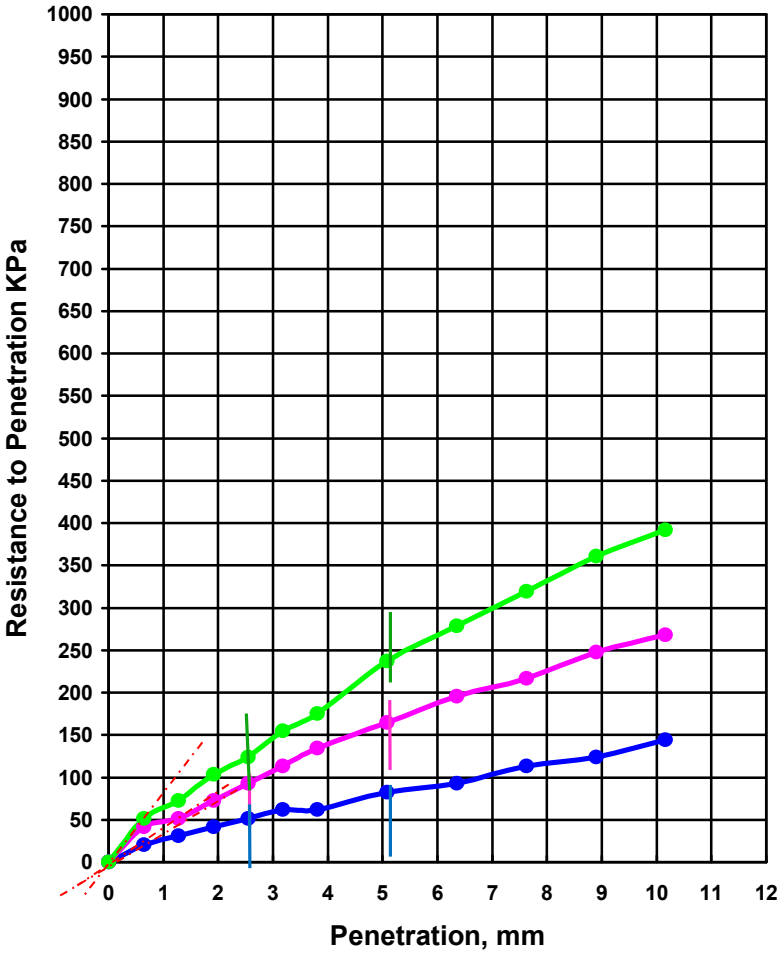
Plate -19 TP-2 - SOAKED

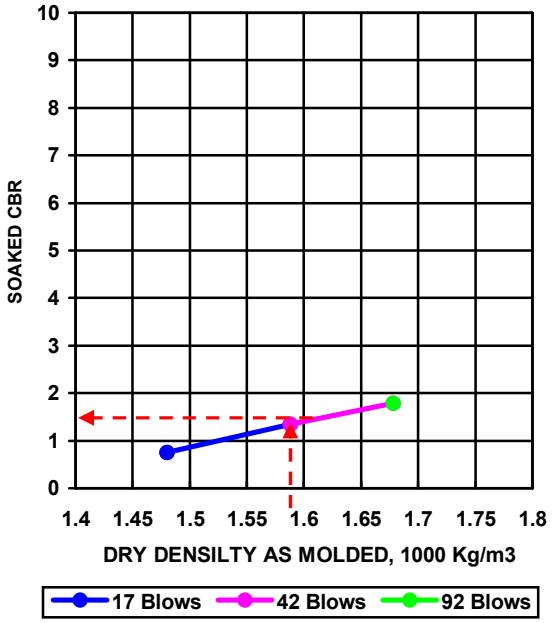
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 2 (STA: 9054054.16S , 777544.62E) Date: 16.10.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1670 kg/m^3 = 1587 kg/m^3.
2. At 1587 kg/m^3, the CBR is 1.3 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
17	1480	89	0.75	0.80	5.10
42	1588	95	1.34	1.60	3.72
92	1678	101	1.79	2.30	3.31

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-2/SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

Location: TP # 3

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 03.09.2018

Density Determination	17 Blows	42 Blows	92 Blows
Mould No.	B-1	B-2	B-3
Wt. of sample + mold (gms)	12000.2	10210.9	10561.6
Wt. of mold (gms)	8400	6495.0	6601.0
Wt. of Sample (gm/cm³)	3600.2	3715.9	3960.6
Wet Density (Kg/m³)	1709	1764	1880
Dry density (kg/m³)	1449	1492	1590
% Compaction	93.26%	96.01%	102.29%

Moisture Determination	Before Compaction	Before Compaction	Before Compaction
Can No.	D-2	D-3	D-4
Wet Soil + can (gms)	220.9	227.8	217
Dry soil + can (gms)	197.1	202.8	192.9
Wt. of moisture (gms)	23.8	25	24.1
Wt. of can (gms)	64.5	65.8	61.2
Wt. of dry soil (gms)	132.6	137	131.7
Moisture content (%)	**17.9**	**18.2**	**18.3**

SWELL	17 Blows	42 Blows	92 Blows
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	449	357	301
Swell (%)	3.86%	3.07%	2.59%

Penetration (mm)	Dial Reading, Blows			Resistance to Penetration, KPa, Blows		
	17	42	92	17	42	92
0.64	4	6	7	41.2	61.8	72.1
1.27	6	10	11	61.8	103.1	113.4
1.91	8	13	16	82.4	134.0	164.9
2.54	9	15	20	92.7	154.6	206.1
3.17	11	17	29	113.4	175.2	298.8
3.80	13	20	39	134.0	206.1	401.9
5.08	19	24	52	195.8	247.3	535.9
6.35	23	29	61	237.0	298.8	628.6
7.62	27	35	72	278.2	360.7	742.0
8.90	31	41	74	319.5	422.5	762.6
10.16	37	46	76	381.3	474.0	783.2

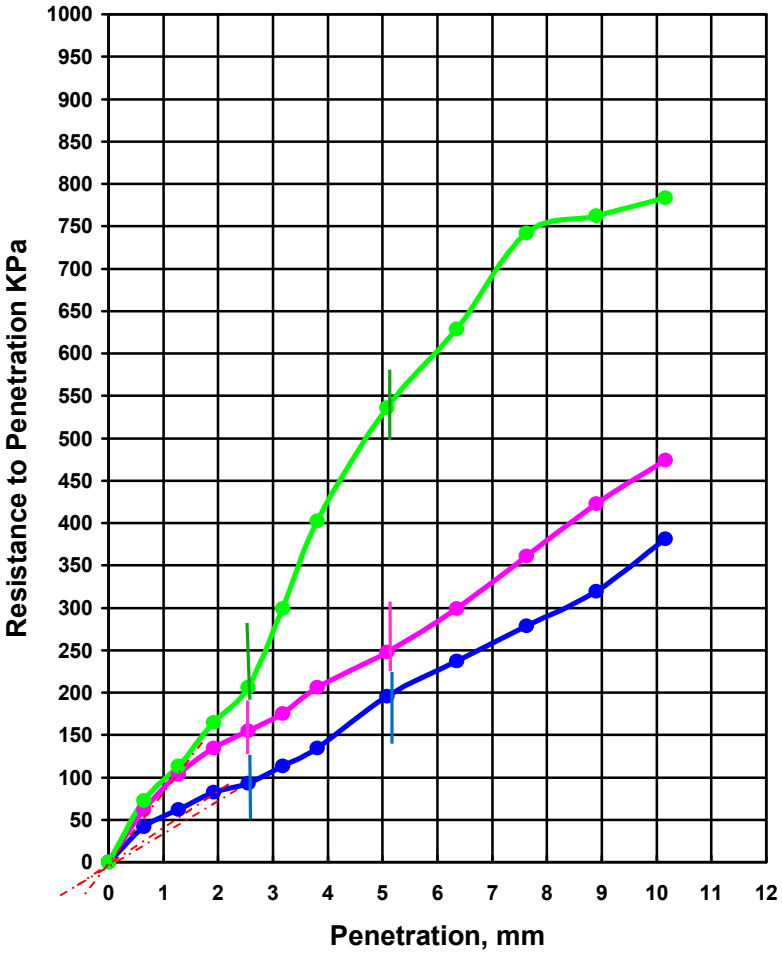
CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**1.34**	**2.24**	**2.99**
5.08mm	**1.90**	**2.40**	**5.20**

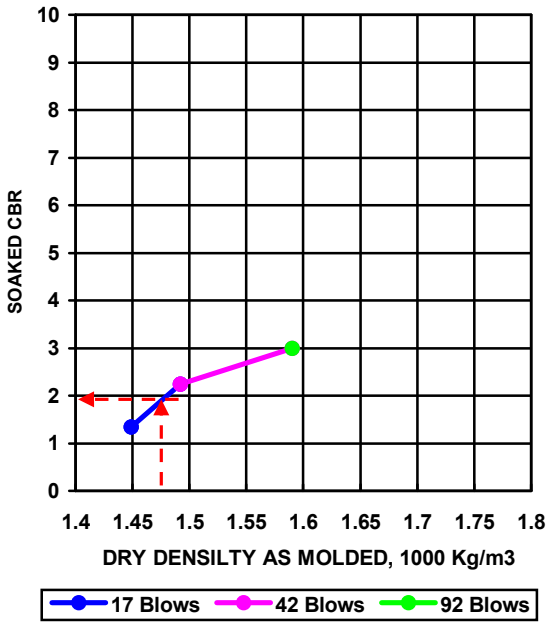
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 3 (STA: 9053995.06S , 777629.38E) Date: 17.09.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1554 kg/m^3 = 1476 kg/m^3.
2. At 1476 kg/m^3, the CBR is 1.9 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
17	1449	93	1.34	1.90	3.86
42	1492	96	2.24	2.40	3.07
92	1590	102	2.99	5.20	2.59

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-3/SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

Location: TP # 4

Layer Depth 1.10 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 03.09.2018

Density Determination	**17 Blows**	**42 Blows**	**92 Blows**
Mould No.	**A-7**	**A-8**	**A-9**
Wt. of sample + mold (gms)	11146.1	11487.5	11628.5
Wt. of mold (gms)	7423.2	7563.4	7498.6
Wt. of Sample (gm/cm³)	3722.9	3924.1	4129.9
Wet Density (Kg/m³)	1768	1863	1961
Dry density (kg/m³)	1590	1673	1767
% Compaction	91.13%	95.86%	101.27%
Moisture Determination	**Before Compaction**	**Before Compaction**	**Before Compaction**
Can No.	**C-4**	**C-5**	**C-6**
Wet Soil + can (gms)	160.2	179.7	190.2
Dry soil + can (gms)	148.2	165.6	175.1
Wt. of moisture (gms)	12	14.1	15.1
Wt. of can (gms)	40.6	41.7	37.3
Wt. of dry soil (gms)	107.6	123.9	137.8
Moisture content (%)	**11.2**	**11.4**	**11.0**

SWELL	**17 Blows**	**42 Blows**	**92 Blows**
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	441	345	336
Swell (%)	3.79%	2.97%	2.89%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	Blows			**Blows**		
	17	**42**	**92**	**17**	**42**	**92**
0.64	3	4	5	30.9	41.2	51.5
1.27	4	5	6	41.2	51.5	61.8
1.91	5	6	7	51.5	61.8	72.1
2.54	6	7	9	61.8	72.1	92.7
3.17	8	9	11	82.4	92.7	113.4
3.80	9	11	14	92.7	113.4	144.3
5.08	11	13	19	113.4	134.0	195.8
6.35	14	16	24	144.3	164.9	247.3
7.62	17	18	31	175.2	185.5	319.5
8.90	21	23	37	216.4	237.0	381.3
10.16	24	25	42	247.3	257.6	432.8

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**0.90**	**1.05**	**1.34**
5.08mm	**1.10**	**1.30**	**1.90**

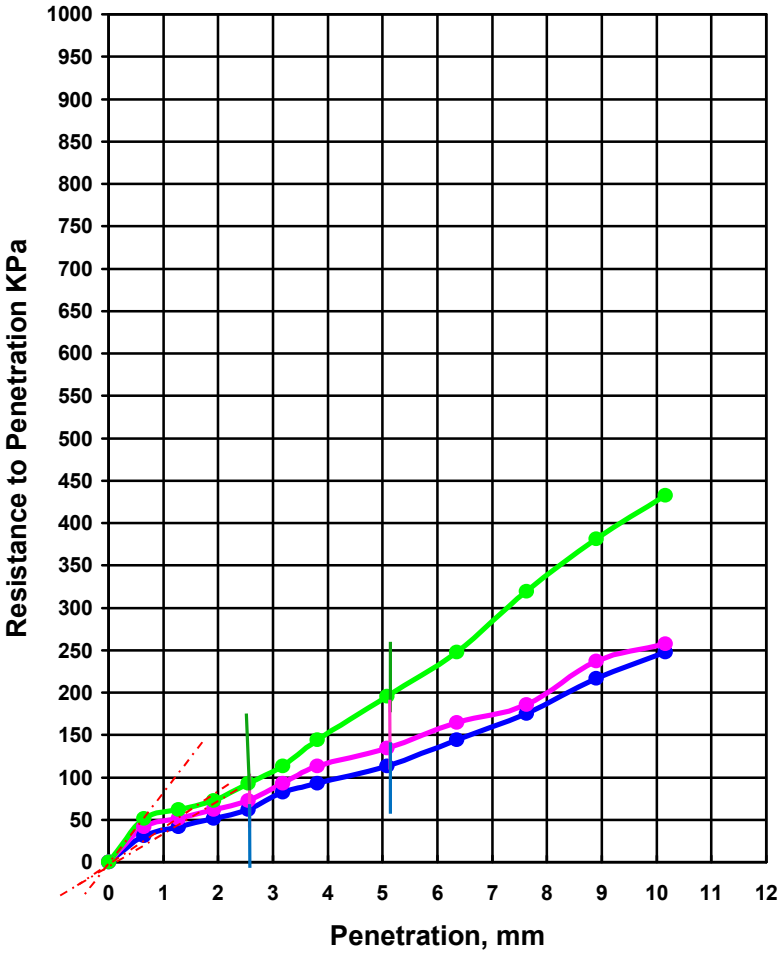
Plate - 23 TP-4 - SOAKED

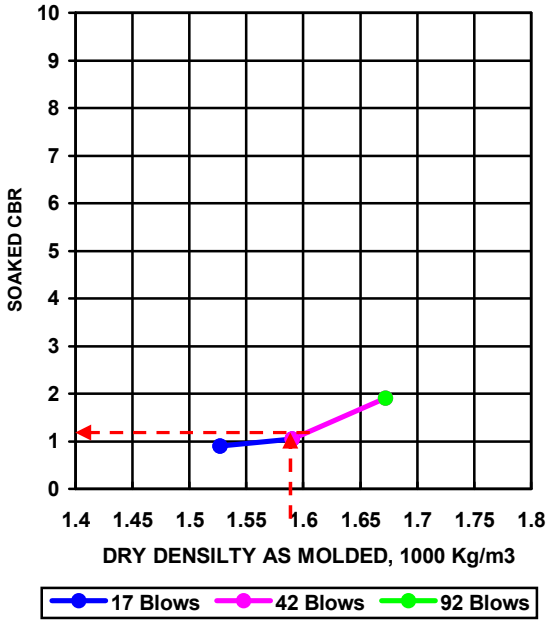
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 4 (STA: 9053769.00S , 777690.49E) Date: 17.10.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1745 kg/m^3 = 1658 kg/m^3.
2. At 1658 kg/m^3, the CBR is 1.1 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
17	1590	91	0.90	1.10	3.79
42	1673	96	1.05	1.30	2.97
92	1767	101	1.34	1.90	2.89

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-4/SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE	Test no. TP# 1
	Sample No. S-1
Location: TP # 1	Layer Depth 1.10 (m)
Sampling Procedure: JIS1211	Station. -
Prooving Ring KN/DIV 0.02 KPa/Div 10.30511	Date of sampling: 26.09.2018
Area of Pistion 1940.785 mm2	Date of Testing: 09.10.2018

Density Determination	**17 Blows**	**42 Blows**	**92 Blows**
Mould No.	**A-10**	**A-11**	**A-12**
Wt. of sample + mold (gms)	11366.8	11662.3	12019.0
Wt. of mold (gms)	7554.1	7597.6	7805.0
Wt. of Sample (gm/cm³)	3812.7	4064.7	4214
Wet Density (Kg/m³)	1810	1930	2001
Dry density (kg/m³)	1554	1657	1722
% Compaction	90.59%	96.64%	100.42%

Moisture Determination	**Before Compaction**	**Before Compaction**	**Before Compaction**
Can No.	**D-5**	**C-10**	**C-11**
Wet Soil + can (gms)	227.6	208.6	237.3
Dry soil + can (gms)	203.5	187.5	212.4
Wt. of moisture (gms)	24.1	21.1	24.9
Wt. of can (gms)	57.6	59.2	58.4
Wt. of dry soil (gms)	145.9	128.3	154
Moisture content (%)	**16.5**	**16.4**	**16.2**

SWELL	**17 Blows**	**42 Blows**	**92 Blows**
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	0	0	0
Swell (%)	0.00%	0.00%	0.00%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	Blows			**Blows**		
	17	**42**	**92**	**17**	**42**	**92**
0.64	13	22	37	134.0	226.7	381.3
1.27	42	49	66	432.8	505.0	680.1
1.91	60	75	90	618.3	772.9	927.5
2.54	68	91	112	700.7	937.8	1154.2
3.17	81	110	137	834.7	1133.6	1411.8
3.80	91	124	156	937.8	1277.8	1607.6
5.08	102	150	196	1051.1	1545.8	2019.8
6.35	111	177	240	1143.9	1824.0	2473.2
7.62	117	191	254	1205.7	1968.3	2617.5
8.90	126	214	262	1298.4	2205.3	2699.9
10.16	132	232	278	1360.3	2390.8	2864.8

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**10.16**	**13.59**	**16.73**
5.08mm	**10.21**	**15.01**	**19.61**

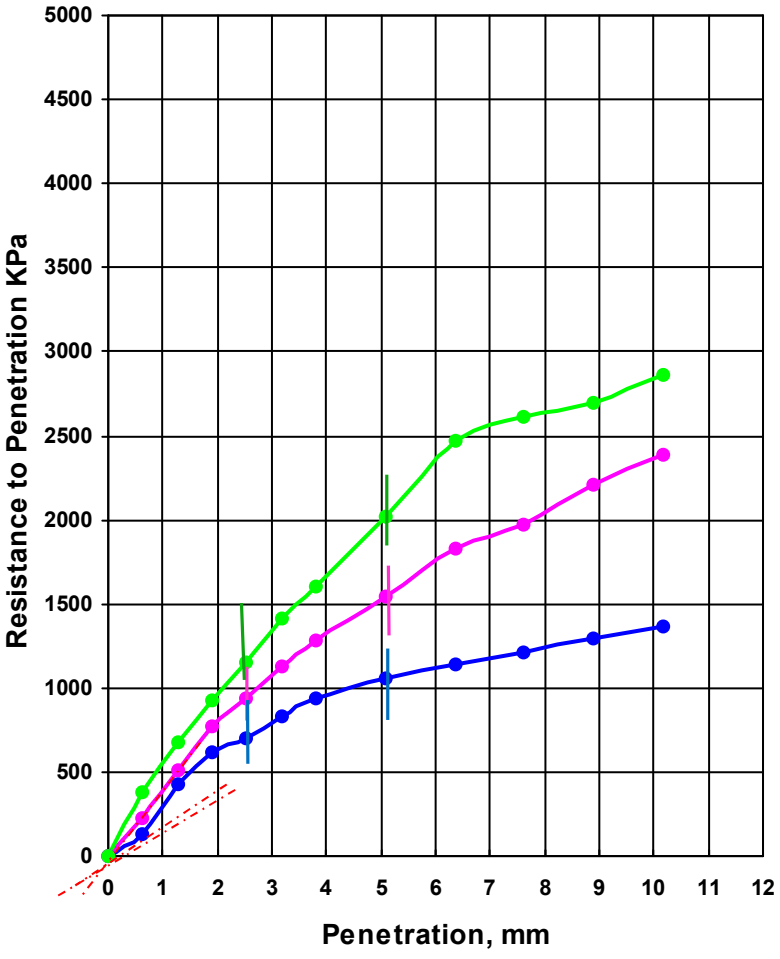
Plate - 25 TP-1 - UN-SOAKED

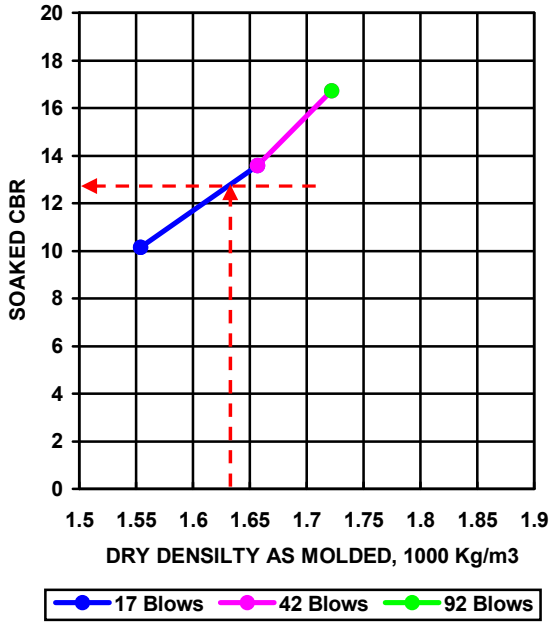
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Un-soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 1 (STA: 9054203.00S , 777503.55E) Date: 12.10.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1715 kg/m^3 = 1629 kg/m^3.
2. At 1629 kg/m^3, the CBR is 12.8 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at	
			2.5 mm	5.08 mm
17	1554	91	10.16	10.21
42	1657	97	13.59	15.01
92	1722	100	16.73	19.61

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-1/UN-SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE	Test no. TP# 2
	Sample No. S-1
Location: TP # 2	Layer Depth 1.15 (m)
Sampling Procedure: JIS1211	Station. -
Prooving Ring KN/DIV 0.02 KPa/Div 10.30511	Date of sampling: 26.09.2018
Area of Pistion 1940.785 mm2	Date of Testing: 03.09.2018

Density Determination	**17 Blows**	**42 Blows**	**92 Blows**
Mould No.	**A-10**	**A-11**	**A-12**
Wt. of sample + mold (gms)	11429	11621.0	12019.0
Wt. of mold (gms)	7554.1	7597.6	7805.0
Wt. of Sample (gm/cm³)	3874.9	4023.4	4214
Wet Density (Kg/m³)	1840	1910	2001
Dry density (kg/m³)	1549	1620	1688
% Compaction	92.77%	97.03%	101.07%
Moisture Determination	**Before Compaction**	**Before Compaction**	**Before Compaction**
Can No.	**A-3**	**A-4**	**A-5**
Wet Soil + can (gms)	274.8	235.4	280.5
Dry soil + can (gms)	241.3	208.8	245.9
Wt. of moisture (gms)	33.5	26.6	34.6
Wt. of can (gms)	62.6	60.1	59.3
Wt. of dry soil (gms)	178.7	148.7	186.6
Moisture content (%)	**18.7**	**17.9**	**18.5**

SWELL	**17 Blows**	**42 Blows**	**92 Blows**
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	0	0	0
Swell (%)	0.00%	0.00%	0.00%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	Blows			**Blows**		
	17	**42**	**92**	**17**	**42**	**92**
0.64	10	14	19	103.1	144.3	195.8
1.27	21	29	32	216.4	298.8	329.8
1.91	29	40	44	298.8	412.2	453.4
2.54	39	52	59	401.9	535.9	608.0
3.17	55	75	84	566.8	772.9	865.6
3.80	70	86	103	721.4	886.2	1061.4
5.08	82	106	128	845.0	1092.3	1319.1
6.35	96	125	145	989.3	1288.1	1494.2
7.62	108	139	169	1113.0	1432.4	1741.6
8.90	120	156	188	1236.6	1607.6	1937.4
10.16	128	165	202	1319.1	1700.3	2081.6

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**5.82**	**7.77**	**8.81**
5.08mm	**8.20**	**10.61**	**12.81**

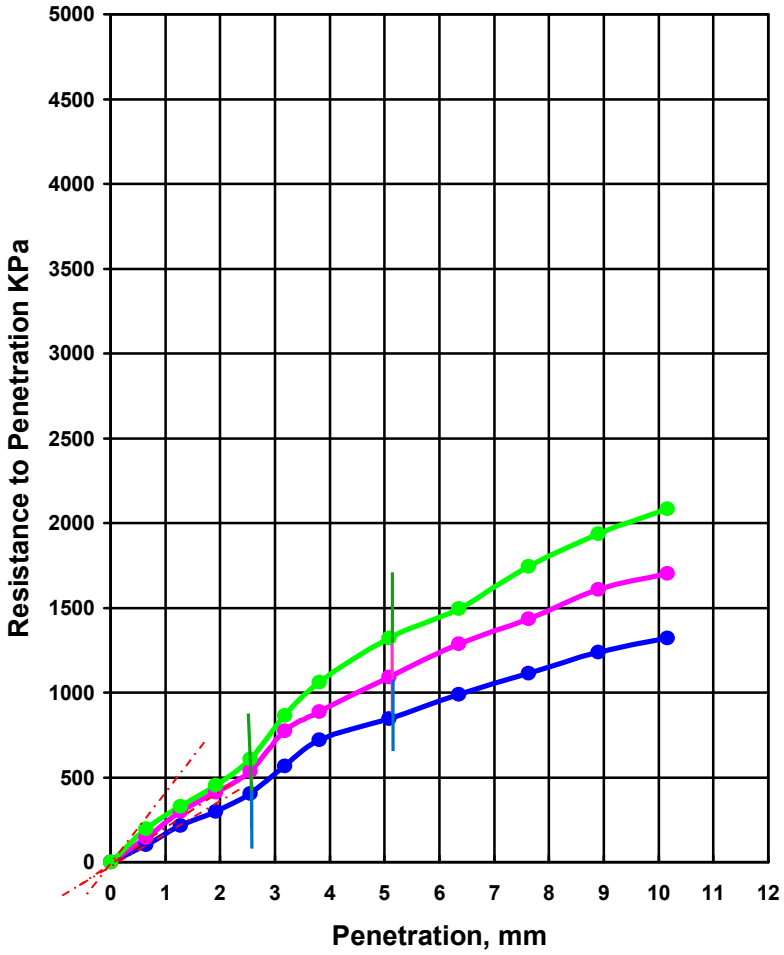
Plate - 27 TP-2 - UN-SOAKED

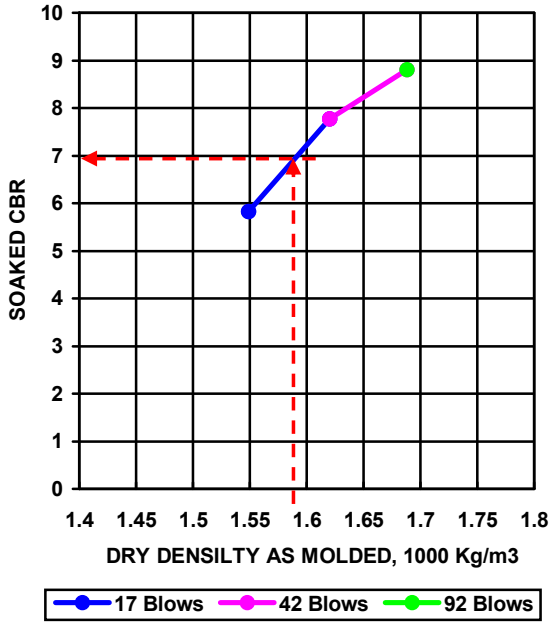
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Un-Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 2 (STA: 9054054.16S , 777544.62E) Date: 16.09.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1670 kg/m^3 = 1587 kg/m^3.
2. At 1587 kg/m^3, the CBR is 7.0 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at	
			2.5 mm	5.08 mm
17	1549	93	5.82	8.20
42	1620	97	7.77	10.61
92	1688	101	8.81	12.81

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-2/UN-SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

Location: TP # 3

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 03.09.2018

Density Determination	17 Blows	42 Blows	92 Blows
Mould No.	A-4	A-5	A-6
Wt. of sample + mold (gms)	11262.0	11537.0	11366.0
Wt. of mold (gms)	7752.7	7835.1	7492.0
Wt. of Sample (gm/cm³)	3509.3	3701.9	3874
Wet Density (Kg/m³)	1666	1758	1839
Dry density (kg/m³)	1402	1483	1560
% Compaction	90.25%	95.44%	100.42%

Moisture Determination	Before Compaction	Before Compaction	Before Compaction
Can No.	C-4	C-5	C-6
Wet Soil + can (gms)	171.3	191.9	218.6
Dry soil + can (gms)	150.6	169.4	191.1
Wt. of moisture (gms)	20.7	22.5	27.5
Wt. of can (gms)	40.5	47.8	37.2
Wt. of dry soil (gms)	110.1	121.6	153.9
Moisture content (%)	**18.8**	**18.5**	**17.9**

SWELL	17 Blows	42 Blows	92 Blows
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	0	0	0
Swell (%)	0.00%	0.00%	0.00%

Penetration (mm)	Dial Reading, Blows			Resistance to Penetration, KPa, Blows		
	17	42	92	17	42	92
0.64	9	12	15	92.7	123.7	154.6
1.27	16	24	32	164.9	247.3	329.8
1.91	23	37	55	237.0	381.3	566.8
2.54	32	51	84	329.8	525.6	865.6
3.17	40	64	106	412.2	659.5	1092.3
3.80	49	78	130	505.0	803.8	1339.7
5.08	58	90	152	597.7	927.5	1566.4
6.35	66	103	170	680.1	1061.4	1751.9
7.62	74	116	188	762.6	1195.4	1937.4
8.90	80	129	206	824.4	1329.4	2122.9
10.16	84	140	222	865.6	1442.7	2287.7

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**4.78**	**7.62**	**12.55**
5.08mm	**5.80**	**9.00**	**15.21**

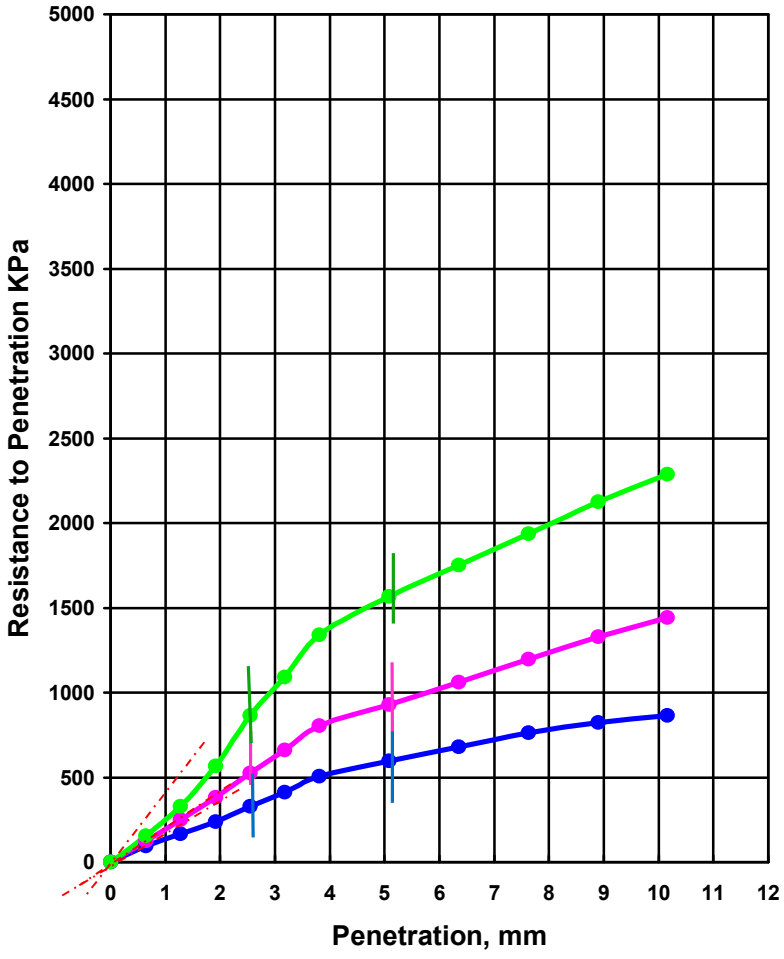
Plate - 29 TP-3 - UN-SOAKED

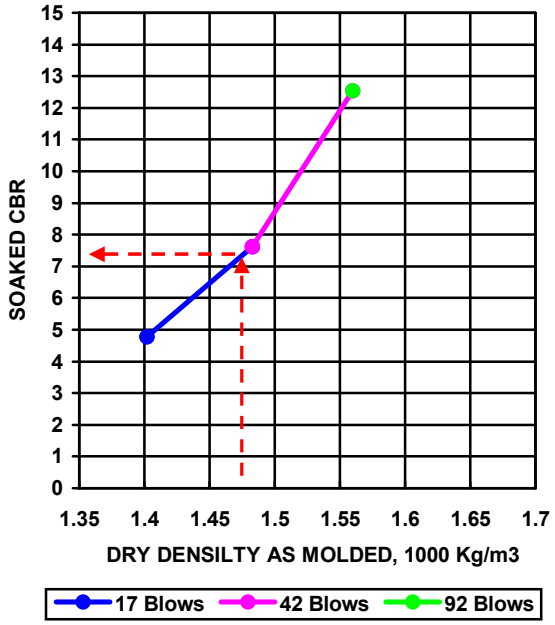
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (ASTM D-1883)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Un-Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 3 Date: 17.10.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1554 kg/m^3 = 1476 kg/m^3.
2. At 1476 kg/m^3, the CBR is 7.2 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at	
			2.5 mm	5.08 mm
17	1402	90	4.78	5.80
42	1483	95	7.62	9.00
92	1560	100	12.55	15.21

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-3/UN-SOAKED

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

Location: TP # 4

Layer Depth 1.10 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 03.09.2018

Density Determination	17 Blows	42 Blows	92 Blows
Mould No.	A-1	A-2	A-3
Wt. of sample + mold (gms)	10120.4	10389.5	10455.3
Wt. of mold (gms)	6376.8	6438.5	6318.5
Wt. of Sample (gm/cm³)	3743.6	3951	4136.8
Wet Density (Kg/m³)	1777	1876	1964
Dry density (kg/m³)	1610	1684	1760
% Compaction	92.27%	96.49%	100.89%
Moisture Determination	Before Compaction	Before Compaction	Before Compaction
Can No.	C-8	C-9	C-10
Wet Soil + can (gms)	203.2	198.3	232.6
Dry soil + can (gms)	187.2	182.1	212.6
Wt. of moisture (gms)	16	16.2	20
Wt. of can (gms)	33.3	40.1	39.7
Wt. of dry soil (gms)	153.9	142	172.9
Moisture content (%)	**10.4**	**11.4**	**11.6**

SWELL	17 Blows	42 Blows	92 Blows
Reading before Soaking (25mm)	0	0	0
Reading after Soaking (25mm)	0	0	0
Swell (%)	0.00%	0.00%	0.00%

Penetration (mm)	Dial Reading, Blows			Resistance to Penetration, KPa, Blows		
	17	42	92	17	42	92
0.64	10	13	35	103.1	134.0	360.7
1.27	25	41	65	257.6	422.5	669.8
1.91	44	62	98	453.4	638.9	1009.9
2.54	65	99	122	669.8	1020.2	1257.2
3.17	83	126	143	855.3	1298.4	1473.6
3.80	100	148	169	1030.5	1525.2	1741.6
5.08	116	170	191	1195.4	1751.9	1968.3
6.35	130	192	207	1339.7	1978.6	2133.2
7.62	140	214	226	1442.7	2205.3	2329.0
8.90	148	231	246	1525.2	2380.5	2535.1
10.16	155	247	254	1597.3	2545.4	2617.5

CBR (%)			
Blows	**17**	**42**	**92**
2.54mm	**9.71**	**14.79**	**18.22**
5.08mm	**11.61**	**17.01**	**19.11**

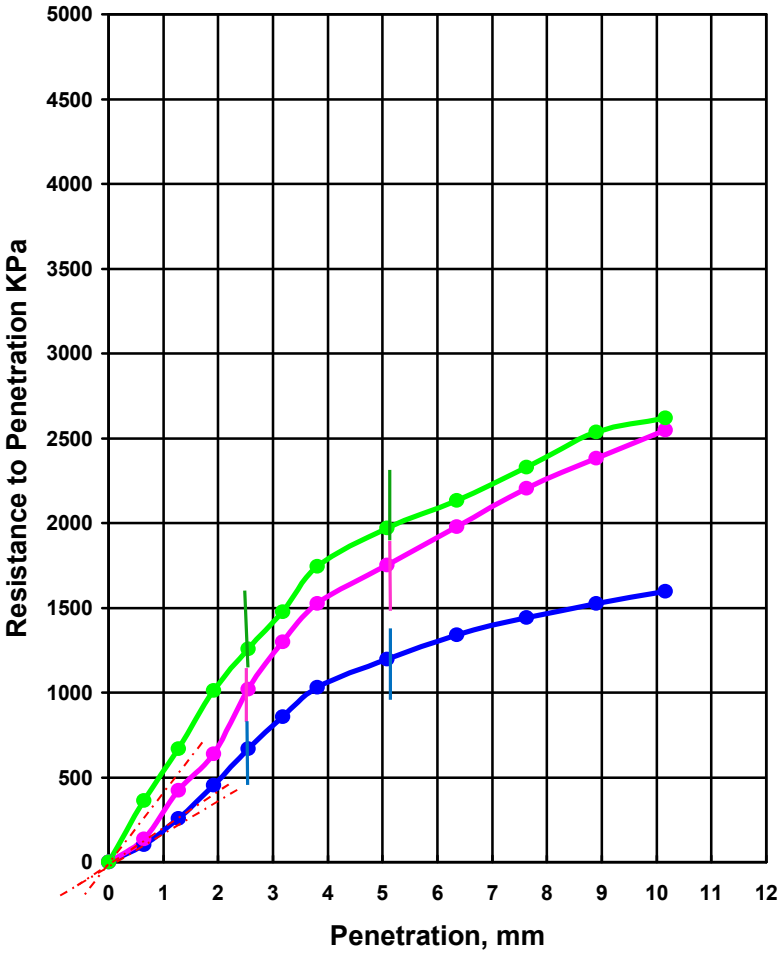
Plate - 31 TP-4 - UN-SOAKED

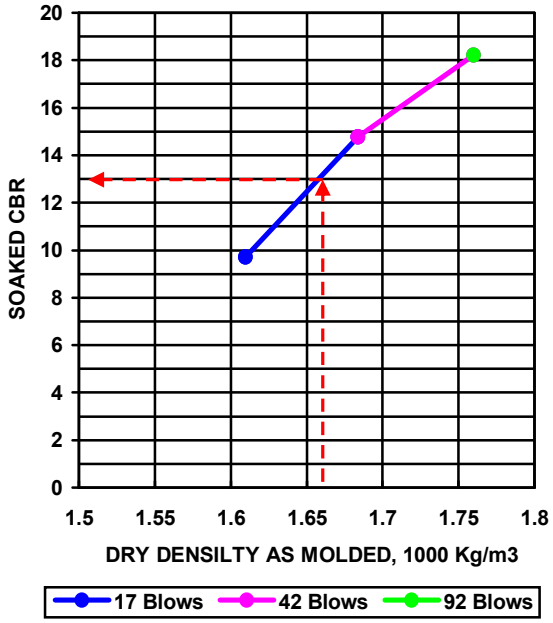
RMS Engineering & Construction Unipessoal Lda

CBR Test Results (ASTM D-1883)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Un-Soaked/JIS1211
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 4 Date: 18.09.2018





The CBR at 95 percent of the maximum dry density:

1. 95 percent of 1745 kg/m^3 = 1658 kg/m^3.
2. At 1658 kg/m^3, the CBR is 13.0 %.

Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
17	1610	92	9.71	11.61	3.79
42	1684	96	14.79	17.01	2.97
92	1760	101	18.22	19.11	2.89

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-4/UN-SOAKED

Laboratory Undisturbed CBR Soaked and Un-Soaked Plates 33 to 40

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 1

Sample No. S-1

Location: TP # 1 , S-1

Layer Depth 1.10 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring KN/DIV 0.02 KPa/Div 10.30511

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 01.10.2018

Density Determination	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Mould No.			
Wt. of sample + mold (gms)	5353.1		5387.8
Wt. of mold (gms)	2103.2		2178.4
Wt. of Sample (gm/cm³)	3249.9		3209.4
Wet Density (Kg/m³)	1497		1447
Dry density (kg/m³)	1425		1371
% Compaction	83.10%		79.95%

Moisture Determination	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Can No.	k-8		K-2
Wet Soil + can (gms)	281.2		380.1
Dry soil + can (gms)	272.8		365.3
Wt. of moisture (gms)	8.4		14.8
Wt. of can (gms)	107.0		99.1
Wt. of dry soil (gms)	165.8		266.2
Moisture content (%)	**5.1**		**5.6**

SWELL	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Reading before Soaking (25mm)	0		0
Reading after Soaking (25mm)	0		11
Swell (%)	0.00%		0.09%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
0.64	7		1	72.1		10.3
1.27	11		2	113.4		20.6
1.91	15		2	154.6		20.6
2.54	17		3	175.2		30.9
3.17	23		4	237.0		41.2
3.80	26		4	267.9		41.2
5.08	32		5	329.8		51.5
6.35	39		5	401.9		51.5
7.62	43		6	443.1		61.8
8.90	47		6	484.3		61.8
10.16	53		7	546.2		72.1

CBR (%)		
	Undisturbed Un-Soaked CBR	**Undisturbed Soaked CBR**
2.54mm	**2.54**	**0.45**
5.08mm	**3.20**	**0.50**

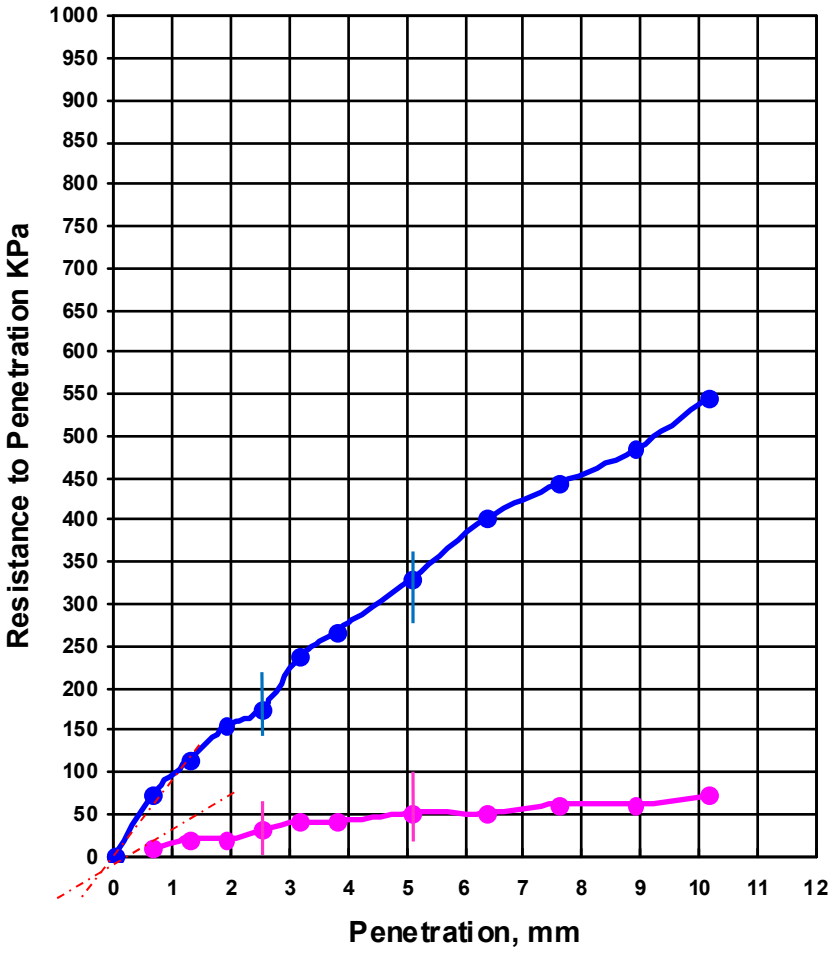
Plate - 33 TP-1/Undisturbed Un-Soaked & Soaked CBR

RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked(JIS1211)
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	Test Pit No. 1 (STA: 9054203.00S , 777503.55E) Date: 10.10.2018



Laboratory CBR Test	Dry Density (kg/cu,m)	CBR at		Swell, %
		2.5 mm	5.08 mm	
Undisturbed Un-Soaked	1425	2.54	3.20	0.00
Undisturbed Soaked	1371	0.45	0.50	2.28

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-1/ Undisturbed Un-Soaked & Undisturbed Soaked

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 2

Sample No. S-1

Location: TP # 2 , S-1

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring **KN/DIV** **0.02** **KPa/Div** **10.30511**

Date of sampling: 26.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 01.10.2018

Density Determination	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Mould No.			
Wt. of sample + mold (gms)	5519.4		5585.9
Wt. of mold (gms)	2102.1		2129.8
Wt. of Sample (gm/cm³)	3417.3		3456.1
Wet Density (Kg/m³)	1575		1559
Dry density (kg/m³)	1553		1528
% Compaction	92.97%		91.48%

Moisture Determination	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Can No.	**K-5**		**K-3**
Wet Soil + can (gms)	320.6		450.8
Dry soil + can (gms)	317.5		443.9
Wt. of moisture (gms)	3.1		6.9
Wt. of can (gms)	98.0		102.8
Wt. of dry soil (gms)	219.5		341.1
Moisture content (%)	**1.4**		**2.0**

SWELL	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Reading before Soaking (25mm)	0		0
Reading after Soaking (25mm)	0		191
Swell (%)	0.00%		1.61%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	UNDISTURBED UN-SOAKED		**UNDISTURBED SOAKED**	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
0.64	13		1	134.0		10.3
1.27	14		2	144.3		20.6
1.91	14		3	144.3		30.9
2.54	15		3	154.6		30.9
3.17	15		4	154.6		41.2
3.80	15		5	154.6		51.5
5.08	15		6	154.6		61.8
6.35	15		7	154.6		72.1
7.62	15		8	154.6		82.4
8.90	16		10	164.9		103.1
10.16	17		12	175.2		123.7

CBR (%)		
	Undisturbed Un-Soaked CBR	**Undisturbed Soaked CBR**
2.54mm	**2.24**	**0.45**
5.08mm	**1.50**	**0.60**

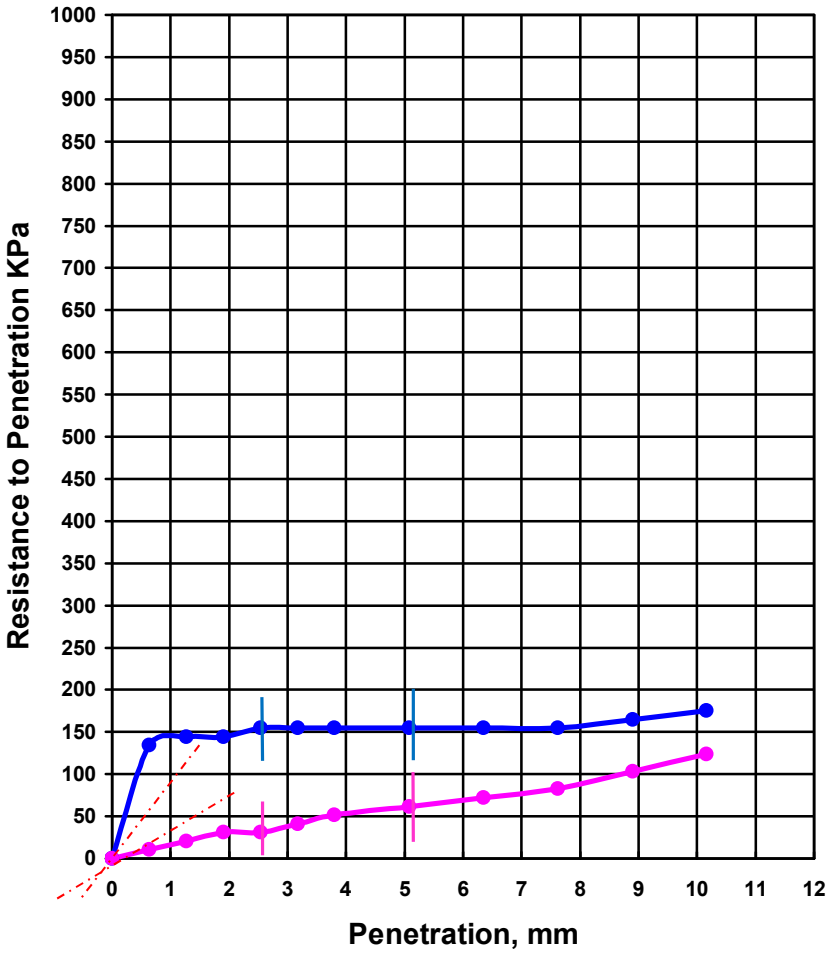
Plate - 35 TP-2/Undisturbed Un-Soaked & Soaked CBR

RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked(JIS1211)
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	TEST PIT LOG: TP # 2 (STA: 9054054.16S , 777544.62E) Date: 10.10.2018



Laboratory CBR Test	Dry Density (kg/cu,m)	CBR at		Swell, %
		2.5 mm	5.08 mm	
Undisturbed Un-Soaked	1553	2.24	1.50	0.00
Undisturbed Soaked	1528	0.45	0.60	1.61

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-2/ Undisturbed Un-Soaked & Undisturbed Soaked

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 3

Sample No. S-1

Location: TP # 3 , S-1

Layer Depth 1.15 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring **KN/DIV** **0.02** **KPa/Div** **10.30511**

Date of sampling: 24.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 30.09.2018

Density Determination	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Mould No.			
Wt. of sample + mold (gms)	5298.1		5517.9
Wt. of mold (gms)	1921.5		2084.2
Wt. of Sample (gm/cm³)	3376.6		3433.7
Wet Density (Kg/m³)	1532		1548
Dry density (kg/m³)	1329		1342
% Compaction	85.52%		86.33%

Moisture Determination	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Can No.	**K-3**		**K-11**
Wet Soil + can (gms)	286.7		347.1
Dry soil + can (gms)	262.3		313.6
Wt. of moisture (gms)	24.4		33.5
Wt. of can (gms)	102.8		96.4
Wt. of dry soil (gms)	159.5		217.2
Moisture content (%)	**15.3**		**15.4**

SWELL	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
Reading before Soaking (25mm)	0		0
Reading after Soaking (25mm)	0		159
Swell (%)	0.00%		1.34%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	UNDISTURBED UN-SOAKED		**UNDISTURBED SOAKED**	**UNDISTURBED UN-SOAKED**		**UNDISTURBED SOAKED**
0.64	1		0	10.3		0.0
1.27	1		0	10.3		0.0
1.91	2		0	20.6		0.0
2.54	2		0	20.6		0.0
3.17	3		0	30.9		0.0
3.80	3		0	30.9		0.0
5.08	4		0	41.2		0.0
6.35	4		0	41.2		0.0
7.62	5		0	51.5		0.0
8.90	5		0	51.5		0.0
10.16	5		0	51.5		0.0

CBR (%)		
	Undisturbed Un-Soaked CBR	**Undisturbed Soaked CBR**
2.54mm	**0.30**	**0.00**
5.08mm	**0.40**	**0.00**

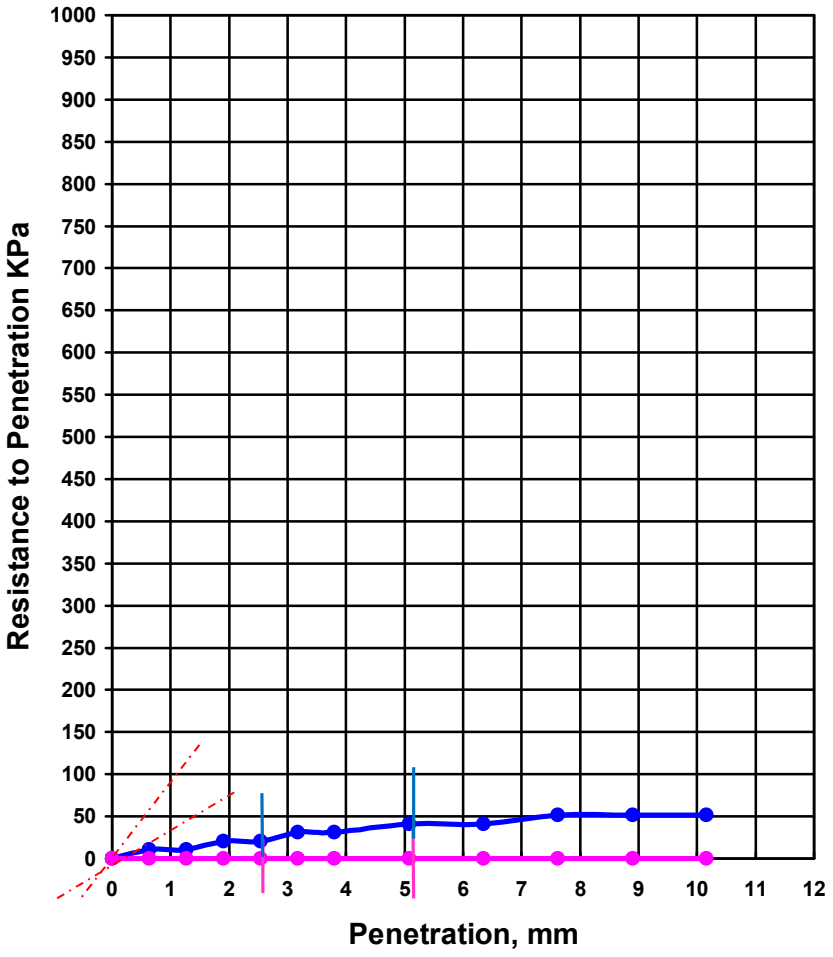
Plate - 37 TP-3/Undisturbed Un-Soaked & Soaked CBR

RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked(JIS1211)
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	TEST PIT LOG: TP # 3 (STA: 9053995.06S , 777629.38E) Date: 10.10.2018



Laboratory CBR Test	Dry Density (kg/cu,m)	CBR at		Swell, %
		2.5 mm	5.08 mm	
Undisturbed Un-Soaked	1329	0.30	0.40	0.00
Undisturbed Soaked	1342	0.00	0.00	1.34

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-3/ Undisturbed Un-Soaked & Undisturbed Soaked

RMS Engineering & Construction Unipessoal Lda

CALIFORNIA BEARING RATIO TEST REPORT

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM

PROJECT: GEOTECHNICAL INVESTIGATION FOR IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT-PAVEMENT PROJECT, DILI, TIMOR LESTE

Test no. TP# 4

Sample No. S-1

Location: TP # 4 , S-1

Layer Depth 1.10 (m)

Sampling Procedure: JIS1211

Station. -

Prooving Ring **KN/DIV** **0.02** **KPa/Div** **10.30511**

Date of sampling: 25.09.2018

Area of Pistion 1940.785 mm2

Date of Testing: 29.09.2018

Density Determination	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Mould No.			
Wt. of sample + mold (gms)	5798.6		5817.9
Wt. of mold (gms)	2097.6		2084.2
Wt. of Sample (gm/cm³)	3701		3733.7
Wet Density (Kg/m³)	1698		1684
Dry density (kg/m³)	1637		1624
% Compaction	93.83%		93.07%

Moisture Determination	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Can No.	K-4		K-1
Wet Soil + can (gms)	252.2		323.6
Dry soil + can (gms)	247.2		315.8
Wt. of moisture (gms)	5		7.8
Wt. of can (gms)	111.3		103.9
Wt. of dry soil (gms)	135.9		211.9
Moisture content (%)	**3.7**		**3.7**

SWELL	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
Reading before Soaking (25mm)	0		0
Reading after Soaking (25mm)	0		109
Swell (%)	0.00%		0.92%

Penetration (mm)	**Dial Reading**			**Resistance to Penetration, KPa**		
	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED	UNDISTURBED UN-SOAKED		UNDISTURBED SOAKED
0.64	11		4	113.4		41.2
1.27	15		4	154.6		41.2
1.91	19		5	195.8		51.5
2.54	23		5	237.0		51.5
3.17	25		6	257.6		61.8
3.80	27		6	278.2		61.8
5.08	29		6	298.8		61.8
6.35	30		7	309.2		72.1
7.62	32		7	329.8		72.1
8.90	38		8	391.6		82.4
10.16	39		8	401.9		82.4

CBR (%)		
	Undisturbed Un-Soaked CBR	**Undisturbed Soaked CBR**
2.54mm	**3.44**	**0.75**
5.08mm	**2.90**	**0.60**

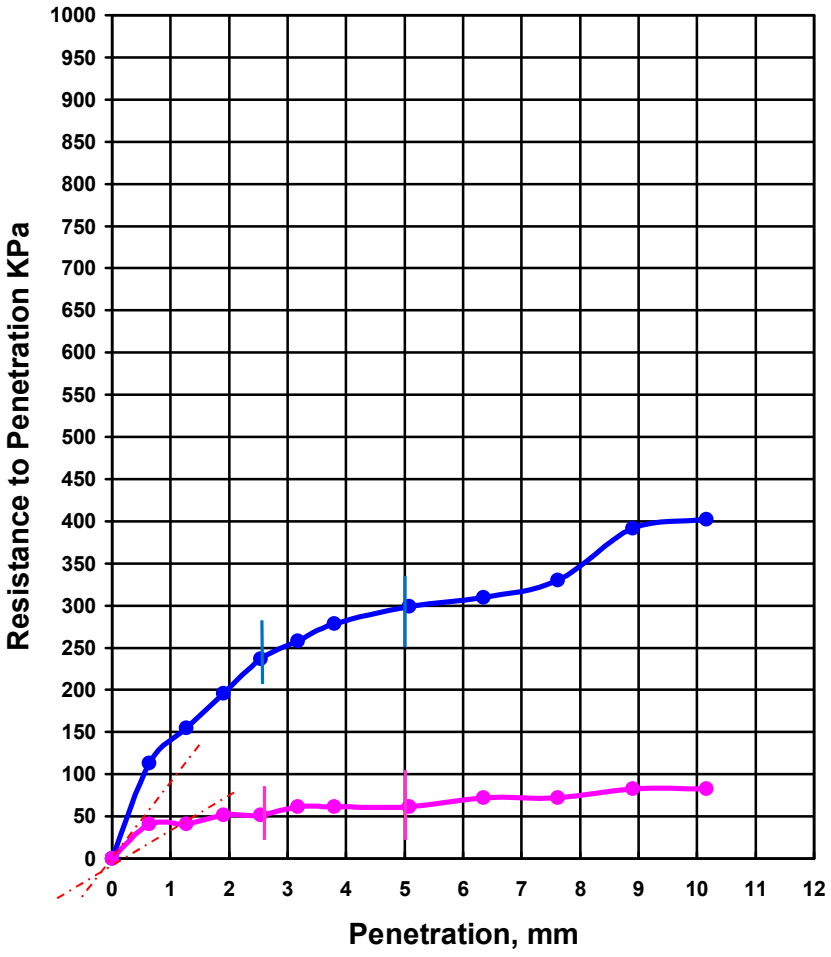
Plate - 39 TP-4/Undisturbed Un-Soaked & Soaked CBR

RMS Engineering & Construction Unipessoal Lda

CBR Test Results (JIS1211)

Report No. GET 18-8002B

CLIENT: JICA STUDY TEAM	Soaked(JIS1211)
PROJECT : *Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport –PAVEMENT Project, Timor Leste*	TEST PIT LOG: TP # 4 (STA: 9053769.00S , 777690.49E) Date: 11.10.2018



Laboratory CBR Test	Dry Density (kg/cu,m)	CBR at		Swell, %
		2.5 mm	5.08 mm	
Undisturbed Un-Soaked	1637	3.44	2.90	0.00
Undisturbed Soaked	1624	0.75	0.60	0.92

C.B.R. TEST RESULTS
Geotechnical Investigation

PLATE – TP-4/ Undisturbed Un-Soaked & Undisturbed Soaked

RMS ENGINEERING AND CONSTRUCTION

JICA STUDY TEAM

Geotechnical Investigation at President Nicolau Lobato Int. Airport, in Democratic Republic of Timor Leste

LOCATION MAP

ENGINEERING AND CONSTRUCTION

JICA STUDY TEAM

Geotechnical Investigation at presedent Nicolau Lobato Int. Airport, in Democratic Republic of Timor leste

PLAN OF FIELD TESTS

TEST POINT	GEOTECHNICAL INVESTIGATTION WORK ITEM	EASTING	NORTHING
BH-1	Mechanical Boring Test Points -1	777638.145	9053909.973
BH-2	Mechanical Boring Test Points -2	777756.787	9053880.013
BH-3	Mechanical Boring Test Points -3	777744.372	9053932.685
BH-4	Mechanical Boring Test Points -4	777649.717	9053857.525
BH-5	Mechanical Boring Test Points -5	777950.315	9053973.767
TP-1a	Test Pits 1a & Plate Bearing Test	777689.628	9053981.51
TP-2a	Test Pits 2a & Plate Bearing Test	777511.710	9053950.189
TP-3a	Test Pits 3a & Plate Bearing Test	777600.208	9053970.018
TP-1	Test Pits Points -1	777657.182	9054214.726
TP-2	Test Pits Points -2	777450.25	9054126.991
TP-3	Test Pits Points -3	778003.197	9053884.822
TP-4	Test Pits Points -4	777779.283	9053835.273
TP-5	Test Pits Points -5	777563.503	9053787.523

BORING LOG

BH - 1

Depth : 30. m

Project	: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Date Started**	:	April 25, 2018	
Location	: Dili, Airport	**Date Finished**	:	April 30, 2018	
Client	: JICA Study Team	**Sheet**	:	1/2 **PLATE-3**	
Boring Method	: Rotary Drilling	**Boring Machine**	:	Gemco Tractar	
Bor Master	: Mr. Zubair **Logged by :** Mr. Mohsin	**Checked by**	:	Mr. Syed Abbas	
	E : 777657.182 N = 9054214.726	**Elevation**	:	**GWL** : 6.40 m	

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1 15	N2 15	N3 15	N	N SPT Graph 0 10 20 30 40 50
April 25, 2018	1		SPT		Loose to medium dense brown **SILT (ML)** with low Plasticity	3	4	5	9	
	2		SPT		- loose to 1.50 m	4	5	9	14	
	3		SPT		- medium dense below 1.50 m	9	10	12	22	
	4		SPT		- with fine to medium Sand below 4.50 m	5	7	5	12	
	5		SPT		- very loose greyish brown below 5.50 m	3	6	9	15	
	6		SPT		**6.00 m**	4	2	1	3	
	7	-7.50 m (Rata - rata)	UD-1 SPT		Medium dense to dense greyish brown Silty fine to coarse **SAND** with Gravel **(SM)**, Gravels are Quartz, sub-angular to sub-rounded	7	10	12	22	
	8		SPT		- dark greyish brown, 6.30 to 7.00 m	21	13	14	27	
	9		SPT		- medium dense to 10.00 m	13	12	14	26	
	10		SPT		- reddish brownish grey, 7.45 to 8.45 m	4	4	7	11	
	11		SPT		- dense, 10.00 to 10.95 m	6	10	13	23	
April 26, 2018	12		SPT		- light brown, 10.95 to 11.55 m - medium dense below 10.95 m	6	19	21	40	
	13		SPT		- greyish below 13.00 m	5	11	16	27	
	14		SPT			17	10	14	24	
	15		SPT		**15.00 m**	19	13	17	30	
	16		SPT		Dense light brown Silty, Sandy well graded **GRAVEL (GM)**, Gravels are Quartz, sub-rounded	24	18	18	36	
			SPT		- very dense below 16.00 m **16.45 m**	24	15	15	30	
April 27, 2018	17		SPT		Dense light grey Silty, Gravelly fine to coarse **SAND (SM)** **17.45 m**	24	18	20	38	
	18		SPT		Dense to very dense light brown Silty fine to coarse **SAND** with Gravel **(SM)**, Gravels are Quartz & Phyllite - flacky and platy, sub-angular to sub-rounded	23	19	20	39	
	19		SPT			19	32	26	>50	
	20		SPT		- very dense brown to 18.50 m - dense below 18.50 m **20.50 m**	19	20	19	39	
						32	23	25	48	

BORING LOG

BH - 1

Depth : 30. m

Project	: Geotechnical Investigation at Improvement of the President Nicolau Lobato International Airport Project, Timor Leste	**Date Started**	:	April 25, 2018	
Location	: Dili, Airport	**Date Finished**	:	April 30, 2018	
Client	: JICA Study Team	**Sheet**	:	2/2 **Plate-3a**	
Boring Method	: Rotary Drilling	**Boring Machine**	:	Gemco Tractar	
Bor Master	: Mr. Zubair **Logged by :** Mr. Mohsin	**Checked by**	:	Mr. Syed Abbas	
	E : 777657.182 N = 9054214.726	**Elevation**	:	0.000 **GWL** : 6.40 m	

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1	N2	N3	N	N SPT Graph 0 10 20 30 40 50
						15	15	15		
	21				Medium dense to dense light brown Silty fine to coarse **SAND (SM), with CLAY Partings**	32	23	25	48	
			SPT			3	4	5	9	
	22				- loose to 22.00 m					
			SPT		- with Gravel, Gravels are Quartz & Phyllite - flacky and platy, sub-angular to sub-rounded 23.00 m	13	10	14	24	
	23					12	18	19	37	
			SPT							
	24				- dense below 22.00 m					
			SPT			10	12	14	26	
April 30, 2018	25									
			SPT		**25.50 m**	24	15	15	30	
	26				Medium dense dark gray **SILT** with fine Sand **(ML)** with low plasticity	5	3	8	11	
			SPT							
	27									
			SPT			2	4	8	12	
	28		UD-2							
	29				- fine to medium Sandy **SILT (ML)** below 28.75 m	3	5	7	12	
			SPT							
	30		SPT		**30.05 m**	23	27	33	>50	
	31									
	32									
	33									
	34									
	35									
	36									
	37									
	38									
	39									
	40									

BORING LOG

BH - 2

Depth : 20. m

Project	:	Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Date Started**	:	May 4, 2018
Location	:	Dili, Airport	**Date Finished**	:	May 7, 2018
Client	:	JICA Study Team	**Sheet**	:	1/1 **PLATE-4**
Boring Method	:	Rotary Drilling	**Boring Machine**	:	Gemco
Bor Master	:	M. Zubair **Logged by :** Mohsin	**Checked by**	:	Syed Abbas
		E : 777450.250 N = 9054126.991	**Elevation**	:	**GWL** : 5.50 m

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1 15	N2 15	N3 15	N	N SPT Graph 0 10 20 30 40 50
May 4, 2018	1	-5.10 m (Rata - rata)	SPT		Loose to medium dense brown **SILT (ML)** with low plasticity, with CLAY Partings	1	2	6	8	
					- loose to 1.55 m					
	2		SPT		- medium dense below 1.55 m	5	9	9	18	
					2.50 m					
	3		SPT		Medium dense brown Silty, Gravelly fine to coarse **SAND (SM),** Gravels are Quartz, Phyllite, sub-angular to sub-rounded	5	11	16	27	
	4		SPT			7	6	6	12	
					2.50 m					
	5		SPT		Medium dense greyish brown Silty, Sandy well graded **GRAVEL (GM),** Gravels are Quartz, Phyllite, sub-angular to sub-rounded	6	7	12	19	
	6		SPT		- loose below 6.05 m	22	14	12	26	
	7		SPT		**2.50 m**	6	5	5	10	
			SPT		Loose to medium dense brownish grey **SILT** with Sand **(ML)** with low plasticity	5	3	2	5	
	8		SPT		- loose Gravelly with Sand to 7.50 m	7	7	8	15	
	9		UD-1		- medium dense below 7.50 m					
	10		SPT			10	10	11	21	
	11		SPT		- yellowish brownish grey with little Sand below 9.10 m	4	5	6	11	
					11.50 m					
May 6, 2018	12		SPT		Medium dense to dense brownish grey Silty fine to coarse **SAND** with Gravel **(SM),** Gravels are Quartz, Phyllite, sub-angular to sub-rounded	8	8	8	16	
	13		SPT		- medium dense to 13.60 m	7	10	12	22	
	14		SPT		- dense below 13.60 m	12	20	18	38	
	15		SPT			16	18	21	39	
	16		SPT			17	18	18	36	
					16.60 m					
May 7, 2018	17		SPT		Dense brown Silty well graded **GRAVEL** with Sand **(GM),** Gravels are Quartz, Phyllite- flaky & platy, sub-angular to sub-rounded **18.00 m**	13	21	27	48	
	18		SPT			13	23	23	46	
	19		SPT		Dense brown grey Silty well graded **GRAVEL** with Sand **(GM),** Gravels are Quartz, Phyllite- flaky & platy, sub-angular to sub-rounded	17	18	16	34	
	20		SPT		- brown below 19.05 m	17	15	16	31	
					20.00 m					

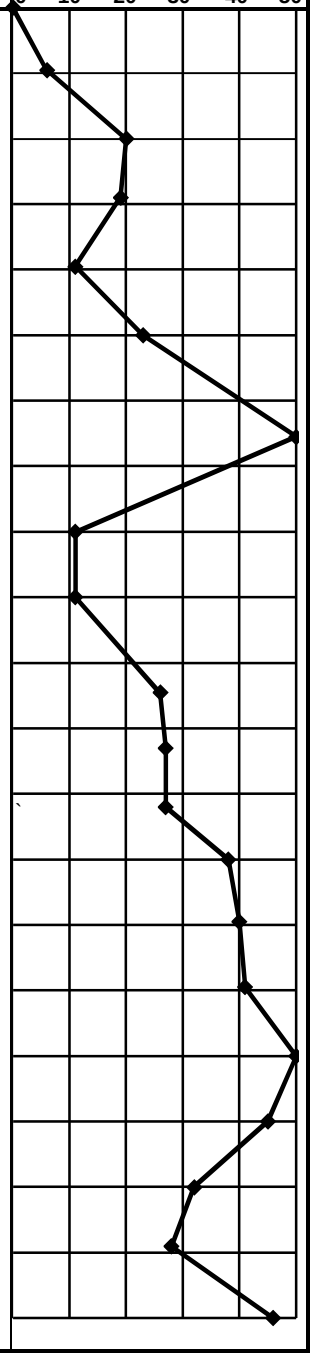
BORING LOG

BH - 3

Depth : 20. m

Project	:	Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Date Started**	:	May 2, 2018
Location	:	Dili, Airport	**Date Finished**	:	May 4, 2018
Client	:	JICA Study Team	**Sheet**	:	1/1 **PLATE-5**
Boring Method	:	Rotary Drilling	**Boring Machine**	:	Gemco Tractor
Bor Master	:	M. Zubair **Logged by :** Mohsin	**Checked by**	:	Syed Abbas
		E : 778003.197 N = 9053884.822	**Elevation**	:	**GWL** : 5.30 m

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1 15	N2 15	N3 15	N
May 2, 2018	1		SPT		Firm to very stiff brown **Silty CLAY** with fine Sand (ML-CL) with low plasticity, with CLAY Partings	2	3	3	6
					- firm to 1.55 m				
	2		SPT		- very stiff below 1.55 m	4	8	12	20
					2.45 m				
	3		SPT		Medium dense brown Silty, Gravelly fine to coarse **SAND (SM),** Gravels are Phyllie- flaky & platy, sub-angular to sub-rounded	14	10	9	19
	4		SPT			23	3	8	11
	5		SPT		- greyish brown below 4.55 m	13	12	11	23
	6	-5.10 m (Rata - rata)			**2.45 m**				
	7		SPT		Medium dense brownish grey **SILT** with little Sand & Gravel **(ML)** with low plasticity	52			>50
	8		SPT		- very dense Gravelly with Sand to 6.55 m	6	4	7	11
	9		SPT		- fine to coarse Sandy, 8.60 to 10.85 m	4	4	7	11
			UD-1						
	10		SPT		- brown below 9.65 m	10	10	16	26
	11				**10.85 m**				
May 3, 2018			SPT		Medium dense to dense brown grey Silty fine to coarse **SAND** with Gravel **(SM),** Gravels are Quartz, Phyllie- flaky & platy, sub-angular to sub-rounded	10	13	14	27
	12		SPT			11	11	16	27
	13		SPT			15	19	19	38
					- Gravelly to 11.30 m				
	14		SPT		- medium dense to 12.55 m - dense, 12.55 to 18.00 m	11	20	20	40
	15		SPT		- Gravelly, 14.50 to 16.95 m	25	23	18	41
	16		SPT			19	24	26	50
May 4, 2018	17		SPT			21	23	22	45
					- medium dense, 18.00 to 18.90 m				
	18		SPT			14	17	15	32
	19		SPT		- very dense brown Gravelly below 18.90 m	13	14	14	28
	20		SPT		**20.05 m**	12	20	26	46



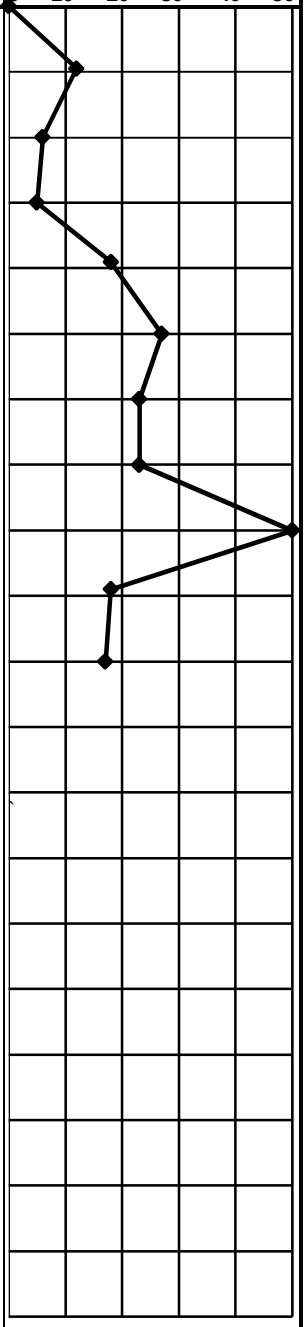
BORING LOG

BH - 4

Depth : 10. m

Project	:	Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Date Started**	:	May 13, 2018
Location	:	Dili, Airport	**Date Finished**	:	May 13, 2018
Client	:	JICA Study Team	**Sheet**	:	1/1 **PLATE-6**
Boring Method	:	Rotary Drilling	**Boring Machine**	:	Gemco
Bor Master	:	M. Zubair **Logged by :** Mohsin	**Checked by**	:	Syed Abbas
		E : 777779.283 N = 9053835.273	**Elevation**	:	**GWL** : DRY m

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1 15	N2 15	N3 15	N
May 13, 2018	1	DRY	SPT		Loose to medium dense brown **SILT** with fine Sand **(ML),** low plasticity, with CLAY Partings	4	7	5	12
	2		SPT		- medium dense to 0.90 m - loose below 0.90 m	2	3	3	6
	3		SPT		**3.50 m**	2	2	3	5
	4		SPT		Medium dense brownish grey Silty fine to coarse **SAND** with Gravel **(SM)**, Gravels are Quartz & Phyllite - flaky and platy, sub-angular to sub-rounded	13	8	10	18
	5		SPT			19	14	13	27
	6		SPT			10	11	12	23
	7		SPT			9	12	11	23
	8		SPT		Very dense greyish brown Sandy **SILT** with Gravel **(ML)**, low plasticity **8.00 m**	28	28	26	>50
	9		SPT		Medium dense brownish grey Silty fine to coarse **SAND** with Gravel **(SM)**, Gravels are Quartz & Phyllite - flaky and platy, sub-angular to sub-rounded	12	10	8	18
	10		SPT		**10.00 m**	7	9	8	17
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								
	20								



BORING LOG

BH - 5

Depth : 20. m

Project	:	Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Date Started**	:	May 8, 2018	
Location	:	Dili, Airport	**Date Finished**	:	May 10, 2018	
Client	:	JICA Study Team	**Sheet**	:	1/1 **PLATE-7**	
Boring Method	:	Rotary Drilling	**Boring Machine**	:	Gemco Tractor	
Bor Master	:	M. Zubair **Logged by :** Mohsin	**Checked by**	:	Syed Abbas	
		E : 778025.704 N = 9053980.208	**Elevation**	:	**GWL** : 4.60 m	

DATE	DEPTH (m)	GWL	UDS/SPT	SYMBOL	SOIL DESCRIPTION	STANDARD PENETRATION TEST N1 15	N2 15	N3 15	N	N SPT Graph 0 10 20 30 40 50
May 8, 2018	1		SPT		Very loose to loose brown **SILT** with Sand **(ML)** with low plasticity	3	2	3	5	
	2		SPT		- loose light brown **SILT (ML)** to 0.95 m	1	2	1	3	
	3		SPT		- very loose, 0.95 to 5.15 m	5	2	2	4	
	4		SPT			1	2	1	3	
			UD-1							
	5	-4.70 m (Rata - rata)								
			SPT		- loose below 5.15 m	1	2	4	6	
	6									
			SPT			3	2	4	6	
	7									
			SPT			1	2	3	5	
	8									
			SPT		- Sandy **SILT (ML)** below 8.05 m	2	3	4	7	
	9				**9.05 m**					
			SPT		Medium dense brownish grey Silty fine to coarse **SAND** with Gravel **(SM),** Gravels are sub-angular to sub-rounded **10.50 m**	8	10	7	17	
	10									
	11		SPT		Medium dense brownish grey Silty, Gravelly fine to coarse **SAND (SM)**, Gravels are Quartz, Phyllite - flaky & platy, sub-angular to sub-rounded **12.45 m**	15	15	15	30	
			SPT			16	18	12	30	
	12									
			SPT			17	10	11	21	
	13									
			SPT		Medium dense to dense brownish grey Silty fine to coarse **SAND** with Gravel **(SM)**, Gravels are Quartz, Phyllite - flaky & platy, sub-angular to sub-rounded	14	20	18	38	
	14									
			SPT			27	30	24	>50	
	15									
			SPT		- dense to 16.20 m	35	43	16	>50	
	16									
			SPT		- medium dense below 16.20 m	33	26	18	44	
	17									
			SPT		- light brown, 15.25 to 16.20 m	15	14	14	28	
	18		SPT			5	12	14	26	
					- greyish brown Silty fine to coarse **SAND** with little Gravel **(SM)** below 18.05 m					
	19		SPT			9	12	18	30	
	20		SPT		**20.05 m**	6	5	15	20	

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 1
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 28-04-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5	UD-1(0.50-0.90m) Sample-1	Brownish grey **SILT** with fine Sand **(ML)** with low plasticity with CLAY Partings		72.0	4.7	SG = 2.31	LL=30.3 PL=29.3 PI=1.0 ML
1.0	UD-2(1.00-1.40m)						
1.5		1.50 m					
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 1a (PLT)
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 2-05-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5	UD-1(0.50-0.90m)	Brownish light black Lean CLAY with fine Sand (CL) with Low plasticity					
	Sample-1			75.0	5.2	SG = 2.28	LL=30.0 PL=22.3 PI=7.7 CL
1.0	UD-1(0.90-1.50m)						
1.5		1.50 m					
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 2
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 28-04-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5	UD-1(0.50-0.90m)	Brownish grey fine Sandy **Lean CLAY (CL)** with Low plasticity					
	Sample-1			65.3	2,1	SG = 2.39	LL=29.8 PL=22.2 PI=7.6 CL
1.0	UD-2(1.00-1.40m)						
1.5		1.50 m					
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 2a (PLT)
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 3-05-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5	UD-1(0.50-0.90m) Sample-1	Greyish light brown **SILT (ML)** with Low plasticity, CLAY Partings		96.3	8.1	SG = 2.17	LL=49.4 PL=38.1 PI=11.0 ML
1.0		1.00 m					
	UD-2(0.90-1.40m)	Brownish grey **SILT (ML)** with Low plasticity					
1.5		1.50 m					
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client:Oriental Consultants Global Co., ltd.,	**TEST PIT LOG: TP** # 3
Location: GEOTECHNICAL INVESTIGATION AT IMPROVEMENT OF PRESIDENTE NICOLAU LOBATO INTERNATIONAL AIRPORT PROJECT, TIMOR LESTE	**DATE OF EXCAVATION TP:** 30-04-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION		SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
			Yellowish grey Silty, Sandy well graded **GRAVEL (GM)** Gravels are Quartz, sub-angular to sub-rounded					
0.5								
		UD-1(0.30-0.90m)	Yellowish grey **SILT** with fine Sand **(ML)** with Low plasticity, CLAY Partings		80.9	1.8	SG = 2.27	LL=29.0 PL=23.0 PI=6.0 ML
1.0								
		UD-2(1.00-1.40m)						
1.5			1.50 m					
2.0								

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP-** 03A (PLT)
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 05.05-2018
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** -

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
0.5	Sample-1	Dark brown **SILT (ML)** with Low plasticity CLAY Partings		92.0	1.5	SG = 2.15	LL=41.2 PL=32.0 PI=9.2 ML
1.0							
1.30 m							
1.5	Sample-2	Greyish brown Silty, Sandy well graded **GRAVEL** with Sand **(GM)** Gravels are Quartz, sub-angular to sub-rounded		26.3	4.6	SG = 2.68	
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 4
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 28-04-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION	SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
		Greyish yellow **SILT** with Gravel **(ML)** with Low plasticity					
0.5		0.50 m					
	UD-1(0.50-0.90m) Sample-1	Greyish yellow **SILT** with fine Sand **(ML)** with Low plasticity, CLAY Partings		83.2	9.5	SG = 2.31	LL=28.9 PL=23.9 PI=5.0 ML
1.0		1.00 m					
	UD-2(1.00-1.40m)	Greyish yellow fine Sandy **SILT (ML)** with Low plasticity					
1.5		1.50 m					
2.0							

RMS Engineering & Construction Unipessoal Lda

Report No. GET 18-8002

TEST PIT LOG

Client: JICA STUDY TEAM	**TEST PIT LOG: TP** # 5
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**DATE OF EXCAVATION TP:** 27-04-18
SIZE: 1.0X2.0X1.5 m	**SHEET: 1 OF 1**
SAMPLING METHOD: Hand Excavation	**WATER DEPTH :** - Dry

DEPTH (m)	SAMPLES	DESCRIPTION		SYMBOL	-0.075 (%)	Natural Moisture Content (%)	FDT% (MDD) (g/cc) {OMC}	Liquid Limit [Plastic Limit]
			Greyish light brown **SILT** with fine Sand and Gravel **(ML)** with Low plasticity					
0.5			0.50 m					
		UD-1(0.50-0.90m)	Greyish light brown **SILT (ML)** with Low plasticity, CLAY Partings		**95.1**	**12.3**	**SG = 2.30**	**LL=43.9 PL+35.0 PI=8.9 ML**
		Sample-1						
1.0			1.00 m					
		UD-2(1.00-1.40m)	Greyish yellow **SILT** with fine Sand **(ML)** with Low plasticity					
1.5			1.50 m					
2.0								

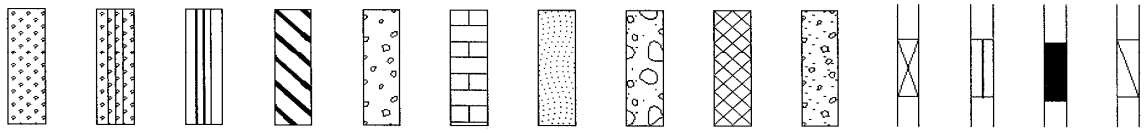
RMS ENGINEERING AND CONSTRUCTION

Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

SYMBOLS AND TERMS USED ON BORING LOGS

SOIL AND ROCK TYPES
(SHOWN IN SYMBOL COLUMN)



Predominant type shown heavy

SAMPLER TYPES
(SHOWN IN SAMPLES COLUMN)

TERMS DESCRIBING DENSITY CONDITION FOR CONSISTENCY

The condition of coarse grained soils may be obtained by performing sampler penetration tests or cone penetrometer tests. Approximate correlation between these tests and the density condition are given below:

DENSITY CONDITION	SPT VALUES, N	CONE TIP RESISTANCE, MPa
Very loose	< 4	< 2
Loose	4 to 10	2 to 4
Medium dense	10 to 30	4 to 12
Dense	30 to 50	12 to 20
Very dense	> 50	20

Density versus SPT value relationship is after Terzaghi and Peck, 1968. See Lacroix and Horn, 1973 if non-standard samplers are used. Density versus cone tip resistance relationship given above, after Meyerhof 1965; is a function of depth also; see Schmertmann, 1978.

The consistencies of cohesive soils may be obtained by performing undrained shear strength tests. Degrees of consistency are given below:

CONSISTENCY	UNDRAINED SHEAR STRENGTH, kPa
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200

TERMS CHARACTERIZING SOIL STRUCTURE

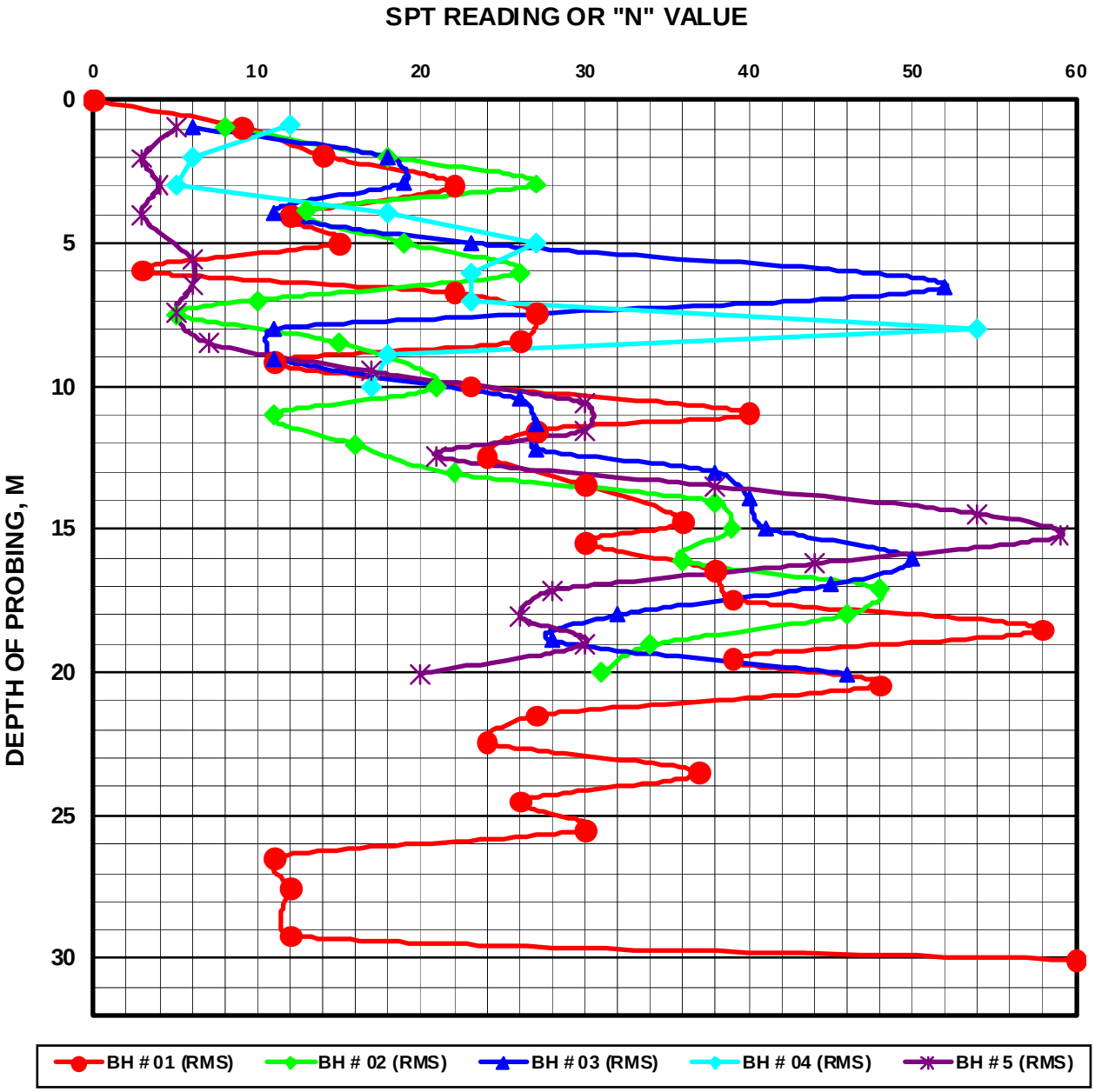
Parting	- horizontal inclusion of different soil type less than 3-mm thick
Seam	- horizontal inclusion of different soil type 3 to 75-mm thick
Layer	- horizontal inclusion of different soil type greater than 75-mm thick
Pocket	- inclusion of different soil type that is smaller than the diameter of the soil sample
Fissured	- containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical
Interbedded	- composed of alternate layers of different soil types
Silty	- containing 12 to 50 percent silt size particles
Calcareous	- containing 12 to 50 percent carbonates
Carbonate	- containing more than 50 percent carbonates

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with ASTM D 2487-90 and D 2488-90

RMS ENGINEERING AND CONSTRUCTION

STANDARD PENETRATION TEST SUMMARY READING

CLIENT:	**JICA Study Team**	TEST REPORT NO:	**PLT # 3A**
PROJECT:	**Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste**	DATE OF REPORT:	**(refer to submission letter)**
PROJECT REF. NO:	**Not Applicable**	DATE RECEIVED:	
LOCATION:	**Presidente Nicolau Lobato International Airport Project, Timor Leste**	DATE TEST STARTED:	**25-04-2018**
IDENTIFICATION:	**Boreholes 1, 2, 3, 4 & 5**	DATE TEST FINSHED:	**13-05-2018**
ACTIVITY PERIOD:	**25 April to 13 May 2018**	TEST PERFORMED BY:	
SUPERVISED BY:		TEST METHOD:	**ASTM D1194**



Remarks:
SPT procedure to ASTM D-1586: Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.
All N-Values are raw SPTs taken every meter of progressive depth using rotary drilling with mud circulation procedure.

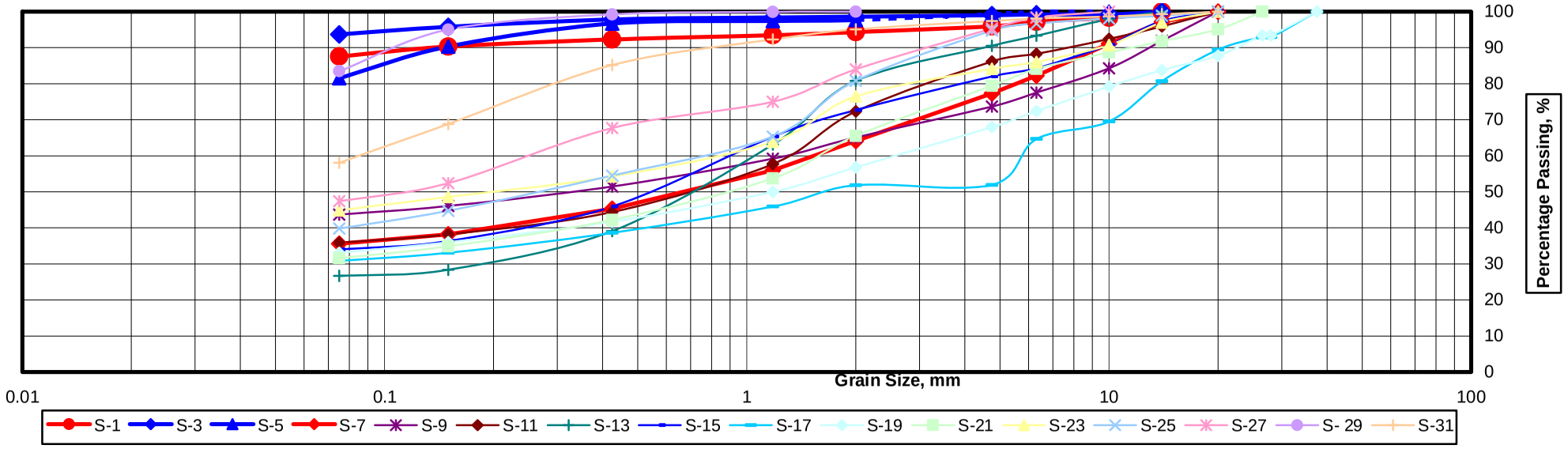
RMS ENGINEERING AND CONSTRUCTION

Client: JICA STUDY TEAM
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-1

Sieve Size, mm	BH # 01 S-1	BH # 01 S-3	BH # 01 S-5	BH # 01 S-7	BH # 01 S-9	BH # 01 S-11	BH # 01 S-13	BH # 01 S-15	BH # 01 S-17	BH # 01 S-19	BH # 01 S-21	BH # 01 S-23	BH # 01 S-25	BH # 01 S-27	BH # 01 S-29	BH # 01 S-31	Remarks
37.5									100.0	100.0							
28									92.9	93.4							
26.5									92.9	93.4	100.0						
20				100.0	100.0	100.0		100.0	89.5	87.8	95.1	100.0	100.0			100.0	
14	100.0	100.0		97.2	91.9	95.9	100.0	97.4	80.7	83.8	91.8	97.0	98.9			99.3	
10	98.3	99.2	100.0	91.1	84.3	92.4	97.9	90.8	69.5	79.2	88.7	90.7	98.1	100.0		98.7	
6.3	97.2	99.2	99.8	82.2	77.5	88.3	93.3	84.3	64.7	72.4	84.1	86.0	96.7	98.4		98.1	
4.75	95.9	99.0	99.2	77.3	73.7	86.2	90.5	82.0	51.9	68.0	79.4	84.1	94.7	95.3		97.4	
2	94.3	98.6	97.7	64.1	65.1	72.3	80.8	72.7	51.8	56.8	65.5	76.5	80.8	84.0	100.0	95.1	
1.18	93.5	98.4	97.4	56.0	59.2	57.7	63.1	65.3	45.9	50.0	53.7	63.9	65.3	75.0	99.9	92.3	
0.425	92.3	97.8	96.7	45.3	51.5	44.4	39.1	45.9	38.6	41.7	42.2	54.3	54.5	67.7	99.2	85.2	
0.15	90.3	95.8	90.3	38.2	46.1	38.2	28.4	36.4	33.1	36.0	34.9	48.6	44.7	52.4	95.0	68.8	
0.075	87.6	93.7	81.5	35.6	43.7	35.9	26.7	34.0	30.8	33.1	31.6	44.9	39.8	47.4	83.5	58.1	

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



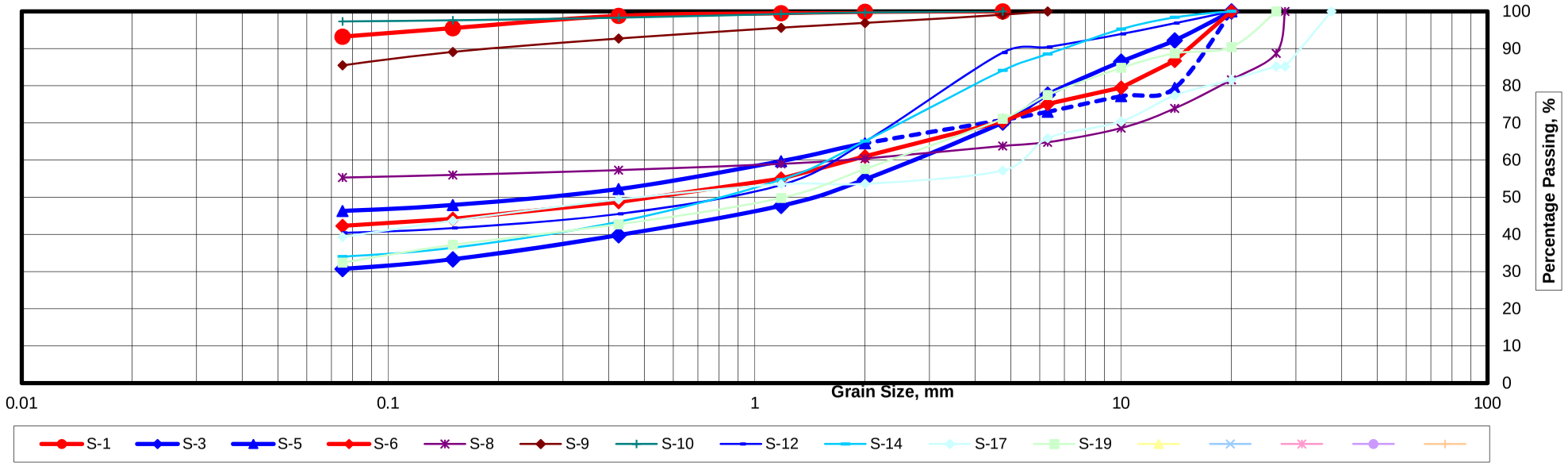
RMS ENGINEERING AND CONSTRUCTION

Client: JICA STUDY TEAM
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-2

Sieve Size, mm	BH # 02 S-1	BH # 02 S-3	BH # 02 S-5	BH # 02 S-6	BH # 02 S-8	BH # 02 S-9	BH # 02 S-10	BH # 02 S-12	BH # 02 S-14	BH # 02 S-17	BH # 02 S-19	Remarks
37.5										100.0		
28					100.0					85.2		
26.5					88.7					85.2	100.0	
20		100.0	100.0	100.0	81.6			100.0	100.0	81.6	90.4	
14		92.2	79.4	86.7	73.9			96.8	98.4	77.4	88.7	
10		86.5	77.2	79.5	68.6			93.9	95.2	70.4	84.8	
6.3		77.6	73.0	75.1	64.8	100.0		90.4	88.5	65.9	77.5	
4.75	100.0	70.1	70.8	70.4	63.8	99.1	100.0	88.9	84.1	57.2	71.1	
2	99.9	54.8	64.5	61.0	60.4	96.9	99.7	64.9	65.1	53.6	57.6	
1.18	99.5	47.7	59.7	55.0	59.0	95.6	99.3	53.3	54.7	53.5	49.8	
0.425	98.8	39.8	52.2	48.7	57.3	92.7	98.3	45.5	43.4	49.4	42.7	
0.15	95.5	33.3	47.9	44.2	56.0	89.1	97.6	41.7	36.4	43.7	37.2	
0.075	93.2	30.7	46.3	42.3	55.3	85.5	97.3	40.4	34.0	39.3	32.4	

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



RMS ENGINEERING AND CONSTRUCTION

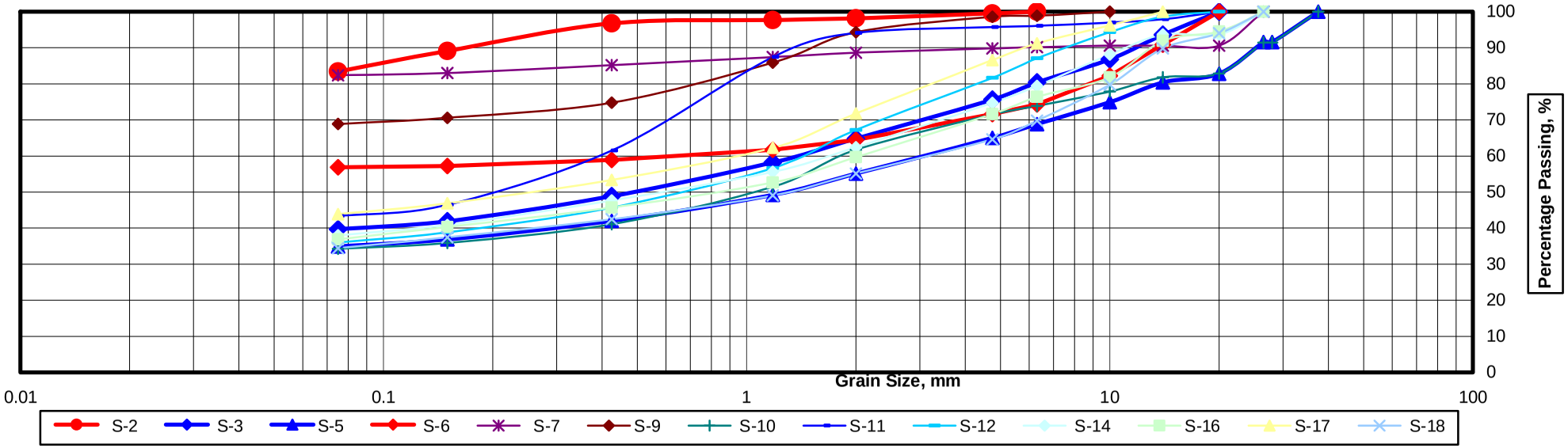
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-3

Sieve Size, mm	BH # 03 S-2	BH # 03 S-3	BH # 03 S-5	BH # 03 S-6	BH # 03 S-7	BH # 03 S-9	BH # 03 S-10	BH # 03 S-11	BH # 03 S-12	BH # 03 S-14	BH # 03 S-16	BH # 03 S-17	BH # 03 S-18	Remarks
37.5			100.0				100.0							
28			91.6				91.4							
26.5			91.6		100.0		91.4			100.0	100.0		100.0	
20		100.0	82.8	100.0	90.6		82.9	100.0	100.0	93.7	94.5		94.0	
14		93.6	80.4	90.9	90.6		81.8	97.9	98.6	93.7	91.9	100.0	89.8	
10		86.8	74.9	82.2	90.6	100.0	77.9	97.0	94.3	88.1	81.8	96.2	79.8	
6.3	100.0	80.4	68.8	74.3	90.2	98.9	73.9	96.1	87.1	79.4	76.4	91.2	69.8	
4.75	99.5	75.6	65.0	71.6	89.8	98.6	71.5	95.7	81.7	74.7	71.6	86.6	64.6	
2	98.2	64.8	55.1	64.5	88.6	94.3	61.7	94.1	67.2	62.4	59.7	71.8	55.1	
1.18	97.7	58.2	49.2	61.7	87.4	85.9	51.5	87.4	56.7	55.6	52.7	62.3	49.1	
0.425	96.8	48.9	42.0	58.9	85.2	74.8	41.1	61.5	45.7	47.7	45.7	53.4	42.5	
0.15	89.1	41.9	36.9	57.2	83.0	70.6	35.9	46.5	38.8	40.9	40.3	46.9	37.4	
0.075	83.4	39.7	34.9	56.9	82.4	68.9	34.3	43.3	36.0	38.0	36.9	43.9	34.4	

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



RMS ENGINEERING AND CONSTRUCTION

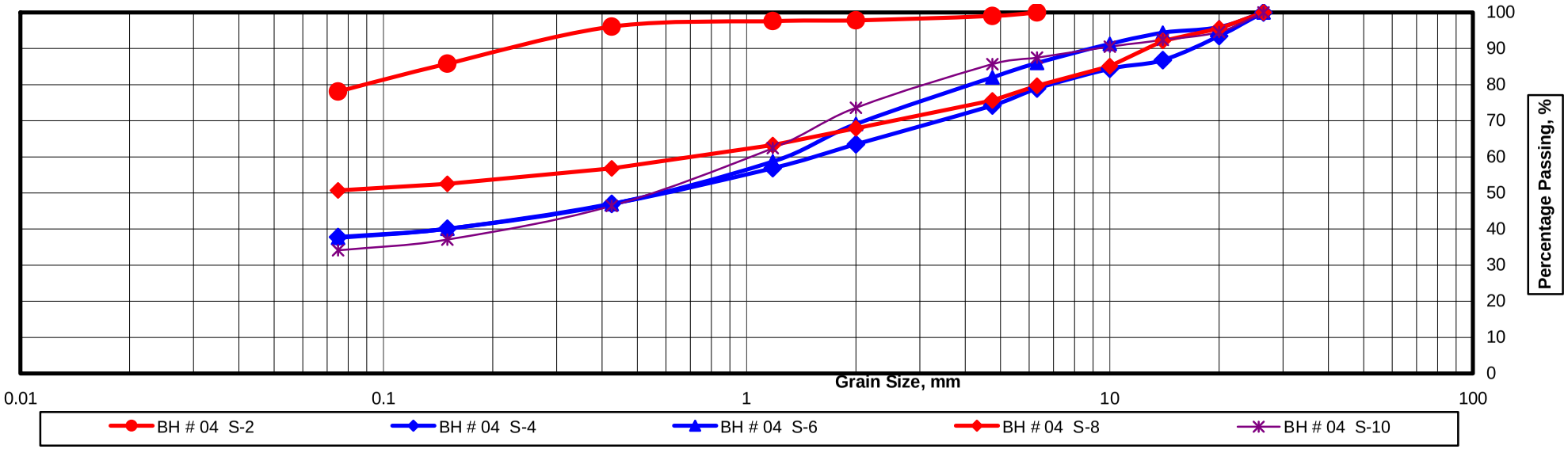
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-4

Sieve Size, mm	BH # 04 S-2	BH # 04 S-4	BH # 04 S-6	BH # 04 S-8	BH # 04 S-10	Remarks
37.5						
28						
26.5		100.0	100.0	100.0	100.0	
20		93.5	95.9	95.6	94.6	
14		86.8	94.4	92.1	92.4	
10		84.4	91.3	85.1	90.5	
6.3	100.0	78.9	86.0	79.7	87.5	
4.75	99.0	74.2	82.0	75.6	85.7	
2	97.8	63.5	69.1	67.9	73.6	
1.18	97.6	56.9	58.7	63.3	62.4	
0.425	96.1	47.0	46.9	56.8	46.4	
0.15	85.8	40.1	40.1	52.5	37.1	
0.075	78.1	37.8	37.6	50.7	34.1	

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



RMS ENGINEERING AND CONSTRUCTION

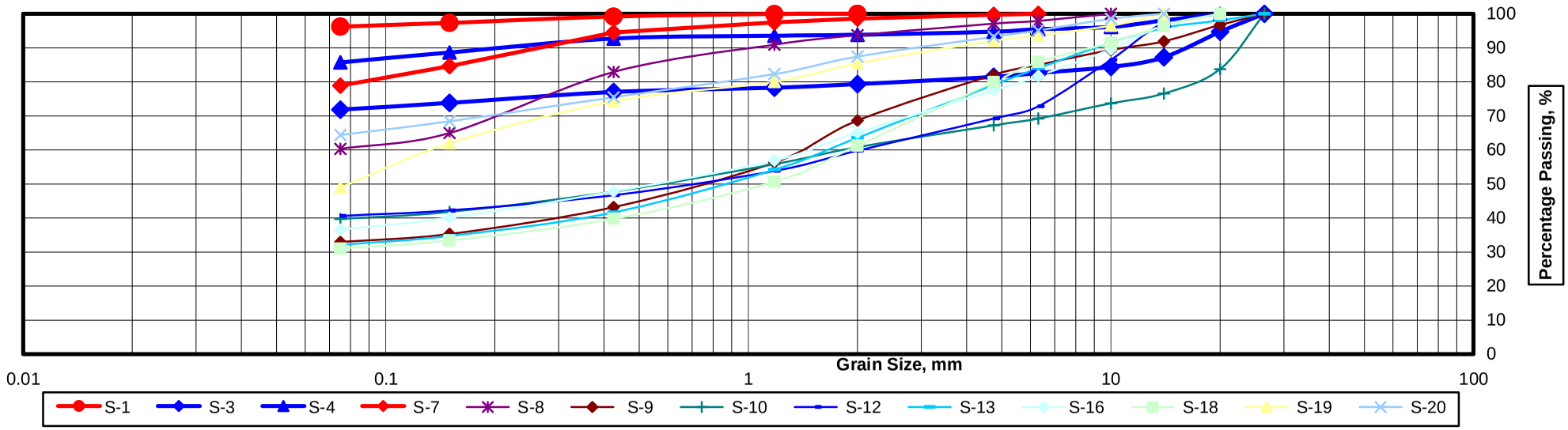
Client: JICA STUDY TEAM

Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, BOREHOLE-5

Sieve Size, mm	BH # 05 S-1	BH # 05 S-3	BH # 05 S-4	BH # 05 S-7	BH # 05 S-8	BH # 05 S-9	BH # 05 S-10	BH # 05 S-12	BH # 05 S-13	BH # 05 S-16	BH # 05 S-18	BH # 05 S-19	BH # 05 S-20	Remarks
37.5														
28														
26.5		100.0				100.0	100.0		100.0					
20		94.7	100.0			96.7	83.7	100.0	98.1	100.0	100.0			
14		87.2	98.1			91.9	76.6	97.3	95.8	96.6	96.4	100.0	100.0	
10		84.4	96.1		100.0	89.4	73.7	86.5	91.5	89.6	91.5	96.5	98.5	
6.3		82.6	95.5	100.0	97.9	85.0	69.2	72.8	84.0	81.7	85.9	93.6	95.1	
4.75		81.5	94.7	99.7	97.1	82.1	67.2	69.2	79.1	77.5	79.9	92.1	93.2	
2	100.0	79.3	93.8	98.6	93.7	68.6	60.8	59.8	63.6	65.1	61.3	85.4	87.4	
1.18	99.9	78.3	93.5	97.5	90.9	56.3	55.8	53.8	54.2	56.9	50.6	80.0	82.3	
0.425	99.2	77.0	92.7	94.5	82.9	43.2	47.7	46.7	41.6	47.8	39.8	74.3	75.5	
0.15	97.3	73.8	88.6	84.6	65.0	35.3	41.8	42.2	34.7	40.1	33.4	61.9	68.4	
0.075	96.2	71.8	85.7	78.9	60.3	32.9	39.7	40.6	32.1	36.6	31.0	48.9	64.4	

GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



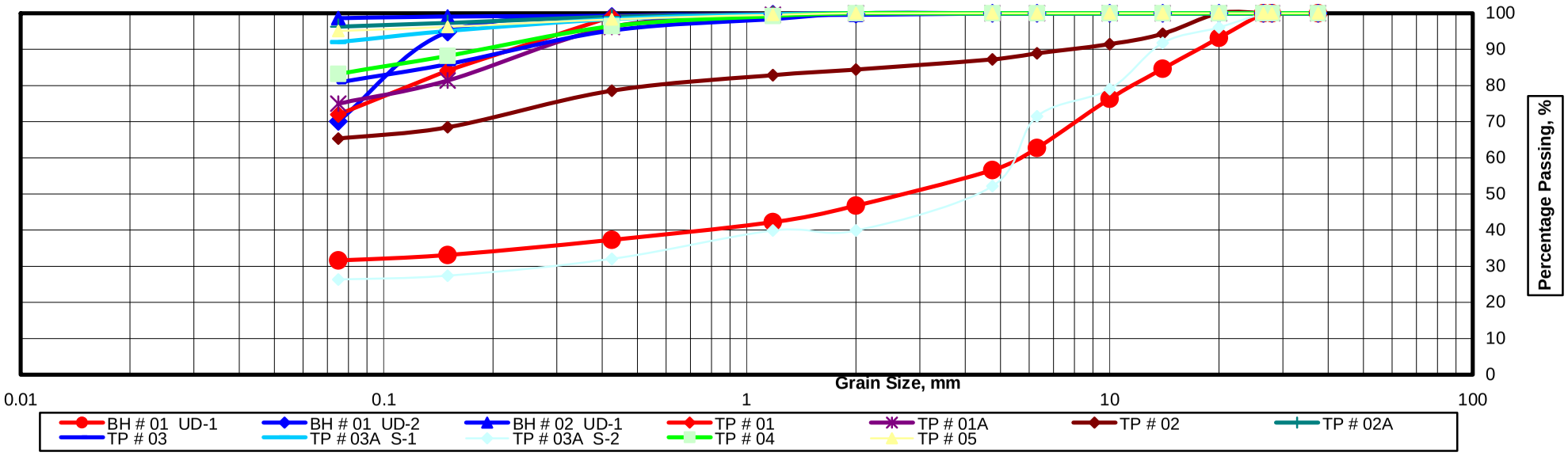
RMS ENGINEERING AND CONSTRUCTION

Client: JICA STUDY TEAM
Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

GRAIN SIZE ANALYSIS PLOT SUMMARY, Test-Pit and Borehole UD

Sieve Size, mm	BH # 01 UD-1	BH # 01 UD-2	BH # 02 UD-1	TP # 01	TP # 01A	TP # 02	TP # 02A	TP # 03	TP # 03A S-1	TP # 03A S-2	TP # 04	TP # 05		Remarks
37.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
28	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
26.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
20	93.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.1	100.0	100.0		
14	84.6	100.0	100.0	100.0	100.0	94.3	100.0	100.0	100.0	91.8	100.0	100.0		
10	76.3	100.0	100.0	100.0	100.0	91.4	100.0	100.0	100.0	79.0	100.0	100.0		
6.3	62.7	100.0	100.0	100.0	100.0	88.9	100.0	100.0	100.0	71.5	100.0	100.0		
4.75	56.6	100.0	99.9	100.0	100.0	87.2	100.0	100.0	100.0	52.2	100.0	100.0		
2	46.8	99.8	99.6	100.0	100.0	84.4	100.0	100.0	100.0	39.9	100.0	100.0		
1.18	42.2	99.7	99.5	99.8	99.6	82.9	99.7	98.4	99.7	39.9	99.2	99.6		
0.425	37.3	99.1	99.3	99.1	96.2	78.6	99.0	95.2	98.4	32.0	96.4	98.3		
0.15	33.1	94.8	99.1	84.1	81.4	68.5	97.3	85.9	95.1	27.4	88.2	96.2		
0.075	31.6	70.1	98.7	72.0	75.0	65.3	96.3	80.9	92.0	26.3	83.2	95.1		

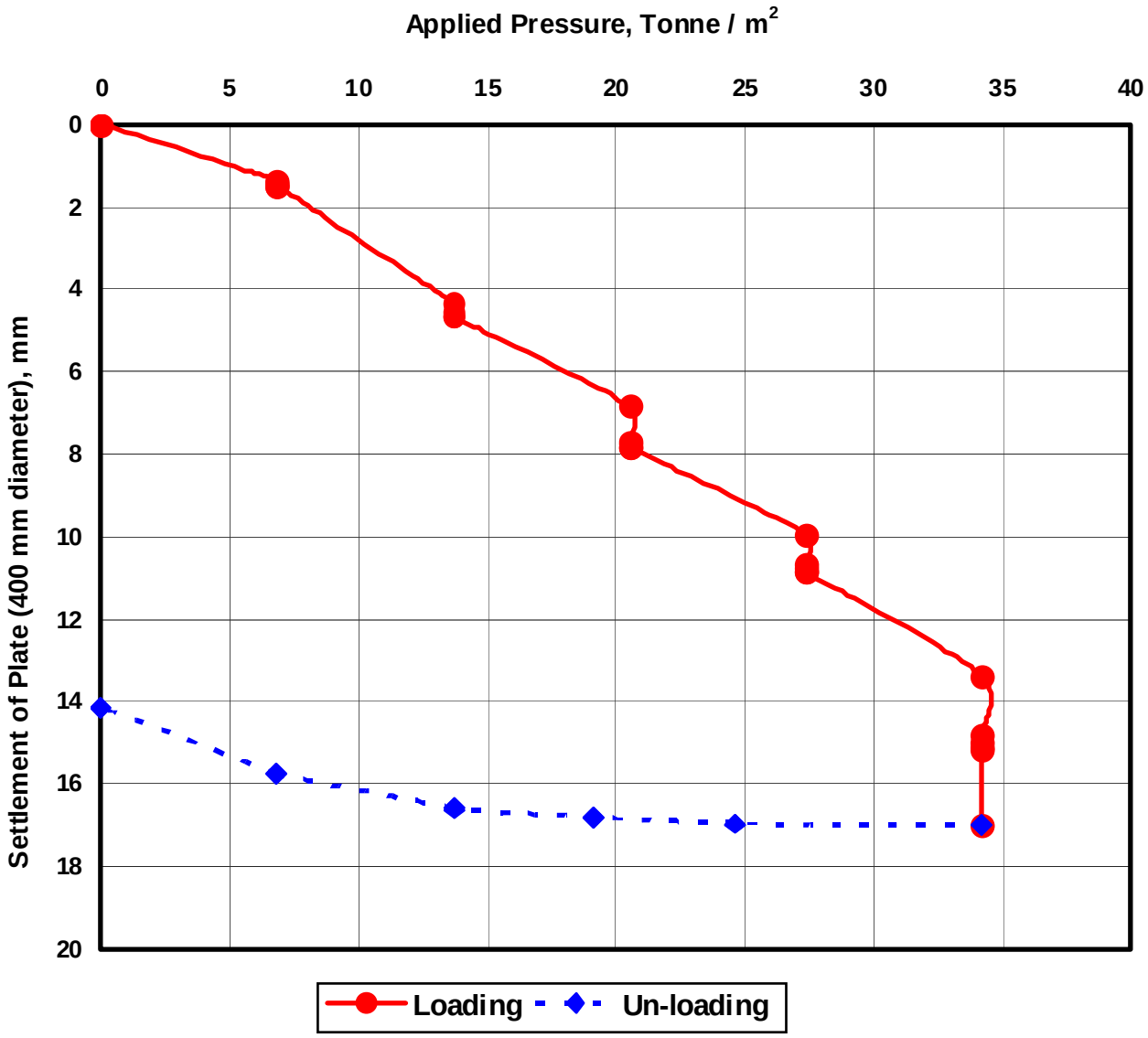
GRAPHICAL PLOT OF GRAIN SIZE DISTRIBUTION



RMS ENGINEERING AND CONSTRUCTION

PLATE LOAD TEST

CLIENT:	**JICA STUDY TEAM**	TEST REPORT NO:	**PLT # 1A**
PROJECT:	**Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste**	DATE OF REPORT:	**(refer to submission letter)**
PROJECT REF. NO:		DATE RECEIVED:	
LOCATION:	**Presidente Nicolau Lobato International Airport Project, Timor Leste**	DATE TEST STARTED:	**03-05-2018**
IDENTIFICATION:	**Plate Load Test**	DATE TEST FINSHED:	**03-05-2018**
ACTIVITY PERIOD:	**03-05-2018**	TEST PERFORMED BY:	
SUPERVISED BY:		TEST METHOD:	**ASTM D1194**



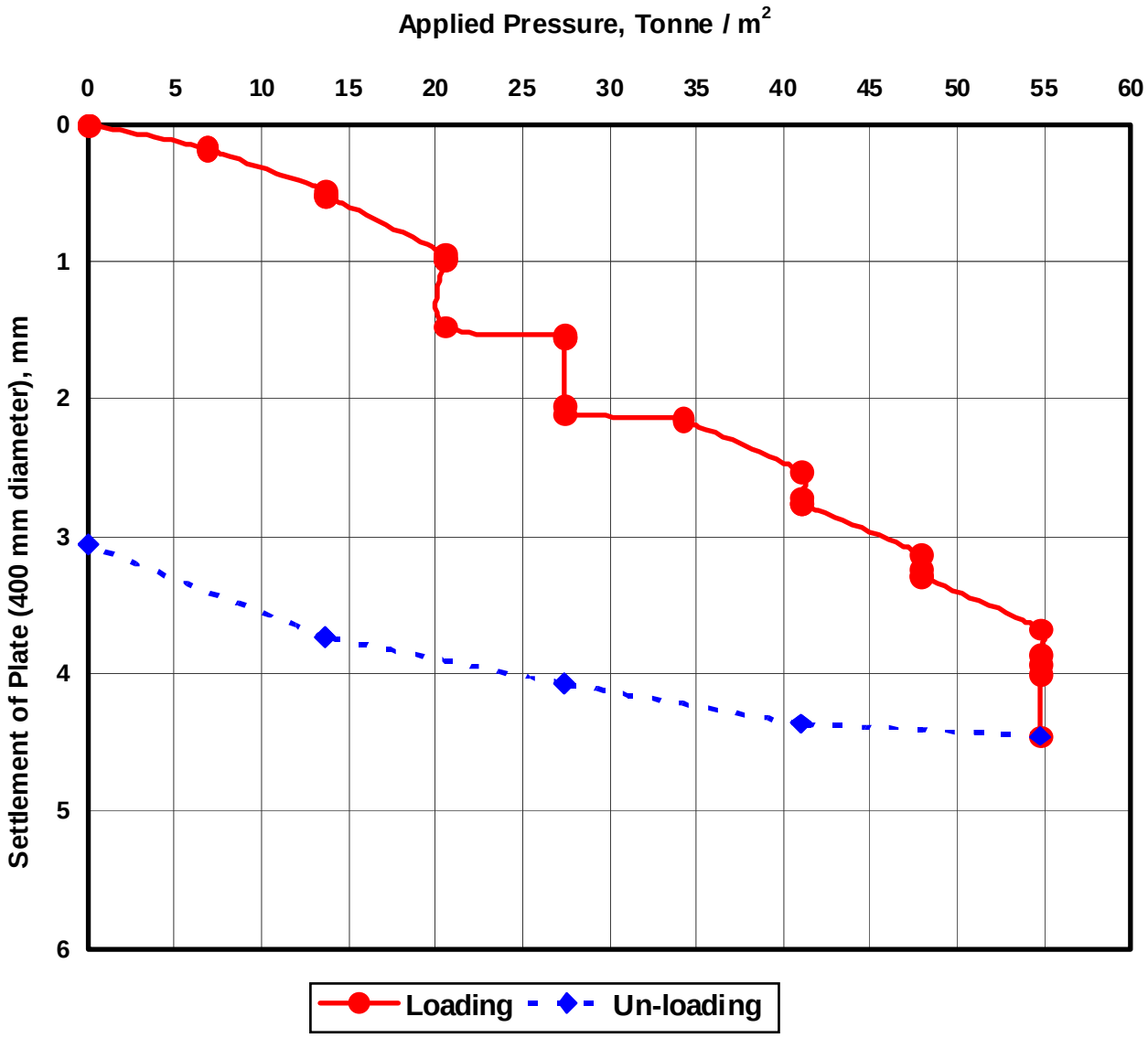
Note:

1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.

RMS ENGINEERING AND CONSTRUCTION

PLATE LOAD TEST

CLIENT:	**JICA Study Team**	TEST REPORT NO:	**PLT # 2A**
PROJECT:	**Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste**	DATE OF REPORT:	**(refer to submission letter)**
PROJECT REF. NO:		DATE RECEIVED:	
LOCATION:	**Presidente Nicolau Lobato International Airport Project, Timor Leste**	DATE TEST STARTED:	**03-05-2018**
IDENTIFICATION:	**Plate Load Test**	DATE TEST FINSHED:	**03-05-2018**
ACTIVITY PERIOD:	**03-05-2018**	TEST PERFORMED BY:	
SUPERVISED BY:		TEST METHOD:	**ASTM D1194**



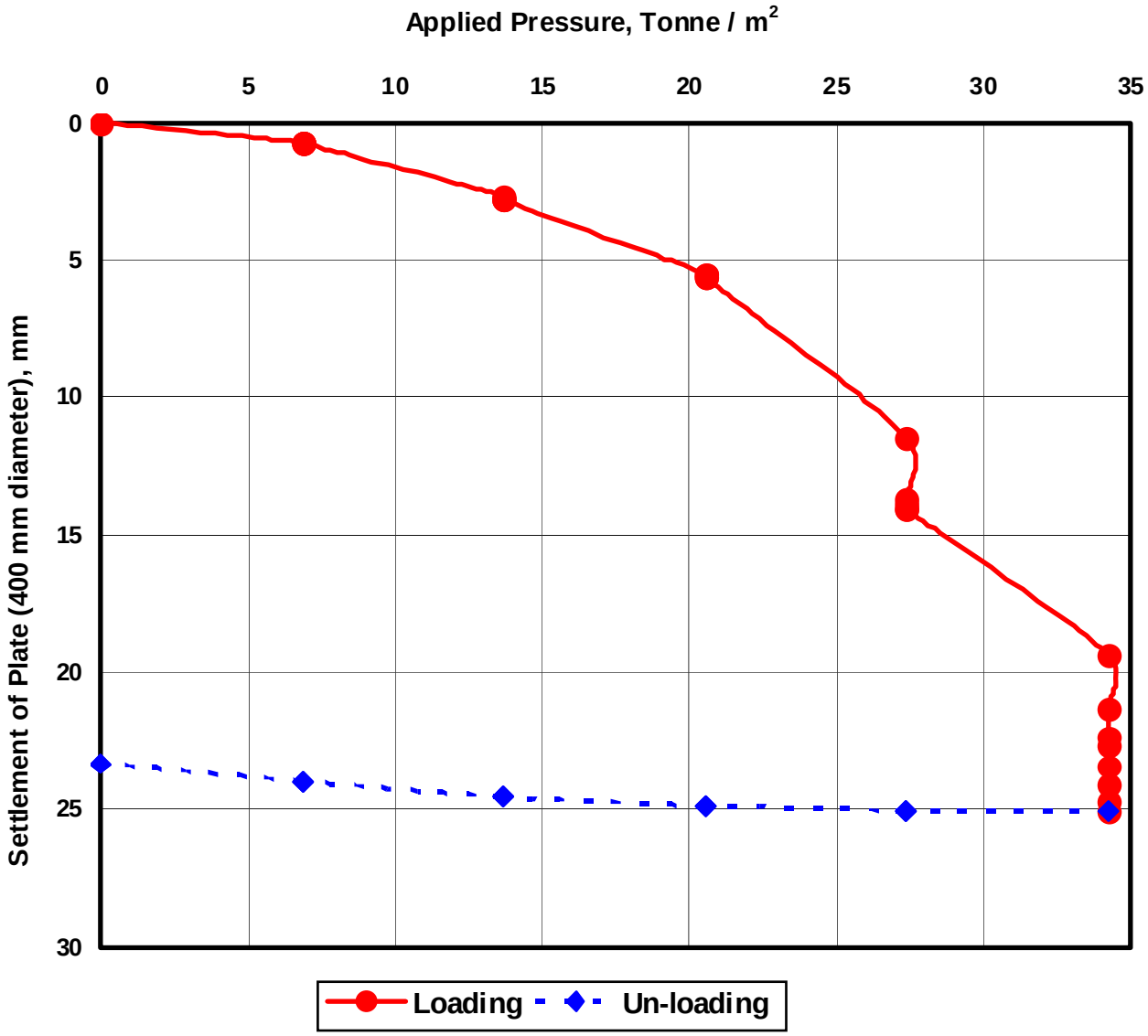
Note:

1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.

RMS ENGINEERING AND CONSTRUCTION

PLATE LOAD TEST

CLIENT:	**JICA Study Team**	TEST REPORT NO:	**PLT # 3A**
PROJECT:	**Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste**	DATE OF REPORT:	**(refer to submission letter)**
PROJECT REF. NO:		DATE RECEIVED:	
LOCATION:	**Presidente Nicolau Lobato International Airport Project, Timor Leste**	DATE TEST STARTED:	**04-05-2018**
IDENTIFICATION:	**Plate Load Test**	DATE TEST FINSHED:	**04-05-2018**
ACTIVITY PERIOD:	**04-05-2018**	TEST PERFORMED BY:	
SUPERVISED BY:		TEST METHOD:	**ASTM D1194**



Note:

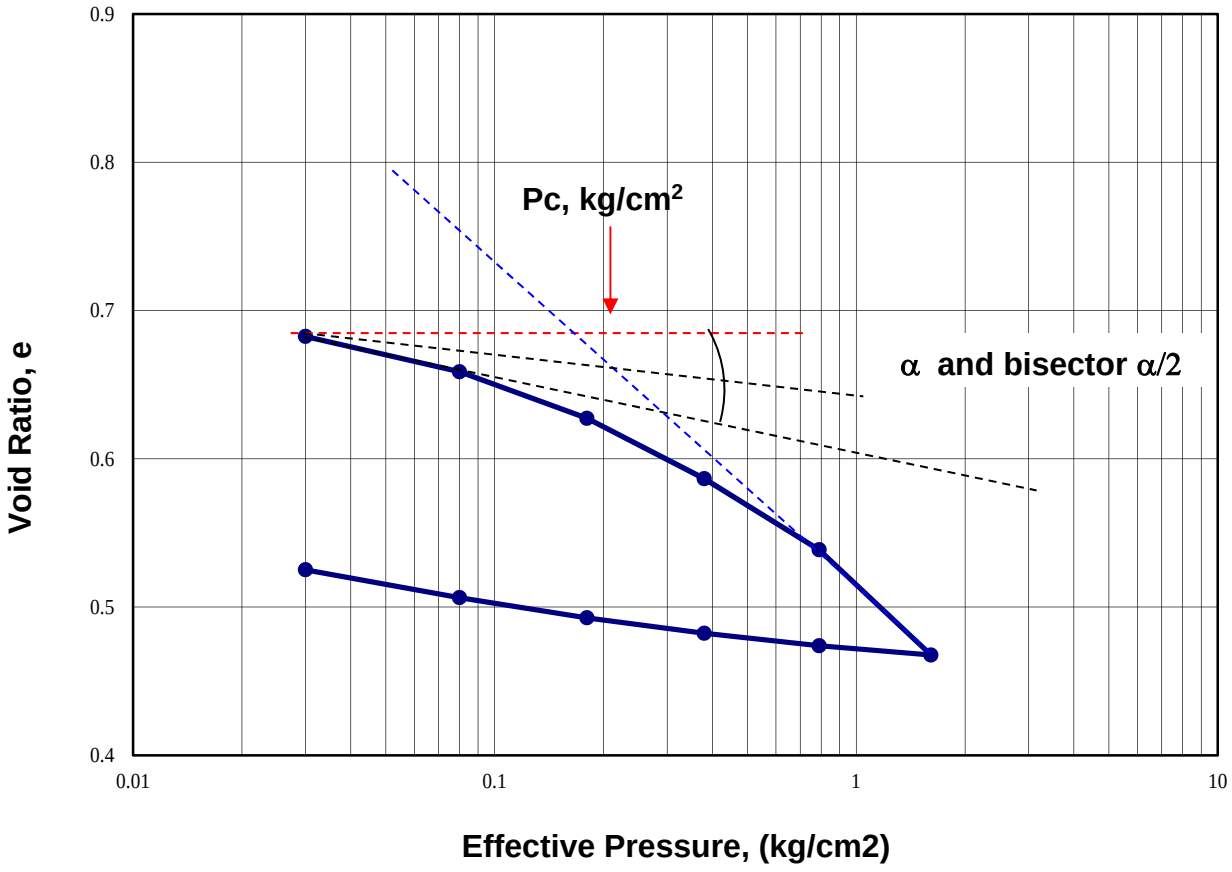
1. Test performed as per ASTM D1194,
2. CIRCULAR PLATE size of 305 mm diameter was in used.
3. Loading and Un-loading curves are presented above.

RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

Void Ratio versus Effective Pressure Curve

Material: **Very loose greyish brown SILT (ML)**
Depth : **27.65 to 28.25 m,**
Borehole: **BH # 1, UD-2**
Percentage of Fines (-0.075mm): **70.1 %**
Liquid Limit: **39.9 %**
Plastic Limit: **27.2 %**
Plastic Index: **12.7 %**
Natural Moisture Content: **39.6 %**
Maximum Pre-consolidation Pressure (Pc): **0.21 kg/cm^2**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

CONSOLIDATION TEST RESULT DATA

Material: **Very loose greyish brown SILT (ML)**
Depth : **27.65 to 28.25 m,** Borehole: **BH # 1, UD-2**

Loading Data:

Applied Pressure (kg/cm^2)	δH (mm)	Specimen Height (mm)	Void Ratio (e)	t_{90} (minutes)	Cc	a_v (cm^2/kg)	m_v (cm^2/kg)	C_v (cm^2/min)	$K = C_v m_v \gamma_w$ (cm/min.)
0.00 - 0.03	0.23	16.17	0.6825	-	-	-	-		
0.03 - 0.08	0.51	15.89	0.6587	15	0.856	9.495	6.234	3.316	0.02067397
0.08 – 0.18	0.81	15.59	0.6273	30	0.104	0.626	0.411	1.596	0.00065633
0.18 – 0.38	1.20	15.20	0.5866	45	0.135	0.407	0.267	1.011	0.00027036
0.38 – 0.79	1.66	14.74	0.5386	60	0.154	0.229	0.150	0.713	0.0001071
0.79 – 1.61	2.34	14.06	0.4676	75	0.249	0.187	0.123	0.519	6.3685E-05

Un-loading Data:

Un-loading (kg/cm^2)	Void Ratio (e)
0.79	0.4739
0.38	0.4823
0.18	0.4927
0.08	0.5063
0.03	0.5251
0	0.5585

Legend:

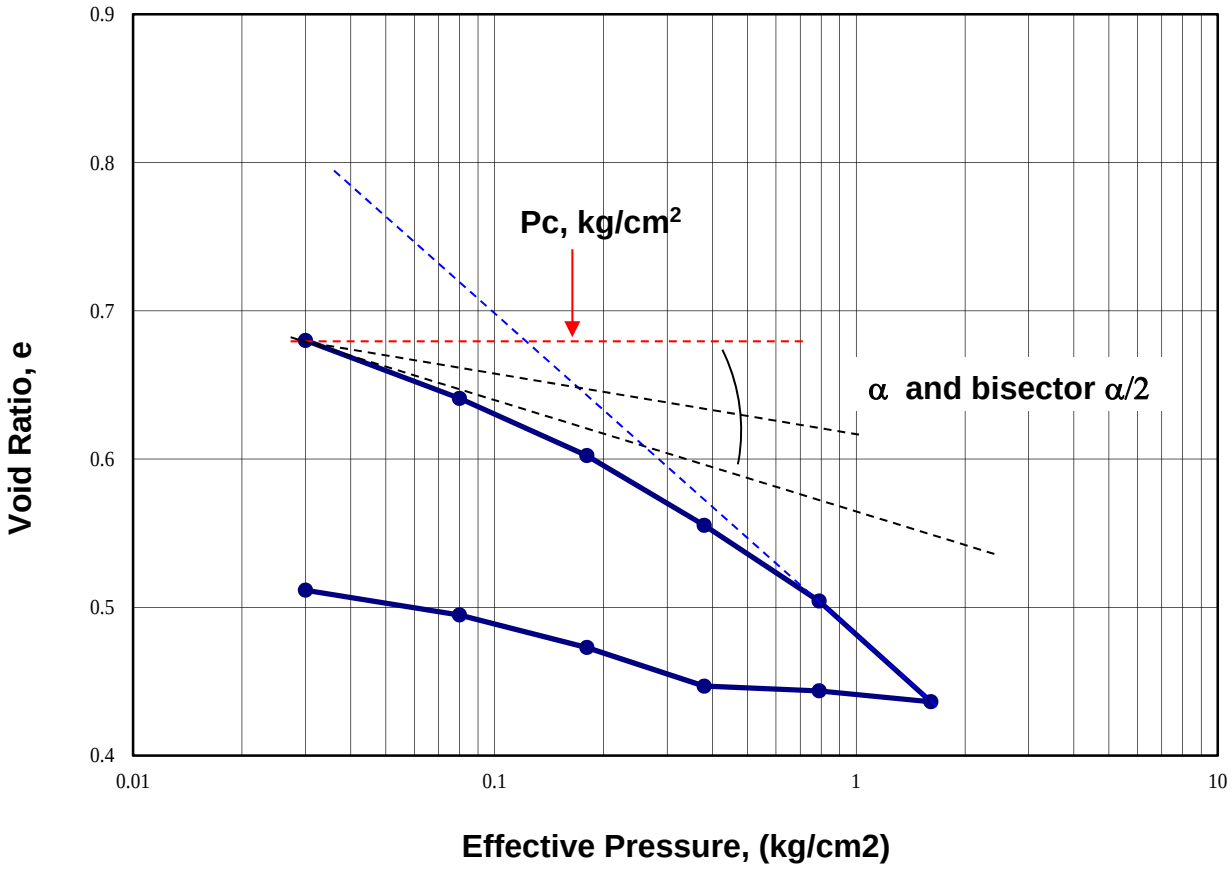
C_c	Compression Index	C_v	Coefficient of Consolidation
a_v	Coefficient of Compression	Pc	**0.21** Pre-consolidation Pressure, **kg/cm^2**
m_v	Coefficient of Volume Compressibility	K	Coefficient of Permeability

RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

Void Ratio versus Effective Pressure Curve

Material: **Medium dense brownish grey SILT (ML)**
Depth : **8.50 to 9.10 m,**
Borehole: **BH # 2, UD-1**
Percentage of Fines (-0.075mm): **98.7 %**
Liquid Limit: **41.4 %**
Plastic Limit: **34.5 %**
Plastic Index: **6.9 %**
Natural Moisture Content: **36.1.6 %**
Maximum Pre-consolidation Pressure (Pc): **0.16 kg/cm^2**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

CONSOLIDATION TEST RESULT DATA

Material: **Medium dense brownish grey SILT with Sand (ML)**
Depth : **8.50to 9.10 m,** Borehole: **BH # 2, UD-1**

Loading Data:

Applied Pressure (kg/cm^2)	δH (mm)	Specimen Height (mm)	Void Ratio (e)	t_{90} (minutes)	Cc	a_v (cm^2/kg)	m_v (cm^2/kg)	C_v (cm^2/min)	$K = C_v m_v \gamma_w$ (cm/min.)
0.00 - 0.03	0.29	16.01	0.6800	-	-	-	-		
0.03 - 0.08	0.58	15.72	0.6409	15	0.630	6.983	4.585	3.245	0.01488022
0.08 – 0.18	0.95	15.35	0.6023	30	0.128	0.772	0.507	1.547	0.00078474
0.18 – 0.38	1.40	14.90	0.5553	45	0.156	0.470	0.308	0.972	0.00029976
0.38 – 0.79	1.89	14.41	0.5042	60	0.164	0.244	0.160	0.682	0.00010903
0.79 – 1.61	2.54	13.76	0.4363	75	0.238	0.179	0.117	0.497	5.8305E-05

Un-loading Data:

Un-loading (kg/cm^2)	Void Ratio (e)
0.79	0.4436
0.38	0.4468
0.18	0.4729
0.08	0.4948
0.03	0.5115
0	0.6065

Legend:

C_c	Compression Index	C_v	Coefficient of Consolidation
a_v	Coefficient of Compression	Pc	**0.16** Pre-consolidation Pressure, **kg/cm^2**
m_v	Coefficient of Volume Compressibility	K	Coefficient of Permeability

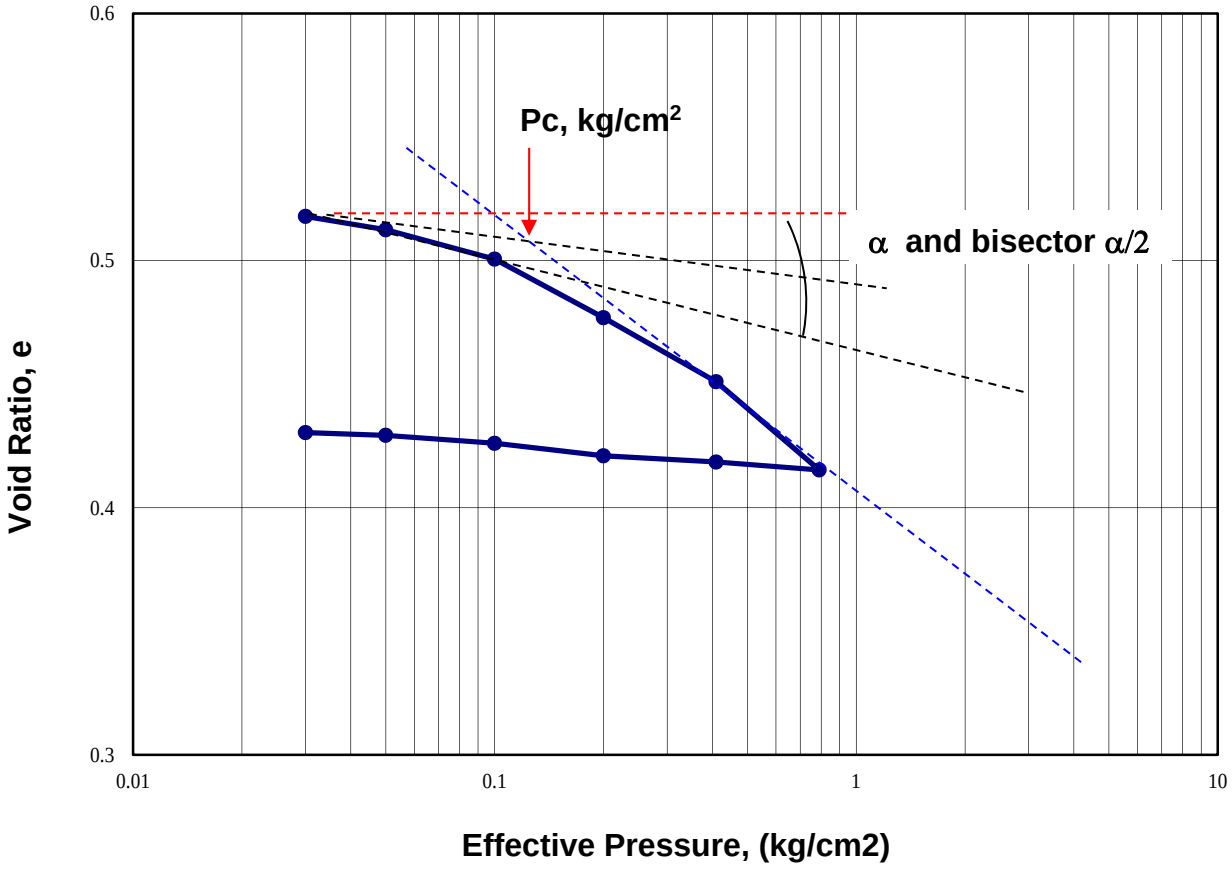
RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Airport in Democratic Republic of Timor Leste

Void Ratio Verses Effective Pressure Curve

Material: **Medium dense brownish grey Sandy SILT (ML)**
Depth : **9.05 to 9.85 m,**
Borehole: **BH # 3, UD-1**
Percentage of Fines (-0.075mm): **68.7 %**
Liquid Limit: **40.3 %**
Plastic Limit: **29.5 %**
Plastic Index: **10.8 %**
Natural Moisture Content: **29.4 %**
Maximum Pre-consolidation Pressure (Pc): **0.13 kg/cm^2**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

CONSOLIDATION TEST RESULT DATA

Material: **Medium dense brownish grey Sandy SILT (ML)**
Depth : **9.05 to 9.65 m,** Borehole: **BH # 3, UD-1**

Loading Data:

Applied Pressure (kg/cm^2)	δH (mm)	Specimen Height (mm)	Void Ratio (e)	t_{90} (minutes)	Cc	a_v (cm^2/kg)	m_v (cm^2/kg)	C_v (cm^2/min)	$K = C_v m_v \gamma_w$ (cm/min.)
0.00 - 0.03	0.05	14.05	0.5179	-	-	-	-		
0.03 - 0.05	0.10	14	0.5125	15	0.024	0.270	0.177	2.574	0.00045651
0.05 – 0.10	0.21	13.89	0.5006	30	0.039	0.238	0.156	1.267	0.00019772
0.10 – 0.20	0.43	13.67	0.4769	45	0.079	0.238	0.156	0.818	0.00012767
0.20 – 0.41	0.67	13.43	0.4510	60	0.083	0.123	0.081	0.592	4.801E-05
0.41 – 0.79	1.00	13.1	0.4153	75	0.125	0.094	0.062	0.451	2.7769E-05

Un-loading Data:

Un-loading (kg/cm^2)	Void Ratio (e)
0.41	0.4185
0.20	0.4210
0.01	0.4261
0.05	0.4293
0.03	0.4304
0.0	0.4337

Legend:

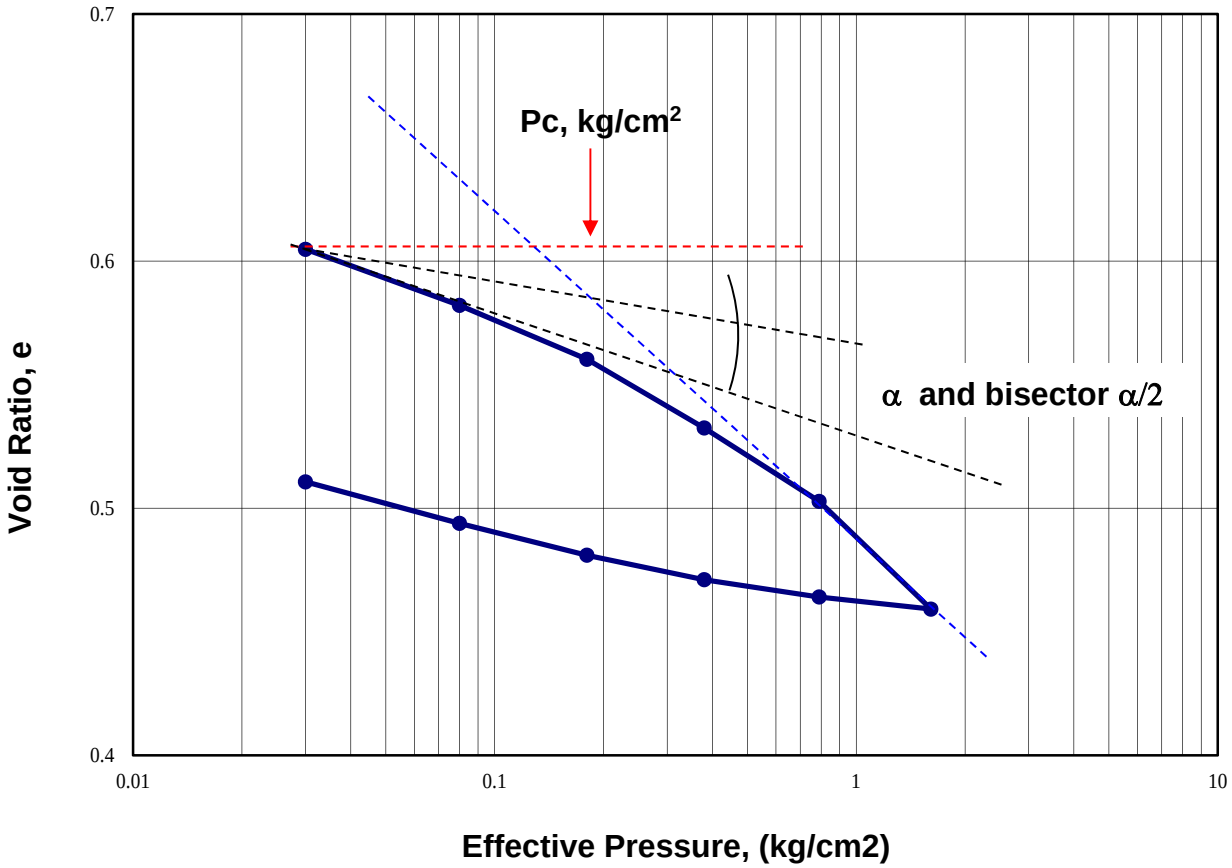
C_c	Compression Index	C_v	Coefficient of Consolidation
a_v	Coefficient of Compression	Pc	**0.13** Pre-consolidation Pressure, **kg/cm^2**
m_v	Coefficient of Volume Compressibility	K	Coefficient of Permeability

RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

Void Ratio versus Effective Pressure Curve

Material: **Very loose brown SILT (ML)**
Depth : **4.05 to 4.65 m,**
Borehole: **BH # 5, UD-1**
Percentage of Fines (-0.075mm): **95.4 %**
Liquid Limit: **39.9 %**
Plastic Limit: **27.2 %**
Plastic Index: **12.7 %**
Natural Moisture Content: **32.07 %**
Maximum Pre-consolidation Pressure (Pc): **0.19 kg/cm^2**



RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

CONSOLIDATION TEST RESULT DATA

Material: **Very loose brown SILT (ML)**
Depth : **4.05 to 4.65 m,** Borehole: **BH # 5, UD-1**

Loading Data:

Applied Pressure (kg/cm^2)	δH (mm)	Specimen Height (mm)	Void Ratio (e)	t_{90} (minutes)	Cc	a_v (cm^2/kg)	m_v (cm^2/kg)	C_v (cm^2/min)	$K = C_v m_v \gamma_w$ (cm/min.)
0.00 - 0.03	0.24	16.31	0.6048	-	-	-	-		
0.03 - 0.08	0.44	15.96	0.5821	15	0.157	1.738	1.141	3.345	0.00381686
0.08 – 0.18	0.66	15.74	0.5603	30	0.072	0.436	0.286	1.627	0.00046591
0.18 – 0.38	0.94	15.46	0.5325	45	0.092	0.278	0.182	1.046	0.00019069
0.38 – 0.79	1.24	15.16	0.5028	60	0.095	0.142	0.093	0.755	7.0163E-05
0.79 – 1.61	1.68	14.72	0.4592	75	0.153	0.115	0.075	0.569	4.2893E-05

Un-loading Data:

Un-loading (kg/cm^2)	Void Ratio (e)
0.79	0.4641
0.38	0.4711
0.18	0.4810
0.08	0.4939
0.03	0.5107
0	0.5464

Legend:

C_c	Compression Index	C_v	Coefficient of Consolidation
a_v	Coefficient of Compression	Pc	**0.19** Pre-consolidation Pressure, kg/cm^2
m_v	Coefficient of Volume Compressibility	K	Coefficient of Permeability

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

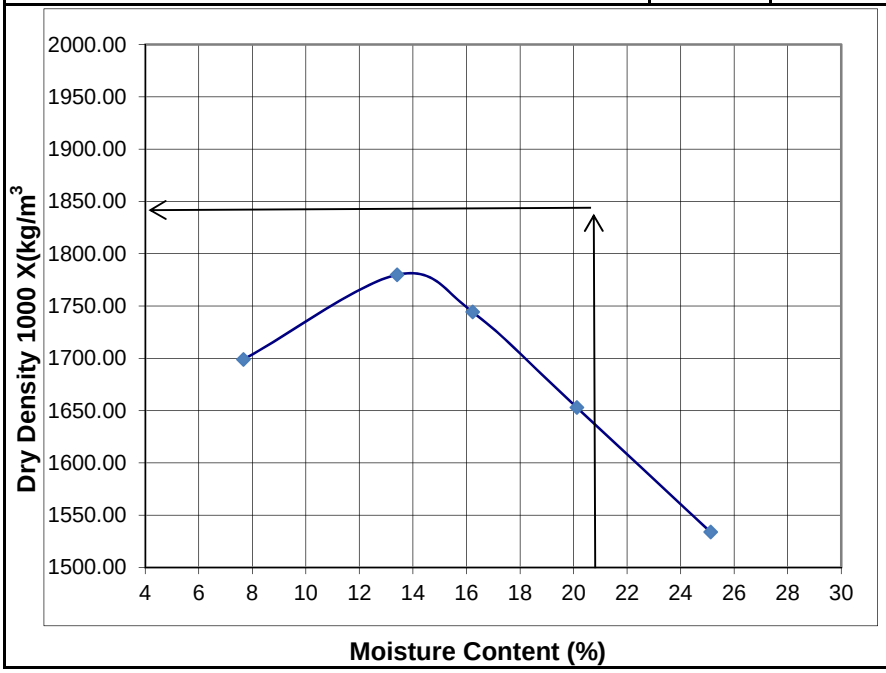
CLIENT: JICA Study Team	DATE: **21/05/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 METHOD-A

LOCATION : **TP # 1 S-1**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5230.80** **g** **VOLUME OF MOULD (V) :** **996** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	7052.6	7241.2	7250.0	7208.3	7142.2
Mass of Soil ($m_2 - m_1$)	g	1821.8	2010.4	2019.2	1977.5	1911.4
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1829.12	2018.47	2027.31	1985.44	1919.08
Moisture Content, Container No.		A-1	A-2	A-3	A-4	A-4
Mass of Wet Soil + Container (A)	g	195.0	201.0	240.9	253.5	314.8
Mass of Dry Soil + Container (B)	g	185.6	184.2	216.0	221.1	263.5
Mass of Container (C)	g	63.0	58.9	62.6	60.1	59.3
Mass of Moisture (D = A - B)	g	9.4	16.8	24.9	32.4	51.3
Mass of Dry Soil (E = B - C)	g	122.6	125.3	153.4	161.0	204.2
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	7.7	13.4	16.2	20.1	25.1
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1699	1780	1744	1653	1534



Maximum Dry Density	**1780**
Optimum Moisture Content	**14.0%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

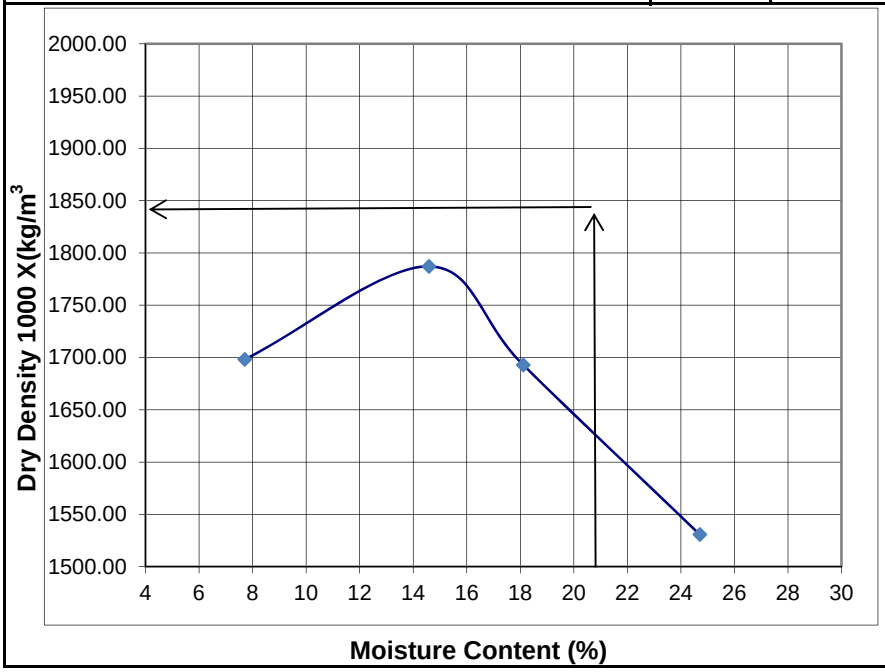
CLIENT: JICA Study Team	DATE: **21/05/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 METH

LOCATION : **TP # 1a**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) 5230.80 g **VOLUME OF MOULD (V) : 996 cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	7052.5	7270.4	7222.2	7132.1	
Mass of Soil ($m_2 - m_1$)	g	1821.7	2039.6	1991.4	1901.3	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1829.02	2047.79	1999.40	1908.94	
Moisture Content, Container No.		A-7	A-8	A-9	A-10	
Mass of Wet Soil + Container (A)	g	223.5	242.2	295.4	323.0	
Mass of Dry Soil + Container (B)	g	211.7	219.3	259.7	271.0	
Mass of Container (C)	g	58.6	62.3	62.6	60.5	
Mass of Moisture (D = A - B)	g	11.8	22.9	35.7	52.0	
Mass of Dry Soil (E = B - C)	g	153.1	157.0	197.1	210.5	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	7.7	14.6	18.1	24.7	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1698	1787	1693	1531	



Maximum Dry Density	**1787**
Optimum Moisture Content	**14.6%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

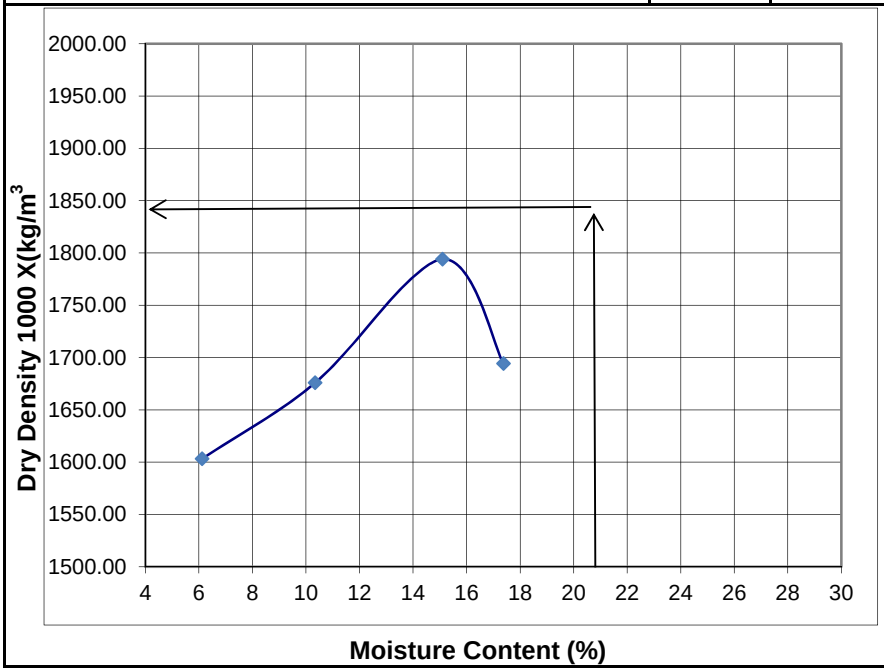
CLIENT: JICA Study Team	DATE: **21/05/2018**
PROJECT: Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 Method-A

LOCATION : **TP # 2**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5230.80** **g** **VOLUME OF MOULD (V) :** **996** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6925.2	7072.6	7287.5	7211.6	
Mass of Soil ($m_2 - m_1$)	g	1694.4	1841.8	2056.7	1980.8	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1701.20	1849.20	2064.96	1988.76	
Moisture Content, Container No.		A-12	A-13	A-14	A-11	
Mass of Wet Soil + Container (A)	g	237.6	222.2	222.1	243.2	
Mass of Dry Soil + Container (B)	g	227.7	207.2	200.7	216.0	
Mass of Container (C)	g	65.9	62.2	59.0	59.5	
Mass of Moisture (D = A - B)	g	9.9	15.0	21.4	27.2	
Mass of Dry Soil (E = B - C)	g	161.8	145.0	141.7	156.5	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	6.1	10.3	15.1	17.4	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1603	1676	1794	1694	



Maximum Dry Density	**1794**
Optimum Moisture Content	**15.1%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

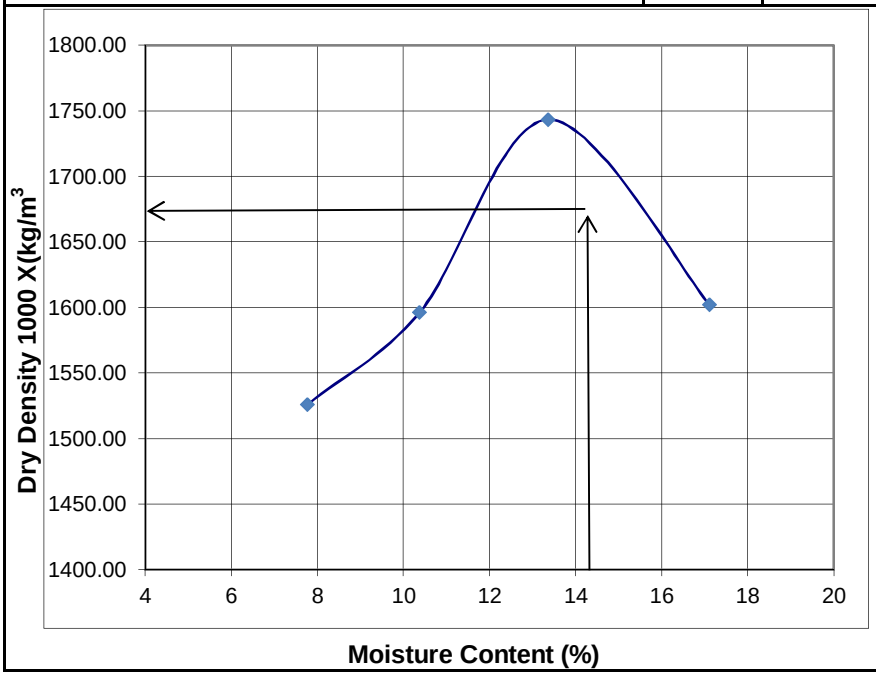
CLIENT: JICA Study Team	DATE: **21/05/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 Methd-

LOCATION : **TP # 2a**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5230.80** **g** **VOLUME OF MOULD (V) :** **996** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6868.5	6985.5	7199.4	7099.4	
Mass of Soil ($m_2 - m_1$)	g	1637.7	1754.7	1968.6	1868.6	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1644.28	1761.75	1976.51	1876.10	
Moisture Content, Container No.		A-15	A-16	A-17	A-18	
Mass of Wet Soil + Container (A)	g	235.6	213.4	251.7	251.7	
Mass of Dry Soil + Container (B)	g	223.1	198.8	229.0	224.0	
Mass of Container (C)	g	62.2	58.1	59.2	62.1	
Mass of Moisture (D = A - B)	g	12.5	14.6	22.7	27.7	
Mass of Dry Soil (E = B - C)	g	160.9	140.7	169.8	161.9	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	7.8	10.4	13.4	17.1	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1526	1596	1743	1602	



Maximum Dry Density	**1743**
Optimum Moisture Content	**13.4%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

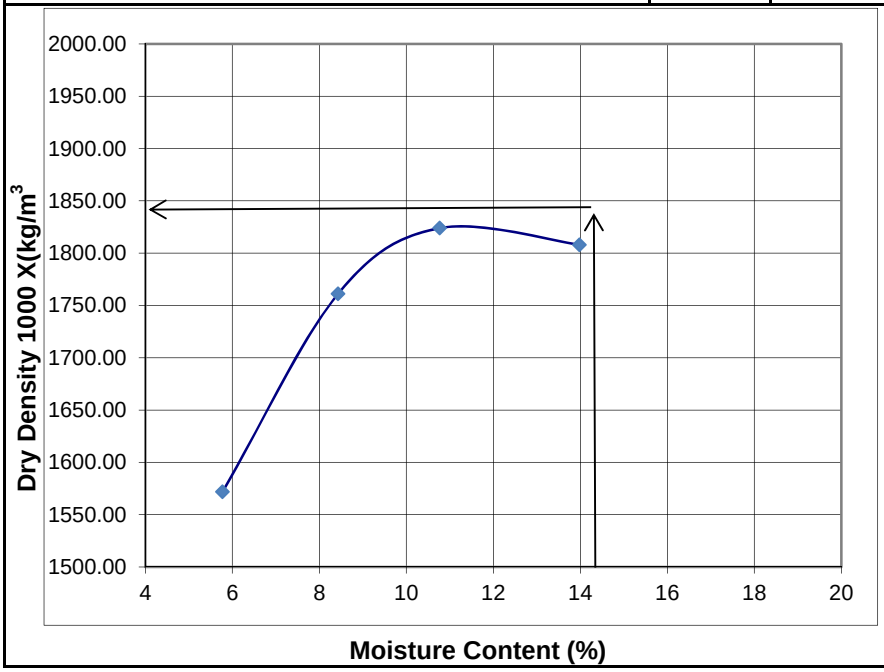
CLIENT: JICA Study Team	DATE: **30/05/2018**
PROJECT: Project: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 METH

LOCATION : **TP # 3**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5230.80** **g** **VOLUME OF MOULD (V) :** **998** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6890.0	7136.6	7247.1	7287.4	
Mass of Soil (m_2 - m_1)	g	1659.2	1905.8	2016.3	2056.6	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1662.53	1909.62	2020.34	2060.72	
Moisture Content, Container No.		A-18	A-19	A-20	K-18	
Mass of Wet Soil + Container (A)	g	245.3	285.0	264.9	328.4	
Mass of Dry Soil + Container (B)	g	235.3	267.6	244.7	298.4	
Mass of Container (C)	g	62.1	61.2	57.1	83.8	
Mass of Moisture (D = A - B)	g	10.0	17.4	20.2	30.0	
Mass of Dry Soil (E = B - C)	g	173.2	206.4	187.6	214.6	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	5.8	8.4	10.8	14.0	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1572	1761	1824	1808	



Maximum Dry Density	**1824**
Optimum Moisture Content	**10.8%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

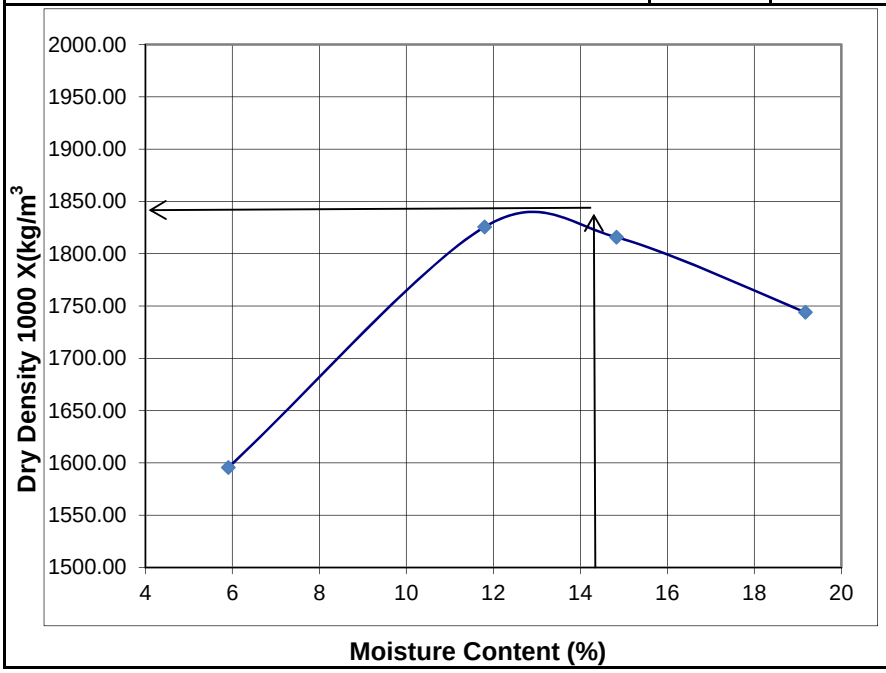
CLIENT: JICA Study Team	DATE: **30/05/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8002**
	TESTING METHOD: ASTM D-1557 METH

LOCATION : **TP # 3a**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5230.80** **g** **VOLUME OF MOULD (V) :** **998** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6917.2	7267.7	7311.7	7305.0	
Mass of Soil (m_2 - m_1)	g	1686.4	2036.9	2080.9	2074.2	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1689.78	2040.98	2085.07	2078.36	
Moisture Content, Container No.		A-26	A-27	A-28	H-6	
Mass of Wet Soil + Container (A)	g	207.5	253.8	236.4	266.0	
Mass of Dry Soil + Container (B)	g	199.4	233.4	213.9	236.8	
Mass of Container (C)	g	62.3	60.5	62.2	84.5	
Mass of Moisture (D = A - B)	g	8.1	20.4	22.5	29.2	
Mass of Dry Soil (E = B - C)	g	137.1	172.9	151.7	152.3	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	5.9	11.8	14.8	19.2	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1596	1826	1816	1744	



Maximum Dry Density	**1840**
Optimum Moisture Content	**12.8%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

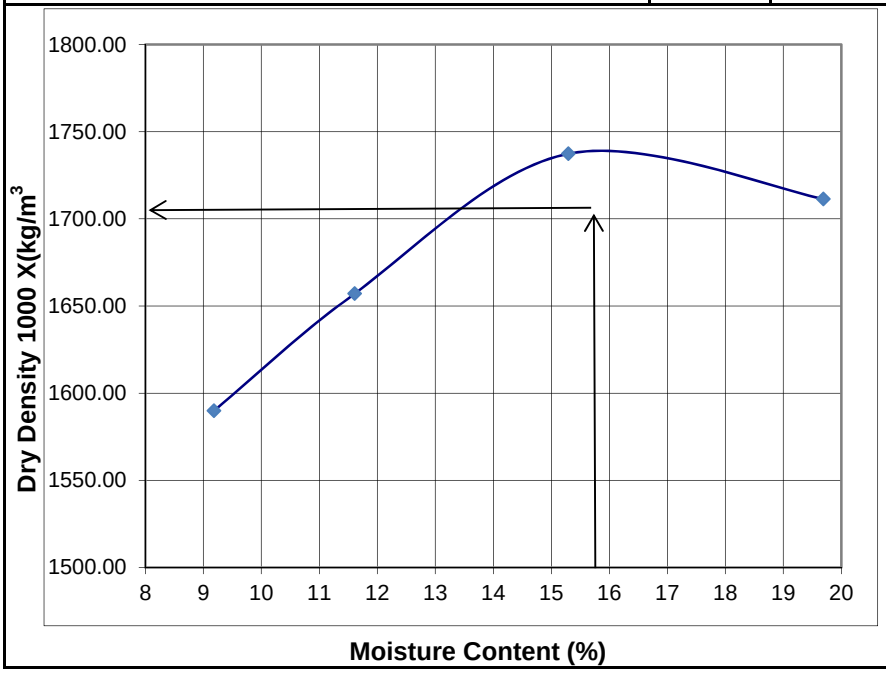
CLIENT: JICA Study Team	DATE: **28/05/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8014**
	TESTING METHOD: ASTM D-1557 METH

LOCATION : **TP#4**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5231.50** **g** **VOLUME OF MOULD (V) :** **998** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6963.9	7077.3	7230.6	7275.8	
Mass of Soil ($m_2 - m_1$)	g	1732.4	1845.8	1999.1	2044.3	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1735.87	1849.50	2003.11	2048.40	
Moisture Content, Container No.		A-1	A-2	A-3	A-4	
Mass of Wet Soil + Container (A)	g	215.2	198.3	297.8	253.4	
Mass of Dry Soil + Container (B)	g	202.4	183.8	266.6	221.6	
Mass of Container (C)	g	63.0	58.9	62.6	60.1	
Mass of Moisture (D = A - B)	g	12.8	14.5	31.2	31.8	
Mass of Dry Soil (E = B - C)	g	139.4	124.9	204.0	161.5	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	9.2	11.6	15.3	19.7	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1590	1657	1737	1711	



Maximum Dry Density	**1737**
Optimum Moisture Content	**15.4%**

Remarks:

RMS ENGINEERING AND CONSTRUCTION

COMPACTION TEST (Dry Density/Moisture Content Relationship)

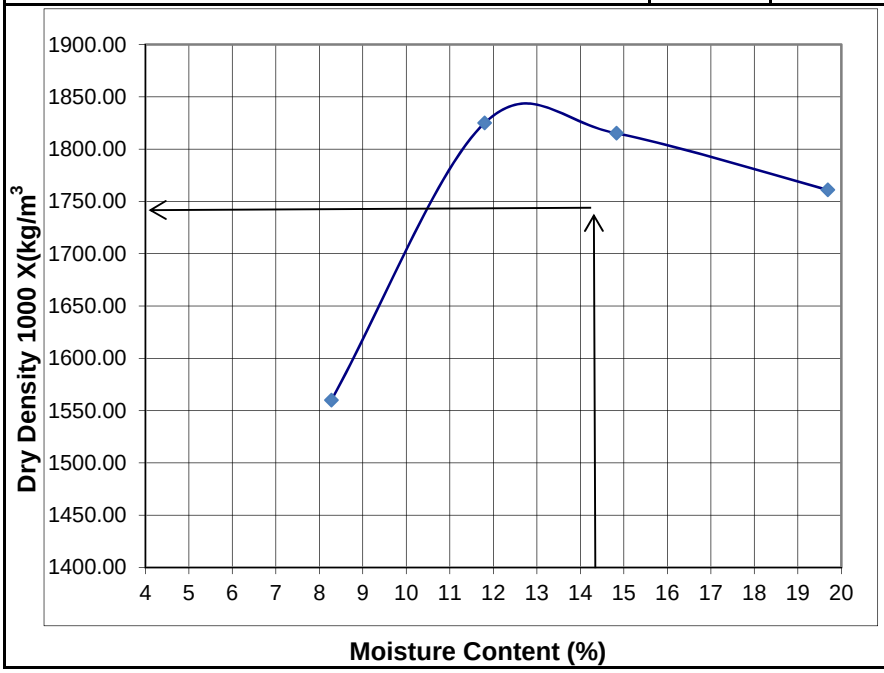
CLIENT: JICA Study Team	DATE: **01/06/2018**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	LAB NO. : **GET-18-8014**
	TESTING METHOD: ASTM D-1557 METHOD-A

LOCATION : **TP#5**

RETAINED % ON 20MM/37.5MM SIEVE.

MASS OF MOULD (m_1) **5231.50** **g** **VOLUME OF MOULD (V) :** **998** **cm^3**

Test Number		1	2	3	4	5
Mass of Mould + Soil (m_2)	g	6917.2	7267.7	7311.7	7335.0	
Mass of Soil ($m_2 - m_1$)	g	1685.7	2036.2	2080.2	2103.5	
Bulk Density P = $\frac{m_2 - m_1}{V}$	KG/m^3	1689.08	2040.28	2084.37	2107.72	
Moisture Content, Container No.		A-26	A-27	A-28	A-4	
Mass of Wet Soil + Container (A)	g	207.5	253.8	236.4	253.4	
Mass of Dry Soil + Container (B)	g	196.4	233.4	213.9	221.6	
Mass of Container (C)	g	62.3	60.5	62.2	60.1	
Mass of Moisture (D = A - B)	g	11.1	20.4	22.5	31.8	
Mass of Dry Soil (E = B - C)	g	134.1	172.9	151.7	161.5	
Moisture Content W= $\left[\frac{D \times 100}{E}\right]$	%	8.3	11.8	14.8	19.7	
Dry Density Pd = $\frac{100\ P}{100 + W}$	kg/m^3	1560	1825	1815	1761	



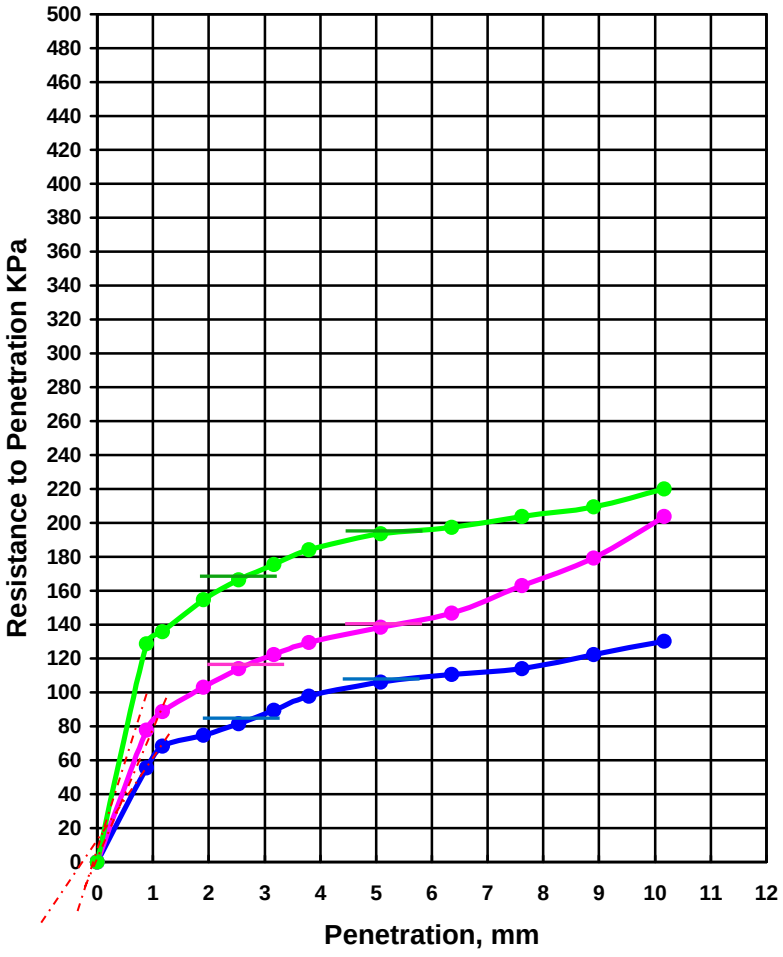
Maximum Dry Density	**1842**
Optimum Moisture Content	**12.8%**

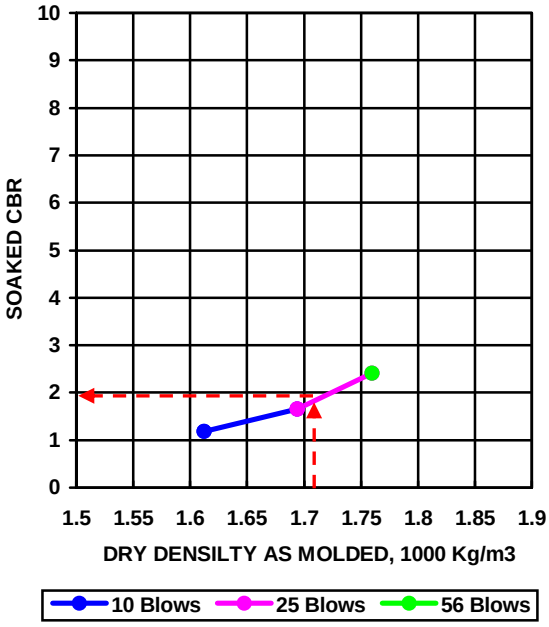
Remarks:

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 1 /S-1** **Date: 30.05.2018**





The CBR at 96 percent of the maximum dry density:

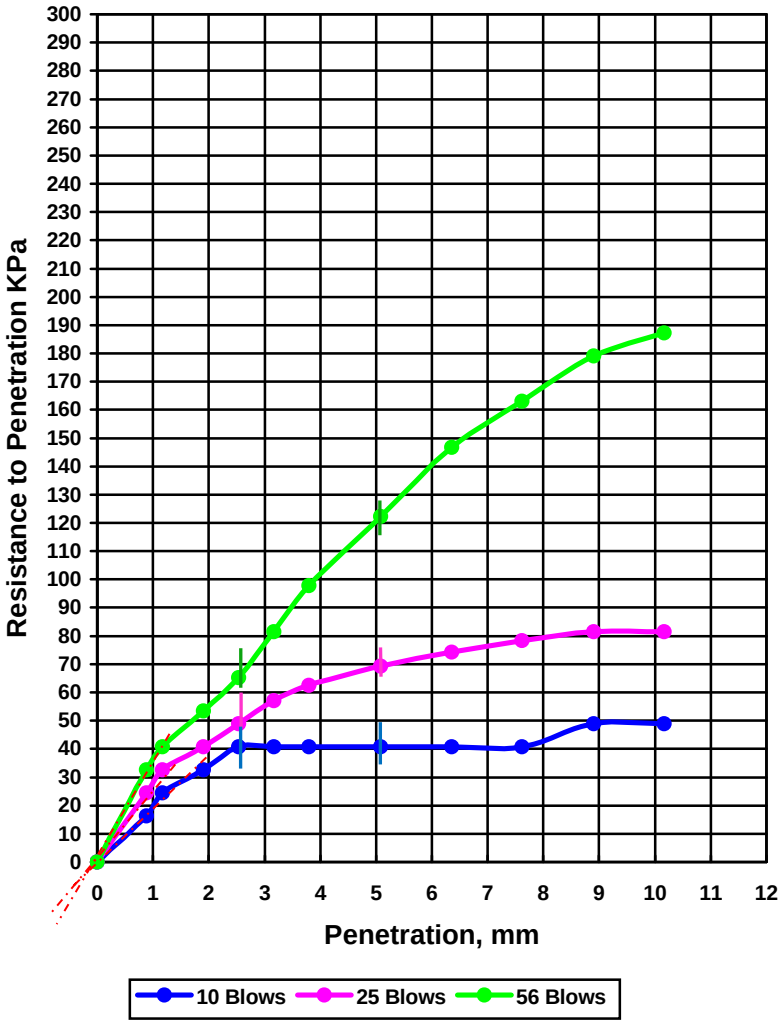
1. 96 percent of 1780 kg/m^3 = 1709 kg/m^3.
2. At 1709 kg/m^3, the CBR is 1.9 %.

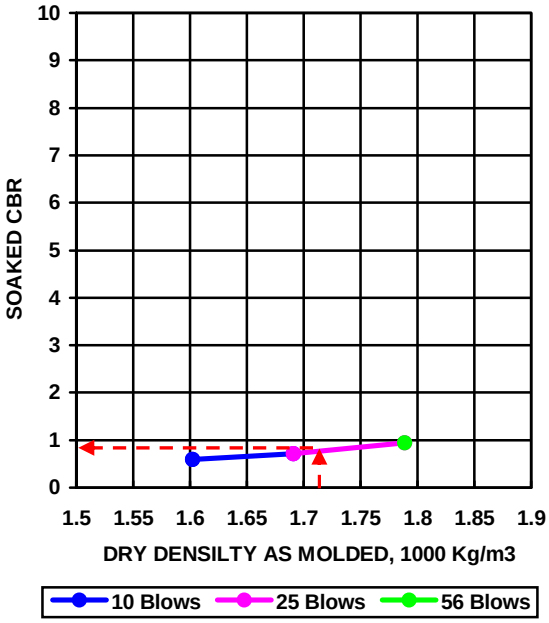
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1642	91	1.18	1.03	5.1
25	1704	95	1.65	1.34	4.0
56	1764	99	2.41	1.88	3.4

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	Soaked
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	Test Pit No. 1a PLT/S-1 Date: 30.05.2018





The CBR at 96 percent of the maximum dry density:

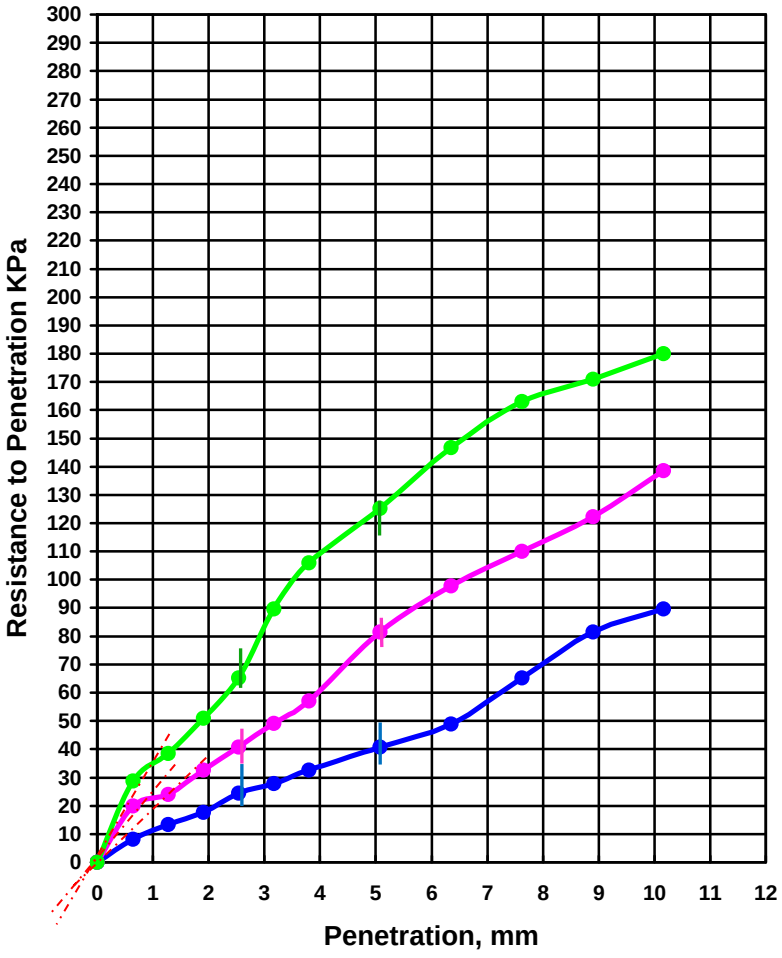
1. 96 percent of 1787 kg/m^3 = 1716 kg/m^3.
2. At 1716 kg/m^3, the CBR is 0.9 %.

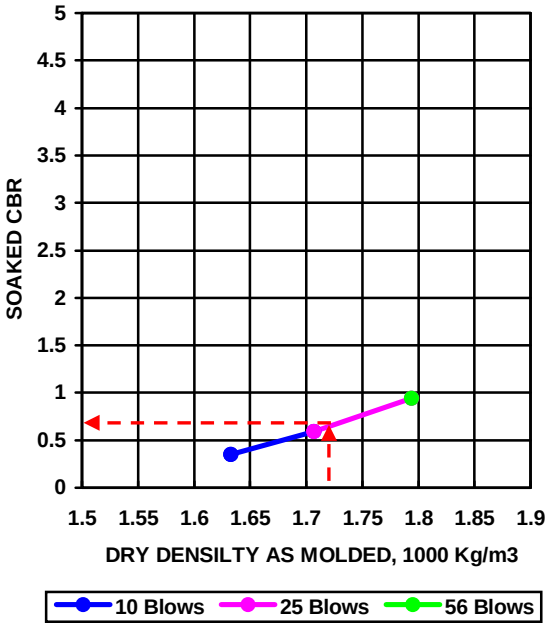
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1602	90	0.59	0.40	7.9
25	1691	95	0.71	0.67	7.0
56	1789	100	0.94	1.19	6.2

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	Soaked
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	Test Pit No. 2 /S-1 Date: 30.05.2018





The CBR at 96 percent of the maximum dry density:

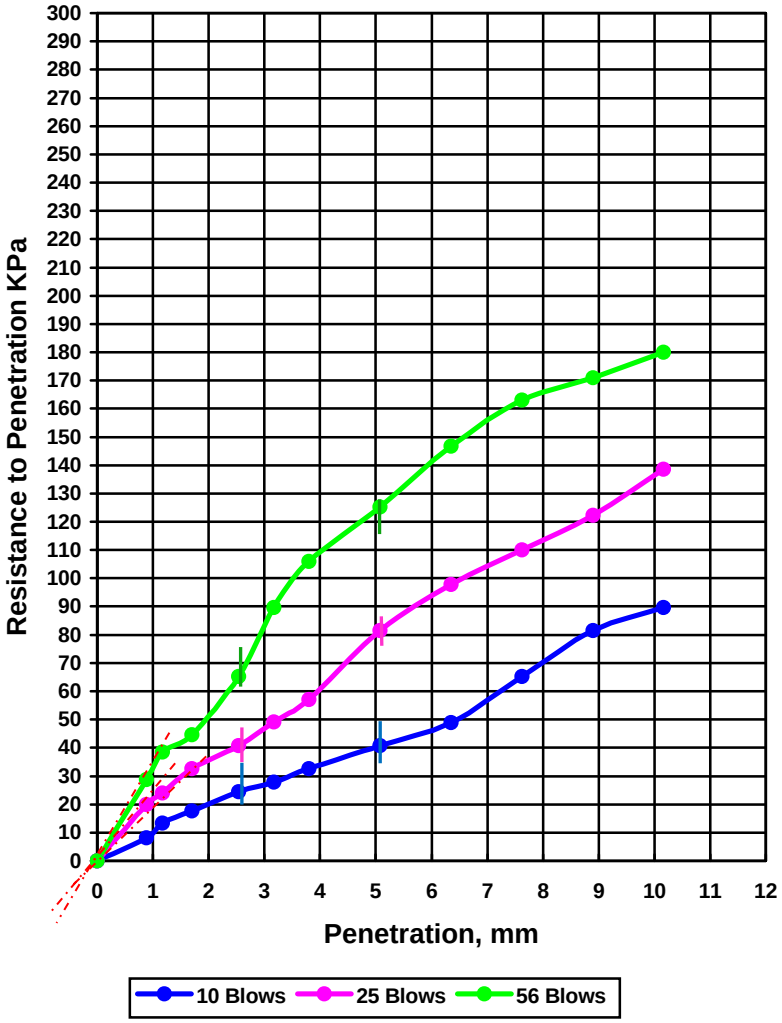
1. 96 percent of 1794 kg/m^3 = 1722 kg/m^3.
2. At 1722 kg/m^3, the CBR is 0.7 %.

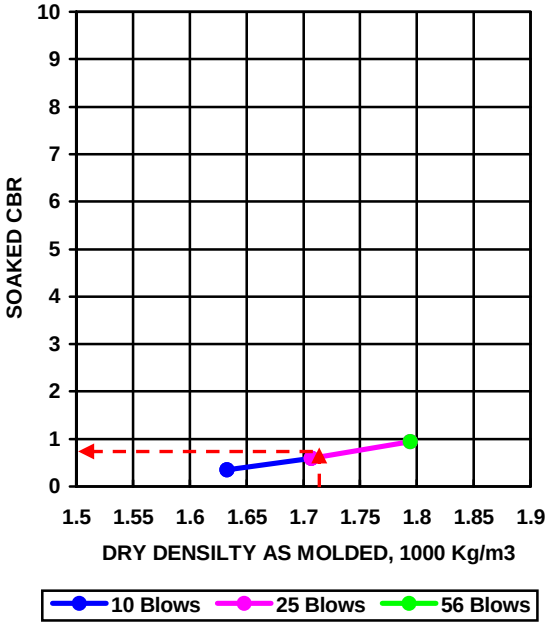
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1633	91	0.35	0.40	4.8
25	1707	95	0.59	0.79	3.5
56	1794	100	0.94	1.22	3.2

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 2 /S-1** **Date: 30.05.2018**





The CBR at 96 percent of the maximum dry density:

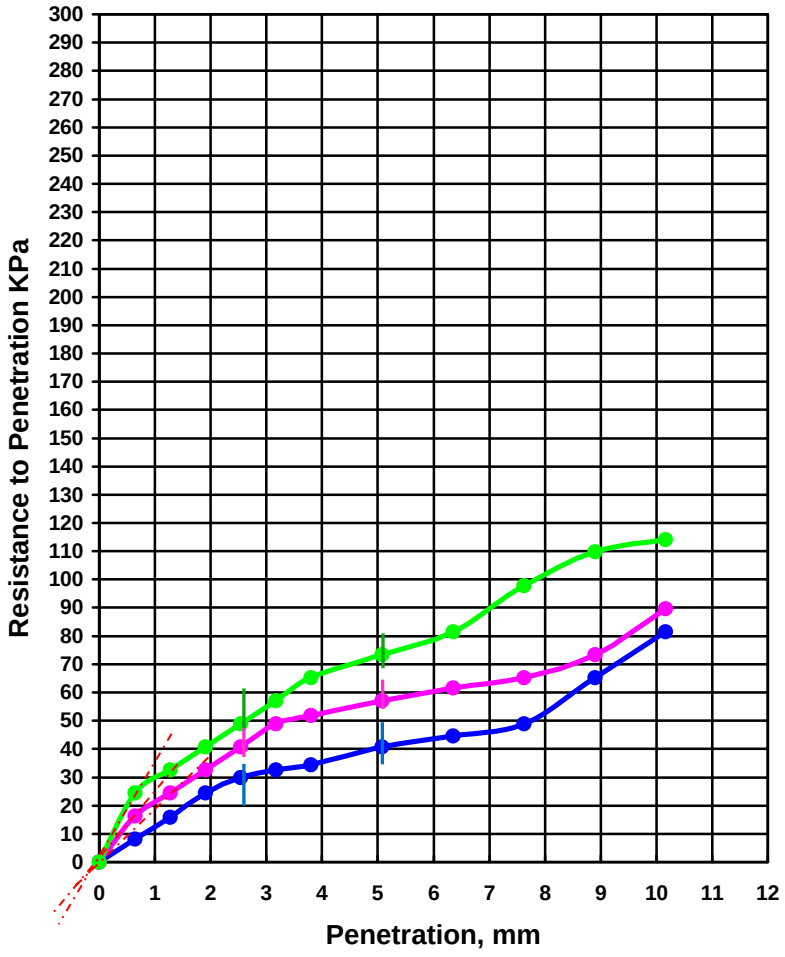
1. 96 percent of 1794 kg/m^3 = 1722 kg/m^3.
2. At 1722 kg/m^3, the CBR is 0.8 %.

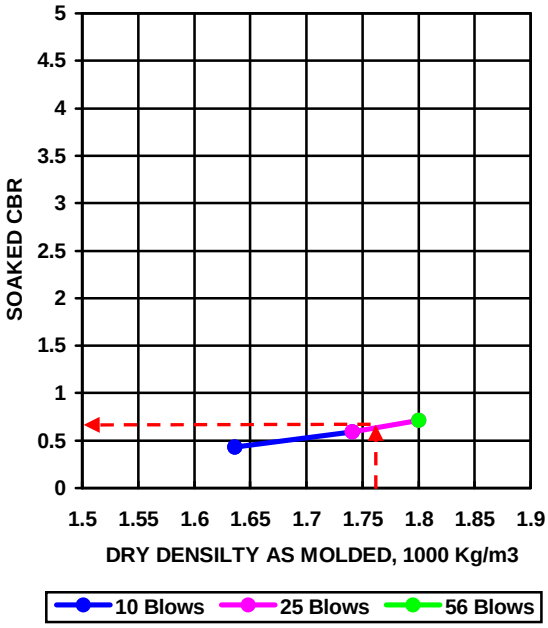
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1633	91	0.35	0.40	4.8
25	1707	95	0.59	0.79	3.5
56	1794	100	0.94	1.19	3.2

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 3 /S-1** **Date: 1.6.2018**





The CBR at 96 percent of the maximum dry density:

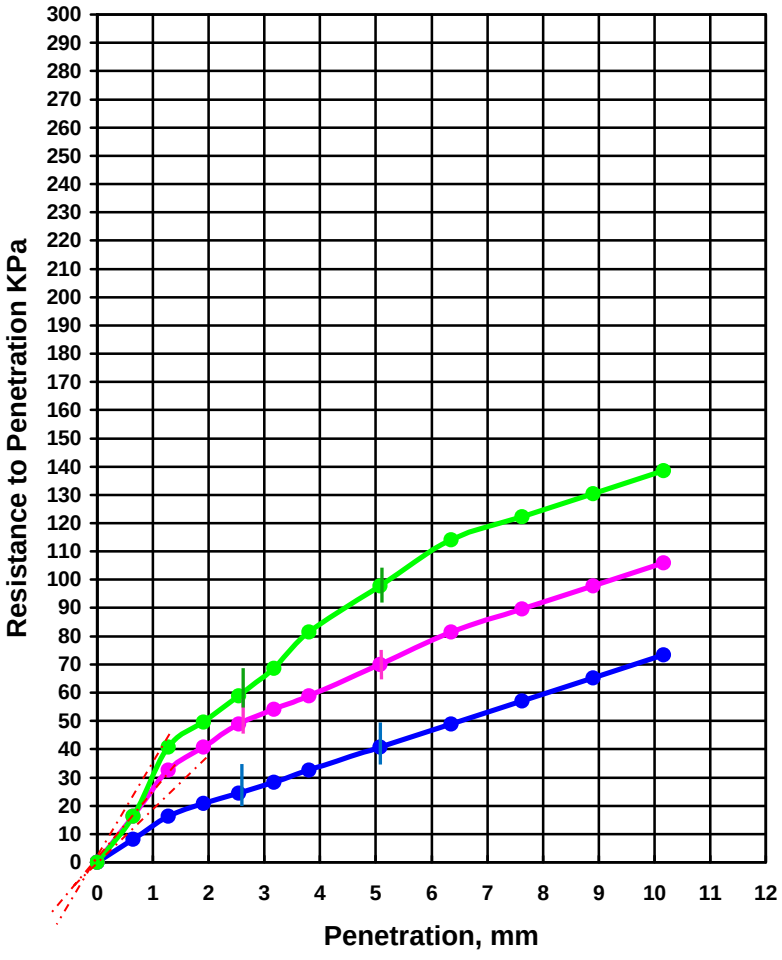
1. 96 percent of 1824 kg/m^3 = 1751 kg/m^3.
2. At 1751 kg/m^3, the CBR is 0.6 %.

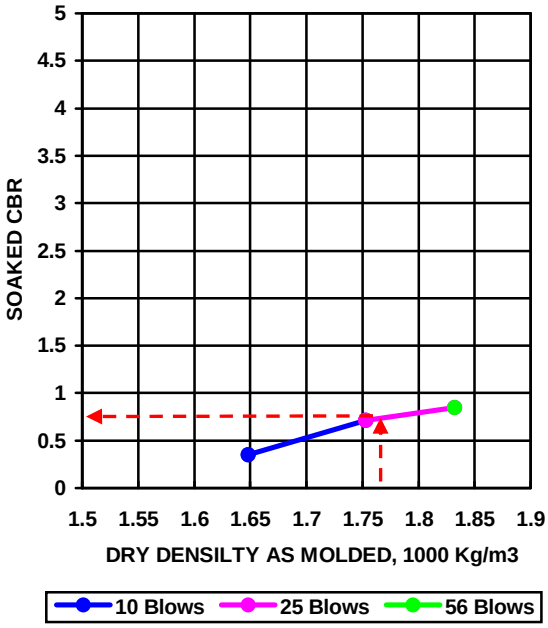
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1636	90	0.43	0.40	5.9
25	1741	95	0.59	0.55	4.9
56	1800	99	0.71	0.71	4.1

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 3a /S-1** **Date: 1.6.2018**





The CBR at 96 percent of the maximum dry density:

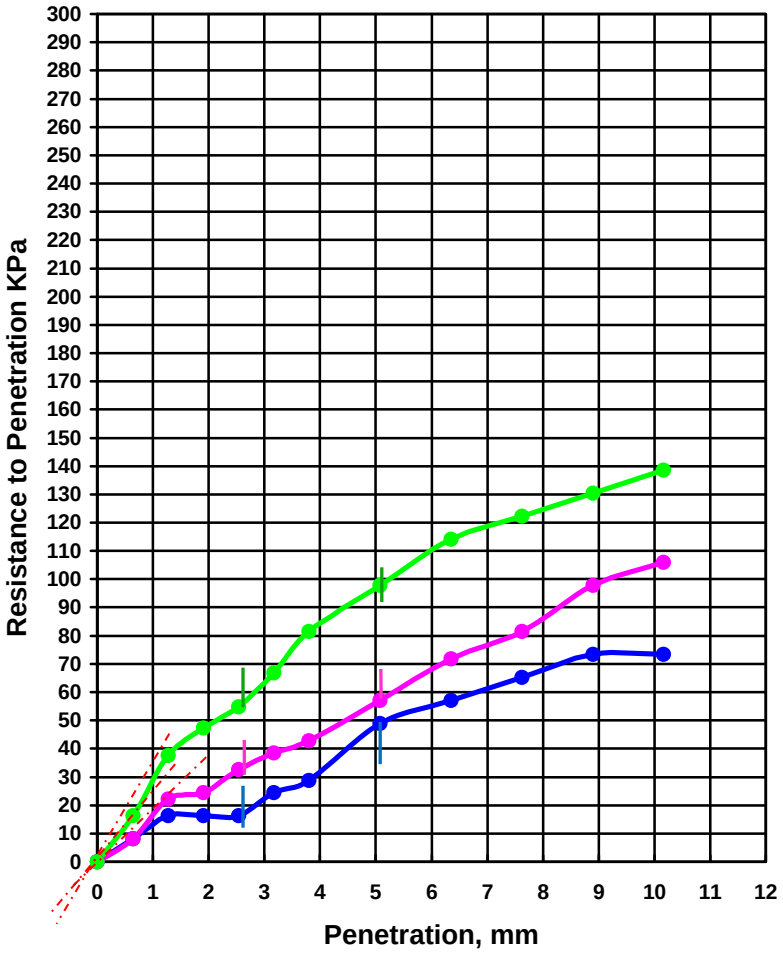
1. 96 percent of 1824 kg/m^3 = 1766 kg/m^3.
2. At 1766 kg/m^3, the CBR is 0.7 %.

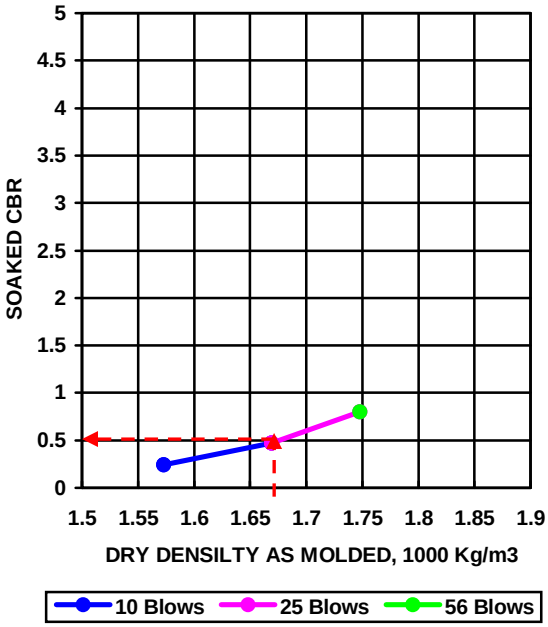
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1648	90	0.35	0.40	9.4
25	1753	95	0.71	0.68	8.4
56	1832	100	0.85	0.95	5.3

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 4 /S-1 Date: 2.6.2018**





The CBR at 96 percent of the maximum dry density:

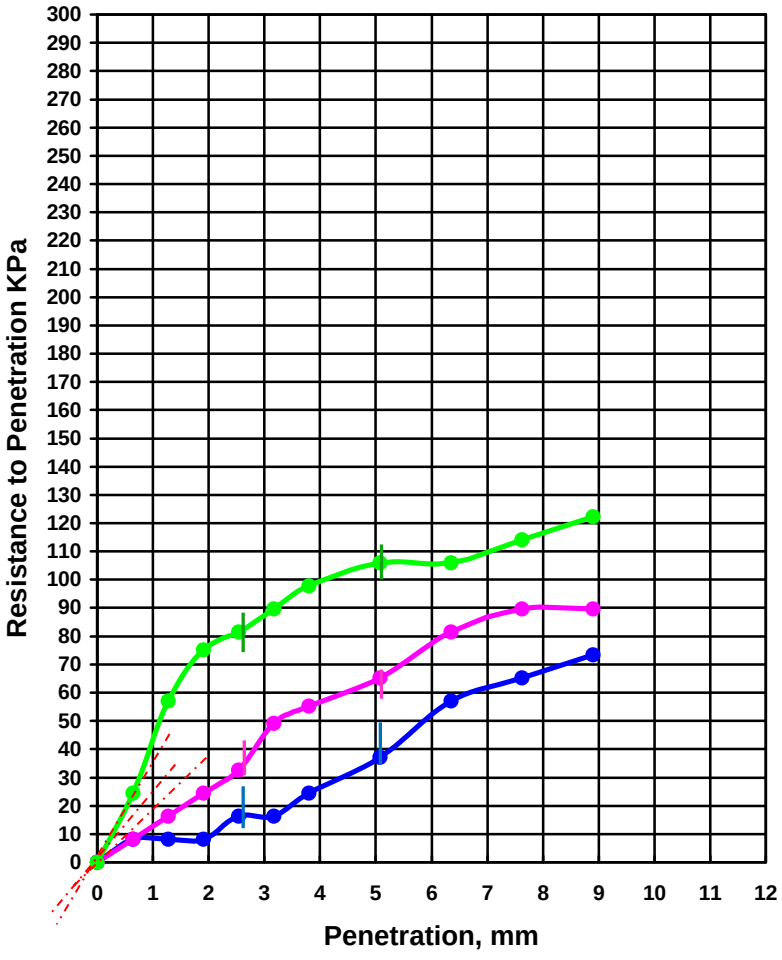
1. 96 percent of 1737 kg/m^3 = 1668 kg/m^3.
2. At 1668 kg/m^3, the CBR is 0.5 %.

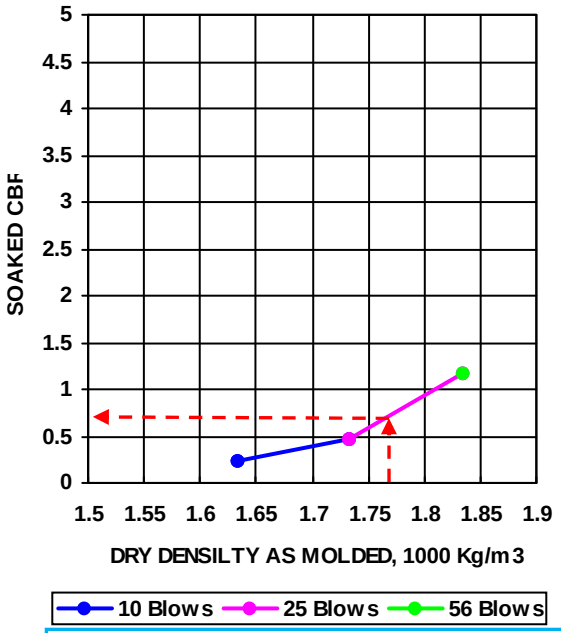
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1573	91	0.24	0.47	11.6
25	1669	96	0.47	0.55	8.2
56	1748	101	0.80	0.95	4.6

RMS ENGINEERING AND CONSTRUCTION

CBR Test Results (ASTM D-1883)

Client: JICA Study Team	**Soaked**
PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste	**Test Pit No. 5 /S-1** **Date: 5.6.2018**





The CBR at 96 percent of the maximum dry density:

1. 96 percent of 1842 kg/m^3 = 1768 kg/m^3.
2. At 1768 kg/m^3, the CBR is 0.7 %.

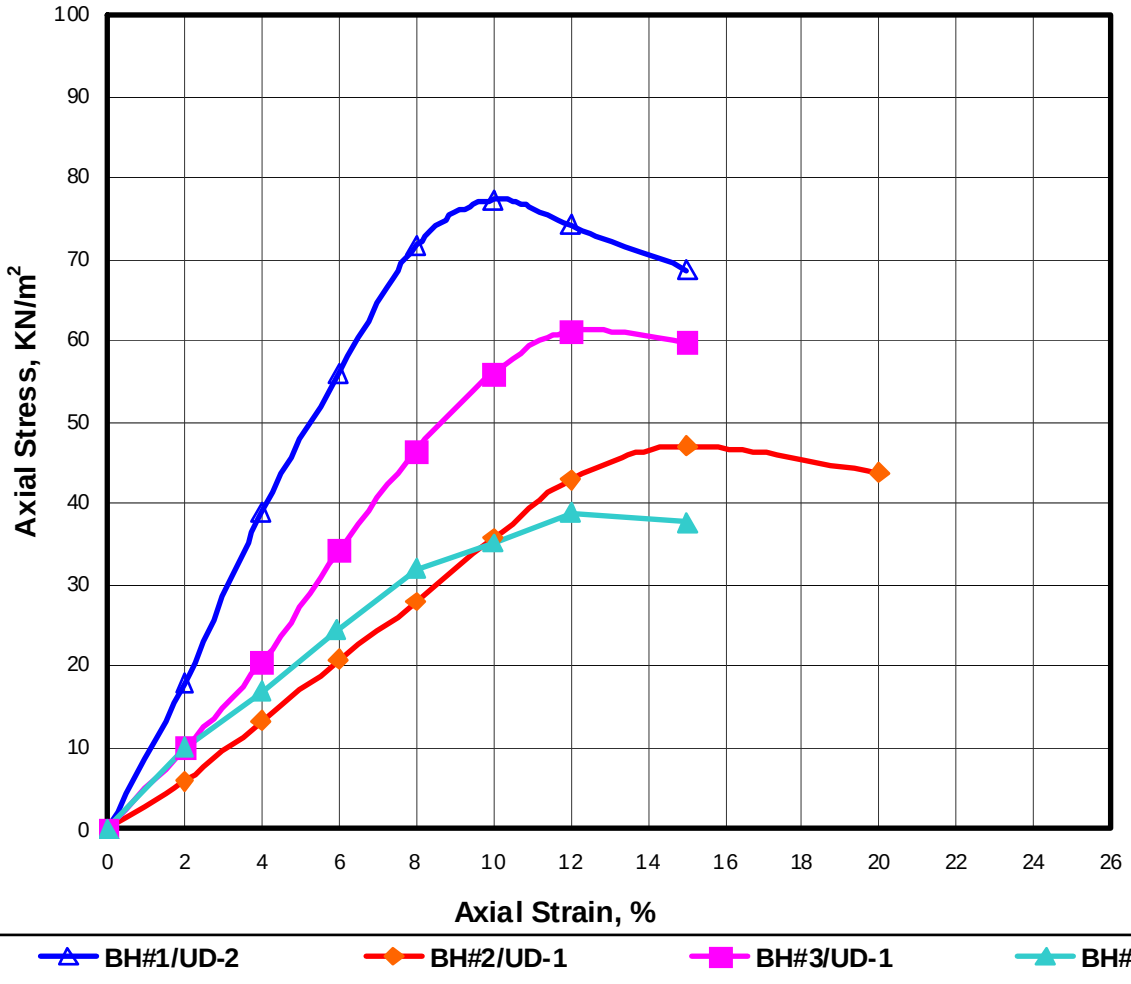
Compaction Effort (blows per layer)	Dry Density (kg/cu,m)	Compaction (Percent of Max. Dry Density)	CBR at		Swell, %
			2.5 mm	5.08 mm	
10	1633	89	0.24	0.36	10.4
25	1732	94	0.47	0.63	7.3
56	1835	100	1.18	1.03	4.3

RMS ENGINEERING AND CONSTRUCTION

Client: JICA Study Team

PROJECT: Geotechnical Investigation for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato Int. Airport in Democratic Republic of Timor Leste

TRI-AXIAL UCS TEST RESULTS (ASTM D-2166)



Borehole No.	Depth, m	-200	LL	PL	PI	Natural Moisture, %	Specific Gravity	Shear Strength, Su, KN/m2	Material
BH#1/UD-2	27.65 - 28.25	70.1	41.0	34.5	6.5	33.7	2.52	35.65	Medium dense dark gray SILT with fine Sand (ML) with low plasticity
BH#2/UD-1	8.50 - 9.10	98.7	41.4	34.5	6.9	36.1	2.25	23.55	Medium dense brownish grey SILT (ML)
BH#3/UD-1	9.05-9.65	68.7	40.3	29.5	10.8	29.4	2.48	30.6	Medium dense brownish grey Sandy SILT (ML) with low plasticity
BH#5/UD-1	4.05 - 4.65	95.4	39.9	27.2	12.7	32.07	2.34	19.4	Very loose brown SILT (ML)