Supplement to the **Annual Report**

'08

Contents

A Word From The Managing Director

In fiscal year 2007-8, the National Roads Authority found itself still making the transition from its former role as the Roads Section of Public Works Department to a fully-fledged National Authority.

That it was also perhaps less established than had been envisaged was due primarily to Hurricane Ivan which hit Grand Cayman just three months after the Authority's founding in July 2004.

For the NRA, Ivan was an unmitigated disaster; the storm destroyed much of the organisation's equipment and facilities. The election of a new government in 2005 and its plans for an aggressive programme of roads development certainly added to the challenges facing the NRA's Board and Management.

2007 was the year in which the first really significant progress was made towards Government's far reaching roads programme

Among the list of strategic issues facing the Cayman Islands, the development and maintenance of the transportation system is one of the most important.

The significant social, political and financial implications of an under-developed system require the Government to continue to put roads at the forefront of national policy for the Cayman Islands.

2007 was the year in which the first really significant progress was made towards Government's programme, following the many months of post-Ivan recovery and reinstatement.

Among many in 2007-8, the NRA's more notable achievements include: the design, planning or completion of several arterial highways; reinstatement of the Authority's headquarters, Materials Testing Lab and Sign Fabrication facility; and the acquisition of nine acres of land for the future NRA compound.

Many challenges lie ahead of us, and the NRA is still growing into its important role in the development of an efficient road network. And yet in our team we have amongst the best and brightest minds the Cayman Islands has produced.

With theirs' and Government's commitment, we will continue to bring to bear the technical, operational and visionary skills for the Islands' future development and the benefit of the people who live here.

Brian Tomlinson
NRA Managing Director

The Esterley Tibbetts Highway

Booming development along Cayman's West Bay corridor meant that, by 2003, traffic volumes had become unacceptably high on the key thoroughfare of West Bay Road.

By any measure a major achievement; the NRA substantially completed the Britannia to Indies Suites section of the Esterley Tibbetts Highway

To alleviate the growing problem, the Britannia to Indies Suites stretch of the Esterley Tibbetts Highway was opened in 2006, albeit with only a single lane north and south, a temporary road surface and without fixed safety features.

While every road building project presents its challenges, it is fair to say that, in addition to the extremely short project deadline, this section offered more challenges than any other the NRA had previously faced.

In January 2006 the NRA was directed to complete the project within 12 months. However, the planning, design and engineering teams had first to provide solutions to a series of significant issues:

The initial 2003 surveys revealed major variations in the terrain's underlying structure. Relatively hard stretches of bedrock in the area gave way frequently to deep pockets of soft peat. Such were the inconsistencies in the geology

that the Design team, headed by Senior Engineer Peter Ogden, elected to support the roadbase with a geotextile underlay. The technique, called 'surcharging', uses a woven matrix which reduces differential settling of the land which has and will continue to occur. This was the third time this method had been used in the Cayman Islands.

As the Engineering team overcame the geology, the Planning team were busy addressing problems associated with building a major roadway through this dense commercial and residential area.

The Transportation Planning Unit (TPU) managed all outstanding land acquisition for the project and access issues for local residents and businesses. Reaching a satisfactory compromise for the myriad of stakeholders, as well as for the Highway's practical success, involved extensive neighbourhood meetings, delicate negotiation and complex legal work.

As a major arterial, the dual carriageway road's primary purpose is to quickly carry large volumes of traffic bewteen Grand Cayman's two principal districts. The TPU's task was to provide convenient local community access in the most expedient way.

Project Engineer Edison Jackson, meanwhile, had to ensure that traffic continued to flow unimpeded even as construction was underway. Minimising public inconvenience is a perennial battle for NRA managers who are continually improving methodologies towards that end.

A notable feature of the new stretch is the bridge spanning the Ritz-Carlton Canal. The NRA Engineering and Design team worked closely with the resort's consultants to construct the bridge - the first of its kind in the Cayman Islands.

The complex vertical design, completed in-house, ensured both cost-effective construction and the necessary sight-lines for maximum driving safety.

School Zone Flashing Signs

The safety of pedestrians around Cayman's roads is no less important than for drivers, especially when they are school students

There are 11 public and private schools in Grand Cayman and our objective in 2007-8 was to ensure clearly identify each school zone with high visibility signage.

After extensive research, NRA Engineer Brian Chin Yee selected Carmanah solar powered flashing beacons. The specification called for signs that could withstand the harsh environment; insects, wind, tropical rain and boisterous school students are all hazards that these critical signs must withstand.

At a cost of CI$6,000 per school, the new signs require infrequent maintenance and are hard-wired to work in sequence for both traffic directions. The signs also store school calendar data uploaded via laptop to ensure they work on appropriate days.

Signmaking Capability Restored

The NRA Sign Shop, one of the casualties of Hurricane Ivan, was reinstated in May 2008. The shop is staffed by the 'Signs & Lines' crew who can fill time otherwise wasted during inclement weather when outdoor work cannot be done.

Fully digitised, the shop can now produce durable, high quality custom signage on short notice, especially for sign replacement.

"With the new facility we can provide 24-hour turnaround to get signs back out on the roads where they're needed," says Senior Engineer Peter Ogden.

New Road Equipment

In addition to five new Chevrolet Colorado pickup trucks, two low-boy trailers and a 2008 specialist tractor head, the Authority invested in six Variable Messaging Signs.

Computer programmed in the field, these high-visibility mobile signs are solar-powered and not only ensure the safety of road crews and motorists but also allow for uninterrupted traffic flow on roads under repair or construction.

Traffic Calming

Virtually every Cayman district and neighbourhood suffers its share of antisocial driving.

Certain roads become attractive to drag racers and other roads invite 'cut-thru' traffic during peak times. Even supermarket parking lots are not immune to the practice which often makes life miserable - and dangerous - for local residents.

In 2007, the NRA launched a Traffic Calming programme to combat a problem which has grown in recent years with the huge increase of vehicle numbers on Cayman roads.

Techniques are being tested and introduced to combat a variety of antisocial road use such as speeding

Speed humps are installed typically in response to a Community Action Request supported by a minimum of 75% of local residents or on the recommendation of the police.

The NRA in 2007-2008 installed around 100 speed humps in many locations in Grand Cayman including West Bay, Savannah and North Sound Estates.

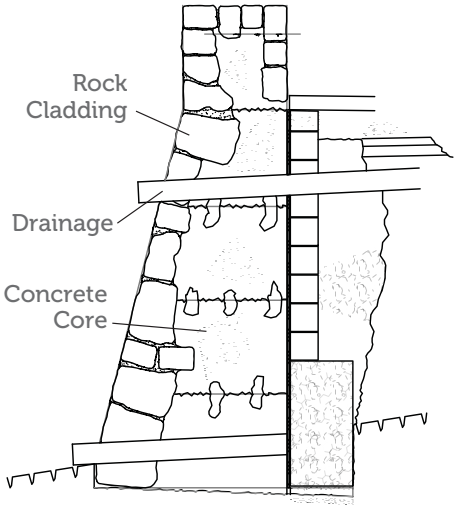
In Savannah alone, where humps were introduced, average speeds were reduced to less than 25 mph from a dangerous 40 mph.

The NRA's design team also began extensive research into several other solutions. Road narrowing, curvilinear streets and so-called 'skinny streets' have all been under design review with the aim of introduction across the Island through 2009-2010.

Speed humps are one of the traffic calming options available to road designers. Placed apart at carefully gauged distances, humps will reduce 85 percentile speeds by 8–10 mph.

The Seawall at Clarinda Beach

A remarkable engineering project solves a historic problem: the vulnerability to storm waves of East End's south coast road



Gravity Wall Construction

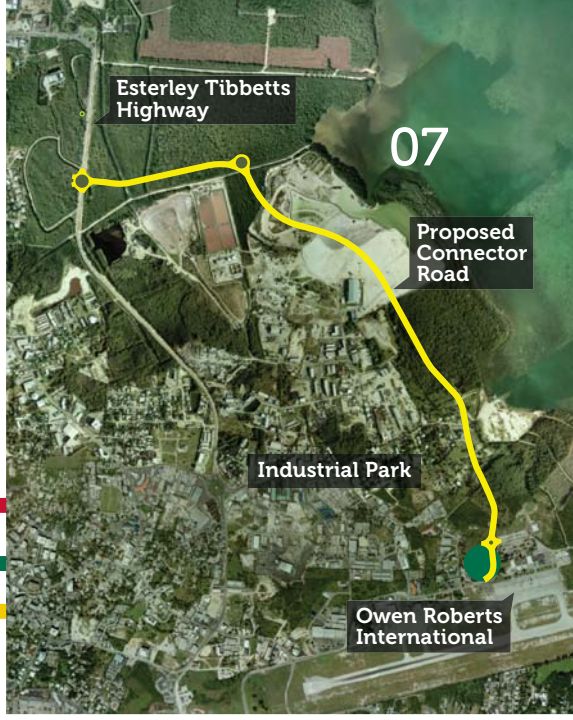
Clarinda Beach is an area of scenic coastline just west of the Blow Holes in East End. Sections of Seaview Road, which runs along the stretch, are highly vulnerable to washout during hurricanes. The most recent and severe damage occurred during Hurricane Ivan in 2004.

After temporarily reinstating part of the roadway in 2005, the NRA built a gravity wall to help reinforce the most heavily damaged sections.

NRA engineers by 2006 had finished some 400 feet of the stone and concrete seawall which included an extra wide base keyed into existing bedrock and rising to a tapered height of around 15 feet.

In 2007, at the behest of Honourable Minister Arden McLean, the NRA added 800 feet to the existing wall, putting the total length at Clarinda Beach at 1200 feet.

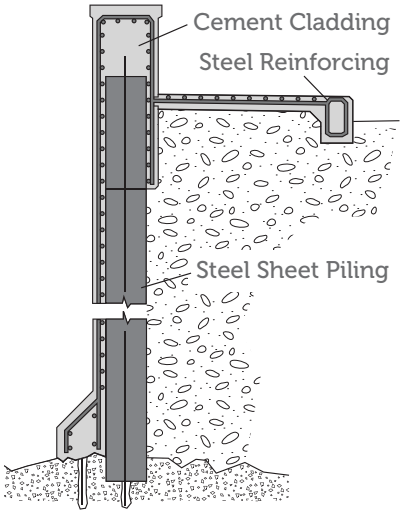
The new section was constructed using high tensile interlocking steel sheet piles driven into the bedrock and reinforced with horizontal steel H beams at 50 foot intervals. The structure was then clad with poured concrete and a quarry stone finish to seamlessly match the original 400 foot section.



Lower End of the Bay

The NRA began work on 1700 feet of new seawall at the entrance to East End Village. As at Clarinda Beach, steel sheet piling construction provides both coastal protection and security for the roadway.

An ashlar stone print, new parallel parking bays, resurfaced roadway and coconut palms are added aesthetic features. Total cost of the three-phase project at Lower End of the Bay is around $3.5m.



Sheet Piling Construction

Airport Connector

Currently, visitors to Grand Cayman who arrive by air are required to travel through the Industrial Park and via the municipal landfill to get to the main tourist area of Seven Mile Beach - hardly a positive first impression.

The generally heavy congestion in the busy Industrial Park adds to the need for an Airport to Seven Mile Beach connector road.

The proposed road corridor will provide a convenient, swift route from Owen Roberts International Airport along North Sound to the Seven Mile Beach area.

A key NRA objective is to complete design work on major road projects well before construction begins. Accordingly, the RFP for the Airport Connector was issued to local engineering firms in June 2008.

Extensive preparatory planning and design work, geotechnical surveys were conducted by the Engineering team under Paul Parchment.

Construction of this essential component of the National Roads Plan is dependent on funding.

East/West Arterial

In December 2008 3,300 feet of the East/West Arterial was officially opened to traffic between Grand Harbour and Hirst Road, Savannah.

The new section is a major step towards easing traffic flows into and out of George Town and a key component of Cayman's long-range roads strategy.

A major success in terms of traffic relief, the new 3,300 foot section of the East/West Arterial was completed in record time

Certainly the largest single road building project yet seen in Cayman - this section of the East/West Arterial is notable for its complex design, speed of completion and innovative construction methods.

Since the plan called for the completion of all access roads prior to the Arterial roadway itself, timely land acquisition and the planning of access from adjacent roads was of prime importance.

As with the Esterley Tibbetts Highway, the geotechnical surveys encountered many pockets of deep, peaty terrain on the route which, requiring many additional tons of fill material, slowed progress.

Technically an interim design, the Arterial is built from the Selkirk Roundabout to Hirst Road with a single, outer lane in each direction

allowing for addition of the inside lanes as future resources permit.

Joining the dual-carriageway section between Selkirk Roundabout to the existing Shamrock Road while at the same time adding two lanes to the latter was a major challenge for the design team.

Keeping fast moving opposing traffic apart is critical to safety and was effected by the construction of a necessary four foot-wide median over 3200 linear feet.

Completing the median from Silver Oaks Roundabout to Selkirk Drive within the target timetable was made possible by using special re-useable metal formwork in conjunction with fibre-reinforced concrete.

"The method allowed crews to keep the existing roadway open and traffic moving round the clock," says Engineer Edison Jackson, adding, "It's also cheaper and safer".

"It's a unique project," Acting Deputy Managing Director Paul Parchment believes, adding, "The scope actually changed three times while we were building; it required excellent co-ordination between the planners, engineers, surveyors, design team, materials and construction crews."

Despite all these issues, the project was completed within nine months of the instruction to proceed given by the Ministry of Communications, Works & Infrastructure.

Design of the Arterial Extension

In keeping with the policy to complete all design well in advance of construction of major projects, the NRA issued an RFP for the engineering design of the proposed section of the East/West Arterial from Hirst Road to Lookout Road.

Five proposals were received from local engineering firms and their partnering US-based consultants.

Savannah Gully Sea Protection Wall

Cayman's history is punctuated with reports of the Island being severed by flood water through Savannah's Gully area and into North Sound.

These destructive events, repeated in Hurricanes Ivan (2004) and Wilma (2005), were serious enough that the NRA was called on to analyse and solve the problem.

A detailed investigation completed in March 2007 showed that, contrary to popular opinion, wave run-up rather than storm surge was the cause of the flooding.

In conjunction with US engineering consultants Orth Rodgers, three conceptual engineering solutions were developed, tested and presented to community groups.

A unique problem requiring a unique solution: storm seawater flooding in the Savannah Gully

A three-pronged modified design build approach called for: 1) coastal armouring, 2) a sea protection wall to dissipate wave energy, and, 3) channels and wells to mitigate flooding and move remaining water away and into North Sound.

As a first step, the construction of a seawall was selected as the most effective engineering solution.

In June 2008 the Central Planning Authority approved the plan after it was supported by the majority of affected Savannah residents. The project was, however, halted pending an appeal against the CPA filed in July 2008.

Road Surface Upgrades

NRA Road Crews continue to repair and upgrade existing roadways around Grand Cayman.

The work is to be co-ordinated with the outputs from the Pavement Management System and is part of the drive to raise the average Pavement Condition Index of all Cayman roads.

In 2007 thru 2008 the emphasis has been to upgrade; where existing roads are gravel, they are upgraded to chip & spray, with older chip & spray roads being in turn upgraded to asphalt.

Six miles of road surfaces were upgraded in this way during 2007-8.

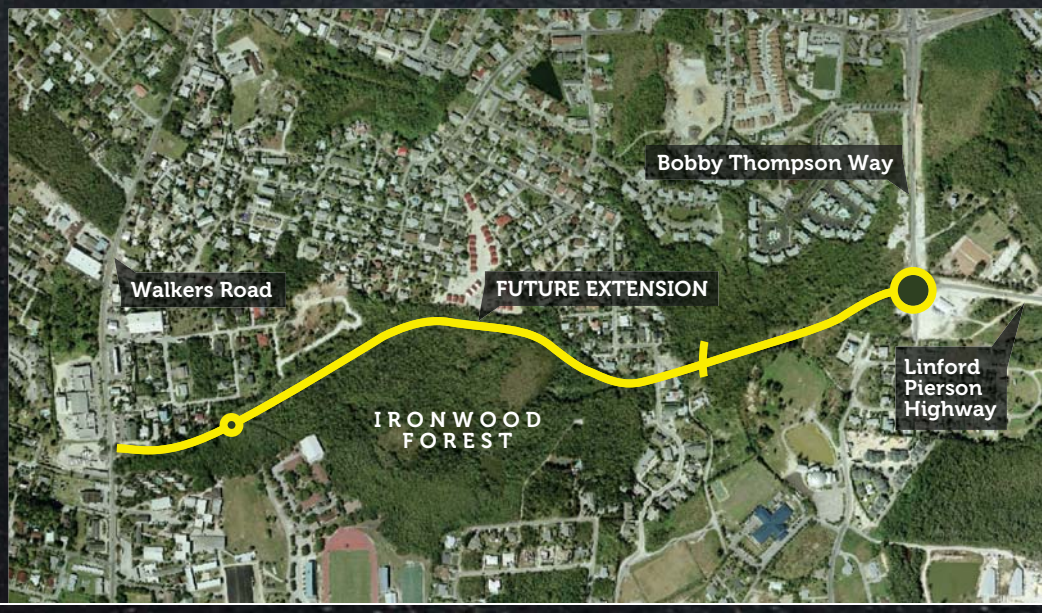
Linford Pierson Highway Extension

A key element of the plan to relieve peak time traffic congestion into and out of the capital awaits resolution of an environmental review

Scheduled for construction between March 2008 to June 2009, the Linford Pierson Highway link from Bobby Thompson Way to Walkers Road was halted.

Concerns were raised about the 'Ironwood Forest', a habitat for endangered ghost orchids, which sits in the area planned for the final leg of the Highway.

With the exception of the section containing the orchids, the NRA had already gazetted, completed a geotechnical survey and cleared most of the route.



Vesting of Northward Land

With an eye on the future, 9.2 acres of Crown land was vested to the NRA for its new compound and a base for all its operations

With development demands ever increasing on the NRA, its staff and equipment, a purpose built head-quarters has become a top priority.

Following an exhaustive review and Island-wide serach for a suitable location, NRA managers have opted for a site on Crown land in the Northward area.

It is anticipated that Government will vest 9.2 acres astride the future East/West Arterial extension north of HM Northward prison.

"It's a good compromise," says NRA Acting Deputy Managing Director Paul Parchment, "given its relatively central location on the Island and the fact that it'll be well served by the Arterial road".

The site's acreage is ample enough to accommodate plant and equipment, vehicle maintenance and fuelling, administrative offices and material stockpiles - something not currently possible in the cramped environs of the Industrial Park in George Town.

Being close to the principal quarries in the Central and Eastern districts of Grand Cayman will also make life much easier for logistics.

Development of the new site is scheduled to begin as funding becomes available.

Road Design Training

The benefits of NRA's Eagle Point design software can be fully realised following a comprehensive training programme

NRA Engineer Edison Jackson and Technician Delroy Myles underwent an intensive one-week course on the Eagle Point road design package.

Used by road engineers throughout North America, this powerful tool underpins the NRA's in-house design capability.

"We can now run several designs for each project and test each one," explains Edison Jackson, adding, "We can analyse several designs to determine the most cost effective option, and in a much shorter time frame"

Estimating quantities, cross sections, 3D renderings; all are now made possible by training on Eagle Point.

Material Testing Training

The NRA vision calls for its staff to possess as complete as possible a range of technical skills.

These skills include road surface materials testing to the standards set by the American Association of State Highway and Transportation Officials (ASHTO) and American Society for the Testing of Materials (ASTM).

With the reinstatement of the Materials Testing Lab in March 2008 we also conducted a full training programme for Patriena Walrond, Weston Williams and Tyree Hernandez.

The three technicians are now proficient in the use of the Lab's Marhall testing equipment, which help ensure that the NRA can continue to meet the stringent ASHTO and ASTM road surface standards and specifications.

Signmaking Training

Both the permanent Sign Shop staff and eight members of the Signs & Lines crew have been trained to produce high-quality road signage in-house.

This 'everyone should be able to do everything' policy is effective since the outdoor crew can perform the essential work during inclement weather.

The production process includes desktop design using Corel Draw and cutting and application of substrates to sign boards.

Says Senior Engineer Peter Ogden, "The training has meant significant improvements in quality, quantity and turn-around of signs."

Accounting System

Project Managers working on major road projects need timely cost reporting data - often in the field while projects are ongoing - in order to meet timetable, progress and budget targets.

With the introduction of the Explorer Accounting package, the NRA can reduce operational costs while at the same time improve project management.

The specialised system allows NRA managers to streamline their workflow by capturing payroll, equipment usage, material costs, and hired equipment data, all on a day-to-day basis.

This in turn means that managers can make more informed decisions based on sophisticated business analysis.

In use by Highway managers and developers worldwide, the new system has quickly proved its worth on virtually every project underway at the NRA.

Pavement Management System Deploys

Keeping track of the condition of over 296 miles of roadway in Grand Cayman has become a complex and demanding task requiring the adoption of modern technology.

In April 2008 NRA managers initiated a Pavement Management System (PMS) to rate Cayman's roads using the widely accepted Pavement Condition Index (PCI) method developed by the US Army Corps of Engineers.

The PMS is essentially a detailed database of physical characteristics of the road network coupled with distress data from visual condition surveys of each road section. "At any time we can run a report on the road inventory," says Engineer Brian Chin Yee, adding,"We know the length, thickness and relative condition of every road on the Island.

The system helps the NRA to achieve its target of an average PCI of 70 out of 100 for the network - very high by international standards.

The system is scheduled to be fully implemented in January 2009.

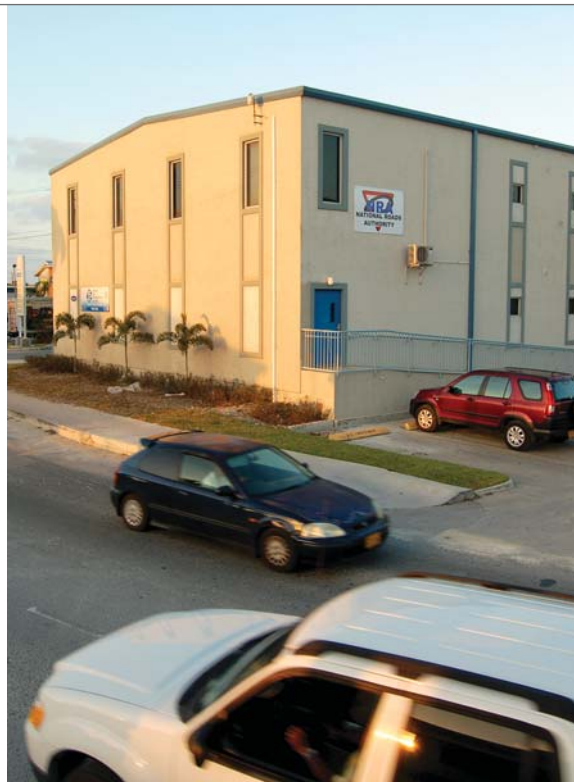
Dorcy Drive Office Location

Efficient teamwork is once more possible with management's relocation to a single office space in the heart of the Industrial Park

In July 2008 NRA management relocated to a single office space on Dorcy Drive, adjacent to the old PWD compound.

The benefits were felt immediately as the 25 staff occupied the 4,000 square feet of office space.

Said Transportation Planner Marion Pandohie, "We were so cramped in the old PWD offices. Now at least we have room to operate in a user-friendly space."



NRA
NATIONAL ROADS AUTHORITY

342B Dorcy Drive, 2nd Floor
Box 10426
Grand Cayman, KY1-1004
Cayman Islands

www.caymanroads.com

T + 345 946 7780
F + 345 946 4151
E info@caymanroads.com

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