



His Majesty's Government of the Kingdom of Tonga

Institutional Assessment of Road Construction and Maintenance Services in the Royal Kingdom of Tonga

Final Report



This report was prepared by Robert Frank McCotter, Kisione Tupou and Posesi Bloomfield as individual consultants under the guidance and support of the Pacific Infrastructure Advisory Centre (PIAC) in Sydney, Australia.

PIAC operates under the coordination of the Pacific Region Infrastructure Facility (PRIF), a partnership for improved infrastructure in the Pacific Region between the Asian Development Bank, the Australian Agency for International Development, the European Commission, the European Investment Bank, the New Zealand Aid Programme, and the World Bank Group.

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Executive Summary

Proposed Strategy

The overall conclusions of this report are that future road maintenance in Tonga should be undertaken by the private sector, with government tendering its requirements, ensuring probity and transparency, and maintaining quality standards.

After independent testing of six commercial quarries and a disused quarry at 'Ahononou, it has been confirmed that 'Ahononou Quarry provides the most dense, least porous, strongest and most durable rock available on Tongatapu that can be used for sealing aggregate. It supports the quarry's strategic value and the need to re-open it to serve current and future road and airport construction projects. That reopening should be via a contract with a competent quarry operator.

It is recommended that the government procures a series of leases to secure the lands necessary to extract rock and process it. Forms of these leases outlining the legal principles involved are included in Appendix D. Sub-leases to the quarry contractor will mirror the requirements of the main leases. The operating contract itself could initially be for five years and a draft general form of contract is presented in Appendix E. It is also recommended that two specific items of equipment, namely a street sweeper and a vacuum suction truck be maintained and made available for hire by the quarry contractor or an independent maintenance contractor and that the Ministry of Transport holds the operating contract and main property leases.

Surplus equipment should be sold by tender. If the Government wishes to enhance the capacity of local contractors on the outer islands, it could subsidise the purchase of some of this plant and seek development assistance to return it to operating condition. Any such work should be done within the context of facilitating and implementing a road maintenance contract.

It is suggested that the Government seek urgent advice from the Crown Solicitor and Ministry of Environment and Climate Change on the need for an Environmental Impact Assessment on the re-opening of 'Ahononou Quarry. If this is needed, an EIA report should be prepared and submitted to the Ministry of Environment and Climate Change as quickly as possible. Finally, should there be insufficient human resources in the Ministry of Transport to administer the operating contract, help should be sought from the World Bank under the Transport Sector Consolidation Project.

Recommended Actions

To implement the above strategy, the following actions are recommended:

1. Re-open the 'Ahononou Quarry, which has the best quality rock available for sealing aggregate, to provide sealing aggregate for all road surfacing and airport runway re-sheeting programs.
2. The government to obtain a long term lease to secure the potential reserves of rock in the land to the north of the existing quarry void, with payment for use of that land via an annual royalty based on the volume of materials extracted.
3. The government to obtain another lease over the existing quarry void at 'Ahononou to give transport access, storage and processing space for rock extracted from the northern area. A royalty structure would not be appropriate for this land and if any remuneration is required, it should be based on a flat payment per annum for use of the land.
4. It may be desirable to establish a third lease for the existing quarry processing area, assuming the successful contractor wishes to use this site. On this site, lease fees should be based on the land area to be used.

5. Establish parallel sub-leases between the Government and the quarry contractor to give the latter access to the land needed for him to operate the quarry.
6. Establish a contract between the Government and a competent quarry operator to extract and process rock from 'Ahononou into sealing aggregate. Production would be as specified to meet currently anticipated annual needs and the contractor would be responsible for supplying in accordance with national quality standards.
7. Make the contractor responsible for all works necessary to re-open the quarry including reconstruction of access roads and ramps, repair of equipment and pre-stripping a section of the adjoining land to the north.
8. Limit quarry production to sealing aggregates alone unless the contractor can demonstrate to the satisfaction of the government that further reserves of comparable quality are available in adjoining lands.
9. The contractor may or may not want to use the existing crushing and screening equipment in its present location. Should he wish to purchase the plant, this could be achieved by paying an amount per tonne of aggregate sold over the first two years of the contract. If he elects to use the machinery, whether he purchases it or not, he should be made responsible for the repair and maintenance of the equipment.
10. Sell by open tender on the international market the existing Caterpillar AP-1050B paver as it is surplus to the requirements in Tonga.
11. Retain two other specialised equipment items in public ownership, namely a street sweeper and a vacuum suction truck but to be maintained by the quarry contractor or an independent maintenance contractor in accordance with manufacturers' recommendations. They are to be made available for hire at a nominated minimum availability and the contractor is to be remunerated in an open book structure which is reconciled at the end of each year, depending on the amount each item is used.
12. Surplus plant items currently owned by the Ministry of Works can best be disposed of by local open tender. Much of this equipment is derelict and suitable only for scrap. Some items could be repaired and the government may wish to enhance the capacity of local contractors on the outer islands by subsidising their tender bids. If this is the case, the Government may wish to seek Development Partner assistance in making key items serviceable.
13. It is recommended that 'Ahononou sealing aggregates be used for all roads resealing, not just for major roads. The differences in quality with other alternatives could otherwise compromise road longevity.
14. Some compromises may be appropriate for aggregate grading curves, but Aggregate Crushing Value specifications should be maintained at 35% and Aggregate Wet Strength at 125kN.
15. Discussions could be held with Development Partners to ensure the sharing of a fair allocation of risk with the contractor in the event of program delays that are beyond its control.
16. The Contractor should pay all royalty and lease payments required in accordance with the procedures laid out in the Land Act.
17. Development Partners are encouraged to include requirements that road and airport contractors being paid by them provide certificates that they have paid all staff and suppliers before contract payments are released.
18. The Government to seek urgent advice from the Crown Solicitor and Ministry of Environment and Climate Change on the need for an Environmental Impact Assessment approval for 'Ahononou Quarry. If this is needed, an EIA report should be prepared and submitted to the Ministry of Environment and Climate Change as quickly as possible.
19. The Quarry Contractor should be required to submit a draft quarry rehabilitation plan and lodge it with the Ministry of Transport, together with a rehabilitation bond based on the number of hectares of land he expects to disturb during the contract with a unit rate based on the cost of carrying out the ultimate rehabilitation plan.

20. Should there prove to be insufficient human resources in the Ministry of Transport to administer the operating contract, to seek assistance from the World Bank under the Transport Sector Consolidation Project.

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ABBREVIATIONS

ACV	Aggregate Crushing Value
ADB	Asian Development Bank
AusAID	Australian Agency for International Development
dbst	double bitumen surface treatment
DLO	Direct Labour Organisation
EoI	Expression of Interest
FAO	Food and Agriculture Organisation of the United Nations
GIS	Geographic Information System
GoT	Government of Tonga
IDA	International Development Agency
ICB	International Competitive Bidding
IFR	Interim Findings Report
IT	Information Technology
km	Kilometres
LTD	Land Transport Division
LCB	Local Competitive Bidding
LTA	Land Transport Authority
LTD	Land Transport Division
LTS	Land Transport Services
MER	Minor Emergency Maintenance
MFNP	Ministry of Finance and National Planning
MLSNR	Ministry of Lands, Survey and Natural Resources
MoT	Ministry of Transport
MoTW	Ministry of Transport and Works
MoW	Ministry of Works
NCB	National Competitive Bidding
NDC	Nuku'alofa Development Corporation
NSPF	National Strategic Planning Framework
PM	Periodic Maintenance
PMO	Prime Minister's Office
PMS	Pavement Management System
PSC	Public Service Commission
RAMS	Road Asset Management System
RM	Routine Maintenance
sbst	single bitumen surface treatment
SMEC	Snowy Mountains Engineering Corporation
SoE	State Owned Enterprise
TA	Technical Assistance
TIUDP	Tonga Integrated Urban Development Project
TOP	Tongan Pa'anga, the local currency
ToR	Terms of Reference
TSCP	Transport Sector Consolidation Project
TTSR	Tonga Transport Sector Review
WB	World Bank

1. Background

1.1 Stage 1 Findings

The present report presents the outcomes of Stage 2 investigations to develop a sustainable road maintenance structure for the Kingdom of Tonga. The Government of Tonga sought assistance from the Pacific Region Infrastructure Facility in evolving a better way of maintaining the Nation's roads. A team of international and local experts was assembled that carried out background research and site inspections in February and March 2011. It reviewed government policies on road maintenance within a broader strategic perspective of key national development goals. Some of these included reducing direct public sector involvement in service delivery and enhancing the capacity of the private sector to economically build and maintain public infrastructure.

The need for quarry products to satisfy existing and proposed road and airport rehabilitation projects was quantified, showing that demand for these products will peak in the coming three to four years. Thereafter, requirements will reduce to a more nominal level. About 65,000 tonnes of good quality sealing aggregate will be required to service roads and airport re-sheeting on Tongatapu over the next three years.

There are at least six operating quarries on the island producing sealing aggregate sized products, together with a former quarry owned by the Ministry of Works at 'Ahononou that is not currently functional. Historical records suggested that the output of 'Ahononou gave the highest quality materials available locally. As road longevity depends partly on the quality of sealing aggregate, it was important to understand the quality of offerings from each of the current quarries. Due to limitations on the veracity of results from the Ministry of Works' materials laboratory, representative samples of crushed aggregate were taken to Australia for independent testing. The results of those tests are included in the present document.

The Stage 1 investigations also focused on available earthmoving equipment that would be suitable for road construction and maintenance. The largest fleet is held by the Ministry of Works, but several contractors and quarry operators have assembled reasonable quantities of such equipment. Unfortunately, due to funding shortages and management shortcomings, the Ministry of Works fleet is largely derelict, with few items currently operational.

It was found that the collective pool of equipment on Tongatapu as listed in the Stage 1 report is sufficient for normal road maintenance using chip seal techniques. An asphalt manufacturing plant is too small to be of practical use, while an almost new asphalt paver is too large to be used. This report recommends that it be disposed via international tender. Current designs call for chip sealing to be used on almost all paving applications. The two exceptions were the NDC reconstruction works and re-sealing of Fua'amotu Airport. The latter will most likely be undertaken over a short period by a specialist international contractor, while the former only requires a small quantity of asphaltic concrete that would not justify a new asphalt plant and paving machine. However, it is understood that the Chinese contractor might be prepared to import a suitable plant for the NDC reconstruction works.

A survey of professional engineers, technicians and road supervisors found that there are small numbers of each employed by government agencies and private contractors. Some training would assist in strengthening their capabilities in road design, tendering, contract administration and construction, but this is being addressed as part of the AusAID/World Bank Transport Sector Consolidation Project.

The Stage 1 study cited different international models for road maintenance, including Samoa, Nauru and rural Australia. It outlined several options for Tonga, ranging from a continuation of Government monopolies for maintenance, the establishment of one or more new State Owned Enterprises, operating and maintenance contracts, and an alternative involving a Public Private Partnership. The options were workshopped with key stakeholders in mid March. Their feedback was incorporated into a refined list of options that was submitted to the Government and Development Partners for further review.

A consensus emerged that the following structures or actions would be pursued during Stage 2 of the present Technical Assessment:

- A lease agreement between the Government and land owners covering 'Ahononou Quarry and possibly the current aggregate processing area;
- A lease agreement between the Government and a competent quarry operator to re-open 'Ahononou Quarry and to extract the necessary quantities of sealing aggregate to satisfy current and planned paving programs;
- Arrangements for the disposal of most items in the Ministry of Works fleet that are so dilapidated that they cannot be economically rehabilitated to be disposed of by local tender;
- Arrangements for the disposal by international tender of the asphaltic concrete paving machine as there is little practical use for it;
- Arrangements for two other relatively new plant items, namely a street sweeper and a vacuum suction truck to be included in the quarry operating contract or an independent maintenance contract. The contractor to be responsible for maintaining them in accordance with the relevant manufacturers' recommendations and making them available for hire at a specified hourly rate. It is understood that the Government of Tonga would still prefer to establish its own plant fleet, which could include these two items, notwithstanding the recommendations of the Stage 1 Report;
- Upgrading of the performance of the Ministry of Works materials testing laboratory so it can reliably provide quality assurance testing of road and building materials; and
- Arrangements for closure or privatization of the Ministry of Works equipment maintenance workshop.

1.2 Stage 2 Objectives

The original Stage 2 objectives were summarised as:

"Carrying out a pre-feasibility analysis and preparing the outline of a business plan for the establishment, possible incorporation and operationalization of an organizational entity for this purpose." (See Appendix A of the Stage 1 Report).

This was further detailed in the original Stage 2 Terms of Reference as follows:

"After the Government has taken a decision on the preferred option, the consultants will continue to produce an outline business plan for the organizational entity or entities to be established, including an assessment and recommendations of the legal, organizational, managerial, financial and operational issues involved." (Op cit, page 2).

These objectives assumed that the findings of Stage 1 would include the need for a new entity such as a State Owned Enterprise. It was subsequently found that a new SOE would neither be necessary nor prudent to achieve the objectives of the assignment. Instead, a series of agreements in the form of leases and operating contracts would more efficiently promote a sustainable structure for road maintenance. The emphasis then changed from business plans for a new entity to the legal and institutional framework for these agreements.

1.3 Revised Stage 2 Terms of Reference

A revised Consultants' Terms of Reference prepared by PIAC and agreed with the consultants is presented in Appendix A. It reflects the change in project objectives noted above. In particular, it notes the need for the Consultants to prepare an outline of how the preferred strategy is to be achieved, including recommendations on the legal, organisational, managerial, financial, operational and environmental issues involved.

1.4 Project Team

The same consulting team continued the Stage 2 component of the Technical Assessment. The Team Leader was Mr Robert McCotter, Chairman of environmental consultants EMGA Mitchell McLennan Pty Limited. He is a civil engineer with more than 40 years professional experience in international infrastructure projects. He was joined by Mr Kisione Tupou, a director of JK Chartered Accountants. Mr Tupou is a chartered accountant with auditing and business experience in New Zealand and Tonga in both the private and public sectors.

Given the modified scope of Stage 2, the team engaged the services of Mr Posesi Bloomfield, a partner of Solutions Consulting House as National Legal Adviser. Mr Bloomfield is an experienced lawyer well qualified to advise the team on lease structures and operational contracts.

2. Independent Sealing Aggregate Testing Program

2.1 Sampling Regime

Fifty kilogram samples of crushed sealing aggregates were collected from each of six operating quarries. The samples were collected personally by the project team from available stockpiles of sealing aggregate to ensure no bias in sampling sources. These were re-bagged into dual 25kg sacks suitable for air transport.

Samples of rock from the floor of 'Ahononou Quarry were broken from previously quarried boulders by sledge hammer and placed into collection sacks. The original intention was to have them crushed at the quarry processing area. Unfortunately, it was not possible to arrange to have the crushers reinstated so that they could process the samples. Instead, Malapo Quarry kindly undertook a campaign crushing program of the samples so they would be available in time. The crushers were run until no materials were carried from previous feedstock, to avoid sample contamination.

Export permission was obtained from the Government of Tonga and DHL Couriers air freighted the samples to Sydney. They were cleared by the Australian Quarantine & Inspection Service and Australian Customs, and transported to the Boral materials testing laboratory at Baulkham Hills. The laboratory is accredited for technical compliance with ISO/IEC Standard 17025 by the National Association of Testing Authorities (NATA) for the range of tests specified. The testing procedure was in accordance with Australian Standard AS1141 – Methods for Sampling and Testing Aggregates.

2.2 Test Results

Test results are summarised in Table 1, while the original testing sheets are in Appendix B.

The specification limits given in the last column of Table 1 are generally from the Roads & Traffic Authority's QA Specification 3151, Cover Aggregate for Sprayed Bituminous Surfacing (RTA, Edition 10, May 2009). The exception is the Aggregate Crushing Value, which is not explicitly included in the specification. If suitable igneous aggregates are available, a normal specification limit is not more than 20%, when tested against Australian Standard AS1141.21 (Gold Coast City Council, 2005). However, if highest quality material is not available, this value is usually relaxed to be as high as 35% (Waltham, 1993). CCCC First Highway Consultants Co Limited, the design consultants for the Tonga National Road Improvement Project, adopted this more liberal upper limit of 35% as the maximum that should be used (FHCC S3-1, Page 14).

The Tafolo and Vete samples had materials larger than 19mm, but that is just a matter of adjusting the sieve sizes. None of the samples met the 13.2mm sieve specification, indicating that the material broke down readily. The Tafolo sample was far too fine in all fractions. Finer fractions (1.18mm and less than 75 microns) were present in relatively high percentages in all samples. International experience suggests that this is often the case with limestone based sealing aggregates. The only way to overcome this is to wet sieve to wash the finer fractions from the aggregate. There are currently no washing sieves on Tonga. However, provided the aggregate is suitably primed, the main consequence of excess fines is a potentially higher use of sealing bitumen.

Table 1 Sealing Aggregate Test Results

Sample	Chinese Quarry	Malapo Quarry	Ahononou	Nishi Quarry	Royco Quarry	Tafolo Quarry	Vete Quarry	Specification
Sample Number	1	2	3	4	5	6	7	Limits
% Passing Sieve								
26.5mm						100	100	
19mm	100	100	100	100	100	90	97	100
13.2mm	57	65	56	61	62	63	41	90-100
9.5mm	6	20	17	8	30	37	11	0-30
6.7mm	5	6	6	5	11	24	8	0-5
4.75mm	5	5	4	5	6	19	8	
2.36mm	5	5	4	5	6	17	8	
1.18mm	4	5	3	5	5	16	7	0-1
% Finer than 75µm	2	2	2	2	2	5	3	≤1
% Mis-shapen								
Ratio 2:1	5	4	10	2	4	5	2	≤35
Ratio 3:1	0	0	1	0	0	0	0	≤10
Ave Least Dimension	10.7	9.2	8.4	10.6	8.2	8.4	11.3	≥7
Aggregate Crushing Value (%)	43.3	41.4	36.4	42.7	46.4	50.2	43.4	35
Aggregate Wet Strength (kN)	75	85	126	89	79	45	76	≥150
Wet/Dry Variation	10	11	5	12	9	26	11	≤35%

Perhaps the more relevant figures are the Aggregate Crushing Value (ACV) losses and the Aggregate Wet Strength. 'Ahononou is just over the limiting ACV at 36.4%, whereas all other samples are significantly weaker, with losses of 41-50%.

While all samples were less than a desirable Aggregate Wet Strength of 150kN, 'Ahononou was between 1.4 and 2.8 times stronger than any alternative aggregate source.

2.3 Conclusions

The present sampling program gave consistent results to earlier investigations carried out in the 1990's, as reported in Section 4.4 of the Stage 1 report. It reinforced the conclusions of Harrison (1993) that 'Ahononou Quarry provides the most dense, least porous, strongest and most durable rock available on Tongatapu that can be used for sealing aggregate. It supports the quarry's strategic value and the need to re-open it to serve current and future road construction projects.

3. 'Ahononou Quarry Lease

3.1 Existing Quarry Void

3.1.1 Lease Requirements

The present quarry void is contained within a trapezoidal shaped land parcel covering 2ha, as shown in Appendix B of the Stage 1 report. It is approximately 302 metres long by up to 102 metres wide. The ownership of this land has not been finally confirmed with the Ministry of Lands, Survey and Natural Resources, but it is reported that the owner is Prince Tungi.

Although no detailed survey has been undertaken, it seems from a comparison of plans and aerial photographs that the void occupies the entire land parcel. This means that no further resources can be extracted from the land. However, it would be convenient for transport, storage of unprocessed rock and possibly for crushers, screens and product stockpiles. This would depend on the extraction plan adopted by the quarry operations contractor.

Viable rock reserves appear to extend north from the existing void onto the adjoining land parcel. Previous extraction has been by drill and blast techniques, which could continue once the quarry is re-opened. Alternatively, it may be possible to rip the rock with dozers and push it over the highwall into the void. It could then be loaded into trucks for off-site processing, or it could be crushed and screened on the floor of the void.

As no resources would be won from the void itself, it would be most appropriate to pay an annual ground lease rental to the owner, not a royalty based remuneration regime. The Government should secure this lease in the national interest prior to calling tenders for the quarry operations contract. The term should ideally be for 99 years, though a 50 year lease is thought to be sufficient.

The Government has powers of land resumption in the national interest under the provisions of section 141 of the Land Act found in Appendix C. Re-opening 'Ahononou Quarry would pass that test, in that it provides the best quality sealing aggregate to be used on the Nation's roads. As far as is currently known, it is a unique resource that is needed to repair and maintain sealed roads on Tongatapu. However, resumption would be a last resort only if the owner proves unwilling to release the land at a reasonable annual charge.

3.1.2 Form of Lease

Typical lease elements could include the following:

- Responsibilities for restoration of the current void?
- Indemnification of the owner against prosecution for pollution offences committed by the contractor.
- Indemnification of the owner against failure by the contractor to adhere to any conditions applied by the planning consent if required.
- Indemnification of the owner against any OH&S failures of the contractor.
- Owner not to burden the title by offering the land as a security or any other act that would compromise the rights of the Government as the lessee.
- Government to have the right to sub-lease to the contractor or a third party if it wishes.
- Lease is to specifically contemplate the uses envisaged, i.e. the collection, transport and storage of unprocessed and semi-processed rock, the loading and transport of said rock from the site, location and use of quarry crushing and screening facilities and product

stockpiles, including ancillary services and activities such as utilities, offices, pollution control and monitoring devices, etc.

- Lease to be void if the adjoining parcel of land to the north does not contain viable reserves of good quality rock, or a lease cannot be secured over that land for quarrying purposes.
- Duration: 99 years or 50 years – linked to same period as the land to the north.
- Payments adjusted for inflation?

3.2 Future Reserves

3.2.1 Lease Requirements

As shown on the plans given in Appendix B of the Stage 1 report, to the north of the quarry there is an eight acre land parcel that may be a tax allotment to a person known as Siaoisi Pakileata, reference T.S. Vol 3182. From inspections of the adjoining void highwall, it is reasonable to infer that limestone reserves extend into that land parcel. At a nominal average depth of 12 metres, the land could contain up to about 750,000 tonnes of reserves, depending on losses for boundary batters, etc. Assuming 50% net yield, this could translate to about 375,000 tonnes of sealing aggregate. The current program calls for about 65,000 tonnes spread over three years, followed by 4,800 tonnes per year for the following seventeen years, or 146,600 tonnes each twenty years. Assuming the cycle starts again, this means that the land could contain about 50 years of reserves of sealing aggregate. The draft operating contract given in Appendix E provides for further exploration to confirm these quantities.

In this case, a royalty based compensation package could be the most appropriate. This could be either calculated on product tonnes per year or volume of materials removed, once the reserves are exposed by pre-stripping. It is recommended that a volume based schedule be negotiated. Product tonnes are more difficult to verify, whereas differences in the size of the void each year can be objectively calculated using conventional survey techniques. The disadvantage is that it de-couples the way the operating contractor would be paid (per tonne of complying product produced), so there is the potential for windfall gains or losses.

3.2.2 Form of Lease

Typical lease elements could include the following:

- Term: 99 years or 50 years – linked to same term as the adjoining area to the south.
- Responsibilities for restoration of the void that will be formed.
- Indemnification of the owner against prosecution for pollution offences committed by the contractor.
- Indemnification of the owner against failure by the contractor to adhere to any conditions applied by the planning consent, if any.
- Indemnification of the owner against any OH&S failures of the contractor.
- Owner not to burden the title by offering the land as a security or any other act that would compromise the rights of the Government as the lessee.
- Government to have the right to sub-lease to the contractor or a third party if it wishes.
- Lease is to specifically contemplate the uses envisaged, i.e. the extraction, transport and storage of unprocessed and semi-processed rock, the loading and/or transport of said rock from the site, including ancillary services and activities such as utilities, offices, pollution control and monitoring devices, etc.
- Lease to be void if the land does not contain viable reserves of good quality rock, or that a lease cannot be secured over the land to the south for quarrying support purposes.
- Payments adjusted for inflation?

- Payments calculated annually based on the volume of material removed once areas are pre-stripped.

3.3 Processing Area

3.3.1 Lease Requirements

As explained in Section 4, the quarry operating contractor may or may not require the present processing plant site, an 8,094 square metre parcel subdivided from Lot 17, as shown in Appendix B of the Stage 1 report. This was the subject of a five year lease that has presently expired. Should the contractor want to use the site, it is an open question whether he or the government should be responsible for securing the lease. In the interests of efficiency, it is probably best for the government to secure the lease, but make it conditional on the contractor entering into a sub-lease for the site.

As no resources are to be extracted from the site, a lease based on annual land use payments rather than royalties would be the most appropriate.

3.3.2 Form of Lease

Typical lease elements could include:

- Responsibilities for restoration of the current disturbed area?
- Indemnification of the owner against prosecution for pollution offences committed by the contractor.
- Indemnification of the owner against failure by the contractor to adhere to any conditions applied by the planning consent, if any.
- Indemnification of the owner against any OH&S failures of the contractor.
- Owner not to burden the title by offering the land as a security or any other act that would compromise the rights of the Government as the lessee.
- Government to have the right to sub-lease to the contractor or a third party if it wishes.
- Lease is to specifically contemplate the uses envisaged, i.e. the receipt and storage of unprocessed and semi-processed rock, the use of quarry crushing and screening facilities and product stockpiles, including ancillary services and activities such as utilities, offices, pollution control and monitoring devices, etc.
- Lease to be void unless the contractor enters into a valid sub-lease for the land.
- Duration possibly five years with renewable option.
- Payments adjusted for inflation?

3.4 Sub-leases

Assuming that the Government successfully secures the land leases detailed above, it should enter into sub-leases with the successful quarry operations tenderer for each lease that it holds. The tenure of each sub-lease would be the same as for the operating contract, with options to renew that are triggered by a successful renewal of the operating contract.

Each sub-lease would mirror the conditions of the main lease, including payment regimes, indemnities and specified land uses. The advantage of this structure is that if a particular lease is not required, the sub-lease is automatically voided without affecting the enforceability of other sub-leases.

4. Processing Area and Equipment

4.1 Preferences of Quarry Operator

At this stage, it is not possible to know if the successful quarry operator will want to use the existing processing equipment. It is likely that the operator would already operate a quarry on Tongatapu, and will therefore have access to existing plant and equipment. A variety of possible scenarios include:

1. The Contractor could remove raw rock and truck it to his existing crushing plant;
2. The Contractor could remove raw rock and truck it to both his existing crushing plant and the Ministry of Works processing plant, depending on whether his customers are on the northern or southern side of the Island;
3. The Contractor could crush all output at the Ministry of Works processing plant;
4. The Contractor could relocate the crushers to the base of the existing void to eliminate double handling of the unprocessed rock. Blasted or ripped rock could be loaded directly into the primary crusher feed chute without intermediate transport. In this option, the Contractor would not need the processing area land at all;
5. If the Contractor does not want the crushers and the Government decides to sell them, the purchaser may want to disassemble and remove the crushers, leave them in the hope of winning the next round of quarry operating contracts, or bring road base from another quarry and process it on the site.

4.2 Equipment Location

Should the Contractor not want the crushers in its current location but still wants to use them elsewhere, there would be no need for a new lease on the processing area site. The expired lease has not been cited to determine whether the Government, or more specifically the Ministry of Works, has an obligation to rehabilitate and make good the site. It is understood that under Tongan law, there is no general obligation to rehabilitate unless it is specifically provided for in the lease. It is recommended that the expired lease document be obtained from the Ministry of Lands, Survey and Natural Resources so the rehabilitation requirements can be determined.

4.3 Ownership of Equipment

The current state of repair of the crushing and screening plant is a matter of some conjecture. Different repair costs have been quoted by the Ministry of Works and various international consultants. The Ministry maintains that the facility can operate and it apparently dry ran the plant earlier this year. However, it does not appear to have been used to crush any rock.

It is a policy decision whether the government would want to retain ownership of the facilities. If it retains ownership, this gives slightly more flexibility in its negotiations at the end of the first operating contract to renew or re-tender. It also might attract a wider range of tenderers to the initial operating contract, because they would not be burdened with up-front payments for processing equipment. However, it locks up scarce government funds that might be put to better use.

One option would be to tender on the basis that the Contractor would be responsible for repairing and maintaining the equipment, and would pay a rate per tonne of aggregate processed for the first two years. If a tenderer did not want to use the facility, his tender price would presumably be cheaper because it would not include the sunk purchase price of the crushers. If the Contractor

elects not to use it, the machinery could be sold by open tender and the funds returned to the government.

4.4 Equipment Repair and Maintenance

Assuming the equipment is offered as part of the operating contract, the Contractor should be responsible for repairing and maintaining the crushers so that they are still in good operating condition at the end of the contract period. It was suggested that the government should repair the machinery at the outset and then make it available for the Contractor's use. It is recommended that this strategy not be pursued because divided responsibility would be a potential cause of future disputes. Failures caused by poor maintenance could always be blamed on insufficient repairs at the beginning of the contract.

5. Items of Specialised Equipment

5.1 AC Paver



A Caterpillar AP – 1050B asphalt paver was purchased some years ago in anticipation of being used to pave Tonga’s roads and it is currently owned by the Ministry of Works. Unfortunately, it was too large for most applications and the only asphalt plant on the Island was too small to allow the paver to operate as intended. As a result, the paver has done very little work and remains unused in storage.

The NDC advised that it was too large to be used for the re-surfacing of roads in the centre of Nuku’alofa. Construction contractors suggested that if they were successful in tendering for the airport re-sheeting program, they would not take the risk of using something that has not operated for many years, due to the tight timeframes available between aircraft movements. As these are the only two applications planned for asphaltic concrete, the paver is surplus to requirements.

There would be no point in attempting to sell it locally, because the successful purchaser would have no use for it. It is recommended that the paver be disposed of by international tender.

5.2 Street Sweeper and Vacuum Suction Truck

5.2.1 Future Ownership



In 2009, the Ministry of Works purchased a Schwarze street sweeper and an Isuzu Vacjet Hurricane vacuum suction truck, mainly to clean the streets and drains in the centre of Nuku'alofa. These are valuable assets, but the Ministry has been reluctant to hire them out to other agencies or users because hire fees are directed to the central treasury rather than the department that must maintain and operate them. Their specialised applications mean that they are unlikely to be used frequently, so if they were sold, it is unlikely that the government would recover a fair price for them. It is recommended that the Government retain ownership of these assets, but place the responsibility for their maintenance and operations on the quarry contractor or a maintenance contractor. The rationale is that they would already have the workshops and expertise required to properly maintain them without building up an unsustainable overhead structure.

5.2.2 Maintenance and Operations

Manufacturers' estimates were sought of current replacement costs and annual maintenance charges for the two equipment items. Much will depend on the number of operating hours that each truck is used for. An accounting analysis of likely cost scenarios is presented in Appendix F. The relevant Contractor will be charged with maintaining these items in accordance with the respective manufacturer's recommendations and making them available with a minimum annual availability of 90%. The Contractor will be reimbursed for each hour that the items are hired.

Tonga Airports has indicated that it would be willing to hire the sweeper for a nominated minimum number of hours per year to maintain the airport runways free of loose stones and other rubbish that might otherwise compromise aircraft safety. In addition, the contractors responsible for maintaining roads with kerb and gutter will also need to use both plant items.

6. Disposal of Surplus Equipment

6.1 Institutional Arrangements for Surplus Assets

No government agency is permitted to dispose of surplus assets without the permission of the Ministry of Finance. This is normally undertaken by a special unit of the Ministry called the Government Asset Disposal Committee. The Public Finance Management Act (Treasury Instructions) 2010 sets out in sections 84 to 89 the proper processes to be followed in the disposal of surplus government assets. Any proceeds from the sale of government assets must be paid into the Government General Revenue (section 86).

Sales usually occur by openly advertised tender. This would presumably take place for the AC paver, surplus earthmoving equipment and possibly the crushing and screening plant, depending on the preferences of the successful quarry operating tenderer.

6.2 Sale Restrictions

In disposing of surplus assets, the government may wish to achieve certain policy objectives in addition to obtaining the highest purchase price. For example, to encourage a competitive structure for future road maintenance contracts, it may wish to restrict how many plant items are able to be bought by a single bidder. It might also wish to support small contractors outside the Tongatapu Island Group to obtain enough equipment in the outer islands to viably bid for maintenance contracts in their own areas. The precedent established by Samoa might be instructive here. As described in Section 8.1 of the Stage 1 report, Samoa supported the development of small private sector contractors by making equipment available to them at less than book value, coupled with guaranteed period contracts to facilitate their establishment.

The only difficulty with the latter objective is that much of the equipment will require servicing before it can be used by small contractors. It is possible that they will not have the initial financial capacity to order spare parts themselves, so the equipment could be of limited value to them. This might be one area where the assistance of Development Partners could be sought.

7. Quarry Operating Lease

7.1 Production Quantities

The estimated quantities of sealing aggregate over the next three years were scheduled in Section 3.4 of the Stage 1 report. This indicated that about 65,000 tonnes of sealing aggregate would be needed over the next three years.

An initial concept was that a fixed percentage of the total requirement could be offered, with the balance tendered as an optional amount, depending on the sale price offered by the various tenderers. The thought was to introduce competitive tension in the market, with the best quality material being used on moderately to heavily trafficked road, while lightly used rural roads could be surfaced with lesser quality material.

To establish the split between the base quantity and the variable amount, it is necessary to understand the distribution between lightly and heavily used roads. In the absence of proper traffic counts, the only way of doing this is based on road widths. The assumption was that narrow roads are only lightly used, while wider roads are more heavily patronised.

To assess this assumption, the road widths documented in the Tonga National Road Improvement Project were measured for sealing aggregate quantities by width of road. Other projects were assessed as requiring good or moderate quality aggregates. These are given in Table 2.

Table 2 Sealing Aggregate Quantities by Road Widths

Program	Aggregate Tonnes (t)	Major Road	Minor Road	Major Road	Minor Road
		≥6m	≤5m	≥7m	≤6m
NDC	2,310	2,310		2,310	
Chinese Non-Urban	28,368	24,374	3,994	8,028	20,340
ADB	5,920	5,920		5,920	
WB/AusAid	10,800	9,277	1,523	3,056	7,744
Tongatapu Airport	17,423	17,423		17,423	
Total	64,821	59,304	5,517	36,737	28,084
Percentages		91.5%	8.5%	56.7%	43.3%

The assumptions used in Table 2 were that the Nuku'alofa Development Corporation (NDC), ADB and Tongatapu Airport projects all require first quality materials, and that the World Bank/AusAID project has the same distribution of road widths as the Chinese non-urban program.

If major roads are six metres and above, virtually all sealing aggregate would be consumed on major roads, with 92% of the total used in that category. If major roads were increased to seven metres and above, more than half or 57% of all sealing aggregate would be directed to main roads.

The next matter to consider was what the consequences of using lesser grade materials would be on the longevity of minor roads. As detailed in Section 2.2 above, 'Ahononou aggregate is between 1.4 and 2.8 times as strong as other commercial products. It is doubtful if the risks of using lesser quality materials are worth the marginal potential savings in purchase price. Competitive tension would be assured by open tendering of the quarry operating contract. Further compromises could place the life of road assets at risk.

7.2 Quality Specifications

It is recommended that achievable but realistic specifications be imposed on sealing aggregates, but that they are applied consistently in management of the operations contract. Metamorphosed coral is highly variable, so consistent quality will depend on the skills of the quarry contractor. This was seen at the abandoned Farm Quarry and harder bands in the Vete Quarry.

Some relaxation of the grading specifications in Table 1 might be feasible if it is found to be too difficult to comply with. There would be scope to improve the grading characteristics with wet screening of aggregates should the excess fines affect bitumen stripping characteristics. However, the Aggregate Crushing Value should be maintained at 35% and the Aggregate Wet Strength reduced to perhaps 125kN to avoid excessive rejections.

7.3 Contractor's Responsibilities

7.3.1 Production Obligations

The quarry operator should be obliged to produce the nominated quantity of aggregates of the required quality shown in Table 3, unless timetable revisions when the contract documentation is prepared, indicate the desirability of re-programming the production timetable.

It is recommended that all sealing aggregate be included in the "take or pay" quantities in the contract. There appears to be little merit in reducing the base quantity and relying on poorer grade materials to fill in the gaps.

The slightly unusual payment regime of the contract as detailed in Section 7.5 below means that the quarry contractor could be exposed to timing risks that it has no control over in the event that paving programs are delayed. For example, if the airport re-sheeting project was to be delayed by a year, some 17,400 tonnes of aggregate would have been produced that could not be paid for. In that situation, it might be feasible to seek an undertaking from Development Partners to underwrite part of the cost of the aggregate. The contractor could be encouraged to extract the raw rock, but not add value by crushing and screening it until it is needed. This would reduce exposure and also minimise the risk that development projects would be disrupted by the non-availability of suitable aggregates.

Table 3 Sealing Aggregate Demand Timetable

Project	Quarters	Tonnage	2010				2011				2012				2013				2014				
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
NDC CBD Project	5	462																					
Chinese Non-urban	15	1891																					
ADB	2	2960																					
WB/AusAid	9	1200																					
Ongoing Maintenance	5	1200																					
Airport Resealing	2	8712																					
Total Aggregate Tonnage Per Quarter					1,891	1,891	1,891	2,353	3,553	6,513	6,513	12,265	12,265	3,091	3,091	3,091	3,091	3,091	3,091	3,091	1,200	1,200	1,200
Cumulative Tonnage								3,553	10,066	16,579	28,844	41,109	44,200	47,291	50,382	53,473	56,564	59,655	60,855	62,055	63,255		

7.3.2 *Adherence to Lease Conditions*

The various landholder leases will no doubt contain conditions that the Contractor will need to be aware of and adhere to. It has therefore been suggested that there should be a series of formal sub-leases entered into between the government and the Contractor that mirror the leases between the government and the landowners of the quarry void, the area adjoining to the north and possibly the processing area.

In addition, the Contractor will need to be bound by any conditions imposed by relevant agencies as part of environmental impact assessment and planning approvals. It would be best to include these requirements in the operating contract.

7.3.3 *Development Works*

The Contractor will also be responsible for development works to re-establish the quarry before extraction can commence. These will include, but not be confined to:

- Rebuilding the main access road from the quarry to the processing area;
- Repairing the road from the processing area to the main island perimeter road;
- Backfilling and reinstating the main quarry access ramp, including backfilling the sink hole near the top and removing all vegetation covering the roadway into the pit;
- Building diversion drains and sedimentation ponds on the adjoining land before any land surface is disturbed;
- Building access roads to the adjoining land;
- Removing surplus equipment from the pit and processing area, and either disposing of it or delivering it to the Ministry of Works compound, at the discretion of the government;
- Repairing the power supply and crushing and screening machinery in the processing area if the Contractor elects to continue to use those facilities;
- Clean up the base of the pit and grade the floor such that it can be pumped dry of water;
- Remove vegetation from the initial extraction area, stockpile and burn in accordance with environmental regulations;
- Carefully strip topsoil and sub-soil from the initial extraction area and stockpile separately for use in later rehabilitation; and
- Establish worker amenities, offices and storage facilities as required.

7.4 **Excess Production**

Ministry of Works personnel reported that between 30% and 40% of throughput from 'Ahononou was reduced to crusher dust, which is consistent with reports from other limestone sources such as Iraq. This finer material still has a use in filling and general building construction, but is not suitable for sealing aggregate. It would be sensible to allow the Contractor to sell crusher dust and other non-specification products on the open market.

There are public benefits in producing high quality aggregates for other applications than sealing aggregate. It is difficult to produce high strength concrete in Tonga using local aggregates. For strengths of greater than 40MPa, mix designs have to be modified with the addition of significant amounts of cement. All cement is imported, which is expensive and high percentages of cement lead to other technical problems including elevated heat of hydration and increased cracking and shrinkage. Should the Contractor be permitted to produce concrete and other aggregate products in addition to sealing aggregate?

As detailed in Section 3.2.1, the northern land has potential reserves sufficient to supply about 50 years of requirements for sealing aggregate. There is every chance that reserves are not confined to that land parcel, but extend further north, east and west. However, this is not yet known and 'Ahononou is currently the only verified source of better quality materials. Notwithstanding these observations, no scientific assessment has been made of the likely reserves of the quarry. Therefore, the opinions herein on this subject need to be tested using appropriate mechanical and analytical methodologies and practices.

In any event, there is a strong argument for conserving these reserves for future generations. This means that the operating contract could restrict the quarry contractor to only producing sealing aggregate, unless he can demonstrate by drilling and testing that suitable resources are available on adjoining properties. If he can satisfy the government that this is the case, the restriction could be relaxed, which would benefit the building industry and public infrastructure.

7.5 Contract Payments

7.5.1 Equipment Hire

Appendix F gives estimates of hire rates per operating hour for the two specialised items of equipment, namely the street sweeper and the vacuum suction truck. These include manning costs, on the assumption that the plant would only be hired with an operator to guard against misuse by renters. They also include maintenance costs, a fair margin for the contractor's overheads and profit, and amortisation costs for ultimate equipment replacement.

It is not possible to accurately predict in advance how many hours each item will be hired for. Tonga Airports may be able to give a realistic estimate for the street sweeper and calculations could be made about the length of roads and frequency that a maintenance contractor should be using that plant. Use of the more expensive vacuum suction truck would be far more difficult to estimate. It is recommended that an open book approach be adopted, whereby estimates are given at the start of each year and annual payments reconciled, based on the actual number of hours each unit is hired throughout the year.

A nominated part of hourly hire fees would cover payments to a sinking fund to replace each item at the end of its economic life. The contractor would remit these amounts to the government who would establish a replacement sinking fund.

7.5.2 Royalty and Lease Payments

The Land Act requires that the Minister of Lands must collect all rents from registered leases (including sub-leases) and allotments and pay this into the Treasury. A relevant extract from the Land Act is as follows:

Land Act s19 (7)

(7) He shall collect the rents for all allotments on Crown Land, and all leases (including sub-leases) and permits; and where the land leased is part of any hereditary estate or an allotment shall pay the lease rent into the Treasury and shall issue a voucher in favour of the holder of the estate or allotment for that amount of rent less ten per centum thereof.

The sub-lessee will be required to make lease payments to the Ministry of Lands, Survey and Natural Resources who will then pay Treasury. The Ministry of Lands, Survey and Natural Resources will also issue a lease payment voucher to the estate/allotment holder.

7.5.3 *Payments from Road and Airport Contractors*

Concern was expressed that quarry contractors may be reluctant to enter into an agreement with the government, due to the depressed nature of the national economy. The Government may not be able to assure contractors that it will have the funds to pay them for their work. Most of the sealing materials used in the coming three to four years will be grants or loans from Development Partners. In the case of ADB, AusAID and World Bank funds, road and airport construction money will be paid directly to construction contractors who will buy sealing aggregate from the quarry contractor. NDC and other Chinese loan funds are for a specific purpose and could be directed to the relevant contractor for aggregate purchases. In the case of Bank funds, it is normal practice for a contractor to certify that its employees and suppliers have been fully paid before it is reimbursed by the Bank. This would give reasonable security to the quarry operator that its invoices will be paid.

7.6 **Framework of Contract**

Typical contract elements could include:

- Responsibilities for restoration of the northern area? How will this occur when the contract could only be for five years and the operating life could be 50? Is there a role for a rehabilitation bond based on the area disturbed?
- Indemnification of the government and land owners against prosecution for pollution offences committed by the contractor.
- Indemnification of the government and land owners against failure by the contractor to adhere to any conditions applied by the planning consent, if any.
- Indemnification of the government and land owners against any OH&S failures of the contractor.
- Government to sub-lease to the contractor the right to enter and work on each land parcel and the right to retain ownership of materials extracted.
- Sub lease to be void unless the contractor enters into a valid quarry operating contract with the government.
- Duration of sub-leases and operating contract possibly five years with renewable option.
- Payments adjusted for inflation?
- Terms to trigger cancellation and/or penalties due to non-adherence to contract.
- Disputes resolution mechanisms including mediation, arbitration, winding up, insolvency, etc.

The various frameworks mention limitations of liability for land owners and the government due to acts or omissions of the contractor. One such limitation is ensuring public safety. This obligation would be borne by the contractor during the period of the contract, brought in Tonga only by general tort law (negligence) rather than as a requirement in existing legislation. It may be borne by the Government after the period of the contract if the contractor fails to ensure the site was rehabilitated as it undertook to do in the EIA. Again, the Government's liability after the period of the contract for safety of the quarry would be primarily subject to general tort law in Tonga.

Obligations to keep the quarry safe during and after the contract period and indemnification of the Government and land owners should be written into the operational contract.

8. Statutory Approvals Process

8.1 Environmental Impact Assessment

The Environmental Impact Assessment (EIA) Act 2003 details the processes required to assess the environmental impacts of projects. Major developments listed in the Schedule to the Act require the preparation and submission of an Environmental Impact Assessment Report. Quarries are not specifically noted in the Schedule, though they would be covered by the definition of mining, being an activity that disturbs more than one hectare of the surface of land.

Clause 23 details the transitional provisions of the Act. It notes that any major project which has not been completed by the commencement of the Act in 2003 is exempt from its requirements. As 'Ahononou began about forty years ago, it pre-dated the commencement of the Act. It could be argued that it was not complete in 2003 because material was extracted after that date. Indeed, the purpose of re-opening the quarry is to continue to extract materials, so it is still not completed.

Some legal jurisdictions would hold that a period of inactivity would extinguish any existing user rights on the quarry. Alternatively, progression of extraction from one land title to another may constitute a different though contiguous project that is not protected by existing user rights. Informal guidance was sought from the Ministry of Environment and Climate Change on these points, but it advised that no applications had been received since 2003 for existing or new quarries, so there was no case law to help decide these questions.

If an EIA Report is required, who should seek it – the Government as the lessee of the quarry or the quarry operator? The Act binds the Crown (Clause 3), so there is no exemption granted because the government could be the proponent. Notwithstanding this, it is recommended that if environmental impact approval is required, it should be sought by the government, not the contractor. It is likely that a Crown proponent would be afforded a timelier outcome than an application from the private sector.

Given the unclear status of an expanded quarry, it is further recommended that the government seek formal guidance from the Crown Solicitor and the Ministry of Environment and Climate Change on whether an EIA is required. If the answer is affirmative, it should be prepared and submitted by the Ministry of Transport as a matter of urgency.

8.2 Pollution Control Licences

Following discussions with Ministry of Environment and Climate Change officials and a review of existing environmental legislations, there is no Pollution Control Licence or similar licence used in Tonga. This means the Contractor would only be bound by the general provisions to avoid pollution contained in the Environmental Management Act 2010.

8.3 Planning Approvals

After a review of existing environmental and land legislations, no separate planning approval is required from the Ministry of Lands, Survey and Natural Resources as the 'Ahononou site is not urban land.

8.4 Quarry Rehabilitation

Ministry of Environment officials were interviewed on this issue. From the Ministry's standpoint, restoration is an issue that "could" be raised by the applicant in their EIA. This would be considered in the applicant's rehabilitation plans for the land after its use.

The *Environmental Impact Assessment Act* does not require information on rehabilitation/restoration be included in an EIA. It is not one of the Section 8 listed criteria that the Minister must consider in an EIA prior to making a decision on a proposed project. Similarly, under the *Environmental Impact Assessment Regulations*, rehabilitation is not one of the required items at Regulation 16 which must be considered in an EIA.

Nevertheless, good environmental practice would dictate that before a new quarry or a new part of an existing quarry is opened, plans should be produced for its ultimate rehabilitation. This would include how the land is to be re-shaped, topsoiled and revegetated, with details of how long term drainage and water management would be achieved and how a sustainable and safe end use can be maintained. In other jurisdictions, this is usually accompanied by a rehabilitation bond, determined at a rate per hectare disturbed. The amount is calculated based on what types of works are needed to re-establish vegetation and to maintain it for long enough to demonstrate that it is sustainable. The bond is paid to the Government and if there are multiple contractors, each contributes in proportion to the area of land that is disturbed. At the end of quarrying, either the contractor carries out rehabilitation and the Government releases the bond, or the Government itself arranges the rehabilitation, paid for by the bond. This mechanism might be appropriate at 'Ahononou.

9. Institutional Capacity

9.1 Contract Management Expertise

Leases and operating contracts can be drawn up by suitably qualified lawyers, either within the Crown Solicitors Office or in private practice. However, monitoring the conduct of the contract and seeking its enforcement will require experience in contract administration. Particular expertise in quarry operations or civil engineering would not be essential, though they would obviously assist the relevant officer in carrying out his or her duties.

The appropriate agency to administer the contract would be the Ministry of Transport. Enquiries were therefore made whether the necessary expertise was already contained in the Ministry, or whether some training and institutional strengthening would be needed. It was advised that suitable officers were available in the joint resources of the Ministry of Transport and the Ministry of Works. It was beyond the scope of the present assignment to assess the depth of that expertise. Nevertheless, if there are concerns in this area, it may be appropriate for the Transport Sector Consolidation Project to include in the institutional strengthening support already being provided to the Ministry.

9.2 Lease Holders

A question remains of whether the land owner leases required for the quarry and possibly the processing area should be held on behalf of the government by the Ministry of Transport as the implementing agency, or the Ministry of Lands, Survey and Natural Resources as the agency most involved in lease arrangements. While there are advantages in either option, on balance, it is recommended that the Ministry of Transport should be the relevant agency. It is the agency charged with overall responsibility for road maintenance under future privatised arrangements. The Ministry of Lands, Survey and Natural Resources would carry out its normal role of registering the leases, processing lease payments and ensuring their compatibility with land title formalities.

10. Conclusions and Recommendations

10.1 Conclusions

The overall conclusions of the Stage 1 investigations continue to be appropriate, i.e., future road maintenance in Tonga should be undertaken by the private sector, with government ensuring proper tendering of requirements, probity and transparency, and maintaining quality standards.

After independent testing of six commercial quarries and a disused quarry at 'Ahononou, it has been confirmed that 'Ahononou Quarry provides the most dense, least porous, strongest and most durable rock available on Tongatapu that can be used for sealing aggregate. It supports the quarry's strategic value and the need to re-open it to serve current and future road and airport construction projects. That re-opening should be via a contract with a competent quarry operator.

A series of leases should be procured by the government to secure the lands necessary to extract and process rock. Forms of these leases outlining the legal principles involved are included in Appendix D. Sub-leases to the quarry contractor should mirror the requirements of the main leases. The operating contract itself should initially be for five years in a general form given in Appendix E.

The Ministry of Works has the largest amount of earthmoving equipment for road construction, but several contractors have reasonable fleets of such equipment. Unfortunately, due to funding shortages and management shortcomings, the Ministry of Works' fleet is largely derelict, with few items currently operational. Nevertheless, the capital pool of equipment in both public and private ownership on Tongatapu is sufficient for normal road maintenance using chip seal techniques.

Two specific items of equipment, namely a street sweeper and a vacuum suction truck should be maintained and made available for hire by the quarry contractor or a maintenance contractor. The operating contract and main property leases should be held by the Ministry of Transport. Surplus equipment should be sold by tender. If the Government wishes to enhance the capacity of local contractors on the outer islands, it could subsidise the purchase of some key equipment and seek development assistance to return it to operating condition. Any such, work should be done within the context of facilitating and implementing a road maintenance contract.

It is suggested that the Government seek urgent advice from the Crown Solicitor and Ministry of Environment and Climate Change on the need for an EIA on the re-opening of 'Ahononou Quarry. If this is needed, an EIA report should be prepared and submitted to the Ministry of Environment and Climate Change as quickly as possible. Quarry rehabilitation is not a mandatory requirement under current Tongan environmental legislation. However, consistent with good environmental practice, the contractor should be required to submit a draft quarry rehabilitation plan and lodge it with the Ministry of Transport, together with a rehabilitation bond based on the number of hectares of land it expects to disturb during the contract. The unit rehabilitation rate per hectare should be determined based on the cost of carrying out the ultimate rehabilitation plan.

Finally, should there prove to be insufficient human resources in the Ministry of Transport to administer the operating contract, help should be sought from the World Bank under the Transport Sector Consolidation Project.

10.2 Recommendations

1. 'Ahononou Quarry has the best quality rock available for sealing aggregate. It should be re-opened to provide sealing aggregate for all road surfacing and airport runway re-sheeting programs.
2. A long term lease should be obtained by the government to secure the potential reserves of rock in the land to the north of the existing quarry void, with payment for use of that land via an annual royalty based on the volume of materials extracted.
3. The government to obtain another lease over the existing quarry void at 'Ahononou to give transport access, storage and processing space for rock extracted from the northern area. A royalty structure would not be appropriate for this land and if any remuneration is required, it should be based on a flat payment per annum for use of the land.
4. It may be desirable to establish a third lease for the existing quarry processing area, assuming the successful contractor wishes to use this site. On this site, lease fees should be based on the land area to be used.
5. Parallel sub-leases should be entered into between the Government and the quarry contractor to give the latter access to the land needed for him to operate the quarry.
6. Establish a contract between the Government and a competent quarry operator to extract and process rock from 'Ahononou into sealing aggregate. Production would be as specified to meet currently anticipated annual needs and the contractor would be responsible for supplying in accordance with national quality standards.
7. The contractor should be responsible for all works necessary to re-open the quarry including reconstruction of access roads and ramps, repair of equipment and pre-stripping a section of the adjoining land to the north.
8. Limit quarry production to sealing aggregates alone unless the contractor can demonstrate to the satisfaction of the government that further reserves of comparable quality are available in adjoining lands.
9. The contractor may or may not want to use the existing crushing and screening equipment in its present location. Should it wish to purchase the plant, this could be achieved by paying an amount per tonne of aggregate sold over the first two years of the contract. If it elects to use the machinery, whether purchased or not, it should be made responsible for the repair and maintenance of the equipment.
10. Sell by open tender on the international market, the existing Caterpillar AP-1050B paver, as it is surplus to the requirements in Tonga.
11. Retain two other specialised equipment items in public ownership, namely a street sweeper and a vacuum suction truck but to be maintained by the quarry contractor or a maintenance contractor in accordance with manufacturers' recommendations. They are to be made available for hire at a nominated minimum availability and the contractor is to be remunerated in an open book structure which is reconciled at the end of each year, depending on the amount each item is used.
12. Surplus plant items currently owned by the Ministry of Works can be best disposed by local open tender. Much of this equipment is derelict and suitable only for scrap. Some items could be repaired and the government might like to enhance the capacity of local contractors on outer islands by subsidising their tender bids. If that is the case, the Government might like to seek Development Partner assistance in making key items serviceable.
13. It is recommended that 'Ahononou sealing aggregates be used for all roads resealing, not just for major roads. The differences in quality with other alternatives could otherwise compromise road longevity.
14. Some compromises may be appropriate for aggregate grading curves, but Aggregate Crushing Value specifications should be maintained at 35% and Aggregate Wet Strength at 125kN.

15. Discussions could be held with Development Partners to ensure the sharing of a fair allocation of risk with the contractor in the event of program delays that are beyond its control.
16. The Contractor should pay all royalty and lease payments required in accordance with the procedures laid out in the Land Act.
17. Development Partners are encouraged to include requirements that road and airport contractors being paid by them provide certificates that they have paid all staff and suppliers before contract payments are released.
18. The Government to seek urgent advice from the Crown Solicitor and Ministry of Environment and Climate Change on the need for an Environmental Impact Assessment approval for 'Ahononou Quarry. If this is needed, an EIA report should be prepared and submitted to the Ministry of Environment and Climate Change as quickly as possible.
19. The Quarry Contractor should be required to submit a draft quarry rehabilitation plan and lodge it with the Ministry of Transport, together with a rehabilitation bond based on the number of hectares of land it expects to disturb during the contract with a unit rate based on the cost of carrying out the ultimate rehabilitation plan.
20. Should there prove to be insufficient human resources in the Ministry of Transport to administer the operating contract, seek assistance from the World Bank Transport Sector Consolidation Project.

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Appendices

Appendix A	Consultants' Terms of Reference
Appendix B	Independent Aggregate Testing Results
Appendix C	Relevant Provisions of the Land Use Act
Appendix D	Draft Form of Quarry Land Owner Leases
Appendix E	Draft Form of Quarry Operating Contract
Appendix F	Equipment Hire Rates
Appendix G	Legal Research Advice

Appendix A Consultants' Terms of Reference

Objective of the Assignment:

The TA aims to assist the Government of Tonga evaluate the various options that exist to create a transparent and cost effective institutional framework for ownership and management of the quarry, the asphalt plant and larger road maintenance equipment in Tonga; and to carrying out further analysis and prepare the outline and implementation plan for contractual and operational arrangements to implement the preferred option.

Scope of Work:

This TA will provide the services of a team of an international and a national consultant to assist the Government to:

- a. Evaluate the various options that exist to create a transparent and cost effective institutional framework for ownership and management of the quarry, the asphalt plant and larger road maintenance equipment in Tonga in order to avoid the disadvantages of monopolistic market tendencies and stimulate the development of a local industry of SME's for road maintenance and related infrastructure projects.
- b. Carrying out an assessment and prepare a strategy and action plan for implementing the institutional framework and contractual and operational arrangements for the preferred option.

The TA will ensure that all the possible options to establish the institutional framework are reviewed and that the organizational entity will operate in a transparent and cost effective manner, based on commercial principles and in accordance with legal rules established for all companies. Work will be split into two phases.

Phase 1: During the first phase the consultants will consult with government agencies and other stakeholders to assess the various options to arrange ownership and management of the quarry, the asphalt plant and road maintenance equipment and prepare an interim report presenting the results of their assessment and recommendations. Such options may e.g. include (but not be limited to) ownership and management by the government, by statutory SOE(s), by corporatised SOE(s), through Private Sector Participation models, and involve different forms of management and/or service contracts. The report will be presented and discussed with the government, national stakeholders and the development partners to obtain their view on the findings and recommendations of the assessment and their support for proposed option(s). This phase will require 1-1.5 months.

Phase 2: After the Government has taken a decision on the preferred option, the consultants will continue to produce the implementation strategy and action plan for the preferred option, including detailed recommendations for the legal, organizational, commercial, financial, environmental and operational issues involved. This phase is also expected to be completed within a period of 1.5 months.

Detailed Tasks:

The Team Leader and Business Development Specialist will have qualifications in business management/administration with a civil engineering experience and knowledge of quarrying, pavement construction materials, material handling, processing, and distribution, infrastructure maintenance and construction management.

The Business Development Specialist/Team Leader shall be responsible for the following tasks:

Phase 1

- (i) Determine the current status, policies and long-term vision and objectives of the Government for the country's construction industry.
- (ii) Assess the current status and future demand for services of the quarry and asphalt plant and the need for major equipment in future projects:
 - assess current and medium term construction and other civil-work projects that will require raw materials and quantification of demand from the quarry and asphalt plant in the next 5 years; and
 - an assessment of the current and required production level by the quarry and asphalt plant to support demand taking into consideration sustainable exploitation and use of scarce resources;
 - identification/listing of appropriate production technology, plant, equipment and other assets required to meet demand including costs and options for acquisition;
 - assessing the number of contractors likely to be involved in relevant infrastructure investment projects and the volume of construction support (in terms of equipment and labor) that will be required.
- (iii) Assess existing policies, legislation, taxation and regulatory systems and their potential effect on future institutional arrangements for road maintenance and related infrastructure investments.
- (iv) Collect and review information on how other, comparable countries have tried to institutionalize and organize the sector and review experience with different types of institutional settings. For this purpose the consultant will consult especially with development partners and their experiences in different countries and projects.
- (v) Consult with government, stakeholders and development partners and identify the various options that exist to institutionalize and organize the road construction and maintenance sector in a transparent, cost effective manner and lead the evaluation of the different options based on a set of clear criteria, taking into account international best practice in comparable countries and situations.
- (vi) Prepare and present to the Government and main stakeholders an Interim Report that will include the different options identified and their evaluation with recommendations to the government on the preferred option.

Phase 2

After the Government has taken a decision on the preferred option, it will establish a Working Group of contract specialists of the Ministries of Transport and Works. The international consultant will work closely with this group and lead the preparation of an implementation strategy and action plan for the preferred option(s), including

- (vii) Consult with stakeholders and relevant experts and analyze and identify appropriate legal instruments (e.g. concession, lease or operations type of contracts) to arrange the management and operation of the Ahononou Quarry by a private operator.
- (viii) Prepare a detailed brief for a contract that will arrange for the management and operation of the Ahononou Quarry by a private operator that describes the legal, institutional, commercial, financial, operational and environmental aspects to be covered in the contract and how these aspects should be arranged.
- (ix) Report on the outcome of laboratory testing with regard to the quality of materials obtained from the various quarries in order to confirm the assumed quality of materials from the Ahononou Quarry and of materials of other quarries.

- (x) Consult with stakeholders and prepare recommendations on the best way to make use of the specialized pieces of equipment which are still operable (paver, sweeper, suction truck) and suggest contractual arrangements that could be utilized in the arrangements.
- (xi) Consult with stakeholders and prepare recommendations on the best way to dispose of the current pool of inoperable equipment owned by the Ministry of Works.
- (xii) Assess the institutional capacity of the Government to manage the contractual arrangements for road construction and maintenance in Tonga.
- (xiii) Identify risks including potential environmental impacts and other potential constraints that may affect the above contractual and operational arrangements.
- (xiv) Prepare a draft Implementation Plan for implementing the new institutional framework and/or organizational and contractual arrangements.

Output/Reporting Requirements:

The Specialist shall primarily be responsible for the preparation and submission of the following reports:

- (i) An interim report recommending a transparent and cost effective structure to arrange ownership and management of the quarry, asphalt plant and main road maintenance equipment in Tonga within 2 months of the start of the TA; and
- (ii) A Final Report that will include an implementation strategy and action plan covering the contractual arrangements for operating the Ahononou Quarry and the use/disposal of remaining equipment owned by the Ministry of Works. The draft Final Report will be submitted within 5 months of starting the assignment.

Appendix B Independent Aggregate Testing Results

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116379	
Date Received:	19.5.11	
Sample Description:	CCCC #1	
Test Method	Test	Results
AS1141.Z2	Dry Strength (kN)	83
	Wet Strength (kN)	75
	Wet/Dry Strength Variation (%)	10
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

B. McCotter, File, Ref: 5245.Reg



Approved Signatory 
 Date 9.6.11 Serial No. 96110

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116380	
Date Received:	19.5.11	
Sample Description:	MALAPO #2	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	95
	Wet Strength (kN)	85
	Wet/Dry Strength Variation (%)	11
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

B. McCotter, File, Ref: 5245.Rep



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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 462/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116361	
Date Received:	19.5.11	
Sample Description:	MOW #3	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	133
	Wet Strength (kN)	126
	Wet/Dry Strength Variation (%)	5
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

B. McCotter, File, Ref: 5245.Rep



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Date 9.6.11

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116382	
Date Received:	19.5.11	
Sample Description:	NISHI #4	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	101
	Wet Strength (kN)	89
	Wet/Dry Strength Variation (%)	12
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

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Date 9.6.11

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116383	
Date Received:	19.5.11	
Sample Description:	ROYCO #5	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	87
	Wet Strength (kN)	79
	Wet/Dry Strength Variation (%)	9
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

B. McCotter, File, Ref: 5245.Rep



Approved Signatory

Date 9.6.11 Serial No. 96114

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116384	
Date Received:	19.5.11	
Sample Description:	TAFOLO #6	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	60
	Wet Strength (kN)	45
	Wet/Dry Strength Variation (%)	26
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

B. McCotter, File, Ref: 5245.Rep



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Date 9.6.11

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TEST REPORT

CLIENT: EMGA-Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116385	
Date Received:	19.5.11	
Sample Description:	VETE #7	
Test Method	Test	Results
AS1141.22	Dry Strength (kN)	85
	Wet Strength (kN)	76
	Wet/Dry Strength Variation (%)	11
	Fraction tested (mm)	-19.0+9.5
	The amount of significant breakdown (%)	>0.2
	Size of cylinder used: 150mm diam.	

Sample submitted by client.

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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1

AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No: 116379
 Date Received: 19.5.11
 Sample Description: CCCC #1

Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	
	19.0mm	100
	13.2mm	57
	9.5mm	6
	6.7mm	5
	4.75mm	5
	2.36mm	5
	1.18mm	4
RTA T203	Material finer than 75 micron (%)	2
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	5
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	10.7
AS1141.21	Average Crushing Value (% Loss)	43.3
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

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Date 27.5.11 Serial No. 95770

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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1
 AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No: 116380
 Date Received: 19.5.11
 Sample Description: MALAPO #2

Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	
	19.0mm	100
	13.2mm	65
	9.5mm	20
	6.7mm	6
	4.75mm	5
	2.36mm	5
	1.18mm	5
RTA T203	Material finer than 75 micron (%)	2
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	4
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	9.2
AS1141.21	Average Crushing Value (% Loss)	41.4
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

bohmccollter@optusnet.com.au, File, Ref. 5233.Rep



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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1
AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No: 116381
Date Received: 19.5.11
Sample Description: MOW #3

Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	100
	19.0mm	56
	13.2mm	17
	9.5mm	6
	6.7mm	4
	4.75mm	4
	2.36mm	3
1.18mm		
RTA T203	Material finer than 75 micron (%)	2
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	10
	Ratio 3:1	1
RTA T235	Average Least Dimension (mm)	8.4
AS1141.21	Average Crushing Value (% Loss)	36.4
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1

AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No: 116362
Date Received: 19.5.11
Sample Description: NISHI #4

Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	
	19.0mm	100
	13.2mm	61
	9.5mm	8
	6.7mm	5
	4.75mm	5
	2.36mm	5
1.18mm	5	
RTA T203	Material finer than 75 micron (%)	2
AS1141.14	Mis-shape Particles (%)	
	Ratio 2:1	2
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	10.6
AS1141.21	Average Crushing Value (% Loss)	42.7
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

botmccotten@optusnet.com.au, File, Ref. 5233.Rep



Approved Signatory: 
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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1
 AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116383	
Date Received:	19.5.11	
Sample Description:	ROYCO #5	
Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	
	19.0mm	100
	13.2mm	62
	9.5mm	30
	6.7mm	11
	4.75mm	6
	2.36mm	6
	1.18mm	5
RTA T203	Material finer than 75 micron (%)	2
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	4
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	8.2
AS1141.21	Average Crushing Value (% Loss)	46.4
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

bohmccotten@optusnet.com.au, File, Ref. 5233.Rep



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 Date 27.5.11 Serial No. 95774

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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1
 AS1141 - Methods for Sampling and Testing Aggregates

Laboratory Sample No:	116384	
Date Received:	19.5.11	
Sample Description:	TAFOLO #6	
Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	100
	19.0mm	90
	13.2mm	63
	9.5mm	37
	6.7mm	24
	4.75mm	19
	2.36mm	17
	1.18mm	16
RTA T203	Material finer than 75 micron (%)	5
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	5
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	8.4
AS1141.21	Average Crushing Value (% Loss)	50.2
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

bohmccoffen@optusnet.com.au, File, Ref. 5233.Rep



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TEST REPORT

CLIENT: EMGA – Mitchell McLennan

FILE NO: 482/11

PROJECT: Quality Control

TEST PROCEDURE: RTA – Materials Test Method Vol. 1

AS1141 – Methods for Sampling and Testing Aggregates

Laboratory Sample No: 116385
 Date Received: 19.5.11
 Sample Description: VETE #7

Test Method:	Test:	Results:
RTA T201	% Passing A.S. Sieve	
	26.5mm	100
	19.0mm	97
	13.2mm	41
	9.5mm	11
	6.7mm	8
	4.75mm	8
	2.36mm	8
	1.18mm	7
RTA T203	Material finer than 75 micron (%)	3
AS1141.14	Mis-shapen Particles (%)	
	Ratio 2:1	2
	Ratio 3:1	Nil
RTA T235	Average Least Dimension (mm)	11.3
AS1141.21	Average Crushing Value (% Loss)	43.4
	Fraction Tested (mm)	-19.0+13.2

Sample submitted by client.

bobmccolter@optusnet.com.au, File, Ref. 5233.Rep



Approved Signatory: 
 Date: 27.5.11 Serial No. 95776

Richard Bawer

This document is issued in accordance with the NATA's accreditation requirements.
 Accredited for compliance with ISO/IEC 17025

NATA Accredited Laboratory
 Number: 547

Appendix C Relevant Sections of the Land Act

Sections 141 to 143 of the Land Act state:

141 Land may be resumed compulsorily

- (1) The King may, with the consent of the Privy Council, call upon any holder to give up possession of land held by him provided that the Council is satisfied that the land is required for public purposes.
- (2) In all such cases the Minister shall, to the holder of the land to be resumed —
 - (a) in respect of the crops being grown on the land to be resumed, pay money compensation to be calculated at the rates and in the manner provided in this Part of this Act;
 - (b) in respect of the land to be resumed, at the Minister's own discretion, either grant other land in its place, or pay money compensation to be calculated at the rates and in the manner provided in this Part of this Act, or both grant other land and pay money compensation;
 - (c) in respect of any building or buildings erected on the land to be resumed, pay money compensation to be calculated at the rates and in the manner provided by this Part of this Act.
- (3) The powers of resumption granted to the Privy Council by this section shall not preclude nobles or others with the consent of Privy Council from voluntarily relinquishing land for public purposes and no compensation either in land or money shall be given to any noble or other person relinquishing land in accordance with this subsection.

142 Notice of resumption to be given

Where the Crown intends to resume land held by any person, the Minister shall give to the holder thereof a notice in writing of such intention in the form specified in Schedule XIII to this Act, and the said notice must be given at least thirty (30) days before the date on which it is intended to resume possession of the land.

143 Compensation for resumed landⁱ

- (1) The King may, with the consent of Privy Council, make regulations from time to time specifying the rates of money compensation to be paid for land resumed by the Crown under this Part of this Act; and for crops being grown and for buildings on such land and the method of calculation of such rates.
- (2) The amount of money compensation to be paid based on said rates will be calculated within 30 days of the date of the said notice specified in section 142 of this Act.

Under section 141 (c), the relevant noble could voluntarily relinquish the land for public purposes with no compensation by way of money or land, if he were so minded.

Appendix D Draft Form of Quarry Land Owner Leases

FORM OF APPLICATION FOR LEASE

.....2011

Lord Ma'afu, Minister for Lands,
Nuku'alofa.

Sir,

We have the honour to make application for the lease of certain property at 'Ahononou more particularly described below. The purpose for which we wish to put to use the said property is for the collection, transport and storage of unprocessed and semi-processed rock, the loading and transport of said rock from the site, location and use of quarry crushing and screening facilities and product stockpiles, including ancillary services and activities.

District of	Estate of	'Api kolo of and date registered	Area of holding
FUA'AMOTU	LORD TUNGI	SIAOSI PAKILEATA	8 ACRES
Area required	Term of years	Rent per annum	Amount of Survey fee
8 ACRES	50	Annual fixed	To be advised

Signature of applicant.....

FOR THE GOVERNMENT OF THE KINGDOM OF TONGA

I hereby agree to the lease of the property as described above and declare that there is no impediment to prejudice this lease.

Signature of grantor

SIAOSI PAKILEATA

Witness to signatures.....

Remarks by Minister.....

TOFI'A

Total number of Taxpayers	Area leased to Foreigners	Area leased to Tongans
--	--	--

Survey fee official receipt no.

Date2011

..... Minister

FORM OF LEASE

THIS DEED OF LEASE made this 1st day of the month of [December?] in the year of Our Lord 2011 by SIAOSI PAKILEATA, of the one part, hereinafter called in this Deed the Lessor, and the Government of the Kingdom of Tonga of the other part, hereinafter called in this Deed the Lessee.

Witnesseth that in consideration of the payment of the yearly rent that is recorded in this Deed and the performance of the covenants in this Deed by the Lessee itself and its successors, the Lessor leases for himself and his successors to the Lessee, and its successors, all that piece of land [*Ahononou Quarry described*] in accordance with the Land Act. And the Lessee, and its successors, shall hold the piece of land described in this Deed from the [1st] day of the month of [December] in the year of Our Lord 2011 until the [1st] day of the month of [December] in the year of Our Lord 2061.

And the Lessee covenants for itself and its successors, that he will pay the sum of [*enter annual fixed rent adjusted for inflation or the formula for a volume or tonnage based royalty*] in legal currency on the 1st day of the month of [December] in each and every year to the Lessor or his successors because of this Lease. And will make the first payment of the same on the execution of this Deed. And the Lessee for itself and its successors, hereby covenants that it will comply with the regulations made by the King and the Legislative Assembly and Government: such as the laws relative to weeding the frontage and making the roads, and all municipal laws and ordinances which shall be made by the King and the Legislative Assembly and the Government.

And the Lessee Covenants for itself and its successors that in respect of the land hereunder leased, it will:—

- (a) permit the land to be used only for the purpose of collection, transport and storage of unprocessed and semi-processed rock, the loading and transport of said rock from the site, location and use of quarry crushing and screening facilities and product stockpiles, including ancillary services and activities.
- (b) not abandon, neglect or fail to use it for any period or periods of altogether 3 years; or
- (b) not use or permit any person or persons to use it for any purpose other than that upon which application have hitherto been made.

And the Lessor Covenants for himself and his successors that in respect of the land hereunder leased, it will:--

- (a) Not burden the title by offering the land as security or any other act that would compromise the rights of the lessee.
- (b) Not interfere with the activities of the lessee, or act in any way which may reasonably inferred to negatively impact the lawful activities of the lessee, and the purposes of this lease.

This Lease shall immediately become null and void if:--

- (a) The land does not contain viable reserves of required quality rock in the volume and quality required by the Government.
- (b) If the lease for the land area situated to the south of this land is unable to be secured by the lessee for quarrying support services.

If any of the above covenants are not complied with by the lessee, for itself and its successors, **OR** by the lessor for himself and his successors, then the wronged party may at their discretion terminate this lease.

But it shall be lawful for the Lessee, for itself and its successors to remove all houses and improvements which may have been built on the said land. And it is hereby agreed by these presents if at the expiration of twenty-one (21) days from the day the rent becomes due by the Lessee, for itself and its successors, to the Lessor or his successors because of this Lease, as is recorded in this Deed, the rent hereby reserved or any part of it should remain unpaid, it shall be lawful for the Lessor or his successors to take possession of all or parts of the lands herein leased by this Deed, or to sell by auction the houses or house or anything which may be on this land, to the amount of rent owing by the Lessee, for itself and its successors, because of the rent of his land or to take civil proceedings in a court of competent jurisdiction of the Kingdom for the recovery of the said rent.

SIGNED

WITNESS the signature of the Minister of Lands and the seal of his office both affixed hereto in the name of His Majesty and in accordance with clause 110 of the Constitution of Tonga on the..... day of the month of in the year of Our Lord 2011 and the signature of the Lessee and his seal done on theday of the month of..... in the year of Our Lord 2011 .

.....
Cabinet Minister

.....
Minister of Transport

.....
Witness to the signature of Lessee

.....
Lessee

REGISTERED in the Registry of Leases of the Tonga Government in the Office of the Minister of Lands, Nuku'alofa, on the day of the month of..... 2011.

No.....

.....
Minister of Lands

FORM OF SUBLEASE

THIS DEED OF SUBLEASE made this 1st day of the month of [*December?*] in the year of Our Lord 2011 by THE GOVERNMENT OF THE KINGDOM OF TONGA, of the one part, hereinafter called in this Deed the Sublessor, and the 'AHONONOU QUARRY OPERATOR of the other part, hereinafter called in this Deed the Sublessee.

Witnesseth that in consideration of the payment of the yearly rent that is recorded in this Deed and the performance of the covenants in this Deed by the Sublessee itself and its successors, the Sublessor subleases for itself and its successors to the Sublessee, and its successors, all that piece of land [*Ahononou Quarry described*] in accordance with the Land Act. And the Sublessee, and its successors, shall hold the piece of land described in this Deed from the [1st] day of the month of [*December?*] in the year of Our Lord 2011 until the [1st] day of the month of [*December*] in the year of Our Lord 2016.

And the Sublessee covenants for itself and its successors, that he will pay the sum of [*enter annual fixed rent adjusted for inflation*] in legal currency on the 1st day of the month of [*December?*] in each and every year to the Sublessor or his successors because of this Sublease. And will make the first payment of the same on the execution of this Deed. And the Sublessee for itself and its successors, hereby covenants that it will comply with the regulations made by the King and the Legislative Assembly and Government: such as the laws relative to weeding the frontage and making the roads, and all municipal laws and ordinances which shall be made by the King and the Legislative Assembly and the Government.

And the Sublessee Covenants for itself and its successors that in respect of the land hereunder subleased, it will:—

- (a) use the land only for the purpose of collection, transport and storage of unprocessed and semi-processed rock, the loading and transport of said rock from the site, location and use of quarry crushing and screening facilities and product stockpiles, including ancillary services and activities.
- (b) not abandon, neglect or fail to use it for any period or periods of altogether 3 years; or
- (b) not use or permit any person or persons to use it for any purpose other than that upon which this sublease was granted.

And the Sublessor Covenants for himself and his successors that in respect of the land hereunder subleased, it will:--

- (c) Not burden the title by offering the land as security or any other act that would compromise the rights of the Sublessee.
- (d) Not interfere with the activities of the Sublessee, or act in any way which may reasonably be inferred to negatively impact the lawful activities of the Sublessee, and the purposes of this sublease.

This Sublease shall immediately become null and void if:--

- (c) If the sublease for the land area situated to the south of this land is unable to be secured for quarrying support services.

If any of the above covenants are not complied with by the Sublessee, for itself and its successors, **OR** by the Sublessor for himself and his successors, then the wronged party may at their discretion terminate this sublease.

But it shall be lawful for the Sublessee, for itself and its successors to remove all houses and improvements which may have been built on the said land. And it is hereby agreed by these presents if at the expiration of twenty-one (21) days from the day the rent becomes due by the Sublessee, for itself and its successors, to the Sublessor or his successors because of this Sublease, as is recorded in this Deed, the rent hereby reserved or any part of it should remain unpaid, it shall be lawful for the Sublessor or his successors to take possession of all or parts of the lands herein subleased by this Deed, or to sell by auction the houses or house or anything which may be on this land, to the amount of rent owing by the Sublessee, for itself and its successors, because of the rent of his land or to take civil proceedings in a court of competent jurisdiction of the Kingdom for the recovery of the said rent.

SIGNED

.....

Sublessee

The signature of the Sublessee done on theday of the month of..... in the year of Our Lord 2011.

Witnessed by:

.....

Sublessor

The signature of the Sublessor done on the day of the month of..... in the year of Our Lord 2011 .

Witnessed by:

Appendix E Draft Form of Quarry Operating Contract

**OPERATING CONTRACT BETWEEN
THE GOVERNMENT OF THE
KINGDOM OF TONGA
AND
[“QUARRY OPERATOR”]**

AGREEMENT

This Agreement, made and entered into in Nuku’alofa, in the Kingdom of Tonga, on the [] day of [] 2011, by and between the Government of the Kingdom of Tonga, represented herein by the Hon. Minister for Transport (hereinafter called the Government) and the [Quarry Operator], hereinafter called “the Company,”

RECITALS

WHEREAS the Government is desirous of advancing the economic development of the people of Tonga through the improvement and building of its public roads, and to which end obtained funding from [donor source] towards this particular purpose,

AND WHEREAS the Government is desirous of obtaining the best possible source of rock aggregate for the building and improvement of these public roads,

WHEREFORE the Government has obtained the leases for land including and adjacent to the current ‘Ahononou Quarry site, the totality of these leases being believed to contain commercially viable deposits of the best possible rock aggregate (the whole area hereinafter referred to collectively as the “quarry site”) in Tongatapu for the improvement and building of public roads,

WHEREAS through its procurement process, the Government has properly identified the [quarry operator] to be awarded the operating contract for the operation of the quarry site to produce from it the rock aggregate needed for the improvement and building of public roads,

AND WHEREFORE the [quarry operator] company, incorporated in Kingdom of Tonga, has represented that it has the capacity, the information, knowledge, experience and proven technical and financial capability and other resources to undertake the quarrying, processing and production of rock aggregate from the quarry site, and is ready and willing to proceed thereto under the terms and subject to the conditions set forth in this Agreement,

NOW THEREFORE, in consideration of the mutual promises, covenants and conditions hereinafter set out to be performed and kept by the Parties hereto, and intending to be legally bound hereby, it is stipulated and agreed between the Parties hereto as follows:

ARTICLE 1
APPOINTMENT AND RESPONSIBILITY OF THE COMPANY

1. The Government hereby grants to the Company the sole operating contract with respect to the quarry site. The Company shall perform work and obligations imposed on it by this Agreement, including the investment of capital in the site, the payment of taxes to the Government, and shall have all rights conferred on it by this Agreement.
2. In furtherance of this Agreement, the Government grants to the Company particularly the sole rights to quarry for rock aggregate in the quarry site (as hereinafter defined), and thereby to develop, process, and transport all rock aggregate extracted, to market, sell or dispose of all the product, and to perform all other operations and activities which may be necessary or convenient in connection therewith, with due observance of this Agreement.
3. The Company accepts the rights and obligations to conduct operations and activities in accordance with the terms of this Agreement. The Company shall conduct all such operations and activities in a good technical manner in accordance with good and acceptable quarrying standards and practices and in accordance with modern and accepted scientific and technical principles using appropriate modern and effective techniques, materials and methods to achieve minimum wastage and maximum safety as provided in the applicable laws and regulations of Tonga.
4. The Company agrees to conduct all operations and activities under this Agreement so as to avoid waste or loss of natural resources, and to protect natural resources against unnecessary damage. Production shall not be restricted to the extraction of high grade rock aggregate to the neglect of low grade rock aggregate, but shall be related to the approved development plans and to agreed-to grades throughout the term of this contract.
5. The Company shall conduct its operations under this Agreement in such a manner as to minimise harm to the Environment and shall utilise recognised modern quarrying practices to protect natural resources against unnecessary damage, to minimise pollution and harmful emissions into the environment in its operations and to dispose of waste materials in a manner consistent with good waste disposal practices. The Company shall otherwise conform with the relevant environmental protection laws and regulations of Tonga.
6. In any event the Company shall be responsible for all damages as a result of emissions harmful to the environment in the course of its operations, caused by the negligence of the Company. The Company shall also be responsible for reasonable preservation of the natural environment within which the Company operates and especially for taking no acts which may unnecessarily and unreasonably block or limit the further development of the resources of the area.
7. The Company shall take measures to prevent damage to the rights and property of the Government or third parties. In the event of negligence on the part of the Company or its agents or of any sub-contractor carrying on operations or activities for the Company under this Agreement, they shall be liable for such negligence in accordance with the laws of Tonga.
8. The Company shall install and utilise such modern safety devices and shall observe such modern safety precautions as are provided and observed under conditions and operations comparable to those undertaken by the Company under this Agreement.

9. The Company shall observe recognised modern measures for the protection of the general health and safety of its employees and of all other persons having legal access to the area covered by this Agreement. The Company shall comply with the relevant health, safety and sanitary laws and regulations of Tonga and comply with such instructions as may be given in writing by the appropriate authorities in accordance with such laws and regulations.
10. The Company shall have sole control and management of all of its activities under this Agreement and shall have full responsibility therefore and assume all risk thereof in accordance with the terms and conditions of this Agreement. Without in any way detracting from the Company's responsibilities and obligations hereunder the Company may engage sub-contractors, whether or not affiliates of the Company, for the execution of such phases of its operations as the Company deems appropriate. The records of such sub-contractors relative to operations for the Company under this Agreement shall be made available to Government inspectors.

ARTICLE 2
OPERATIONS

11. The Company is a corporation incorporated under the laws of the Kingdom of Tonga and shall be domiciled in Tonga and subject to the laws and the jurisdiction of courts in Tonga which normally have jurisdiction over corporations. The Company shall maintain in Nuku'alofa a principal office for receipt of any notification or other official and legal communication.
12. The Company shall conduct a general survey of the quarry site, followed by test quarrying on selected areas, before beginning its general quarrying operations. The total activities and work subject to this Agreement shall be divided into three periods or stages hereinafter referred to as "General Survey Period", "Test Quarrying Period", and "General Quarrying Period".
13. The Government may work together with the Company during the test quarrying period. After the test quarrying period, the Company shall produce a report to the Government indicating the levels and grade of rock aggregate estimated to be contained in the quarry site. Subject to Article 4 of this Agreement, if after the Test Quarrying Period, it is decided by the Government that the site does not contain enough rock aggregate in the grade required for the improvement and building of public roads and airports in Tongatapu for the next 5 years, this Agreement shall become null and void.
14. The Company may contract for necessary technical, management and administrative services, provided that it shall not be released from any of its obligations hereunder. In the event that such services are contracted from affiliates, such services will be obtained only at a charge not more than a non-affiliated party with equivalent qualifications to perform such services would charge for provision of such services to equivalent standards. All such charges should be fair and reasonable and accounted for in accordance with generally accepted accounting principles consistently applied. The Company shall produce on request by the Ministry evidence verifying all such charges.
15. The Company undertakes to conduct all activities hereunder in the manner and subject to the conditions set forth in and to continue such activities without interruption subject to this Agreement, provided that such activities may be interrupted or suspended with the concurrence of the Government. Any such interruption or suspension shall not affect the mutual rights and obligations of the Parties hereto under this Agreement.

ARTICLE 3
GENERAL SURVEY PERIOD

16. The “quarry site” means that area as defined in Annex “A” attached to this Agreement, as changed by an extension or reduction of the area in accordance with this Agreement. For all purposes of this Agreement, the quarry site shall be deemed to contain [XX] hectares.
17. Company shall commence as soon as possible but not later than [X] months after the signing of this Agreement. The Company shall first conduct a General Survey of the quarry site to determine in what parts of it that deposits of rock aggregate are most likely to occur. The “General Survey Period” shall end on that date which shall be [X] months after such commencement.
18. The Company shall spend not less than [\$TOP] per square metre on field expenditure for the General Survey of the quarry site during the General Survey Period. Such expenses may include general organisational overhead and administrative expenses directly connected with field activities under this Agreement.
19. In connection with the Company’s obligations under this Article, the Company shall submit to the Ministry within two (2) weeks from the expiration of the General Survey Period, a report setting forth results of the survey and the items and amounts of expenditure during the General Survey Period. The Company shall be prepared to support such report with documentation should the Government so request.
20. The Company may at any time discontinue the General Survey in any part or parts of the quarry site on the ground that the continuation of such General Survey is no longer a commercially feasible or practical proposition and shall apply in writing to the Ministry for the surrender of its rights and obligations for the quarry site.

ARTICLE 4
TEST QUARRYING PERIOD

21. Upon completion of the General Survey the Company shall commence test quarrying the most promising parts of the quarry site. The program of “Test Quarrying” shall as appropriate include detailed geology, geophysics and geochemistry as may be applicable, sampling, pitting, dredging and drilling to be undertaken during the “Test Quarrying Period”.
22. The Company may at any time discontinue the test quarrying in any part or parts of the quarry site on the grounds that the continuation of such test quarrying is no longer a commercially feasible or practical proposition and shall apply in writing to the Ministry for the surrender of its rights and obligations for the quarry site.
23. The Company shall spend not less than [\$TOP] per square metre on field expenditure during the “Test Quarrying” Period. Such expenses may include general organisational overhead and administrative expenses directly connected with field activities under this Agreement.
24. In connection with the Company’s obligations under this Article, the Company shall submit to the Ministry within two (2) weeks from the expiration of the “Test Quarrying” Period, a report setting forth results of the survey and the items and amounts of expenditure during the “Test Quarrying” Period. The Company shall be prepared to support such report with documentation should the

Government so request.

25. If after review of the report, the Government wishes to discontinue this agreement for reasons that no commercially viable aggregate was likely to be present in the quarry site, this agreement shall become null and void. The following items with the Company shall immediately become the property of the Government:
- (i) maps indicating all places in the quarry site in which the Company shall have drilled holes or sunk pits,
 - (ii) copies of logs of such drill holes and pits and of assay results with respect to any analysed samples recovered from them, and
 - (iii) copies of any geological and/or geophysical maps of the quarry site which shall have been prepared by the Company.

ARTICLE 5
GENERAL QUARRYING PERIOD

26. The Company shall proceed with general quarrying activities subject to this Agreement not more than [X weeks] after the end of the "Test Quarrying" Period. The General Quarrying Period for the quarry site shall be deemed to commence after which the average daily throughput is at least XX per cent [XX%] of consistently good grade aggregate rock, of the design capacity of the facilities constructed for the purpose of quarrying and processing the aggregate rock in the quarrying site, but not later than the date falling [X] months after the date of completion of such facilities.
27. The Company will provide quarrying and rock processing facilities in Tonga according to recognised economic, technical and scientific standards. The rock aggregate to be quarried by the Company shall be of sufficient tonnage and quality amenable to improving and building public roads in Tonga. Production shall be scheduled to satisfy the demand for sealing aggregate scheduled in Annex D.
28. The Company shall produce aggregate rock consistently at a commercially viable grade as specified in Annex E and with output to satisfy the minimum requirements detailed in Annex D. Failure to achieve this standard, despite written warning from the Government giving the Company XX [days/months] to improve to the required standard, shall result in this Agreement becoming null and void.
29. The Company shall sell rock aggregate for the improvement and building of Tonga's roads or airport at a price of [X] per tonne, or at the price which may be determined in writing from time to time between the parties.
30. The Company will keep the Government informed concerning the quarry work through submission of quarterly progress reports, beginning with the first calendar quarter plus any part of a calendar quarter that remains following the date of signing of this Agreement, as to the progress and results of the Company's Exploration and development operations and activities under this Agreement.
31. The Company will upon request keep the Government advised from time to time of the Company's plans concerning the quarry work, including the progress of any construction, operation, employment and expenditure. These progress reports should be submitted within 30

(thirty) days after the end of each calendar quarter and be in such form as the Minister may from time to time prescribe. These quarterly progress reports relating to Exploration activities shall include:

- (i) the results of geological and geophysical investigation and proving of aggregate rock deposits in the quarry site and the sampling of such deposits;
 - (ii) the results of any general reconnaissance of the various sites of proposed operations and activities under this Agreement;
 - (iii) such other plans and information as to the progress of the Company's activities in the quarry site as the Ministry may from time to time reasonably require.
32. The Company shall after the date of signing this Agreement place with a bank appointed by the Government a deposit of X Pa'anga (\$XX,000.00). This amount shall hereinafter collectively be called "the Security Deposit". This deposit shall be released by the Government as follows:
- (i) 25% upon the expiration of the General Survey Period,
 - (ii) 25% upon the expiration of the Test Quarrying Period,
 - (iii) And upon:
 - (a) satisfactory performance according to the Government for each of the first two periods (survey and test), and
 - (b) the expenditure by the Company in such periods of the same amount of money.
33. The remaining fifty per cent (50%) of this Security Deposit will be released at the end of the term of this Agreement, or earlier upon this Agreement becoming null and void for any reason, less any costs incurred by the Government.
34. Reserves from the Quarry shall only be extracted to satisfy demand for road and airport sealing aggregate unless the Company can demonstrate to the satisfaction of the Government that more than 750,000 tonnes of resources are available to be extracted. In that case, permission may be granted by the Government to produce aggregates for a wider range of uses than sealing aggregate. The amount of surplus production and royalties paid for that surplus shall be subject to agreement between the parties.
35. The Company shall submit to the Government prior to commencing the General Quarrying Period a quarry rehabilitation plan showing how the Company would propose to rehabilitate the Quarry at the end of aggregate extraction. Once the plan is accepted by the Government, the Company shall lodge a rehabilitation bond with the Government at the rate of \$TOP X per hectare of land disturbed by the Company. This will form a sinking fund to pay for the ultimate rehabilitation of the quarry void.
36. The Company shall secure the Quarry site to ensure the safety of employees, visitors and members of the General Public. This shall include adequate fencing and other measures to safeguard against injuries to persons or property.
37. The General Quarrying Period shall continue for five years, or such longer period as the Government, on the written application of the Company, may approve.
38. During the General Operation Period the Company shall submit to the Ministry the following

reports:

- (i) a six-monthly statistical report beginning with the first month following the commencement of this Period which shall set forth the number and location of the workings on which work was begun during the preceding month; the number of workmen employed thereon at the end of the month; a list of the equipment at each working at the end of the month and a brief description of the work in progress at the end of the month and of the work contemplated during the following month.
 - (ii) a quarterly financial report beginning with the first quarter following the commencement of the Operating Period concerning the progress of its operations in the quarry site. This report shall specify in full the sales of the rock aggregate, including volume sold, costs charged, expenses and losses (as the case may be).
 - (iii) an annual report beginning with the first complete year following the commencement of this Period which shall include:
 - (a) the total volume of aggregate rock, grade-by-grade, broken down between volumes quarried, volumes transported from the quarry site and their corresponding destination, volumes stockpiled at the quarry site or elsewhere in Tonga, volumes sold, and
 - (b) work accomplished and work in progress at the end of the year in question with respect to all of the installations and facilities related to the quarrying program, together with a full description of all work programmed for the ensuing year with respect to such installations and facilities including a detailed report of all investment actually made or committed during the year in question and all investment committed for the ensuing year or years.
39. The Company shall also furnish the Government all other information related to the Company's activities under this Agreement of whatever kind and which is, or could be by the exercise of reasonable efforts by the Company have been, within the control of the Company which the Government may request in order that the Government may be fully appraised of the Company's activities.
40. The Company shall have full and effective control and management of all matters relating to the operation of the quarry including the production and marketing of its products in accordance with sound, long term policies. The Company may make expansions, modifications, improvements and replacements of the quarry site's facilities, and may add new facilities, as the Company shall consider necessary for the operation of the quarry or to provide services or to carry on activities ancillary or incidental to the quarry. All such expansions, modifications, improvements, replacements and additions shall be considered part of the Agreement facilities.
41. The Government will cooperate with the Company to the end that the Company may in compliance with the existing rules and regulations select the transportation facilities to be used in connection with sale and transportation of aggregate rock under this Agreement.

ARTICLE 6

TAXES AND OTHER FINANCIAL OBLIGATIONS OF THE COMPANY

42. Subject to the terms of this Agreement, the Company shall pay to the Government and fulfill its tax liabilities as hereinafter provided:
- (i) Lease payments in respect of the Quarry site.
 - (ii) Royalties in respect of the company's production of rock aggregate.
 - (iii) Income taxes in respect of all kinds of profits received or accrued by the Company.
 - (iv) Personal income tax.
 - (v) Withholding taxes on interest, dividends and royalties.
 - (vi) Consumption Tax on purchases and sales of taxable goods.
 - (vii) Stamp duty on legal documents.
 - (viii) Import duty on goods imported into Tonga.
43. Royalties in respect of the Company's production of rock aggregate. The Company shall pay royalties in respect of the aggregate rock produced from the quarry site, to the extent that aggregate rock is a product which shall have value according to general practice and is paid to the Company by a buyer. Royalties shall be paid on or before the last day of the month following each calendar quarter. Each payment shall be accompanied by a statement in reasonable detail showing the basis of computation of royalties due in respect of volume extracted during the preceding calendar quarter.
44. Royalties will be computed from the rates specified in Annex "B" as follows:
- (a) the tonnage or quantity by weight used in the computation shall be that quantity extracted for domestic sale.
 - (b) the royalty shall be increased or decreased in the same proportion that the current price shall be different from the prices set out in Annex "C" for each type of sealing aggregate sold.

ARTICLE 7 **GENERAL CLAUSES**

45. Audits

An external audit of the financial reports shall be conducted each year via an agreement signed by the Company with a well-known auditing firm, legally authorized to carry such work in Tonga. The results of these external audits and the comments made by the Company shall be delivered by the Company to the Government within a maximum term of thirty (30) calendar days after receiving the audit report. If the Government believes that a specific issue requires additional investigation, the Company shall be asked to clarify its comments within

the following thirty (30) calendar days, or, if necessary, the Government shall recommend the Company takes the required remedial measures.

46. Severability

If any Clause or provision of this Operating Contract is deemed not valid for any reason, such invalidity shall not affect the validity or enforcement of the rest of the Operating Contract.

47. Waiver

Any waiver at any time by any Party to demand compliance of a provision under this Operating Agreement shall not be a precedent and shall not be construed as a waiver to demand compliance with such provision in the future.

48. Termination of this Contract

This Agreement shall terminate for the following reasons:

- (a) For failure to perform any term of this agreement, having been notified of such failure by the other party, and having continued to fail to perform such terms for a period of 30 days.
- (b) For reasons provided for in paragraphs 13, 20, 22, 25 and 28 with no need for notification of failure.
- (c) By mutual agreement between the Parties.
- (d) The Confidentiality provisions of this Agreement shall remain effective for [X] years after the termination of the Agreement.

49. Insurance

The company shall purchase the following insurance coverage as required for the operation of the Quarry. The interests of the Government shall be noted on all policies:

Contractors All Risk insurance for a minimum amount of \$TOP X;
Public Liability insurance for a minimum amount of \$TOP X [if this is not included in Contractors All Risk insurance in Tonga];
Workers Compensation insurance as required by law;

Should the Company fail to take out such insurance, the Government may take out the policies and recover all premiums as a debt owing by the Company. Certificates of Currency of all insurance shall be provided to the Government annually.

50. Settlement of Disputes

Disputes arising as a consequence or with respect to this Agreement shall be settled by an independent arbitrator agreed upon by both parties. Such arbitrator may be nominated by either party and shall be confirmed when both parties agree. The decisions of the arbitrator shall be binding on both parties to this agreement.

51. Communications and Notices

Notices between the Parties shall be in writing, in Tongan or English, and shall be deemed as sent only upon evidence of written confirmation of receipt at the following addresses:

[QUARRY OPERATOR]:
Address

GOVERNMENT OF THE KINGDOM OF TONGA
Ministry of Transport,
Level 3, O.G Sanft Building
NUKU'ALOFA

52. Confidential Information and Exchange of Information

All plans, designs, drawings, data, technical and scientific reports and any other kind of information concerning operations and services procured with respect to the quarry site and this Agreement shall be treated by the parties in a confidential manner, so that their content, whether total or partial may not be disclosed in any way whatsoever to third parties without the prior written consent of both parties.

53. Successors

This agreement shall be binding on and inure to the benefit of the successors and assigns of the parties.

54. Interpretation

The language in all parts of this agreement shall be interpreted simply, and according to its fair meaning, and not strictly for or against either party.

55. Governing Law

This agreement shall be governed by the laws of the Kingdom of Tonga.

56. No Oral Modification

This is the entire agreement of the parties and incorporates or supersedes all prior or contemporaneous oral and written agreements of the parties in respect to the subject matter of this agreement. No amendment, modification, or other alteration to the terms hereof shall be effective unless made in writing and signed by the party against whom enforcement is sought.

IN WITNESS WHEREOF, the GOVERNMENT OF THE KINGDOM OF TONGA and COMPANY [QUARRY OPERATOR] have executed this agreement on the _____ DAY of the MONTH of _____ in the year 2011.

SIGNED BY

HON. MINISTER FOR TRANSPORT
FOR THE GOVERNMENT OF THE
KINGDOM OF TONGA

In the presence of

Name of Witness
Occupation
Address

SIGNED BY

COMPANY DIRECTOR
FOR THE [QUARRY OPERATOR]

In the presence of

Name of Witness
Occupation
Address

Appendix F Equipment Rate Hires

General Principles for Setting Equipment Hire Rate

1. Calculate the book value of the equipment.
 - Calculated at cost price less accumulated depreciation.
 - Use Revenue Services Department tax depreciation rates.
2. Estimate how many more operating hours (years) the equipment will be in operation before it is disposed.
3. Determine the operating costs of equipment for the remaining life of the equipment.
 - This should cover such expenses as fuel, oil, lubrication, repairs, spare parts and operator costs.
4. Estimate the number of hours the equipment will be hired out per annum.
5. Determine the fair profit margin as a return to the operator.
6. Set the equipment hire rate to cover costs outlined in 1 – 5.

Example 1: MOW Sweeper Truck

1. Current book value = T\$324,992
 - a. Purchased in August 2009 for approximately T\$527,014
 - b. Tax department approved depreciation rate (straight line) is 20% per annum, T\$105,403 per annum
 - c. Accumulated depreciation to June 2012 is T\$202,022
 - d. Book value = T\$527,014 less T\$202,022
2. Estimate Sweeper Truck will operate for 4 years before being disposed.
3. Determine operating costs for Sweeper Truck to be T\$61,800 annually (4 years = T\$247,200)
4. Estimate Sweeper Truck to be hired out 878 hours annually (4 years = 3,512 hours)
5. Profit margin determined to be 20%, Profit desired is $(324,992 + 247,200) \times 20\%$, Profit desired after 4 years T\$114,438 (T\$28,609 annually)
6. Hire Rate = $(324,992 + 247,200 + 114,438) / 3,512$ hours = T\$195.51 per hour

Example 2: MOW Vacuum Truck

1. Current book value = T\$487,488
 - a. Purchased in August 2009 for approximately T\$790,520
 - b. Tax department approved depreciation rate (straight line) is 20% per annum, T\$158,104 per annum
 - c. Accumulated depreciation to June 2012 is T\$303,033
 - d. Book value = T\$790,520 less T\$303,033
2. Estimate Vacuum Truck will operate for 15 years before being disposed.
3. Determine operating costs for Vacuum Truck to be T\$36,000 annually (15 years = T\$540,000)
4. Estimate Vacuum Truck to be hired out at 220 hours annually (15 years = 3,300 hours)
5. Profit margin determined to be 20%, Profit desired is $(487,488 + 540,000) \times 20\%$, Profit desired after 15 years T\$205,500 (T\$13,700 annually)
6. Hire Rate = $(487,488 + 540,000 + 205,500) / 3,300$ hours = T\$373.63 per hour

General Principles for Setting Equipment Hire Rate

Assumptions used in Example 1 & 2

- i. Equipment hired out:
 - a. Monday to Friday, 8.30am – 5.00pm
 - b. Saturday, 8.30am – 12.30pm
- ii. Equipment not available for hire on Sundays and Public Holidays
- iii. Estimated usage of equipment:
 - a. Sweeper Truck @ 40% of monthly available hours
 1. Likely operations: sweeping of Nuku’alofa CBD and of airport runway.
 - b. Vacuum Truck @ 10% of monthly available hours
 1. Likely operations: clearing of Nuku’alofa drain network

- iv. Using assumptions i to iii above:

Month	Available Hours	Hire Hours	
		Sweeper	Vacuum
January	180	72	18
February	176	70	18
March	200	80	20
April	168	67	17
May	188	75	19
June	184	74	18
July	180	72	18
August	192	77	19
September	192	77	19
October	188	75	19
November	184	74	18
December	164	66	16
	2,196	878	220

- v. Disposal of equipment when exceed 100,000 kms
 - a. Sweeper Truck currently < 500 kms (usage 878 hrs @ 30km = 26,340 km/yr; 4 years)
 - b. Vacuum Truck currently < 500 kms (usage 220 hrs @ 30km = 6,600 km/yr; 15 years)
- vi. Funds received from disposal of equipment to go towards replacement costs of equipment
- vii. Estimated monthly operating expenses as follows:

Expense	Sweeper	Vacuum
	Truck	Truck
Fuel	1,800	600
Oil & Lube	100	50
Repairs	1,000	500
Spares	1,000	1,000
Tyres	50	50
Operator	1,200	800
	5,150	3,000

- viii. Profit margin to compensate operator is 20% of the total equipment operating expenses only.
- ix. The 20% margin on the depreciation charge will be paid by the operator to the government to compensate the first two years of depreciation on the equipment.
- x. Payment to Government. The operator will pay to Government the portion of the hourly hire rate relating to the depreciation (and 20% margin on depreciation) component.

Hire Rate	Sweeper Truck	Vacuum Truck
Govt	111.05	177.27
Operator	84.46	196.36
	195.51	373.63

Appendix G Legal Research Advice



Prepared for: Institutional Assessment of Road Construction and Maintenance Systems in Tonga

Document Title: [DRAFT] Legal research findings

Royalty paid to northern landowner is based on the volume of material removed after pre-stripping.

Remuneration paid to contractor paid on the basis of tonnes of rock that he actually sells.

Void created each year in the northern area is to be used as the basis of annual royalty payments.

I. KEY

Document A.1

Proper lease between the Government (lessee) and the landowner (lessor) of the land encompassing the 'Ahononou quarry site.

Document A.2

Proper sublease between Government (sub-lessor) and Contractor (sub-lessee) for the quarry site.

Document B.1

Proper lease between the Government and the landowner of the adjacent land to the north believed to contain aggregate deposits.

Document B.2

Proper sublease between Government (sub-lessor) and Contractor (sub-lessee) for the northern site.

Document C.1

Proper lease between the Government and the landowner of the area encompassing the current processing site for the quarry.

Document C.2

Proper sublease between Government (sub-lessor) and Contractor (sub-lessee) for the processing site.

Document D

Operating contract between Government and Contractor for the operation and use of the lands under A-C.

II. TABLE 1. SUMMARY OF DOCUMENTS

	FORM	Method of Payment	Recommended Duration	Extendable Term	Comments
Document A.1 <i>Current Quarry site</i>	<i>Land Act</i> Schd. IX Form 3, Standard Form	Non-royalty based. Annual rental payments.	50 years	Yes, shorter period	Void if lease for north land not acquired or aggregate reserves are not suitable
Document A.2	Sublease under Schd. IX Form 4	Same	Same as operating contract	Same as operating contract	
Document B.1 <i>"North" land</i>	Schd. IX Form 3, Standard Form	Royalty based. Annual Payments	Same	Same	Void if unsuitable aggregate is encountered or lease for current quarry site is not obtained.
Document B.2	Sublease under Schd. IX Form 4Schd.	same	Same as operating contract	Same	
Document C.1 <i>"Processing" Site</i>	Schd. IX Form 3, Standard Form	Non-royalty based. Annual Payments	5 years renewable		Void if not required by successful contractor
Document C.2	Sublease under Schd. IX Form 4Schd.	Same	5 years renewable	Same	Same
Document D. <i>"Operating lease"</i>	Contract to be prepared	Contract stipulates payment terms	5 years renewable	Same	

Note: *If the northern site proves to be a taxation allotment, the lease can be no longer than 20 years.*

III. PRELIMINARY ISSUES

Issue 1. Land compulsorily acquired for public use

Section 141 of the *Land Act* provides for land to be resumed compulsorily for public purposes, subject to fair compensation. This has been used for the acquisition of land to build roads and create easements.

141 Land may be resumed compulsorily

- (1) The King may, with the consent of the Privy Council, call upon any holder to give up possession of land held by him provided that the Council is satisfied that the land is required for public purposes.
- (2) In all such cases the Minister shall, to the holder of the land to be resumed —
 - (a) in respect of the crops being grown on the land to be resumed, pay money compensation to be calculated at the rates and in the manner provided in this Part of this Act;
 - (b) in respect of the land to be resumed, at the Minister's own discretion, either grant other land in its place, or pay money compensation to be calculated at the rates and in the manner provided in this Part of this Act, or both grant other land and pay money compensation;
 - (c) in respect of any building or buildings erected on the land to be resumed, pay money compensation to be calculated at the rates and in the manner provided by this Part of this Act.
- (3) The powers of resumption granted to the Privy Council by this section shall not preclude nobles or others with the consent of Privy Council from voluntarily relinquishing land for public purposes and no compensation either in land or money shall be given to any noble or other person relinquishing land in accordance with this subsection.

142 Notice of resumption to be given

Where the Crown intends to resume land held by any person, the Minister shall give to the holder thereof a notice in writing of such intention in the form specified in Schedule XIII to this Act, and the said notice must be given at least thirty (30) days before the date on which it is intended to resume possession of the land.

143 Compensation for resumed landⁱⁱ

- (1) The King may, with the consent of Privy Council, make regulations from time to time specifying the rates of money compensation to be paid for land resumed by the Crown under this Part of this Act; and for crops being grown and for buildings on such land and the method of calculation of such rates.
- (2) The amount of money compensation to be paid based on said rates will be calculated within 30 days of the date of the said notice specified in section 142 of this Act.

Issue 2 Restoration

Researcher interviewed Ministry of Environment Officials on this issue. From the Ministry's standpoint, restoration is an issue that "could" be raised by the applicant in their EIA. This would be termed as the applicant's "rehabilitation" plans for the land after its use.

The *Environmental Impact Assessment Act* does not require information for rehabilitation/restoration to be included in an EIA. It is not one of the Section 8 listed criteria that the Minister must consider in an EIA prior to a decision on a proposed project.

Similarly, under the *Environmental Impact Assessment Regulations*, rehabilitation is not one of the required items at Regulation 16 which must be considered in an EIA.

Issue 3. Obligations to make the quarry safe /Owner indemnification

This obligation would be borne by the contractor during the period of the operational contract, brought on in Tonga only by general tort law (negligence) rather than as a requirement in existing legislation. It may be borne by the Government after the period of the contract IF the contractor failed to ensure the site was “rehabilitated” as it undertook to do in the EIA. Again, the Government’s liability after the period of the contract for safety of the quarry would be primarily subject to general tort law in Tonga.

Obligations to keep the quarry safe during and after the contract period and indemnification of the Government and land owners should be written into the concession contract.

Issue 4. Pollution Control Licence and Separate Planning Approvals

Following discussions with Ministry of Environment and Climate Change officials and a review of existing environmental legislation, there is no Pollution Control Licence or similar licence used in Tonga. This means the Contractor would only be bound by the general provisions to avoid pollution contained in the Environmental Management Act 2010.

After a review of existing environmental and land legislation, no separate planning approval is required from the Ministry of Lands, Survey and Natural Resources as the ‘Ahononou site is not urban land.

IV. GENERAL ADVICE

Advice for documents A.1, B.1 and C.1 (LEASES for Quarry site, North land, and Processing site)

- See Comments column in Table 1 above for voiding clauses.
- Government as lessee negotiates with respective landowners to lease their (lessor’s) land, free of all encumbrances etc.
- Government does have the power to appropriate land for public purposes and has done so previously for public roads and provided compensation/royalties as provided in section 141 of the *Land Act*.
- Under section 141(3) of the Land Act, the relevant noble could voluntarily relinquish the void at ‘Ahononou for public purposes if he were so minded, without payment of land or money by the government.
- Amendment made to standard lease forms to provide for subleasing.
- Amendment made only to Document B.1 standard lease form to ensure that it will be based on royalties that will be paid annually.
- Amendment made only to Document B.1 standard lease form (and the application) to specifically state what the land will be used for.

Advice for document A.1, B.1, C.1 (Subleases for quarry site, north land, and processing site)

- Government as sub-lessor awards successful bid contractor sublease over land A.1 and B.1. Government subleases C.1 only if necessary.

- Amendment made to standard sublease form to ensure that sublease payments must be in the form of monthly payments of the production royalty.
- Amendment made to standard sublease form to ensure that land may be used for the purposes required for the operational contract to operate.
- Amendment made to standard sublease form allowing subleasing, but only with the permission of the Government.

Advice for Document D (Operational Contract)

Pre-Contract

- Operational contract must be drafted to ensure the annual quantities of aggregates detailed in the tender documents be produced to the specified quality throughout the contract period.
- Awarding process should be by competitive bidding subject to Procurement Committee Procedures.
- Selection criteria should include bidder who offers lowest price of aggregate, size of investment commitment but in the end, should state terms to the effect of “best overall proposal”. The government should have the right to not accept the lowest tender or any tender and the costs of tender preparation should be borne by each tenderer.
- Best available information known to both parties must be made available prior to contract to avoid later legal complications.
- Include payment for crushing and screening machinery if the Government wishes to sell them and the contractor wishes to buy them.
- A Statement from each tenderer that prices submitted have not been disclosed to any other tenderer and are valid for the period stated in the tender documents.

Contract

- Should include specific time period that is based on the estimated time of greatest need for the aggregate, so should not be less than 5 years.
- Terms should grant contractor exclusive rights to operate, maintain, control, realize revenue, and invest in the quarry.
- Contractual terms would set out specific requirements for the mobilization period, fully functioning period, and for the end period (or transfer) of the contract.
- Should include contractual terms for renewing the contract.
- Specific terms for the pricing, which must include the aggregate price. Terms would set price, but consider fair remuneration and some room to adjust due to factors outside the control of the contractor that could not have been reasonably foreseen at the time of tendering. Period review should be provided for.

- Terms would also provide for the timely processing of royalty payments. This would be linked to the terms set out in the leases and sublease.
- Terms to specify no cash transfer or financial liability from the Government. (However, if the Government were to include Ministry of Works/Transport machinery in the contract, the value of the machinery would be termed as an investment in kind which would be realised from the revenue.) [Depends though on whether the Ministry of Finance would agree to not put through their process].
- Terms to provide for parties to agree on necessary amendments to the contract.

Post-Contract

- Terms to trigger early termination due to “mismanagement” by the contractor.
- Terms which would set out the termination process for failure to comply with terms of contract and/or leases and sublease. Included in this would be penalties for non-compliance but which would allow contract to continue. Regular oversight and monitoring terms should be linked to this.
- Terms to provide for agreed mediation/mediators, winding up, disputes, arbitration et. al.

V. RECOMMENDATION

- Draft Operational Contract
 - Draft Lease
-