

E N V I R O N M E N T A L P E R M I T

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- 2.0 **PROPONENT** : Ministry of Public Works
Lynch Street
Monrovia Liberia
- 3.0 **PROJECT SITE** : Somalia Drive (Phase II).
Montserrado County, Liberia
- 4.0 **TYPE OF WORK** : **ASPHALT ROAD CONSTRUCTION**
(Reconstruction of the Somalia
Drive Road - Phase II)

In pursuance of the Environment Protection & Management Law of Liberia, 2003 Part III Sections 8 (1), 11 (1) 13 and on the basis of the submitted "Environmental and Social Impact Assessment (ESIA)" and Abbreviated Resettlement Action Plan (RAP), this Environmental permit is **issued** for Ministry of Public Works (MPW) to carry on the reconstruction of the Somalia Drive Road (Phase II) Montserrado County, Liberia.

CONDITION OF PERMIT

5.0 COMPLY WITH THE FOLLOWING GENERAL MEASURES:

5.1 Resettlement Action Plan- Ensure that all affected parties identified in the submitted Abbreviated Resettlement Action Plan are settled before demolition exercises.

5.2 Land Disturbance

The following measures should be taken to minimize erosion:

- a. Schedule measures to avoid and reduce erosion by phasing the work program to minimize land disturbance in the planning and design stage.
- b. Keep the areas of land cleared to a minimum, and the period of time areas remain cleared to a minimum
- c. Base control measures to manage erosion on the vulnerability of cleared land to soil loss, paying particular attention to protecting slopes.

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- d. Mulch, roughen and seed cleared slopes and stockpiles where no works are planned for more than 28 days, with sterile grasses.
- e. Keep vehicles to well-defined haul roads.
- f. Rehabilitate cleared areas promptly.

5.3 Management of Contaminated Storm Water

The following measures should be taken to minimize the generation of contaminated storm water:

- a. Minimize the quantity of uncontaminated storm water entering cleared areas.
- b. Establish cut-off or intercept drains to redirect storm water away from cleared areas and slopes to stable (vegetated) areas or effective treatment installations.
- c. Reduce water velocities.

5.4 Sediment Control

The following measures should be taken to minimize the impact of contaminated storm water on receiving waters:

- a. Install erosion and sediment control measures, if possible before construction commences.
- b. Identify drainage lines and install control measures to handle predicted storm water and sediment loads generated in the mini-catchment.
- c. Establish an adequate inspection, maintenance and cleaning program for sediment run-off control structures.
- d. Ensure that contingency plans are in place for unusual storm events.
- e. Continually assess the effectiveness of sediment control measures and make necessary improvements.

5.5 De-Watering Work Sites

The following measures should be taken to ensure that de-watering operations do not result in turbid water entering natural Waterways:

- a. Treat contaminated water pumped into the storm water system or a natural waterway to remove sediment if the turbidity exceeds 30 NTU.
- b. Ensure that the level of suspended solids in waters pumped into natural waterways never exceeds the regulatory water quality standard.
- c. De-water by pumping water, wherever practical, on to vegetated area of sufficient width to remove suspended soil, or to sediment control devices.
- d. Supervise all pumping and implement precautions to ensure that turbidity of pumped water is minimized.
- e. Monitor every hour during a pumping operation the turbidity of water pumped directly to a natural waterway or a drainage system discharging to a natural waterway. *AV*

5.6 Dust Control

The following measures should be taken to ensure there is no health risk or loss of amenity due to emission of dust to the environment:

- a. Implement a dust prevention strategy, developed at the project planning stage.
- b. Take dust suppression measures, such as promptly watering exposed areas when visible dust is observed.
- c. Install wind fences wherever appropriate

5.7 Management Of Stockpile Sand Batters

The following measures should be taken to manage soil stockpiles so that dust and sediment in run-off are minimized:

- a. Minimize the number of stockpiles, and the area and the time stockpiles are exposed.
- b. Keep topsoil and under burden stockpiles separate.
- c. Locate stockpiles away from drainage lines, at least 10 meters away from natural waterways and where they will be least susceptible to wind erosion.
- d. Ensure that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical).
- e. Stabilize stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass.
- f. Establish sediment controls around unsterilized stockpiles and batters.
- g. Suppress dust on stockpiles and batters, as circumstances demand.

5.8 Noise and Vibration

The following measures should be taken to ensure nuisance from noise and vibration does not occur:

- a. Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site.
- b. Enclose noisy equipment.
- c. Provide noise attenuation screens, where appropriate.
- d. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays, except where, for practical reasons, the activity is unavoidable.
- e. Noise should not be above background levels inside any adjacent residence between 10 pm and 7 am.
- f. Advise local residents when unavoidable out-of-hours work will occur.
- g. Schedule deliveries to the site so that disruption to local amenity and traffic are minimized.
- h. Minimize air vibrations.

5.9 Contaminated Material And Wastes

The following measures should be taken to ensure that all contaminated material uncovered on a construction site are excavated and disposed of in an environmentally responsible manner:

- a. Assay material uncovered on-site prior to disposal. If the wastes include putrescible wastes, then also analyses leachate and landfill gases.
- b. Excavate material in a manner which avoids off-site environmental problems.
- c. Seal remaining contaminated material or wastes, where only part of the tip has been excavated, to ensure that there is no off-site effect now or in the future.
- d. Transport odorous wastes in covered vehicles.
- e. Dispose of contaminated material in a landfill licensed to take the type of contaminated material or wastes uncovered.

6.0 Spraying Bituminous Materials

It is important when spraying bituminous material to ensure that the work practices are consistent with minimizing the risk of the material entering the drainage system and causing an environmental hazard or pollution. This should include:

- a. Ensuring that the surface to be sprayed is adequately compacted and swept and at the appropriate moisture content prior to spraying.
- b. For cutback primers, the surface should be dry but for cutback primerbinders and emulsions the surface should be damp. The retention of windrows of material swept from the pavement along the edges of the pavement can assist in minimizing wash-off.
- c. Positioning of the sprayer to avoid spraying beyond the area to be primed or primersealed, where the bituminous material could be more readily washed into drainage systems.
- d. Ensuring that the sprayer is well-maintained, operated by a trained crew and that spray nozzles are operating correctly so that the bituminous material is applied at the design rate of application uniformly across the surface (two light applications may provide a lower risk than a single heavy application).
- e. Avoiding windy conditions when there is the potential for spray drift into areas adjacent to the pavement.
- f. Establishing appropriate traffic control measures in the event of damage due to wet weather – for primerseals reducing the speed and intensity of traffic can reduce the severity of wash-off.
- g. Clean all equipment in areas that will not impact on the environment or result in wash-off into the stormwater or open waterways. AV

- h. Site supervisors, senior staff and foreman on site should be trained in areas such as inspection procedures, spill prevention and response, correct handling, storage and cleaning procedures, management of waste materials and environmental impacts of primer or primerbinder wash off. Site supervisors and senior staff must ensure all staff follow proper procedures to prevent primer and primer binder wash-off and all staff should be aware of the environmental impacts that may

7.0 HEALTH AND SAFETY

Implement a comprehensive Health and Safety Policy to cover employees, contractors, sub-contractors and suppliers at the construction site during the construction phase:

- a. Ensure the provision of Personal Protective Equipment (PPE) for the entire workforce;
- b. All measures should be taken to avoid air pollution emanating from vehicular emission and Earth Equipment that would impact workers health in the project area;
- c. Ensure the reduction of employee exposure to any other issues arising from projects activities through a routine monitoring of workers' health condition.

8.0 MONITORING REPORT:

The company shall monitor its operations and make an audit report to the Agency biannually.

9.0 REGULATORY MONITORING:

The EPAL reserves itself the right to conduct documentary and field monitoring of the company's operations at any time. The company must facilitate such monitoring by making all documents available, granting Access to sites and facilitating Access to all working areas.

10.0 FINES AND PENALTIES:

All non-compliance with this permit shall be considered a fine as established by the EPA. All fines shall be served with written notification-terms and conditions stipulated therein, based on the level of non-compliance, the EPA reserves the right to hire a third party certified environmental evaluator to assess and remediate said contamination with the permittee undertaking the full cost of the clean-up; however-the permittee also reserves the right to hire a third-party certified environmental evaluator to perform such task with the approval of the EPA.

Should the EPA provide this service, i.e., assessment and remediation of potential environmental degradation, the permittee shall then be liable to pay the EPA a total of three times the cost market value for services performed.

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PERMIT NUMBER: EPA/EC/ESIA/RAP/003-0916

ISSUED DATE: 11/10/16

EXPIRATION DATE: 10/10/18

11.0 NOTIFICATION OF CHANGES

- a. Notify the EPA of any major changes in the planned development other than the information provided in communication and Assessment Form.
- b. Notify the Agency within 72 hours of any environmental emergency onsite, including all measures taken to remedy the situation.

12.0 NOTWITHSTANDING THIS PERMIT, the construction work is subject to other relevant regulations and permits pertaining to the sector and must be observed.

13.0 TRANSFERABILITY: this permit is not transferable, except authorized and approved by the Environmental Protection Agency of Liberia.

14.0 VALIDITY PERIOD, this permit is valid for two (2) years commencing 11th October 2016 to 10th October 2018; renewable under new terms and conditions.

15.0 NOTIFICATION FOR RENEWAL

The company should submit application for renewal of this permit fifteen (15) days prior to its expiration date.

FAILURE TO COMPLY WITH OR OBSERVE ALL THE PERMIT CONDITIONS ABOVE MAY WARRANT FINES AND/OR REVOCATION.

Anyaa Vohiri

Anyaa Vohiri
EXECUTIVE DIRECTOR/CEO

13/10/16

DATE



JICA	RECONSTRUCTION OF THE SOMALIA DRIVE – PHASE 2
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CONSULTATION MEETING MINUTES

Stakeholder visited :	PAPS in 50 ft. from median
Date :	06/03/2016
Time (start – end):	2:30 PM-4:00 PM
Attendees:	13 Persons

Name	Issues Discussed	Response
	We understand that there is a two-lane road presently undergoing construction on the left side of the Somalia drive, will there be another two-lane constructed on the right side as well?	Yes, the right side will also be constructed to a two-lane road to have (4) four lanes, should the Japanese Government agree to the request of the Government of Liberia. But before that, the Japanese's Government through, JICA, has commissioned studies to ascertain the impact the project will have. Hence, our firm, Earth Environmental Consultancy, was contracted to do an environmental impact assessment and a resettlement action plan to ascertain the environmental impact and actual number of Liberian citizens that might be affected by the project, and to make recommendation to the Liberian Government and JICA.
	If the Liberian Government will be making some compensation to all project affected persons (PAPs), with in the 50ft measurement of the right-off way, will that entirely be based on your studies report?	Absolutely. Should there be any compensation of any kind, that has to be implemented based on the reports presented by Earth Environmental Consultancy (EEC), the local firm that was hired.
	During your presentation, you spoke of a study conducted, where your consultancy firm captured structures along the right-off –way in 50ft, 60ft and 75ft. What is it, this meeting only concentrates on structures in 50ft?	Our terms of reference indicated that we conduct our studies within 50 ft., 60 ft. and 75 ft. However so as to reduce the impact of the project, JICA has decided to undertake the construction within 50 ft. from the median of the new road. Within this area, there will be limited impact as only 26 structures might be affected, according to our report.
	You mentioned that the Japanese agency JICA said that they are able to do the road construction with in 50ft. So, why structures within 60ft and 75ft marked?	According to Liberian laws, all roads in Liberia should have a side walls or a path along the road for pedestrians. This area is called the right-of-way (ROW) in some areas, it is 75 ft. from the median. In other areas, it is 150 ft. However, since people have moved into major portion of the RW and to

RECONSTRUCTION OF THE SOMALIA DRIVE – PHASE 2

		<p>reduce the project impact, JICA has proposed to work in 50 ft. of the median.</p>
	<p>Is the (EEC) a private entity or a governmental entity?</p>	<p>Earth Environmental Consultancy or (EEC) is a private entity. It does not work for the Government of Liberia. It was hired by the Japanese company Katahira & Engineers International to conduct the study for JICA.</p>
	<p>What is the actual distance required for right off ways in Liberia?</p>	<p>According to the Liberian Government laws, the right off ways should be 75 ft. or 150ft, on both left and right sides of the road, from the median.</p>
	<p>You spoke of 50ft in your presentation, that the government owns a right-of-way of 75 ft. or 150ft, while the studies was one for 50ft, 60ft, and 75ft. If so, why didn't EEC restrict the exercise to 50ft, knowing that the project can be undertaken in 50ft?</p>	<p>It is obvious that JICA is able to work within 50ft. of the median, but the Japanese government is also interested to know the likely impact the project would have if the project is undertaken within 60 ft. or 75 ft. of the median. The Japanese government does not want the project to affect many persons, that is why the studies were done to ascertain information across the three distances and the 50ft distance impact is less.</p>
	<p>You said that your company EEC was hired to conduct the social economic survey, and you were to make recommendations as an independent entity. Is demolition exercise going to be one of EEC's recommendations?</p>	<p>Development comes with pain. The essence of undertaking the studies is to ascertain if the project can be undertaken without anyone being displaced. If people are to be displaced, the studies also wish to ascertain how the least number of persons can be affected. The last resort is that if structures are to be demolished, there should be no other better alternatives, and the owners of structures to be affected must be compensated and provided other assistance so that their livelihood is not adversely affected.</p>
<p>...</p>	<p>Is it compulsory that all project affected persons (PAPs) within the 50 ft. measurement be compensated?</p>	<p>Yes, all of those identified within the 50 ft. will be compensated.</p>
	<p>We understand that every country around the world needs development though it comes along with a lot of pains. We also know that people should be able to care for themselves before they can make use of whatever development. So, we want you to please convey to the government of Liberia that we need a compensation for the damage to restart our lives.</p>	<p>Thanks for your comment and rest assure it will be conveyed.</p>

7. 収集資料リスト

収集資料リスト

調査名: リベリア国モンロビア首都圏ソマリアドライブ復旧計画フェーズ2準備調査

番号	資料の名称	形態 図書・ビデオ 地図・写真等	オリジナル/ コピー	発行機関	発行年
1	Drawing of Parker Paint Road (From Red Right IS.)	PDF	コピー	From Local Consultant (WRI Inc.) through MoPW	2010-2012
2	Drawing of SKD Road	図書	コピー	From Local Consultant (TSC Engineering & Construction Consultants Inc.) through MoPW	(2013?)
3	01 CIDP FINAL Engineering Design Report	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
4	02 CIDP FINAL Engineering Design Drawing	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
5	03 CIDP FINAL Properties on the Right Of Way	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
6	04 CIDP FINAL PRICED CHIP SEAL & BILL DOCUMENTS	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
7	05 CIDP FINAL UN-PRICED CHIP SEAL & BILL DOCUMENTS	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
8	06 CIDP FINAL PRICED RIGID PAVEMENT BILLS	PDF	コピー	From Local Consultant (TSC)	Sep. 2015
9	GANTA-YEKEPA HIGHWAY UPGRADE PROJECT	図書	コピー	MPW/ArceIorMitta/Campagin e Sahelienne D'Entreprises	2014/12
10	RED LIGHT-GBARNGA-GUINEA BORDER ROAD Lot1: "Red Light-Gate 15-Gbarnga" Road (180.36km)	図書	コピー	MPW/IUU	2012/1
11	RED LIGHT-GBARNGA-GUINEA BORDER ROAD Lot2: "Gbarnga-Ganta-Guinea Border" Road (68.61km)	図書	コピー	MPW/IUU	2013/5

番号	資料の名称	形態 図書・ビデオ 地図・写真等	オリジナル/ コピー	発行機関	発行年
12	Terms of Reference CONSULTANCY SERVICES FOR PREPARATION OF CONCEPTUAL DESIGN, SUPPORT IN PROCUREMENT OF CIVIL WORKS CONTRACT AND MONITORING SUPERVISION SERVICES FOR THE CONSTRUCTION OF FOUR LANE ARTERIAL ROAD FROM S.D. COOPER ROAD INTERSECTION(THROUGH ELWA AND RED LIGHT INTERSECTIONS) TO COCA COLA FACTORY (ALONGRED LIGHT-GBARNGA HIGHWAY)	図書	コピー	MPW/IUU	-
13	Terms of Reference CONSULTANCY SERVICES FOR THE CONCEPTUAL DESIGN AND PREPARATION OF WORKS CONTRACTS FOR GANTA TO TAPPITA APPROXIMATELY 101.4km USING OUTPUT AND PERFORMANCE	図書	コピー	MPW/IUU	-
14	Annual Report -2015	図書	コピー	Central Bank of Liberia	2016/1
15	Strategic Plan	図書	コピー	Ministry of Finance and Development Planning	2015/6

8. 技術資料

8.1 地質調査結果

(1) 路床土の採取及び CBR 試験

- 目的 新設舗装計画位置の路床土の設計 CBR 値の調査を実施する。
- 調査方法 既設道路横にて新設舗装計画の路床土(深度=0.9m~1.2m)を採取し、自然含水比での締め固め、水浸4日後、貫入試験値と標準値の比を測定した。また採取土の物理試験を行った。さらに、アスファルト舗装、路盤の厚みを確認した。



写真-1：採取状況

- 試験数量 対象道路区間の500m毎を基本として26地点で試料採取、試験を行った。

表：CBR 試験結果

測点	設計 CBR 値	測点	設計 CBR 値	測点	設計 CBR 値
Sta. 0+500	12	Sta. 3+950	12	Sta. 7+500	12
Sta. 1+500	12	Sta. 4+000	12	Sta. 9+000	12
Sta. 1+750	12	Sta. 4+500	12	Sta. 9+500	12
Sta. 1+780	12	Sta. 5+000	12	Sta.10+000	12
Sta. 2+000	12	Sta. 5+500	12	Sta.11+000	12
Sta. 2+500	12	Sta. 6+000	8	Sta.11+500	12
Sta. 3+000	12	Sta. 6+500	12	Sta.12+000	12
Sta. 3+500	12	Sta. 7+000	12	Sta.12+500	12
				Sta.13+000	12

(2) 動的コーン貫入試験 (DCP テスト)

- 目的 新設舗装計画位置の地盤の固さ(現場 CBR 値)を調査する。
- 調査方法 既設道路横(新設舗装計画位置)にて0.3~0.5m掘削し、コーンがついたロッドを一定量貫入するために必要な打撃回数を測定した。
- 試験数量 対象道路区間26地点(約500m間隔)と道路舗装に亀裂の多い3箇所(ピット掘削横)で実施した。



写真-2：試験状況

(3) キャスポル試験

- 目的 新設舗装計画位置の地盤の固さ(CBR 値)調査を補完する。
- 調査方法 既設道路横あるいは法下の表土または約0.2~0.3m掘り下げた地盤にキャスポルランマーを落下させ CBR 値を測定した。
- 試験数量 対象道路区間26地点を選定した。



写真-3：試験状況

①DCP, CBR, Caspol 調査結果

DCPT : 26 places

Laboratory test of soil sample : 26 places

Caspol test : 23 places

注) DCP試験

注) CBR試験

$$CBR = 292 / (DCPI)^{1.12}$$

4日水浸 3供試体平均

DCPI : 打撃1回当たりの貫入量

8%~12% 設計CBR 8


$$0.5 \leq CBR \leq 100$$

12%~ 設計CBR 12

0+025 AC

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10						24.4	on walkway surface
0.10 - 0.20	0.10							Max 26.0
0.20 - 0.30	0.10							Mini 21.8
0.30 - 0.40	0.10	5						Black overburden
0.40 - 0.50	0.10	5						
0.50 - 0.60	0.10	5						
0.60 - 0.70	0.10	5						
0.70 - 0.80	0.10	9						
0.80 - 0.90	0.10	25						
0.90 - 1.00	0.10	17						
1.00 - 1.10	0.10	22						
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							


0+250 AC

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10	45					PaveGL-0.1	Gray overburden
0.10 - 0.20	0.10	100					57.6	Max 60.1
0.20 - 0.30	0.10	43						Mini 53.8
0.30 - 0.40	0.10	51						
0.40 - 0.50	0.10	100						
0.50 - 0.60	0.10	100						
0.60 - 0.70	0.10	59						
0.70 - 0.80	0.10	48						
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							spreading thin sand on surface

0+500 AC 75 mm

Depth (m)	Thickness (m)	DCP		Soil SAMPLING		
		CBR	Remark	CBR	Class	Remark
0.00 - 0.10	0.10			soaked CBR test	AASHTO classification of soil	(Dark Brown soil)
0.10 - 0.20	0.10			①、②、③		
0.20 - 0.30	0.10			20.05	A-2-6	P index 13
0.30 - 0.40	0.10			16.31	SC	LL 34
0.40 - 0.50	0.10			12.57		PL 21
0.50 - 0.60	0.10					Consistency Index 0.62
0.60 - 0.70	0.10			ave. 16.3	Clayey Sand	Natural Moisture Content 26%
0.70 - 0.80	0.10			設計 CBR 12.0	Dark Brown	Particle Density 2.69
0.80 - 0.90	0.10					OMC 6.2%
0.90 - 1.00	0.10					MDD 1122kg/CuM
1.00 - 1.10	0.10					
1.10 - 1.20	0.10					
1.20 - 1.30	0.10					

0+750 AC

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.10 - 0.20	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10	70						
0.40 - 0.50	0.10	45						
0.50 - 0.60	0.10	20						
0.60 - 0.70	0.10	28						
0.70 - 0.80	0.10	36						
0.80 - 0.90	0.10	35						
0.90 - 1.00	0.10	37						
1.00 - 1.10	0.10	44						
1.10 - 1.20	0.10	48						
1.20 - 1.30	0.10							

1+000 AC 50 mm
5 Aggregate 315 mm

Depth (m)	Thickness (m)	DCP		Soil SAMPLING		
		CBR	Remark	CBR	Class	Remark
0.00 - 0.10	0.10			soaked CBR test	AASHTO classification of soil	(Dark Gray soil)
0.10 - 0.20	0.10			①、②、③		
0.20 - 0.30	0.10				A-2-6	P index 11
0.30 - 0.40	0.10			16.84	SC	LL 35
0.40 - 0.50	0.10			14.17		PL 24
0.50 - 0.60	0.10			11.50		Consistency Index 0.36
0.60 - 0.70	0.10					Natural Moisture Content 31%
0.70 - 0.80	0.10			ave.		
0.80 - 0.90	0.10			14.2		Particle Density 2.71
0.90 - 1.00	0.10			設計 CBR	Clayey Sand	
1.00 - 1.10	0.10			12.0	Dark Gray	OMC 7.2%
1.10 - 1.20	0.10					MDD 1198kg/CuM
1.20 - 1.30	0.10					

1+250 AC 6
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	17						
0.70 - 0.80	0.10	35						
0.80 - 0.90	0.10	17						
0.90 - 1.00	0.10	13						
1.00 - 1.10	0.10	10						
1.10 - 1.20	0.10	5						
1.20 - 1.30	0.10	5						

1+750 AC 70 mm
7 Aggregate 140 mm

Depth (m)	Thickness (m)	DCP		Soil SAMPLING		
		CBR	Remark	CBR	Class	Remark
0.00 - 0.10	0.10			soaked CBR test	AASHTO classification of soil	(Dark Gray soil)
0.20 - 0.30	0.10			①、②、③		
0.30 - 0.40	0.10			19.25	A-2-6	P index 13
0.40 - 0.50	0.10			17.11	SC	LL 35
0.50 - 0.60	0.10			12.03		PL 22
0.60 - 0.70	0.10			ave.	Clayey Sand	Consistency Index 0.54
0.70 - 0.80	0.10			16.1		Natural Moisture Content 28%
0.80 - 0.90	0.10			設計 CBR	Green Gray	Particle Density 2.73
0.90 - 1.00	0.10			12.0		
1.00 - 1.10	0.10					OMC 9.0%
1.10 - 1.20	0.10					MDD 1064kg/CuM
1.20 - 1.30	0.10					

1+780 AC 50
8 Aggregate 120

Depth (m)	Thickness (m)	DCP		Soil SAMPLING		
		CBR	Remark	CBR	Class	Remark
0.00 - 0.10	0.10			soaked CBR test	AASHTO classification of soil	(Brown soil)
0.20 - 0.30	0.10			①、②、③		
0.30 - 0.40	0.10			22.19	A-2-6	P index 12
0.40 - 0.50	0.10	6		19.12	Clayey Sand	LL 32
0.50 - 0.60	0.10	7		16.04	Brown	PL 20
0.60 - 0.70	0.10	9		ave.		Consistency Index 0.75
0.70 - 0.80	0.10	12		19.1	Green Gray	Natural Moisture Content 23%
0.80 - 0.90	0.10	15		設計 CBR		Particle Density 2.71
0.90 - 1.00	0.10	16		12.0		
1.00 - 1.10	0.10	16				
1.10 - 1.20	0.10	14				
1.20 - 1.30	0.10	13				

2+000 AC
9 Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10			soaked CBR test				
0.20 - 0.30	0.10			①、②、③				
0.30 - 0.40	0.10			14.97				
0.40 - 0.50	0.10			12.83				
0.50 - 0.60	0.10			10.70				
0.60 - 0.70	0.10							
0.70 - 0.80	0.10			ave.				
0.80 - 0.90	0.10			12.8	Light green			
0.90 - 1.00	0.10			設計 CBR				
1.00 - 1.10	0.10			12.0				
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							

2+250 AC
10 Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							at road side of Phase I
0.20 - 0.30	0.10							Green Yellow soil
0.30 - 0.40	0.10							Max 33.0
0.40 - 0.50	0.10							Mini 23.3
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	3						
0.70 - 0.80	0.10	4						
0.80 - 0.90	0.10	7						
0.90 - 1.00	0.10	9						
1.00 - 1.10	0.10	11						
1.10 - 1.20	0.10	13						
1.20 - 1.30	0.10	13						


2+500 AC
11 Aggregate


60
130



Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10			soaked CBR test				
0.20 - 0.30	0.10			①、②、③				
0.30 - 0.40	0.10			18.18				at 0.8m below
0.40 - 0.50	0.10			16.71				from road shoulder
0.50 - 0.60	0.10			15.24				Brown soil
0.60 - 0.70	0.10							
0.70 - 0.80	0.10			ave.				
0.80 - 0.90	0.10			16.7				
0.90 - 1.00	0.10			設計 CBR	Gray			
1.00 - 1.10	0.10			12.0				
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							



2+750 AC
12 Aggregate


Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							at 1.1m below
0.20 - 0.30	0.10							from road shoulder
0.30 - 0.40	0.10							Brown soil
0.40 - 0.50	0.10	59						
0.50 - 0.60	0.10	79						
0.60 - 0.70	0.10	82						
0.70 - 0.80	0.10	59						
0.80 - 0.90	0.10	79						
0.90 - 1.00	0.10	93						
1.00 - 1.10	0.10	68						
1.10 - 1.20	0.10	55						
1.20 - 1.30	0.10							

3+000		AC						
13		Aggregate						
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 20.32 17.51 14.71 ave. 17.5 設計 CBR 12.0	Green			
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							


3+250		AC						
14		Aggregate						
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10	22						
0.50 - 0.60	0.10	21						
0.60 - 0.70	0.10	17						
0.70 - 0.80	0.10	41						
0.80 - 0.90	0.10	81						
0.90 - 1.00	0.10	83						
1.00 - 1.10	0.10	43						
1.10 - 1.20	0.10	17						
1.20 - 1.30	0.10							
1.20 - 1.30	0.10							
							PaveGL-1.0 45	Max 51.0 Mini 40.5 at 0.8m below from road shoulder Yellow Brown soil

3+500		AC						
15		Aggregate						
				80				
				140				
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 17.91 16.31 13.90 ave. 16.0 設計 CBR 12.0	Yellow			
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							
							PaveGL-1.4 31.7	at 1.2m below from road shoulder Brownish Black soil 

3+750		AC						
16		Aggregate						
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10	37						
0.60 - 0.70	0.10	40						
0.70 - 0.80	0.10	51						
0.80 - 0.90	0.10	45						
0.90 - 1.00	0.10	40						
1.00 - 1.10	0.10	25						
1.10 - 1.20	0.10	14						
1.20 - 1.30	0.10							
1.20 - 1.30	0.10							
1.20 - 1.30	0.10							
							PaveGL-0.5 61.9	at road side of Phase I Yellow Brown soil Max 66.2 Mini 54.3 



3+950		AC							
17		Aggregate							
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10								
0.20 - 0.30	0.10								
0.20 - 0.30	0.10							at 1m below from road shoulder	
0.30 - 0.40	0.10							Brown soil	
0.40 - 0.50	0.10			soaked CBR test ①、②、③					
0.50 - 0.60	0.10								
0.60 - 0.70	0.10			19.25					
0.70 - 0.80	0.10			16.58					
0.80 - 0.90	0.10			13.90					
0.90 - 1.00	0.10			ave.			PaveGL-1.1	Max 48.5	
1.00 - 1.10	0.10			16.6			39.8	Mini 32.5	
1.10 - 1.20	0.10			設計 CBR	Green				
1.20 - 1.30	0.10			12.0					

4+000		AC							
18		Aggregate							
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10								
0.20 - 0.30	0.10								
0.20 - 0.30	0.10								
0.30 - 0.40	0.10								
0.40 - 0.50	0.10			soaked CBR test ①、②、③					
0.50 - 0.60	0.10			21.12					
0.60 - 0.70	0.10			17.91					
0.70 - 0.80	0.10			15.51					
0.80 - 0.90	0.10			ave.					
0.90 - 1.00	0.10			18.2					
1.00 - 1.10	0.10			設計 CBR	Dark green gray				
1.10 - 1.20	0.10			12.0					
1.20 - 1.30	0.10								


4+250		AC							
19		Aggregate							
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10								
0.20 - 0.30	0.10								
0.20 - 0.30	0.10							at road shoulder	
0.30 - 0.40	0.10	35						Gray soil	
0.40 - 0.50	0.10	43						Max 27.1	
0.50 - 0.60	0.10	47						Mini 21.2	
0.60 - 0.70	0.10	37							
0.70 - 0.80	0.10	32							
0.80 - 0.90	0.10	28							
0.90 - 1.00	0.10	21							
1.00 - 1.10	0.10	19							
1.10 - 1.20	0.10	22							
1.20 - 1.30	0.10								

4+500		AC		50					
20		Aggregate		230					
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10								
0.20 - 0.30	0.10								
0.20 - 0.30	0.10								
0.30 - 0.40	0.10			soaked CBR test ①、②、③					
0.40 - 0.50	0.10			17.65					
0.50 - 0.60	0.10			16.84					
0.60 - 0.70	0.10			16.04					
0.70 - 0.80	0.10			ave.					
0.80 - 0.90	0.10			16.8					
0.90 - 1.00	0.10			設計 CBR	Yellow Brown				
1.00 - 1.10	0.10			12.0					
1.10 - 1.20	0.10								
1.20 - 1.30	0.10								


4+750 AC
21 Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10						at 0.6m below from road shoulder	
0.20 - 0.30	0.10						Brown soil Max 34.4 Mini 28.1	
0.30 - 0.40	0.10	37						
0.40 - 0.50	0.10	46						
0.50 - 0.60	0.10	56						
0.60 - 0.70	0.10	44						
0.70 - 0.80	0.10	24						
0.80 - 0.90	0.10	13						
0.90 - 1.00	0.10	8						
1.00 - 1.10	0.10	6						
1.10 - 1.20	0.10	6						
1.20 - 1.30	0.10							


5+000 AC 100
22 Aggregate 200

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10						at 1.0m below from road shoulder Yellow Brown soil Max 35.1 Mini 18.3	
0.20 - 0.30	0.10							
0.30 - 0.40	0.10			soaked CBR test ①、②、③				
0.40 - 0.50	0.10					17.91		
0.50 - 0.60	0.10					14.30		
0.60 - 0.70	0.10					10.70		
0.80 - 0.90	0.10					ave.		
0.90 - 1.00	0.10					14.3		
1.00 - 1.10	0.10					設計 CBR		
1.10 - 1.20	0.10					12.0		
1.20 - 1.30	0.10				Dark Yellow Green			

5+250 AC
23 Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10	22						
0.50 - 0.60	0.10	39						
0.60 - 0.70	0.10	57						
0.70 - 0.80	0.10	47						
0.80 - 0.90	0.10	27						
0.90 - 1.00	0.10	21						
1.00 - 1.10	0.10	17						
1.10 - 1.20	0.10	13						
1.20 - 1.30	0.10							

5+500 AC 68
24 Aggregate 180

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10			soaked CBR test ①、②、③				
0.50 - 0.60	0.10					21.39		
0.60 - 0.70	0.10					19.25		
0.70 - 0.80	0.10					13.37		
0.80 - 0.90	0.10					ave.		
0.90 - 1.00	0.10					18.0		
1.00 - 1.10	0.10					設計 CBR		
1.10 - 1.20	0.10					12.0		
1.20 - 1.30	0.10				Yellow Gray			

5+750 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							at road side of Phase I Yellow soil Max 21.8 Mini 17.8
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	8						
0.70 - 0.80	0.10	3						
0.80 - 0.90	0.10	5						
0.90 - 1.00	0.10	8						
1.00 - 1.10	0.10	8						
1.10 - 1.20	0.10	6						
1.20 - 1.30	0.10	6						



6+000 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							

soaked CBR test
①、②、③

13.10

12.03

10.16

ave.

11.8

設計 CBR

8.0

Yellow Brown

6+300 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	37						
0.70 - 0.80	0.10	27						
0.80 - 0.90	0.10	22						
0.90 - 1.00	0.10	20						
1.00 - 1.10	0.10	15						
1.10 - 1.20	0.10	15						
1.20 - 1.30	0.10	22						



6+500 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							

soaked CBR test
①、②、③

18.18

15.24

12.30

ave.

15.2

設計 CBR


12.0

Grayish Black



6+750 AC
29 Aggregate



Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	35						
0.70 - 0.80	0.10	33						
0.80 - 0.90	0.10	40						
0.90 - 1.00	0.10	67						
1.00 - 1.10	0.10	85						
1.10 - 1.20	0.10	87						
1.20 - 1.30	0.10	90						



7+000 AC
30 Aggregate



65
230

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10						PaveGL-0.1	Light brown overburden at road shoulder
0.20 - 0.30	0.10						48.7	
0.20 - 0.30	0.10			soaked CBR test				Max 52.7
0.30 - 0.40	0.10			①、②、③				Mini 43.5
0.40 - 0.50	0.10			20.32				
0.50 - 0.60	0.10			18.85				
0.60 - 0.70	0.10			17.38				
0.70 - 0.80	0.10							
0.80 - 0.90	0.10			ave.				
0.90 - 1.00	0.10			18.9				
1.00 - 1.10	0.10			設計 CBR	Light Gray			
1.10 - 1.20	0.10			12.0				
1.20 - 1.30	0.10							

7+250 AC
31 Aggregate



Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							at 0.9m below from road shoulder
0.20 - 0.30	0.10							Yellow White soil
0.20 - 0.30	0.10							Max 37.3
0.30 - 0.40	0.10							Mini 19.9
0.40 - 0.50	0.10	54						
0.50 - 0.60	0.10	66						
0.60 - 0.70	0.10	100						
0.70 - 0.80	0.10	100						
0.80 - 0.90	0.10	100						
0.90 - 1.00	0.10	100						
1.00 - 1.10	0.10	100						
1.10 - 1.20	0.10	100					PaveGL-1.1	
1.20 - 1.30	0.10	74					27.9	






7+500 AC
32 Aggregate


60
200


Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							Brown soil
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10			soaked CBR test				
0.40 - 0.50	0.10			①、②、③				
0.50 - 0.60	0.10			19.25				
0.60 - 0.70	0.10			16.04				
0.70 - 0.80	0.10			12.83				
0.80 - 0.90	0.10							
0.90 - 1.00	0.10			ave.				
1.00 - 1.10	0.10			16.0				
1.10 - 1.20	0.10			設計 CBR	Yellow Gray			at 1.0m below from road shoulder
1.20 - 1.30	0.10			12.0			PaveGL-1.3	Max 28.1
							20.4	Mini 14.9







7+750 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							at 1.0m below from road shoulder Dark Brown soil Max 26.7 Mini 18.9 
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10	32						
0.70 - 0.80	0.10	49						
0.80 - 0.90	0.10	60						
0.90 - 1.00	0.10	51						
1.00 - 1.10	0.10	45						
1.10 - 1.20	0.10	54						
1.20 - 1.30	0.10	67						


8+000 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							at 1.3m below from road shoulder Yellow soil Max 25.4 Mini 20.4 
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10	56						
0.60 - 0.70	0.10	87						
0.70 - 0.80	0.10	70						
0.80 - 0.90	0.10	79						
0.90 - 1.00	0.10	76						
1.00 - 1.10	0.10	48						
1.10 - 1.20	0.10	27						
1.20 - 1.30	0.10	22						


9+000 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							soaked CBR test ①、②、③ 17.91 15.24 12.83 ave. 15.3 設計 CBR 12.0 Light Brown 
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							

9+250 AC		Aggregate		Soil SAMPLING			CASPOL	
Depth (m)	Thickness (m)	DCP		CBR	Class	Remark	CBR	Remark
		CBR	Remark					
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10	79						
0.60 - 0.70	0.10	97						
0.70 - 0.80	0.10	100						
0.80 - 0.90	0.10	88						
0.90 - 1.00	0.10	77						
1.00 - 1.10	0.10	62						
1.10 - 1.20	0.10	48						
1.20 - 1.30	0.10	43						


9+500		AC		55					
37		Aggregate		170					
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 18.72 16.58 13.64 ave. 16.3 設計 CBR 12.0	Yellow Brown				
0.20 - 0.30	0.10								
0.20 - 0.30	0.10								
0.30 - 0.40	0.10								
0.40 - 0.50	0.10								
0.50 - 0.60	0.10								
0.60 - 0.70	0.10								
0.70 - 0.80	0.10								
0.80 - 0.90	0.10								
0.90 - 1.00	0.10								
1.00 - 1.10	0.10								
1.10 - 1.20	0.10								
1.20 - 1.30	0.10								

9+750		AC		70					
38		Aggregate		120					
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10							at 0.5m below from road shoulder	
0.20 - 0.30	0.10							White soil	
0.20 - 0.30	0.10							Max 41.5	
0.30 - 0.40	0.10							Mini 27.3	
0.40 - 0.50	0.10	48							
0.50 - 0.60	0.10	51							
0.60 - 0.70	0.10	69							
0.70 - 0.80	0.10	100							
0.80 - 0.90	0.10	100							
0.90 - 1.00	0.10	100							
1.00 - 1.10	0.10	100							
1.10 - 1.20	0.10	100							
1.20 - 1.30	0.10	100							
									PaveGL-0.7 35.5
									

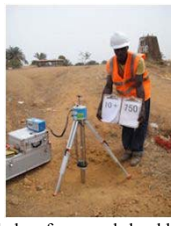
10+000		AC		70					
39		Aggregate		120					
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 17.38 14.44 11.50 ave. 14.4 設計 CBR 12.0	Brown				
0.20 - 0.30	0.10								
0.20 - 0.30	0.10								
0.30 - 0.40	0.10								
0.40 - 0.50	0.10								
0.50 - 0.60	0.10								
0.60 - 0.70	0.10								
0.70 - 0.80	0.10								
0.80 - 0.90	0.10								
0.90 - 1.00	0.10								
1.00 - 1.10	0.10								
1.10 - 1.20	0.10								
1.20 - 1.30	0.10								

10+250		AC		70					
40		Aggregate		120					
Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL		
		CBR	Remark	CBR	Class	Remark	CBR	Remark	
0.00 - 0.10	0.10								
0.20 - 0.30	0.10								
0.20 - 0.30	0.10								
0.30 - 0.40	0.10								
0.40 - 0.50	0.10	27							
0.50 - 0.60	0.10	80							
0.60 - 0.70	0.10	100							
0.70 - 0.80	0.10	64							
0.80 - 0.90	0.10	26							
0.90 - 1.00	0.10	16							
1.00 - 1.10	0.10	12							
1.10 - 1.20	0.10	14							
1.20 - 1.30	0.10								


10+500 AC 45
41 Aggregate 150

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 16.58 15.78 14.97 ave. 15.8 設計 CBR 12.0	Light Brown			
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10							
0.60 - 0.70	0.10							
0.70 - 0.80	0.10							
0.80 - 0.90	0.10							
0.90 - 1.00	0.10							
1.00 - 1.10	0.10							
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							


10+750 AC 42
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							Light Brown soil
0.20 - 0.30	0.10							 at 1.3m below from road shoulder PaveGL-1.5 Max 58.3 49.7 Mini 44.9
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10	40						
0.50 - 0.60	0.10	32						
0.60 - 0.70	0.10	59						
0.70 - 0.80	0.10	43						
0.80 - 0.90	0.10	37						
0.90 - 1.00	0.10	54						
1.00 - 1.10	0.10	35						
1.10 - 1.20	0.10	22						
1.20 - 1.30	0.10							


11+000 AC 65
43 Aggregate 140

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10			soaked CBR test ①、②、③ 18.18 16.84 15.51 ave. 16.8 設計 CBR 12.0	Green Gray			
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10	40						
0.60 - 0.70	0.10	45						
0.70 - 0.80	0.10	35						
0.80 - 0.90	0.10	30						
0.90 - 1.00	0.10	27						
1.00 - 1.10	0.10	37						
1.10 - 1.20	0.10	20						
1.20 - 1.30	0.10							

11+250 AC 44
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							Yellow Brown soil
0.20 - 0.30	0.10							 at excavated DCPT point Max 33.0 Mini 11.5
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10	7						
0.50 - 0.60	0.10	8						
0.60 - 0.70	0.10	8						
0.70 - 0.80	0.10	6						
0.80 - 0.90	0.10	7						
0.90 - 1.00	0.10	8						
1.00 - 1.10	0.10	8						
1.10 - 1.20	0.10	8						
1.20 - 1.30	0.10							


11+500 AC 50
45 Aggregate 140

Depth (m)	Thickness (m)	DCP		Soil SAMPLING		
		CBR	Remark	CBR	Class	Remark
0.00 - 0.10	0.10					(Brown soil)
0.20 - 0.30	0.10			soaked CBR test	AASHTO classification of soil A-2-6 SC Clayey Sand Brown	 P index 11 LL 31 PL 20 Consistency Index 0.64 Natural Moisture Content 24% Particle Density 2.73 OMC 6.5% MDD 1130kg/CuM
0.20 - 0.30	0.10			①、②、③		
0.30 - 0.40	0.10			14.97		
0.40 - 0.5 0	0.10	37		12.57		
0.50 - 0.60	0.10	40		11.23		
0.60 - 0.70	0.10	48				
0.70 - 0.80	0.10	42		ave.		
0.80 - 0.90	0.10	26		12.9		
0.90 - 1.00	0.10	28		設計 CBR		
1.00 - 1.10	0.10	31		12.0		
1.10 - 1.20	0.10	27				
1.20 - 1.30	0.10					

11+750 AC 46
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.5 0	0.10	22						
0.50 - 0.60	0.10	35						
0.60 - 0.70	0.10	30						
0.70 - 0.80	0.10	27						
0.80 - 0.90	0.10	25						
0.90 - 1.00	0.10	22						
1.00 - 1.10	0.10	20						
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							


12+000 AC 48
47 Aggregate 187

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10			soaked CBR test	 ①、②、③			
0.30 - 0.40	0.10			17.91				
0.40 - 0.5 0	0.10			16.31				
0.50 - 0.60	0.10			14.71				
0.60 - 0.70	0.10							
0.70 - 0.80	0.10			ave.				
0.80 - 0.90	0.10			16.3				
0.90 - 1.00	0.10			設計 CBR				
1.00 - 1.10	0.10			12.0				
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							


12+250 AC 48
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.5 0	0.10	30						
0.50 - 0.60	0.10	23						
0.60 - 0.70	0.10	15						
0.70 - 0.80	0.10	11						
0.80 - 0.90	0.10	11						
0.90 - 1.00	0.10	11						
1.00 - 1.10	0.10	9						
1.10 - 1.20	0.10	8						
1.20 - 1.30	0.10							

12+500 AC 55
49 Aggregate 180

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10			soaked CBR test ①、②、③				
0.40 - 0.50	0.10			17.11				
0.50 - 0.60	0.10			15.51				
0.60 - 0.70	0.10			13.90				
0.70 - 0.80	0.10							
0.80 - 0.90	0.10			ave.				
0.90 - 1.00	0.10			15.5				
1.00 - 1.10	0.10			設計 CBR	Yellow Brown			
1.10 - 1.20	0.10			12.0				
1.20 - 1.30	0.10							

12+750 AC 50
Aggregate

Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10	15						
0.50 - 0.60	0.10	18						
0.60 - 0.70	0.10	27						
0.70 - 0.80	0.10	36						
0.80 - 0.90	0.10	44						
0.90 - 1.00	0.10	39						
1.00 - 1.10	0.10	30						
1.10 - 1.20	0.10	30						
1.20 - 1.30	0.10							

13+000 AC 51
Aggregate



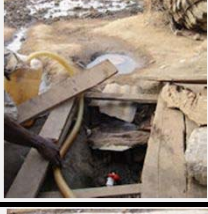





Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10			soaked CBR test ①、②、③				
0.20 - 0.30	0.10							
0.30 - 0.40	0.10			17.91				
0.40 - 0.50	0.10			17.51				
0.50 - 0.60	0.10			17.11				
0.60 - 0.70	0.10							
0.70 - 0.80	0.10			ave.				
0.80 - 0.90	0.10			17.5				
0.90 - 1.00	0.10			設計 CBR				
1.00 - 1.10	0.10			12.0				
1.10 - 1.20	0.10							
1.20 - 1.30	0.10							










13+230 AC 52
Aggregate








Depth (m)	Thickness (m)	DCP		Soil SAMPLING			CASPOL	
		CBR	Remark	CBR	Class	Remark	CBR	Remark
0.00 - 0.10	0.10							
0.20 - 0.30	0.10							
0.20 - 0.30	0.10							
0.30 - 0.40	0.10							
0.40 - 0.50	0.10							
0.50 - 0.60	0.10	25						
0.60 - 0.70	0.10	38						
0.70 - 0.80	0.10	55						
0.80 - 0.90	0.10	43						
0.90 - 1.00	0.10	27						
1.00 - 1.10	0.10	28						
1.10 - 1.20	0.10	30						
1.20 - 1.30	0.10	30						

②埋設物調査結果

Utility (Water Pipe) Investigation Result

Station Nr/ Chainage	Location Description	Service type	Coordinates		Depth of Utility (m)	Old/New	Type, Diameter Size	Rating	Run Dist. from Pavement edge (m)	Remarks
			Eastings	Northings						
0+700	Doe Community Junction	Water pipe	302296	700994	1.27	Old	PVC, 4"	Major	8	
1+230	Jamaica Junction	W.P	302631	700972	2.65	Old	PVC, 4"	Major	5.3	
2+175		W.P	303723	700967	0.62	Old	PVC, 2"	Minor	1.5	
2+200	200m from station 2+000	W.P	303773	700965	0.74	Old	PVC, 2"	Minor	5	
2+650	Topo village junction	W.P	304200	700912	1.9	Old	PVC, 4"	Major	13.5	
2+800	Opp old filling station Topo village	W.P	304351	700903	1.88	Old	Galv. 4"	Major	2.6	
3+400	Iron factory, opp Dukuly F.S	W.P	304951	700813	1.68	Old	Galv. 4"	Major	3.3	
4+325	By Total F.S, new georgia	W.P	305795	700708	1.75	New	PVC, 4"	Major	Nil	

4+550	New Georgia junction	W.P	305869	700704	1.93	New	PVC, 6"	Major	Nil	
4+632	Life water premises	W.P	306172	700658	2.6	Old	PVC, 2"	Minor	3	
4+870		W.P	306412	700621	1.27	Old	PVC, 2"	Minor	4.5	
6+230	Barnerville junction	W.P	307602	700025	2.31	New	PVC, 6"	Major	Nil	
6+850	LPRC junction	W.P	308148	699673	2.11	New	PVC, 4"	Major	Nil	
7+230	NTA junction	W.P	308362	699374	1.34	Old	PVC, 2"	Minor	2.1	
8+140	Double bridge, Boboh town community	W.P	308457	698566	2.18	New	PVC, 6"	Major	Nil	
8+736	486m from double bridge	W.P	308774	698456	1.84	Old	PVC, 4"	Major	3	
9+320	New Hope junction	W.P	309165	697245	1.73	New	PVC, 4"	Major	Nil	

9+930	St. Francis junction	W.P	310118	697465	2.6	Old	Galv. 4"	Major	5.7	
10+480	Jay's unique restaurant	W.P	310503	697207	2.36	Old	PVC, 2"	Minor	7	
10+950	10m to station 11+000	W.P	310631	697110	1.89	New	PVC, 4"	Major	Nil	
11+450	In culvert	W.P	311420	696915	1.65	Old	PVC, 4"	Major	Nil	
11+820	10m from 72 nd junction to R/L	W.P	311590	696938	2.1	New	PVC, 4"	Major	Nil	
12+200	Close to Redlight park	W.P	312145	696261	1.95	New	PVC, 4"	Major	Nil	
12+680	Close to shopping mall	W.P	312565	696025	1.85	New	PVC, 4"	Major	Nil	

Note) New : New placed pipe crossing under Phase I and extending under Phase II in near future
Old : Pipe crossing under Phase I and Phase II already at present

8.2 既存道路狀況調査結果
① 既存道狀況

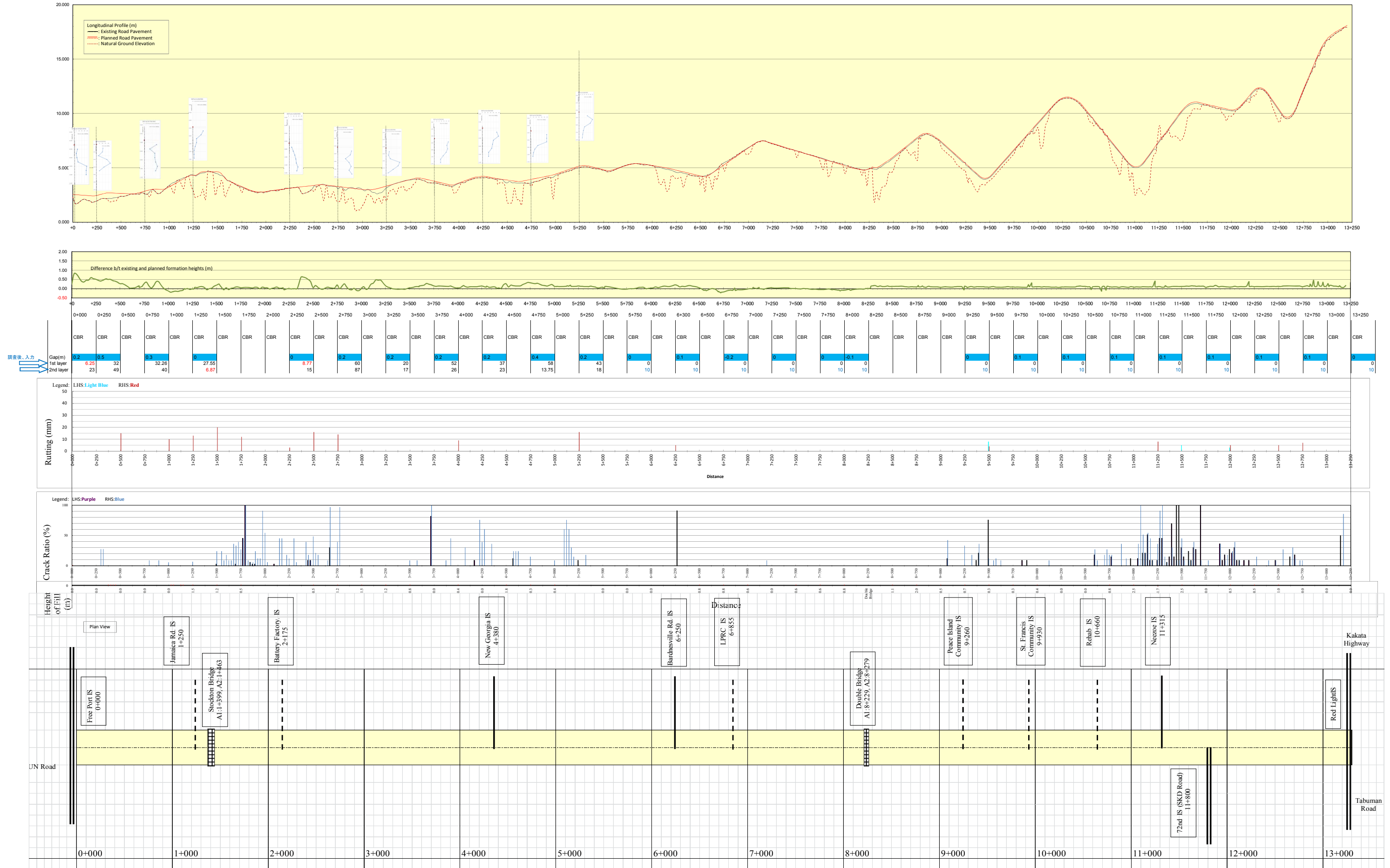
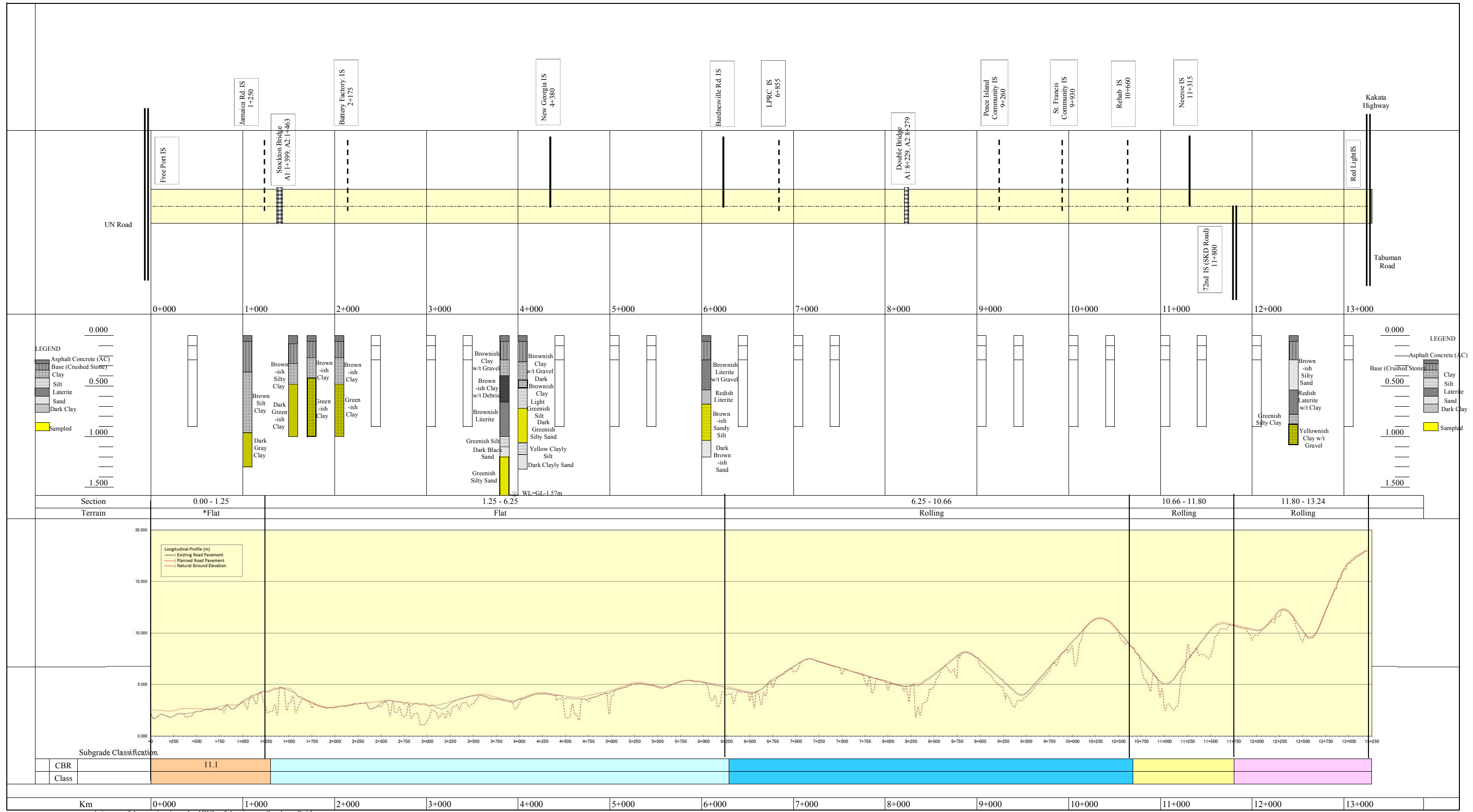


図8.2-1：既存道路狀況図

② 既存道路試掘結果



* A part of the section is under HWL of the river at Stockton Bridge.





図8.2-2 : 試掘結果







③既存舗装損傷現地調査結果







ソマリアドライブの舗装剥離、大規模損傷箇所
Table- Outline of present major damaged location on Somalia Drive

番号 No.	測点 Station	LHS				RHS				備考 Remarks
		現地盤か らの盛土 高(m) Height of Fill(m)	損傷幅 (m) Width of damaged (m)	損傷長さ (m) Length of damaged (m)	損傷面積 (m2) Area of damaged (m)	損傷幅 (m) Width of damaged (m)	損傷長さ (m) Length of damaged (m)	損傷面積 (m2) Area of damaged (m)	損傷区分 Sorts of damaged	
	0+000	0.0								Free Port IS.
D1	0+280	0.0				1.0	30.0	30.0	Major depression	
D2	0+320	0.0				1.0	7.0	7.0	Major depression	
D3	0+800	0.0				1.0	20.0	20.0	Major depression	
D4	0+900	0.0				1.0	20.0	20.0	Major depression	
D5-1	1+780	0.5	3.3	15.0	49.5				Surface is severely corrupted	320m from Stockton Bridge
D5-2	1+780	0.5				3.3	15.0	49.5	Surface is severely corrupted	320m from Stockton Bridge
D6	4+250	0.0	0.0	0.0	0.0	1.0	10.0	10.0	Major depression	130m from New Goergia IS. towards BP
D7	5+140	0.0	0.0	0.0	0.0	2.0	15.0	30.0	Major depression	
D8	5+200	0.0	0.0	0.0	0.0	1.0	15.0	15.0	Major depression	
D9	5+350	0.0	0.0	0.0	0.0	2.0	6.0	12.0	Major depression	
D10	5+950	0.0	0.0	0.0	0.0	1.0	1.0	1.0	Major pothole	
D11	5+955	0.0	0.0	0.0	0.0	1.0	10.0	10.0	Major depression	
D12	9+380	1.5	0.0	0.0	0.0	1.0	7.0	7.0	Major pothole	120m from Peace Island IS. towards EP
D13	9+495	0.3	0.0	0.0	0.0	1.6	2.0	3.2	Major pothole	
D14	9+810	0.0	0.0	0.0	0.0	1.5	6.0	9.0	Major pothole	120m from St.Francis IS. towards BP
D15	11+020	2.0	0.0	0.0	0.0	1.5	22.0	33.0	Major pothole	
D16	11+100	3.0	0.0	0.0	0.0	3.0	3.0	9.0	Surface is severely corrupted	
D17	11+245	-1.4	0.0	0.0	0.0	1.5	1.0	1.5	Major pothole	
D18	11+280	0.0	0.0	0.0	0.0	1.5	30.0	45.0	Surface is severely corrupted	In Neezoe IS.
D19	11+700	0.0	3.3	7.0	23.1				Major pothole	From 72nd IS. towards BP
Total					72.6			312.2		m2
						Grand total		384.8		m2
						Total Pavement Area		87,384.0		m2
						Major damaged ratio		0.44%		







Feb. 2016

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D19	11 + 700	0.0	6.60	From 72nd IS. Towards BP	
			11.70 km from Free Port IS		1.54 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Left hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major pot-hole					Type of Defects	Major pot-hole
	The width of Defects (m)	3.3					The length of Defects (m)	7.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D18	11 + 280	0.0	6.60	Neezoe IS.	
			11.28 km from Free Port IS		1.96 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Surface is severely					Type of Defects	Surface is severely
	The width of Defects (m)	1.5					The length of Defects (m)	30.0
								







Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D17	11 + 245	-1.4	6.60	
			11.25 km from Free Port IS		2 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major pot-hole			Type of Defects	Major pot-hole	
	The width of Defects (m)	1.5			The length of Defects (m)	1.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D16	11 + 100	3.0	6.60	
			11.10 km from Free Port IS		2.14 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Surface is severely			Type of Defects	Surface is severely	
	The width of Defects (m)	3.0			The length of Defects (m)	3.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D15	11 + 20	2.0	6.60	
			11.02 km from Free Port IS		2.22 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major pot-hole			Type of Defects	Major pot-hole	
	The width of Defects (m)	1.5			The length of Defects (m)	22.0	
							

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D14	9 + 810	0.0	6.60	120m from St.Francis IS. towards BP	
			9.81 km from Free Port IS		3.43 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major pot-hole					Type of Defects	Major pot-hole
	The width of Defects (m)	1.5					The length of Defects (m)	6.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D13	9 + 495	0.3	6.60		
			9.50 km from Free Port IS		3.75 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major pot-hole					Type of Defects	Major pot-hole
	The width of Defects (m)	1.6					The length of Defects (m)	2.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D12	9 + 380	1.5	6.60	120m from Peace Island IS. towards EP	
			9.38 km from Free Port IS		3.86 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major pot-hole					Type of Defects	Major pot-hole
	The width of Defects (m)	1.0					The length of Defects (m)	7.0
								

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D11	5 + 955	0.0	6.60	
			5.96 km from Free Port IS		7.29 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major depression			Type of Defects	Major depression	
	The width of Defects (m)	1.0			The length of Defects (m)	10.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D10	5 + 950	0.0	6.60	
			5.95 km from Free Port IS		7.29 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major pot-hole			Type of Defects	Major pot-hole	
	The width of Defects (m)	1.0			The length of Defects (m)	1.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D9	5 + 350	0.0	6.60	
			5.35 km from Free Port IS		7.89 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major depression			Type of Defects	Major depression	
	The width of Defects (m)	2.0			The length of Defects (m)	6.0	
							

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D8	5 + 200	0.0	6.60	
			5.20 km from Free Port IS		8.04 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major depression			Type of Defects	Major depression	
	The width of Defects (m)	1.0			The length of Defects (m)	15.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D7	5 + 140	0.0	6.60	
			5.14 km from Free Port IS		8.1 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major depression			Type of Defects	Major depression	
	The width of Defects (m)	2.0			The length of Defects (m)	15.0	
							
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks
Date: February 2016			D6	4 + 250	0.0	6.60	130m from New Goergia IS. towards BP
			4.25 km from Free Port IS		8.99 km from Red Light IS		
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS		Existing Lane width (m)	3.30	
	Type of Defects	Major depression			Type of Defects	Major depression	
	The width of Defects (m)	1.0			The length of Defects (m)	10.0	
							

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D5-2	1 + 780	0.5	6.60	320m from Stockton Bridge	
			1.78 km from Free Port IS		11.46 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Surface is severely distressed					Type of Defects	Surface is severely distressed
	The width of Defects (m)	3.3					The length of Defects (m)	15.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D5-1	1 + 780	0.5	6.60	320m from Stockton Bridge	
			1.78 km from Free Port IS		11.46 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Left hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Surface is severely distressed					Type of Defects	Surface is severely distressed
	The width of Defects (m)	3.3					The length of Defects (m)	15.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D4	0 + 900	0.0	6.60		
			0.90 km from Free Port IS		12.34 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major depression					Type of Defects	Major depression
	The width of Defects (m)	1.0					The length of Defects (m)	20.0
								

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D3	0 + 800	0.0	6.60		
			0.80 km from Free Port IS		12.44 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major depression					Type of Defects	Major depression
	The width of Defects (m)	1.0					The length of Defects (m)	20.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D2	0 + 320	0.0	6.60		
			0.32 km from Free Port IS		12.92 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major depression					Type of Defects	Major depression
	The width of Defects (m)	1.0					The length of Defects (m)	7.0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			D1	0 + 280	0.0	6.60		
			0.28 km from Free Port IS		12.96 km from Red Light IS			
Right hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Type of Defects	Major depression					Type of Defects	Major depression
	The width of Defects (m)	1.0					The length of Defects (m)	30.0
								

④わだち掘れ現地調査結果

ソマリアドライブのわだち掘れ状況測定
(ひび割れ箇所を参考に代表断面を抽出)

Table- Outline of rutting condition on behalf of present 250m interval road surface survey on Somalia Drive based on existing road surface condition survey






Feb. 2016

番号 No.	測点 Station	現地盤からの盛土高 (m) Height of Fill(m)	LHS			RHS		備考 Remarks
			わだち掘れ 量(mm) Depth of rutting (mm)	幅(m) Width of affected (m)	ひび割れ率 (%) Crack ratio (%)	わだち掘れ 量(mm) Depth of rutting (mm)	幅(m) Width of affected (m)	
	0+000	0.0	-	-		-	-	Free Port IS.
1	0+250	0.0	0	4.0		0	4.0	
2	0+500	0.0	0	3.6		15	3.6	
3	0+750	0.0	0	3.4		0	3.4	
4	1+000	0.0	0	3.4		10	3.4	
5	1+250	1.5	0	5.5		13	3.4	Jamaica Road IS
6	1+500	1.2	0	3.3		20	3.3	
7	1+750	0.5	0	3.3		12	3.3	
8	2+000	0.0	0	3.3		0	3.3	
9	2+250	0.0	0	3.3		3	3.3	
10	2+500	0.5	0	3.3		16	3.3	
11	2+750	1.2	0	3.4		14	3.4	
12	4+000	0.4	0	3.3		9	3.3	
13	4+250	0.0	0	3.3		50	3.3	Pothole
14	5+250	0.0	0	3.3		16	3.3	
15	6+250	0.6	0	3.3		5	3.3	
16	9+500	0.3	8	3.3		4	3.3	
17	11+250	-1.4	0	3.2		8	3.2	
18	11+500	2.5	5	3.3		0	3.3	
19	12+000	0.5	3	3.3		5	3.3	
20	12+500	1.0	0	3.3		5	3.3	
21	12+750	0.0	0	3.3		7	3.3	
	Total				0.0			
						Grand total		
						Total Pavement Area		
						Major damaged ratio		

Note: Measurement with 1m ruler in principal which is used on locations where are on behalf of typical conditions in Somalia Drive based on existing road survey.

Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				21	12 + 750	0.0	6.60		
				12.75 km from Free Port IS			0.49 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting						Rutting	A Few
	The Rutting (mm)	0						The Rutting (mm)	7
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				20	12 + 500	1.0	6.60		
				12.50 km from Free Port IS			0.74 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting						Rutting	A Few
	The Rutting (mm)	0						The Rutting (mm)	5
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				19	12 + 0	0.5	6.60		
				12.00 km from Free Port IS			1.24 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	A Few						Rutting	A Few
	The Rutting (mm)	3						The Rutting (mm)	5
									

A Few : Not more than 10mm
Moderate : More than 10mm but not more than 20mm
Much : More than 20mm

Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				18	11 + 500	2.5	6.60		
				11.50 km from Free Port IS			1.74 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS	Existing Lane width (m)	3.30				
	Rutting	A Few		Rutting	No Rutting				
	The Rutting (mm)	5		The Rutting (mm)	0				
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				17	11 + 250	-1.4	6.40		
				11.25 km from Free Port IS			1.99 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.20	Right hand side towards Red Light IS	Existing Lane width (m)	3.20				
	Rutting	No Rutting		Rutting	A Few				
	The Rutting (mm)	0		The Rutting (mm)	8				
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				16	9 + 500	0.3	6.60		
				9.50 km from Free Port IS			3.74 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS	Existing Lane width (m)	3.30				
	Rutting	A Few		Rutting	A Few				
	The Rutting (mm)	8		The Rutting (mm)	4				
									

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			15	6 + 250	0.6	6.60		
			6.25 km from Free Port IS			6.99 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Rutting	A Few
	The Rutting (mm)	0					The Rutting (mm)	5
								
								
Left hand side towards Red Light IS			Right hand side towards Red Light IS					
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			14	5 + 250	0.0	6.60		
			5.25 km from Free Port IS			7.99 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	16
								
								
Left hand side towards Red Light IS			Right hand side towards Red Light IS					
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			13	4 + 250	0.0	6.60		
			4.25 km from Free Port IS			8.99 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Defects	Pothole
	The Rutting (mm)	0					The Rutting (mm)	50
								
								
Left hand side towards Red Light IS			Right hand side towards Red Light IS					

A Few : Not more than 10mm
Moderate : More than 10mm but not more than 20mm
Much : More than 20mm

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			12	4 + 0	0.4	6.60		
			4.00 km from Free Port IS			9.24 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Rutting	A Few
	The Rutting (mm)	0					The Rutting (mm)	9
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			11	2 + 750	1.2	6.80		
			2.75 km from Free Port IS			10.49 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.40	Right hand side towards Red Light IS				Existing Lane width (m)	3.40
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	14
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			10	2 + 500	0.5	6.60		
			2.50 km from Free Port IS			10.74 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	16
								

Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				9	2 + 250	0.0	6.60		
				2.25 km from Free Port IS			10.99 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting						Rutting	A Few
	The Rutting (mm)	0						The Rutting (mm)	3
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				8	2 + 0	0.0	6.60	There was crocodile cracks.	
				2.00 km from Free Port IS			11.24 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting						Rutting	No Rutting
	The Rutting (mm)	0						The Rutting (mm)	0
									
Existing Road Surface Condition on the Road				No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016				7	1 + 750	0.5	6.60		
				1.75 km from Free Port IS			11.49 km from Red Light IS		
Left hand side towards Red Light IS	Existing Lane width (m)	3.30		Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting						Rutting	Moderate
	The Rutting (mm)	0						The Rutting (mm)	12
									

A Few : Not more than 10mm
Moderate : More than 10mm but not more than 20mm
Much : More than 20mm

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			6	1 + 500	1.2	6.60		
			1.50 km from Free Port IS		11.74 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	3.30
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	20
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			5	1 + 250	1.5	8.90	Jamaica IS.	
			1.25 km from Free Port IS		11.99 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	5.50	Right hand side towards Red Light IS				Existing Lane width (m)	3.40
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	13
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			4	1 + 0	0.5	6.80		
			1.00 km from Free Port IS		12.24 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.40	Right hand side towards Red Light IS				Existing Lane width (m)	3.40
	Rutting	No Rutting					Rutting	A Few
	The Rutting (mm)	0					The Rutting (mm)	10
								

Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			3	0 + 750	0.0	6.80		
			0.75 km from Free Port IS		12.49 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.40	Right hand side towards Red Light IS				Existing Lane width (m)	3.40
	Rutting	No Rutting					Rutting	No Rutting
	The Rutting (mm)	0					The Rutting (mm)	0
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			2	0 + 500	0.0	7.20		
			0.50 km from Free Port IS		12.74 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.60	Right hand side towards Red Light IS				Existing Lane width (m)	3.60
	Rutting	No Rutting					Rutting	Moderate
	The Rutting (mm)	0					The Rutting (mm)	15
								
Existing Road Surface Condition on the Road			No	Station	Height of Embankment (m)	Total Carriage Width (m)	Remarks	
Date: February 2016			1	0 + 250	0.0	8.00		
			0.25 km from Free Port IS		12.99 km from Red Light IS			
Left hand side towards Red Light IS	Existing Lane width (m)	3.30	Right hand side towards Red Light IS				Existing Lane width (m)	4.00
	Rutting	No Rutting					Rutting	No Rutting
	The Rutting (mm)	0					The Rutting (mm)	0
								

8.3 交通量調査結果

①24時間交通量

The Preparatory Survey on the Project for Reconstruction of Somalia Drive in Monrovia

(Road Side Traffic Counts Phase II)

Road												Key Map
Name: <u>Somalia Drive</u>		Date: <u>2016/3/29</u>										
Location / <u>Waste Station</u>		Surveyed by: <u>M.Davies, G.Freeman, R.Blanyen</u>										
Direction / From: <u>Freeport</u> To: <u>Redlight</u>		Supervised by: <u>Windell Johnson</u>										
No.	Category		1	2	3	4	5	6	7	8	9	10
Hours	Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailor (Articulated Truck)	Motorbike	Bicycle	Pedestrian		
6:00	~	6:15	28	57	37	23	16	9	4	14	0	17
6:15	~	6:30	30	49	44	23	0	16	0	15	0	17
6:30	~	6:45	18	28	22	14	2	4	1	16	0	16
6:45	~	7:00	14	14	15	9	5	1	14	0	14	0
7:00	~	7:15	16	21	14	11	0	1	0	16	0	18
7:15	~	7:30	3	21	14	0	0	0	0	11	0	11
7:30	~	7:45	14	35	25	13	4	2	1	12	0	21
7:45	~	8:00	24	42	35	10	7	3	0	12	0	24
8:00	~	8:15	16	35	29	10	0	2	1	22	0	27
8:15	~	8:30	15	35	21	13	4	3	0	7	0	21
8:30	~	8:45	21	49	23	7	2	3	1	12	0	21
8:45	~	9:00	11	35	22	8	3	3	1	21	0	30
9:00	~	9:15	24	56	30	8	2	3	1	10	0	14
9:15	~	9:30	22	28	24	8	7	7	1	8	0	15
9:30	~	9:45	21	70	29	3	1	3	2	18	1	21
9:45	~	10:00	21	44	31	5	7	9	1	7	1	14
10:00	~	10:15	15	56	23	2	7	7	0	7	0	25
10:15	~	10:30	28	50	28	3	9	9	4	9	0	25
10:30	~	10:45	21	39	24	8	5	4	1	14	0	22
10:45	~	11:00	21	35	21	0	3	5	0	23	0	21
11:00	~	11:15	29	42	28	3	4	10	3	9	0	23
11:15	~	11:30	24	48	37	9	5	10	4	19	0	28
11:30	~	11:45	21	56	18	0	7	11	1	9	0	23
11:45	~	12:00	45	49	31	2	2	10	1	11	1	25
12:00	~	12:15	47	42	35	3	7	14	4	15	0	23
12:15	~	12:30	30	56	28	4	5	11	2	16	2	30
12:30	~	12:45	30	63	39	1	8	10	4	11	2	22
12:45	~	13:00	42	84	38	4	3	10	1	21	0	36
13:00	~	13:15	30	58	23	1	5	14	2	16	0	26
13:15	~	13:30	40	49	36	1	3	7	2	14	0	32
13:30	~	13:45	39	49	22	7	3	9	2	17	2	16
13:45	~	14:00	36	77	24	7	14	9	2	21	0	26
14:00	~	14:15	70	42	21	10	16	10	7	4	3	17
14:15	~	14:30	35	15	9	3	1	1	0	5	0	0
14:30	~	14:45	52	25	12	5	4	4	2	2	0	0
14:45	~	15:00	77	22	14	5	21	5	1	6	0	7
15:00	~	15:15	95	22	12	2	14	8	5	10	2	4
15:15	~	15:30	49	28	14	9	9	7	6	4	2	17
15:30	~	15:45	49	21	5	14	7	22	8	6	1	25
15:45	~	16:00	77	21	14	9	14	0	8	5	0	24
16:00	~	16:15	42	28	15	11	10	15	7	5	0	15
16:15	~	16:30	49	14	14	14	9	7	4	9	2	12
16:30	~	16:45	80	35	13	7	16	5	8	4	0	25
16:45	~	17:00	56	28	14	7	14	10	9	6	0	10
17:00	~	17:15	57	33	21	9	13	11	7	3	1	21
17:15	~	17:30	77	35	8	7	6	8	4	7	0	5
17:30	~	17:45	56	38	16	7	8	10	4	7	0	5
17:45	~	18:00	105	28	28	7	15	14	5	2	2	7
18:00	~	18:15	106	49	31	23	11	35	16	29	0	42
18:15	~	18:30	87	35	19	5	9	4	7	12	0	30
18:30	~	18:45	84	45	19	7	8	5	5	16	0	28
18:45	~	19:00	109	60	16	13	21	9	8	22	2	34
19:00	~	19:15	110	40	25	5	3	0	6	23	0	28
19:15	~	19:30	110	49	30	14	9	6	5	33	0	40

19:30	~	19:45	112	51	20	8	10	3	3	25	0	9
19:45	~	20:00	112	24	15	7	8	0	0	18	0	10
20:00	~	20:15	70	42	18	12	5	9	7	14	0	5
20:15	~	20:30	77	35	16	21	9	11	7	28	0	0
20:30	~	20:45	64	32	15	7	9	5	5	18	0	8
20:45	~	21:00	46	27	20	10	8	5	4	24	0	2
21:00	~	21:15	35	16	8	8	5	5	4	10	0	7
21:15	~	21:30	28	14	10	3	2	0	5	4	0	0
21:30	~	21:45	39	21	2	3	6	4	0	14	0	0
21:45	~	22:00	55	29	5	6	5	3	2	6	0	6
22:00	~	22:15	54	12	3	0	5	3	0	7	1	15
22:15	~	22:30	40	12	0	2	0	0	0	5	0	3
22:30	~	22:45	38	5	3	2	1	0	0	6	0	4
22:45	~	23:00	31	6	1	0	0	0	0	7	0	2
23:00	~	23:15	27	5	1	0	1	0	0	0	0	0
23:15	~	23:30	17	5	1	0	2	1	0	3	0	0
23:30	~	23:45	11	1	0	0	0	1	0	1	0	3
23:45	~	0:00	19	1	0	0	0	0	0	1	0	0
0:00	~	0:15	8	8	5	0	4	0	2	0	0	0
0:15	~	0:30	10	4	2	2	0	2	2	0	0	0
0:30	~	0:45	4	6	0	0	2	1	3	0	0	0
0:45	~	1:00	6	4	0	1	3	1	3	0	0	0
1:00	~	1:15	0	0	0	0	0	1	3	0	0	0
1:15	~	1:30	0	0	0	0	0	2	1	0	0	0
1:30	~	1:45	0	0	0	0	0	0	0	0	0	0
1:45	~	2:00	2	0	0	1	0	0	1	0	0	0
2:00	~	2:15	0	0	0	0	0	0	0	0	0	0
2:15	~	2:30	0	0	0	0	0	0	0	0	0	0
2:30	~	2:45	6	3	0	0	0	0	0	0	0	0
2:45	~	3:00	2	0	0	0	2	1	2	0	0	0
3:00	~	3:15	5	0	0	0	2	0	0	0	0	0
3:15	~	3:30	0	0	0	0	0	0	0	0	0	0
3:30	~	3:45	0	0	0	0	0	0	1	0	0	0
3:45	~	4:00	13	4	0	0	0	4	3	0	0	0
4:00	~	4:15	42	14	21	6	2	8	2	12	0	3
4:15	~	4:30	49	16	3	4	1	4	6	17	0	2
4:30	~	4:45	56	23	3	9	5	7	5	11	0	28
4:45	~	5:00	56	29	8	5	5	3	1	21	0	25
5:00	~	5:15	70	34	13	8	4	4	5	12	0	14
5:15	~	5:30	48	25	22	4	6	5	3	15	0	20
5:30	~	5:45	70	35	21	9	5	7	3	13	0	16
5:45	~	6:00	56	30	14	8	8	4	4	5	0	20
Total Traffic			3806	2758	1490	559	513	519	280	950	39	1288

The Preparatory Survey on the Project for Reconstruction of Somalia Drive in Monrovia

(Road Side Traffic Counts Phase II)

Road											Key Map	
Location /		Name: <u>Somalia Drive</u>					Date: <u>2016/3/29</u>					
Direction /		<u>Waste Station</u>			Surveyed by: <u>Freeman, Ajavon, M.Davies</u>							
		From: <u>Redlight</u>		To: <u>Freeport</u>		Supervised by: <u>Windell Johnson</u>						
No.	Category		1	2	3	4	5	6	7	8	9	10
	Hours		Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian
6:00	~	6:15	63	33	25	19	21	12	7	14	0	9
6:15	~	6:30	77	18	42	22	11	4	3	13	0	4
6:30	~	6:45	77	19	23	21	11	14	9	19	9	17
6:45	~	7:00	106	32	35	21	5	10	8	25	0	31
7:00	~	7:15	119	66	70	57	17	19	13	42	9	80
7:15	~	7:30	91	28	21	19	2	5	2	17	0	40
7:30	~	7:45	126	35	33	30	13	16	9	23	11	49
7:45	~	8:00	63	11	10	8	4	5	5	21	0	18
8:00	~	8:15	95	24	23	10	13	18	9	29	8	24
8:15	~	8:30	60	18	10	9	2	2	2	19	0	22
8:30	~	8:45	35	35	35	35	35	35	0	35	5	19
8:45	~	9:00	35	21	7	11	3	3	2	7	0	4
9:00	~	9:15	93	26	19	4	7	5	1	18	0	11
9:15	~	9:30	54	4	13	4	3	3	0	9	0	15
9:30	~	9:45	45	27	17	5	10	5	3	16	0	17
9:45	~	10:00	61	15	13	5	4	1	2	5	0	9
10:00	~	10:15	49	23	18	5	5	1	1	11	1	10
10:15	~	10:30	14	14	14	7	8	10	0	11	0	14
10:30	~	10:45	24	11	16	0	0	0	0	17	0	14
10:45	~	11:00	59	28	21	10	10	2	2	8	0	18
11:00	~	11:15	70	28	14	12	7	6	5	15	0	2
11:15	~	11:30	49	16	9	13	7	7	3	12	0	18
11:30	~	11:45	66	20	18	3	0	7	3	21	0	12
11:45	~	12:00	60	14	17	4	3	6	3	14	0	0
12:00	~	12:15	20	15	10	3	7	3	2	9	0	11
12:15	~	12:30	48	8	8	1	1	0	1	12	1	1
12:30	~	12:45	33	9	4	5	9	0	0	9	0	7
12:45	~	13:00	45	20	23	4	5	0	1	26	1	1
13:00	~	13:15	56	9	15	1	2	0	1	16	0	0
13:15	~	13:30	69	19	11	1	8	2	4	25	1	0
13:30	~	13:45	57	18	17	2	7	6	0	7	0	11
13:45	~	14:00	28	15	11	7	6	8	5	28	3	9
14:00	~	14:15	66	40	17	9	15	8	9	19	0	20
14:15	~	14:30	36	15	14	3	7	2	1	6	0	0
14:30	~	14:45	63	22	21	10	0	3	1	0	0	0
14:45	~	15:00	49	25	16	0	7	10	5	4	0	9
15:00	~	15:15	109	49	18	6	10	12	3	14	2	6
15:15	~	15:30	70	35	10	6	14	9	7	9	0	14
15:30	~	15:45	56	35	21	14	9	10	5	3	0	16
15:45	~	16:00	31	15	9	5	6	8	8	5	0	13
16:00	~	16:15	35	14	10	14	8	7	6	3	0	14
16:15	~	16:30	50	29	7	15	6	4	5	21	0	14
16:30	~	16:45	63	35	15	11	15	8	7	10	0	13
16:45	~	17:00	35	22	15	7	9	4	2	9	0	3
17:00	~	17:15	28	15	13	20	9	8	6	3	0	49
17:15	~	17:30	66	35	7	10	11	13	7	14	0	35
17:30	~	17:45	42	23	17	13	7	14	6	10	0	52
17:45	~	18:00	57	32	9	6	5	8	3	35	0	35
18:00	~	18:15	35	21	5	13	5	7	9	14	2	27
18:15	~	18:30	94	56	17	11	4	10	5	28	0	13
18:30	~	18:45	68	42	28	7	6	8	9	7	0	26
18:45	~	19:00	78	44	27	2	2	0	3	14	0	15
19:00	~	19:15	53	31	10	25	13	7	1	22	0	6
19:15	~	19:30	59	35	12	7	7	2	3	18	0	0

19:30	~	19:45	64	24	12	12	10	3	0	15	0	0
19:45	~	20:00	91	13	8	6	4	4	0	12	0	0
20:00	~	20:15	35	21	8	7	3	6	5	21	0	5
20:15	~	20:30	60	26	5	3	7	2	2	8	0	0
20:30	~	20:45	49	21	7	6	9	7	5	25	0	2
20:45	~	21:00	31	16	5	4	7	4	2	21	0	0
21:00	~	21:15	36	20	7	5	3	6	4	5	0	4
21:15	~	21:30	42	14	7	4	4	7	3	5	0	0
21:30	~	21:45	32	16	3	4	4	2	4	2	0	0
21:45	~	22:00	51	23	0	3	1	4	2	15	0	4
22:00	~	22:15	35	7	5	1	1	0	2	2	0	3
22:15	~	22:30	27	11	0	0	1	0	0	4	0	0
22:30	~	22:45	34	6	4	2	1	0	4	3	0	0
22:45	~	23:00	17	3	1	0	0	0	3	7	0	0
23:00	~	23:15	31	3	1	0	1	1	1	0	0	0
23:15	~	23:30	14	0	0	0	0	0	1	2	0	0
23:30	~	23:45	7	2	0	0	0	0	0	2	0	1
23:45	~	0:00	10	2	1	0	0	0	0	0	0	0
0:00	~	0:15	3	4	0	0	0	2	1	0	0	0
0:15	~	0:30	20	12	7	2	6	2	1	0	0	0
0:30	~	0:45	15	7	3	0	3	0	3	0	0	0
0:45	~	1:00	7	4	1	0	0	2	0	0	0	0
1:00	~	1:15	2	0	0	2	0	4	4	0	0	0
1:15	~	1:30	4	0	0	0	2	2	2	0	0	0
1:30	~	1:45	5	0	0	0	2	0	3	0	0	0
1:45	~	2:00	0	0	0	0	3	1	2	0	0	0
2:00	~	2:15	16	8	0	0	0	0	0	4	0	0
2:15	~	2:30	7	3	0	0	0	0	0	0	0	0
2:30	~	2:45	4	0	0	0	0	0	0	0	0	0
2:45	~	3:00	0	0	0	0	0	0	0	0	0	0
3:00	~	3:15	4	2	0	0	0	0	0	0	0	0
3:15	~	3:30	0	0	0	0	0	0	0	0	0	0
3:30	~	3:45	6	0	0	0	0	0	0	0	0	0
3:45	~	4:00	7	4	0	0	0	0	0	0	0	0
4:00	~	4:15	10	7	4	0	0	0	0	7	0	0
4:15	~	4:30	8	6	0	0	0	0	0	4	0	0
4:30	~	4:45	14	7	5	0	0	0	0	8	0	0
4:45	~	5:00	12	13	3	4	2	1	0	6	0	0
5:00	~	5:15	20	9	5	2	5	4	0	3	0	0
5:15	~	5:30	8	12	0	6	6	0	0	8	0	0
5:30	~	5:45	29	15	10	6	5	3	4	10	0	0
5:45	~	6:00	22	9	6	5	8	5	3	7	0	4
Total Traffic			4079	1699	1058	656	519	449	278	1027	53	900

The Preparatory Survey on the Project for Reconstruction of Somalia Drive in Monrovia

(Road Side Traffic Counts Phase II)

Road											Key Map	
Location /		Name: <u>Somalia Drive</u>					Date: <u>2016/3/30</u>					
Direction /		From: <u>Waste Station</u> To: <u>Freeport Redlight</u>					Surveyed by: <u>Y. Kaba, A. Ajavon, W.Jensen</u>					
		Supervised by: <u>windell Johnson</u>										
No.	1	2	3	4	5	6	7	8	9	10		
Category	Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Artuculated Truck)	Motorbike	Bicycle	Pedestrian		
Hours												
6:00	~	6:15	80	17	33	7	6	5	3	7	1	1
6:15	~	6:30	75	15	27	9	4	7	3	5	1	1
6:30	~	6:45	77	25	27	9	5	3	1	3	0	1
6:45	~	7:00	81	21	27	8	6	7	1	12	0	6
7:00	~	7:15	154	27	38	10	4	8	2	7	0	20
7:15	~	7:30	94	12	14	5	8	4	1	13	2	17
7:30	~	7:45	82	13	22	9	10	9	3	8	1	13
7:45	~	8:00	91	17	14	6	8	3	3	2	0	13
8:00	~	8:15	70	19	17	5	7	5	0	18	0	30
8:15	~	8:30	62	19	5	3	8	2	2	18	0	10
8:30	~	8:45	56	8	10	4	3	0	1	29	1	10
8:45	~	9:00	38	15	9	4	10	3	3	16	0	7
9:00	~	9:15	78	16	11	5	6	7	2	26	0	7
9:15	~	9:30	77	23	13	5	4	4	1	7	0	4
9:30	~	9:45	72	22	16	5	10	2	0	11	0	2
9:45	~	10:00	82	19	11	7	0	2	0	14	0	15
10:00	~	10:15	47	16	12	1	1	0	0	11	0	7
10:15	~	10:30	13	30	14	6	12	3	0	18	0	8
10:30	~	10:45	52	13	10	3	4	3	1	4	0	0
10:45	~	11:00	65	13	7	0	2	3	2	3	1	1
11:00	~	11:15	23	6	3	2	3	0	0	1	0	0
11:15	~	11:30	30	9	5	4	2	1	2	5	0	2
11:30	~	11:45	36	14	9	4	5	1	0	6	0	2
11:45	~	12:00	34	12	11	2	8	4	0	14	0	0
12:00	~	12:15	62	25	14	2	7	0	1	14	0	3
12:15	~	12:30	35	11	6	1	3	2	1	3	0	7
12:30	~	12:45	57	10	12	3	4	6	3	8	1	19
12:45	~	13:00	69	20	13	5	3	1	0	9	1	14
13:00	~	13:15	56	31	17	1	3	5	1	10	0	2
13:15	~	13:30	76	16	9	3	3	8	1	14	2	7
13:30	~	13:45	48	7	9	2	4	2	1	7	0	2
13:45	~	14:00	41	23	18	3	7	7	3	4	1	7
14:00	~	14:15	42	14	13	4	6	2	1	6	0	0
14:15	~	14:30	49	17	19	2	3	2	0	5	0	1
14:30	~	14:45	59	15	21	5	4	1	1	10	1	5
14:45	~	15:00	32	18	10	4	8	1	1	7	1	2
15:00	~	15:15	35	20	13	3	4	1	1	7	1	4
15:15	~	15:30	50	10	13	2	4	1	2	8	1	5
15:30	~	15:45	52	17	18	4	8	3	2	7	1	1
15:45	~	16:00	35	5	14	1	7	1	1	5	1	5
16:00	~	16:15	64	30	24	5	7	3	3	1	1	9
16:15	~	16:30	41	14	12	3	5	1	1	9	0	11
16:30	~	16:45	38	13	17	5	5	5	2	10	0	3
16:45	~	17:00	67	12	14	5	6	7	1	7	1	5

17:00	~	17:15	54	21	12	7	7	2	1	13	1	4
17:15	~	17:30	34	16	10	7	4	3	1	9	1	4
17:30	~	17:45	40	15	10	3	4	1	2	3	2	5
17:45	~	18:00	37	12	14	4	4	1	0	12	0	4
18:00	~	18:15	72	31	24	9	6	7	5	21	2	25
18:15	~	18:30	68	24	11	13	7	5	7	35	3	40
18:30	~	18:45	79	38	24	16	6	9	9	35	0	23
18:45	~	19:00	73	35	13	7	9	5	5	28	0	28
19:00	~	19:15	59	20	6	5	8	4	3	31	0	22
19:15	~	19:30	61	18	13	8	3	9	7	28	2	16
19:30	~	19:45	42	27	12	19	15	6	8	18	0	17
19:45	~	20:00	30	12	6	7	17	5	5	28	1	22
20:00	~	20:15	35	19	7	9	6	7	4	22	0	14
20:15	~	20:30	43	10	6	3	5	2	3	12	0	21
20:30	~	20:45	35	15	8	5	4	6	3	8	0	9
20:45	~	21:00	37	15	12	6	6	4	3	14	0	15
21:00	~	21:15	30	13	6	6	10	6	7	28	0	20
21:15	~	21:30	23	9	5	2	14	7	5	23	0	19
21:30	~	21:45	30	14	4	2	4	5	2	15	0	24
21:45	~	22:00	30	14	7	4	3	3	5	14	0	4
20:00	~	22:15	22	12	2	0	8	7	2	9	0	3
22:15	~	22:30	30	10	14	0	3	1	5	6	0	3
22:30	~	22:45	21	7	4	0	7	4	7	11	0	7
22:45	~	23:00	28	8	5	2	9	3	6	8	0	2
23:00	~	23:15	19	10	2	0	8	1	4	8	0	11
23:15	~	23:30	21	7	1	0	6	4	4	12	0	3
23:30	~	23:45	18	10	2	0	8	2	3	3	0	0
23:45	~	0:00	36	9	0	0	5	6	0	0	0	0
0:00	~	0:15	21	19	4	0	4	0	3	0	0	0
0:15	~	0:30	21	14	10	0	6	0	0	0	0	0
0:30	~	0:45	14	4	0	0	6	0	2	0	0	0
0:45	~	1:00	16	6	0	1	2	4	0	0	0	0
1:00	~	1:15	10	4	0	0	5	0	3	0	0	0
1:15	~	1:30	13	3	0	0	0	0	1	0	0	0
1:30	~	1:45	7	3	0	0	2	0	1	0	0	0
1:45	~	2:00	9	2	0	0	0	0	0	0	0	0
2:00	~	2:15	14	6	0	0	5	0	2	0	0	0
2:15	~	2:30	5	0	0	0	1	0	0	0	0	0
2:30	~	2:45	7	0	0	0	3	0	0	0	0	0
2:45	~	3:00	6	0	0	0	3	0	1	0	0	0
3:00	~	3:15	3	0	0	0	0	0	3	0	0	0
3:15	~	3:30	4	0	0	0	0	0	0	0	0	0
3:30	~	3:45	0	0	0	0	5	4	2	0	0	0
3:45	~	4:00	7	2	0	0	5	4	2	0	0	0
4:00	~	4:15	9	6	7	0	6	4	6	5	0	0
4:15	~	4:30	20	8	5	0	10	5	5	2	0	0
4:30	~	4:45	15	7	3	0	6	4	4	5	0	0
4:45	~	5:00	23	9	7	0	7	9	7	10	0	0
5:00	~	5:15	39	14	11	5	7	5	8	18	0	14
5:15	~	5:30	28	15	8	3	9	6	6	21	0	16
5:30	~	5:45	20	12	4	0	4	7	3	16	0	12
5:45	~	6:00	30	15	6	6	5	5	6	10	0	12
Total Traffic			3226	998	806	291	327	202	111	670	32	499

The Preparatory Survey on the Project for Reconstruction of Somalia Drive in Monrovia

(Road Side Traffic Counts Phase II)

Road												Key Map
Location /		Name: <u>Somalia Drive</u>					Date: <u>2016/3/30</u>					
Direction /		<u>Waste Station</u>					Surveyed by: <u>R.Blanyen, T.Jensen, W.Jensen</u>					
		From: <u>Redlight</u> To: <u>Freeport</u>					Supervised by: <u>Windell Johnson</u>					
No.	Hours		1	2	3	4	5	6	7	8	9	10
Category			Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian
6:00	~	6:15	25	5	18	9	0	3	1	3	0	1
6:15	~	6:30	14	6	21	10	1	3	1	3	0	1
6:30	~	6:45	17	5	31	4	4	2	1	6	1	0
6:45	~	7:00	23	8	21	13	0	4	1	6	0	2
7:00	~	7:15	28	10	6	5	5	0	1	11	2	0
7:15	~	7:30	28	16	12	11	2	0	0	10	0	0
7:30	~	7:45	45	18	24	10	5	3	0	13	0	0
7:45	~	8:00	35	19	18	3	0	0	0	17	1	3
8:00	~	8:15	42	15	23	5	1	0	0	12	0	1
8:15	~	8:30	48	22	17	5	8	1	0	14	0	5
8:30	~	8:45	42	19	21	7	2	0	1	17	0	3
8:45	~	9:00	70	30	16	7	0	4	1	16	2	0
9:00	~	9:15	45	16	14	8	3	0	1	1	0	0
9:15	~	9:30	21	14	18	7	14	8	0	4	0	7
9:30	~	9:45	76	45	32	8	13	2	5	8	4	0
9:45	~	10:00	44	15	20	10	7	8	3	8	0	4
10:00	~	10:15	54	36	29	4	7	2	2	9	0	2
10:15	~	10:30	51	11	20	6	7	2	0	7	1	3
10:30	~	10:45	51	23	30	4	8	1	2	8	0	2
10:45	~	11:00	79	19	18	5	10	2	5	12	0	0
11:00	~	11:15	42	21	14	1	7	5	0	3	0	0
11:15	~	11:30	60	39	23	21	7	2	4	6	0	0
11:30	~	11:45	73	51	34	23	18	11	3	1	1	0
11:45	~	12:00	31	28	20	12	15	8	1	2	0	0
12:00	~	12:15	42	12	14	6	8	4	4	2	0	0
12:15	~	12:30	91	74	66	49	26	14	8	3	0	0
12:30	~	12:45	21	13	11	6	3	0	3	2	0	0
12:45	~	13:00	66	29	17	4	10	3	2	16	0	1
13:00	~	13:15	73	24	19	3	10	3	3	9	2	1
13:15	~	13:30	64	16	11	0	16	2	1	8	0	1
13:30	~	13:45	54	21	14	3	9	4	1	11	3	41
13:45	~	14:00	45	20	19	0	7	2	0	3	2	2
14:00	~	14:15	66	19	10	2	7	2	1	17	0	21
14:15	~	14:30	50	15	7	1	1	1	1	8	2	22
14:30	~	14:45	79	20	19	3	19	0	3	8	0	31
14:45	~	15:00	40	14	14	2	2	0	1	5	0	24
15:00	~	15:15	63	23	8	4	10	3	0	8	2	21
15:15	~	15:30	56	15	10	1	7	3	9	10	1	9
15:30	~	15:45	38	17	14	11	14	3	8	15	3	7
15:45	~	16:00	51	16	9	4	2	4	1	3	0	4
16:00	~	16:15	27	14	11	5	7	3	2	7	0	8
16:15	~	16:30	17	10	9	2	6	4	0	7	2	7
16:30	~	16:45	49	9	8	2	5	5	3	7	2	7
16:45	~	17:00	37	21	17	5	5	2	1	10	3	24
17:00	~	17:15	28	5	6	3	2	4	2	7	0	11
17:15	~	17:30	32	10	7	9	2	4	2	7	4	2
17:30	~	17:45	14	8	6	4	2	1	2	3	1	10

17:45	~	18:00	60	11	10	5	5	4	1	10	0	0
18:00	~	18:15	75	21	21	15	7	12	16	35	5	26
18:15	~	18:30	105	35	13	6	8	4	12	22	2	21
18:30	~	18:45	94	22	15	7	5	5	0	21	5	16
18:45	~	19:00	93	21	16	8	7	1	7	17	0	10
19:00	~	19:15	91	24	15	8	8	2	1	31	4	23
19:15	~	19:30	91	24	13	7	3	0	0	19	1	20
19:30	~	19:45	86	26	8	7	1	1	0	18	0	28
19:45	~	20:00	141	26	12	13	2	1	1	26	1	18
20:00	~	20:15	82	10	19	4	8	2	2	19	0	8
20:15	~	20:30	55	20	6	1	0	1	0	14	1	4
20:30	~	20:45	63	28	20	11	6	12	11	28	4	21
20:45	~	21:00	68	41	28	13	10	18	5	32	5	30
21:00	~	21:15	91	32	19	12	6	9	10	27	0	15
21:15	~	21:30	65	20	11	10	5	8	4	17	0	14
21:30	~	21:45	44	17	4	11	9	3	6	7	0	18
21:45	~	22:00	33	16	6	5	12	5	7	13	0	13
22:00	~	22:15	24	12	5	6	3	2	5	12	0	3
22:15	~	22:30	18	8	3	3	3	7	2	7	0	0
22:30	~	22:45	59	15	5	4	7	5	7	4	0	4
22:45	~	23:00	24	8	2	6	1	3	1	0	0	1
23:00	~	23:15	25	13	5	5	1	7	5	2	0	2
23:15	~	23:30	22	7	7	7	3	2	2	0	0	0
23:30	~	23:45	18	6	3	2	7	6	4	4	0	2
23:45	~	0:00	23	11	3	3	0	2	2	0	0	0
0:00	~	0:15	32	12	2	0	3	3	4	1	0	0
0:15	~	0:30	16	4	0	3	1	5	1	0	0	0
0:30	~	0:45	36	10	5	2	4	7	3	3	0	2
0:45	~	1:00	23	4	1	1	5	0	2	0	0	0
1:00	~	1:15	17	7	0	0	3	4	3	0	0	0
1:15	~	1:30	15	7	3	2	0	2	0	5	0	0
1:30	~	1:45	6	0	0	0	0	0	0	0	0	0
1:45	~	2:00	4	0	0	0	0	0	0	0	0	0
2:00	~	2:15	0	0	0	0	0	0	0	0	0	0
2:15	~	2:30	4	2	0	0	0	0	0	0	0	0
2:30	~	2:45	3	0	0	0	0	0	0	0	0	0
2:45	~	3:00	7	4	0	0	0	0	0	0	0	0
3:00	~	3:15	10	4	0	0	0	0	0	0	0	0
3:15	~	3:30	7	4	0	0	0	3	2	0	0	0
3:30	~	3:45	10	7	5	3	3	4	2	3	0	0
3:45	~	4:00	11	4	5	3	5	3	3	1	0	0
4:00	~	4:15	12	5	5	4	6	4	3	6	0	0
4:15	~	4:30	18	7	7	6	4	2	1	4	0	0
4:30	~	4:45	12	6	4	6	4	4	3	8	0	0
4:45	~	5:00	14	8	10	7	4	3	2	3	0	0
5:00	~	5:15	21	10	7	5	4	2	3	7	0	0
5:15	~	5:30	23	12	10	5	3	1	1	5	0	0
5:30	~	5:45	18	11	7	6	4	7	3	5	0	0
5:45	~	6:00	21	14	7	8	4	3	6	8	0	0
Total Traffic			4037	1532	1173	567	508	321	244	817	67	587

②12時間交通量

The Preparatory Survey for the Reconstruction of Somalia Drive in Monrovia (Phase 2)

(Road Side Traffic Counts)

Road										Key Map	
Name: <u>Somalia Drive</u>					Date: <u>31/03/2016</u>						
Location / <u>N.T.A.</u>					Surveyed by: <u>George Grabo</u>						
Direction / From: <u>Freeport</u> To: <u>Redlight</u>					Supervised by: <u>Dave S. Sourie</u>						
No.	1	2	3	4	5	6	7	8	9	10	
Category	Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian	
Hours											
6:00 ~ 6:15	42	23	21	9	6	3	0	7	0	0	
6:15 ~ 6:30	49	31	13	5	0	0	0	12	0	0	
6:30 ~ 6:45	56	28	14	7	4	0	2	16	0	0	
6:45 ~ 7:00	49	27	24	7	4	0	1	4	0	3	
7:00 ~ 7:15	78	21	25	5	2	2	1	7	0	4	
7:15 ~ 7:30	73	17	22	4	2	1	2	11	0	9	
7:30 ~ 7:45	52	21	25	4	5	0	0	14	0	7	
7:45 ~ 8:00	76	35	25	6	5	1	0	15	0	15	
8:00 ~ 8:15	74	29	21	2	6	1	0	14	0	20	
8:15 ~ 8:30	68	30	19	4	4	3	0	15	0	24	
8:30 ~ 8:45	76	40	16	2	6	2	0	14	0	16	
8:45 ~ 9:00	68	24	26	4	4	0	0	9	1	11	
9:00 ~ 9:15	84	35	13	1	11	4	1	14	0	18	
9:15 ~ 9:30	75	30	19	5	9	1	0	12	2	36	
9:30 ~ 9:45	80	33	23	1	6	3	1	17	0	37	
9:45 ~ 10:00	52	21	21	4	12	2	0	9	0	32	
10:00 ~ 10:15	54	23	11	1	2	2	0	14	0	30	
10:15 ~ 10:30	54	23	17	3	6	1	0	8	0	18	
10:30 ~ 10:45	86	21	24	4	13	1	1	8	0	28	
10:45 ~ 11:00	83	21	23	1	15	4	4	8	0	12	
11:00 ~ 11:15	56	26	14	0	12	2	0	10	1	19	
11:15 ~ 11:30	41	13	5	0	2	1	1	11	0	23	
11:30 ~ 11:45	58	24	15	3	5	1	0	9	0	52	
11:45 ~ 12:00	64	23	10	2	1	1	0	9	0	33	
12:00 ~ 12:15	54	26	9	1	7	4	0	16	1	9	
12:15 ~ 12:30	45	29	11	1	2	6	0	6	1	11	
12:30 ~ 12:45	35	23	11	0	4	3	0	13	2	19	
12:45 ~ 13:00	33	31	21	2	5	3	0	4	1	12	
13:00 ~ 13:15	50	29	27	2	9	35	0	5	3	19	
13:15 ~ 13:30	12	13	5	1	2	14	0	3	0	7	
13:30 ~ 13:45	58	52	19	2	9	21	0	8	0	19	
13:45 ~ 14:00	32	24	9	1	3	10	0	7	0	12	
14:00 ~ 14:15	32	31	6	1	4	4	0	7	1	10	
14:15 ~ 14:30	17	8	5	0	4	2	0	2	0	5	
14:30 ~ 14:45	13	8	7	1	0	3	0	5	0	8	
14:45 ~ 15:00	45	44	22	5	14	11	0	13	0	11	
15:00 ~ 15:15	46	23	20	2	9	8	0	11	0	12	
15:15 ~ 15:30	43	36	15	3	4	9	0	8	0	5	
15:30 ~ 15:45	39	34	12	3	5	3	0	7	0	9	
15:45 ~ 16:00	33	29	16	0	8	12	0	10	0	11	
16:00 ~ 16:15	40	49	19	0	6	4	0	11	0	8	
16:15 ~ 16:30	63	43	28	0	5	7	0	11	0	9	
16:30 ~ 16:45	31	23	13	1	3	5	0	7	1	9	
16:45 ~ 17:00	44	59	14	2	6	8	0	11	3	10	
17:00 ~ 17:15	60	44	13	3	2	4	0	14	0	21	
17:15 ~ 17:30	49	47	16	5	0	4	0	12	0	17	
17:30 ~ 17:45	27	40	9	0	3	2	0	6	2	9	
17:45 ~ 18:00	39	40	9	3	3	4	0	14	0	12	
Total Traffic	2488	1404	782	123	259	222	14	478	19	721	

The Preparatory Survey for the Reconstruction of Somalia Drive in Monrovia (Phase 2)

(Road Side Traffic Counts)

Road												
Name: <u>Somalia Drive</u>										Date: <u>31/03/2016</u>		Key Map
Location / <u>N.T.A.</u>										Surveyed by: <u>Joshua Tarpeh</u>		
Direction /										Supervised by: <u>Dave S. Sourie</u>		
From: <u>Redlight</u>				To: <u>Freeport</u>								
No.			1	2	3	4	5	6	7	8	9	10
Category			Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian
Hours												
6:00	~	6:15	24	12	11	3	1	2	0	1	0	10
6:15	~	6:30	23	11	13	2	3	1	1	6	0	14
6:30	~	6:45	42	23	15	8	4	4	2	5	0	31
6:45	~	7:00	36	11	11	1	1	4	0	13	0	26
7:00	~	7:15	43	17	9	4	2	2	1	14	1	26
7:15	~	7:30	30	24	13	4	6	4	2	8	0	30
7:30	~	7:45	52	21	11	3	3	4	2	19	0	29
7:45	~	8:00	53	27	15	2	2	5	0	17	0	62
8:00	~	8:15	63	22	13	1	6	0	1	7	0	75
8:15	~	8:30	80	19	30	1	4	3	3	18	0	104
8:30	~	8:45	52	25	14	5	7	1	0	9	0	80
8:45	~	9:00	51	25	4	0	2	2	0	10	0	38
9:00	~	9:15	44	19	20	1	1	0	1	9	0	60
9:15	~	9:30	45	24	18	4	4	2	0	4	1	46
9:30	~	9:45	49	23	12	3	5	0	0	10	0	39
9:45	~	10:00	58	21	13	4	5	3	2	11	0	41
10:00	~	10:15	59	27	18	1	5	2	1	13	0	46
10:15	~	10:30	42	24	5	3	7	2	0	8	0	46
10:30	~	10:45	39	12	16	0	3	1	1	7	0	32
10:45	~	11:00	48	43	14	3	4	1	2	6	0	29
11:00	~	11:15	46	21	11	1	4	2	3	10	0	23
11:15	~	11:30	44	22	11	2	5	1	0	7	1	41
11:30	~	11:45	38	10	7	0	1	2	0	8	0	46
11:45	~	12:00	29	16	10	1	4	2	0	5	0	30
12:00	~	12:15	92	93	80	26	23	31	0	24	0	98
12:15	~	12:30	75	80	64	0	2	23	2	8	2	82
12:30	~	12:45	94	99	40	7	28	34	17	32	12	94
12:45	~	13:00	83	86	73	16	24	6	0	33	4	89
13:00	~	13:15	107	119	110	56	36	38	18	81	0	119
13:15	~	13:30	164	146	133	94	123	135	112	100	88	150
13:30	~	13:45	84	56	98	11	21	27	5	23	0	98
13:45	~	14:00	84	75	59	51	9	36	0	31	1	84
14:00	~	14:15	89	98	71	13	22	3	11	67	3	87
14:15	~	14:30	73	92	60	7	22	3	4	24	0	80
14:30	~	14:45	63	86	79	30	7	35	2	39	16	93
14:45	~	15:00	84	105	112	42	58	35	23	56	14	112
15:00	~	15:15	66	77	50	28	10	29	19	51	16	77
15:15	~	15:30	99	98	91	49	37	56	5	10	18	98
15:30	~	15:45	91	82	70	37	17	58	35	77	0	84
15:45	~	16:00	62	91	40	6	20	31	13	21	14	31
16:00	~	16:15	102	100	98	28	31	66	35	63	4	99
16:15	~	16:30	88	73	18	4	22	19	2	18	2	79
16:30	~	16:45	70	63	59	14	4	2	1	21	1	58
16:45	~	17:00	99	112	95	38	70	30	0	59	10	59
17:00	~	17:15	97	74	89	18	29	42	17	64	0	91
17:15	~	17:30	91	72	49	31	4	9	2	23	5	91
17:30	~	17:45	79	98	73	49	25	10	0	51	10	105
17:45	~	18:00	81	60	84	0	10	0	25	42	3	84
Total Traffic			3207	2634	2109	712	743	808	370	1243	226	3146

The Preparatory Survey for the Reconstruction of Somalia Drive in Monrovia (Phase 2)

(Road Side Traffic Counts)

Road										Key Map		
Name: <u>Somalia Drive</u>					Date: <u>2016/4/1</u>							
Location / <u>N.T.A</u>					Surveyed by: <u>W.Jensen Y.Kaba</u>							
Direction / <u>From: Freeport To: Redlight</u>					Supervised by: <u>Windell Johnson</u>							
No.			1	2	3	4	5	6	7	8	9	10
Category			Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian
Hours												
6:00	~	6:15	20	13	10	5	1	2	0	0	0	0
6:15	~	6:30	15	10	13	7	3	0	1	2	0	0
6:30	~	6:45	12	21	20	3	8	4	0	3	0	0
6:45	~	7:00	12	18	14	5	5	2	0	4	1	0
7:00	~	7:15	11	13	15	5	1	1	0	5	0	0
7:15	~	7:30	6	6	13	4	4	1	1	2	0	0
7:30	~	7:45	4	4	10	1	2	1	2	3	0	0
7:45	~	8:00	16	11	3	3	1	2	0	2	0	0
8:00	~	8:15	14	10	9	5	1	1	0	2	0	0
8:15	~	8:30	3	7	5	3	3	2	2	0	0	0
8:30	~	8:45	12	8	9	5	2	30	0	0	0	0
8:45	~	9:00	17	8	10	6	4	6	2	3	2	0
9:00	~	9:15	21	19	15	12	13	0	2	0	0	2
9:15	~	9:30	10	4	8	3	0	0	0	0	0	0
9:30	~	9:45	14	4	13	5	4	4	2	1	0	7
9:45	~	10:00	29	15	15	9	7	6	3	1	0	0
10:00	~	10:15	13	11	7	1	1	4	0	1	1	0
10:15	~	10:30	14	12	6	3	4	1	2	3	0	0
10:30	~	10:45	9	4	5	1	2	2	0	2	0	0
10:45	~	11:00	10	11	12	8	10	3	0	0	3	10
11:00	~	11:15	17	12	6	1	1	4	5	1	0	0
11:15	~	11:30	18	18	11	8	5	7	4	4	2	2
11:30	~	11:45	17	15	17	8	5	2	2	0	0	1
11:45	~	12:00	25	11	18	17	9	6	3	4	0	6
12:00	~	12:15	74	24	23	3	8	7	4	16	2	11
12:15	~	12:30	58	35	22	2	17	6	5	8	1	7
12:30	~	12:45	43	17	22	2	10	5	3	12	0	7
12:45	~	13:00	38	16	18	1	7	8	2	11	1	6
13:00	~	13:15	56	35	22	2	6	8	5	12	1	8
13:15	~	13:30	31	18	6	2	4	7	2	10	1	11
13:30	~	13:45	38	18	14	2	10	6	3	7	1	3
13:45	~	14:00	78	22	24	1	7	6	1	5	2	6
14:00	~	14:15	63	27	14	3	9	4	2	7	1	4
14:15	~	14:30	39	27	11	3	7	4	4	5	1	6
14:30	~	14:45	63	29	15	3	8	4	3	12	1	2
14:45	~	15:00	62	29	18	2	6	6	3	5	1	4
15:00	~	15:15	77	24	13	1	13	9	5	7	1	3
15:15	~	15:30	49	22	19	1	6	6	3	1	0	5
15:30	~	15:45	50	28	8	2	5	3	1	8	1	4
15:45	~	16:00	62	33	28	3	12	8	1	5	3	4
16:00	~	16:15	67	21	20	2	10	8	4	8	0	3
16:15	~	16:30	47	24	15	1	5	8	2	4	1	1
16:30	~	16:45	56	20	13	2	3	8	4	13	1	11
16:45	~	17:00	64	24	14	1	1	7	1	6	1	13
17:00	~	17:15	70	22	18	2	4	12	2	12	2	6
17:15	~	17:30	49	16	8	0	7	6	0	6	1	9
17:30	~	17:45	48	26	25	3	9	5	4	11	2	10
17:45	~	18:00	64	23	11	5	1	8	3	20	4	17
Total Traffic			1685	845	665	177	271	250	98	254	39	189

The Preparatory Survey for the Reconstruction of Somalia Drive in Monrovia (Phase 2)

(Road Side Traffic Counts)

Road										Key Map		
Name: <u>Somalia Drive</u>		Date: <u>2016/4/1</u>										
Location /		<u>N.T.A</u>								Surveyed by: <u>L.Kerkula T.Jensen</u>		
Direction /		From: <u>Redlight</u>		To: <u>Freeport</u>		Supervised by: <u>Windell Johnson</u>						
No.			1	2	3	4	5	6	7	8	9	10
Category			Sedan / Wagon / Pick-up	Taxi	Mini Bus	Large Bus	Light Truck (2-Axle)	Heavy Truck (> 2-Axle)	Trailer (Articulated Truck)	Motorbike	Bicycle	Pedestrian
Hours												
6:00	~	6:15	14	6	17	5	6	5	1	2	0	6
6:15	~	6:30	22	14	18	4	2	5	0	5	0	9
6:30	~	6:45	20	16	15	9	8	9	0	8	0	11
6:45	~	7:00	25	11	17	0	0	6	4	10	0	15
7:00	~	7:15	20	18	11	2	1	2	0	7	1	6
7:15	~	7:30	19	19	13	3	3	6	8	11	0	14
7:30	~	7:45	21	11	11	3	3	4	2	3	0	14
7:45	~	8:00	18	18	17	3	3	2	0	2	0	10
8:00	~	8:15	20	17	16	4	2	3	0	4	0	14
8:15	~	8:30	21	17	17	2	3	3	4	5	0	17
8:30	~	8:45	21	7	9	1	0	3	5	6	0	14
8:45	~	9:00	14	7	8	4	3	1	0	7	2	7
9:00	~	9:15	5	6	4	3	0	2	2	2	1	14
9:15	~	9:30	17	10	7	8	3	3	1	1	0	7
9:30	~	9:45	19	14	8	3	2	2	0	7	0	14
9:45	~	10:00	19	14	15	3	1	11	3	0	0	14
10:00	~	10:15	16	6	8	2	2	4	1	1	0	21
10:15	~	10:30	14	14	10	3	1	7	4	0	0	7
10:30	~	10:45	19	14	8	1	2	0	1	2	0	6
10:45	~	11:00	21	6	9	7	1	7	1	8	0	10
11:00	~	11:15	28	10	4	5	3	2	1	0	0	10
11:15	~	11:30	12	14	6	3	2	2	3	2	0	7
11:30	~	11:45	21	10	8	0	1	1	2	5	1	14
11:45	~	12:00	19	12	18	5	6	1	0	3	0	21
12:00	~	12:15	18	15	9	2	4	5	1	3	0	1
12:15	~	12:30	21	7	7	1	2	7	2	7	0	6
12:30	~	12:45	21	6	5	5	0	4	0	1	0	0
12:45	~	13:00	21	14	14	5	1	3	2	4	1	12
13:00	~	13:15	28	15	19	5	2	3	5	3	0	7
13:15	~	13:30	46	32	31	7	11	5	2	14	8	22
13:30	~	13:45	69	54	41	7	21	9	4	14	22	33
13:45	~	14:00	35	31	22	22	14	14	2	24	7	28
14:00	~	14:15	64	35	21	28	14	14	7	21	7	28
14:15	~	14:30	49	28	14	14	16	7	8	35	7	28
14:30	~	14:45	56	37	21	7	8	5	4	40	5	42
14:45	~	15:00	59	35	29	16	24	17	9	22	17	28
15:00	~	15:15	49	33	15	6	11	6	4	25	12	19
15:15	~	15:30	61	26	22	16	9	8	7	30	5	24
15:30	~	15:45	66	19	13	1	6	7	4	5	1	7
15:45	~	16:00	50	20	18	5	9	4	0	7	0	6
16:00	~	16:15	38	19	13	3	5	1	0	6	0	7
16:15	~	16:30	64	31	19	0	8	8	1	7	0	4
16:30	~	16:45	48	29	12	0	11	6	0	11	0	3
16:45	~	17:00	50	16	18	3	13	3	0	7	2	0
17:00	~	17:15	66	18	20	2	16	2	1	6	0	11
17:15	~	17:30	58	18	19	3	4	5	0	13	3	4
17:30	~	17:45	54	20	14	9	5	5	0	8	1	6
17:45	~	18:00	53	16	18	6	18	6	0	23	0	2
Total Traffic			1589	865	708	256	290	245	106	437	103	610

8.4 舗装設計
 (1) 舗装厚の計算

アスファルト舗装計算

必要舗装構造指数

舗装構造設計区間		ソマリアドライブ
18kip等価単軸載荷荷重	W18	42,180,000
信頼性係数	R (%)	90
標準偏差	ZR	-1.282
荷重及び舗装強度の標準誤差	S0	0.45
初期供用指数	P0	4.2
終局供用指数	P1	2.5
供用指数の差 (P0-P1)	ΔPSI	1.7
路床土CBR値 (%)	CBR	12
路床土復元弾性係数	MR	18,000
舗装厚に必要な目標構造指数	SN	4.548

$$\text{Log}_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \text{Log}_{10}(\text{SN} + 1) - 0.20 + \{ \text{Log}_{10}[\Delta\text{PSI} / (4.2 - 1.5)] / [0.40 + 1094 / (\text{SN} + 1)^{5.19}] \} + 2.32 \times \text{Log}_{10}(\text{MR}) - 8.07$$

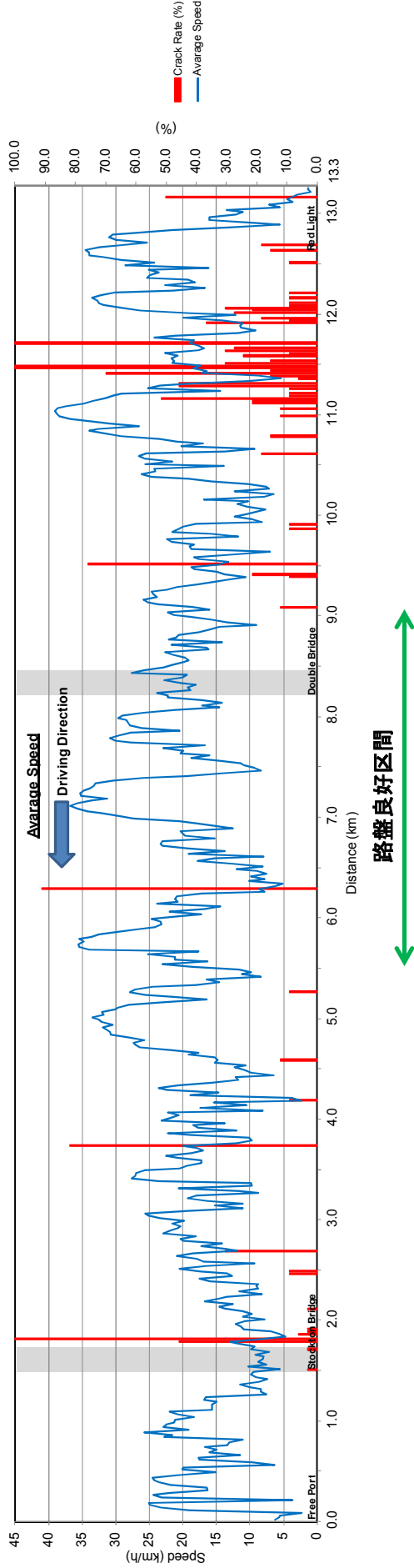
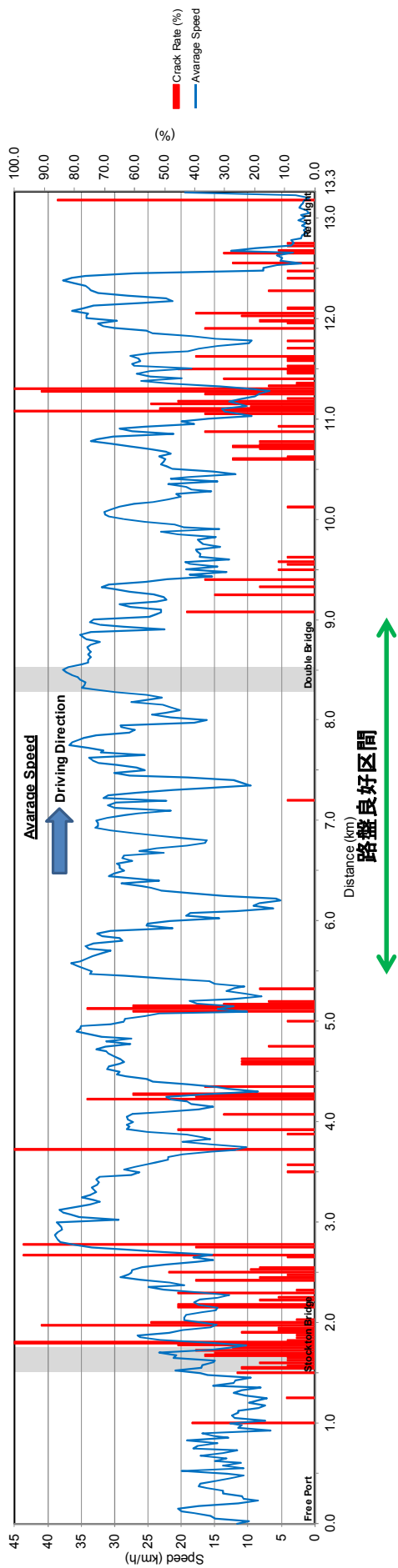
仮計算値 log10(W18)=	7.625
右辺計算値=	7.625

提案する新設舗装構造の構造指数

舗装構成 (新設)	排水係数 (m)	層指数 (a)	
舗装構造設計区間			ソマリアドライブ
アスコン表層	-	0.440	15.0
粒状上層路盤	1.0	0.135	20.0
粒状下層路盤	1.0	0.108	30.0
提案舗装厚の構造指数 (SN)			4.94

$$\text{SN} = a_1 \cdot D_1 + a_2 \cdot m_2 \cdot D_2 + a_3 \cdot m_3 \cdot D_3$$

(2) 既存舗装のひび割れ率と旅行速度の関係



FREEPORT Intersection

Hour: 18:00 - 19:00 (Evening Peak Hour)

AADT

1. Inflow Traffic Volume

Approach Street	North		South		EAST	
	Through	Left	Through	Right	Left	Right
Direction	2	1	2	1	2	1
Number of lanes	2	1	2	1	2	1
Basic saturation flow rate	2,000	1,800	2,000	1,800	1,800	1,800
Safety Factor	0.81	0.81	0.81	0.81	0.81	0.81
Saturation flow rate	1,620	1,458	1,620	1,458	1,458	1,474
Traffic volume (PCU/h)	435	222	716	501	297	107
Traffic volume per lane	218	222	358	501	149	107
Normalized traffic volume	0.13	0.15	0.22	0.34	0.10	0.07
Demand factor of phase 1	0.13	0.15				****
Demand factor of phase 2			0.22	0.24		****
Demand factor of phase 3				0.10	0.10	****
Green time rate of phase 1	0.27	0.27				0.27
Green time rate of phase 2			0.43	0.43		0.43
Green time rate of phase 3				0.18	0.18	0.18
Yellow + red time rate						0.13
Leg Capacity by Direction	864	389	1,377	887	535	1,474
VCR (Vehicle/Capacity Ratio)	0.50	0.57	0.52	0.56	0.56	0.07
Evaluation	OK	OK	OK	OK	OK	OK

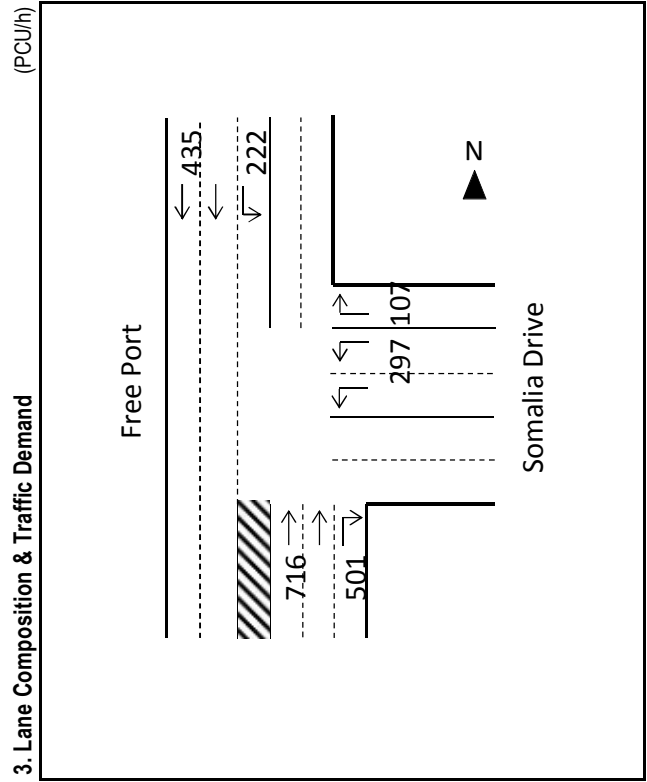
Saturation

0.15	0.24	0.10	0.00
Degree			
0.50			
< 0.9			
OK			

2. Signal Phase

Signal phase	1 ϕ	2 ϕ	3 ϕ
Diagram			
Saturation degree	0.15	0.24	0.10
Demand for green	19	30	13
Green time	32	51	22
Yellow + red time	5	5	5
Cycle	120		
Saturation Degree of Intersection = 0.50			

3. Lane Composition & Traffic Demand



new georgia Intersection

AADT

Hour: 18:00 - 19:00 (Evening Peak Hour)

1. Inflow Traffic Volume

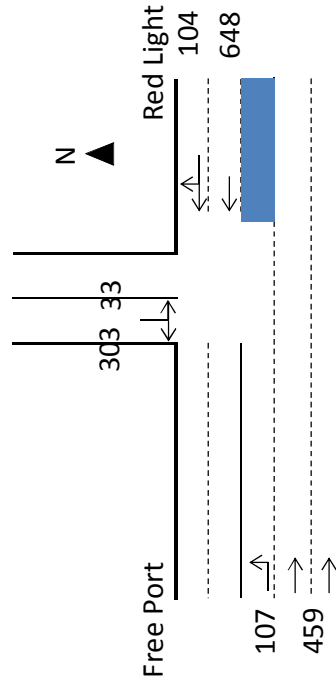
Approach Street	East		West		North	
	Through	Left	Through	Right	Left/Right	Left/Right
Number of lanes	2	1	1	1	1	1
Basic saturation flow rate	2,000	1,800	2,000	1,800	1,800	1,800
Safety Factor	0.81	0.81	0.81	0.81	0.81	0.81
Saturation flow rate	1,620	1,458	1,620	1,458	1,458	1,458
Traffic volume (PCU/h)	459	107	376	376	336	336
Traffic volume per lane	230	107	376	376	336	336
Normalized traffic volume	0.14	0.07	0.23	0.26	0.23	0.23
Demand factor of phase 1	0.14		0.23	0.26		
Demand factor of phase 2	0.00	0.07				
Demand factor of phase 3					0.23	
Green time rate of phase 1	0.42		0.42	0.42		
Green time rate of phase 2	0.12	0.12				
Green time rate of phase 3					0.38	
Leg Capacity by Direction	1,764	178	684	616	551	551
VCR (Vehicle/Capacity Ratio)	0.26	0.60	0.55	0.61	0.61	0.61
Evaluation	OK	OK	OK	OK	OK	OK

Saturation Degree
 0.26
 0.07
 0.23
 0.00
0.56
< 0.9
OK

2. Signal Phase

Signal phase	1 ϕ	2 ϕ	3 ϕ
		→ ←	↕
Saturation degree	0.26	0.07	0.23
Demand for green	47	14	42
Green time	76	22	68
Yellow + red time	5	5	5
Cycle	180		
Saturation Degree of Intersection =			0.56

3. Lane Composition & Traffic Demand (PCU/h)



Barnersville Intersection

AADT

Hour: 18:00 - 19:00 (Evening Peak Hour)

1. Inflow Traffic Volume

Approach Street	East		West		North	
	Through	Left	Through	Right	Left	Right
Number of lanes	2	1	1	1	1	1
Basic saturation flow rate	2,000	1,800	2,000	1,800	1,800	1,800
Safety Factor	0.81	0.81	0.81	0.81	0.81	0.81
Saturation flow rate	1,620	1,458	1,620	1,458	1,458	1,458
Traffic volume (PCU/h)	628	171	338	338	405	405
Traffic volume per lane	314	171	338	338	405	405
Normalized traffic volume	0.19	0.12	0.21	0.23	0.28	0.28
Demand factor of phase 1	0.19		0.21	0.23		
Demand factor of phase 2	0.00	0.12				
Demand factor of phase 3						0.28
Green time rate of phase 1	0.34		0.34	0.34		
Green time rate of phase 2	0.17	0.17				
Green time rate of phase 3						0.41
Leg Capacity by Direction	1,656	251	549	494	591	591
VCR (Vehicle/Capacity Ratio)	0.38	0.68	0.61	0.68	0.68	0.68
Evaluation	OK	OK	OK	OK	OK	OK

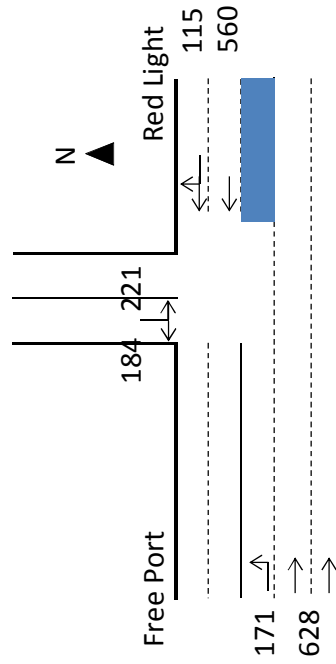
Saturation Degree

0.23	0.12	0.28	0.00	0.63
< 0.9				
OK				

2. Signal Phase

Signal phase	1φ	2φ	3φ
		↔	↔
Saturation degree	0.23	0.12	0.28
Demand for green	42	22	50
Green time	61	31	73
Yellow + red time	5	5	5
Cycle	180		
Saturation Degree of Intersection = 0.63			

3. Lane Composition & Traffic Demand (PCU/h)



Neezoe Intersection

AADT

Hour: 18:00 - 19:00 (Evening Peak Hour)

1. Inflow Traffic Volume

Approach Street	East		West		North	
	Through	Right	Through	Left	Left/Right	
Number of lanes	2	1	1	1	1	
Basic saturation flow rate	2,000	1,800	2,000	1,800	1,800	
Safety Factor	0.81	0.81	0.81	0.81	0.81	
Saturation flow rate	1,620	1,458	1,620	1,458	1,458	
Traffic volume (PCU/h)	1,250	31	277	277	83	
Traffic volume per lane	625	31	277	277	83	
Normalized traffic volume	0.39	0.02	0.17	0.19	0.06	
Demand factor of phase 1	0.19		0.17	0.19		
Demand factor of phase 2	0.20	0.02				
Demand factor of phase 3					0.06	
Green time rate of phase 1	0.39		0.39	0.39		
Green time rate of phase 2	0.41	0.41				
Green time rate of phase 3					0.12	
Leg Capacity by Direction	2,592	591	639	575	170	
VCR (Vehicle/Capacity Ratio)	0.48	0.05	0.43	0.48	0.49	
Evaluation	OK	OK	OK	OK	OK	OK

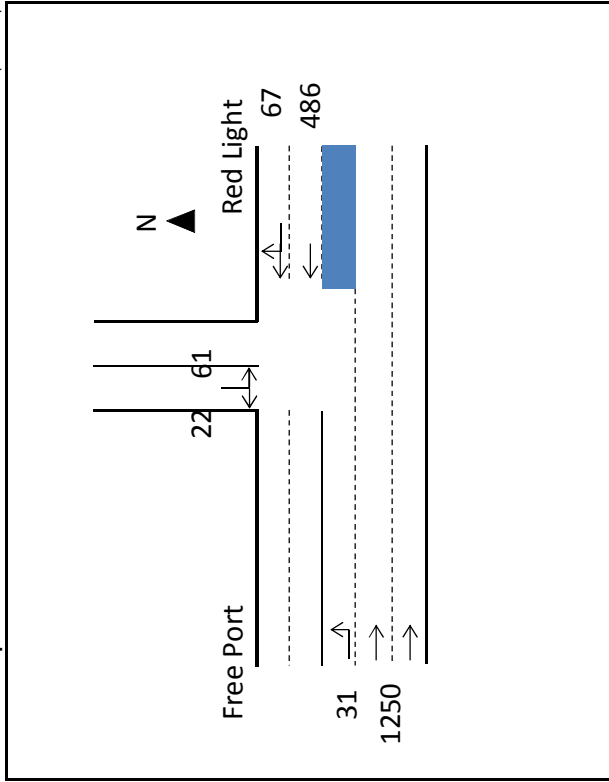
Saturation

Degree
0.19
0.20
0.06
0.00
0.44
< 0.9
OK

2. Signal Phase

Signal phase	1φ	2φ	3φ
	→	↕	↔
Saturation degree	0.19	0.20	0.06
Demand for green	35	36	11
Green time	71	73	21
Yellow + red time	5	5	5
Cycle	180		
Saturation Degree of Intersection =			0.44

3. Lane Composition & Traffic Demand (PCU/h)



72nd Intersection

AADT

Hour: 18:00 - 19:00 (Evening Peak Hour)

1. Inflow Traffic Volume

Approach Street	East		West		South	
	Through	Right	Through	Left	Left	Right
Direction	2	1	2	1	1	1
Number of lanes	2,000	1,800	2,000	1,800	1,800	1,800
Basic saturation flow rate	0.81	0.81	0.81	0.81	0.81	0.81
Safety Factor	1,620	1,474	1,620	1,458	1,458	1,458
Saturation flow rate	1,109	1,467	604	244	274	131
Traffic volume (PCU/h)	555	1,467	302	244	274	131
Traffic volume per lane	0.34	1.00	0.19	0.17	0.19	0.09
Normalized traffic volume	0.34	****	0.19	0.17	0.19	0.09
Demand factor of phase 1	0.34	****	0.19	0.17	0.19	0.09
Demand factor of phase 2	0.34	****	0.19	0.17	0.19	0.09
Demand factor of phase 3	0.34	****	0.19	0.17	0.19	0.09
Green time rate of phase 1	0.44	0.44	0.24	0.24	0.24	0.24
Green time rate of phase 2	0.24	0.24	0.24	0.24	0.24	0.24
Green time rate of phase 3	0.24	0.24	0.24	0.24	0.24	0.24
Yellow + red time rate	0.08					
Leg Capacity by Direction	1,422	1,474	774	348	348	348
VCR (Vehicle/Capacity Ratio)	0.78	0.99	0.78	0.70	0.79	0.38
Evaluation	OK	OK	OK	OK	OK	OK

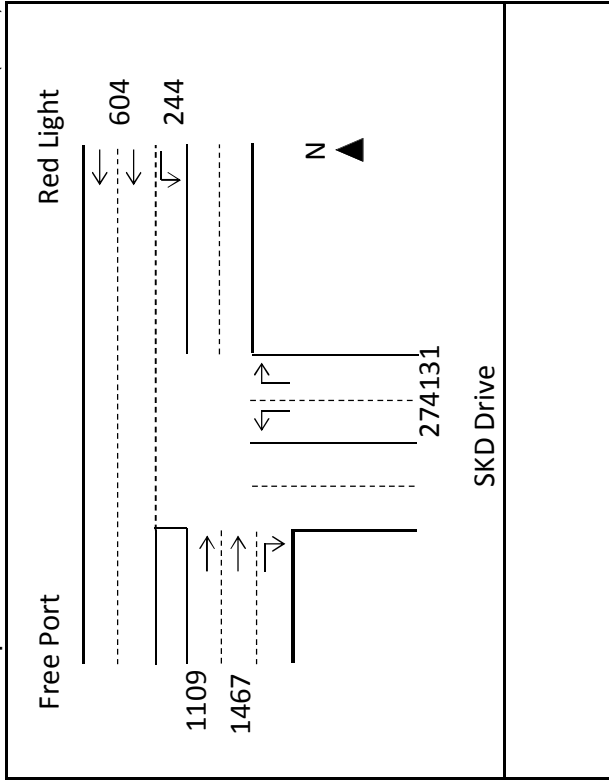
Saturation

0.34	Degree
0.19	
0.19	
0.00	
0.72	OK
< 0.9	

2. Signal Phase

Signal phase	1φ	2φ	3φ
Saturation degree	0.34	0.19	0.19
Demand for green	62	34	34
Green time	79	43	43
Yellow + red time	5	5	5
Cycle	180		
Saturation Degree of Intersection = 0.72			

3. Lane Composition & Traffic Demand (PCU/h)



8.6 排水計算

Flow Calculation

Rational: $Q=(1/(3.6*10^6)) * C * I * a$ $Q=A \cdot V$

discharge coefficient(AC)	0.9	Manning: $V=(1/n) \cdot R^{2/3} \cdot i^{1/2}$
rainfall intensity(3yr return period)	100mm/h	roughness coefficient:(concrete)
catchment width	11.1m	effective depth
		0.015
		0.8

Road edge Drain

No.	Station	Length (m)	Slope (%)	Station	Outlet	discharge (m3/s)	capacity				Judge		
							dipth (m)	width (m)	section area:A (m2)	Hydraulic radius:R (m)		Velocity: V (m/s)	Capacity (m3/s)
1	0+000 ~ 0+225	225	0.067		0+225 inner wetland	0.062	1.00	1.500	1.500	0.429	0.981	1.471	OK
2	0+225 ~ 0+368	143	0.240		0+225 inner wetland	0.040	0.44	0.600	0.264	0.178	1.035	0.273	OK
3	0+368 ~ 0+640	272	0.034		0+640 inner wetland	0.075	0.44	0.600	0.264	0.178	0.390	0.103	OK
4	0+640 ~ 0+844	204	0.238		0+640 inner wetland	0.057	0.44	0.600	0.264	0.178	1.031	0.272	OK
5	0+844 ~ 0+900	56	0.032		0+900 inner wetland	0.016	0.44	0.600	0.264	0.178	0.378	0.100	OK
6	0+900 ~ 1+233	333	0.498		0+900 inner wetland	0.092	0.44	0.600	0.264	0.178	1.491	0.394	OK
7	1+233 ~ 1+262	29	0.004		0+900 inner wetland	0.008	0.44	0.600	0.264	0.178	0.130	0.034	OK
8	1+262 ~ 1+615	353			Stokton river(without project)								
9	1+615 ~ 1+900	285	0.384		1+900 inner wetland	0.079	0.44	0.600	0.264	0.178	1.309	0.346	OK
10	1+900 ~ 2+230	330	0.123		1+900 inner wetland	0.092	0.44	0.600	0.264	0.178	0.741	0.196	OK
11	2+230 ~ 2+575	345	0.106		2+230 inner wetland	0.096	0.44	0.600	0.264	0.178	0.688	0.182	OK
12	2+575 ~ 3+000	425	0.111		3+000 inner wetland	0.118	0.44	0.600	0.264	0.178	0.704	0.186	OK
13	3+000 ~ 3+125	125	0.050		3+125 inner wetland	0.035	0.34	0.600	0.204	0.159	0.438	0.089	OK
14	3+125 ~ 3+580	455	0.246		3+125 inner wetland	0.126	0.34	0.600	0.204	0.159	0.972	0.198	OK
15	3+580 ~ 3+925	345	0.207		3+925 inner wetland	0.096	0.34	0.600	0.204	0.159	0.892	0.182	OK
16	3+925 ~ 4+245	320	0.330		3+925 inner wetland	0.089	0.34	0.600	0.204	0.159	1.126	0.230	OK
17	4+245 ~ 4+632	387	0.125		4+632 inner wetland	0.107	0.34	0.600	0.204	0.159	0.693	0.141	OK
18	4+632 ~ 4+976	344	0.177		4+632 inner wetland	0.095	0.34	0.600	0.204	0.159	0.824	0.168	OK
19	4+976 ~ 5+297	321	0.310		4+976 inner wetland	0.089	0.34	0.600	0.204	0.159	1.091	0.223	OK
20	5+297 ~ 5+556	259	0.221		5+556 inner wetland	0.072	0.34	0.600	0.204	0.159	0.921	0.188	OK
21	5+556 ~ 5+851	295	0.290		5+556 inner wetland	0.082	0.34	0.600	0.204	0.159	1.055	0.215	OK
22	5+851 ~ 6+135	284	0.147		6+135 inner wetland	0.079	0.34	0.600	0.204	0.159	0.751	0.153	OK
23	6+135 ~ 6+562	427	0.212		6+562 inner wetland	0.118	0.34	0.600	0.204	0.159	0.902	0.184	OK
24	6+562 ~ 7+144	582	0.617		6+562 inner wetland	0.162	0.34	0.600	0.204	0.159	1.539	0.314	OK
25	7+144 ~ 7+902	758	0.275		7+902 inner wetland	0.210	0.44	0.600	0.264	0.178	1.108	0.292	OK
26	7+902 ~ 8+075	173	0.275			0.048	0.34	0.600	0.204	0.159	1.028	0.210	OK
27	8+075 ~ 8+229	154	0.160		Double Br(river)	0.043	0.34	0.600	0.204	0.159	0.784	0.160	OK
28	8+229 ~ 8+282	53			Double Br								
29	8+282 ~ 8+460	178	0.587		Double Br(river)	0.049	0.34	0.600	0.204	0.159	1.501	0.306	OK

30	8+460 ~	8+900	440		Only median drain area																		
31	8+900 ~	8+975	75								0.021	0.34	0.600	0.204	0.159	1.523	0.311						OK
32	8+975 ~	9+448	473								0.152	0.34	0.600	0.204	0.159	1.751	0.357						OK
33	9+448 ~	9+544	96		9+544 inner wetland						0.179	0.34	0.600	0.204	0.159	1.386	0.283						OK
34	9+540	10+125	585								0.211	0.44	0.600	0.264	0.178	2.113	0.558						OK
35	10+125	10+264	139								0.049	0.34	0.600	0.204	0.159	2.001	0.408						OK
36	10+264	10+302	38		9+544 inner wetland						0.011	0.34	0.600	0.204	0.159	1.386	0.283						OK
37	10+302	10+428	126								0.035	0.34	0.600	0.204	0.159	1.386	0.283						OK
38	10+428	10+829	401		10+829 inner wetland						0.146	0.34	0.600	0.204	0.159	2.057	0.420						OK
39	10+829	11+017	188								0.052	0.34	0.600	0.204	0.159	2.057	0.420						OK
40	11+017	11+133	116		11+133 inner wetland						0.084	0.34	0.600	0.204	0.159	1.073	0.219						OK
41	11+133	11+262	129								0.089	0.34	0.600	0.204	0.159	2.173	0.443						OK
42	11+262	11+325	63								0.053	0.34	0.600	0.204	0.159	2.066	0.421						OK
43	11+325	11+453	128		11+133 inner wetland						0.036	0.34	0.600	0.204	0.159	2.182	0.445						OK
44	11+453 ~	11+590	137		11+453 inner wetland						0.038	0.34	0.600	0.204	0.159	2.075	0.423						OK
45	11+590 ~	11+800	210		11+800 C-BOX						0.058	0.34	0.600	0.204	0.159	0.923	0.188						OK
46	11+800 ~	11+930	130		11+930 inner wetland						0.036	0.34	0.600	0.204	0.159	0.887	0.181						OK
47	11+930	12+035	105								0.103	0.44	0.600	0.264	0.178	0.668	0.176						OK
48	12+035	12+300	265		11+930 inner wetland						0.074	0.34	0.600	0.204	0.159	2.010	0.410						OK
49	12+300 ~	12+575	275		12+575 inner wetland						0.076	0.44	0.600	0.264	0.178	2.384	0.629						OK
50	12+575	12+775	200								0.056	0.34	0.600	0.204	0.159	2.900	0.592						OK
51	12+775	12+961	186								0.052	0.34	0.600	0.204	0.159	2.838	0.579						OK
52	12+961	13+075	114								0.032	0.34	0.600	0.204	0.159	1.590	0.324						OK
53	13+075	13+200	125		12+575 inner wetland						0.035	0.34	0.600	0.204	0.159	1.391	0.284						OK