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# Final Report of the Special Advisor

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Final Report

July 2005

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# **Task Force for Infrastructure Recovery - Guyana**

## **Final Report of the Special Advisor**

### **Issue and Revision Record**

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# Final Report of the Special Advisor to the Task Force for Infrastructure Recovery

## Introduction

Between 15<sup>th</sup> and 22<sup>nd</sup> January 2005 the coastal regions of Guyana, in particular Region 4<sup>1</sup> (including Georgetown), and to a lesser extent Regions 3 and 5, received extremely heavy and prolonged rainfall, (in the order of 800mm), which led to widespread flooding. The East Demerara Water Conservancy Dam (EDWC) overtopped leading to increased flooding of the Region 4 coastal area. The drainage structures and channels discharging into the Demerara River had insufficient capacity to deal with the massive inflow into the EDWC. To save the EDWC Dam excess waters were released through the Lama Sluices which resulted in severe flooding in the Mahaica area (east Region 4, west Region 5), with extensive loss of the rice crop.

Upon request of the Government of Guyana, a United Nations Disaster Assessment and Coordination (UNDAC) team was deployed by OCHA on 23 January 2005. Based on initial assessments of the situation, the UNDAC team alerted the Joint UNEP/OCHA Environment Unit (Joint Unit) about a potential collapse of the EDWC dam, which would result in further and more extensive flooding.

Two experts of the Ministry of Transport, Public Works and Water Management of The Netherlands were deployed to assist the UNDAC team, from 2 to 11 February 2005.

An action plan was prepared by the UNDAC mission team that outlined inter alia the main measures to be taken in Region 4 before May 2005:

- A. Restore the drainage channels from the Conservancy dam to the coast.
- B. Open up/repair the outlets in the conservancy dam that are currently out of order.
- C. Repair or construct temporary fixtures to facilitate drainage of dysfunctional outlets/sluices through the sea defences.

An immediate response to the Government's request for help was made by DfID and CIDA in Grant Aid with the monies being administered by the UNDP, the UNDP being the contracting party on behalf of the Government of Guyana and the Donor Group.

For Emergency D&I repairs DfID provided £950,000 and CIDA C\$1.870 million, whilst for international consultants DfID provided £217,056 and CIDA C\$0.362 million.

The Donors agreed to fast-track their procedures. The Government of Guyana agreed to fast-track her administrative procedures, including tendering procedures, to enable immediate start of the works. A Task Force for Infrastructure Recovery (TFIR) headed by Mr. Ravi Naraine of the Ministry of Agriculture - Drainage and Irrigation, was put in charge of the contracting of the measures identified in the Action Plan and engaged with supervision, investigations, payment, coordination and management of the whole programme until the coming rainy season of May-June.

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<sup>1</sup> See Location Maps for the location of Regions 2, 3, 4 and 5

The donors, through UNDP agreed to engage a Special Advisor (SA) and a small support team to liaise between the donors and the Government, and to help and support the TFIR in ensuring adequate progress and supervision of the quality of works, and ensure accountability, notwithstanding the use of fast-tracking procedures to minimise procurement delays. The TFIR separately engaged local consulting engineers to provide on-the-ground engineering staff and clerks of works to oversee contractors.

Mr. Olaf van Duin, one of the earlier engineers of the UNDAC team was made available from 04th to 25th March 2005 as the SA to further detail and initiate the Emergency Works Action Plan. Subsequently Mott MacDonald Ltd (MM) was appointed to provide a Special Advisor (SA) and small support team to further these tasks. Members of the MM Team were in Guyana between 20th March and 16th July 2005.

The organisation and interrelationship of the SA's team and the TFIR are shown in Attachment No. 6. The MM engineers reporting to the TFIR and the SA and supervising the day to day operations of the Local Consultants.

This Report covers the Consultancy and Construction Works associated with the Emergency Works Action Plan.

A detailed contractual status report for the Emergency Works is given in Attachment No. 7.

## 1 Location Maps

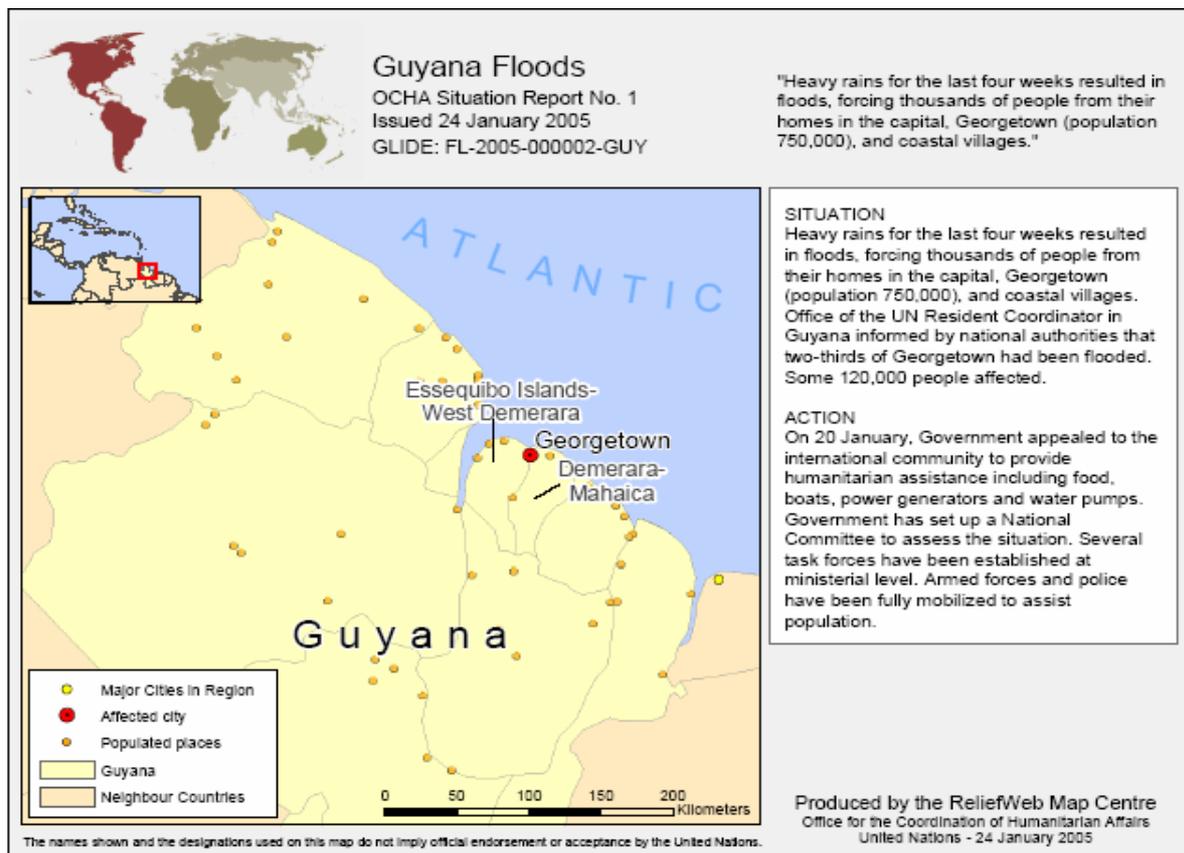
The following map is taken from the OCHA Situation Report No. 1, issued 24 January 2005 and shows the location of the various Regions along the Atlantic coast line.

Region 2 is on the west bank of the Essequibo River.

Region 3 is between the Essequibo and the Demerara Rivers

Region 4 and Georgetown are between the Demerara and the Mahaica Rivers

Region 5 is between the Mahaica and Mahaicony Rivers



Detailed plans showing the location of structures in the EDWC and the BWC are given in Attachment No. 5

## 2 Action Plan

The UNDAC mission to Guyana in February 2005 prepared an Action Plan for the Emergency Works needed to be carried out prior to the May/June 2005 rains.

The Plan<sup>2</sup> envisaged the following:

- A. Restore the drainage channels from the Conservancy dam to the coast.
- B. Open up the outlets in the conservancy dam that are currently out of order.
- C. Repair or construct temporary fixtures to facilitate drainage of dysfunctional outlets in the sea defence
- D. Equip the Repair force for the conservancy dam.
- E. Draw up a Disaster Management Plan (DMP)

Full details are provided in Attachment No. 2.

A comparison of the Initial Plan and that implemented is given in Attachment No. 3.

The original Action Plan envisaged a Budget of G\$930 million (see Attachment No. 4). The Government approved a Budget of G\$800 million.

The subsequent chapters, chapters 3 to 6, describe the works carried out in Regions 2,3 ,4 and 5.

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<sup>2</sup> UNDAC Mission to Guyana 2005 – Geotechnical and hydraulic assessment of flooding damage caused by the East Demerara Water Conservancy Dam, Nisa Nurmahomed and Olaf van Duin, February 2005

### **3 Region 2**

#### **3.1 Region 2 TFIR<sup>3</sup> Works**

The Region 2 RDC requested assistance in April 2005. A Site visit in early May determined that the Works were “Emergency”. CEMCO was appointed as the Design Consultants and E&A the Construction Supervisors. Due to constraints of time and budget the Works were stopped when CEMCO had only produced tender documents for:

- Good Hope Main Drain - construction of flood relief structure,
- Plantation Andrews - desilting of Outfall Channel, Somerset & Berks –
- Desilting of Outfall Channel.

These three contracts together with Lima Outfall Channel - rehabilitation have been included in the “Immediate Works” budget.

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<sup>3</sup> “TFIR Work” refers to work which the Task Force for Infrastructure Recovery has put out to tender, carried out the Tender Evaluation and recommended award, and has subsequently supervised its construction. The detailed Bill of Quantities will either have been prepared by the TFIR, or a Region’s RDC.

## **4 Region 3**

### **4.1 Summary of Works**

#### **Boeraserie Water Conservancy**

- Heightening of embankment – 7 miles

#### **Region 3 Channels**

- Rehabilitation of Main drains - 7miles
- Rehabilitation of other channels – 11 miles
- Rehabilitation of structures – 7 No.

### **4.2 Region 3 TFIR RDC<sup>4</sup> Works**

The TFIR was asked to implement 10 contracts for which the Region had produced designs and detailed Bills of Quantities. It was only after award that it was discovered some of the Works were for irrigation canals, not drainage, and that the Bill of Quantities were inaccurate and the revetment design suspect. One contract was subsequently cancelled.

There was no request for Works in the Boerasirie Water Conservancy, or for rehabilitation of Out Fall Sluices.

### **4.3 TFIR Works**

During the Dam Specialist's visit it was identified that the Patosie drainage channel should be rehabilitated to provide high level relief/drainage from the south east corner of the Conservancy, and that the Conservancy embankment needed to be heightened between Leonora and Namryck to reduce the risk of overtopping. The Hague & La Grange intake kokers were rehabilitated.

During the Conservancy Water Modeller's visit the probable cause of the high flood water levels between Leonora and Namryck and the reason why the 8000 foot weir is not discharging as designed was identified as being restricted waterway channels. Tender documents were drafted and tenders received for the widening of the waterways around the perimeter of the Conservancy between Leonora and the 5 door sluice. Tenders were also received for rehabilitation of drainage channels and outfall sluices. Due to the decision to limit the time scale and the amount of the "Emergency Works" these contracts were postponed for inclusion in the medium term works/IDB works.

The Bill of Quantities for Patosie was produced by the Special Advisor based on observations by the Secretary to the Boerasirie Water Conservancy. It was not possible to travel the length of the drain. Subsequently Variation Orders were issued to cover the addition work in clearance under the embankment, removal of trees in excess of 12" diameter. The Works through the savannah had to be suspended due to high standing water making progress impossible. The remaining section will be constructed under the "Short Term" works.

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<sup>4</sup> In the "TFIR RDC Works" the detailed BoQs were prepared by the Region and incorporated into bidding documents by the TFIR.

Due to slow progress and with the delay in the award for the widening of the Conservancy Perimeter Channel causing problems in obtaining suitable fill material, the heightening of the Boeraserie Conservancy embankment was halted at Tiger Dam. The remaining heightening of the embankment will be carried out in the Medium Term Programme in association with the widening of the adjacent perimeter channel.

## **5 Region 4**

### **5.1 Summary of Works**

#### **East Demerara Water Conservancy**

- Construction of 21 miles of waterways in the EDWC (3.8 miles 56 feet wide 0.58 miles 50 feet wide and 16.6 miles 75 feet wide)
- Rehabilitation of main drainage off take structures – 2 No.
- Closure of uncontrolled discharge from derelict EDWC head regulators – 2 No.
- Leasing of maintenance equipment for the EDWC 15 May to 15 August
- Heightening of low spots in the embankment and general strengthening works - 20,000 clay bags
- Construction of Flag Staff Access Road - 1,100 yards

#### **Region 4 Drainage Channels**

- Rehabilitation of main drainage channel - 10 miles
- Rehabilitation of other channel - 120 miles

#### **Region 4 Sluices**

- Rehabilitation of Sluices, and clearance and maintenance of outfall channels (15 May to 15 August) – 5 No.

### **5.2 East Demerara Water Conservancy**

#### **5.2.1 Waterways**

The Works in the EDWC concentrated on opening up the east – west waterways to provide drainage to the main discharge structures into the Mahaica and the Demerara Rivers and the north – south Georgetown water supply canal (Lamaha).

The Works were carried out through 4 contracts: the Kofi waterways as part of the Kofi Contract, and Lots 1, 2 and 3 of the EDWC waterways contracts. The Kofi waterways are 56 feet wide, whilst Lot 1 is 50 feet wide, and Lots 2 and 3, 75 feet wide.

#### **5.2.2 Leasing of Maintenance Equipment**

Two hydraulic excavators and a 22 RB dragline mounted on pontoons were leased for use in the EDWC up until 15 August 2005 to carry out general maintenance works and be available in case of emergency.

The equipment was used to apply a clay capping protection layer to the clay filled bags that were placed for dam strengthening and raising works. It is proposed that the equipment will be used to drive the revetment work at Enmore and Ann's Grove Head Regulators, which is required to stop off the large uncontrolled discharge at these two disused head regulators, and to carry out general strengthening works in the area west of LBI.

### **5.2.3 Heightening and Strengthening the EDWC Embankment**

Some 20,000 clay bags were used to heighten low spots and to strengthen areas of slippage. The bag material degrades rapidly in direct sun light. It was therefore necessary for a clay capping layer to be provided using the leased maintenance equipment

To the west of LBI some 1000 yards of embankment suffered slip failure on the upstream face, and deep longitudinal cracks were observed in the embankment crest. The leased Maintenance Equipment is to be used to strengthen the downstream slope of the embankment.

### **5.3 Main Drainage Channels**

Two main drainage channels and one canal channel were rehabilitated, Cuhna, Kofi and Shanks respectively. The embankments were rehabilitated and heightened to enable the drains to operate as high level drainage channels acting as relief to the conservancy and so as to be generally independent of the tide.

The Cuhna Drainage Channel contract was a direct appointment. On remeasurement the value of the contract was reduced from G\$42 million to G\$11 million. All of the Work was sub-contracted.

The Rehabilitation of the Cuhna Head Regulator and outfall channel was awarded as a separate contract. Problems were encountered with Barama Timber Yard at the Outfall but were eventually resolved amicably.

The Kofi channel rehabilitation contract also included the rehabilitation of the Head Regulator on the Conservancy. Subsequently it was discovered that there was a low level navigation canal crossing the Kofi channel which required the issuance of a Variation Order to construct a check structure so that the navigation canal did not flood when the Kofi drain was operating as a high level drain. Problems were encountered with squatters on the embankment at the outfall. The problem was eventually resolved amicably.

The Friendship outfall sluice which failed on 23 June 2005 did not form part of this Contract.

The Shanks Irrigation Canal was a direct appointment. On remeasurement the value was reduced from G\$43 million to G\$17 million. All of the Work was sub-contracted. This channel requires the construction of a new Head Regulator and major remodelling of the channel to enable it to be operated as a main drainage channel.

### **5.4 Five Sluices through the Sea Wall**

The Sluices at Beehive, Hope, Belfield, Buxton and BV/Triumph were rehabilitated, the inlet and outfall channels cleared and the gates and mechanical equipment overhauled as necessary. During the tender evaluation the maintenance requirements of the Outfall Channels was changed to enable the NDIB to be able to call in the contractors to clear the outfall channels between 15 May and 15 August as necessary at an agreed daily charge rate with payment against a Provisional Sum. At the time of writing no maintenance has been required.

Jetting equipment owned by the Ministry of Agriculture was made available and was used to jet the outfall channels at Beehive and Buxton, and extend the outfall channel at Hope. Payment was made through the contracts.

Additional gearing and gates were required at Buxton but this was achieved within the Provisional Sum for Contingencies.

## **5.5 Region 4 Drainage Works**

A total of G\$190 million was allocated in the Budget to cover Region 4 RDC and TFIR main and secondary drainage works.

### **5.5.1 Region 4 RDC<sup>5</sup> Works**

The Region 4 RDC asked in total for some G\$400 million worth of Works carried out by them, or proposed to be carried out by them, to be paid for from the TFIR's Emergency Budget. The first request on 17 March was for G\$107 million of completed Works. At that time they were notified that they had to provide proof of competitive bidding, priced Bills of Quantities and minutes of the Region's Tender Board's approval, and that the work would be verified by the Task Force's consultants prior to certification and payment. The verification showed that in a number of cases the Bill of Quantities were either over measured or the Work was incomplete. The RDC and contractors agreed a reduction to G\$91 million. The Region continued to ask for new works without providing supporting information. The last list was received on 04 May and combined previous lists 2 to 4 and covered G\$290 million of Works. Some of the Works were considered not to be of an "Emergency" nature, and could not be completed by the end of June. Also monies from the Budget had already been allocated to "Emergency" Works in other Regions. It was agreed that G\$84 million of contracts from the combined lists would be eligible for reimbursement by TFIR subject to the same proof as required for the first group of contracts.

### **5.5.2 Region 4 TFIR Works**

All of the Region 4 RDC's contracts were plotted on large scale Satellite drawings to check continuity of their proposals. Essential infill drains were identified and 16 contracts put out for tender. During tender evaluation it was discovered that the Region 4 RDC had also been out for tender for 12 of the contracts. Only the four contracts TFIR-16, 19, 24 and 27 not being carried out by the Region 4 RDC were awarded by the TFIR.

To improve drainage water flow to the newly installed 24'' diameter pump at Plaisance, a new façade drain was constructed through contract TFIR 12.

## **5.6 Miscellaneous**

- Access Road to Flagstaff,
- Revetment work at Enmore and Ann's Grove Head Regulators,
- Placement of clay bags on the EDWC embankment.

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<sup>5</sup> RDC Works relates to works contracted by the Regions for which they have subsequently requested funding by the TFIR.

### **5.6.1 Access Road to Flagstaff**

Major problems were encountered with the contractor for the Access Road to Flagstaff. These were all associated with lack of finance which affected his ability to work effectively and efficiently, to obtain materials and construction equipment and hence to work to the programme. Clear notification in the tender document and clarifications issued during the tender briefing stated that no Advance Payment would be provided. To assist the contractor the TFIR purchased the road materials required. A Memorandum of Understanding was signed by the contractor and the TFIR to enable these costs to be deducted from the Payment Certificates. Due to the continued slow progress and poor workmanship the contract was terminated on 30 June 2005. At that time a wearing course was available over the total length of the access road.

A nominated supply sub contract was awarded to Mazaruni Granite for the supply of the stone aggregate.

### **5.6.2 Installation of 3 No. 42” diameter pumps**

3 No. 42” diameter pumps were donated during the January floods.

Installation of pumps and the provision of pump station foundations and superstructure were carried out by direct appointment by the regional representative of the pump manufacturer.

In the event the foundations and the superstructure work could not be carried out prior to the May/June rains. This element of work was transferred from the “Emergency Works” to the “Immediate Works”.

### **5.6.3 Revetment Works at Enmore and Ann’s Grove Head Regulators**

Major uncontrolled discharges occur through abandoned head regulators at Enmore and Ann’s Grove.

#### **Enmore**

The uncontrolled flow is used by Guysuco to provide water to a mini conservancy behind the Crown Dam and hence to the Navigation/Irrigation Canal System and the Factory. Surplus water being discharged through the high level drainage system. At times of high rainfall this uncontrolled flow creates additional drainage problems.

A greenheart revetment has been designed to close off this uncontrolled discharge and quotations received. Approval for the purchase of the material has yet to be granted. It is proposed that the driving of the revetment will be undertaken using the leased Maintenance Equipment. Once the discharge is stopped and until such time as a replacement Head Regulator is constructed, Guysuco have agreed to provide temporary siphon tubes.

#### **Ann’s Grove**

This feeds government lands. A replacement gated head regulator already exists.

A greenheart revetment has been designed to close off this uncontrolled discharge and quotations have been received. Approval for the purchase of the material has yet to be granted. It is proposed that the driving of the revetment will be undertaken using the leased Maintenance Equipment.

## **Clay Bags**

20,000 clay bags were placed on the low sections of the EDWC embankment. The initial price for the work was quoted at G\$19.5 million. After further clarifications a cost of G\$10 million was accepted.

## **6 Region 5**

### **6.1 Summary of Works**

- Rehabilitation of channels – 53 miles
- Construction of flood embankments - 13 miles
- Construction of canal embankments – 3 miles
- Construction of large diameter pipe culverts – 4 No.

### **6.2 Region 5 TFIR RDC Works**

In April the Region5 RDC requested the TFIR to take responsibility for seven contracts for which they had prepared detailed Bills of Quantities.

These were tendered in late April and awarded in early May. Certain sections of flood protection work were omitted. These will form part of the Medium Term Works.

Lot 1– Profit Rising Sun NDC, required a VO in excess of the Contingency Provisional Sum due to a need to increase the length of the drainage channels.

Lots 2, 3 and 7 required minor VOs for increased lengths but were within the Contingency Provisional Sums.

Lot 5 Mahaica Mahaicony Rice Area (Flood Embankment on the Mahaica River). It proved impossible to develop the façade drains as borrow pits for the flood embankment, as envisaged in the RDC’s design. The existing drainage/irrigation channels to the Mahaica River needed to be maintained, requiring gated pipes to be installed through the Flood Embankment. In addition the farmers had not been consulted on the proposed alignment by the RDC which caused problems. The determination of the number, length and diameter of the pipes and the finalisation of the alignment of the embankment was a major exercise and was not completed at the time of the departure of the SA. CEMCO as part of their “Immediate Works” consultancy has been asked to supervise the outstanding work.

### **6.3 Region 5 RDC Works**

In April the Region 5 RDC requested payment of G\$42.5 million for drainage works carried out immediately after the January/February floods. As in Region 4 they were notified that they had to provide proof of competitive bidding, priced Bills of Quantities and minutes of the Region’s Tender Board’s approval, and that the work would be verified by the Task Force’s consultants. This information was only officially received on 04 June. During verification on Site it was discovered that the length of five of the fifteen drains was grossly in excess of that shown in the Contract and for which a budget allocation had been made. The TFIR has only paid for the scope of work included in the Contract.

The contract award total for Extension of the Perth Biaboo canal was \$24.4 million. The RDC had included G\$9 million in their budget for this. Therefore only the balance of G\$15.4 million was included in the TFIR budget. The works have yet to be inspected and paid.

The final amount of Region 5 RDC work is expected to be \$31,206,595, excluding the G\$9 million from the RDC's own budget.

## 7 Consultants and Studies

### 7.1 International Consultants

Mott MacDonald Ltd was notified of acceptance of its proposal for Consultancy Services on 17 March 2005. Mr Robert Goodyear, the new Special Advisor, flew to Guyana on 20 March to ensure there was a five day overlap with Mr Olaf van Duin. Ms Martha Taylor, the Site Engineer, arrived on 31 March 2005. It was subsequently agreed that a further Site Engineer was required and Ms Louise Nitschke arrived on 19 April 2005.

Mr Goodyear had home leave from 21 to 27 May 2005. The staff departed as follows:

- Louise Nitschke 01 July
- Robert Goodyear 05 July
- Martha Taylor 16 July

### 7.2 Local Consultants

Following local competitive tendering a decision was taken to award consultancy services contracts to all consultants who had tendered, using standard rates for the various grades of staff. This worked well in principle allowing additional works to be valued and awarded rapidly. However the smaller consultants had problems in mobilising suitable staff rapidly and working to the deadlines required for the successful implementation of the "Emergency Works".

### 7.3 Conservancy Flood Management Modelling

As a follow on from the Studies undertaken by Mott MacDonald Ltd (MM) in 2003 – 04<sup>6</sup>, they were asked to update the Boerasirie and East Demerara Conservancies hydrological models to assist SEEC in determining safe operating water levels in the EDWC and BWC during the Rainy Seasons and to assess when impoundment operations for irrigation can safely commence. Dr. Robin Wardlaw visited Guyana between 02 and 14 May to update the models. Dr. Wardlaw in his report<sup>7</sup> identified that to be able to model the Boeraserie Conservancy accurately a pseudo two dimension model is required. This would enable the width of waterways to be determined to eliminate the water level differential between Leonora and the 5 door sluice.

The EDWC model shows good simulation of the rise and recession in water levels, giving reasonable confidence in the ability of the model to predict conservancy response to extreme rainfall.

Anthony Babcock visited between 07 and 28 May to train the modellers in the operation of the model as may be required by SEEC. Up to 8 people attended the training sessions, but there were only three people who attended the majority of the training sessions.

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<sup>6</sup> Guyana Drainage and Irrigation Systems Rehabilitation Project – Hydrology and Water Resources, Final Report, June 2004

<sup>7</sup> Draft Report on Conservation Flood Management Modelling, May 2005

#### **7.4 EDWC and BWC Dams Study**

The Terms of Reference of the Special Advisor required an inspection of the Boerasirie Water Conservancy dam. Mr Chris Wagner, Mott MacDonald's dams specialist, visited Guyana between 30 March and 09 April 2005 and presented his report covering both the BWC and the EDWC dams during April. The Report<sup>8</sup> recommended for the EDWC dam:

- the reconstruction of the embankment between Flag Staff and Buxton, the alignment to be defined following hand held auger holes to determine the depth of pegasse over the area;
- detailed site investigations to be carried out along the alignment of the proposed embankment to enable the design to be carried out;
- stability checks to be carried out on the north section of the embankment between Buxton and Nancy Stop Off, and the east section of the embankment between Flag Staff and Lama.

#### **7.5 Medium Term Works**

Mott MacDonald provided Andrew Kirby to assist with the development of the Medium Term Works Programme for submission to the Donors. Andrew visited Guyana between 20 June and 04 July. The report was presented on 03 July 2005.<sup>9</sup>

#### **7.6 Progress Reports**

The SA issued 15 Progress Reports covering the period from 04<sup>th</sup> March 2005 to 30<sup>th</sup> June 2005.

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<sup>8</sup> East Demerara and Boeraserie Dams – Condition Assessment by Dams Specialist, April 2005

<sup>9</sup> Short and Medium Term Plans, July 2005

## **ATTACHMENT No. 1 – Scope of Works and Terms of Reference for the Special Advisor**

### **Scope of Works**

This Special Advisor will have the following responsibilities:

#### **Oversight of the small supervisory team.**

Inspection of the West bank Demerara conservancy (Boerserie) and advice on condition and need for repair works.

Coordination between the various donors committed to the Action Plan and the Task Force; keeping the donors informed upon the approach, coherence, financial issues and progress of the action plan in order to provide maximum transparency.

Timely identification of possible obstacles in order to ensure expeditious completion of the works.

Provide help and advice to the Task Force so they will meet the standards of accountability required by the donors for this emergency works. This will involve participation in the evaluation of tenders procured by Government of Guyana (including the supervisory team) under US Government PL480 arrangements and setting up a management accounting system.

Assist and liaise closely with the local consultants appointed by the Task Force to provide on-the-ground supervision of works, providing advice to assist them in this work.

#### **Expected Outcome**

The expectation is that this input would:

a) **help to ensure** that the quality of the civil works is acceptable to both GoG and donors, and that they are completed within required timeframes.

b) **provide confidence** to the donors that funds are properly managed in an accountable manner.

#### **Conduct of Work**

The Special Advisor and his/her team will work in close collaboration with the Task Force and Drainage & Irrigation / Sea Defence staff, and with other consultants appointed by the Task Force in the implementation of the works. Within the limitations of time, efforts shall be made to undertake tasks in such a way as to provide capacity building opportunities for Guyanese staff.

The Special Advisor will maintain close contact with the donor group supporting this work (DFID, USAID, and CIDA)

The Special Advisor shall preferably arrive before March 22<sup>nd</sup> 2005, in order to have some overlap with Mr. van Duin, who is expected to depart on 25 March 2005. He/she shall stay at least up to the middle of June 2005, (3 months) but may be required to continue until August. (5 months).

#### **Competencies**

The Special Advisor shall be an experienced and professionally qualified Engineer with expertise in the following fields:

Contracting of works, quality supervision and administration of contracts.

Civil, hydraulic and geotechnical engineering relevant to the water management infrastructure of Guyana.

Experience in working in cross-cultural and complex political environments

Requirements of donor agencies in procurement and management of funds.

Development projects and institutional capacity building,

Seniority and experience in Guyana are preferred.

Other team members shall have appropriate experience and expertise for the tasks proposed for them.

#### **Monitoring & Reporting**

The Special Advisor shall keep the donors informed upon the approach, coherence and progress of the action plan together with any financial issues that arise, in order to provide maximum transparency.

This shall be achieved through regular reporting both at the regular Task Force meetings and by brief written weekly progress reports submitted to the Task Force and copied to the donor group.

Presentations to senior Government Officials may be required as part of the overall reporting.

## ATTACHMENT No.2 – Emergency Measures Identified in February 2005

Category	Measures
1. Restore the drainage of the Conservancy	Rehabilitated culverts and outlets and dredging of canals: <ol style="list-style-type: none"> <li>a. Shanks (East Coast Demerara)</li> <li>b. Neabaculis (East Coast Demerara)</li> <li>c. Diamond (East Embankment Demerara)</li> <li>d. Coffee (East Embankment Demerara)</li> <li>e. Cuna (East Embankment Demerara)</li> </ol>
2. Strengthen the dam	Bring the whole dam to a consistent top level Strengthen the patched up areas Create or strengthen a berm at the down side of the dam in order to stabilize it
3. Upgrade the equipment of the Dam security force	Purchase a dragline, trench cleaner and two long boom excavators with appropriate pontoons
4. Provide emergency management craft	Purchase three fast boats. Because of the damage by waves from boats on the conservancy dam and the need for speed, air boats are preferred.
5. Open up the drainage within the conservancy	Dredge and widen the canals within the conservancy: <ol style="list-style-type: none"> <li>a. Enmore</li> <li>b. Enterprise</li> <li>c. 5000 cross</li> <li>d. LBI</li> <li>e. Crag</li> </ol>
6. Restore the function of outlets and pumps in the sea wall that are in a bad state or in disrepair	The discharge of a number of outlet structures can be improved by simple measures: <ol style="list-style-type: none"> <li>a. Plaisance The structure is beyond repair. Excavate trenches toward the structure at both sides. Place (3) large pipes in them, going through the immobile wooden door. Discharge the water at low tide. Put a valve in the pipe to close it at high tide.</li> <li>b. Buxton and BV/Triumph Make use of the existing emergency slots in the sluice. Put new doors in these slots, which may be lifted by dragline or winch. Take out the remains of the old slide doors.</li> <li>c. Mon Repos The new sea wall has two outlet structures less than the old one. Install pumps there.</li> <li>d. Cane Grove Put new pumps where the old ones are broken.</li> <li>e. Gove and John Repair the existing pumping station. If need be replace pumps.</li> <li>f. Greenfield Dredge the sand in the outlet channel at the sea side.</li> </ol>

## ATTACHMENT No. 3 – Action Actually Being Under Taken to Relieve the Situation for the Coming Rains

### Region 4

Rehabilitated culverts and outlets and dredging of canals:

Original	Actual
a. Shanks (East Coast Demerara)	Irrigation canal, discharge capability of head regulator 6 to 7cumec. In an emergency the embankment across the canal with 12” pipe feeding little Shanks irrigation canal at 2+500 yard would need to be raised. The embankment between Big Shanks and Shanks drainage channel would need to be removed and a pipe with a non return valve cast in a new embankment across the drain from the savannah. The Shanks drainage channel has been cleared and should be capable to discharging 2 to 3cumec.
b. Neabaculis (East Coast Demerara)	Abandoned. The drain needs to be totally reconstructed over much of its length with construction of a new drainage head regulator comparable to Kofi or Maduni. Potential 40 cumec.
c. Diamond (East Embankment Demerara)	Abandoned because of downstream constraints - residential and industrial developments.
d. Kofi (East Embankment Demerara)	Drainage channel, head regulator capable of 40 – 50 cumec. Work on the HR was complete by 15 June. System could then be operated as a low level tidal drain. VO for Kofi/ Navigation Canal structure issued. Work completed by 30 June. Work on right hand bank delayed pending completion of KNC structure. LH embankment delayed by 3 illegal houses. Revetment carried out in front of them to allow the drain to operate at a high level. Correction of uncontrolled leakage at the Garden of Eden irrigation system into navigation canal, south of Kofi carried out under the “Immediate Works”
e. Cunha (East Embankment Demerara)	Drainage channel, head regulator capable of 40 – 50 cumec. Work on the HR completed by 30 June. Drainage channel as far as the road substantially completed by mid March. Work on the Outfall section substantially complete by 30 June. Barama removed their temporary bridge. Discharge restricted by existing road culvert and outfall structure.
f. New works	(i) Immediate steps are being taken to cut off the uncontrolled discharge at Enmore and Ann’s Grove.

### Strengthen the Dam

Bring the whole dam to a consistent top level Strengthen the patched up areas	20,000 clay bags have been placed in the low areas identified during the January floods. Level survey completed for the critical section between Flag Staff and Buxton to enable commencement of the strengthening of the patched up areas using the leased equipment. Survey proceeding with the rest of the embankment.
Create or strengthen a berm at the down side of the dam in order to stabilize it	During a joint inspection OvD/RGG a substantial ditch immediately downstream of the toe of the embankment was identified over a length of 6.7 miles west of Flag Staff. This caused concern as to the feasibility of constructing a downstream berm. This was confirmed by Chris Wagner, the dam’s expert, to be impracticable.

### Upgrade the equipment of the Dam security force

Purchase a dragline, trench cleaner and two long boom excavators with appropriate pontoons	Dragline with 1.5 tonne drop hammer, and clam shell bucket, together with a long boom hydraulic excavator, with appropriate pontoons leased for period 15 May to 15 August. Not possible to lease trench cleaner.
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### Provide emergency management craft

Purchase three fast boats. Because of the damage by waves from boats on the conservancy dam and the need for speed, air boats are preferred	One 15 ft aluminium boat together with 25 hp outboard engine has been purchased, together with a replacement 40hp out board engine. One air boat is being purchased.
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### Open up the drainage within the conservancy

Dredge and widen the canals within the conservancy: <ol style="list-style-type: none"> <li>a. Enmore</li> <li>b. Enterprise</li> <li>c. 5000 cross</li> <li>d. LBI</li> <li>e. Craig</li> </ol>	A decision was taken not to open up the south – north waterways for the Emergency Works as this would have reduced the time for flood water to reach the conservancy embankment. Instead the east – west waterways have been opened up to speed the discharge of water through the Land of Canaan 5 door sluice, Cunha, Kofi, Maduni and Lama. During drought it is not essential for water to be brought rapidly to the conservancy embankment.
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### Restore the function of outlets and pumps in the sea wall that are in a bad state or in disrepair

The discharge of a number of outlet structures can be improved by simple measures:

a. Plaisance The structure is beyond repair. Excavate trenches toward the structure at both sides. Place (3) large pipes in them, going through the immobile wooden door. Discharge the water at low tide. Put a valve in the pipe to close it at high tide	24” dia. pump provided. No work carried out to make the Outfall Koker operable.
b. Buxton and BV/Triumph Make use of the existing emergency slots in the sluice. Put new doors in these slots, which may be lifted by dragline or winch. Take out the remains of the old slide doors.	Buxton and BV/Triumph Sluices were rehabilitated by the Task Force.
c. Mon Repos	This is a Guysuco pump station
d. Cane Grove Put new pumps where the old ones are broken	42”dia pump installed.

e. Gove and John	???
f. Greenfield (Beehive) Dredge the sand in the outlet channel at the sea side	Sluice and outfall channel rehabilitated by the Task Force
g. New works by Task Force	Rehabilitation of Hope sluice and inlet and outfall channels. Rehabilitation of Belfield sluice and inlet and outfall channels

**Improvement in the Discharge Capability of the Areas between the EDWC and the Sea**

Existing (Emergency) Works	<p>The Region 4 RDC is currently carrying out some G\$400 million of rehabilitation works of the major, minor and macro drainage system, which they have requested the Task Force to reimburse. This is being checked to ensure competitive tendering; the works are of an “Emergency” nature, the quantity and quality, before payment is made.</p> <p>The Task Force is undertaking major drainage works to ensure that the work carried out by Region 4 is an integrated system and will discharge to the Sea.</p> <p>Such works will only bring the system back, at best, to its original design capacity of 1.5” per 24 hours. It will not provide additional capacity over and above the original design capacity</p>
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## ATTACHMENT No. 4 – Budget for Emergency Works

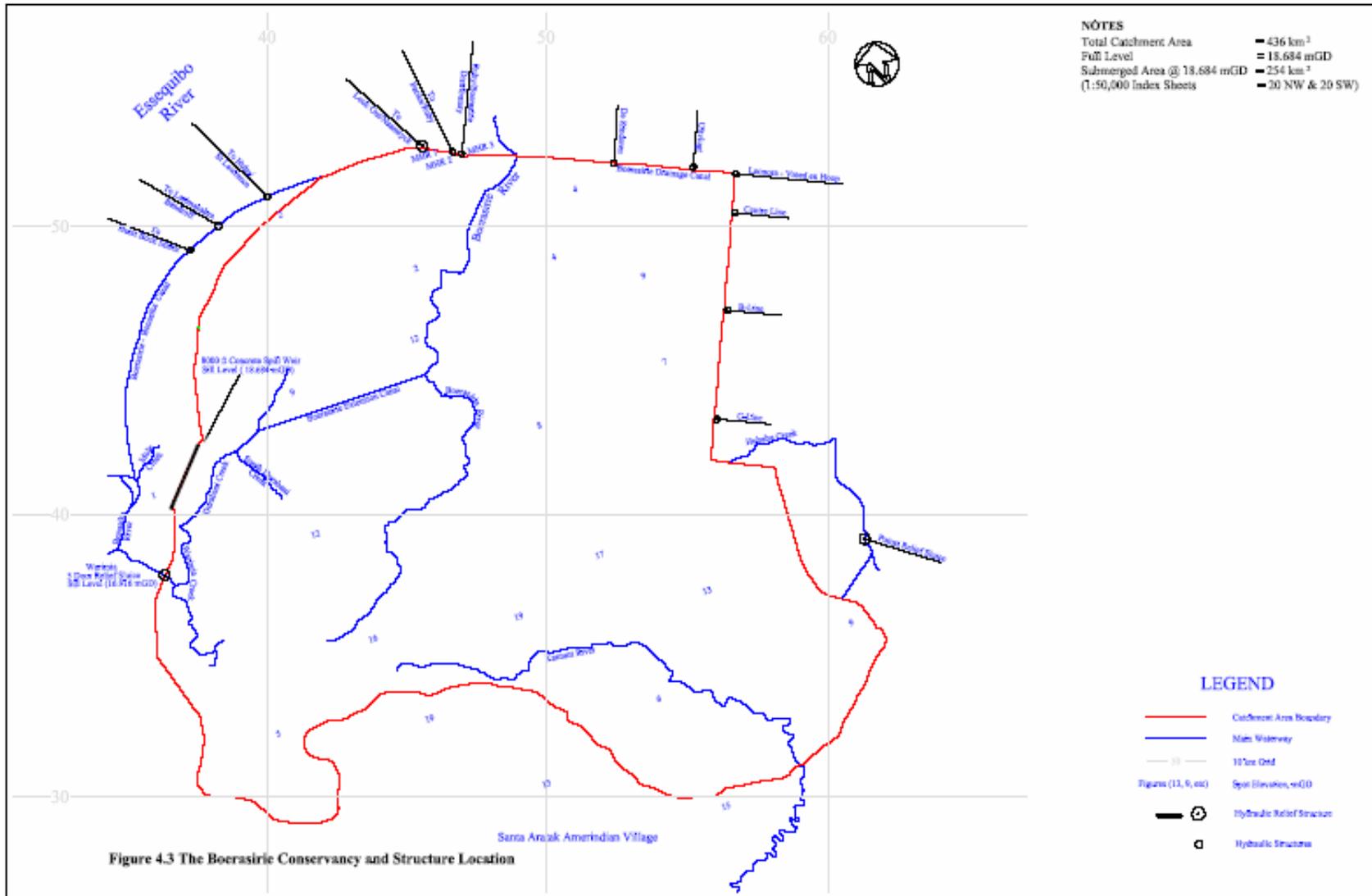
### Initial Budget

No.	Activity	Estimated Cost MG\$	Cummulative Costs MG\$
<b>1 Drainage canals</b>			
1.1	Cunha/Couhnge	25	
1.2	Kofi/Cuffy	30	
1.3	Shanks	25	80
<b>2 Sluices in the Seawall</b>			
2.1	Plaisance	25	
2.2	Triumph	25	
2.3	Victoria	25	
2.4	Buxton	25	
2.5	NDC-works	120	
2.6	Guysuco outlets	0	220
<b>3 Conservancies</b>			
3.1	EDWC dam	90	
3.2	Drainage channels	120	
3.3	Road to Flag Staf	25	
3.4	Provide equipment	20	
3.5	Storage of clay bags	5	
3.6	Boeferie dam	60	
3.7	Region 5	90	410
<b>4 Miscellaneous</b>			
4.1	Task Force	40	
4.2	Consultants	15	
4.3	Special Advisor	p.m.	
4.4	Task Force staf	5	
4.5	Water Mngm. Model	70	130
<b>5 Disaster Managm.Plan</b>			
5.1	Strategy	p.m.	
5.2	Flood preparedness	p.m.	
5.3	Disaster Guidebook	p.m.	0
6	Provision (10%)	90	90
<b>Total</b>			<b>930</b>

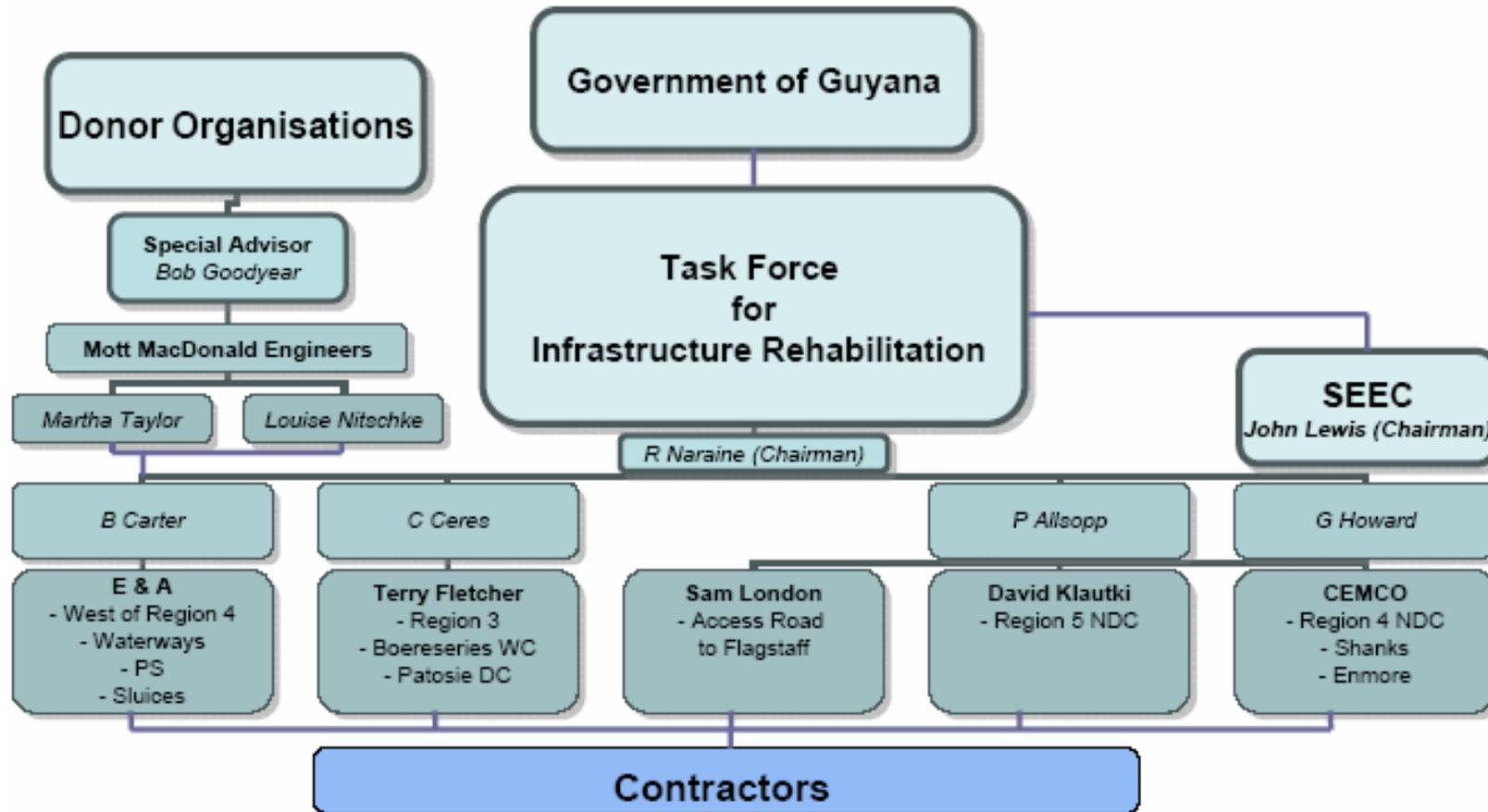
## Final Budget

No.	Activity	Prev. estimated costs MG\$	Estimated Cost MG\$	Cummulative Costs MG\$	Committed Budget MG\$	Cummulative Costs MG\$
<b>1 Drainage canals</b>						
1.1	Shanks	25	25		16.9	
1.2	Cunha/Couhnge	25	25		11.1	
1.2a	Cunha/Couhnge VO	-	10		43.3	
1.3	Kofi/Cuffy	30	30		30.2	
1.3a	Kofi/Cuffy VO	-	10		39.4	
1.4	Region 2 Drainage Works				1.4	
1.5	Region 3 Drainage works	-	25		51.7	
1.6	Region 4 Drainage works	120	120		190.4	
1.7	Region 5 Drainage works	80	60	280	64.3	448.6
<b>2 Sluices in the Seawall</b>						
2.1	Hope	20	20		1.8	
2.2	BV/Triumph	20	20		4.1	
2.3	Belfield	20	20		1.6	
2.4	Beehive	20	20		3.0	
2.5	Buxton + VO	20	20		14.1	
2.6	Installation of Pumps				17.4	41.9
<b>3 Conservancies</b>						
3.2	EDWC Waterways	120	120		180.8	
3.3	Road to Flag Staff	25	25		17.5	
	Sealing Piping in EDWC Dam Enmore, Ann's Grove, LBI				0.7	
					18.0	
3.4	Lease equipment for EDWC	20	10		33.4	
3.5	Supply and storage of clay bags	5	1		10.0	
3.9	Boerasirie conservancy dam	60	60	216	11.9	272.4
<b>4 Miscellaneous</b>						
4.1	Task Force	40	40		9.0	
4.2	Consultants	15	15		23.5	
4.3	Special Advisor	p.m.	p.m.		p.m.	
4.4	Task Force sundries	5	5		5.0	
4.5	Water Management Model	70	70	130	p.m.	37.5
<b>5 Disaster Management Plan</b>						
5.1	Strategy	p.m.	p.m.			
5.2	Flood preparedness	p.m.	p.m.			
5.3	Disaster Guidebook	p.m.	p.m.	0		
<b>6 Provision (10%)</b>						
		90	90	90		
<b>Total MG\$</b>		<b>830</b>		<b>716</b>		<b>800.4</b>
Total US\$ x 1,000		4,150		3,580		4,002.1





### ATTACHMENT No. 6 – Organisation Chart for the TFIR & SA



**ATTACHMENT No. 7 – Emergency Works Contractual Status**



**Region 3**

<b>Contract</b>	Steel Door at Namryck	Patosie	Leonora to Namryck - Lot 1	Hague & La Grange - Lot 1	Hague & La Grange - Lot 2
<b>Reference</b>	-	TFIR-8	TFIR-10	TFIR-12	TFIR-12
<b>Contractor</b>	Madevco & Co.	Ganesh Ramratan	Eagle Transpotation	Ganesh Ramratan	S Khan General Contracting
<b>Consultant</b>	Terrence Fletcher & Associates Ltd	Terrence Fletcher & Associates Ltd	Terrence Fletcher & Associates Ltd	Terrence Fletcher & Associates Ltd	Terrence Fletcher & Associates Ltd
<b>Verbal Acceptance</b>	17-Apr-05	21-Apr-05	01-May-05	28-Apr-05	28-Apr-05
<b>Letter of Intent</b>	29-Apr-05	04-May-05	04-May-05	04-May-05	04-May-05
<b>Contract Price</b>	\$995,340	\$13,399,800	\$8,971,150	\$11,528,463	\$3,248,566
<b>BOQ Amount</b>	\$865,440	\$11,652,000	\$7,801,000	\$10,024,750	\$2,824,840
<b>Contingency Prov Sum</b>	\$129,900	\$1,747,800	\$1,170,150	\$1,503,713	\$423,726
<b>Variation Order No. 1</b>					
<b>Variation Order No. 2</b>					
<b>Variation Order No. 3</b>					
<b>Revised Total</b>	\$865,440	\$11,652,000	\$7,801,000	\$10,024,750	\$2,824,840
<b>Certificate No. 1</b>	\$692,352	\$3,618,240		\$2,944,440	\$755,776
<b>Certificate No. 2</b>					
<b>Certificate No. 3</b>					
<b>Certificate No. 4</b>					
<b>Certificate No. 5</b>					
<b>Total Certified to Date</b>	\$692,352	\$3,618,240	\$0	\$2,944,440	\$755,776
<b>Balance Due</b>	\$173,088	tbc	tbc	tbc	tbc
<b>Progress to date</b>	100% complete FPC & CC to be issued	Works stopped,	Works stopped,	100% complete?	100% complete?
<b>Outstanding Action</b>	issue CC & FPC	FMS, FPC & CC to be issued			
<b>Defects Liability Period</b>	None	None	None	None	None



**Region 4 Drainage and W Region 4 Outfall Sluices**

<b>Contract</b>	<b>Leasing of Maintenance Equipment Lot 2b</b>	<b>Leasing of Maintenance Equipment Lot 2c</b>	<b>Buxton Sluice</b>	<b>Beehive Sluice</b>	<b>BV/Triumph Sluice</b>	<b>Hope Sluice</b>	<b>Belfield</b>
<b>Reference</b>	TFIR-6	TFIR-6					
<b>Contractor</b>	<b>Amuad Reasat</b>	<b>Amuad Reasat</b>	<b>E Cush</b>	<b>Fyuse Hoosain</b>	<b>Fyuse Hoosain</b>	<b>Fyuse Hoosain</b>	<b>Fyuse Hoosain</b>
<b>Consultant</b>	<b>ND&amp;IB</b>	<b>ND&amp;IB</b>	<b>E&amp;A Consultants Inc</b>				
<b>Verbal Acceptance</b>	28-Apr-05	28-Apr-05	30-Mar-05	30-Mar-05	30-Mar-05	30-Mar-05	30-Mar-05
<b>Letter of Intent</b>	04-May-05	04-May-05	05-May-05	05-May-05	05-May-05	05-May-05	05-May-05
<b>Contract Price</b>	\$6,066,614	\$2,426,646	\$14,110,000	\$3,013,400	\$4,720,000	\$1,780,000	\$1,780,000
<b>BOQ Amount</b>	\$5,275,317	\$2,110,127	\$12,260,000	\$2,623,400	\$4,100,000	\$1,550,000	\$1,550,000
<b>Contingency Prov Sum</b>	\$791,297	\$316,519	\$1,850,000	\$390,000	\$620,000	\$230,000	\$230,000
<b>Variation Order No. 1</b>			\$1,975,090	\$68,000		\$200,000	
<b>Variation Order No. 2</b>							
<b>Variation Order No. 3</b>							
<b>Revised Total</b>	\$5,275,317	\$2,110,127	\$14,235,090	\$2,573,800	\$4,000,000	\$1,750,000	\$1,550,000
<b>Certificate No. 1</b>			\$4,267,200	\$1,684,640	\$1,192,000	\$920,000	\$920,000
<b>Certificate No. 2</b>			\$4,176,073	\$398,870	\$2,228,000	\$372,500	\$172,500
<b>Certificate No. 3</b>			\$4,509,113				
<b>Certificate No. 4</b>							
<b>Certificate No. 5</b>							
<b>Total Certified to Date</b>	\$0	\$0	\$12,952,386	\$2,083,510	\$3,420,000	\$1,292,500	\$1,092,500
<b>Balance Due</b>	\$5,275,317	\$2,110,127	\$1,282,704	\$490,290	\$580,000	\$457,500	\$457,500
<b>Progress to date</b>	Completion due 01 August 2005	Completion due 01 August 2005	SCC, SPC issued				
<b>Outstanding Action</b>	IPC to be issued	IPC to be issued	Maintain outfall channel, FMS, FPC & CC to be issued	Maintain outfall channel, FMS, FPC & CC to be issued	Maintain outfall channel, FMS, FPC & CC to be issued	Maintain outfall channel, FMS, FPC & CC to be issued	Maintain outfall channel, FMS, FPC & CC to be issued
<b>Defects Liability Period</b>	None	None	12 months 5% retention				

**Region 4 Drainage**

<b>Contract</b>	Plaisance drain clearing	Golden Grove East	Belfield West	Better Hope	Industry
<b>Reference</b>	TFIR 12	TFIR-16	TFIR-19	TFIR-24	TFIR-27
<b>Contractor</b>	H Naught	KB&B	NY & Sons	Frank Gaul GC	KB&B
<b>Consultant</b>	CEMCO	CEMCO	CEMCO	CEMCO	CEMCO
<b>Verbal Acceptance</b>					
<b>Letter of Intent</b>	17-May-05	17-May-05	17-May-05	17-May-05	17-May-05
<b>Contract Price</b>	\$8,516,900	\$1,277,513	\$455,730	\$2,917,750	\$2,211,000
<b>BOQ Amount</b>	\$7,742,636	\$1,161,375	\$414,300	\$2,652,500	\$2,010,000
<b>Contingency Prov Sum</b>	\$774,264	\$116,138	\$41,430	\$265,250	\$201,000
<b>Variation Order No. 1</b>	??				
<b>Variation Order No. 2</b>					
<b>Variation Order No. 3</b>					
<b>Revised Total</b>	\$8,516,900	\$1,161,375	\$414,300	\$2,652,500	\$2,010,000
<b>Certificate No. 1</b>	\$5,644,800		\$324,300		
<b>Certificate No. 2</b>					
<b>Certificate No. 3</b>					
<b>Certificate No. 4</b>					
<b>Certificate No. 5</b>					
<b>Total Certified to Date</b>	\$5,644,800	\$0	\$324,300	\$0	\$0
<b>Balance Due</b>	\$2,872,100	\$1,161,375	\$90,000	\$2,652,500	\$2,010,000
<b>Progress to date</b>	100% complete?	100% complete?	100% complete?	Works stopped	Works stopped
<b>Outstanding Action</b>	Issue internal VO, FMS, FPC & CC	Issue FMS, FPC & CC	Issue FMS, FPC & CC	Issue stop letter, FMS, FPC & CC	Issue stop letter, FMS, FPC & CC
<b>Defects Liability Period</b>	None	None	None	None	None

Region 4 Miscellaneous

<b>Contract</b>	Access Rd to Flagstaff	Mazaruni Granite	Region 4 3 No. 42" Pumps Installations	Enmore	Ann's Grove	LBI	Clay Bags
<b>Reference</b>	TFIR-4						
<b>Contractor</b>	Rayman Bros	Mazaruni Granite	Harri Tyisie				
<b>Consultant</b>	Samuel London Associates	Samuel London Associates	E&A Consultants Inc	CEMCO	CEMCO	CEMCO	ND&IB
<b>Verbal Acceptance</b>	12-Apr-05		09-Apr-05				
<b>Letter of Intent</b>	15-Apr-05						
<b>Contract Price</b>	\$19,549,400	\$6,269,754	\$17,445,000	\$6,000,000	\$3,000,000	\$3,000,000	\$10,000,000
<b>BOQ Amount</b>	\$16,549,400	\$6,269,754	\$17,445,000	\$9,000,000	\$6,000,000	\$3,000,000	\$10,000,000
<b>Contingency Prov Sum</b>	\$3,000,000						
<b>Variation Order No. 1</b>	-\$6,269,754						
<b>Variation Order No. 2</b>							
<b>Variation Order No. 3</b>							
<b>Revised Total</b>	\$10,279,646	\$6,269,754	\$17,445,000	\$9,000,000	\$6,000,000	\$3,000,000	\$10,000,000
<b>Certificate No. 1</b>	\$6,549,508		\$17,025,000				
<b>Certificate No. 2</b>							
<b>Certificate No. 3</b>							
<b>Certificate No. 4</b>							
<b>Certificate No. 5</b>							
<b>Total Certified to Date</b>	\$6,549,508	\$0	\$17,025,000	\$0	\$0	\$0	\$0
<b>Balance Due</b>	\$3,730,138	\$6,269,754	\$420,000				
<b>Progress to date</b>	Contract terminated	Stone delivered	100% complete?	Revetment designed, material prices received	Revetment designed, material prices received		100% complete
<b>Outstanding Action</b>	Decision to be taken as to whether penalties are applicable due to lateness and poor quality. Internal VO to be prepared to cover the omission of the Provisional Sums (PS) Items 8, 9 and 10; the conversion of the PS for the Timber Bridge into a Lump Sum or priced BoQ, and provide justification of increased quantities for Bill Items 3, 4, 6 and 7.	NP&TA to issue approval for Nominated Supplier Mazaruni Granite G\$\$\$6,269,754	Issue FPC, FCC & CC	Order revetment material and construct	Order revetment material and construct	decision on action to be taken	none
<b>Defects Liability Period</b>	12 months 5% retention	None	None	None	None	None	None

















