

2013

Report of the Independent Review Committee of the Debe to Mon Desir Segment of the San Fernando to Point Fortin Highway

Submitted by: Dr. James Armstrong
Chairman

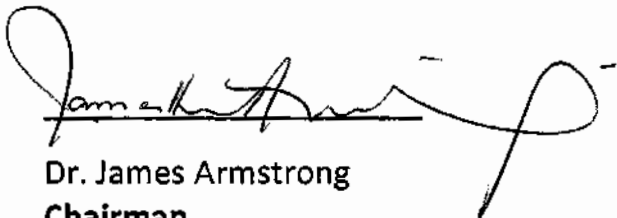
March 3, 2013



3rd March 2013

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Submitted by,

A handwritten signature in black ink, appearing to read 'James Armstrong', written over a horizontal line. The signature is fluid and cursive, with a large loop at the end.

**Dr. James Armstrong
Chairman
Independent Review Committee**

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

INTRODUCTION

This Report of the Highway Review Committee (HRC), which was established to undertake a technical review of the Debe to Mon Desir segment of the extension to the Sir Solomon Hochoy Highway (SHH), comes at an important juncture in the fiftieth year of our evolution and development as an independent State. The exercise demonstrated the advent of an era of enlightenment in which the governance machinery of State and civil society representatives, while in an entrenched face-off of divergent positions, embraced an opportunity to reflect on common interests often assumed in a modern democracy and indeed in the safeguards enshrined in our Constitution. In this regard, there are no winners and losers.

HISTORICAL CONTEXT

The decision to build the ‘San Fernando to Point Fortin Highway’ was conceived over three decades ago and has been considered by successive governments. The National Physical Development Plan (NPDP) of 1984 includes an alignment for such a highway, quite apart from the South Trunk Road. A pre-feasibility study was actually undertaken in 1998, followed by a full feasibility study and initial designs between 2005 and 2007. The final report of the latter study titled *Solomon Hochoy Highway Extension to Point Fortin: Final Report on Feasibility Investigations, Volume 1 - Engineering and Economic Feasibility*, which was prepared by LEA-Trintoplan in association with Ecoengineering, indicates that the 1998 study pointed to “three distinctive traffic issues which need to be addressed:

1. A more direct route between San Fernando and the Point Fortin-La Brea area is needed.
2. There are significant traffic delays on sections of SS Erin Road from Cross Crossing to Siparia.
3. There are significant traffic delays on the two-lane section of the South Trunk Road and Southern Main Road between Cross Crossings and St Mary’s Junction.¹”

Consequently, various alternative alignments were considered for a route between San Fernando and Point Fortin. Particular consideration was given to a route which approximates the alignment reflected in the NPDP.

Three options (*See Figure 1*) were studied as discussed further in this Review Report. The western alignment was the least feasible because it traversed the Oropouche Lagoon directly and would have had significant environmental impacts and be quite costly. The eastern alignment was also found to have significant negative environmental impacts and would have been the most expensive. The centre alignment, from Golconda to Debe to Siparia, to Mon Desir was considered to be superior both from the environmental perspective since it did not significantly impact the lagoon, and from an overall perspective. Trintoplan Consultants, at Section 2.2 in the *Final Report on Feasibility Investigations, Volume 1 – Engineering and Economic Feasibility* proposed that the extension of the highway should follow a route to Point Fortin via Penal and Mon Desir. This is the route that was found to be most appropriate. It was pointed out that construction of the entire route to four-lane standard was not justified

¹ Section 4.2, Page 4-1.

in the near future from an economic viewpoint and that the best alternative for extension of the network to 2020 was a two-lane standard highway. This section of the report, however, notes a directive from the “Ministry” that:

- The South Trunk Road between Dumfries Road and Paria Suites should be widened to four lanes.
- The SHH extension from Golconda to Point Fortin should be to freeway standard.
- A highway connection be established between the route serving the Penal and Siparia areas and that serving Point Fortin.
- A four-lane extension from Golconda to Debe should be the initial freeway implementation contract of the overall project.

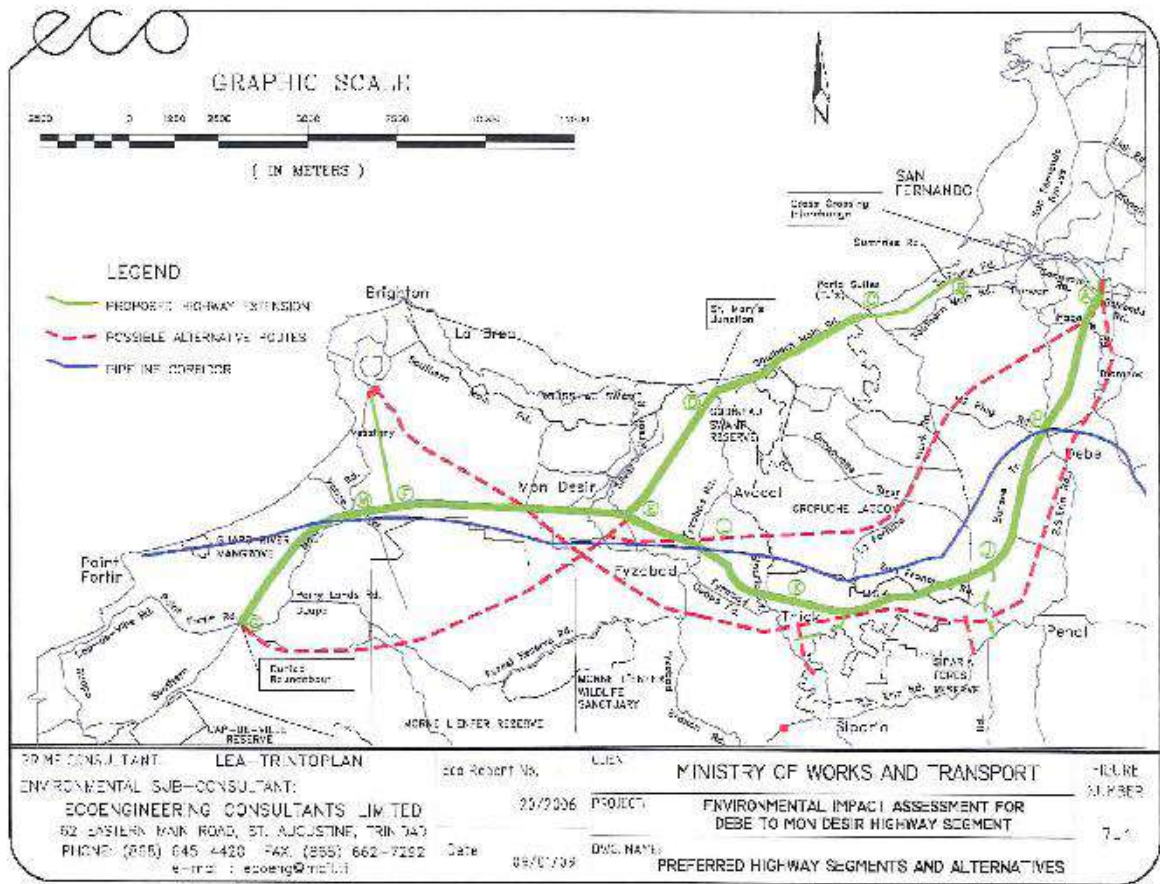


Figure 1: Alternative Alignments Considered

Source: *Highway Extension to Point Fortin: Debe to Mon Desir (Environmental Impact Assessment, Volume 1: Text (Revision 1))*

According to an account of events provided by the National Infrastructure Development Company Limited (NIDCO), as the “detailed designs were completed more than five years ago (2005-2007), and for other pertinent reasons, a decision was taken to tender the construction of the highway, on the 24 February 2010, utilizing the Design-Build model of procurement.” In effect, this meant that the project was no longer going to be phased as was originally envisaged. A Brazilian company Construtora OAS Ltda (OAS) was procured in 2011² to build the entire highway. Actual construction commenced in September 2011, with a planned completion date of September 2015. Under this arrangement, OAS is fully responsible for executing the design of the entire highway on behalf of the Ministry of Works and Infrastructure (MOWI) and NIDCO. The Ministry and NIDCO must approve the design at intervals and, therefore, OAS has engaged the services of international consultants HALCROW to prepare designs that satisfy the requirements of the contract. Further design checks are to be undertaken by reputable consultancy firms.

As details of the decision to build the entire highway at a cost of \$B7.5 emerged various individuals raised concerns about a number of issues. These individuals eventually morphed into the Highway Reroute Movement (HRM). In February 2012 the HRM wrote to the Prime Minister of Trinidad and Tobago requesting that the proposed Debe to Mon Desir segment of the highway should be discontinued and that consideration be given to an alternative route as discussed in the Traffic and Transportation Section of this Review Report. The concerns of the HRM, as outlined in the affidavit filed in the Supreme Court of Trinidad and Tobago by Dr. Wayne Kublalsingh on August 03, 2012 and enunciated in other documents submitted by the HRM were, *inter alia*:

- The route was conceptually flawed and could lead to urban sprawl.
- Disconnectivity of well-established communities.
- An increase in flooding caused by the highway embankment.
- The demolition of homes, well established business, places of worship and an orphanage.
- The destruction of agricultural lands and the splitting of landholdings, orchards, commons and fishing.
- The consultations required for a project of this type were inadequate and flawed.
- The cost of the highway was prohibitive compared to the benefits.

According to a countervailing account given by NIDCO, in the June 2012 *Report on the Debe to Mon Desir Segment Sir Solomon Hochoy Highway*, the State enumerated various benefits to the Highway including:

- A reduction of traffic congestion afforded by an optimized design that allows for the efficient flow of traffic and easy access to otherwise inaccessible areas for the transit of products, goods and services.
- A reduction in road user and life-cycle costs in the form of savings in vehicle operating costs and travel time costs due to reduced travel distances created by more direct routes and increased travel speeds.
- The provision of a safe, efficient, affordable, and aesthetically pleasing highway for all citizens.

² NIDCO: Report on the Debe to Mon desir Segment Sir Solomon Hochoy Highway-Project Background, Wednesday 13th June, 2012.

- The provision of improved access to Siparia, La Brea and Point Fortin to accommodate the anticipated economic growth as expected from government's designation of the south west region as a growth pole.
- Improvement of local road networks in the south west region, increasing connectivity to the main population centres such as Debe, Penal, Siparia, Fyzabad, La Brea and Point Fortin.
- Efficient movement of goods to/from ports within the Gulf of Paria.
- The highway will promote a host of downstream industries poised to stimulate the transportation industry, service contractors, and small entrepreneurs who provide food and other ancillary products.
- Construction of the highway will increase the demand for skilled and unskilled labour resources, thus potentially resulting in a decrease in unemployment levels and increase in income levels. It should be noted that the Contractor (OAS) must utilize a minimum of 40% local inputs which include skilled and unskilled labour, as well as materials, equipment and suppliers.
- Additionally, there will be a transfer of technology to the local construction industry.

The HRM proposed that the Highway should be stopped at Debe with a link to Mosquito Creek and that serious consideration should be given to upgrading local roads. NIDCO disagreed, citing various concerns as follows:

- The residents of the region will not receive the benefits of a modern highway facility that they deserve.
- There will be no reduction in road user costs in the form of savings in vehicle operating costs (VOC), and travel time costs for the people.
- The highway route has provisions for a utility corridor for WASA, T&TEC and other service providers to accommodate future expansion and maintenance of their infrastructure that will be required to service the communities effectively well into the twenty-first century. This benefit will be lost as the local road network cannot facilitate the anticipated improvements.
- Traffic congestion will continue in Debe, Penal and Siparia and worsen over time. A review of the local road shows that even if the government improves the existing road network (which is on-going), connectivity to the main population centres such as Debe, Penal, Siparia, and Fyzabad will still have traffic congestion and safety problems today, which will worsen considerably when one accounts for the projected traffic volume expected in twenty (20) years. This also means that our people will have to commute for hours on a daily basis to get to and from work.
- Traffic congestion will also be exacerbated with the imminent construction of the South UWI Campus at Debe, the development of industrial parks through eTeck, and the new hospital to be built in Penal. These facilities will generate additional traffic with the attendant problems and inconvenience.

Efforts to resolve these opposing positions were not successful. The HRM clearly concluded that their concerns were falling on deaf ears. The stand-off resulted in a principal of the Movement proceeding on a hunger strike on November 15, 2012. The impasse raised serious concerns within the population and various civil society groups, led by the Joint Consultative Council of the Construction Industry (JCC), brokered an agreement which led to the establishment of an independent Highway Review Committee (HRC) to examine "all the documentation on the project provided by NIDCO and all other relevant

documentation and to produce a report within 60 days” from December 03, 2012. It was agreed, however, that in the interim work on the Highway could not be ceased on the sections which were already released to the contractor.

The Terms of Reference (TOR) of the Committee required the review of all of the related technical material, and the receipt and consideration of oral submissions with specific reference to social impacts, hydrology, environmental impacts, and cost/benefit issues. The Committee comprised a Chairman, and consultants in various disciplines, including environmental impact assessment (EIA); social impact assessment (SIA); economic cost benefit analysis (ECBA); urban and regional planning; traffic and transportation planning; land tenure and acquisition; hydrology and hydraulics; law; and archaeology. While most of the consultants were sourced locally, three off-shore consultants were also engaged to provide technical backstopping and advice to the Chairman in critical areas.

The Committee engaged in desk reviews of the subject matter, held inter-sectoral meetings and discussions, and conducted various interviews with representatives of NIDCO and the HRM, as well as with the Debe/Penal Regional Corporation and individuals who wished to make submissions. Members also toured the area by air and traversed the communities to get a first-hand impression of the issues at hand.

SUMMARY OF FINDINGS

Following is a summary of the findings of the consultants reviewing the various aspects of the Highway project.

Urban and Regional Planning

The planning of the proposed Debe to Mon Desir segment of the extension of the SHH highway needed to have been undertaken as part of a comprehensive plan that seeks to balance the land use and transportation needs of south west Trinidad, and to do so with a minimum of disruption of human communities.

Given the limited land space that is available in Trinidad and Tobago, and the large land-take associated with road infrastructure such as highways and interchanges, the Planners need to come up with mechanisms and approaches that would effectively address long-term congestion problems and provide the accessibility that is needed to improve connections between the various areas of the country without severely impacting the lives of people.

Environmental Impact

The environmental impact issues as set out in the Certificate of Environmental Clearance (CEC) and the EIA as issued by the Environmental Management Authority (EMA) were considered critical as a starting point for the review of the relevant documentation. The Committee determined that while the requirements for the environmental assessment were generally adequately set out in the TOR issued by the EMA in April 2006, these were quite dated. The EIA was actually submitted in February 2009, almost three years after the issuance of the final TOR. The initial submission of the EIA for the CEC 1372/2006

was rejected by the EMA with references made to generic deficiencies as elaborated by the EMA's Review Panel comprising various technical state agencies. The deficiencies cited by the EMA's Review Panel were outlined in a Review Assessment Report of 27 October 2009 and included, in part:

- There was insufficient detail with respect to the socio-cultural environment and more details were needed.
- There appeared to be a lack of adequate consultation with agricultural land owners.
- There was no clear provision for the compensation of persons who stood to lose property.
- There was no indication of arrangements for individuals, households, businesses, and farmers to be displaced by the right-of-way (ROW), by resettlement or otherwise.

The responses from the Ministry of Works and Infrastructure (MOWI) to the issues raised by the Review Panel were found by the HRC to be inadequate and often dismissive. The CEC was issued on April 20, 2010, although the Administrative Records at the EMA provided no additional information to determine the basis of its decision. The opinion of the HRC is that the EIA was not acceptable and should have been rejected and returned to the Applicant. It seems that the EMA relented without having the Applicant provide adequate responses.

Social Impacts

A closer examination of the treatment of SIA within the EIA also indicates that this was quite inadequate. It was noted that the study area of direct and indirect impacts was not clearly defined, and not drawn sufficiently wide to allow for the consideration of all of the relevant social issues. The consultant concluded that there is insufficient data in the EIA to adequately assess the social impacts, to classify them in terms of severity, and to plan adequately to mitigate them.

There is need for an adequate SIA to be conducted in accordance with international best practice that is based upon the reality that development interventions as significant as the Highway improvement works under review are likely to have tremendous impact, both positive and negative, on the social fabric of the catchment area that extends way beyond the proposed alignment. These impacts need to be scientifically determined and effective mitigation measures formulated to protect the human element before final decisions are taken regarding this highway development.

Human Settlement

The alignment of the Debe to Mon Desir segment of the SHH route impacts on those settlements that have grown out of economic endeavours pursued over a century ago and which over time have developed into well-established communities. In the event that persons are to be removed from the path of the alignment, it is essential that relocation be based on an Integrated Human Settlement approach that combines a range of land usages designed with sensitivity to the physical environment of the wider area, and arranged in village clusters.

Indications are that approvals for development of the proposed resettlements sites at Petit Morne and Golconda were not obtained from the appropriate authorities, which suggests a flagrant flouting of the

statutory requirements. It is felt that Golconda offers a better option for the consideration of relocation as it allows for conditions similar to those to which the relocates are accustomed.

Economic Cost/Benefit Considerations

The HRC was unable to make an adequate assessment of the economic cost-benefits of the highway segment. It is felt that the EIA and other documents presented did not detail any quantifiable benefits that may be incorporated into a Cost-Benefit Analysis (CBA). Further, while some adverse impacts were anticipated, such as the acquisition of houses; disruption of current and traditional land uses; and loss of business opportunities, there were no quantifiable indicators to make informed assessments. There was no holistic treatment of the project to adequately reflect a convergence of the salient environmental, social, and economic issues that arise. It appears that none of the key agencies involved in the project *viz*, the EMA, the Ministry of Works and Infrastructure (MOWI), Ministry of Finance, NIDCO, or any of the consultants sought to provide an integrated assessment of the project, including primarily a CBA.

Traffic and Transportation

In reviewing the traffic and transportation issues it was found that the need for a highway is driven more by the expected traffic growth from San Fernando and northern areas to the Debe-Penal corridor, than by the through traffic to Point Fortin. The earlier Trintoplan study did include a northern route as is being suggested by the HRM. However, it was found that the HRM's traffic proposals are short-term in nature and do not seem to take into account future increases in car numbers and traffic. These issues are further clouded by a separate decision by the Government to expand the Mosquito Creek segment to four lanes, by the conflation to build a highway to Point Fortin with a paradigm to develop the Siparia-Fyzabad-Penal area, and by the lack of any up-to-date traffic plans for the area. It was noted that NIDCO recently commissioned a traffic study in this connection. The preliminary findings of the recent study conclude that the HRM's proposal will not be the preferred alternative as it does not provide enough capacity for the future traffic requirements in the area to 2030.

Hydrology and Hydraulics

In the area of hydrology and hydraulics it was felt that the Hydrology Report of 2007 fulfilled the objectives of determining the hydrologic information required for inputs to the hydraulics for bridge and culvert preliminary designs at points of intersection of the highway and river crossings. However, the analyses are not carried out in the context of an Integrated Watershed Management Plan for the South Oropouche River Basin. It was again felt that projects of this type must be undertaken in a more holistic manner. It was further observed that the EIA process failed to take into consideration comments by the EMA's Review Panel. The Committee agreed that the EIA considerations were eventually compromised by the Design-Build approach, and concluded that this approach was ill-advised for this project as the implementation risks are in direct conflict with Best Practice, and therefore not in the best interest of the people of Trinidad and Tobago.

Land Tenure and Acquisition

Various observations were made with respect to property acquisition practices related to the project. It has been reported that entry on to property for executing the project might have been made without Section 4 authority as required by legislation. It must be stressed that improper land acquisition procedures are the

cause of substantial delays. The policy and arrangements for ‘ex-gratia’ awards in many cases appear to be unsatisfactory.

Conclusion

The Trinidad and Tobago Constitution guarantees certain rights and freedoms which are considered fundamental to the operation of a democratic society. Section 4 of the Constitution guarantees the right of enjoyment of property and the right not to be deprived thereof except by due process of the law. It follows that there is no breach of a person’s constitutional rights if that person’s property is acquired in strict compliance with the law and that such person receives adequate compensation, including consideration of trade-offs. A significant concern with the Debe to Mon Desir Highway is whether or not the lawful authority responsible for this large public expenditure is conforming to due process, including observance of various oversight statutory requirements for environmental management, the development of land, and due consideration of socio-economic impacts of the affected persons.

The HRC found that there were significant shortcomings which warrant further interrogation to determine the way forward. The complex and sensitive issues involved in this project certainly could not be addressed within the confines of this 60-day review period. Should the Government decide to proceed with the construction of the Debe-Mon Desir segment, the HRC is of the considered opinion that shortcomings resulting from the inadequacies of proper assessment of the likely impacts on the human and natural environment must first be determined and resolved.

RECOMMENDATIONS

1. Recommendations Specific to the Proposed Debe to Mon Desir Project

The following recommendations of the Highway Review Committee seek to address deficiencies discussed in this Report, and are grounded in the need for the proponents of the Debe to Mon Desir segment of the Highway to observe the requirements of the relevant legislation, in particular the EMA Act, the TCP Act, the Land Acquisition Act (LAA), and the Municipal Corporation Act (1990). They include factors that need to be taken into consideration in arriving at a decision regarding the construction of the Highway.

In keeping with the TOR for this review, proposals that could be of benefit to the project in social, environmental, and economic terms are also included.

- 1.1 The CEC 1372/2006 contains an extensive list of conditions intended to address the lack of detail presented to the EMA at the time of the application. A significant amount of work still needs to be undertaken to obtain approvals before any additional site activities are carried out. It is recommended that no further work be undertaken on the Highway site until all of the conditions contained in the CEC have been fulfilled, including the need for all plans specified in the EIA to be submitted to the EMA, and for approvals to be obtained from the relevant agencies. This includes the Storm Water Management Plan and the Water Management Plan, consideration of which involves stakeholder consultation and feedback via the Working Group which is required to be formed as part of the CEC conditions.
- 1.2 In accordance with the TCP Act no further construction work should be carried out on the site until all of the conditions attached to Notice of Grant of PP referenced T7M: 0440/2007 and Notice of Grant of PP referenced T8N: 0443/2007 have been fulfilled.
- 1.3 It is imperative that a proper Social Impact Assessment be undertaken before a decision is made whether or not to continue with the Debe to Mon Desir segment of the Highway given the potential for severe adverse impacts on the resident population and other stakeholders within the immediate and wider area of impact, including the potential severing of extended family ties. In this regard non-relocated residents, and the agricultural stakeholders who would be affected by the loss of their lands, as well as the non-relocated business people who would be affected by the Highway, also need to be drawn into the study. The SIA studies should include attention to the alternate routes proposed by the HRM and by MOWT/NIDCO.
- 1.4 In view of the issues relating to the dislocation of persons from their homes it is critical that a Resettlement Plan showing compliance with condition (iii) (e) of the CEC, that is, “The Applicant should pursueresident relocation and resettlement utilising best industry practices.....” should be prepared and submitted to the EMA before any decision is finalised regarding the resettlement of affected persons.
- 1.5 No further engineering operations are to be undertaken on the land at Petit Morne, St. Madeline on which it is proposed to relocate persons residing in the path of the alignment until all necessary approvals are obtained from the relevant agencies.

- 1.6 Quantitative assessment is critical to this project in the areas of hydrology and drainage. Hence, a quantitative surface and groundwater hydrology model and study of the wetland as a hydrodynamic system should be undertaken in the public interest as part of Best Practice before an informed decision can be made as to whether or not this segment of the Highway should proceed as proposed.
- 1.7 An Environmental Economic Study of this Project must also be undertaken to inform a decision whether or not to proceed with this Highway segment. This should include a cost-benefit analysis, comparing the economic costs of the various alignment alternatives that were assessed to demonstrate the costs of the adverse effects compared with the projected benefits.
- 1.8 Off-site impacts, such as the impact of removing and transporting extraordinarily large quantities of aggregate to be sourced from areas far removed from the Project Area, for example, quarries in the Northern Range, also need to be determined and measures designed to mitigate any negative impacts.
- 1.9 The HRC recommends that the APDSL studies be continued. The HRM spokesperson on traffic should be drawn into this study as part of the community involvement in this major transportation investment programme. It is further recommended that consideration be given to staging highway improvement for the south western peninsula to allow the phased development of the transportation system and minimize the potential for 'overbuilding' the road network at the expense of competing land uses and to the detriment of the communities within the direct or indirect range of the alignments.
- 1.10 The HRC recommends that all relevant state agencies together review their policy for the assessment of damage at Section 3 of the LA Act. This must include the Commissioner of State Lands (COSL), MOWI, the Valuation Division (VD), and the Ministry of Food Production. It also recommends that the Institute of Surveyors of Trinidad and Tobago (ISTT) be consulted and that consideration be given to including the Agricultural Society and the Law Association. It is further recommended that the Commissioner of Valuation (CoV) ensures proper compliance with the law and Land Economy principles.

CONCLUSION

The HRC found that there were significant shortcomings which warrant further interrogation to determine the way forward. The complex and sensitive issues involved in this project certainly could not be addressed within the confines of this 60-day review period. Should the Government decide to proceed with the construction of the Debe-Mon Desir segment, the HRC is of the considered opinion that shortcomings resulting from the inadequacies of proper assessment of the likely impacts on the human and natural environment must first be determined and resolved.

2. Recommendations for Consideration of Future Projects

- 2.1 Infrastructural projects of this scale should be conceptualised in the context of land use/spatial plans that incorporate solutions that address employment/housing mismatches, and that are based on the establishment of various modes of travel and improved public transportation facilities that would serve to reduce the need for highway expansion. Such plans should be done at the level of the watershed, and might take the form of Integrated Watershed Management Plans which appropriately address the interests of the various stakeholders and provide a balanced approach to the water resources management and stormwater management in the watershed. Only in the context of an overall Integrated Watershed Management Plan can a proper hydrological assessment be carried as part of the EIA and as support for the detailed designs.
- 2.2 For future projects of this magnitude it is recommended that the EMA insist on the design and implementation of a proper hydrological data monitoring programme either before a CEC is granted or as a condition of the CEC.
- 2.3 The Design-Build approach that is being followed in the construction of the Highway is suitable for well-defined projects, such as buildings, with a clearly defined scope of works and list of requirements. In the case of infrastructural works such as highways, the concept should be applied only in situations in which detailed designs are available at Tendering Phase, and the design tasks will be focussed primarily on value engineering and further detailing. The Design-Build approach for the implementation of large infrastructural projects involves a major risk with respect to construction delays as it is dependent on the approvals of the detailed designs and plans by numerous approval agencies and the involvement of stakeholder consultation. Design-Build is not the appropriate implementation strategy for any future large infrastructural projects.
- 2.4 It is recommended that the Rules governing the preparation of an EIA should give explicit consideration of physical/natural impacts and the socio-economic impacts of proposed projects. The economic valuation should be a mandatory aspect of the EIA to determine direct and indirect costs and benefits. The inadvertent omission of values of non-marketed goods and services results in an undervaluation of project costs as appropriate mitigation measures that may be employed. The HRC has recommended a range of indicators which should be considered for future projects of this type.
- 2.5 It is also important that the relevant legislation – including the EM Act, the TCP Act, and the State Land Act – be reviewed as a matter of urgency to address the deficiencies highlighted in this report. There is need for early resolution of the incongruent sequential relationship between TCPD approvals and the CEC process.
- 2.5 The Committee advises that it is necessary to strengthen the capacity of the relevant institutions, including the EMA and the TCP, and to provide the necessary infrastructure and resources, including human resources expert in the areas of Social Impact Assessment and Hydrology to ensure that social impacts and hydrological considerations are adequately treated in EIAs.

2.6 Finally, effective stakeholder participation is essential in the decision making process. The relevant agencies must ensure that proper consultation is carried out following effective communication of information to all stakeholders. What has transpired with this project may not have occurred if an appropriate process for incorporating stakeholder involvement was applied.

I. INTRODUCTION

BACKGROUND

The Debe to Mon Desir Highway forms one segment of the Golconda to Point Fortin Highway, described as the SHH extension. It is part of the Trinidad and Tobago National Highways Programme: Trunk Roads Expansion Component, initiated in 1998 under the management of the Ministry of Works and Transport (MOWT), now designated the Ministry of Works and Infrastructure (MOWI).

One of the objectives of the Trinidad and Tobago National Highways Programme: Trunk Roads Expansion was stated as:

“To address the necessity for providing highway improvements to the south and west of San Fernando, involving improving the road access to La Brea, Point Fortin and Siparia.”

This will, it elaborated:

1. Reduce travel times between the local regions and other urban areas,
2. Support industrial development,
3. Increase employment and income levels, and
4. Improve movement of people, goods and services, all to the benefit of the regional population as a whole and the national economy.

In 1998 a pre-feasibility study of the SHH extension was commissioned by the Government of Trinidad and Tobago through the MOWT from a foreign-local joint venture of ND LEA (Canada) and Trintoplan, (LEATrintoplan). The study area comprised the wards of Erin, La Brea, Siparia and the Borough of Point Fortin in St. Patrick County, and a part of the ward of Naparima in Victoria County. Within the area a network of roads existed that included the San Fernando Siparia Erin Road (S.S Erin Road), the South Trunk Road/Southern Main Road, the Siparia Road, the Fyzabad Road and San Francique Road. The Southern Main Road was the main route to Point Fortin and the S.S Erin Road provided access to Debe, Penal, Siparia, Palo Seco and Erin.

The Pre-feasibility study concluded that the most economical way to satisfy the total road transport demand of the area was through four separate projects as opposed to a single route between the Solomon Hochoy Highway Extension and Point Fortin. These projects were identified as:

1. The La Brea By-pass, starting at St. Mary's Junction and running cross country south of La Brea joining with the Southern Main Road south of Vance River
2. Rehabilitation of the Southern Main Road from Vance River to Point Fortin
3. Extension of the SHH to S.S. Erin Road, Penal
4. Dualling of the South Trunk Road

The Pre-feasibility Study was completed in October 1999 and a final report in three volumes was submitted to the then MOWT.

In 2005, under IADB Loan 932/0C-TT Trunk Roads Expansion Project, the joint venture of LeaTrintoplan undertook the Feasibility Study for the extension of the SHH (Golconda to Point Fortin a distance of 32km), one of three road projects listed in the programme. Trintoplan indicates in its report documenting the history of the project that at this stage there was a review of the findings of the Pre-feasibility Study completed six years earlier in 1999 and further traffic analyses were carried out to determine the final options for the highway extension project. It noted that, as had been done in the in the pre-feasibility study, several alternative road alignment routes were analyzed. After consultation with several stakeholders most notably PETROTRIN, the main land owner, the final route was determined. The final route comprised two components:

1. Extension of the SHH from Golconda in an alignment which runs in a southerly direction just west of Debe, Penal, Siparia before turning in a westerly direction to Fyzabad, Mon Desir, La Brea Connector and Point Fortin.
2. Widening of the South Trunk Road from Dumfries Road through Mosquito Creek and St. Mary's Junction and in a southwesterly direction to meet the alignment described at (1) above at an interchange at Mon Desir.

The outcome of the Feasibility Study was the Final Reports on Feasibility Investigations of May 2006. It comprised four volumes: Volume 1 Engineering and Economic Feasibility; Volume 2 Environmental Feasibility; Volume 3 Potential Socio-Economic Impacts; and Volume 4 Institutional Strengthening and Maintenance.

On February 23, 2006. The Certificate of Environmental Clearance (CEC) Application for the Debe to Mon Desir highway segment was submitted by the Ministry of Works and Transport. The EMA indicated that an Environmental Impact Assessment (EIA) would be required for this development, and issued draft Terms of Reference (TOR) for the EIA. Final TOR were issued on May 25, 2006.

In August 2006 public consultations were held as part of the EIA process, and as a result of what was described in the EIA Report (June 2009) as 'intense public resistance to the preferred alignment' mainly from the Debe community, the MOWT, agreed to a more in-depth analysis of the three route alignments; a central, western and eastern alignment. Two field studies were commissioned, to obtain more site-specific information on the geotechnical characteristics of the area and the wetlands within the area.

The outcome of the analysis was the choice of the centre alignment as the preferred route, eliminating the other two on the basis that:

- The central alignment is longer than the western alignment and poses some geotechnical challenges, although it largely avoids the wetlands and has reasonable connectivity to Penal and Siparia.
- The eastern alignment is the longest, and involves significant acquisition of houses, and the western is problematic and perhaps prohibitive from a geotechnical standpoint, is associated with adverse impacts on the wetlands, and poor connectivity to Penal and Siparia.

In February 2007 four public meetings were held to present the findings of the EIA, and seek comments from stakeholders or respond to their questions. The meetings were at the:

- Fyzabad Regional Community Complex on February 08, 2007;
- San Francique Hindu School on February 10, 2007;
- Debe Community Centre, on February 13, 2007; and
- Delhi Road Community Centre on February 15, 2007.

The EIA report states that residents raised objections over the houses and lands which would need to be acquired in the Bunsee trace area and suggested an alternative alignment west of that roadway crossing the South Oropouche Wetland area and the Tennant Hills. In response to these objections the Consultant's Design Team undertook a route comparison assessment which is documented in a *Route Comparison Report* produced by Lea - Trintoplan in December 2007.

Two new alignments were reviewed with the objective of reducing the number of houses to be acquired. Alignment 1, the original alignment, and Alignment 2, one shifted slightly eastward to reduce the number of houses to be acquired along Bunsee Trace and south of the Oropouche River, were described in the Report as virtually identical in all aspects. An alignment described as “corresponding closely to the route proposed by residents” was developed and became Alignment 3 (west of Bunsee Trace crossing the South Oropouche Wetland area and the Tennant Hills).

The Route Comparison Report concluded that Alignment 2 ‘was clearly the better of the two alternatives’ and stated with respect to Alternative 3;

“There are greater environmental concerns over the potential loss of wildlife habitat, noise impacts on wildlife, pollution and risk of squatters in the wetlands with Alignment 3. The construction costs and risk of unforeseen cost increases of Alignment 3 are greater.”

In the EIA report submitted in June 2009 the MOWT states that the preferred alternative alignment of the Debe to Mon Desir segment of the SHHE ‘is based on all three of these comparisons 1998, 2006, and 2008).

This review of options undertaken in 2007 is said in the EIA report (Appendix L) “...to have delayed the completion of the EIA by almost two years”.

The original version of the EIA, dated February 13, 2009, was submitted to the EMA on February 18, 2009. By letter dated February 27, 2009, the EMA returned that EIA for revision. A meeting was held on March 26, 2009, to discuss the EMA's reasons for returning the EIA Report, and a revised EIA Report was prepared and submitted on June 26, 2009.

In the 2009 Report the overall objective of the highway expansion project as stated was;

- To improve accessibility to the Counties of Victoria and St. Patrick.

Consequential objectives given were:

- To stimulate social and economic development in the southwest region.
- To support development in the La Brea area (which is earmarked for light industrial activity) and the Point Fortin area (which currently hosts a liquefied natural gas plant).
- To encourage rural settlements by building up the area. The proposed extension will encourage new lands to open for development.

The project justification stated that the existing S.S. Erin Road was operating above the expected capacity for a 2-lane road surrounded by ribbon type development, and that existing traffic volumes would grow over time. The EIA listed the properties along the alignment that would need to be acquired.

It also noted that the Debe to Mon Desir segment of the proposed highway extension will cross a corridor housing several large-diameter high-pressure natural gas pipelines.

The projected start date of the segment was given as the third quarter of 2010 with site clearance and handover to take place from September to October, 2013.

The EIA, in Section 5.5 (page217), stated the expected benefits of the project:

General

- The proposed highway is part of a wider highway extension programme that has been designed to extend the current SHH. The proposed highway will improve accessibility to areas in southwest Trinidad (La Romain, Debe, Penal, Siparia, Fyzabad, La Brea and Point Fortin).
- It is expected that the highway will bring about social and economic development and progress in southwest Trinidad.
- There would be increase in potential for agricultural production and distribution.
- There would be increase in residential, industrial, and domestic and foreign tourism development.
- Previously small settlements would be encouraged to expand and additional areas would be opened up to built development and services.
- The increased accessibility afforded by the highway will tend to generally increase property values and so be a benefit of this project.

Construction Phase:

- Employment during site preparation and construction.

Operation Phase:

- The proposed highway will decrease the time taken to reach areas in south Trinidad by providing better roads and shorter travelling distances, as well as reducing the vehicular congestion on existing arterials.
- There would be the opening up of vistas along the route of the proposed highway.

In Section 5.5.2, a Summary Classification of Adverse Impacts was given in Table 5-4.

On October 27, 2009 the EMA issued its Review and Assessment Report (RAR) to the MOWT. On January 04, 2010 it gave an additional extension of the review period to March 2010, and issued CEC 1372/2006 on April 20, 2010.

On February 24, 2010, the Government of the Republic of Trinidad and Tobago (GORTT) issued an Invitation for Proposal stating its desire 'of improving access and mobility in the south western quadrant of the island of Trinidad, through the construction of 49.5 kilometers of a highway system originating at Golconda and ending at Point Fortin'. The highway system is identified as Package 3, one of five in the implementation of the National Highways Programme. The National Infrastructure Development Company (NIDCO) brochure describing the project states:

“As the detailed designs were completed more than five years ago (2005 - 2007) and for other pertinent reasons, a decision was made to tender the construction of the highway, utilizing the Design-Build model of procurement.”

The GORTT designated the NIDCO as the responsible agency to develop and implement the procurement and management of the design and construction services necessary to deliver the project to the satisfaction of the GORTT.

In May 2010, NIDCO engaged Engineering Consultants, AECOM to advise and support its appointed Evaluation Committee on the selection of the preferred Contractor with the best design and construction services bid. In January 2011, NIDCO appointed a Negotiation Committee to advise on the finalization of the procurement of the construction services offered in the preferred Contractor's bid, with support from AECOM. The project was described as follows;

The project comprises approximately 47 kilometres (km) of 4-lane highway and 2.5 km of 2-lane highway (excluding ramps but including connector roads) extending the SHH to Point Fortin, and it includes the following work packages:

- Phase 1 - Golconda to Debe & Dumfries Rd to Paria Suites to Godineau River;
- Phase 2 - Godineau River to Mon Desir Interchange, Penal Interchange and connector road, Siparia Interchange and connector road, and Fyzabad Interchange;
- Phase 3 - Mon Desir Interchange to Dunlop Roundabout, Point Fortin; AND
- Phase 4 - Debe to Mon Desir Interchange

On May 07, 2010, the closing date for this procurement, three proposals were submitted by 1.00 p.m. (from the 29 Request for Proposals issued)

The three entities submitting tenders were, in alphabetical order:

1. China Railway Construction Corporation Limited;
2. Construtora OAS Ltda (OAS); and
3. GLF Construction Corporation

On May 13, 2010 The NIDCO Evaluation Committee submitted its Final Report and recommended OAS as the Preferred Respondent, and so informed OAS by letter dated May 25, 2010. On October 20, 2010 the MOWI hosted a public consultation at the Debe High School to inform stakeholders of the GORTT intention to proceed with the highway project.

On November 27, 2010 a press conference was held between the then Honourable Minister of Finance, Mr. Winston Dookeran, the then Honourable Minister of Works and Transport, Mr. Austin Jack Warner, and NIDCO's President, Dr. Carson Charles to announce the construction of the Highway. Negotiations between NIDCO and OAS took place during the period from January 05, 2011 to January 14, 2011 in Port of Spain. On January 25, 2011, the Honourable Prime Minister, Kamla Persad-Bissessar turned the sod for the construction of the Highway and in February, 2011 Cabinet approved the overall project cost of the Highway: TT\$ million7,502.80

In 2011, OAS, a Brazilian company was procured, and physical construction of the Highway started in September 2011. Construction of the entire highway is scheduled to be completed in 2015.

Under the contract, OAS is fully responsible for executing the design of the entire highway on behalf of the MOWI and NIDCO who are both required to approve the designs. Accordingly, OAS has employed the consultant, HALCROW to prepare designs that satisfy the requirements of the contract. Further, design checks are carried out by the international consultant, ARUP and technical oversight of the designs and construction is being done by AECOM.

NIDCO describes the Integral Benefits of the Highway in its brochure (2012) as follows:

Construction of the proposed highway brings many benefits to the region and the country as a whole. Some of these benefits are summarized below:

- Reduction of traffic congestion afforded by an optimized design that allows for efficient flow of traffic and easy access to otherwise inaccessible areas for the transit of products, goods and services.
- Reduction in road user and life-cycle costs in the form of savings in vehicle operating costs and travel time costs due to reduced travel distances created by more direct routes and increased travel speeds.
- Provision of a safe, efficient, affordable, and aesthetically pleasing highway for all citizens.

- Provision of improved access to Siparia, La Brea and Point Fortin to accommodate the anticipated economic growth. It should be noted that Government has proposed the southwest region as an economic Growth Pole in the Medium- Term Policy Framework 2011-2014 (MTPF).
- Improvement of the local road network in the southwest region, increasing connectivity to the main population centers such as Debe, Penal, Siparia, Fyzabad, La Brea and Point Fortin.
- Efficient movement of goods to/from ports within the Gulf of Paria.
- The highway will promote a host of downstream industries poised to stimulate the transportation industry, service contractors, and small entrepreneurs who provide food and other ancillary products.
- Construction of the highway will increase the demand for skilled and unskilled labour resources, thus potentially resulting in a decrease in unemployment levels and increase in income levels. It should be noted that the Contractor (OAS) must utilize a minimum of 40% local inputs which include skilled and unskilled labour as well as materials, equipment, and suppliers.
- Additionally, there will be transfer of technology to the local construction industry

The Ministry of Works and Infrastructure NIDCO Comprehensive Land Transportation Programme: San Fernando to Point Fortin Highway (MOWI/NIDCO brochure) 2012.

Description of the Project

The project involves the construction of a 4-lane divided highway to international freeway standards, and comprising several segments of length totaling 47 km of 4-lane highway and 2.5 km of 2-lane high-way (excluding ramps but including connector roads). The highway has been planned to free-way standards with a design speed of 110 km/hr (70 mph). Other features include:

- Golconda Interchange
- Debe Interchange
- Penal Interchange
- Siparia Interchange
- Fyzabad Interchange
- Mon Desir Interchange
- St. Mary's Interchange
- La Brea Interchange
- Underpasses
- Overpasses
- Bridges
- Utility corridors
- Golconda to Debe

Approximately 5km segment of new 4-lane highway begins at the southern end of the Solomon Hochoy Highway at Golconda and ends at the Debe Interchange.

- Debe to San Francique Road

Approximately 6km section of new 4-lane highway begins at the new Debe Interchange and ends at the San Francique Overpass.

- San Francique Road to Fyzabad Interchange approximately 6.3 km section of new 4-lane highway begins at the San Francique Overpass and ends at the Fyzabad Interchange.
- Fyzabad Interchange to La Brea Connector (Includes Mon Desir Interchange)
Approximately 10km section of new 4-lane highway begins at the Fyzabad Interchange and ends at the La Brea Interchange.
- La Brea Connector to Dunlop Roundabout
Approximately 6 km section of new 4-lane highway beginning at the La Brea Interchange and ending at the existing Dunlop Roundabout
- Dumfries Road to Paria Suites
Heading southwest from San Fernando, a 3.1 kilometre section of the existing South Trunk Road (an existing 2-lane highway), is to be widened to 4 lanes.
- Paria Suites to St. Mary's Junction
The road, a length of approximately 5 kilometres is to be widened from two to four lanes with provision for widening to (6) six lanes.
- St. Mary's Junction to Mon Desir Interchange (Delhi Road)
This 3.7 km section of new 4-lane highway begins after St. Mary's Junction and ends at Mon Desir interchange. `

The document indicates that "Site access will be provided to the contractor in three phases:"

- Phase I** Golconda to Debe and Dumfries Road through Paria Suites to Godineau River
- Phase II** Godineau River to Mon Desir Interchange; Penal Interchange and Connector Road; Siparia Interchange and Connector Road; Fyzabad Interchange and Connectors
- Phase III** Mon Desir Interchange to Dunlop Roundabout, Point Fortin and Debe to Mon Desir Interchange

Project Rationale

The socio-economic development of the South West Region has been identified by the GORTT in the MTPF as one of the major growth poles. The project is a key component of this development as it will:

1. Support industrial and agricultural development
2. Increase employment and income levels all to the benefit of the regional population and the national economy.
3. Improve the road network in the South West Region,
4. Provide connectivity to the main population centres such as Debe, Penal, Siparia, Fyzabad and Point Fortin.

METHODOLOGY

Upon the agreement of the various parties to establish an independent Highway Review Committee, the JCC approached the Chairman designate to discuss the parameters of the assignment. The TOR of the work of the committee was agreed as follows:

1. Review all technical reports/data and information of relevance to the project, and the Debe/Mon Desir segment in particular.
2. Invite written and oral submissions of the principal parties including the executing agency - National Infrastructure Development Co. (NIDCO); the HRC and other stakeholders.
3. Ascertain the veracity of technical issues raised by the respective parties and the consequences/impacts in respect of the Mon Desir to Debe segment, keeping in mind related international best practice.
4. Make specific recommendations in the public-interest.
5. Outline proposals that could be of benefit to the project in social, environmental and economic terms.
6. Based on the findings, outline recommendations which could inform the process for development projects of this magnitude in the future.

The Chairman was required, with the support of the Joint Consultative Council for the Construction Industry (JCC), to identify a number of consultants to initiate the process to address the inter-sectoral tasks. While all the disciplines were available locally, it was felt that the input of experts in the relevant areas who were somewhat more removed from the situation and not as exposed to the extensive media coverage of the matter, should be sourced. Consequently, three consultants were engaged, one each from Barbados and Jamaica, and a Trinidad and Tobago national who resides in the USA. These persons were assigned discrete tasks but were also required to provide specialised technical backstopping to the Chairman and to comment from time to time on selected aspects of deliverables by local consultants.

Following its initial meeting on December 20, 2012 the consultants undertook a desk review of documentation provided by the relevant agencies and other bodies as indicated in Appendix 3. Members of the Committee toured the proposed highway alignment and surrounding areas from the air and also traversed the communities by land transport, on occasion meeting with residents of the affected areas.

Various meetings were held with representatives of NIDCO and the HRM. The Chairman and Councillors of the Penal/Debe Regional Corporation also requested an opportunity to make a presentation to the Committee and were received accordingly. The public was also invited to make submissions via the public media. The schedule of these meetings is also listed in Appendix 3.

Records of all proceedings and documentation will be lodged with the JCC for any future reference.

II. REVIEW AND CRITICAL ANALYSIS OF THE ISSUES

1.0 URBAN REGIONAL PLANNING

1.1 Introduction and Background

The Terms of Reference (TOR) for the Senior Urban-Regional Planner Consultant on the Committee for Review of the Extension of the Solomon Hochoy Highway (SHH) requires the examination and review of the land use and spatial development issues associated with the proposal for the Debe to Mon Desir segment of the extension of the highway to Point Fortin.

The Consultant is required to, *inter alia*:

- Review the TOR for the Environmental Impact Assessment (EIA) as prescribed by the Environmental Management Authority (EMA), as well as the resulting EIA, to glean an appreciation of the spatial development implications of the proposed Highway extension, within the context of National Human Settlements Development;
- Review the National Physical Development Plan of 1984 (NPDP) which, although dated, would still have implications in relation to the earlier decision to extend the SHH;
- Review the relevant municipal level Regional Plans for implications/consistency with ongoing/proposed spatial development projects;
- Review implications of the resettlement requirements resulting from the current alignment of the Highway extension, with consideration of any alternative, and land use implications thereto; and
- Ascertain the compliance of ongoing/proposed land use, including the resettlement schemes, with statutory requirements.

The work required an appreciation of transportation needs of Trinidad and Tobago in general, and of the south west of Trinidad in particular, and an understanding of the connection between land use planning and transportation planning that would allow for an assessment of the positions being advanced by the various parties, *viz.*, the proponents of the highway, mainly the Ministry of Works and Transport (MOWT) and the NIDCO on the one hand; and the Highway Reroute Movement (HRM) on the other.

The Debe to Mon Desir segment of the highway is planned to run southward a distance of 4,050 metres (m) from the intersection of the M2 Ring Road and San Fernando Siparia Erin Road (S.S.Erin Road) in the Debe area to the San Francique Road area, and then a further 11,100 m westwards through the Thick and Pluck areas, terminating in the Mon Desir area.

According to the document titled *Highway Extension to Point Fortin: Debe to Mon Desir (Environmental Impact Assessment, Volume 1: Text (Revision 1))*, hereinafter referred to as the EIA, and other documents related to the project, the right of way (ROW) was planned to be 100 m wide³, the area considered to be the study area for the purposes of determining the impact on land use (Table 4-1). Approximately 44m of this will be occupied by a four-lane dual carriageway, the remainder to be reserved for future expansion and possible utility corridors (4.1.1).

³ The National Infrastructure and Development Company Limited has, at a meeting held with the Committee on January 08, 2013, indicated that it is proposed to reserve a ROW 60 metres in width.

The development includes interchanges at Debe, Penal, Siparia and Fyzabad; overpasses at five locations including San Francique Road, Siparia Road, and Fyzabad Road; a number of frontage roads; and two connector roads – the Penal Connector Road, and the Siparia Connector Road. It will require the acquisition of 150 dwelling houses (27 in Debe, 42 in Penal, 31 in San Francique, 35 in Fyzabad, and 15 in Delhi Settlement); 13 businesses (two in Debe, three in Penal, three in San Francique, four in Fyzabad, and one in Delhi Settlement); a church; and a mosque. A total of 119 agricultural parcels ranging in area from one acre to 137 acres, and five parcels of State-owned land are also earmarked for acquisition to make way for the highway segment (3.3.1.2).

Three alternative alignments were studied for the segment. Factors considered in comparing the options and determining the final alignment were: geotechnical characteristics, the impact on wetland systems in the area, the number of residential buildings that would be affected, the length of the route, and connectivity to the towns of Penal and Siparia.

1.1.1 The Ministry of Works and Transport (MOWT) /National Infrastructure and Development Company (NIDCO) Position

The justification given for extension of the highway relates to the fact that the S. S. Erin Road is considered to be operating above capacity and that, with projected increases in traffic volumes, the situation would be exacerbated.

The overall objective of the project, as stated in the EIA and other relevant reports is to “improve accessibility to the Counties of Victoria and St. Patrick.” Consequential objectives indicated are:

- To stimulate social and economic development in the south west region;
- To support development in the La Brea and Point Fortin areas; and
- To encourage rural settlements by building up the area, the proposed extension encouraging the opening up of new lands for development.”

The highway is expected to bring about:

- An increase in potential for agricultural production and distribution;
- Increase in residential, industrial, and domestic and foreign tourism development;
- An expansion in small settlements and opening up of additional areas to built development and services; and
- General increase in property values due to the increased accessibility afforded by the highway.

1.1.2 The Highway Reroute Movement Position

Following are the land use and spatial development issues raised by the HRM as outlined in affidavit filed in the Supreme Court of Trinidad and Tobago by Dr. Wayne Kublalsingh on August 03, 2012 and enunciated in other documents submitted by the HRM:

- Thousands of acres of agricultural land would be destroyed including land used for domestic-scale agriculture that is practiced in most homes in the area;
- Thirteen communities would be split by the proposed alignment;
- Hundreds of buildings including homes, schools, and businesses would be demolished; and
- Urban sprawl would take place in the Fyzabad, Siparia, Penal and Debe areas.

Alternatives put forward by the HRM as indicated in Dr. Kublalsingh's affidavit include:

- Developing a highway link from Paria Suites in the west to Golconda in the east across vacant "Caroni lands";
- Utilising old "Caroni" roads and other ROWs to add to the system;
- Repairing and widening certain roads in the network;
- Building roads around town centres to increase accessibility; and
- Improving the national transport system for maximum efficiency.

1.2 Review of the Environmental Impact Assessment (EIA)

1.2.1 Review of the Terms of Reference for the EIA

Section 1.1 of the TOR stipulates that "the proposed highway alignment needs to be considered in the context of the land use policy for the area, the nature and sensitivity of the areas, the developmental initiatives scheduled for the area, as well as the potential to open up Green-field areas to subsequent development". This indicates that the EMA required the proponents of the project to take account of the relationship between spatial planning and transportation planning.

At 2.1, the EMA required a determination of the area of study "by the extent of direct and indirect impacts on the environments.....during site preparation and construction". It might not have been clear that impacts anticipated during the operation stage of the project were required to be addressed. Apart from this, the TOR properly covers the issues that needed to be studied as part of the process of assessing the impacts of the proposed highway.

1.2.2 Review of the Environmental Impact Assessment (EIA) Report

The following first considers the response of the EMA to the EIA as conveyed in the *Review and Assessment Report (MOWT Environmental Health and Safety Unit - EIA for the Establishment of a Highway Alignment from Debe to Mon Desir (CEC 1372/2006), Response to Review and Assessment Report)* and the response of the proponents to that review, since a number of this consultant's observations concur with those of the EMA. Other comments not made by the EMA are indicated next.

(a) Settlement of Displaced Persons

EMA Comment

“The EIA report did not provide any possible areas where displaced landowners may resettle or any other arrangements for individuals, households, businesses and farmers displaced by the ROW.”

MOWT Response

“Relocation issues are addressed in Appendix S. More details than provided are simply not available at the EIA stage and will not be available until much later in the acquisition process.”

Consultant's Comment

Some details regarding alternative accommodation for displaced persons should have been provided at this point as the MOWT should have been sufficiently mindful of the social impacts of the project to have this information to present to stakeholders at the mandatory consultations. Section 2.7.5 of the TOR requested a “.....resettlement action plan addressing the social and economic issues arising from the need to relocate occupants.....”, and included a stipulation for the identification of resettlement sites. It is noted that other terms and conditions outlined at iii (c) of the CEC include a requirement for the applicant to develop and submit a resident relocation and resettlement plan to the EMA not less than one month prior to the start of works. The CEC also stipulates, at (iii)(e), that “the applicant should pursue, where applicable, resident relocation and resettlement utilising best industry practices, such as the World Bank operational policy on involuntary resettlement, operational policy 4.12”.

(b) Analysis of Alternatives to the Proposed Project

EMA Comment

“The report does not properly assess the ‘no action’ alternative. No comparison of impacts was provided. Furthermore, the justification for the project should be contextualised in the context of a feasibility study regarding the transportation needs of the south western region of the island of Trinidad.”

MOWT Response

“A Feasibility Study of the transport needs in the south western region was not within the scope of the project. We also disagree with the request for a detailed comparison of impacts relative to the ‘no-action’ alternative.”

Consultant’s Comment

The TOR required the proponents to identify and compare alternatives that could achieve the same objectives (that is, improving accessibility to the south west of Trinidad; stimulating social and economic development in the region; supporting development in the La Brea and Point Fortin areas; and encouraging rural settlements by facilitating the opening up of new lands for development). This is critical to the proper evaluation of the need for a highway of the level proposed, and the land use impacts of inaction needed to have been explored with reference, for example, to the imbalance of the physical development of the country in favour of the north and west of Trinidad.

(c) **Mapping**

EMA Comment

“The study area for the socio-cultural survey should have been mapped, providing details on the residences, agricultural lands and businesses to be acquired.”

MOWT Response

“This information is already provided in Appendix S. Maps in that appendix show all properties to be acquired and tables summarise the areas.....”

Consultant’s Comment

What is provided in Appendix S is cadastral mapping with the alignment superimposed thereon. This Consultant is of the view that what was required was detailed land use information relating to all of the buildings in the path of the alignment. A land use survey should have been undertaken to determine the exact location of the properties to be acquired and the use to which each one is put, and the results of the survey mapped and submitted with the EIA.

Other Comments of the Consultant

The TOR, at 2.1, specified that the study area should also identify adjacent and proposed developments in south west Trinidad, industrial developments in particular, that could influence the project. There are two large projects, *viz.*, the Union Industrial Estate and Port at Brighton, and the La Brea Industrial Estate and Port⁴ which are both shown on the map at Figure 4.13 of the EIA but for which no other information is given. These are

⁴ Union Industrial Estate and the Port at Brighton is situated on approximately 400 hectares of land, and will cater for a mix of heavy and light downstream gas-based industries. La Brea Industrial Estate and Port managed by the National Energy Corporation of Trinidad and Tobago (NEC) through the La Brea Industrial Development Company (LABIDCO) is comprised of 162 hectares of fully developed land subdivided into 58 serviceable lots and will cater for a mix of heavy and light downstream gas-based industries. (www.nec.co.tt).

quite significant for their employment-generating potential and for the impact which the highway might have on their sustainability, and needed to have been examined and discussed in some detail.

Section 2.5 of the TOR required the proponents to undertake a review of the activities (existing or proposed) in the wider area of study, and to determine the potential cumulative impacts of these activities, including any that might stem from “.....the opening up of Green-field areas to development.” The EIA, at 5.4.3.1.1, does identify the potential for land use conflict during the operation phase of the proposed highway which the proponents expect would make the areas more attractive for development for residential, commercial, and industrial purposes, and tend to “.... increase pressure for conversion of agricultural lands to built development (induced development). However, some attempt should have been made to project or to predict in more detail the impact which the proposed highway would have on the landscape of the south western peninsula. This consultant suggests that the improved accessibility would increase the potential for development in the area, but that other factors including economic growth; and the provision of infrastructure, in particular drainage infrastructure to mitigate the flooding problem experienced in the area (and that the HRM fears may be exacerbated by the highway), would also influence the impact that the new highway might have. Outside of the immediate area of impact, the Petroleum Company of Trinidad and Tobago Limited (PETROTRIN) has large land holdings in the Point Fortin area which could become attractive for development and which would make a significant change to the economic fortunes of the region.

With respect to what is referred to as ‘authorised development’⁵ the EIA recognises that, if unmitigated, the potential impact may be extreme, major in intensity, and long term in duration. The suggestion that the adverse impacts could be mitigated by the preparation of a plan and the determination of development proposals in accordance with such a document, and in accordance with the mandates of the relevant agencies, is simplistic and unrealistic given the history of enforcement against unauthorised development in Trinidad and Tobago.

The acquisition by the State of the large acreages proposed would appear to encourage squatting, which is treated at section 5.4.3.1.2, particularly given the approach of the state through the NIDCO of making *ex gratia* payments to squatters who are to be removed from the path of the highway.

Section 5.4.3.2 attempts to address one of the areas of greatest concern to the HRM, that is, the reality that the proposed highway would split settlements at Ghandi Village, Suchit Trace, Tulsa Trace, San Francique Road, Siparia Road, and Fyzabad Road, disrupting community networks forged over generations; would separate children from schools, and

⁵ Reference should be made to development on legally owned, as opposed to illegally occupied, land. Development is not ‘authorised’ unless it has been granted Planning Permission by the TCPD on behalf of the Minister under the TCP Act.

communities from recreational and religious facilities; and would separate a number of agricultural holdings from the residences of the farmers. It is difficult to determine the efficacy of the proposed mitigation measures, that is, the construction of interchanges and overpasses at the affected locations.

1.3 Review of Relevant Planning Instruments

The intention to improve road connectivity between the Capital Region and the south west of Trinidad as far as Point Fortin is reflected in all spatial or physical development plans prepared by the Town and Country Planning Division (TCPD) dating back to 1974, including the NPDP. These documents are reviewed in the following section.

1.3.1 Planning for Development: The South West Region

This plan was prepared in 1974 to cover the south western peninsula of Trinidad including the entire area of direct impact of the proposed Debe to Mon Desir highway segment.

The goals based on which the plan was formulated include the provision of “.....the best possible accessibility for the movement of people and goods to, from, and within the region; and the development of a pattern of identifiable urban and rural communities functionally related to one another and to the needs of people.”

Proposals in the plan include the development of a “.....transportation network in the region to provide a more efficient service between districts inside and outside of the region.” The plan recommended the extension of the SHH to link Point Fortin and Siparia with San Fernando and other points to the north; and the provision and/or upgrading of rural access roads through key agricultural areas. The view was expressed that the capital costs of this project should be measured against the benefits to be derived in the form of shorter travel times and distances between the Capital Region and St. Patrick; industrial development carded for the region; and the opening up of new lands for development in the Siparia, Fyzabad, and Point Fortin areas.

It was also recommended that improvements be effected to the road network in the region as the “basis of a more efficient system of bus routes and a more reliable public transport service.”

1.3.2 The National Physical Development Plan Trinidad and Tobago (NPDP)

Land use planning in Trinidad and Tobago is guided by the Town and Country Planning Act, Chapter 35:01 (the Act) which was proclaimed in August 1969. Part II, Section 5 of the Act requires the Minister (with responsibility for town and country planning) to prepare and to submit for the approval of Parliament a development plan indicating the manner in which it is proposed to utilise the land space of Trinidad and Tobago. The NPDP was prepared in accordance with this

Part, and was approved by Parliament in 1984. It is the only statutory guide to the use and development of land in the country.

The following are among the objectives on which the Plan is based (Volume 1):

- The stimulation of agricultural productivity and production....;
- The effective improvement of the networks and systems of transportation....to raise the level of accessibility.....;
- The reduction of disparities in income, employment opportunities, etc., between and within geographical areas; and
- The improvement in the standard of living in rural areas.

Section 6.5 of the Survey portion of the Plan lists problems associated with internal transportation to include:

- High levels of congestion in the major urban areas caused, *inter alia*, by the patterns of ribbon development along major arterials together with a high proportion of secondary and direct access points; and absence of alternative routes to destinations;
- Major deficiencies in the mass transportation system including inadequate service in rural areas; and
- The poor condition of many segments of major roads.

Among measures suggested to assist in relieving traffic congestion were:

- Promoting closer relationship between residences and employment opportunities, schools and retail centres, in order to reduce the incidence of commuting;
- Making mass public transportation an attractive alternative for commuters;
- Developing a more effective system for the maintenance of major roads;
- Limiting ribbon development along main roads;
- Developing and upgrading rural access roads; and
- Promoting rational land use decisions which bear in mind such considerations as traffic generation.

Plan proposals included the development of a major growth centre at Point Fortin, and the implementation of “.....strong land use controls particularly with respect to agriculture and conservation areas – the most suitable agricultural lands in parts of the Oropouche lagoon, for example, being designated green belts for agricultural use (18.5).” The settlement system proposed involved the establishment of Sub-regional centres at Point Fortin and Siparia and a District centre at Penal (19.3).

Transportation proposals in the Plan (Section 23.8) were intended to, *inter alia*, “.....provide adequately for present and future traffic demands in order to achieve an improved level of accessibility; and provide for better land development.” The need was stressed for “.....a national transportation plan which would analyse transport demand in the context of the NPDP and detail transportation proposals for implementation and phasing: over the ensuing 20 years. The Plan

also recommended the establishment of a limited number of new major routes, one of the most important of which was a link from San Fernando to Point Fortin in the form of an extension of the SHH (Figure 1.1).

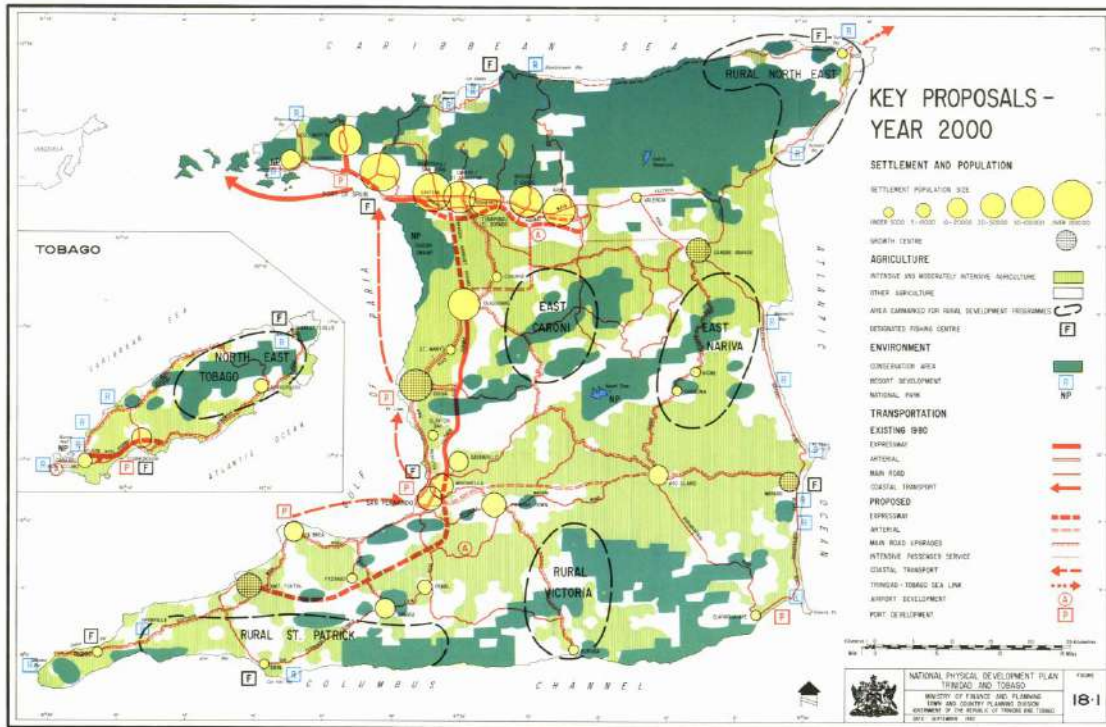


Figure 1.1: National Physical Development Plan, Proposals Map

Source: *National Physical Development Plan, Volume I.*

It was also recommended that ribbon development along key access roads be controlled, and that alternative means of transportation for people and goods, such as rail transportation, be investigated.

Although outdated, the NPDP is generally used as the basis of policy applied by the TCPD. It has also been indicated as the framework for regional level plans for the municipalities of Siparia and Penal/Debe, and the Borough of Point Fortin, the relevant sections of which are covered in the following section. These Plans have been accepted by the Cabinet of the Government of Trinidad and Tobago and are being used by the relevant Corporations as a guide to the determination of projects for implementation.

1.3.3 Review of the Relevant Municipal Level Plans

1.3.3.1 Siparia Final Draft Municipal Development Plan

Most of the area through which the Debe to Mon Desir segment is routed falls within the municipality of Siparia for which the *Siparia Final Draft Municipal Development Plan* (the Siparia Plan) was prepared for the Ministry of Local Government in 2009-2010.

The planners noted that the major road networks such as the S.S. Erin Road and Siparia Road are in need of repair, upgrading and, in some instances, re-alignment.

The SWOT analysis undertaken during the survey phase of the planning exercise identified a number of weaknesses including insufficient room for improvement along major road networks, and remoteness from main centres; and opportunities such as the potential for the creation of linkages to the outer lying regions of the South, and heavy industrial development at Union at La Brea estates and Brighton Port.

Among the strategic objectives listed as informing the plan proposals was improvement in the region's accessibility (inter-regional transport and intra-regional mobility) through, *inter alia*, the provision of highway access from San Fernando; integration of land use and transportation systems for efficient access to services and facilities; and promotion of the use of public transport over private vehicles in order to reduce congestion.

One of the priorities listed with respect to transportation was the proposed highway to Point Fortin which was considered as important in providing easy highway access which is critical to the development of the region. The planners recommended that the Siparia Corporation promote the early implementation of the highway project.

The Plan projects that the La Brea Industrial Estate and Port and the Union Industrial Estate and Port at Brighton would create employment opportunities throughout the region, and act as stimuli to development in the areas around the Siparia and Fyzabad interchanges and at locations at which the new road connections are opened.

1.3.3.2 Penal/Debe Regional Corporation Final Draft Municipal Development Plan

One of the objectives of the Penal/Debe Plan is to "Improve the Region's accessibility and inter-connectivity."

Issues listed in the *Supplementary Report of the Situational Report 1* as requiring attention in the Penal/Debe municipality relate to the decline of the agricultural sector and the need to encourage the participation of farmers; and the necessity for more effective development control to avoid the loss of valuable agricultural lands to housing and other forms of built development.

Weaknesses listed in the SWOT analysis conducted for the plan exercise include the deterioration of roads; unplanned housing developments; and traffic congestion and lack of parking facilities in Debe and Penal. Opportunities were seen in the potential for the revitalisation of the agricultural sector including downstream agri-businesses, while threats identified relate to "urban sprawl" and lack of sufficient control over squatting.

The proposed highway extension project was considered as being important in the efforts to improve accessibility in the region for the links that it would effect between Debe, San Francique Road, and subsequently to Fyzabad, La Brea and Point Fortin. The planners indicated that the proposed highway had partly formed the basis of “.....the preferred development scenario which promotes economic opportunity through this planned development corridor.”

Since the Plan was prepared a decision was taken by the Government to establish the University of the West Indies Law Campus at Debe. Subsequent planning exercises would need to determine, and plan for, the spin-off effects of this development.

1.3.3.3 Point Fortin Plan

Although no portion of the Debe to Mon Desir segment of the highway falls within the Borough of Point Fortin, it is useful to review the plan that was prepared for the jurisdiction, given that it is the terminus of the proposed highway and the location of land use activities that would generate opportunities for growth in the overall region.

The objective for transportation is to improve the accessibility and permeability of the Borough based on a policy of “.....establishing a transportation system complementary to the land use system and offering safe, convenient and effective access to and within the Borough.” As is to be expected, the proposed Golconda to Point Fortin highway is included among the main transportation features of the plan.

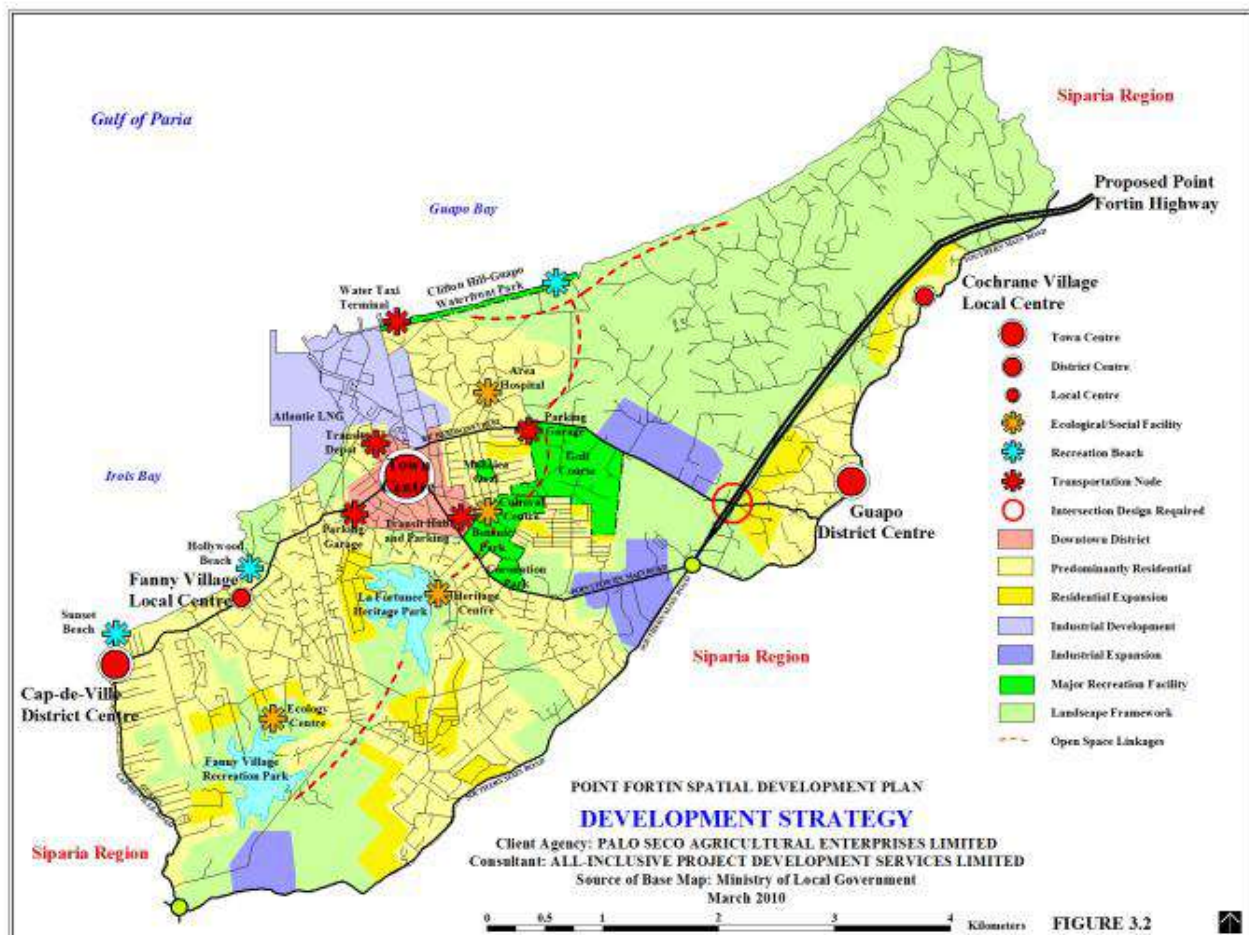


Figure 1.2: Point Fortin Development Strategy

Source: Point F

With respect to economic activity, the objective is to “attract investment projects and business enterprises that will generate meaningful and secure jobs at appropriate locations in the Borough” with the emphasis on “.....downstream industries linked to the proposed major industrial development at La Brea and Union Estates.”

1.3.4 The National Spatial Development Strategy

A new NPDP is currently being developed in the form of a National Spatial Development Strategy (NSDS) which is intended to “.....articulate a more strategic approach to the integration of national socio-economic and spatial goals towards the sustainable development of the human and physical” resources of the country. The NSDS is intended to take account of a Growth Pole Development Strategy which has been enunciated by the Government in the *Medium Term Policy Framework 2011-2014*, and which seeks to stimulate development and decentralise economic activity in five areas of the country including the South Western Peninsula of Trinidad. The

Request for Proposals for the development of the strategy specifies a Civil Engineer/Transportation Planner as one of the core professionals, reflecting an understanding of the imperative of incorporating transportation issues into spatial planning. The Minister of Planning and Sustainable Development has indicated that once the Strategy has been completed work will be started towards the revision of the municipal level plans.

1.4 Implications of Re-Settlement Requirements

The *NIDCO Report on the Debe to Mon Desir Segment* dated June 2012 refers, on page 9, to land to be given to displaced persons at a “new development at Petit Morne” to “build a new community”; the possibility of accommodating some persons “within small village expansion projects to be developed by NIDCO in other areas”; and the intention to allocate two-acre plots to affected farmers.

Further information provided by NIDCO indicates the location of the Petit Morne site (Figure 1.3). The displaced farmers are to be granted plots on a site at Golconda shown in Figure 1.4. It is noted that the displaced residents currently occupy plots that are almost all significantly larger than 10,000 square feet, many in excess of one-half acre (EIA Appendix S). According to the HRM most of these parcels accommodate a kitchen garden. It can be expected that there are also instances of poultry and livestock rearing as is the practice in many rural areas in Trinidad and Tobago.

PETITE MORNE DEVELOPMENT



10° 15' 34.97" N



DATE: 07th DECEMBER 2012.

PREPARED BY: NIDCO - ENGINEERING AND PROGRAMME MANAGEMENT DEPT.

Figure 1.3: Location of land at Petit Morne
Source: NIDCO

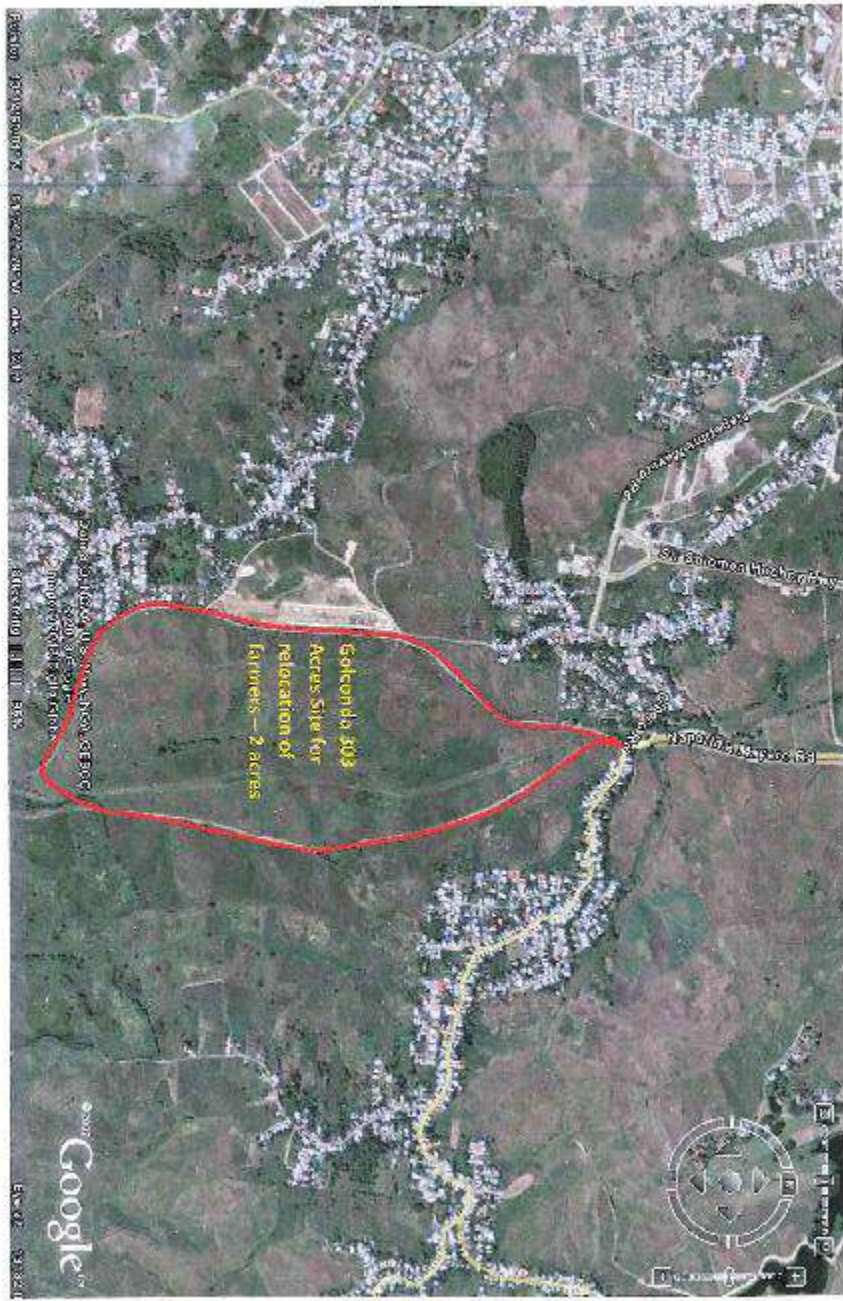


Figure 1.4: Location of land at Golconda
Source: NIDCO

A more reasonable alternative to the Petit Morne type concept would be for suitable land to be identified and developed for village expansion on the fringes of existing settlements, or to the rear of ribbon development, to accommodate persons who need to be moved to make way for the highway.

1.5 Statutory Requirements

Part III of the TCP Act, which relates to the control of development of land, stipulates that permission is required for any development that is carried out after the commencement of the Act, development being defined to include the carrying out of building or engineering operations in, on, over or under any land; the making of any material change in the use of any land; and the subdivision of any land.

1.5.1 Requirements relating to the Proposed Highway

Full Planning Permission is required for new road construction that is not within the operational land of the statutory undertaker, that is, the MOWT. Hence, the two submissions described in the following were made to the TCPD by the MOWT and determined as indicated.

- (i) Application **T7M:0440/2007** – this submission was made on March 05, 2007 for Planning Permission (PP) for the development of 160 hectares of land for “Transportation purposes” including the subdivision of the land, stated as being then used for “abandoned and active agriculture; minor forestry; oil fields; some residential and commercial”. The existing use of the land was indicated as being “one hundred and fifty houses and thirteen commercial structures...” and it was indicated that these buildings were to be demolished. Whereas the location of the land was given as “Debe – Mon Desir” and the alignment shown on what appears to be a location drawing is the entire alignment of the segment under review, all of the other drawings attached to the application show only the stretch from the intersection of the M2 Ring Road and the S.S.Erin Road in the Debe area to the proposed Fyzabad Interchange.

The application was determined following the grant of the CEC (CEC1372/2006) by the EMA. PP was granted by *Notice of Grant of Permission to Develop Land Subject to Conditions* (notice of PP) dated May 19, 2010 for “.....the subdivision of land for the creation of several parcels together comprising 160.0 hectares and the amalgamation of those parcels and for the construction of the extension to the Solomon Hochoy Highway.....” One of the conditions attached to the PP was that the consent of the Local Authority be obtained prior to the commencement of development in accordance with the requirements of the Municipal Corporation Act (1990).

Application **T7M:0443/2007** was submitted on March 05, 2007. The submission was not available for inspection as the TCPD is currently unable to locate the documents. However, the notice of PP was provided by the NIDCO and the TCPD, and this document indicates that the permission was granted, by notice of PP dated March 12, 2009 for “.....the development of land situated between St. Mary’s Village South Oropouche to Mon Desir-Delhi Road

Fyzabad and to Dunlop Roundabout Point Fortin and of an unspecified area by the subdivision of land for the creation of several parcels together comprising 100 ha and the amalgamation of those parcels and for the construction of the extension of the Solomon Hochoy Highway for transport purposes in accordance with the proposals set out in your applicationsubmitted 2007.03.05.....” The permission was also conditioned upon the consent of the Local Authority under the Municipal Corporation Act (1990).

- (ii) Drawings seen at the offices of the MOWT on January 31, 2013 show that this submission included the stretch of the (Debe to Mon Desir) segment that runs from the Fyzabad Interchange to Mon Desir, and which forms part of the alignment for which CEC1372/2006 was granted on April 20, 2010. It should be noted, therefore, that PP was granted before the CEC was obtained, whereas the CEC Rules stipulate that PP cannot be granted until a CEC is obtained from the EMA.

1.5.2 Requirements relating to the Resettlement Sites

Full Planning Permission is also required to be obtained for the sites for the proposed resettlement of the persons to be displaced from their residences and/or agricultural plots. With respect to the residential development, it is assumed that serviced sites are to be allocated, in which case the application would need to be for permission to subdivide land and install infrastructure in the form of roads, drains, and water and sewerage facilities, and would require the prior approval of the relevant agencies, *viz.*, the relevant Municipal Corporation, the Division of Drainage, and the Water and Sewerage Authority. This process is also applicable to the agricultural sites.

Investigations reveal that an application referenced T7K:3216/2009 was submitted to the TCPD on December 24, 2009 for outline PP for the development of a site of 193.3836 hectares at M2 Ring Road and Manahambre Road, Petit Morne, St. Madeline for residential purposes. Outline PP was granted by letter dated June 15, 2010 with a condition that the permission “.... shall lapse and become null and void unless the particulars and plans.....are submittedwithin one (1) year from the date of this Outline Permission.” Verbal communication from the TCPD indicates that no particulars and plans were submitted pursuant to the grant of the outline PP, so that there is currently no permission for these lands to be developed. Site visit on January 13, 2013 revealed that engineering operations are underway on land at Petit Morne, but the exact location of the area earmarked for the relocation of displaced persons could not be determined.

It should be noted that where land to be developed is in excess of two hectares the CEC Rules, 2001 requires that a CEC be obtained, and that the relevant application must be made to the TCPD. In accordance with the provisions of the legislation a CEC must be obtained before PP can be granted by the Minister under the TCP Act. In this case, outline PP was granted in contravention of this law.

The process involved in allocating sites in this development to persons displaced by the proposed Debe to Mon Desir Highway is therefore likely to be a lengthy one. Even after a CEC is obtained

and all of the other statutory requirements (including the grant of PP) are met the TCPD would require that all infrastructural facilities are completed to the satisfaction of the competent authorities before applications for PP to develop individual plots are entertained.

Investigations reveal that PP has not yet been sought for the development of the Golconda site for agricultural purposes.

1.5.3 Relationship between the TCP Act and the Land Acquisition Act

The requirements of part III of the TCP Act are relevant to the issue of compensation for persons whose properties are to be acquired under the Land Acquisition (LA) Act, Chapter 58:01. In establishing the value of land, the LA Act specifically excludes the consideration of unapproved use and the consideration of illegal development as a means of increasing property value, account being taken only of the lawful existing use of the land and the value attributable to any PPs granted and in force. In this regard it is noted, on site inspection, that a large number of buildings pointed out as affected by the alignment do not appear to meet site development standards enforced by the TCPD and might not have been granted Planning Permission. For example the 25-foot building setback distance required to be observed from major roads, such as the S. S. Erin Road, and that is intended to allow for future road improvements, is more often breached than observed.

1.6 Conclusions and Recommendations

The planning of the proposed Debe to Mon Desir segment of the extension of the SHH highway needed to have been undertaken as part of a comprehensive plan that seeks to balance the land use and transportation needs of south west Trinidad, and to do so with a minimum of disruption of human communities.

Given the limited land space that is available in Trinidad and Tobago, and the large land-take associated with road infrastructure such as highways and interchanges, land that could be more efficiently utilised for other productive purposes, the Planners need to come up with mechanisms and approaches that would effectively address long-term congestion problems and provide the accessibility that is needed to improve connections between the various areas of the country without severely impacting the lives of the people.

The NSDS and planning exercises that are to follow would need to incorporate these considerations and seek out solutions that must involve addressing employment/housing mismatches, and establishing various modes of travel and improved public transportation facilities that would serve to reduce the need for highway expansion.

2.0 ENVIRONMENT

2.1 Objectives

This report was created in response to Terms of Reference issued by the Chairman of the Highway Review Committee (HRC) for a review of the environmental aspects as they pertain to the proposed segment of the Solomon Hochoy Highway Extension (SHHE) from Debe to Mon Desir. The objectives of the review are as follows:

- To determine whether the procedural requirements for granting of Certificate of Environmental Clearance for this Project were carried out in accordance with the provisions of the Environmental Management Act 2000 and the Certificate of Environmental Clearance (CEC); including the CEC Rules (2001), the CEC (Designated Activities) Order and the CEC (Fees and Charges) Regulations (all 2001)
- To determine whether the substantive content of the environmental studies done, their review and assessment, and related decision-making were in keeping with Acceptable Practice and whether enough satisfactory environmental information had been provided to allow for a properly informed decision to have been made with regard to granting the CEC
- To determine the validity of the concerns brought forward by representatives of the Highway Reroute Movement (HRM)

2.2. Approach

The task of undertaking the review included a number of interdisciplinary meetings amongst the members of the Highway Review Committee to discuss all issues at hand.

Additionally, meetings were held with NIDCO whose role is to project manage the establishment of the Highway and with the HRM, the group which has sought the cessation of the Highway. This was done in order to obtain a full understanding of the dispute. A detailed review of all relevant documentation was carried out, including the Environmental Impact Assessment submitted in accordance with the CEC application, along with other supplementary submissions in support of the application. Further, the Administrative Record, lodged at the information centre of the EMA was reviewed in order to glean a proper understanding of the application process for the Project.

While undertaking the review, the main areas of concern brought forward by the HRM, as well as those presented by their Environmental Specialist were examined. The issues raised by the latter were as follows:

- A poorly defined Study Area within the
- The EIA ignoring the importance of the Oropouche Lagoon as one of the country's most significant wetlands and its use in the context of the National Wetlands Policy
- The fact that the Siparia Forest Reserve is in close proximity to the Highway and should have been included in the Study Area
- The omission of a hydrological study in the EIA
- The health and safety issues associated with likely human crossings across the proposed highway
- The inadequate assessment of the socio-cultural environment and of socio-cultural impacts within the EIA
- The mention in the EIA of important and rare indigenous species, the impacts on which were not properly assessed

2.3 Overview of the CEC Application Process for CEC 1372/2006

The Certificate of Environmental Clearance Rules were made law on July 07 2001 pursuant to Section 26 (h) of the Environmental Management Act 2000. The CEC Rules require that once a project includes a proposal to undertake any of (or more than one of) the 44 activities listed and defined in the Certificate of Environmental Clearance Order (2001) that a Certificate of Environmental Clearance must be obtained prior to commencement of those activities. The Administrative Record for CEC 1372/2006 at the EMA Information Centre was reviewed and it can be reported that the CEC process for this case was followed according to the chronology below:

2.3.1 Submission of Application

An application was made in accordance with Sub-rule 3 on February 16 2006 and stamped received by the EMA on February 23 2006. In it was a claim for confidentiality regarding the cost of the Project with a reason given that placing that information in the public sphere could compromise the contractor bidding process. The EMA upheld the claim.

The Applicant was the Highways Division, Project Implementation Unit Ministry of Works and Transport.

The EMA acknowledged the application on March 09 2006 in accordance with Sub-rule 4, indicating that a CEC was required for the activity and that an EIA was required.

2.3.2 Issuance of the Terms of Reference for the EIA

A Draft TOR for the EIA was issued to the Applicant as required by Sub-rule 5 on April 13 2006. It must be noted that there is no documentary evidence that the EMA consulted with the Applicant prior to the preparation of the TOR according to Sub-rule 5 (1) (a). The latter clause does not however specify that the consultation must occur prior to preparation of the 'Draft', yet it is implied.

The TOR indicated that Activity 33 (a) of the CEC Order was applicable to the Project and a review fee of \$10,000.00 TT was charged in accordance with the CEC (Fees and Charges) Regulations (2001).

The Applicant wrote to the EMA reporting on its consultations with a number of stakeholders (in adherence to Sub-rule 5 (2)) and requested changes to be included in the Final TOR. There were a number of written comments from stakeholders; however none specifically requested changes to the TOR. Comments were received from The National Gas Company of Trinidad and Tobago Ltd.(NGC), Water and Sewerage Authority of Trinidad and Tobago (WASA), Town and Country Planning Division (TCPD) and two village councils.

In response to the TOR, an e-mail was sent to the EIA preparers on behalf of the Murray Trace Action Committee and Secret Sports Club and the councillor for the area, citing the possible negative impacts of the development on his community including: “flooding impacts on farmers, river crossing, land acquisition, road crossings, traffic lights existing roads to connect...along the proposed route”.

The EMA hereafter responded to written modifications to the TOR (as required by Sub-rule 5 (3)) made by the Applicant and made changes to the Draft TOR in preparation of the Final TOR. The changes made were largely with regard to the specificity of language in the TOR as opposed to substantive content. The Final TOR was issued on May 25 2006.

2.3.3 Initial Submission of the EIA

The EIA was submitted almost three years after the issue of the Final TOR on February 17 2009. The EIA discussed a change in route made and the re-doing of public consultations. The Administrative Record does not however contain documentation of such changes, including notification to the EMA of any change in scope of the Application that may have resulted in such a long hiatus between TOR issue and EIA submission.

The EMA, in 2006 instituted an initial review of submitted EIAs to ensure that they included the basic elements outlined in their Terms of Reference. The CEC Rules outline the legal requirements for the elements of an EIA in Sub-rule 10 (a) to (k) most of which are typically contained in the Terms of Reference.

Other than this, there are no overt clauses within the CEC Rules that guide this policy; however an assumption could be made that proper legal interpretation of Sub-rule 10 and other aspects of the EMA legislation may have been used to justify its implementation. It was however never made clear to the public by the EMA, which aspects of the EMA legislation were used to guide this policy. At the end of this initial review, the EMA may either accept the EIA for further review and processing or return the EIA to the Applicant and require that the EIA is resubmitted. According to this policy, the 80-day period specified in Sub-rule 6 (1) (b) restarts only when the EIA is accepted.

In this case, the EMA returned the EIA to the Applicant citing deficiencies. It should be noted, that in accordance with the policy of the EMA in this regard, deficiencies at this juncture refer only to elements and sections of the TOR that were not addressed at all or were incorrect in form, for example, scales of maps. It does not refer to the quality of the content in these elements and sections.

2.3.4 Rejection of the Initial Submission

The EIA for CEC 1372/2006 was rejected after the preliminary review, with the EMA citing the use of guidelines from the International Association for Impact Assessment (IAIA) to make the determination. The EMA outlined generic deficiencies to the Applicant and requested that the EIA be augmented and resubmitted.

2.3.5 Acceptance of the EIA for Further Review

The Applicant resubmitted the corrected EIA on June 30 2009, following which the EMA wrote to the Applicant stating that the EIA was “acceptable for further processing”.

2.3.6 Public Review

The accepted version of the EIA was lodged at designated locations throughout Trinidad and Tobago for public review and to solicit public comments. This is normal procedure with regard to the review of EIAs and it is assumed that the normal notifications were made in national daily newspapers, as this is the instituted practice of the EMA in this regard. The notice is also placed in the Trinidad and Tobago Gazette. The designated review period for this EIA was August 10 2009 to September 11 2009.

Upon review of the Administrative Record, one set (only) of written public comments submitted during this period were found to be on file, and they were from the Non-governmental organization (NGO) Council of Presidents of the Environment (COPE). These comments responded to the EIA section by section, but all comments were from a document quality control perspective for example “Documentation of consultations – good”

2.3.7 Technical Review

Letters can be found on the Administrative Record dated August 20 2009 written to a number of Government Agencies and one NGO requesting their inclusion on a technical review panel for this EIA and giving clear guidelines as to what was required of them as reviewers. This is normal practice by the EMA during the EIA review process. The responsibilities of the technical review committee include examining the EIA to ensure that it has properly addressed any areas of

potential impact in a manner such that an informed decision can be made with regard to granting or denying the CEC as set out in Sub-rule 6 (1) (b).

The technical review panel is typically selected to include those state bodies that may be called on to issue permits and consents for a given project, as well as those considered to offer disciplinary expertise on the type of project in question. In this case the EMA selected the following agencies to be part of the technical review panel in addition to itself (note that the names of some of these Ministries and State bodies may since have changed): the Drainage Division (Ministry of Works and Transport), WASA and the Water Resources Agency (also WASA), the Trinidad and Tobago Meteorological Office, the Ministry of Energy and Energy Industries (MEEI), the Forestry Division (Ministry of Agriculture, Land and Marine Resources), the Fire Services Division, the Archaeological Committee and the Siparia Regional Corporation.

It should be noted that the TCPD, the Wildlife Division and the Soil Experimentation Station (Centeno) were also invited to be part of the technical review panel, however from the documentation held in the public record it would appear that the invitations to TCPD and the Wildlife Division were not accepted. Written comments from the Soil Experimentation Station are on record, but the EMA does not list them as having been part of its technical review panel in the Review and Assessment Report (RAR).

2.3.8 Submissions from the Technical Review Panel

Many, though not all members of the technical review panel, submitted written comments on the EIA. The summary of main concerns identified in submissions by the technical review panel members is as follows:

Drainage Division

- Lack of proper analysis of the role of existing drains in the right of way of the proposed Highway.
- Lack of proper analysis of the effect of surrounding wetland (Godineau Swamp and Oropouche Lagoon) in its role as a 'natural detention system'.
- The effect of the project on slope stability in the area.
- The EIA does not indicate the return period used in devising drainage.

WASA

- Inadequate descriptions of mitigation measures and use of somewhat dismissive language where this was concerned.
- Lack of proper assessment of utility (especially water) crossings.

Water Resources Agency

- The lack of a “comprehensive evaluation of this wetland”
- Figure 4-5 in the EIA showing groundwater has a “fundamental error” showing the Durham and Sum Sum sands within the study area rather than the Morne L’Enfer formation.
- The EIA did not discuss the fault system along the proposed route and does not consider the type of displacement in the area and therefore the effect that faulting could have on the integrity of the highway in the medium and long term.

Ministry of Energy and Energy Industries (now Affairs)

- The lack of set back distances from existing wells both operating and abandoned
- Quarrying sites and transport routes for materials should be considered in the study area and impacts and mitigation of the aggregate requirement aspects of the project should have been included.
- Lack of proper discussion of treatment of crossings with energy pipelines
- There were no pre-meetings as are required, with the MEEI to discuss any issues related to energy infrastructure
- No consultation with regard to abandonment of wells.
- A question as to whether an analysis was done on the price changes on aggregate that would likely occur as a result of the very large demand placed by this project
- The MEEI included a stern warning about the requirement for the proponent to meet with them to iron out their concerns

Forestry Division

- Reminder of the need for permits to remove trees
- A concern about the possible changes in hydrology within the neighbouring (Siparia) Forest Reserve
- Unsatisfactory mapping and identification of sample points and a lack of comprehensive data set descriptions
- Recommendations that data set and sample point data should be “unpacked and upgraded to eliminate vague impressions”
- The need for mitigation measures to protect against scouring and erosion along embankments
- The need for functional detention ponds

Meteorological Office

- Incomplete mapping of flood prone and landslip areas for example Debe is a flood prone area that was not mapped in fig 4-2 Bunsee and Banwarie Trace should have been mapped as areas with unstable slopes.
- Need for mitigation measures to deal with leveling and cutting of slopes

- A specific concern was stated about a “vegetative gully system” along the Fyzabad Main Road opposite the Pepper Village Government School. The gully as an existing flood control system which will be removed, what is the impact?
- The use of the Pepper Village Government School car park as a point through which the highway passes. What is the effect of this on safety at the School?
- Concern about loss of Wetland. What are the impacts?
- Point of disagreement with the EIA that the project will not impact on climate. An expected impact could be on the micro-climate as the removal of large areas of vegetation can cause changes in wind flow and rainfall patterns which could be “inimical to the survival of the wetland since the nature of this environment depends on water excesses”.
- Need for a microclimate study (which this review recommends, should be included in a hydrology study)

Soil Experimentation Unit (invited but not listed on the Review Panel)

- 'Endorsed' EIA.
- Descriptions of soils were correct

2.3.9 The Review and Assessment Report

On October 27 2009, the EMA submitted a letter accompanying its (RAR) to the Applicant indicating that the review of the EIA was complete and that a determination of the application could not be done before the applicant submitted a response to the RAR. It also stated that the new date for a determination was January 08 2010, which was 50 working days after the expiration of the initial 80 day period. Sub-rule 6 (2) makes an allowance for such an extension. This is normal procedure for the EMA when it deems that there are content deficiencies in an EIA.

The RAR indicated a number of areas of the EIA that needed to be augmented and categorized them into 1. Critical Information 2. Supplementary Information 3. General Comments. The EMA’s overview of the EIA was stated as follows:

“There was a general adherence to the majority of the requirements of the TOR. However, deficiencies were identified as certain requirements of the TOR were either not adequately addressed or not considered in the document.”

The EMA then went on to provide detailed descriptions of the deficiencies it found. In common practice, the EMA would usually consolidate the written concerns of the technical review panel for inclusion in the RAR, however the RAR from the EMA seems to omit a significant number of the concerns raised by other members of the panel. This will be discussed further below. The deficiencies listed in the RAR are summarized below and for ease of reading, summarized responses from the Highways Division, Project Implementation Unit, Ministry of Works and Transport are included in this Section:

2.3.9.1 Deficiencies listed in the RAR and MOWT Responses

Reference TOR Section 2.5

- There was no justification given for correlating the peak flow periods to a rainfall event (this should have stated ‘return period’) for example 1:25 or 1:50 rainfall event.
- The document does not provide calculations to justify the size of relief culverts and “as an adequate measure to control sheet flow”.
- It requests further information on integration of the Highway drainage system with natural and artificial drainage systems in the area.
- Need to identify streams used for abstraction of water, abstraction points, duration of abstraction.
- Despite identification of water in most rivers in study areas as polluted “no remediation measures were considered to ensure that polluted water is not to be used as a dust control measure”.

Response from MOWT

In the absence of local guidelines, a rainfall recurrence of 1:50 years was used. For relief culverts, engineers examined the profile of the existing ground and placed culverts where there was a depression in the profile. Given the nature of sheet flow, the size of culverts was dictated by maintenance considerations.

The “information provided is adequate for the purposes of an EIA”. Drainage calculations were to be submitted to the Drainage Division and “not normally part of an EIA”

Information on stream abstractions not available at that time. Permissions for any abstraction would be obtained from the Water Resources Agency.

Reference TOR Section 2.5: 5, 6, 8

- Request to provide dust noise and vibration mitigation measures to be employed at the Pepper Village Government School.
- Why was no noise profiling done at Pepper Village Government School
- Provide frequency of air monitoring. Mitigation measures if parameter standards are exceeded.

Response from MOWT PIU

Submissions on monitoring air and noise were submitted as an addendum to the Response. A number of generic mitigation measures were provided to reduce impacts on air during construction e.g. covering truck trays, washing tires, regular vehicle servicing retention of vegetation buffer.

Proposed mitigation during operation included air monitoring and conference with the Ministry of Education for collaborative solutions “if it is determined from monitoring that the school is being affected”

Mitigation of noise included; outfitting vehicles with noise abatement devices, consultation with school administration, scheduling of works after hours and during vacations as best as possible, repair or compensation for property damaged by construction work, a retaining wall built along the common boundary.

The EIA preparers also “strongly recommended” a 2.5 m high grouted blockwork wall as measure to “protect children from falling onto the highway” and for additional noise attenuation.

A noise monitoring report was submitted as an attachment to the response (Attachment 2)

Reference TOR Section 2.7.5

- Requirement to provide an explanation for why Pepper Village Govt School was not considered for resettlement
- Requirement to provide a proposal for compensation for those who stand to lose property. EIA report did not provide any possible areas for resettlement “or any other arrangements for individuals, households, businesses and farmers displaced by the ROW”.

Response from MOWT PIU

Relocation of the school is not justified on the basis of expected noise or air quality impact.

Details were not available at the response points the EMA to Appendix S of the EIA. It states that further time.

Reference TOR Section 2.3.3

- “The EIA does not provide enough detail with respect to the socio-cultural environment...” Social mechanisms to treat with immediate concerns of residents are not identified or outlined. “The EIA report requires a more in-depth investigation of the socio-cultural environment”. A justification for the method of study used is required.
- The venues used for consultation with the Village Council Representatives did not attract a wide enough cross section of the community.
- “Further research is indispensable...” “the communities affected by the highway were not consulted in a meaningful way” to allow effective mitigation of impacts.
- EIA did not provide evidence of proper consultation with agricultural land owners.
- The study area for the socio-cultural survey should have been mapped providing details of residences, agricultural lands and businesses to be acquired.

Response from MOWT PIU

The response stated disagreement with the EMA’s assessment that the treatment of the socio-cultural environment was inadequate and pointed the EMA to a number of sections in the EIA within which it was treated.

The response stated strong disagreement that the communities affected by the highway were not consulted in a meaningful way. It stated that the EMA’s comment “ignored” the meetings and surveys that were done.

The response pointed the EMA to the survey of property owners reported in Appendix L.

The response pointed the EMA seemed to disagree about the comment vis a vis mapping of the socio-cultural study area and pointed to Appendix S which it said showed all the properties to be acquired

Reference TOR Section 2.6

- Poor assessment of ‘No Action Alternative’. No comparison of impacts.
- “The justification for the project should be contextualized in the context of a feasibility study regarding the transportation needs of the south western region of the island”.

Response from MOWT PIU

Response claimed that a Feasibility Study for the transportation needs of the south west region of the Island were not within the scope of the Project. The response disagreed with a request for comparison of impacts relative to no action. It further lists impacts of no-action as:

No benefits of the project will be realized, existing impacts on the environment will intensify and the environmental concerns listing in the EIA will be largely eliminated.

The MOWT PIU did not respond to any further deficiencies listed in the RAR.

Reference TOR Section 2.1

- Requirement to provide a map showing the location of the 61 wells to be plugged and setback distances of the wells in relation to the proposed highway.
- Requirement to clarify if the Ministry of Works and Transport would be doing the abandonments.

Reference TOR Section 2.2

- Requirement to state ‘realistic expectations’ on how the new highway alignment would address the projected traffic capacity.

Reference TOR Section 2.3.2

- Need to clarify an inconsistency in the statement of distance of the site from the Siparia Forest Reserve (in Section 5.3.2.6 quoted as 4km from site and in section 5.3.2.1 as 0.5 km)

Reference TOR Section 2.5

- Requirement to clarify if there would be compensatory measures for ‘moderate’ loss of wildlife and wildlife habitat.
- Requirement to clarify why impact of sources for construction material was not reduced after application of mitigation measures
- Justification for why dust and exhaust fumes during transport were classified as ‘low;
- No projection of vehicle emissions during operational phase so as to allow an assessment of the impact on air quality.

- EIA did not consider impact of disrupted foot traffic. Were walkovers considered and if not, provide a justification for the lack of mitigation measures for loss of foot access within communities severed by the Highway.

2.3.10 Further Extension of Review Period

In a letter dated January 04 2010, the EMA sent a letter to the Applicant giving an additional extension of the review period to March 10 2010. The reason given was that no response to the Review and Assessment Report had been received and therefore a determination of the CEC was not possible.

It should be noted that at this point, the EMA is simply using its discretion in giving the applicant another chance for the possibility of a positive outcome. The Authority was well within its legal bounds at this time to issue a refusal of the application based on Sub-rule 6 (2).

2.3.11 Issue of the CEC

The Certificate of Environmental Clearance was issued dated April 20 2010. There is no further documentation in the Administrative Record that can allow the reader to determine what the EMA's further considerations were in making its decision, apart from the MOWT Response to the RAR. One can only assume that the EMA determined that the response had satisfactorily addressed its concerns cited in the RAR and that a CEC could be granted as outlined in Sub-rule 7 (a).

2.4 Opinion on the Content of the Final Terms of Reference for the EIA

2.4.1 Terms of Reference as Required by the CEC Rules

The EMA's TOR is consistent with typical Terms of Reference that the Authority has issued since the onset of the CEC rules in 2001. In this case, the TOR broadly covers most of what can be seen as critical issues surrounding this development. It at least covers the basic requirements laid out in the CEC Sub-rule 10 (Standards for Preparation of EIA). It should also be noted that the basis for the EMA TOR is a generic EIA Terms of Reference that was used by the World Bank at least up until 2001. It was first adopted by the EMA shortly after the implementation of the CEC Rules in 2001.

2.4.2 Scoping

The flaws in the TOR as well seen in the EIA seem to reflect an omission of a proper scoping exercise prior to developing the TOR. Scoping is a fundamental component of EIA best practice. It must however be said that the CEC Rules do not contain a requirement for a scoping exercise and the EMA has not implemented the requirement prior to its own TOR preparation, nor does it require such an exercise of the proponent as part of EIA preparation.

2.4.3 Terms of Reference Deficiencies

What this TOR fails to do is what some EMA TORs have done in the past; to identify and emphasize the Oropouche Lagoon as an area of particular environmental sensitivity. This would have forced the EIA study area to have included the lagoon in its entirety, though in its requirement for definition of the study area, the TOR does require the inclusion of wetlands and forest reserves among other environmental elements.

Although it is not designated as an Environmentally Sensitive Area (ESA) under the ESA Rules, the Oropouche Lagoon was listed by the EMA as an area that should eventually be considered for that status when the first ESA designations were done.

The TOR requests a Re-settlement Plan for potentially evicted residents but while it touches on the subject with a request for 'the acceptability of the project' to residents, it does not require a detailed assessment of how acquisitions would affect various aspects of the community and its lifestyles. It does not specifically require a Social Impact Assessment (SIA) but rather touches on aspects of socio cultural impacts. This could give the impression that there was an initial lack of understanding of how severely the acquisitions could have affected the receiving communities.

As is typical with EMA TORs, but nevertheless a drawback, the TOR does not require the use of quantitative methods to assess impacts, except in the area of risk and coastal hydrodynamics. Quantitative assessment seems critical to this project in the areas of hydrology and drainage and in the assessment of human impacts.

2.4.3.1 *Specific Biological Concerns*

While there are questions arising about the criteria used to define the immediate and wider study areas, based on the TOR, the EMA makes reference to the “*wider study area*” in Section 2.3.2 Biological Environment, stating, “*Provide definitions, characterization and location of the vegetation types and associated habitats with the development site, special attention should be paid to the wetland ecosystems and forests (both natural and secondary) located in the wider study area.*” It leads to the question whether this was the guiding principle in the choice of excluding the South Oropouche Swamp (also known as

the Godineau Swamp, the largest swamp on the western coast second only to the Caroni Swamp) and the Siparia Forest Reserve as part of the immediate study area.

Section 2.3.2 of the TOR requests that information be provided on “*the presence of endangered/protected species in the wider study area,*” and that this “*data must include sources of baseline data as well as location of sampling points.*” Based on this, three items of importance can be inferred: (i) information on the presence of endangered and/or protected species should be provided for the *wider* study area only, with exclusion of this information being provided for the study area; (ii) the Proponent was expected to conduct sampling and/or provide data for the wider study area and (iii) the understanding of what the “*study area*” and “*wider study area*” are, is unclear to the preparers of the TOR.

The EIA (Section 3.3.2.1 Clearing of Vegetation) states the amount of forested area to be cleared. It clearly exceeds 2ha in a 2-year period. The CEC application included Activity 8 (a) The clearing, excavation, grading or land filling of an area of more than 2 hectares during a two year period and Activity 8 (b) The clearing of more than one half a hectare of a forested area during a two year period, yet the TOR only makes reference to Activity 33 (a) The establishment (inclusive of associated works) of a road of more than 1 kilometre in length.

2.5 Opinion on the Contents of the EIA

2.5.1 Rationale for the Project

There is a very vague and brief rationale for the proposition of the project. There are no specific goals or objectives that clearly explain why this segment of the highway is needed as well as who needs it. Given the high significance of impacts associated with the highway, not the least of which is human displacement, one would expect that the time would have been taken to develop present a clear, specific and convincing case for why this highway needs to be built. That was not done.

2.5.2 Definition of the Study Area

The study area for this project was defined in Table 4-1 of the EIA. The area studied is defined differently for each environmental element studied, which is highly irregular and poor practice. In most cases it resulted in the examination of a small swath of area on either side of the proposed route Right of Way (ROW), as opposed to including areas where direct and indirect impacts could extend, for example river courses.

The method used for defining the study area is not best or even acceptable practice in the conduct of EIAs and one is left to wonder why it was not immediately rejected by the EMA, or flagged by the technical review panel. This definition immediately absolved the EIA of having

to include the study of the Oropouche Lagoon and the Siparia Forest Reserve as ecological units, or the communities as continuous groups of people. It should have been rejected right away.

In its RAR, the EMA only addresses the Study Area with regard to the identification of wells to be abandoned, the need to map them and their setback but there is no mention of the *area* defined as the study area, which is inexplicable.

2.5.2.1 Specific Biological Concerns

In Section 2.1 Study Area of the TOR, the proponent is provided with a general study area definition that should include the proposed right of way (ROW), adjacent forested lands, wetlands, rivers, streams/tributaries and communities that can be affected by noise, dust, traffic and surface runoff during site preparation and construction. This study area definition was requested to include an area that is expected to experience both direct and indirect impacts. However, the EIA presents an immediate study area with a mere 100m on either side of the ROW - an area which does not encompass any of the potential indirect impacts to the site. Of note, many of the rivers within the study site empty into the Gulf of Paria and pass through the Godineau Swamp, including the Oropouche River, Timull's Channel, St. John's Channel, Blackwater Canal, Coora River and Gucharon River. Greater consideration should have been paid to these areas downstream of the rivers traversing the site for the proposed ROW.

International EIAs for highways have used the approach of defining the immediate study area as a certain distance on either side of the ROW, but this is dependent on several factors including:

- (i) the complexity and variety of the ecosystems present;
- (ii) the species composition of the ecosystems, many of which are affected by edge effects at a minimum of 500m from ROWs;
- (iii) the spatial zone from which the effects of pollutants will be exerted; and
- (iv) The area in which indirect and cumulative impacts on ecological communities will occur, especially in light of the fact that the proposed highway for this EIA will be in conjunction with other highway segments.

2.5.3 Mapping in the EIA

Mapping in the EIA is generally poor, with too few maps being included in the body of the EIA. Some maps included in the appendices for example the map of the Oropouche Lagoon in the Institute of Marine Affairs (IMA) Wetland Report should have been included in the chapter describing the environment. It is the only map in the document that shows the natural boundaries of the Lagoon and would have been critical to any reader immediately understanding the

relationship between the highway route and the Oropouche Lagoon. Further, the communities to be affected are not properly mapped such that densities and settlement patterns can be observed.

It would seem that portions of published maps showing geology, hydrogeology etc. were simply scanned and the route superimposed on them, rather than the use of a geographic information system (GIS) to generate maps. This seemed to have resulted in a ‘fundamental flaw’ in the hydrogeological map, which was flagged by the Water Resources Agency in its review comments. The Durham and Sum Sum sands were mapped as groundwater resources in the study area and this is incorrect.

2.5.3.1 Specific Biological Concerns

According to Section 2.1 Study Area of the TOR, the EMA requested that “*Printed maps should be provided to indicate the general layout of the proposed routes, as well as their relationship to the overall study area. The study area should be properly identified and described with accompanying aerial photographs, maps and diagrams at easily understood scales to illustrate the spatial extent of the project and the impact area.*” The EIA does not provide any specific map that clearly delineates the boundaries of both the defined immediate or wider study area. While Figure 4-12 and Figure J-2 show the boundaries of the Siparia Forest Reserve, the boundaries of the Godineau Swamp are not displayed. Figure 4-10 only shows some parts of the rivers that were sampled for the study, but does not show their exit points along the Gulf of Paria or where they join to other rivers. Given that effects on rivers are not stationary, the rivers should have been clearly mapped so that potential downstream effects and the spatial extent of the impacts could have been assessed.

2.5.4 The Physical Environment

While a number of requisite studies were done using normal methods for conducting baseline studies used to describe the surrounding environment, the sample collection plan for each is unacceptable by virtue of the poorly defined study area and therefore these studies are not representative of what is required to properly assess the impacts of this Project. Once again this was grounds for the out right rejection of this document.

While other inadequacies are present in the EIA, this review has focused on those considered most critical to decision making where this Highway is concerned.

2.5.4.1 Hydrology Study

The omission of a hydrology study as part of the EIA is one of its most significant deficiencies. The discharge and flow of water within the wetland, both surface and groundwater is the most important factor that defines that type of terrestrial environment. It is essential in determining soil conditions and therefore the type of vegetation that can be supported, which in turn determines habitat conditions and ultimately the type of fauna

that can survive. If the proposed project could possibly impact negatively on hydrology, for example interrupting sheet flow from some areas and 'drying' them out, it could cause significant changes to its ecology and wetland destruction. This issue was raised in some detail by the Hydrologist representing the HRM.

A quantitative surface and groundwater hydrology model and study of the wetland as a hydrodynamic system must be done before an informed decision can be made as to whether this segment of highway should proceed as proposed or not. It should be noted that the EIA in fact cited the wrong aquifers in the description of the environment, referring to the Durham and Sum Sum sands which are formations that exist in Central Trinidad, rather than the Morne L'Enfer sands which are part of the study area. This was flagged by the Water Resources Agency in its review comments, but not by the EMA in its Review and Assessment Report (RAR), most likely because the WRA submission was dated after that of the RAR.

Interestingly, the lack of a hydrological study to assist with decision-making was flagged in one way or another by most members of the EIA technical review panel but was not included in the RAR. The EMA should have made this issue a 'showstopper' in its decision to grant or deny a CEC, both by virtue of its own determinations, as well as those of the panel members and it did not.

2.5.4.2 *Hydraulic Study*

While the EIA describes the drains to be constructed and expected peak flows, it does not include the return period and calculations used to develop the drainage plan. The Drainage Division flagged this in the EIA review and the EMA described this deficiency in its Review and Assessment Report.

The response of the MOWT PIU could be interpreted as dismissive, whereby it provided the return period used in the drainage calculation as 1:50 but does not provide the calculation done, stating that it would be provided to the Drainage Division and was not normally part of an EIA. It is untrue to say that the submission of drainage calculations is not normally part of an EIA and the EMA very often insists on drainage calculations even for smaller projects not requiring EIAs. It is not fully understood why the EMA relented on this point, given the level of concern expressed in consultations vis a vis flooding.

2.5.4.3 *Topographical Features, Structural Geology and Slope Stability*

The Meteorological Office, as a member of the technical review panel pointed to the incomplete nature of the slope capability mapping. It also specifically referred to a vegetated gully close to the Pepper Village Government School and the fact that the ROW would see this feature removed. One could ask how many such gullies may be in the pathway of the selected route. The WRA also raised the need for consideration of fault zones in the area and how they could impact on the long-term stability of the highway.

The EMA did not address any of these concerns in its RAR and therefore these concerns remain.

A geological (as differentiated from a soil engineering) survey along the Highway route should be done. This type of ground-truthing is an important exercise that should be used to determine possible impacts on land and slope stability, as well as on drainage. Existing literature such as the geological and topographical maps for the entire island do not map localized features resulting from fault zones (e.g. rock jointing and fracturing), nor do they map small localized topographical features (like gullies), interference with which could have deleterious effects both on the environment and on the highway. A geological survey would resolve these issues.

2.5.5 The Biological Environment

For the water sampling regime, there were five selected sites along Debe, Oropouche and Coora Rivers, Blackwater Channel and St. John's Canal, while Table 4-1 Definition of Study Area states that the study area for surface water quality includes: Debe, Gucharon, Oropouche, Quebrada, Coora, Morocunapo, Cunapo and John Rivers, Blackwater and Timull's Channels and St. John's Canal. With two sample points located upstream of the designated activities and only one sampling point each of these five chosen rivers in the study, it would be difficult to develop an effective monitoring plan without upstream and downstream data to assess the variability and short-term or long-term changes in water quality. These changes can possibly have a significant effect on the ecology of the waterways and the downstream Godineau Swamp.

Overall, the species richness presented for the secondary forest is low, possibly due to the narrow belt of land used as the study area. The information provided on the biological environment does not give a clear picture of overall ecosystem health or function as it mostly includes species richness.

As with terrestrial ecosystems, the numbers of species of benthic fauna says little about ecosystem health. By providing information using the species diversity indices and indicators of environmental conditions, a better picture of ecosystem health could have been provided. For example, Apple snails (*Marisa* sp.) which were present in the benthic samples, while tolerant to a variety of conditions, thrive in rivers that receive an input of nutrient-enriched waters with low dissolved oxygen content. Diversity indices, species richness and densities of benthic communities are excellent indicators of aquatic health as benthic macrofauna are sessile and sensitive to changes in aquatic conditions. Diversity indices could be then be used to assess overall changes in the freshwater environment and can form part of the monitoring regime.

Reference is made to the ecology of Puzzle Island, but the location of this area is not included in any of the Figures presented either in the main body of the EIA or the Appendix J – Ecology. However, information on the location of Puzzle Island is made available in Appendix K – IMA Wetland Report. This should have been included in the main report since reference is made to it. The IMA Wetland Report also supplies information related to the boundaries of the Godineau

Swamp, which would have proved useful in the main body of the EIA report5.06 The Socio-Cultural Environment

The issue of a poorly selected study area extends to the study of the socio cultural environment. While the TOR asks for direct and indirect impacts, the EIA only considers the residents in the direct ROW and in doing so, overlooked negative and/ or positive impacts on the wider community. Additionally, while the public consultation will have reflected some of the objections to the highway, the myopic examination of social impacts resulted in only those households in the ROW being surveyed. Among other impacts of same, could be that surveys would have completely missed any groups that may in fact foresee benefits of such a project and may want it to proceed. The EIA should therefore have sought a much broader sample of the community, expanding the general study area to all communities that could have direct access to the proposed highway.

The survey, labeled as an ‘Attitude Survey’ is in fact a poorly devised demographic survey. It includes minimal information on the attitudes of the residents to removal of their properties. Given the evolution of the Highway Reroute Movement (HRM), it is plain to see that the work done was simply inadequate.

Apart from poor surveying, the EIA’s treatment of the Socio-Cultural Environment was cursory at best, dismissive at worst. The EMA in its RAR made several damning remarks about the socio-cultural work done, yet it does not go far enough in prescribing what corrective measures should have been taken to eliminate the deficiencies.

Further, the MOWT PIU responded to the EMA’s findings defending what had been presented in the EIA and offered no further information in this regard. According to the public record, the EMA *did* appear to have pressed further on this point.

2.5.5.1 Community Linkages

The impacts of the highway on the surrounding communities are many and far reaching. From anecdotal evidence (personal communications) it would seem that there are many members of surrounding communities who are in fact looking forward to the highway being built since they have long commutes to work in north and central Trinidad. There are also directly affected members from the communities who feel very passionately about loss of their properties and severing of their neighbourhoods.

Some of the concerns raised by the latter include potential severing of extended family ties, organizations, religious congregations, school bodies. The HRM Highway raised issues of generational land ownership, loss of income from agricultural use of land, loss of commercial business, the splitting of local access roads used by the communities. There seems to be significant fear about the intrusion of new people into the communities leading to deterioration of security. Members of the HRM do not seem to be informed

about what types of developments will be introduced into the areas given the additional access of the highway. These are all legitimate concerns that require further study.

2.5.5.2 Health and Safety

In one presentation given by a member of the HRM, the question of humans crossing the highway was raised as a health and safety issue. If people who live on either side of the highway are used to interacting closely for example, extended families, there will be a tendency to want to cross the highway by foot. This can lead to serious and fatal accidents. The EMA raises this as a concern in its RAR, however words its concern in a manner that could seem to allow the proponent to explain away why it did not include mitigation measures for this potential impact. This issue should be included in an expanded Social Impact Assessment

Further, the Meteorological Office, in its review comments, flagged the proposed use of the Pepper Village Government School carpark as part of the ROW. The EMA subsequently asked why this school was not considered for re-settlement. This issue is a critical one that must be resolved for the safety of students, staff and parents of the school.

The TOR asks for a Re-settlement Plan and none was provided. It is mentioned in the RAR, however, the EMA did not seem to hold the proponent to this requirement. Based on information received at the recent meeting of the Highway Review Committee (HRC) with NIDCO, it would seem that no comprehensive document on re-settlement has been developed up to this time.

It is imperative that a proper SIA be undertaken before a decision is made to continue or discontinue the Debe to Mon Desir segment of the highway. The human impacts, which at this time are still not fully understood, have the potential to be too significant to proceed otherwise. The Terms of Reference of the EIA would suggest that there is a need for a subject matter expert in the area of Social Impact Assessment to develop the TOR for the SIA.

2.5.5.3 Concerns of the Ministry of Energy and Energy Industries

The MEEI flagged in its review comments, great concern over its lack of prior knowledge with regard to points at which the proposed highway would cross pipelines and the wells to be abandoned. It demanded in its comments that the applicant be asked to consult with it to further discuss any interactions with pipeline infrastructure. The concerns of the MEEI were barely mentioned in the EMA's RAR.

There is no response on record to any of the stated MEEI concerns listed post review.

2.5.6 Public and Stakeholder Engagement

The reporting of the consultations held with village council leaders as well as reports of the public consultation meetings were paraphrased. It is unclear to the reader whether the content is complete or if some of what transpired may have been lost. It is common practice in preparing EIA's that paraphrasing could be used in the body of the document; however it is extremely useful to have verbatim transcripts of these meetings in the appendices. This was not done, but in fairness to the EIA writers, it was not specifically prescribed in the TOR. Consultations seem to have been done at least in keeping with the requirements of the EMA's TOR.

A number of concerns were raised during the public consultation meetings by affected community members and not resolved in the EIA.

2.5.7 Method for Assessing Impacts and Proposing Mitigation Measures

The EMA in its TOR does not call for quantitative assessment of impacts. In the case of this Highway however, it was very important that the hydrology and hydraulic impacts be modeled or at least quantified. This was not done. There was also a need to do more quantitative impact assessment as it pertained to loss of ecological resources as well as socio-cultural impacts. The EIA is inadequate in this regard. The description of impacts in the EIA came across as shallow and in some cases dismissive of issues that should have been absolutely critical to decision making. Without quantitative assessment, the random and subjective nature of the significance ranking (which is a universal problem with environmental impact assessment) allowed for the authors to downplay many of the major impacts such as surface runoff and flooding.

2.5.7.1 Proposed Mitigation Measures

The EIA seemed to have considered mitigation measures in passing. This entire chapter should be re-done to include detailed descriptions and specifications of mitigation measures to be used to mitigate specific significant impacts.

2.5.8 Analysis of Alternatives

Given the presentations made by members of the HRM, it would seem that there are at least two other alternatives that need to be assessed in detail:

1. The upgrade of the existing Murray Trace

There was some discussion about the upgrade of this route, which is seen by the HRM as a means for quick egress out of the general area. There was a suggestion that it could be upgraded and re-classified with some use of safety measures in areas of dense population. It should be assessed to

see whether it is a solution with regard to the concerns of the HRM as well as those who want relief from extended commutes to north and central Trinidad.

2. The building of elevated segments of the South Trunk Road along the existing Mosquito Creek

The hydrology assessment by the HRM postulates that the portion of the SS Erin Road along the Mosquito Creek may be resulting in a coastal limitation of the Godineau Swamp to expand seaward and suggests that the solution to this may be an elevated portion of the freeway which can allow water to flow freely below it. This should be considered in the context of alternatives.

2.6 The Role of the Public in the EIA Review Process

As evidenced by the initiation of this review, the proposed Debe to Mon Desir highway segment has been the source of many objections. Interestingly, the Administrative Record for this EIA does not contain even one submission of public comment in accordance with the public review period from August to September 2009. The copy of the Administrative Record available to the public shows that the EIA was viewed by some members of the public, however there are several other copies held by the EMA outside of the public record which would give a complete picture as to how many members of the public reviewed the lodged EIA. There is however only one set of public comments on file; those from the NGO COPE, which seemed to have done a point by point quality grading of the EIA document. No significant concerns were raised in their comments.

The lack of documented public concerns from the local communities seems to have been a missed opportunity by those who are calling for a reversal of the decision to proceed with the Highway. If public comments had been submitted in writing iterating many of the concerns being brought forward during this HRC review and in the great detail that has been presented by the HRM to the HRC, the EMA *should* have had to have demonstrated greater consideration of the perceptions of this group.

2.7 The Role of the EMA in Reviewing the EIA and CEC Decision Making

There are three main findings with respect to the review of the EMA's role in determining the CEC.

1. The EMA followed the statutory requirements and its policies developed further to the CEC Rules to the letter. Each required step of the CEC application process was adhered to by the EMA from a strictly legislative view and no fault can be found in this regard.
2. The Review and Assessment Report was a poorly done assessment of the EIA and did not go far enough in getting the preparers to correct its deficiencies.

The most glaring failure of the EMA in the review was with regard to the definition of the Study Area. As described above, the EIA should have been rejected outright for this reason and sent back to the preparers to re-do.

The EMA failed to represent many of the concerns of the members of the technical review panel in its RAR and in so doing did not address some of the most fundamental issues that required closure prior to a decision being made. The most critical of these was the lack of a hydrological and ecological study of the Oropouche Lagoon. It must be said in fairness that the dates of submission and receipt on two sets of comments (the WRA and the Drainage Division) after the date of the RAR may have exempted the inclusion of their content in the RAR. The EMA nevertheless had a responsibility to bring the significant issues that these two panel members raised to the Applicant's attention, whether via an addendum to the RAR or otherwise.

This review also finds that the Town and Country Planning Division and the Wildlife Division had a responsibility to accept the EMA's invitation to participate on the technical review panel. Additionally, the Ministry of Community Development and the Valuation Division should have been invited to the review panel to offer guidance in their areas of specialty vis a vis Community relations and land acquisitions.

The EMA importantly, failed to relay the concerns of the MEEI, which were significant safety concerns with regard to energy infrastructure.

1. It is not common practice for the EMA to prepare a document explaining its reasons for issuing a CEC, nor is such a document required in any Sub-rule of the CEC Rules 2001. The basis for the final decision to issue this CEC is however, unclear.

Even after submission of a response to the EMA's RAR by the Applicant, most of the issues flagged by the EMA were not adequately redressed in such a manner that concerns about the project's impacts and the proponent's ability and commitment to mitigating them were assuaged. In fact many of the most significant impacts remain improperly assessed whereby the Applicant simply disagreed with many of the concerns stated in the RAR and in only few instances provided additional information. Substantive information was not provided in response most critical issues that apply to this Project.

It should be noted, that there have been many cases in the past where the EMA has issued several RAR addenda when it is not satisfied with the responses of Applicants. That process can extend until the Authority considers all outstanding issues to be resolved. It is not understood why this approach was not taken in this case.

It is difficult therefore, for anyone reading the Administrative Record, to make a clear connection between the information that was submitted and the decision to grant the CEC. It is possible that further meetings were held between the Applicant and the Regulator that gave the EMA sufficient

confidence to issue the CEC, however there is no evidence that allows the public to understand how the gaps were bridged. This leaves lingering questions about why and how the EMA came to its decision to grant CEC 1372/2006.

2.8 Main Conclusions

The EIA was not acceptable and should have been rejected by the EMA and returned to the Applicant at an early stage in the eighty day review period for revision. The reasons being; poor study area selection, inadequate assessment of the environment and of significant impacts.

There seemed to have been a lack of appreciation by the EMA and members of the Technical Review Panel of the gravity of impacts posed by (at the very least), the land acquisitions associated with the proposed highway segment.

The EMA seemed to ignore many of the concerns listed by its technical review panel and therefore many of the most critical comments provided were not posed to the Applicant for response.

The EMA should have played a stronger role in ensuring that a thorough EIA and inclusive SIA were done such that its decision to grant or deny a CEC would have been evident.

The entire submission in support of CEC application 1372/2006; EIA and RAR responses could give the impression that insufficient effort was extended to identifying, assessing and mitigating the most important impacts posed by this Highway.

The Authority relented too easily with respect to having the Applicant provide proper assessments of issues that it raised as critical post review. The Applicant provided responses that in most cases simply disagreed with many of the concerns listed in the RAR. The EMA did not insist that its concerns were resolved prior to granting the CEC and this was a significant failure on its part.

2.9 Recommendations

2.9.1 General Recommendations with regard to the Regulators

1. The EMA in future may consider implementing a joint scoping exercise between itself and the proponent prior to generation of its Terms of Reference.
2. The EMA may consider playing a greater role in defining study areas for EIA in order to prevent entire studies being done around poorly designed study areas.
3. The EMA should consider augmenting its capabilities in the areas of hydrology, hydraulics and social impact assessment.

4. The EMA needs to define criteria for weightings of socio-cultural issues in decision making. For example, the Regulator does not have a scheme to quantify or to help it determine when social impacts are so significant that they may warrant a CEC denial.
5. Significant effort needs to be made by the State to resolve the incongruent sequential relationship between the Town and Country Planning Division Approvals and the Certificate of Environmental Clearance. It has been well documented that the current sequence of the requirement for a proposed project to obtain Outline Planning Approval followed by the CEC, then (Final) Planning, then other Approvals (Drainage, WASA etc) results in Proponents perceptions that doing detailed designs for the EIA is a wasteful (and costly) exercise when the likelihood of the TCPD and other Agencies requiring subsequent significant changes is very high.

2.9.2 Recommendations with regard to this Project

1. A hydrological and ecological study of the Oropouche Lagoon should be initiated such that impacts of this project can be modeled or quantified to inform a decision to/ or not to proceed with the Project.
2. The potential of this project to impact on flooding needs to be understood.
3. A Social Impact Assessment and Environmental Economic Study of this Project must be done to inform a decision to proceed or not to proceed. This study should capture broad segments of the affected communities and should seek to get opinions from both antagonists as well as protagonists of the highway.
4. A proper evaluation of possible impacts on the Siparia Forest Reserve should be done to inform further decisions.
5. The construction of the Debe to Mon Desir segment of the Highway (SHHE) should not proceed until the recommended studies are done and it can be scientifically demonstrated that residual impacts are low.

3.0 SOCIAL IMPACTS

3.1 Introduction and Background

The Terms of Reference for the Social Impact Assessment (SIA) Specialist included inter alia:

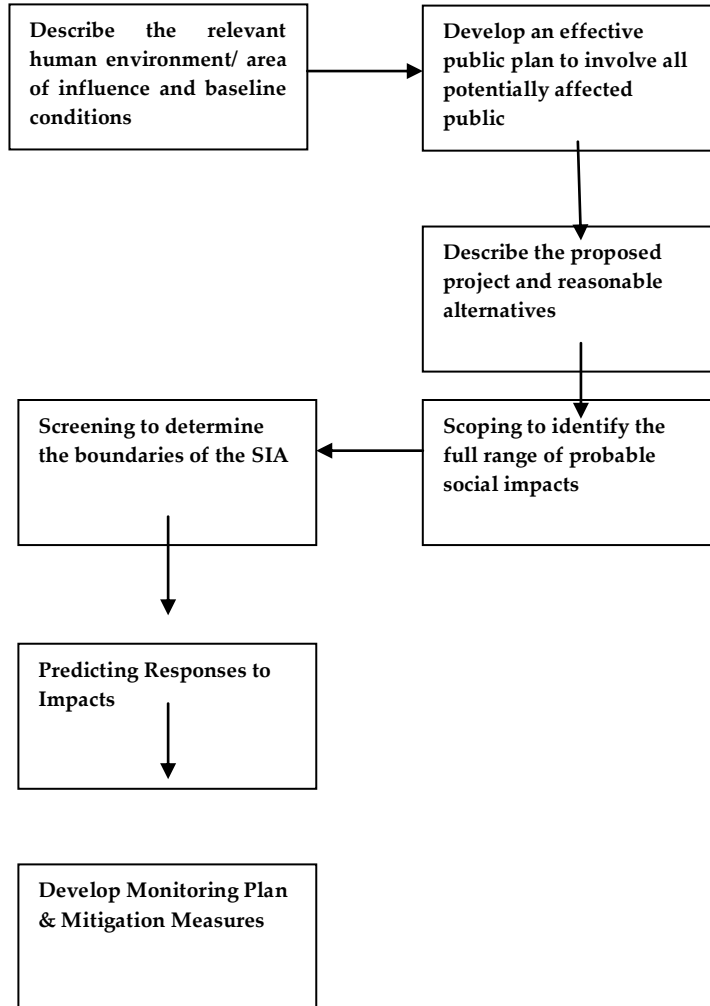
1. Set out a brief of critical baseline indicators pertaining to social impact assessments within the context of major infrastructure works and human settlements developments in Trinidad and Tobago, along with processes for the conduct of an SIA accordingly.
2. Review all relevant documentation/survey data, particularly the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to determine the procedures and treatment of social impact considerations and consequences of the Highway extension, particularly the Mon Desir/Debe segment, and any mitigation measures as may be set out to inform policy, planning and development.
3. Comment on implications of pros and cons of the social impacts of the current alignment in relation to proposed alternatives.
4. Evaluate written and oral submissions from interested parties with respect to social impact implications of the Highway Project, and in particular the section between Debe and Mon Desir.
5. Participate in inter-disciplinary meetings to consider and advise on social impact assessment implications of the project.
6. Provide specialist advice to the other consultants within the group
7. Prepare an objective technical assessment of findings and recommendations for inclusion in the Final Report of the Committee

3.2 Critical Baseline Indicators pertaining to Social Impact Assessments (Best Practice)

There are many organisations which detail the requirements for good SIAs including the World Bank, and the European Commission. With some minor differences these tend to be very similar and we have selected a procedure by Vivek Misra which is relevant to the highway project under consideration as being an example of “best practice”.

Misra notes that “Social Impact Assessment (SIA) is predicated on the notion that development interventions have social ramifications and it is imperative that decision-makers understand the consequences of their decisions before they act and people affected get the opportunity to participate in designing their future.” This is the basic position which guides this review.

Misra defines the following stages in Social Impact Assessment;



An eight point model (modified from Misra) has been used to illustrate an appropriate process for conducting an SIA relevant to the Debe to Mon Desir segment of the highway project under consideration. The eight steps are as follows:

1. Public Involvement - Develop an effective public plan to involve all potentially affected publics.

Stakeholders are to be identified, and representatives from each group should be systematically interviewed to determine potential areas of concern/impact, and ways each representative might be involved in the planning decision process.

2. Identification of Alternatives - Describe the proposed action or policy change and reasonable alternatives.

In the next step, the proposed action is described in enough detail to begin to identify the data requirements needed from the project proponent to frame the SIA.

3. Baseline Conditions - Describe the relevant human environment/area of influence and baseline conditions.

The baseline conditions are the existing conditions and past trends associated with the human environment in which the proposed activity is to take place. For construction projects, a geographical area is identified along with the distribution of special populations at risk.

4. Scoping - After obtaining a technical understanding of the proposal, identify the full range of probable social impacts that will be addressed based on discussion or interviews with numbers of all potentially affected.

After initial scoping, the social impact assessor selects the SIA variables for further assessment situations. Consideration needs to be devoted both to the impacts perceived by the acting agency and to those perceived by affected groups and communities.

Relevant criteria for selecting significant impacts include:

- Probability of the event occurring;
- Number of people, including indigenous populations that will be affected;
- Duration of impacts (long-term vs. short-term);
- Value of benefits and costs to impacted groups (intensity of impacts);
- Extent that the impact is reversible or can be mitigated;
- Likelihood of causing subsequent impacts;
- Relevance to present and future policy decisions;
- Uncertainty over possible effects; and
- Presence or absence of controversy over the issue.

5. Projection of Estimated Effects - Investigate the probable impacts.

The probable social impacts are then formulated in terms of predicted conditions without the actions (baseline projection); predicted conditions with the actions; and predicted impacts which can be interpreted as the differences between the future with and without the proposed action.

It is also important to analyse impact equity (the old, the young, and the differently-abled) and to identify clearly who gains and who loses from the project.

6. Indirect and Cumulative Impacts - Estimate subsequent impacts and cumulative impacts.

Indirect impacts are those caused by the direct impacts; they often occur later than the direct impact, or farther away. Cumulative impacts are those impacts which result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes them.

7. Changes in Alternatives - Recommended new or changed alternatives and estimate or project their consequences.

Each new alternative or recommended change should be assessed separately.

8. Mitigation - Develop a mitigation plan.

A social impact assessment not only forecasts impacts, it should identify means to mitigate adverse impacts. Mitigation includes avoiding the impact by not taking or modifying an action; minimizing, rectifying, or reducing the impacts through the design or operation of the project or policy; or compensating for the impact by providing substitute facilities, resources, or opportunities.

3.3 Review of relevant documentation - The TOR for the Environmental Impact Assessment

One of the key items in the Highway Reroute Movement's (HRM) objection to the proposed Debe to Mon Desir segment of the highway is the lack of an SIA.

It is noted at the outset that there is no specific requirement for an SIA in the TOR. However the TOR relating to the EIA for this highway segment was examined to glean what is required of the project proponent that could be identified as elements of an SIA.

The TOR for the Debe to Mon Desir segment of the proposed highway contains many of the elements described above as being required for an acceptable SIA, although they are not specifically identified as such.

For example, the TOR in Section 1.2 describes the objectives of the environmental assessment as follows:

“The scope of the environmental assessment will be to determine the extent of environmental and social impacts arising from the proposed highway alignment from Debe to Mon Desir and at the same time examining the cumulative impacts from ongoing and other proposed development for the southwest Trinidad. It will also include a management plan to provide mitigation measures to deal with the negative impacts, a monitoring plan to gauge effectiveness of mitigation, and an assessment of the risks and hazards associated with the activity. The timely provision of adequate data to support the environmental assessment process is important.”

The highlighted phrases point to key elements of an adequate SIA.

More detailed requirements for the SIA are embedded in those specified for the EIA. These are highlighted below from the TOR document.

3.4 The Study Area

The study area should be **determined by the extent of direct and indirect impacts on the physical, biological and social environments**. This should include the location of the proposed Right-of-Way (ROW) for the proposed highway extension, adjacent forested lands, wetlands, roads, rivers, streams/tributaries, major natural gas pipeline corridor, industrial sites, quarries as well as surrounding communities in and adjacent to the project site that can be affected by noise, dust, surface runoff and traffic during site preparation and construction. **The study area should also identify adjacent and proposed developments in southwest Trinidad.**

The most detailed requirements for the SIA are described in the TOR document under Section 2.3.3 headed Socio-Cultural Environment. The requirements are as follows:

- Describe the project area in terms of past and present land use as well as development plans.
- Identification and location of all human settlements (including ribbon development) impacted by the proposed project as well as support activities. This should be presented using suitable maps and in relation to the proposed ROW;
- Determination of the socio-economic and cultural activities that take place presently in the project related area (both year-round and seasonal);
- Description and qualification of the area in terms of past, present and proposed planning and land use. This should include a statement on the compatibility of the highway design with the areas where it is proposed to be located;
- Identification of occupants of parcels located in the project area subject to relocation/ resettlement using cadastral information as related to the proposed ROW;

- Employment and labour market – indicate opportunities for employment generation and the availability of such employment in affected communities;
- Compatibility of the proposed highway alignment in the context of industrial development and existing infrastructure with particular emphasis on oil and gas sector, as well as related downstream industries;
- Customs, aspiration and attitudes – indicate the acceptability of the proposed project to nearby communities such as South Oropouche, Debe (with particular reference to Bunsee Trace and San Francique Road), Avocat, Pluck, Thick and Mon Desir as well as other stakeholders who use the area for commercial and recreational activities, environmental non-governmental organizations and community based organisations;
- Agricultural and fishing activities (with details of acreages and types of crops/ species harvested);
- Determination of emergency resources, indicating if the existing resources can adequately respond to a potential increase in emergencies;
- Existing roads, bridges, traffic in relation to ongoing and future activities (including other highway extension works on this overall project);
- Existing and proposed infrastructure including, but not limited to, water (inclusive of well fields and associated treatment plants), electricity, telephones, oil and gas infrastructure, sewerage systems as well as buried utility lines affected by the proposed development;
- Assessment of archaeological artefacts/ historic sites in the wider study area;
- Traditional uses of the study area, access routes, planned and approved future activities.

Identify all significant impacts that could arise during the different phases of the activity, and after the completion of the project.

Human Beings

- Relocation and resettlement, loss of property, disruption of daily life;
- Disruption of traditional access routes and uses of the area during and subsequent to the project such as agriculture, fishing, recreation, community facilities and institutions;
- Labour force (short and long term);
- Archaeological and cultural resources;
- Disruption to the quality of life as perceived by resident communities and other stakeholders;
- Suitability of the use of pesticides, fertilizers and other project related chemicals for use near human settlements;
- Loss of crops and livestock due to possible flooding resulting from project based activities;
- Provide a proposal for compensation to persons affected by loss of property, relocation, loss of income, etc.
- Demonstrate consultation with affected property owners and tenants to address the resolution of grievances.

In addition Section 2.8 outlines the monitoring requirements as follows:

A detailed monitoring plan must be provided for the different phases of the project to ensure that mitigation measures are achieving their objectives and where this is not so, contingency plans should be described to minimise adverse situations that may arise. Monitoring programmes should address the physical, biological **and social impacts and the parameters to be monitored and their respective frequencies of measurement must be stated.**

Finally, the consultation and public participation requirements are outlined in Section 2.9 as follows:

*“Consultation and public participation can assist in identification and mitigation of impacts while **preventing** environmentally unacceptable development, **controversy**, **confrontation and delay**.*

The stakeholders that can assist in the provision of information relevant to the project should be determined and their input into its feasibility sought as it relates to the impact assessment process.”

Summarizing the above, the TOR for the EIA requires the following elements as they relate to an SIA:

- Identification of stakeholders and implementation of consultation and public participation measures.
- Identification of areas of direct impact and the wider areas of influence in the South Western peninsular
- Description of the relevant human environment
- Identification of the social impacts of the highway *and* of its alternatives
- Development of mitigation measures
- Development of monitoring plans

The actual SIA elements contained in the EIA report are now examined from two viewpoints viz.

1. To what extent it conforms with the requirements of the TOR and to “best practice”.
2. To what extent it addresses issues raised by the HRM.

3.5 Conformity with the Requirements of the SIA and with “Best Practice”

In our view, a major failing of the SIA components of the EIA related to the Debe to Mon Desir segment of the Solomon Hochoy Highway Extension to Point Fortin project begins with inadequate scoping. The scoping phase of an SIA is designed to determine “the full range of probable social impacts”. These include the geographic scope (the study area) and the issues scope. Having defined the scope, the determination of stakeholders, issues impacts and acceptable mitigation becomes clearer. The scoping exercise requires a clear definition of the project so as to be able to determine the areas of direct impact and the areas of influence.

3.6 Geographic Scope

The project has changed several times since its inception. It has most recently been described as follows:

‘The “Sir Solomon Hochoy Highway Extension to Point Fortin” project consists of two separate, but connected roadway corridors, plus numerous local road network connections. The first corridor will consist of approximately 33 km of new highway from the Golconda Roundabout to the Dunlop Roundabout near Point Fortin, including Mon Desir Interchange. The second corridor involves the widening and reconstruction of approximately 12 km of the Southern Main Highway and Southern Trunk Road from Dumfries Road to Delhi (Mon Desir). The project therefore affects or is directly located within the Penal-Debe Regional Corporation, San Fernando City Corporation, Siparia Regional Corporation, and Point Fortin Borough Corporation.’

Source: Sir Solomon Hochoy Highway Extension to Point Fortin Traffic Volumes and Operational Analysis Report (Halcrow).

Note that this definition recognises “two separate, but connected roadway corridors, plus numerous local road network connections.”

If the Halcrow definition is accepted it is clear that the geographic scope of the project is considerably expanded and that SIAs need to be done along both corridors. **No SIA studies have been found relating to the segment relating to the “widening and reconstruction of approximately 12 km of the Southern Main Highway and Southern Trunk Road from Dumfries Road to Delhi (Mon Desir).”**

With respect to the second roadway corridor, the Debe to Mon Desir segment, two studies have been examined which have relevance to the SIA requirements of the project viz.:

1. Final Report on Feasibility Investigations: Volume 3 - Potential Socio-economic Impact Submitted by Roy Mc Cree and Richard Braithwaite in association with LEA - Trintoplan Consultants Ltd. and Ecoengineering Consultants Ltd. April 2006.

2. The Ministry of Works and Transport: Highway Extension to Point Fortin: Debe to Mon Desir.
Appendix L. Attitudes to Proposed Highway.

The Mc Cree and Braithwaite report does not clearly delineate the geographic scope of the project and relies on secondary data (Census et al) relating to the counties, wards and communities, surrounding the proposed highway. As an example the data relating to unemployment and poverty reads as follows:

The average rate of unemployment throughout the decade of the 1990's was 19.5 percent for St. Patrick and 23.9 percent for Pt. Fortin. Historically, Point Fortin has had the highest level of unemployment of all regions in the country which stood at 24.4 percent in 2003 compared to the national figure of 10.5 percent (CSO, 2003). The corresponding figures for St. Patrick (13.4%) and Victoria (12.7%) were relatively much lower and closer to the national figure. The establishment of an LNG Plant in Point Fortin in 1995 therefore, seems to have had little sustainable long-term impact on unemployment in the Borough and its environs. The historically and relatively high levels of unemployment may also help explain the relatively high levels of poverty in the two main regions. In St. Patrick, for instance, despite the relatively lower level of unemployment, the incidence of poverty stood at 34.9% in 1997/1998 compared to the national average of 24% (IADB, 2005: 54), while the figure for Victoria also remained high at 33% (ibid.). In Point Fortin, the level of poverty level stood at 36% in 1992, the most recent year for which data are available for that region (Survey of Living Conditions, 1992: 25).

Even in 2006, some of the data was outdated (1992) and there was no attempt to obtain current data that would be relevant to the actual areas of direct impact which were undefined in the Report. This Report is inadequate even as a description of baseline conditions.

With respect to the second major document containing data relevant to an SIA (*Appendix L Attitudes to the Proposed Highway*), three features are noted which make the study inadequate viz:

1. Inappropriate use of data gathering techniques
2. Restriction of the target groups of the surveys to those directly in the ROW and who were earmarked to be displaced.
3. Failure to clearly identify impacts in such a manner as to be able to quantify them for cost benefit analysis and for purposes of mitigation.

The report notes that its sources were as follows:

- Focus Group Meetings with Village Council Representatives,
- A Questionnaire Survey of House Owners,
- A Questionnaire Survey of Business Owners,
- A Questionnaire Survey of Institutions,
- Meetings with the Penal / Debe Regional Corporation and Siparia Regional Corporation;
- Public Consultation Meetings.

The document further stated that “specific information on the relocation preferences of home owners, businesses and institutions was acquired from questionnaire surveys,” and that “in order to collect socio-economic information for this EIA, focus group meetings were set up at the Debe Community Centre, the Fyzabad Regional Community Complex and the Delhi Road Hindu School.”

The first point to note is that the use of focus groups to collect socio-economic data is inappropriate. The sample of persons in such groups is small and typically not representative of the population of interest. Such groups are very useful to gain insights into socio-cultural issues such as lifestyles and stakeholder identification. These then have to be followed up using surveys and depth interviews of a representative sample of persons in the areas of direct impact and the areas of influence.

The socio-economic data collected from the groups was general and vague and could not be used in either identifying precise impacts or in quantifying costs and benefits. Typical questions and responses from the focus groups are shown below to illustrate:

Q: What percentage of the population of this area depends on agriculture today for a livelihood?

R: About 60-70% of the population depend on agriculture.

Q: What are the main agricultural and fishing activities in this area?

R: Growing all the major crops (short crops, citrus, etc). Fishing activities include commercial and recreational.

Q. What types of crops are grown in this area?

R: Every kind of agricultural crop is grown in this area (short term, long term)

Q. What types of fish are caught in this area?

R: The types of fish caught in this area include cascadura, tilapia, and coscorub, three types of sardine, wabine, crapaud fish, grand ecaille, brochet, mullet and catfish. The villagers also mentioned that they caught crabs and crayfish and said that there are caiman in the rivers in the area.”

It is unclear why detailed data on the “agricultural and fishing activities (with details of acreages and types of crops/ species harvested)” - required by the TOR - was not sought from the Ministry of Food Production, Land and Marine Affairs (MFPLMA) in the area.

A single visit to the regional offices of the MFPLMA in Debe on Jan 30 2013, yielded data on the Oropouche State Lands Section III with respect to: total acreage (40 hectares comprising 97 parcels), average size of holding (.08 hectares – 2.46 hectares); total acreage cultivated (12 hectares), total number of farmers (approximately 60), total number of active farmers (approximately 20) and crops cultivated (vegetables- mainly ochro and bodi).

The Agricultural Officer noted that in the Section III Block:

- Approximately 50% of the Block was affected by salt water intrusion and depending on the tidal activity, 90% could be affected.
- The majority of the Block was abandoned with cultivation taking place only in the dry season. The last occupancy survey done in 2012 indicated that only 17% of the Block was cultivated.
- There was no water or electricity on the Block.

If this data was obtained and evaluated it would have signalled, inter alia, that the cumulative effects on agricultural production of the proposed highway segment could be extremely significant. This is in the light of the 90% salt water intrusion and that only 17% of the Block was under cultivation.

The same issue of inappropriate data collection techniques arises with respect to travel data in the areas of impact. A sample of focus group questions and responses follows:

Q: Roughly what proportion of workers travel out of the area to their jobs?

R: It was felt that approximately 90% of the workforce who reside in the Debe and San Francique areas travel outside of the area to work, this being mainly to the north within the San Fernando area. This is mainly attributed to the presence of no industries in the area and lack of job opportunities. It was estimated that less than 10% of villagers depend on agricultural practice for sustenance.

Q: Roughly what proportion of students travel out of the area to go to school?

R: Approximately 50% of pre-schoolers attend classes in the local community while the remaining 50% attend schools that are nearer to where their parents work. Approximately 25-30% of primary school students attend school in the local communities.”

Accurate data on travel patterns was required however the estimates given are unreliable.

With respect to the Survey of House Owners, the report notes:

“To make way for the construction of the highway extension from Debe to Mon Desir, 150 houses are earmarked to be acquired. In 2006, an attempt was made to interview the occupants of all such properties, and at that time the occupants of 122 of those houses were interviewed. The remaining 28 were not interviewed for a number of reasons: some simply declined to be interviewed, others wished to consult with their lawyers before answering the questionnaire (and did not get back to us), and still others could not be contacted. Those 122 interviews form the primary basis for this section of Appendix L.”

Note that the house owners interviewed did not include any that were nor directly in the ROW – a major omission in the determination of social impacts. All of the data collected on the ROW properties to be acquired, should have been collected on a sample of households in say a 2-4 km wide band on either side of the proposed roadway. (The exact area depends on the definition of the area of direct impact and may

be wider) This includes data on commuting, location of employment, and age structure of households (to assess vulnerability of the old and children) and community structures.

The report however, clearly identifies the objections of the homeowners to the proposed segment of the highway. It notes in this regard that:

“Residents of the Debe to San Francique area objected strongly to the proposed alignment of this highway segment, and the Ministry of Works and Transport instructed that other alignments should be considered, including an alignment suggested by the residents between Debe and San Francique.”

The failure to identify this group as a critical stakeholder is reflected in the fact that many years later the issue has escalated to a point of major contention.

The report also notes:

“As it turned out, the original alignment proved to be the preferred option (see Appendix P), but the review of options delayed the completion of the EIA by almost two years. For this reason, it was deemed prudent to re-interview a sample of the households to identify any changes in attitude. This was done in October and November, 2008, when 40 randomly selected households (eight from each area), were re-interviewed.”

Note that because of the two year delay caused by these objections “it was deemed prudent to re-interview a sample of the households to identify any changes in attitude”. It seems strange that a further four year delay in the execution of the project elicited no similar desire to revisit the communities to identify any changes.

The Survey of Business Owners related to a survey of four business owners earmarked for acquisition to make way for the construction of the highway extension from Debe to Mon Desir. The same criticisms apply to this portion of the study viz:

- Its restriction to business owners earmarked for acquisition rather than a random sample of businesses in the areas of direct impact.
- Failure to clearly identify impacts in such a manner as to be able to quantify them for cost benefit analysis and for purposes of mitigation.

Similarly the Survey of Institutions was restricted to the two that were earmarked for acquisition with attendant limitations. The two were:

- The ASJA P.C.O.L. Mosque
- The New Testament Church of God, Miracle Fountain of Life Ministries

The limitations of the SIA related reports of the EIA were recognised by the EMA which noted in its response (RAR) to the CEC submission that:

“The EIA report does not provide enough detail with respect to socio-cultural environment as evidenced by Section 4.4.3.1.3 of the EIA report. This section stated that “the question on future development of their community may have been posted to the wrong group, since that would be best answered by Government agencies” is rather ambiguous and the EIA should address and make recommendation on the future development of these areas. Also Section 4.4.3.1.3 mentioned that a ‘social mechanism must be part of the construction phase to meet and treat with immediate concerns of residents’. However, these social mechanisms were not identified, neither was the process outlined. The EIA report required a more in-depth investigation and analysis of the socio cultural environment. It is suggested that a detailed justification be provided for the methodology employed in the study.”

The EMA went on to note:

“Section 4.4.3.1 as well as Appendix L of the EIA report, deals with feedback from meetings with the Village Council Representative. Unfortunately, these venues did not attract a wide enough cross- section of the community in order to get comprehensive feedback. Further research is indispensable with respect to community and institutional structures, political and social resources, individual and family changes and community resources. The information provided in the EIA report indicated the communities affected by the highway were not consulted in a meaningful way to assess the impacts of the proposed ROW so as to effectively mitigate potential impacts.”

The response of the developer, the Ministry of Works and Transport, was extraordinary. The MOWT responded as follows:

“We strongly disagree with the statement that communities affected by the highway were not consulted in a meaningful way. The comment above focuses only on the focus group meeting with Village Council Representatives. It ignores meetings with the two Regional Corporations (see Section 9.2 of the EIA Report), questionnaire surveys with 136 property owners (see Section 9.3 to 9.5) and 4 public meetings attended by 380 persons (see Section 9.6). All of these are for a documented in Appendix L.”

Since the CEC *was* granted, it can be assumed that the EMA accepted the response of the developer – an even more extraordinary outcome in the opinion of the reviewer.

3.7 Evaluation of Issues Raised by the Highway Reroute Movement

The most comprehensive statements on the SIA submitted by the HRM were papers delivered to the Highway Review Committee by Terrence Boodhai and Dr. Jolynna Sinanan.

Mr Boodhai summarizes his case for not constructing the Debe to Mon Desir segment of the highway as follows:

1. According [to] the EIA Report (Jun 26 2009) submitted by the Ministry of Works of Trinidad and Tobago, this highway will achieve certain objectives related to the social development of the region through which the highway passes.
2. The EIA does not identify how these objectives will be achieved.
3. The EIA does not seriously consider the severe negative and permanent impacts that the highway will have on the social fabric of the communities.
4. A scientific and objective Social Impact Assessment was not done for Debe to Mon Desir highway
5. The highway should not be constructed on the basis of these severe negative and permanent impacts which cannot be mitigated.

He notes that based on the objectives outlined in the EIA, it is clear that “social development is a key theme of the highway”. This social and economic development is to be achieved because (according to the EIA):

- There would be increase in potential for agricultural production and distribution.
- There would be increase in residential, industrial, and domestic and foreign tourism development.
- Previously small settlements would be encouraged to expand and additional areas would be opened up to built development and services.
- The increased accessibility afforded by the highway will tend to generally increase property values and so be a benefit of this project.

The focus here will be on the social development aspects of the HRM position as outlined by Mr. Boodhai as the economic costs and benefits will be addressed in another HRC reviewer’s report.

Mr. Boodhai notes that:

“Social development is hinged upon the creation and sustaining of social capital. It is achieved through:

- *Development of social networks*
- *Promotion of family life*
- *Recreational facilities for communities*

- *Enhancement of quality of life of community groups*
- *Development of systems and policies that protect the poor, disadvantaged and vulnerable groups in the community, namely the elderly, women and children.*
- *Promotion of health and well-being, both physical and psychological*
- *Provision of security*

However, the EIA does not address any of these key areas. It does not elucidate how the proposed highway will achieve or help to facilitate any of the above.”

Dr. Sinanan concurs. She notes that:

“The EIA suggests there will be benefits to the community. But this is based on speculation. It doesn’t provide either evidence or calculations...”

The above conclusions of Mr Boodhai and Dr Sinanan (and by extension, the HRM) that the EIA “does not elucidate how the proposed highway will achieve or help to facilitate [social development] is clearly correct.

Dr Sinanan spent two days in the area (Debe to Mon Desir) to elucidate some of the social impacts which would relate especially to elderly women and children; issues of impact equity. She is well aware of the preliminary nature of the findings (given the short time period and the small samples of people interviewed) but they are instructive for three reasons:

- Firstly, they illustrate the need for data.
- Secondly, they illustrate some of the techniques used world wide in assessing social impacts of this nature
- Thirdly, they illustrate what a scoping study even of such short duration could achieve in terms of study area definition, issue identification and selection of significant impacts to be further investigated in the full SIA.

She notes:

“In the absence of an adequate SIA, I spent two days in the area of the proposed segment of the highway and spoke with people who are going to be affected, whether they would be remaining in their homes or relocated. I focused on elderly people and on women in particular, because as seen in worldwide trends, in initiatives for the purpose of development, it is often women and the elderly who are affected the most and are often left behind in the consultation process (Moghadam, 2005).”

The sample of 40 women living outside of and within the ROW was interviewed on two separate days.

Sample I

The sample consisted of “20 people aged over 60 were spoken with in Gopie Trace, Banwarie Br. Trace #1, Jokhan Trace and the immediate vicinity who are living in the proposed segment of the highway.”

The general findings are summarized as follows:

“We don’t have to look for anything, it have everything here”.

The average time that had been spent on extending and repairing a property: 10 – 15 years, which implies accumulative resource investment put into homes. This has not been taken into account in remuneration.

Most households have multiple streams of income: in addition to their pension, people in this age group also rely on small farming (garden and animal rearing), which they suggest contributes to sustaining the household, allowing them to depend less on grocery and market shopping. Many also receive contributions from their children (from professional and informal sectors, suggesting a strong informal economy as well.)

Health problems and accessing health care are the key concerns, most travel to the health clinic and pharmacy because it is easy and convenient, most respondents did not want to burden their families with asking to be transported or their families worked and could not be available to transport them during the day.

Those who face relocation are concerned with how they will access health care that they need on an ongoing basis, and for those who remain, they are concerned how the section of the highway will disrupt their means of travelling by taxi, which at the moment is relatively close to their homes (100 – 200m walking distance).

Most respondents are independent and self sufficient and some are primary caregiver for grandchildren and relatives with special needs (such as physical disabilities). Half of the respondents care for grandchildren while the parents are working; the social support they provide will be disrupted in the cases of relocation and could have a detrimental effect on the parents and their livelihoods.

Apart from travelling for necessities: grocery, market and health care, the ‘quality of life’ for many of the elderly surrounds home life; their homes are comfortable due to the accumulation of extensions and renovations which have been undertaken in over a decade and family and friends visit every day to every few days. Although they largely remain at home, social and emotional support from family and friends is still available and close at hand. (This suggests a tight knit system of social capital and social support that again has been accumulated over decades.)

Sample II

This sample consisted of: “20 women between the age of 22 and 68 were spoken with in Murray Trace, Doubles Trace, Debe Trace and Banwarie Br Trace and the immediate vicinity who are living in the proposed segment of the highway”.

The general findings are summarized as follows:

Women are the primary caregivers for 2 children on average; half also care for an elderly relative or a relative with special needs.

In addition to care giving, half are responsible for all grocery and market shopping and rely on taxis for transport. They find this a safe and convenient way to travel. Half rely on their husbands for transport and occasionally husbands without their own means of transport will travel to obtain household necessities.

For women with children in primary school (one third of respondents), children attend school nearby. For children who travel, their parents' main concern would be, even if they remain in the area affected and are not required to relocate, how will the proposed section of the highway affect their safe accessibility to school. A key concern is whether adequate pedestrian walkways have been considered.

All respondents have close relatives living nearby, siblings and in-laws. Those with children (Three quarters of respondents) describe their children as growing up in a close-knit and safe environment; this is the aspect of 'community' which not only means a great deal to them, but comprises of an intact network of support. For those who are being relocated (One quarter of respondents), one of their key concerns is with potential separation that comes with the relocation of individual nuclear families from extended family.

Such information is rich and nuanced and gives a clearer picture of the social impacts than is available in the SIA data presented in the EIA and allows for a better basis for classification of impacts and the need for mitigation.

Mr. Boodhai lists the social impacts outlined in the EIA:

- Acquisition of Homes
- Acquisition of Institutions
- Transportation impacts (road congestion and damage to existing roadways)
- Air quality
- Disruption of Current and Traditional Uses (Agricultural Lands)
- Land Use Conflict (Squatting)
- Severing of Communities
- Loss of Business Opportunities

He notes that *“there are several shortcomings in the method by which data was collected, the accuracy of the results, an assessment of the impacts (in particular those that are significant negative and permanent) and a general understanding of the local social context and community values and norms of the affected persons along the route.”*

The above comment by Mr Boodhai is one with which this review fully concurs.

3.8 Evaluation of NIDCO's Position on the SIA

One of the major issues in the HRC review with respect to the SIA is that NIDCO seems to be of the opinion that the SIA data from past studies is adequate to guide the present construction of the project.

While under the design-build arrangement an engineering consulting firm (Halcrow), has been appointed to ensure proper design and standards from an engineering viewpoint, no such arrangement is thought to be necessary to determine, assess and monitor social impacts as the design of the highway changes.

There is ample evidence that the data on which the original designs were based have now changed substantially.

The recent report by APDSL with respect to traffic flows and volumes is a case in point. It notes in part:

The Lea-Trintoplan Traffic Study (2005) found that analysis of their origin and destination survey showed: (a) A high proportion of traffic from San Fernando and from the Solomon Hochoy Highway as destined for areas close to San Fernando; (b) Total traffic levels entering and passing through Point Fortin at about one quarter of those totals immediately south of San Fernando; (c) A small long-distance traffic component travelling between San Fernando and Point Fortin; and, (d) A preponderance of relatively short-distance traffic in the overall travel patterns in the study area. They concluded that the attractiveness of new routes through the study area will depend upon convenient access to local areas along any such route in addition to providing for the small volumes of long-distance traffic.

The current study found major differences from the Lea-Trintoplan work. Figure 3.1.1 gives the Travel Desire Lines for daily weekday two-way Total Vehicle Trips in the study area. It shows that (1) more than 10,000 vehicles travel daily between the northern and southern external zones; (2) more than 6,000 vehicles travel daily between the northern external zone and Debe Proper; (3) more than 6,000 vehicles travel daily between the northern external zone and Penal Proper; (4) about 3,000 vehicles travel daily between Siparia and the northern external zone, and a similar number between Siparia and the internal aggregated zones containing Fyzabad and Oropouche; (5) about 3,000 vehicles travel daily between the northern external zone and Barrackpore and Palmiste/Philippine; (6) more than 6,000 vehicles travel daily between the northern external zone and the internal aggregated zones containing Fyzabad and Oropouche; (7) about 6,000 vehicles travel daily between the northern external zone and La Romain /Duncan Village.

These changes imply significant changes in social impacts as well as costs and benefits, and suggest that these should be monitored using rapid assessment techniques.

3.9 Implications of Pros and Cons of the Social Impacts of the current Alignment in relation to Proposed Alternatives.

The fundamental determination of this review is that there is not enough data in the current EIA to adequately assess the social impacts, to classify them in terms of severity and to plan adequately to mitigate them.

3.10 Recommendations

The review suggests that there are several severe potential social impacts which have not been properly evaluated and that this phase of the highway should not proceed until the following has been done:

- Rigorously define the study area of direct and indirect impact. This includes areas outside of the ROW and may include quarrying areas in the Northern Range and Sangre Grande.
- Conduct an EIA based on data that is relevant and current, using techniques and personnel that conform to accepted best practice.
- Quantify the impacts where feasible. This includes estimates of the value of current methods livelihoods, transportation costs related to work, school, recreation etc.
- Ensure that SIA studies include alternate routes proposed by the HRM and NIDCO.

4.0 HUMAN SETTLEMENTS

“How you shape the land so will you shape the civilization.....Community viability is one of the main pre-requisites for sustainable development.”

Objective: To review the human settlements structure of the communities within the Debe to Mon Desir segment of the highway alignment.

4.1 Ethos & Working Definition

Human Settlement is an all-embracing approach to the sustainable development of the living environment. It incorporates shelter and housing; land use, land ownership and land development; productive economic activity particularly related to job creation in the formal and informal sectors; the quality of relationships within the community; the development of infrastructure; the provision of social services and recreational, sporting and cultural facilities. It is an approach requiring integration, cooperation and coordination which makes paramount the need for community participation. It generates important linkages with agriculture and tourism development and village revitalization.

4.2 Concept & Context

“To change your language you must change your life” – Codicil, Derek Walcott

“To change the world you have to change your language”- Lloyd Best

- In the context of the small islands of the Eastern Caribbean and, in particular, the infrastructural initiatives proposed for the South West Peninsula of Trinidad, the choice of language and modes of communication are of critical importance. Land settlement is about people and the way they inhabit and shape the environment over generations. In a development context, such sensitivity is vital for negotiating and balancing needs in order to avoid the collision of interests that could damage a nation’s path to development and progress.
- Caribbean solutions to Caribbean problems must be drawn from a deep understanding of the Caribbean reality that is based on a scientific and empirical approach. This requires walking the land, listening to the voices and rejecting notions of development based on formulaic, one-size-fits-all solution that automatically privileges the grandeur of the “mega” over such concepts as staging and scoping.

Modern and progressive concepts of land settlements draw as much from Art as from Science and is expressed as equally in poetry as in engineering. Here in the Caribbean, we can find our way to land settlement options and solutions through:

- the poetry of Cesaire, M.G. Smith, Walcott
- the novels of Lovelace, Naipaul, the Guyanese Harris (who was a Land Surveyor)
- the writing of Fr. De Verteuil, Bridgette Bereton, Michael Anthony
- the music of Marley, Tanker, Kitchener, Sparrow, Rudder
- the Costa Rican architect Jimenez who works in the USA and who publicly attributed his design of a complex on the outskirts of Dallas, Texas to the novels of John Steinbeck.

4.3 Background

4.3.1 The major development centres in the South West Region of Trinidad are the industrial centres of Point Fortin and La Brea and the city of San Fernando. There has always been a need to connect these centres in a highway-type artery.

4.3.2. Based on engineering designs and environmental considerations between 2006 and 2010 the Government of Trinidad and Tobago decided to make this connection via two highway routes from the Golconda Interchange (GI) at the southern end of the Solomon Hochoy Highway:

- 1) The North Highway (NH) westward from the Golconda Interchange onto the South Trunk Road, then onto the Southern Main Road along the Mosquito Creek to St. Mary's Village and then onto Mon Desir Village.
- 2) The South Highway (SH) eastward from the Golconda Interchange west of Golconda Village between the San Fernando Erin Road and the M2 Ring Road, skirting Debe on the west, southwards across the eastern end of the Oropouche Lagoon, then southwards touching the villages west and north of Penal and Siparia, skirting Fyzabad on the north and then onto MonDesir where it connects with the North Highway. **This is the highway route that is under review.**

From Mon Desir, the route becomes a single highway westward onto La Brea and Point Fortin.

4.4 The Settlements

The South Highway route impacts on those settlements that have grown out of economic endeavours pursued since Emancipation in 1838 and which over time have developed into well-established living environments. Over the many years the economic endeavours focussed on the achievement of sustainable development, generating a communal rhythm to everyday living.

4.4.1 Over the course of the past 175 years, the economic activities in this region included:

- Cultivation of cocoa on the higher ground south of the Oropouche Lagoon and embracing Penal, Siparia and Fyzabad.
- Cultivation of sugar cane straddling the lands mainly to the north and east of the Lagoon – Debe, La Romain and Barrackpore.
- Settlement land usage responses appropriate for sustainable development - residential, communal, religious, commercial, agricultural gardening, recreational outlets.
- Cultivation of rice alongside freshwater fishing in the Oropouche Lagoon with the planting of foodcrops here during the dry season.
- Petroleum exploration and production from the first decade of the 20th Century when oil is discovered in Barrackpore, the outskirts of Penal and Siparia and Fyzabad, giving rise to a range of contracting enterprises (some of which are now quite substantial) and fuelling employment which, in turn, led to the consolidation of labour unionism.

Many residents of the settlements have a long generational connection to the Region with the result that some landholdings comprise multi-family occupation. Like long-settled communities everywhere, there are bonds of trust and cultural kinship which translate into high communal activities and low crime rates.

4.4.2 From a human settlement perspective, the scoping domain adopted for the purposes of the Environment Impact Assessment (EIA) is not adequate for arriving at an informed position. In the context of the expenditure on the overall highway Project, the whole Peninsula and regions east of it should be the Study Area in order to support decisions that maximise the benefits to be derived from the highway project which is the country's most expensive infrastructure investment ever. This is especially important given the historically high levels of unemployment and poverty in the St Patrick region.

4.4.3 **Affected Areas**

“You see that ground? Constantine played cricket there when I was a young man. I never forget” – Moruga resident to youthful land surveyor involved in the survey of plots of the Robinson Estate to tenants in the 1970s.

- Debe and Penal are connected via Rochard Douglas Road to the Village of St. Mary's on the Moruga Road (where a Regularisation Project for the Land Settlement Agency is currently in the design stage). St Mary's is a semi-urban hub with access to Princes Town to the north, Grand Chemin to the south on the coast and, via Saunders Trace eastward to Rio Claro and Guayaguayare. The roads are in deplorable condition but have supported sugar-cane production and petroleum exploration and production in Barrackpore and Guayaguayare.
- Penal connects to Grand Chemin (Moruga Village) via the Penal Rock Road. Cocoa plantations embraced the connection with some quarrying and fishing with the later being a major enterprise. Moruga is an old, established community with a distinct cultural character that incorporates the environment, settlement patterns and history that does not end with only a re-enactment of the arrival of Christopher Columbus on Discovery Day.
- Siparia is at the Settlements centre – Debe and Penal to the north Fyzabad and Mon Desir to the west. This Settlement was another cocoa region but also gave rise to Palo Seco, the petroleum centre to the south, and further on to Erin on the coast. The journey westward from Erin connected to Cap-de-Ville and Point Fortin to the north. But the Peninsula has its furthest reach at Cedros and Icacos travelling westward from Cap-de-Ville. Part of this area's past is the cultivation of coconuts with the production of product. Importantly, Cedros is Trinidad's natural gateway to Venezuela across the Gulf with significant human traffic occurring across the Gulf and through the rivers of the Orinocco Delta.
- Fyzabad enjoys a landmark position along the road to Independence. The development of oilfields in Apex and Forest Reserve with connections to industry in Guapo and Point Fortin provided the conditions that created a highly politicised labour movement that led to the Labour Riots of 1937 which ultimately opened the way to political Independence in 1962, organised labour and the modern trade union movement of Trinidad and Tobago.

4.4.4 The above descriptions of the character of the affected communities make the case for broadening the scope of the Project beyond mere highway development to development of the Peninsula and neighbouring regions.

An enterprise lies before the Region that, if sensitively handled and planned with careful *staging*, has the capacity to stimulate the imagination, unleash our creative energies and get the most out of the major financial investment being made.

4.5 The Process

- 4.5.1 In terms of the process, the human settlement task is focused on the future viability of the settlements from the standpoint of their physical, psychological and cultural environments.
- 4.5.2 The EIA indicates that the section of the proposed highway from San Francique to Mon Desir, which is 11.1km long, has a Right-of-Way (RoW) of 100m (328ft.) which includes central median (9m), shoulders (4m), 4 lanes (14.6m) and clear zones (12m), totalling 39.6m. This leaves approximately 30m on each side of the Highway. The land acreage involved is approximately 67 hectares (165 acres) within which fall some of the residents earmarked for relocation. The actual length of the four-lane highway from Debe to Mon Desir is 16m.

In response to queries about the expansive 100m width of the RoW, NIDCO's President indicated to the HRC that it is being reduced in some areas to "maybe 60m" which will result in a reduction of about 50 percent in the properties that will need to be acquired.

The Construction Contract is design/build.. The nature of this contract is such that detailed engineering designs will include the final alignment of the Highway, the final RoW and the parcels to be acquired.

This means that the acquisition process and the construction process will proceed simultaneously. This raises the following questions:

- What time-frame is being given for those affected by the land acquisition requirements to move and be compensated?
- For those being offered relocation, what arrangements are being made for ensuring that the Relocation Site/s are ready for occupation at the point of relocation?

4.6 The Regional and National Context

- 4.6.1 At the time of review, a number of strategic studies of relevance to this major \$7.5 billion highway project are either on-going or have been completed. These studies are:
- National Spatial Development Strategy (NSDS) – Ministry of Planning and Sustainable Development. This is now being formulated to establish the development trends for the next 10 to 20 years. It is expected that this Report

should be finalised by April of this year. The South West Region has been designated as a major development area.

- Transport Study related to the Highway Rout as commissioned by NIDCO.
- The Quarry Study recently awarded by the Ministry of Energy. The Study is an – Strategic Environmental Impact Assessment to locate by Lidar Surveys the existing quarries in Trinidad and Tobago and to establish Mining Zones.
- The Draft Climate Changes Forest and Protected Areas 2010 (Completed)
- Feasibility Studies and Detail Designs for the South Oropouche River Basin Flood Mitigation & Integrated Watershed Management Project. To be awarded by NIDCO.
- Three Regional Plans – Ministry of Local Government (2009 – 2010) – Penal / Debe Regional Corporation Municipal Development Plan, Siparia Municipal Development Plan, Point Fortin Municipal Development Plan.

It should be noted that the overall findings of these studies could have a significant impact on the section of the Highway under review. The findings should therefore be taken into consideration in the official decision-making process, both in terms of the Highway Project and in charting the way forward in developing the South West Region of the country in a national development context.

4.6.2 The Routes and Alternatives

Several routes have been proposed in addition to the one that has been adopted:

- The current routes being pursued by NIDCO
- The routes suggested by the Highway Reroute Movement which would require the upgrading of the existing road network encompassing Debe, Penal, Siparia and Fyzabad and a by-pass connection from Golconda to Debe Highway westward from Debe to join the NH at the Paria Suites Intersection.
- Improvement of the Golconda Highway connection to the Dumfries Road Intersection while maintaining the North Highway to Point Fortin.
- Construction of the Golconda To Debe Highway in an early phase with a connection to an upgraded existing road network between Debe and Fyzabad. In a subsequent phase, construct a highway between Fyzabad and the Mon Desir Interchange.
- Upgrading of the connector roads from the four Settlements eastward, south and westward to the other settlements of the Peninsula and those onto its eastern fringe such as Grand Chemin and St. Mary's Village Moruga.

4.6.3 Relocation Sites

Two sites have been proposed for the relocation of affected residents: Petit Morne and Golconda.

- **Petit Morne (EMBD Project)** This site is north of Golconda Village. It is a proposed residential settlement offering single family plots at sizes currently used by the housing agencies. These are in the range of 465sq.m (5000sq.ft.). The records indicate that no approvals have been granted. Earthwork has been done and there is evidence of the road network having been cleared. Relocation to Petit Morne would take affected residents well away from their current environments and involve significant dislocation including school accessibility, family connections, and generational patterns of community. In addition the current approval and implementation process indicates that the availability of usable residential plots at Petit Morne cannot be achieved under two to three years. **This site is not recommended for Relocation.**
- **Golconda (EMBD Project 303acs. / 123ha.)** This is a large site lying just north of Debe on the eastern side of the M2 Ring Road and fringing Golconda Village to the north. There is no evidence of any application for land use approval for the site though it is designated for 2-acre farms for the relocation of farmers who may be affected by the Highway. However, although the site is designated for relocation of farmers, given its location with the UWI South Campus Debe near to the south west, Debe directly south and adjacent NAMDECO, **GOLCONDA is ideally suited for an Integrated Human Settlement.** What is envisaged is a place that captures the essence of the community life of the settlements of Debe, Penal, Siparia and Fyzabad.

The recommended option is an Integrated Human Settlement of *“village clusters”* combining a range of land usages designed with sensitivity to the topography and to the physical environment of the wider area. The usages will include:

- Residential – single family and multi-family residences designed and structured to provide for elbow room.
- Residential / Commercial – residence above small business below. A family endeavour in the village tradition.
- Homesteads – small farms (1–2 acres each) where the family can reside in an atmosphere conducive to organic farming with experimentation in this form of agricultural pursuits, provided for the farmers by NAMDEVCO and taught in the schools – primary, secondary and tertiary at the UWI South Campus Debe.
- Commerce – centres for business activity of various types and linked to some possible relocation of those commercial activities that currently cause congestion in the business centres of Debe and Penal.
- Communal Spaces – for schools as necessary, for parks (passive recreation), for playgrounds (active recreation), for cultural and religious pursuits.
- Government Agencies – to service the Region.

4.7 Recommendations

- Expand the Study Area to cover the South West Region so as to ensure that sustainable development possibilities can be viewed from the standpoint of the Human Settlement Perspective.
- Draw on current and ongoing studies to ensure integration development strategies are achieved.
- Embrace a staged infrastructural upgrading programme to substantially improve the road connections within the Peninsula and to those Settlements to the east which will have the effect of opening up possibilities for enterprising endeavours, job opportunities and economic pursuits.
- Let GOLCONDA be the chosen site for Village Expansion – an Integrated Human Settlement.

5.0 ECONOMIC COST BENEFIT CONSIDERATIONS

5.1 Sectoral Terms of Reference

The specific TOR for the Consultant Economist included, *inter alia*,:

1. Setting out a listing of criteria/indicators and methodology normally employed in the consideration of major infrastructure projects;
2. Reviewing documentation for any available cost/benefit considerations in respect of the Debe to Mon Desir segment of the highway.
3. Reviewing relevant oral/written submissions to further inform the review;
4. Commenting on the process employed in any cost/benefit analysis;
5. Considering the cost/benefit implications and any mitigation measures for the Debe to Mon Desir segment, taking into consideration the following:
 - Overall assessment of the direct/indirect and cumulative costs and impacts of the project;
 - The fact that a contract has already been awarded for the entire project; and
 - Implications for consideration of any realignment; and
6. Preparing an objective technical assessment of findings and recommendations for inclusion in the final Report of the Committee.

5.2 Methodology for Review of the Project

In an effort to make an assessment of the extent to which the Economic Cost Benefit Analysis (ECBA) process for this project was executed diligently (in the context of the Consultant's TOR) the following documents were reviewed :

- *Environmental Impact Assessment for Debe To Mon Desir Highway Segment (Rev. 1)*
- *Final Report on Feasibility Investigations, Volume 1 - Engineering and Economic Feasibility*
- *Final Report on Feasibility Investigations, Volume 3 - Potential Socio-economic Impact*
- *An Analysis Of Inputs For A Projected Strategic Cost Benefit Analysis For The Proposed Debe To Mon Desir Highway* (submitted by Dr. W. Kublalsingh)

The above reports were supplemented by:

- Personal interactions/meetings/accounts with NIDCO personnel ; members of the HRM (See Appendix 3)
- Review of the relevant literature which could inform the review including, *inter alia*, identification of best practices Documentation relating to environmental and social impacts of the proposed projects

In light of the abovementioned TOR three comments are made to provide a context for the review:

1. The literature (Bateman et al 2005) recognises that the CBA approach, when carried out comprehensively and impartially, has many distinct advantages over alternative appraisal systems. In theory, by minimising reliance on subjective decision making and imposing an

economic efficiency criterion, the system provides an explicit record of which impacts were considered and how that analysis was performed, including any assumptions regarding valuation. This should encourage inspection and provide a means of detecting any biases which may be present in political decision systems. When correctly executed the CBA approach allows options to be ranked according to their economic efficiency, ensuring that 'scarce' public resources are allocated in rational manner.

2. The role of ECBA in project evaluation - ECBA is a technique normally used to inform the economic feasibility of mega projects⁶ including projects such as the highway extension under consideration in this specific instance.
3. In completing a full-scale ECBA the preferred approach is one which includes social and environmental impacts – positive and negative – so that the full benefit or cost of the proposed project can be fully appreciated. In other words direct and indirect benefits and costs are captured and valued so that the overall economic feasibility reflects environmental, social and economic considerations that may impact on the sustainable development dimension of the project.

A mega-project can be defined as a particular investment which will have a significant national impact in terms of the economy, society and environment as follows:

- **Economic impacts** would include contributions to national employment, livelihoods/ poverty eradication/equity, foreign exchange/government revenue, deepening of knowledge and linkages across economic sectors and gross capital formation;
- **Environmental impacts** would address negative or positive changes in eco-system goods and services, human and environmental health impacts, and waste absorption capacity; and
- **Social impacts** would cover negative or positive changes in heritage or other cultural assets, norms and behaviour and impacts on communities.

5.3 Economic Cost Benefit Analysis Technique

The ECBA approach is a well-known and recognised procedure used to structure and analyse available information in the evaluation of public infrastructure projects to address the efficiency issue and the economic growth such projects may generate. Facilitating choice among projects and allocation of public resources are the two main objectives of the ECBA. This requires setting-up a base case and comparing other scenarios against it.

The technique is recommended for the appraisal of partially or fully publicly financed investment projects in order to allocate resources in a way most profitable to society. The objective is to set a monetary value for the benefits and economic costs of the project when compared to the base case. All elements of cost and benefit must be detailed and the appropriate monetary value attributed to them. The diagram at Figure 5.1 summarises the general process of conducting an ECBA. It is important to note that in an

⁶ The President of NIDCO noted that the project was the largest of its kind ever attempted in Trinidad and Tobago and attention ought to be paid to the public cost and seeking the public interest.

ECBA, it is also recognised that the market prices of goods and factors of production do not necessarily reflect their social value and costs respectively. Corrections to market prices are normally therefore made.

Traditional cost-benefit analysis of highway projects concentrates on savings in vehicle operating cost, maintenance cost, and time savings. The contention is that road projects create benefits that come in the form of savings of costs. They do not create revenues *per se* as in the case of other types of projects in which one may factor into the ECBA the “stream of revenues” that may arise from the project. In road projects, externalities are the major source of benefits, and the challenge is to internalise these externalities and thus give a measure and a value of the effects on vehicle operating costs, people’s time, their lives, and the environment, among other factors.

It is also recognised that investment in transportation infrastructure can generate substantial secondary benefits by reducing costs for existing productive activities, providing access to new areas with economic development potential, and triggering investment activities. These secondary benefits are usually translated in generated traffic, and are generally captured in the forecast activity.

Simply stated, public and private sector analyses differ in the nature and the range of benefits and costs taken into consideration. With public sector projects consideration ought to be given to the “earning power” of an investment not only from an individual point of view but from the national perspective. The Section below provides further details, including a discussion on Economic Valuation.

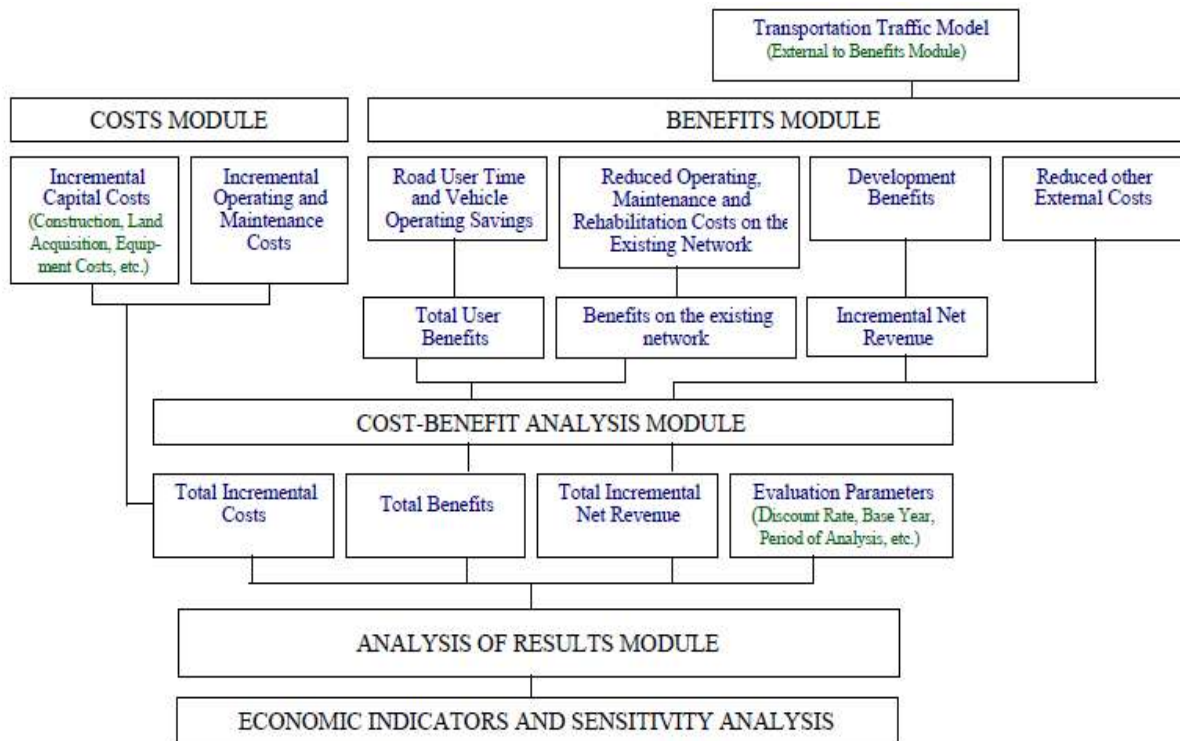


Figure 5.1: General Process of an ECBA

5.3.1 Best Practice for conducting Economic Analysis of projects which have a social, economic and environmental dimension

The following section provides some guidelines in terms of best practice for undertaking an economic analysis of projects for which there is an environmental dimension. “Environment” in this context is taken to mean both the natural and social environment. The section also includes summary information on the methodology involved in valuing “non-marketed” goods and services such as the psychological impact of an event on the well-being of an individual.

The World Bank (1998) notes that “Successful economic development depends on the rational use of natural resources and on reducing as far as possible the adverse environmental impacts of development projects. Environmental assessment (EA) is a primary tool for achieving this objective, by inserting critical environmental information into the process of project identification, preparation, and implementation. Economic analysis, by comparison, is employed to determine if the overall economic benefits of a proposed project exceed its costs, and to help design the project in a way that produces a solid economic rate of return. Adverse environmental impacts are part of the costs of a project, and positive environmental impacts are part of its benefits. Consideration of environmental impacts, therefore, should be integrated with the other aspects of the project in the economic analysis to the extent possible.”

The Bank goes on to state that, “...environmental costs and benefits should be quantified to the extent possible, and economic values should be attached where feasible.” This should be done for both alternative project designs and alternative mitigation options. Moreover, EA findings and recommendations should be taken into account in project appraisal and supporting benefit-cost analysis.”

In the first stage, the economic analysis will normally consist of estimating monetary costs and benefits (valuation) of the various environmental impacts identified in the EA, using a range of valuation techniques. In the second stage, the analysis is extended to consider the costs and benefits of preventive and mitigative measures, so that comparisons can be made with the original project impacts. At the third stage, the monetary values for the selected alternative are integrated into the overall economic evaluation of the proposed project. For the environmental impacts of a project to be valued, they must first be identified and measured. This is generally far from straightforward. Environmental impacts are often dislocated in time and space, making cause and effect difficult to establish. The severity of environmental impacts often depends on the accumulation of problems (over time, over space, or both). Many environmental goods and services do not enter markets, or do so only imperfectly. The difficulties this causes for valuation are compounded by the empirical limitation that available data are often scarce or of poor quality.

Benefit-cost vs. cost-effectiveness - Two approaches are possible to the economic analysis of environmental impacts. The first is to use standard benefit-cost criteria, in which the benefits of an action are compared to its costs to determine whether the action is worth undertaking. This approach is commonly used to compare alternative options and requires that the environmental impacts be identified and that monetary values be placed on the outcomes. In some cases, however, a traditional benefit-cost analysis may not be feasible or desirable. It may not be possible to make monetary estimates of benefits. For example, some natural areas may be so unique that it might be felt that they should be conserved at all costs. In other cases, there might

be substantial uncertainty about the benefits provided by environmental goods and services, either now or in the future, or great problems in determining appropriate values in monetary terms. When loss of these goods and services would be irreversible it may be desirable to choose the strategy that minimizes maximum possible losses due to environmental damage, unless the social cost to do so is unacceptably large - this is known as the safe minimum standard approach. In such cases, the appropriate approach to the analysis is one of cost-effectiveness rather than cost benefit; that is, the issue becomes one of finding the cheapest and most effective way of achieving the conservation objective or some other goal. Note that the cost-effectiveness approach **does** identify the most efficient way of reaching a goal, but does not indicate whether or not the expected benefits justify the costs.

Cost of Illness and Human Capital

The HRM suggests that the prospect of the project being executed is resulting in significant human health impacts to the community. Many environmental impacts, such as air and water pollution, have repercussions for human health. Valuing the cost of pollution-related morbidity (sickness) requires information on the underlying damage function (usually some form of a dose-response relationship) which relates the level of exposure to the degree of health effect as well as information on how the project will affect the level of health impact. The costs of an increase in morbidity due to increased pollution levels, for example, can then be estimated using information on various costs associated with the increase in morbidity: any loss of earnings resulting from illness, medical costs such as for doctors, hospital visits or stays, medication, and any other related out-of-pocket expenses.

Economic Valuation Techniques

Two valuation techniques are summarised below:

(i) Travel Cost Technique

The travel cost (TC) method is an example of a technique that attempts to deduce value from observed behaviour. It uses information on the total expenditure of visitors to visit a site in order to derive their demand curve for the site's services. The technique assumes that changes in total travel costs are equivalent to changes in admission fees. From this demand curve, the total benefit that visitors obtain can be calculated. The TC method was designed for and has been used extensively to value the benefits of recreation.

(ii) Contingent Valuation Technique

Unlike techniques which use observed data, the Contingent Valuation (CV) technique relies on direct questioning of consumers (actual or potential) to determine their willingness-to-pay (WTP) to obtain an environmental good. The actual valuation can be obtained in a number of ways, such as asking respondents to name a figure, having them chose from a number of options, or asking them whether they would pay a specific amount (in which case, follow-up questions with higher or lower amounts are often used). CV can, in principle, be used to value any environmental

benefit. Moreover, since it is not limited to deducing preferences from available data, it can be targeted quite accurately to pose question about the specific changes in benefits to be derived from the proposed project. This also means that, with appropriately-worded questions, CV can provide an all-encompassing estimate of the perceived costs and benefits of environmental changes, in contrast to other techniques which, as noted above, often only provide a partial estimate of environmental costs and benefits. Because of the need to describe in detail the good being valued, interviews in CV surveys are often quite time-consuming. It is also very important that the questionnaire be extensively pre-tested to avoid various sources of bias.

Below shows the linkages between environmental assessment, economic analysis, and the project cycle. In summary, the TOR for the environmental assessment should be clearly defined from the outset of the project and costs derived for environmental costs or benefits so that the economic appraisal of the project reflects the direct and indirect social and environmental factors that might affect the developmental impact of the particular project.

<i>Project stage</i>	<i>EA activity</i>	<i>Associated economic analysis activity</i>
Preparation	Environmental screening	Potential environmental costs and benefits are considered on a preliminary basis
	Preparation of EA TORs	Requirement to quantify environmental impacts and assign monetary values spelled out
	EA team selection	EA team includes resource or health economist, as appropriate
	EA preparation	EA team analyses the impact of project alternatives and compares them, using monetary values on their costs and benefits, where feasible
	Review of EA	The Bank reviews the EA report, including the economic analysis
Appraisal	Incorporation of EA into project design and documentation	EA findings, including the environmental costs and benefits, are incorporated into the project economic analysis and the estimation of the economic rate of return
Negotiations	Agreements reached on actions to be taken, based on the findings of the EA	
Implementation	Environmental supervision	Supervision includes monitoring the project's actual environmental costs and benefits

Figure 5.2: Table of Economic Analysis, and the Project Cycle

Source: Environmental Assessment UPDATE. The World Bank: Washington, D.C. 1998

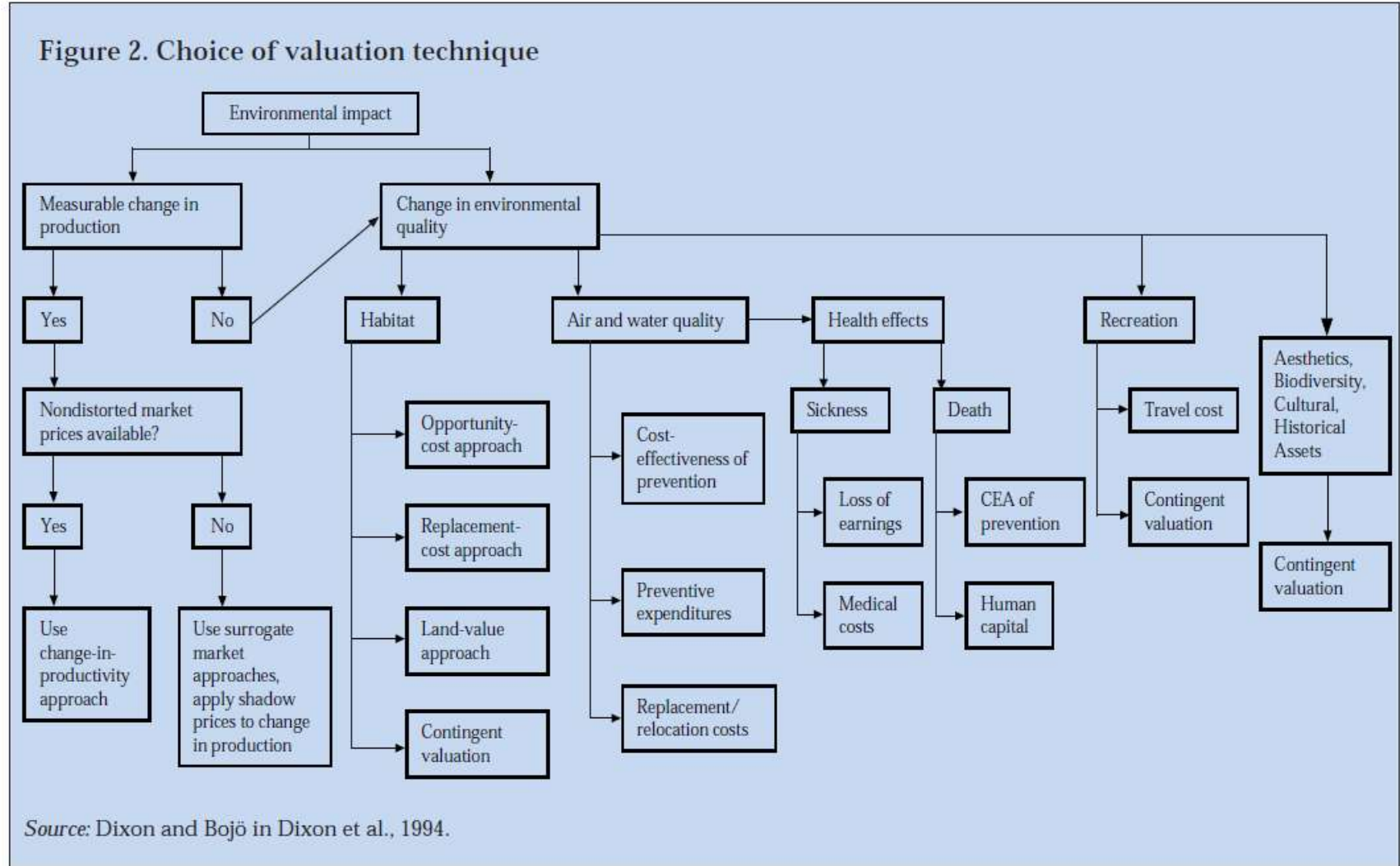


Figure 5.3: Choice of Valuation Technique

Source: *Environmental Assessment UPDATE*. The World Bank: Washington, D.C. 1998

5.4 Findings

5.4.1 *Environmental Impact Assessment for Debe to Mon Desir Highway Segment (Rev. 1)*

With respect to anticipated benefits and costs of the project, the EIA noted, *inter alia*, the following:

(i) **Project Benefits**

- a) The proposed highway will improve accessibility to areas in southwest Trinidad (La Romain, Debe, Penal, Siparia, Fyzabad, La Brea and Point Fortin).
- b) It is expected that the highway will bring about social and economic development and progress in southwest Trinidad.
- c) There would be increase in potential for agricultural production and distribution.
- d) There would be increase in residential, industrial, and domestic and foreign tourism development.
- e) Previously small settlements would be encouraged to expand and additional areas would be opened up to built development and services.
- f) The increased accessibility afforded by the highway will tend to generally increase property values and so be a benefit of this project.
- g) Employment will be generated during site preparation and construction.
- h) The proposed highway will decrease the time taken to reach areas in south Trinidad by providing better roads and shorter travelling distances, as well as reducing the vehicular congestion on existing arterials.
- i) There would be the opening up of vistas along the route of the proposed highway.

Consultant's comments:

- a) The EIA presented, as well as other documentation reviewed, do not detail any quantifiable benefits that may be incorporated into a CBA for the project so it is unclear, for example, what economic value (dollar value) is placed on "... residential, industrial, and domestic and foreign tourism development." Regarding tourism development for instance, what would the nature of that anticipated tourism development be, and will it result in increased employment (by how much), revenues (by how much), economic growth in the area (by how much).
- b) Regarding the benefit of "increased accessibility afforded by the highway [that] will tend to generally increase property values and so be a benefit of this project" there is no documentation on the current values of properties in the area and therefore the likely incremental increase that may be used to make a judgement on the beneficial impact of the project
- c) Employment is likely to increase during the construction phase. This is customary in many projects, and given that the area is marred by high unemployment levels this could alleviate that unsustainable situation. However it would be useful to have clarity on the nature of the employment to be available during the construction phase and whether the project area contains persons with the requisite skills. If employment is to be generated for unskilled persons this is unlikely to yield sustainable benefits from the project.

(ii) **Adverse Impacts**

Adverse impacts were assessed (with and without mitigation measures) based on numerical analysis, experience on earlier projects, and expert judgment. Some of the adverse impacts identified in the Project EIA are as follows:

- Acquisition of houses
- Acquisition of institutions
- Disruption of current and traditional uses (agricultural lands)
- Air quality (fumes from hot asphalt paving)
- Rare, Vulnerable and Endangered Species
- Waste disposal and management
- Land use conflict Loss of business opportunities

Consultant's comments:

As with the proposed benefits there is an absence of specific and quantifiable information on the economic impact of the above mentioned adverse impacts. The EIA notes for example:

- a) The loss of rare, vulnerable and endangered species. This means that the EIA identified species in danger of extinction and/or likely to become endangered. The HRM also notes this negative impact and identifies the Sulphury Flycatcher which is classified as rare (spotted in Murray Trace, on route of highway); the Blue and Yellow Macaw which is classified as an endangered species (spotted at Supra Trace Ext, close to route); the Scarlet Macaw which was first sighted in Trinidad and Tobago at Supra Trace Extension. The Scarlet Ibis which nests at the Oropouche Lagoon is classified as a vulnerable species. The highway embankment will provide a “formidable” barrier for howler monkeys to cross; and, as their habitat will be disturbed, may face dislocation. (All information on these threats is taken from the EIA report).

Trinidad and Tobago is signatory to the Convention on International Trade in Endangered Species (CITES) as well as the Convention on Biological Diversity, which means that insufficient mitigation measures to protect such species may contravene commitments such as contained in the National Biodiversity Strategy and Action Plan (NBSAP), for example. It is necessary to place a value on these rare and endangered species by using economic analysis that would calculate:

- i. the willingness to pay by surveyed households for ecosystem protection (Contingent Valuation)
 - ii. The likely revenues to be earned from ecotourism (visitors paying to view these rare, species etc)
- b) Disruption of current and traditional uses (agricultural lands): At a time when the Government of the Republic of Trinidad and Tobago is speaking about increasing national agricultural production (in the context of headline inflation increasing as well

as food import bills) it is curious that no cost was attached to the loss of agricultural lands.

5.4.2 The Ministry of Works and Transport (MOWT) /National Infrastructure and Development Company (NIDCO) Position

The MOWT and NIDCO “positions” reflected in this report are culled from mainly two documents:

(i) *Final Report on Feasibility Investigations, Volume 1 - Engineering and Economic Feasibility* and (ii) *Final Report on Feasibility Investigations, Volume 3 - Potential Socio-economic Impact*.

Apart from the cited documentation, information in this section is gleaned from a meeting held with NIDCO on January 08, 2013. The Report on the potential socio-economic impact which was prepared by Mc Cree and Braithwaite in 2006, notes the “...*In the short-term, the most important impact would be on the relatively high level of unemployment that plagues the region. Road construction is usually a labour intensive activity and requires some degree of unskilled labour. Given the significant number of unskilled and unemployed persons in the region, the construction of such an extensive network can provide many job opportunities for local residents...*” Page 24). Additional economic impacts are detailed in the report as follows:

- As a consequence of the change in the flow of traffic, own account workers and micro entrepreneurs will be “adversely affected” which may require such persons to find alternative employment. This loss in employment may be “matched” by “benefits to similar own account workers along the new highway” (Page 26).
- Loss of social and human capital may be stymied since the highway will facilitate easier commute by more trained and educated members of the community. The report suggested that the “new highway will provide easier access to the rest of the country and encourage persons to live in the community” which will bring “additional economic benefits”
- Regarding the environmental impact, McCree and Braithwaite locate the potential negative impacts from the construction of the highway in the context of “ a widespread perception that there has been and will be severe environmental damage” and given the “proximity of the highway network to the Oropouche Lagoon, the Godineau Swamp and the Rousillac Swamp, this may raise environmental fears ...”

The socio-economic report does not attempt to quantify any costs or benefits but concludes that “The decision to extend the Solomon Hochoy Highway to Pt. Fortin is a positive step towards stimulating the socio-economic development of southwest Trinidad.”

The Final Report on Feasibility Investigations, Volume 1 - Engineering and Economic Feasibility (2006) noted that the network improvement scheme “... meets the requirements of the government in terms of road linkages and satisfies the future requirements of PETROTRIN for development of petroleum reserves in the project corridor. It also has a lower capital cost than the alternative routes investigated [however] ...In economic terms the scheme does not meet the normal investment criteria expected by an international development bank. However, in the feasibility investigations, benefits have been estimated on the perhaps narrow basis of road user

cost (vehicle operation and passenger time) savings. The work did not attempt the larger task of quantifying and evaluating the developmental and social benefits in south western Trinidad that will be derived from the vastly improved road communications links to and within the region which will result from project implementation.” (LEA-Trintoplan Consultants, 2006; 6-1)

5.4.3 The Highway Reroute Movement (HRM) Position

The HRM Position is culled from the report submitted entitled An Analysis Of Inputs For A Projected Strategic Cost Benefit Analysis For The Proposed Debe To Mon Desir Highway. Information also is gleaned from meetings with the HRM held on January 10 and January 21, 2013.

The above captioned report notes, “ One of the standard tools used to guide the planner to answer these questions is the Cost Benefit Analysis. In this analysis such inputs as the bio-physical and socio-economic environments are predicted and measured in dollar terms. Two problems arise. First, how does the economist or econometrician measure such non-market, unpriced impacts and effects. Second, what is to be done when there is little or no data available. Attempts to solicit data on the economics of this project from the project managers, NIDCO, and the Ministry of Works have proved futile. This report confronts this problem by omitting costing altogether; and instead focuses on listing the known inputs that would have to be costed and analysing their likely magnitude in verbal terms. It is not to be regarded as a Cost Benefit Analysis”.

Consultant’s comments:

As mentioned earlier there are economic valuation techniques that may be employed when there are no readily available “market prices” for environmental goods and services. The HRM/Kublalsingh document correctly notes that the NIDCO documents did not seem to contain the requisite economic data to facilitate a CBA. The HRM/Kublalsingh document lists a number of costs – financial, social and environmental costs that might arise as a result of the project. In weighing the costs and benefits of the proposed highway, the HRM/Kublalsingh report notes, “Even a cursory glance at the potential costs and perceived benefits of the Debe to Mon Desir High-way shows that this project is an unmitigated planning disaster. Its potential destructive impacts are non-mitigatable and permanent:

- (i) It will bifurcate thirteen well-established communities and engender permanent disconnectivities.
- (ii) It will disaggregate a socially, economically, and culturally empowered region.
- (iii) It will jeopardize the future of the Oropouche Lagoon as a potential food basket.
- (iv) It will fragment a system of well-connected road system West of the Siparia-Erin Main Road.
- (v) it will compromise the system of hydrology of the Oropouche Lagoon and its ecology.
- (vi) Its financial costs will be exceedingly more than advertised by the state and will jeopardize the other viable segments of the highway, and the national economy.
- (vii) It will lead to significant and permanent negative environmental and health effects on residents who live within its catchment.

- (viii) It would cause flooding to remaining communities stretching as far back as Barrackpore in the East; particularly if hydraulic systems are not maintained; the costs of these systems will be permanent.
- (ix) The aggregate required will be 1.4 million tons which will jeopardize the water, soil and vegetation systems of the Northern Range and North East Trinidad.

Perceived benefits, as listed in the EIA for this project, and implied in the rationale and objectives for this project are either negligible when contrasted with potential costs; and are based on flawed conceptions of “development” and “progress”. Reports done by the IMA in 2006, and the IADB in 2009/2010 point to the hazards of Debe to Mon Desir on the one hand and on the government’s approach on the other.”

Consultant’s Comments

The Consultant concurs with the general sentiment of the HRM as stated above given the absence of quantifiable evidence to corroborate the benefits and costs of the Project. It should be noted though that the HRM/Kublalsingh report also does not detail any dollar values for the ranges of negative impacts from the project that it has identified.

5.5 Summary of Findings

1. There is no holistic treatment given to the project, that is, no document that reflects convergence of the salient environmental, social and economic issues that arise in the project.
2. It would seem that none of the key agencies involved in this project *viz*, the EMA, the MOWT, the Ministry of Finance, NIDCO, or any of the Consultants engaged by the proponents sought to provide an integrated assessment of the project including primarily a CBA.
3. The scope of the project (including the project area) is broad and does not delimit the particular project area and the communities that are likely to be affected by the project. In an effort to correctly capture “what is at risk” and therefore what costs and/or benefits might be incurred or accrued, there was need for clear demographic and socio-economic data specific to the area so that appropriate mitigation measures could be identified and valued, for example, the value of agriculture taking place in the Oropouche Lagoon (in terms of fish stocks, number of persons whose livelihoods depend on the Lagoon, etc.).
4. Although the TOR for the EIA requires consideration of direct and indirect impacts the indirect impacts are not valued or included in a comprehensive ECBA
5. Sweeping statements are made by proponents and opponents of the Project regarding its potential benefits or costs in the absence of any associated dollar values for same.
6. There seems to be a general lack of appreciation for what is entailed in doing a CBA for which equal consideration and weighting ought to be given for social, environmental and economic benefits/costs.

5.6 Recommendations

This Consultant recommends as follows:

1. That economic valuation is a mandatory aspect of an EIA and SIA to determine the direct and indirect costs and benefits of a project. By including such values the full economic, social and environmental impact of a project may be quantifiable, leading to more transparent and informed decision making as well as efficient use of resources. The inadvertent omission of values of non-marketed goods and services results in an undervaluation of project costs and possible benefits as well as appropriate mitigation measures that may be employed.
2. In the context of national Sustainable Development, to which this project is meant to contribute, it should be noted that the SD framework includes procedural issues considered important dimensions of the democratic process, *viz*, participation, consultation, transparency, accountability and public right to information. This project seems to fall short in many of these areas.
3. In seeking to capture the full environmental, social and economic costs and benefits of a mega project in a Cost Benefit Analysis, such as the one under consideration, the following are some metrics suggested :
 - a) Construction costs
 - b) Land costs
 - c) Demolition costs
 - d) Building/replacement costs
 - e) Compensation costs
 - f) Maintenance costs
 - g) Vehicles operating costs (based on market prices of fuel, operating costs, etc.)
 - h) Time savings
 - i) Accident reductions (re value of life, value of health)
 - j) Recreation/amenity loss
 - k) Traffic noise quantified
 - l) Visual obstruction
 - m) Visual intrusion
 - n) Air pollution
 - o) Built environment/heritage
 - p) Ecological sites
 - q) Pedestrian/cyclists

6.0 TRAFFIC AND TRANSPORTATION

6.1 Terms of Reference

The Terms of reference for the Transportation issues are to

1. Review all technical reports/data and information of relevance to the project, and the Debe/Mon Desir segment in particular..
2. Invite written and oral submissions of the principal parties including the executing agency - National Infrastructure Development Co. (NIDCO); the HRM and other stakeholders.
3. Ascertain the veracity of technical issues raised by the respective parties and the consequences/impacts in respect of the Mon Desir to Debe segment, keeping in mind related international best practice.
4. Make specific recommendations in the public-interest.
5. Outline proposals that could be of benefit to the project in social, environmental and economic terms.
6. Based on the findings, outline recommendations which could inform the process for development projects of this magnitude in the future.

6.2 Traffic & Transportation Issues.

The major issues raised by the Highway Reroute Movement (HRM), from the point of view of traffic and transportation analysis are as follows

- The Debe to Mon Desir segment of the extension of the Solomom Hochoy Highway will not be an optimal solution to traffic and transportation needs in the area. The HRM agrees that the extension of the Solomon Hochoy Highway (SHH) to Debe will be beneficial, but contends that the Debe-Penal Siparia-Fyzabad region would be better served by upgrading local roads.
- The HRM has proposed an alternative route (the Northern Route which is defined later in this report). The HRM claims that NIDCO has not properly examined this alternative

In the course of the review, the consultants have posed the following questions.

- Were the traffic and transportation requirements of the region itself adequately considered?
- Do the projections justify the planned construction?
- What were comments made by the various consultants on staging?

6.3 Documents & Notation

This report will refer to several documents, a subset of those studied by the consultants.

- Halcrow-Fox Sir Solomon Hochoy Highway: Extension to Point Fortin: Traffic Volumes and Operational Analysis Feb 2012 *Ref Halcrow*
- Highway Re-route Movement: Addressing Transportation Issues in the Debe to Mon Desir Area Jan 2013 *Ref HRM*
- Lea-Trintoplan Final Report on Feasibility Investigations Volume 1 - Engineering and Economic Feasibility *Ref Trintoplan Apr 2006*
- Lea-Trintoplan National Highway Programme : Trunk Road Expansion Component Solomon Hochoy Highway Extension : Debe To San Francique Road Route Comparison Report *Ref Trintoplan Route Comparison Dec 2007*
- NIDCO :Report on the Debe to MonDesir Segment of the Solomon Hochoy Highway Extension *Ref NIDCO*
- NIDCO :Report on the Debe to MonDesir Segment of the Solomon Hochoy Highway Extension Appendix 2: Discontinuation of the Debe to Mon Desir Segment June 2012 *Ref NIDCO Appendix2*
- NIDCO - Debe to Siparia Highway Segment - Economic and Traffic Feasibility Study - Problem Diagnosis REVISED - Nov 2012.pdf *Ref APDSL*
- NIDCO - Debe to Siparia Highway Segment - Traffic Feasibility Study - Traffic Assignment - Report.pdf Nov 2012 *Ref APDSL 2*

In this review, the terminology used in the Trintoplan documents has been adopted: **Northern routes** are routes using the Dumfries Rd. -PariaSuites-Mosquito Creek –St Mary’s Junction path, which is an alignment following a section of the Southern Main Road . **Southern routes** are routes passing to the south of the bulk of the Oropouche Lagoon.

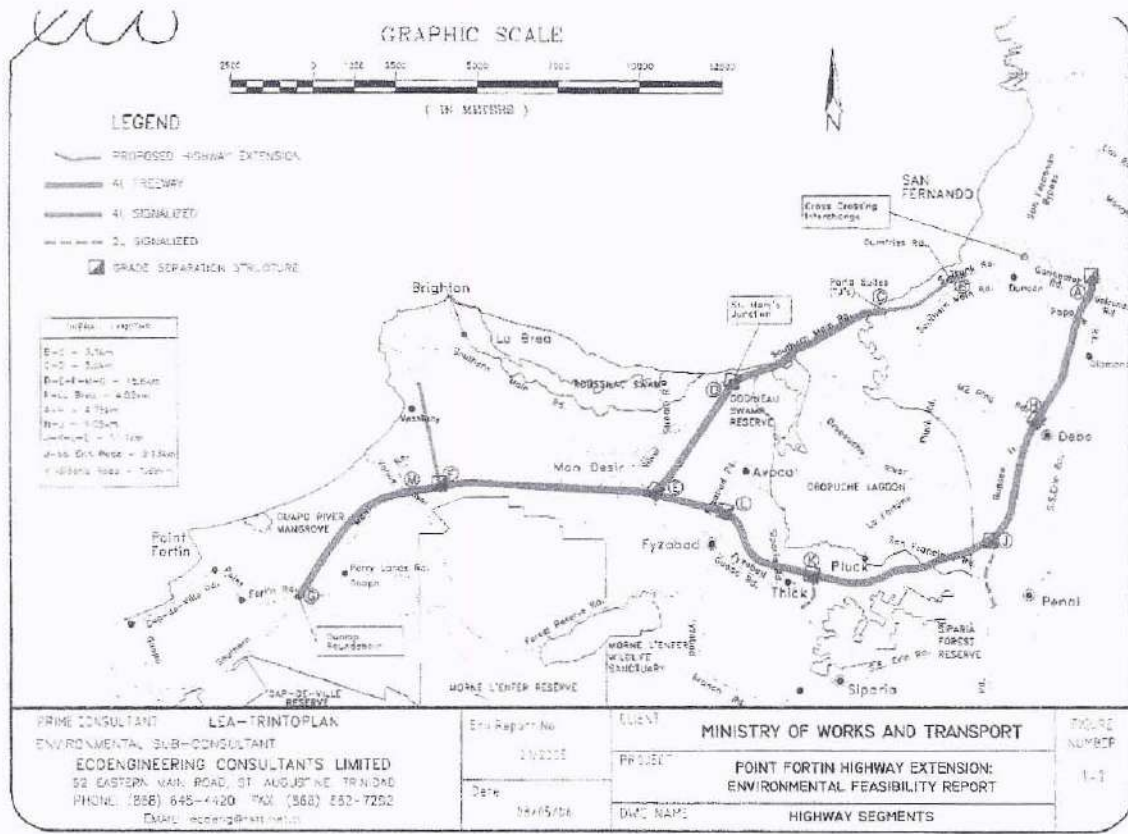


Figure 6.1 Golconda to Point Fortin Highway Segments

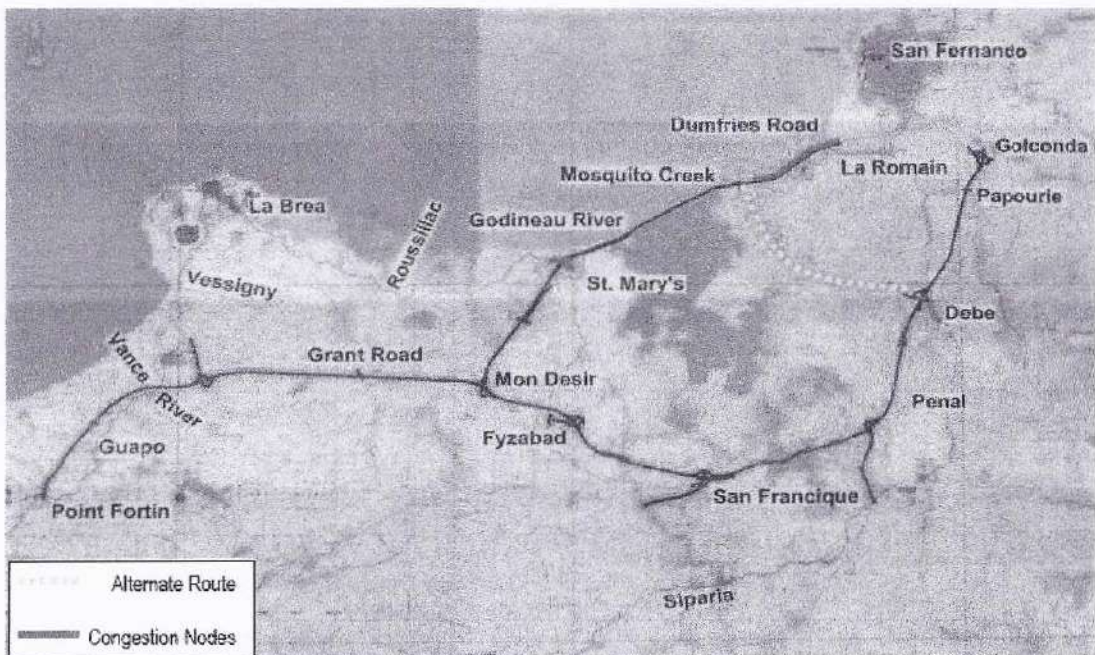


Figure 6.2: Golconda to Point Fortin Highway and Alternative Route Proposed by the HRM

6.4 Methodology

6.4.1 NIDCO/Trintoplan Consultants Route Analysis

The Consultants reviewed the Trintoplan documents, and subsequently met with Trintoplan to discuss some of the issues raised.

One issue was the choice of a southern route over the northern route. In its study, Trintoplan evaluated various configurations (four-lane freeway, four-lane road, two-lane freeway (*ibid*), two-lane road) . and concluded;

1. *The extension of the SHH as the future route to Point Fortin should follow the Southern route via Penal and Mon Desir.*
2. *Construction of the entire route to four lane standard is not justified in the near future from an economic viewpoint.*
3. *The only 2010 option evaluated that comes close to meeting normal economic criteria is extension of the SHH from Debe to Penal to two lane standard (Option 2).*
4. *The best alternative for extension of the network by 2020 is two lane standard.."*
5. *The comparisons .. have been significantly influenced by the high cost of improving the Paria Suites St. Mary's link. If the cost of this link were similar to others the Northern route would be more favourable ...'*

The Trintoplan report points out that the Ministry of Works and Transport had directed that

- South Trunk Road between Dumfries Road and Paria Suites should be widened to four lanes
- SHH extension from Golconda to Point Fortin should be to freeway standard.
- A highway connection be established between the route serving the Penal and Siparia areas and that serving Point Fortin.
- A four-lane SHH extension from Golconda to Debe should be the initial freeway implementation contract of the overall project.

It is the opinion of the consultants that the Trintoplan analysis and recommendations were sound. In adding further directives, the Ministry seems to have had an objective that is not well captured by the rubric "a highway to Pt Fortin". This is borne out by the fact notwithstanding the Trintoplan Projections, the Ministry still, did not revise the route allocation when it apparently decided to improve the segment from Paria Suites to St Mary's junction to four lanes.

In the light of this conclusion, the consultants are of the opinion that the Ministry should have requested studies specifically centred on the region under consideration. Such studies are currently being undertaken by APDSL.

Among the options considered by Trintoplan was a route which effectively is the option suggested by the HRM (See Figure 6.3).

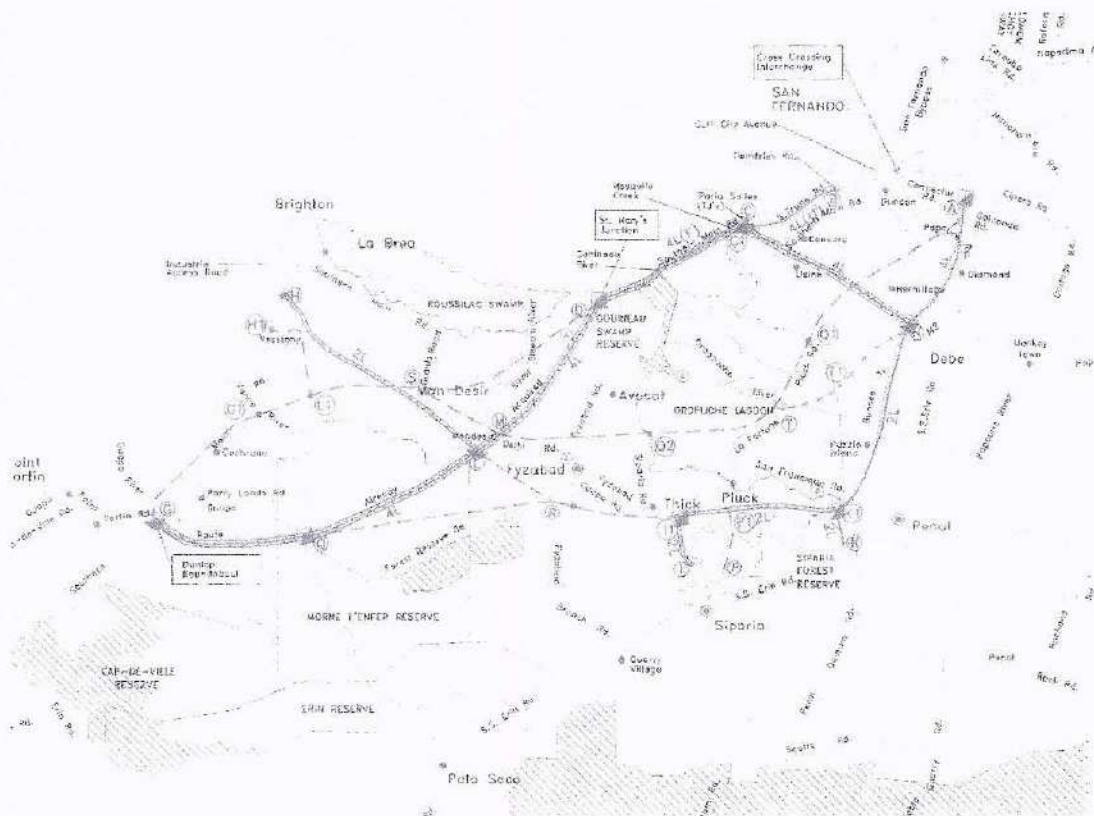


Figure 6.3: Golconda to Point Fortin Highway, Possible Route Options

Source: Solomon Hochoy Highway Extension to Point Fortin, Final Report on Feasibility Investigations, Volume 1 - Engineering and Economic Feasibility, LEA-Trintoplan Consultants Ltd, Figure 2.4.B.a.

6.4.2 Highway Reroute Movement

The consultants reviewed the oral and written submission by the HRM's Traffic advocate. The traffic analysis was centred around the existing traffic congestion problems in the area. The analysis identified the possible causes and offered potential solutions for the Debe/Penal areas in particular. These solutions include road widening and upgrades of tasker roads as a means of improving the road network within the study area. Given the limitations of their

situation, it appears to us that the HRM advocates had considered carefully the areas where whatever congestion problems existed in the region could be mitigated. The consultants own observations of the SS Erin Road during a typical weekday morning is that the road serves a multiplicity of purposes. It is both the main thoroughfare linking the major conurbations of Debe, Penal and Siparia as well as the local access road directly serving households and businesses. In many areas it is also the terminal (Parking location) for auto users and the taxi terminal. This is typical of the main roads in ribbon developments in Trinidad e.g. Eastern Main Rd. and Western Main Rd. in North Trinidad and the Southern Main Road further west of the S.S.Erin Rd.

Whilst some of the ideas put forward have merit in a short term Traffic Management context, the proposals will require a quantitative analysis to determine their effectiveness. Furthermore, the potential for these solutions to cater for the expected growth in activity (even without the UWI Campus) and thus traffic would have to be ascertained.

6.4.3 NIDCO Preliminary Response to HRM

The Consultants reviewed four documents from NIDCO: a lead document, two Certificates of Environmental Clearance, and a fourth report on the discontinuation. The lead document reviews the history of the implementation of the highway. It also lists benefits of the project for the community, and tabulates “dis-benefits” of not constructing the highway. The document then closes with a repudiation of the points raised by the HRM.

The Certificates of Environmental Clearance confirm that approval was granted for the construction of the Golconda to Debe and Debe to Mon Desir sections of the SHH extension.

The fourth report is a detailed rebuttal of the HRM proposals. It does not appear to represent an independent review of the proposals. Furthermore there is not enough rigour in the quantitative analysis to counter a possible claim of bias.

6.4.4 Halcrow

The Halcrow work is aimed at ensuring that the highway construction meets or exceeds quantitative and traffic capacity targets. It is therefore of limited value to our study, which considers the other end of the spectrum: i.e. whether the highway is necessary or not.

6.4.5 APDSL

In 2012, NIDCO engaged APDSL to undertake a Traffic Feasibility Study and Urban Traffic Plan for Debe, Siparia and the surrounding areas. The purpose of this study is quoted as

“Study Purpose

This study is a traffic feasibility study and urban traffic management plan for Debe to Siparia and surrounding areas. Its objective is as follows:

1. Primary data collection through traffic surveys and field walk-throughs.

2. Traffic analysis and forecasts, and presentation of the results, including preparation of Trip Distribution Plans and Road Network Assignment Plans.
3. Preliminary road planning and alignment options for efficient highway linkage between Golconda and Dumfries Road / South Trunk Road area.
4. A highway alignment and traffic level-of-service requirements in the Debe to Siparia and surrounding areas that respect current and future stakeholder needs and demands.
5. An urban traffic management plan for the Debe to Siparia and surrounding areas, in order to improve unresolved intra-urban traffic linkage needs.

The diagnosis involves estimation of the existing vehicle and person traffic through collection and review of existing data, and new data collection and analysis.”

APDSL carried out extensive traffic engineering surveys in September 2012. Based on the analysis of the data collected thus far, Traffic Forecasts and Traffic Assignment were done for five year intervals from 2015 to 2035. Both the existing road network and the proposed HRM route were examined. The report concluded inter alia that there was urgent need for an urban primary arterial system connecting the South Western peninsular to improve accessibility to the urban centres in the region including Debe, Penal, Siparia, Fyzabad, La Romaine, Oropouche, La Brea and Pt. Fortin. It also noted the requirement for Traffic Management Solutions in the Debe area. Furthermore, the analysis showed that the HRM proposed routing would not have the capacity to cater for the 2015 Traffic forecast

6.5 Conclusions

The consultants have concluded that

- The need for the Debe to Mon Desir segment of the highway has been driven more by the expected traffic growth from San Fernando and Northern areas to the Debe-Penal corridor than by the through traffic to Point Fortin.
- Among the options considered by Trintoplan was a route which effectively is the option suggested by the HRM.
- The report NIDCO Appendix 2, which addresses the HRM counter-proposal, including their Northern Route, is a defense of NIDCO’s position, and not the independent unbiased study which should have been undertaken.
- The HRM traffic proposals are short-term in nature, and do not seem to take into account future increases in car population and traffic.
- The issues are clouded by a separate decision to expand the Mosquito Creek segment to four lanes, by the conflation of a plan to build a highway to Pt Fortin with a

paradigm to develop the Siparia-Fyzabad-Penal area, and by the lack of any up-to-date traffic plans for the area.

The phrase “highway to Pt Fortin” encourages residents of the area to view the project as a highway from the North to Point Fortin, passing through their territory.

The APDSL study is not yet finalized. From the results of this study that the consultants have seen so far, it can be concluded that the HRM proposal will not be the preferred alternative as it does not provide enough capacity for the future (2030) traffic requirements in the area.

6.6 Recommendations for Immediate Consideration

- (1) The consultants recommend that the APDSL studies should be continued and that the HRM traffic presenter should be drawn into this study. The proposed Debe to Mon Desir Highway segment will not solve the congestion problems on the S.S. Erin Rd between Debe and Penal which are due to localised travel patterns and behaviours, as have been highlighted by both the HRM and APDSL.
- (2) The consultants recommend that consideration be given to staging the highway improvement programme for the South-Western peninsular. Both Trintoplan and APDSL recognise that staging the construction had economic advantages, although, to quote Trintoplan

“In economic terms the scheme does not meet the normal investment criteria expected by an international development bank. However, in the feasibility investigations, benefits have been estimated on the perhaps narrow basis of road user cost (vehicle operation and passenger time) savings. The work did not attempt the larger task of quantifying and evaluating the developmental and social benefits in south western Trinidad that will be derived from the vastly improved road communications links to and within the region which will result from project implementation. The traffic volumes predicted on the links west of Debe and St Mary's do not justify four lanes before 2020 and there is considerable scope for capital cost savings if staged construction were adopted for these links, namely two lanes in the first instance with a further two lanes built when traffic so justifies. However, because there are serious road safety implications in the provision of two lane high speed roads and because the government is ready to invest in trunk road improvements now, it is appropriate that construction should proceed apace in order to obtain the attendant transport benefits for project corridor residents and the nation as quickly as is possible.”

6.7 Recommendations for Future Developments

1. **Major Transportation Investments Should be Preceded by a Transportation Planning Study.**

The Institute of Transportation Engineers (ITE) in its internationally recognised and used *Best Practice Guide, the Transportation Planning Handbook, 2nd Ed.* p. 422 states as follows:

"The MIS (Major Investment Study) is reserved for situations where it is clear that a large investment is required and offers a rigorous method to evaluate the trade-offs, for example, between additional expressway lanes, HOV(High Occupancy Vehicle) lanes or fixed guide way rail transit. Just as the public and stakeholder groups were involved in the development of the plan, this same requirement exists on a more focused basis for the MIS."

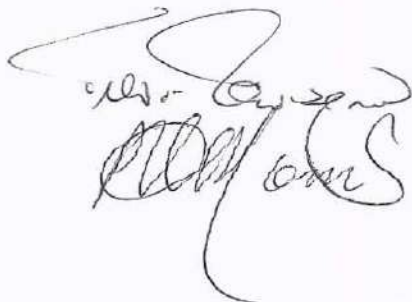
The key element in these studies is that the planners should recognise the importance of having an open process that involves the community in a meaningful way and broadly examines corridor solutions without preconceived biases.

2. Transportation Sector Improvements should complement proposed land use/ activity patterns

Travel is a derived demand. As such, while appropriate transportation linkages are essential to support economic activity, it is unlikely that the mere existence of the link would generate the activity. The development of the transportation sector in a region should be timed to coincide with the requirements for movement of people and goods given the spatial development strategies being pursued. This is especially important because much transportation infrastructure is relatively inflexible and represents a significant resource allocation.

3. Investment in Transportation Infrastructure should be staged.

Staging would allow the phased development of the transportation system and minimize the potential for "over-building" the road network at the expense of competing land uses. This is especially so in this case where there are clear competing land uses that are going to be significantly disrupted by the highway. Staging would also allow the highway planners the opportunity to adjust the design parameters based on the actual experiences as the stages are implemented. It would also allow for the use of less costly and disruptive alternatives such as Transit System improvements and Traffic Management Schemes, which would ensure that whatever road improvements are made, are optimized in terms of fulfilling the demands for accessibility and linkages between key human activities. By deciding to build the entire project as a single one, the options are locked in from now into the foreseeable future.



7.0 HYDROLOGY AND HYDRAULICS

7.1 Sectoral Terms of Reference – Hydrology

The HRC is required to undertake the following in relation to hydrology:

- Review all technical reports/data and information of relevance to the project, and the Debe - Mon Desir segment in particular. See reference list for an overview of available material.
- Invite written and oral submissions of the principal parties including the executing agency - National Infrastructure Development Co. (NIDCO); the HRC and other stakeholders.
- Ascertain the veracity of technical issues raised by the respective parties and the consequences/impacts in respect of the Debe to Mon Desir segment, keeping in mind related international best practice.
- Make specific recommendations in the public-interest concerning Hydrology
- Outline proposals that could be of benefit to the project in social, environmental and economic terms.
- Based on the findings, outline recommendations which could inform the process for development projects of this magnitude in the future.

Please note that explanations of the abbreviations can be found at the end of the section on hydrology, immediately after the list of references relevant to this section.

7.1.1 Main Objective

The main objective of this report is to review the reports pertaining to the hydrology and hydraulics for the Debe to Mon Desir Highway extension, provide an assessment of its adequacy for the project, examine the concerns that were raised by the Highway Reroute Movement and to make recommendations for the present highway project as well as future similar infrastructural projects.

7.2 Sector Issues - Hydrology

7.2.1 Background

The Government of the Republic of Trinidad & Tobago has embarked on the extension of the Solomon Hochoy Highway to Point Fortin which is located in the south western area of Trinidad. This highway extension involves several segments, one of which is from Debe to Mon Desir which is the main area of focus of this hydrology review.

The project is located in Hydrometric Areas 7 and 8 (Water Resources Agency), namely South Oropouche and Central West Coast. The terrain is essentially flat with some undulating hills and a considerable portion of wetland with significant depression storage capacity

The proposed Highway Route Alternative A to be implemented between Debe and Mon Desir cuts the eastern side of the South Oropouche Swamp near Puzzle Island and the South Oropouche River. From the mapping exercise undertaken by the Institute of Marine Affairs in 2006, the South Oropouche Swamp is a tidal marsh, mangrove swamp of approximately 3171 hectares. The area referred to as the South Oropouche Swamp includes the Godineau Swamp which is the mangrove swamp along the coastline.

The swamp extends from the Gulf of Paria on the coast to the eastern boundary inland just west of the San Fernando Siparia Erin Road, while the southern boundary extends to just north of the San Francique Road, except for a small area that extends south of the San Francique Road. The South Oropouche swamp is about 50% of the size of the Nariva Swamp and the third largest swamp in the country with the Nariva Swamp (6234 ha) and Caroni Swamp (5611 ha) being larger.

The South Oropouche River drains an area of approximately 438 km². The highway crosses flood prone areas in the vicinity of the South Oropouche River, Black Water Channel, Coora River, San Francique Road, Timital Trace, Siparia Road and Thick Village.

Over the years, considerable land use changes and related realignment and diversions of streams would have significantly influenced the hydrologic processes.

The areal extent of the South Oropouche Swamp may have been reduced as a result of legal developments and squatting while the water quality has deteriorated due to anthropogenic activities, such as poor agricultural practices and poor waste disposal practices.

The South Oropouche Swamp, like other swamps, serves to protect against coastal erosion and flooding, filter contaminants in water, support carbon absorption and provide support to a particular ecosystem that has emerged based on the environmental conditions.

From the standpoint of hydrology and hydraulics, the potential negative impacts of the highway route are identified as:

- Increased total local runoff because of larger impervious surfaces;

- blockage by embankments of drainage and sheet flow, which could lead to increased flooding;
- a loss of available water to the swamp either from obstructed flood plain sheet flow and /or other sources of water;
- increase of local flood depth due to reduced locally available space as result of the space requirements of the highway embankment;
- impact of the concentrated of flows through a limited number of crossings; and
- Increased concentrations of water pollution.

A number of reports pertaining to the extension of the Highway from Debe to Mon Desir was reviewed to determine the extent to which the hydrology and hydraulics were addressed in the feasibility design process and the Environmental Impact Assessment.

A list of References relevant to Hydrology, including technical documents, affidavits, TORs is presented at the end of this review.

7.3 The Review

The hydrology review is based on the assessment of several documents (reports, affidavits, CEC) and the results of meetings with the Preliminary Design consultants Trintoplan, representatives of the Highway Reroute Movement and the representatives of the Debe - Penal Regional Corporation.

The notes and observations are represented in the following sections and are followed by a listing of conclusions in Section 4 HRC Summary of Observations and Conclusions.

7.3.1 Notes on Report by Narinesingh (2012)

The report ([5] Sept 2012) prepared by Dr. Pramenath Narinesingh (**PN**) addresses the hydrology and potential impacts on the environment by the proposed highway section between Debe and Mon Desir based on a review of the Environmental Impact Assessment (EIA) report by EcoEngineering ([3] 2009).

In the following, the main points of concern brought forward by Dr P. Narinesingh, in relation to hydrology are presented:

[5] Page 1:

- *There is no detailed study presented in the EIA on the Hydrology or Hydraulics of the*

South Oropouche River Basin

- *Works on the highway should be halted until a detailed full hydrological study is completed, which has to include impacts of any flood mitigation actions on the South Oropouche Swamp and its ecosystem.*

[5] Page 2 – (from [3] EIA Appendix J 6.1.1)

Historically the hydrological regime of the South Oropouche Swamp has been changed extensively to facilitate human needs such as settlements, flood mitigation and agriculture. The channelization of watercourses and construction of embankments have altered the wetland characteristics and by extension influence the present ecology of the area.

The EIA further identifies the following potential impacts:

- *Loss of habitats, mainly tidal marshes*
- *Fragmentation of wetland habitat*
- *Altered hydrological conditions (diversion of watercourses, loss of permeable surface, potential increase of flood depth and frequency)*

[5] Page 5 – (from [3f] EIA Appendix K -IMA Wetland Report)

“It is a natural function that wetlands spread flood water through them and retain flood waters for some time. This allows for the deposition of sediment necessary for the building of the wetlands and the flushing /migration of aquatic life to the ocean”.

Previous construction projects such as the Forty Foot Trench, the New Cut Channel, levees and sluice gates in the South Oropouche Swamp area have demonstrated that the engineering solutions focussed on flood control in a wetland environment have negative impacts on the ecology of the wetlands by changing the flood patterns and allowing saltwater intrusion farther into the river system.

[5] Page 7

PN: *“The EIA TOR recommends that consideration be given to the developments triggered by the highway and the impact on the ecological sensitive areas. This is not sufficiently addressed in the EIA”.*

[5] Page 8

PN: *Maintenance of peak flows as a basis for the design of drains is not appropriate for the analysis of sheet flows necessary for the preservation of the hydrological system. Sheet flow analysis on location, depth, duration and timing is essential for the preservation and sustenance of the native ecology of the swamp and its connected hydrological environments.”*

The Highway Review Committee (HRC) noted that the preliminary design is based on limited assessment of the sheet flows and their function for the ecology of the wetlands. This is considered normal practice for preliminary design. However, the final design is required to include a detailed analysis of the sheet flow at each location as part of the development of the Water Management Plan and the Stormwater Management Plan. Both of these plans together with a detailed Sedimentation Management Plan are required by the CEC and are part of Best Practices in the development and implementation of a highway,

This detailed analysis may result in changes to the proposed preliminary design to mitigate any unacceptable negative impacts according to the highway design standards developed by AASHTO and the requirements of the Drainage Division (MOEWR). These changes could for example include construction of a causeway to cross a flood plain instead of flood relief culverts or construction of a series of ponds along the alignment which act as retention basins as well as wetland preservation measures.

7.3.1 EIA Review

The Environmental Impact Assessment Report ([3[EcoEngineering, 2009) was reviewed with respect to issues related to hydrology and hydraulics.

In the executive summary it was noted that the required environmental approvals mentioned in the table does not provide a complete overview. Notably absent in relation to hydrology, were approvals for:

- Stormwater Management Plan (by Drainage Division and Regional Corporations)
- Water Management Plan (by WRA, Drainage Division and Regional Corporations)
- Sedimentation and Erosion Management Plan (by WRA, Drainage Division and EMA)

These are supplementary plans to the Environmental Management Plan (EMP). The Environmental Management Plan (EMP) needs to be approved before ANY construction activities can take place. This includes the preparation, construction and operational phase of the highway project.

A large segment of the hydrology and environmental concerns have not been sufficiently addressed in the EIA as only a conceptual/preliminary design was available. These are therefore to be addressed in the detailed design phase and proposed mitigation measures which are to be reviewed and approved before construction can take place. This approval process requires including stakeholder consultation since the detailed design may significantly alter the preliminary design and impact on several stakeholders.

This consultation and approval process may further alter the designs, delay the construction and subsequently change the implementation and costing. This is a significant negative aspect of the Design-Build approach for a highway project where detailed designs are not available at the

tendering phase and when the Environmental Impact Assessment is undertaken

The HRC notes (see environmental review section) the following comments from stakeholders involved in the review of the EIA:

Drainage Division (Ministry of Environment and Water Resources, (formerly part of MOWT))

Concerns expressed:

- Lack of proper analysis of the role of existing drains in the right of way of the proposed Highway.
- Lack of proper analysis of the effect of surrounding wetland (Godineau Swamp and Oropouche Lagoon) in its role as a ‘natural detention system’
- The effect of the project on slope stability in the area is not adequately addressed
- The EIA does not indicate the return period used in devising drainage nor does it make recommendations.

Water Resources Agency

Concerns expressed by WRA:

- The lack of a “comprehensive evaluation of this wetland”
- Figure 4-5 in the EIA showing groundwater has a “fundamental error” showing the Durham and Sum Sum sands within the study area rather than the Morne L’Enfer formation.

Forestry Division

Concerns expressed:

- Possible changes in hydrology within the neighbouring (Siparia) Forest Reserve
- The need for mitigation measures to protect against scouring and erosion along embankments
- The need for functional detention ponds

Meteorological Office

Concerns expressed:

- Incomplete mapping of flood prone and landslip areas e.g. Debe is a flood prone area that was not mapped in fig 4-2. Bunsee and Banwaree Trace should have been mapped as areas with unstable slopes.
- Need for mitigation measures to deal with leveling and cutting of slopes
- A specific concern was stated about a “vegetative gully system” along the Fyzabad Main Road opposite the Pepper Village Government School. The gully as an existing flood control system will be removed; what is the impact?

EIA Review and Assessment Report (RAR)-Reference TOR Section 2.5

The following are also noted from the EIA RAR:

- There was no justification given for correlating the peak flow periods to a rainfall event (this should have stated ‘return period) e.g. 1:25 or 1:50 rainfall event. Only single 24-hour rainfall events were considered while reality shows that multiple-day rainfall events cause the most severe flood events, especially for the South Oropouche River which drains a large catchment (438 km²).
- The EIA does not provide calculations to justify the size of relief culverts and “as an adequate measure to control sheet flow”. Detailed design requires detailed assessment of the sheet flow patterns, the function of the sheet flows and the impact of concentrating flows at flood relief crossings. However, the EIA is based on preliminary designs, which generally do not provide such detailed analysis.
- Further information on integration of the Highway drainage system with natural and artificial drainage systems in the area is required.
- There is a need to identify streams used for abstraction of water, abstraction points, and duration of abstraction. This is also a condition of the CEC and requires approval by WRA...
- Despite identification of water in most rivers in the study areas as polluted “no remediation measures were considered to ensure that polluted water is not to be used as a dust control measure”.

The Highway Review Committee noted that a quantitative surface and groundwater hydrology model and study of the wetland as a hydrodynamic system should be done as part of Best Practices, which are required by the CEC, before an informed decision can be made as to whether this segment of highway should proceed as proposed or not.

It should also be noted that the EIA in fact cited the wrong aquifers in the description of the environment, referring to the Durham and Sum Sum sands which formations that exist in Central Trinidad, rather than the Morne L’Enfer sands which are part of the study area. This was flagged by the Water Resources Agency in its review comments, but NOT by the EMA in its Review and Assessment Report (RAR)

The lack of a hydrological study to assist with decision-making was highlighted in one way or another by most members of the EIA review panel but was not included in the RAR. The EMA should have made this issue a ‘showstopper’ in its decision to grant or deny a CEC and it did not.

Hydraulic Study

While the EIA describes the drains to be constructed and expected peak flows, it does not include the return period and calculations used to develop the drainage plan. The Drainage Division flagged this in the EIA review and the EMA described this deficiency in its Review and Assessment Report. The responsibility for this seems to be shifted towards the CEC conditions, which require a detailed Water Management Plan and a detailed Stormwater Management Plan.

It seems unusual to grant a CEC without the detailed plans and designs but this is the result of an (preliminary) EIA and a Design-Build Tender based on preliminary designs, which do not include detailed stormwater designs. This practice should not be accepted by the EMA.

Wetland Report [3f] Appendix K - IMA Wetland Report

One of the objectives of the Wetlands Report prepared by the Institute of Marine Affairs is a description of the vegetation communities and hydrologic conditions that exist at the proposed site for construction of the highway. However, the hydrologic conditions did not include anything on the existing hydrology as it pertains to climate/rainfall, the water quality, sedimentation, flooding, etc.

Even though a listing is made of the potential impacts of the highway construction no attempts are made for a preliminary assessment of these impacts and the required mitigation measures.

No Sedimentation Management Plan for the South Oropouche River basin is available; however this is considered part of Best Practices and an essential part of an Integrated Watershed Management Study and an integral part of a Wetland Management Plan. This is because the characteristics of the flood plains, wetlands and swamps are strongly influenced by the sediment deposits in the watercourses and those as result of overflow onto the flood plains.

The main value of the IMA Wetland Report is considered the description of the wetlands and the delineation of the South Oropouche Swamp. However, a more comprehensive analysis of the impacts of the highway project is expected to support the overall EIA.

It was further expected that the Wetland Report would at least identify recommendations to address the issues related to the potential impact on the hydrology and ecology of the South Oropouche Swamp but this was not the case.

7.3.2 Notes and Questions Resulting From the CEC Review:

The following observations were made during review of the CEC 1372/2006, which was granted on April 20, 2010, and which directly or indirectly influence the approach to hydrology issues in the design, construction and operation of the highway section between Debe and Mon-Desir.

- The CEC 1372/2006 was granted in April 2010 and requires extension before April 2013.
- Before any construction can take place, including site preparations, it is a **MUST** that all **conditions of the CECs** are fulfilled. This includes submission of plans to EMA and approvals by different stakeholders (Drainage Division, Regional Corporations, Town & Country, etc...).

(I) General Conditions (GC)

- GC (c) and (d): This Certificate shall **ONLY** validate activities included in the scope of works submitted to the EMA, in accordance with the application for this CEC. Modifications to the scope **MUST BE** submitted to, and approved by EMA, prior to the start of the works related to such modifications.

- GC (e): Applicant is required to submit a source application to the EMA at least 45 days prior to the release of ANY water pollutant. Examples of effluent that may contain water pollutants include stormwater, release from settling/detention ponds, facility wash-down runoff, etc...

(II) Mitigation Measures (MM)

Communication Plan

- MM (a): Applicant shall conduct a well-published public consultation/interview at least 4 weeks before start of works in order to identify and conduct face-to-face interviews with ALL potentially affected stakeholders regarding the project. Within 2 weeks following these interviews the Applicant shall establish a Working Group with representatives of stakeholders throughout the lifespan of the project until at least 18 months after the start of the operation of the highway. The Applicant shall appoint a Community Relation Officer (CRO) out of the Working Group and develop a detailed Communication Plan. This plan shall consider factors, inclusive of, but not limited to: (4) Plans associated with the project such as: **Stormwater Management Plan (SMP)** and **Water Management Plan (WMP)**.

It is noted by the HRC that since the Communication Plan has to be submitted two months prior to any site activities, these hydrology related plans (the SMP and WMP) also must be submitted and approved by the EMA and the relevant approval entities such as Drainage Division and Regional Corporations, **prior to the start of any works** related to this project. Any concerns by other stakeholders related to issues addressed by these plans can be put forward via the Working Group, which in turn will inform the EMA. The Communication Plan needs to be approved by the EMA and the Applicant shall ensure that activities do not proceed until the outstanding issues are resolved and receive approval from the EMA.

Pre-Construction

- MM (d): The Applicant shall ensure that its contractors adhere to the conditions of this CEC 1372/2006.

This means that the Applicant is responsible for ensuring that all the CEC conditions are met by any (sub-) contractor and (sub-) consultant related to this project, which includes the submission to the EMA of the finalized scope of works and detailed scheduling two months prior to the commencement of ALL site activities.

Site Preparation and Construction

- MM (l): **Temporary drainage** shall be designed to prevent runoff of silted material in surrounding areas and/or watercourses
- MM (m): **All temporary and permanent drainage shall be designed to ensure that there is no net increase in surface runoff from the pre-development to the post-development phase.**

ALL the temporary and permanent drainage designs shall be approved by the Regional Corporations and the Drainage Division prior to commencement of site activities.

It is expected that all these drainage designs are part of the Stormwater Management plan which addresses the stormwater management both during construction phase and operational phase. Stakeholders, other than the approval entities, are able to review and comment on these designs through the Working Group.

- MM (n): Drainage network is to be adequately designed and maintained to prevent unnecessary accumulation of water at the other locations on the site and to retain the maximum expected runoff from the site, hereby ensuring that there is no net increase in peak runoff (see MM (m) above).
- MM (o): The Applicant shall ensure that existing stormwater drains are protected by the installation of suitable filtering devices to prevent pollutants, such as sediments, from entering these systems as well as to ensure **that the stormwater runoff does not contribute to any flooding events and additionally retains the stormwater runoff in the event of flood events.**

This is expected to address the concerns brought forward by HRM concerning the impact of storm water runoff from the highway on surrounding areas in respect of sediment and increase of flooding. **However, it has to be stressed that the stormwater designs are to be made available to the approving agencies, the EMA and the Working Group prior to ALL site activities,** according to the CEC conditions, to ensure that proper review can be done in a timely manner and that the subsequent required adjustments to the designs can be implemented before construction activities commence.

- MM (q): The Applicant is responsible for ensuring that sediment-retention measures are utilized prior and during any earthworks to minimize the amount of sediment migrating off-site.

(III) Other Terms and Conditions (OTAC)

- OTAC (a) the highway design, including hydrology and hydraulics, **shall comply with the latest internationally accepted codes and standards such as the American Association of State Highway and Transportations Officials (AASHTO)** and in consultation and compliance with the requirements of the Drainage Division (MOEWR).

The AASHTO design codes for Highway Design include hydrology and hydraulic design standards for e.g. the design of stormwater systems, river crossings, flood relief culverts and crossings of flood plains and wetlands. Following these design codes may result in significant changes to the preliminary designs and require detailed reviews and approvals of relevant entities. It is expected that once this code, and other conditions of the CEC, are followed the identified potentially negative impacts will be sufficiently addressed and mitigated. It is the responsibility of the CEC Applicant that the Design Engineer follows these design codes. Potential delays and/or resulting extra costs as a result of significant design changes will have to be agreed upon between the Applicant (the Client) and the Design-Build Contractor.

- OTAC (b) the design, layout, scale and components of the development shall be **subject to the approval of relevant authorities**, such as the Drainage Division, MOWI, WRA, WASA, and the Regional Corporations.

This includes review and approval of all the detailed designs and plans such as the Stormwater Management Plan and the Water Management Plan, which are required as part of the conditions of this CEC.

- OTAC (c) **Submittal of finalized scope and detailed schedule at least two months PRIOR to ALL site activities.**

Considering the approvals which are required, it is expected that the period between detailed design and start of site activities will be significantly greater than two months. They have to be publicly available via EMA as those are impacting stakeholders and are likely to be different from the preliminary scope and schedule on which the EIA and CEC was based.

- OTAC (m): **A CEC is required for the catchment, abstraction or treatment for distribution of potable or process water.**
- OTAC (n): **Permission has to be obtained from WRA for abstraction** of water from the watercourses.

7.3.2.1 General conclusions with respect to the CEC

It is noted that the Applicant for this CEC is the Programme Implementation Unit, Highway Division, Ministry of Works and Infrastructure. The ultimate responsibility for the fulfilment of the conditions of this CEC is therefore with this Applicant. It is not clear how this responsibility has been addressed in its agreement with NIDCO, which is the implementation agency for this project, and its contract with the Engineer's representative (AECOM), which is responsible for e.g. managing the contract, quality control and checking the designs.

It is the opinion of the Highway Review Committee that many concerns, related to hydrology, brought forward by the Highway Reroute Movement are a logical result of available information based on the preliminary designs and the Environmental Impact Assessment, which were based on the results of the Feasibility Study. The CEC is also based on the information from the Feasibility Study and EIA and has not reviewed the detailed designs and construction methodologies. The result is that this CEC has extensive conditions to be met in addressing this lack of detail at the time of the application. A significant amount of work has to be done prior to commencement of ANY site activities.

The Committee has been advised that no drainage approvals have been granted by the Drainage Division (MOEWR).

As a result the detailed design, including the many plans such as the Storm water Management Plan, is still subject to approvals by the relevant state entities **before ANY site activities can start**. This must also involve stakeholder consultation and feedback via the established Working Group which has to be formed as part of the CEC conditions. This approval process has to be done in an appropriate manner and is expected to take significant time as is considered normal for such a large project.

This strongly begs the question if Design-Build is the appropriate manner to approach the implementation of (large) infrastructural projects. A major risk involved in this approach is that the construction is significantly delayed as it is depending on the approvals of the detailed designs and plans and involves stakeholder consultation and numerous approval agencies.

7.3.3 Review of Hydrologic and Hydraulic Engineering Feasibility Study, 2007

The objective of the *Hydrologic and Hydraulic Engineering Feasibility Study* undertaken by Dr. Shrivastava ([2] LEA Trintoplan January 2006) was to identify the streams between Debe and the Southern Main Road segment of the Solomon Hochoy Highway Extension Project, determine a preliminary estimate of the 50-year design peak flows for the streams at the proposed points of stream/highway intersection where bridges and culverts may be required and to recommend a methodology for the site-specific hydraulic design of bridge(s) during the detailed design phase.

The report by Dr. Shrivastava provides general guidelines for the hydraulic designs of the crossings, including the method for flow estimation, the sizing of the waterway opening and the determination of the scour depth at the abutments and channel below the bridges. The report also included estimates of the 50 year design peak flows for nine (9) highway/river crossings from Southern Main Road to Siparia Road and nine (9) highway/river crossings from Siparia to Debe.

The Highway Review Committee considers the methodologies described in this report are accepted practice for the hydrologic analyses and hydraulic designs for preliminary design but require review for the detailed design phase.

The final “*River Crossings*” reports by Dr. Cooper ([2] LEA Trintoplan, Oct 2007) provide detailed hydraulic requirements for the highway/river crossings including adequacy of the proposed bridge openings, estimates of scour depths at abutments and channel below bridges, and suggestions for the protection of the abutments from scour. The detailed design of the six river crossings undertaken by Dr. Cooper are the Silver Stream crossing, the Tarouba river crossing, the Guapo river crossing, the Oropouche river crossing and the Godineau River and Mosquito Creek Crossings. Of these five crossings only the Oropouche river crossing is located between Siparia and Debe.

For the hydraulic design, Dr Cooper undertook the hydrologic analyses required to estimate the 50-year design peak flows and for the scour depth estimation which normally must be considered under conditions of at least the 100-year design peak flows. The latter were also determined utilizing the same methodology.

The two main hydrologic design criteria used are 1) a return period of 50 years for the design of bridges and culverts and 2) a design life of 50 years for the project. The latter is required for extrapolating present peak flows and for taking into account the likely impacts of climate change.

Estimation of peak flows

The 50 year peak design flows were estimated using the National Resources Conservation Service (NRCS) triangular hydrograph method which is normal acceptable practice. It was considered necessary to adjust the estimated design peak flows for storage attenuation, since a considerable part of the catchments is low lying and has significant depression storage. The analyses undertaken did not include a multiple-day rainfall event with subsequent flood event with the consequence that the peak flows could be seriously underestimated. The committee believes that this type of multiple-day rainfall event should be considered in the design flood event which will need to be addressed in the detailed design analyses.

For the estimation of the design storm depth for the highway/river crossings in the feasibility study undertaken by Shrivastava, the Rainfall Intensity Duration Frequency (IDF) Curves for Palmist (Station 7:9) and Siparia (Station 7:1) from the Water Resources Agency 1995 were used, and the greater values of the rainfall intensities were used. However, in the hydraulic designs,

only the Palmiste IDF curves were used to determine the rainfall intensities. The HRC recommends that updated IDF curves be used for the detailed design phase.

Anticipated changes in land use and climate likely to occur in the future were also taken into consideration by extrapolating the estimated 50-year design peak flows. The total increase in urbanization by 2055 is estimated to be 26% and the rainfall intensities are expected to increase by approximately 2.5% in Trinidad during the next 50 years. The Highway Review Committee notes that significant land use changes are anticipated as a result of the construction of the highway even if this is not planned.

The Regional Plans were not available at that time therefore the projected land use changes following from these reports have not been incorporated. These should be included in the Detailed Design phase. As the highway improves access to a large area, significant land use changes can be expected and these development scenarios need to be included in runoff analysis scenarios. The estimated increase in urbanization should therefore be reviewed in the detailed design as it may be significantly higher than estimated.

Hydraulic Design of Bridges

The two main components that were determined in the hydraulic design of the bridges are the bridge waterway and the scour depth. As part of the proper design of the bridge waterway, the top water surface width at the design peak flow and the freeboard were estimated. The necessity for freeboard is to permit the safe passage of floating debris and to include a factor of safety for the passage of flood flows greater than the estimated design peak flow.

The hydraulic analysis (Cooper, 2007) for the river crossings is based on the methodology recommended by Shrivastava (2005) for designing hydraulic structures required for the highway crossing watercourses.

Hydraulic considerations for structures at highway crossings are required to minimize the risk of flooding and to prevent their collapse due to foundation undermining, failure from hydrodynamic forces or impact by debris. In the hydraulic analysis, peak flow, freeboard and scour depth are determined.

The following design assumptions and approaches were made/used:

- The peak flows for the 50-year flood and the 100-year flood were determined with the 100-year peak flow being estimated for determination of the scour depth.
- The NRCS procedure was used for estimation of the peak flow.
- An area reduction factor of 0.2 was applied to the daily rainfall to account for the spatial variability over the large catchment.
- A factor of 1.1 was applied to the rainfall to account for uncertainties in the current

rainfall as the rainfall curve for the rainfall station was developed using a very dated data set (1947 to 1967).

- A storage attenuation factor of 0.7 was use for the South Oropouche River crossing

The peak flow estimation is sensitive to the formula chosen for determining the time of concentration. Hence the Bransby-Williams empirical equation developed for rural flat catchments was chosen to estimate the time of concentration.

The Muskingum method was used for routing the hydrographs generated in the upper reaches through reaches connected to the outlet at Godineau River Bridge at the coastline.

A hydraulic analysis was performed on a reach of the River in the vicinity of the proposed crossing to determine the freeboard. The scour depth at a bridge is the net effect of the scour due to:

- a) the degradation and aggradation of the stream;
- b) local scour due to turbulent flow at the abutments and piers;
- c) contraction scour due to increased flow intensities at the constricted waterway through the bridge; and perhaps
- d) Effects of migration of the stream.

The three components comprising the effect of scour were determined.

Two aspects that were considered regarding the water level in the design of the highway profile are that:

- (i) the lowest elevation of the highway as it traverses the floodplain should be above the expected flood water elevation, with some additional freeboard added; and
- (ii) The proposed highway should not increase the flood water elevations, if the design flood were to occur under existing conditions.

Drainage – Box culverts and surface drains were sized based on rainfall intensities and peak flow estimates to accommodate the expected increase in runoff.

The Highway Review Committee considers the approach and the design assumptions to be acceptable for preliminary design for the crossings of the main watercourses. Serious consideration should be given in the detailed design analysis to review the design standards and the impact of the availability and reliability of the hydrological data. Also to be reviewed is the correlation between the design flow and the relation to rainfall events as it is the opinion of the Committee that a 50-year 24-hour rainfall event causes a flood event with a return period which is smaller than 50 years.

The influence of the hydrological data and analysis on the costs of the highway are considered to be significant, since the results determine the sizing of the structure for all the river crossings, the required levels of the highway embankments through the flood plains (and therefore required fill)

and the design of the stormwater system. A sensitivity analysis should be part of a value engineering exercise and result in recommendations for the detailed final designs.

Meeting with Trintoplan – JAN 9th, 2013

On January 9th, a meeting took place between the HRC and Trintoplan at their offices. The following notes were made with respect to hydrology:

Trintoplan stated that the hydrology (location of the rivers and wetlands, angle of crossings, etc...) had no major impact on the determination of the alignment.

At the time of preliminary design Trintoplan was informed that an Integrated River Basin Study was about to commence for the South Oropouche River Basin. This was expected to inform the detailed design of the highway and the detailed assessment of the hydrology and hydraulics.

As there was very little information available from the Drainage Division at the time, and recognizing that several stretches of the alignment are prone to flooding, it was decided to design in such a way as to avoid or minimize the impact on flooding. This was done by ensuring all culvert soffits were above ground level, by implementation of flood relief culverts at low points between regular culvert crossings and sizing them based on maintenance considerations.

Trintoplan indicated that according to their analysis the tidal influence would reach Penal on the New Cut Channel, but would not reach the SS Erin Road.

Trintoplan indicated that design flows were based on anticipated flows from upstream; assuming that present constriction upstream may be removed in the future. This is generally a conservative approach to determine the design peak flows, and detailed design phase this will need to be further investigated and assessed. The South Oropouche River crossing was designed assuming no constriction downstream.

The recommendations by Trintoplan for the Detailed Design phase included:

- Assess the need for additional flood relief culverts to deal with sheet flow.
- Include the back water effects caused by downstream bridges, such as the Silver Bridge, on the capacity upstream
- Consider re-alignment of several water courses as they approach the highway in order to shorten the crossing and subsequently reduce downstream velocities and subsequent scour.
- Check the downstream velocities to implement energy dissipation mechanisms as part of the erosion control management
- Allow for wider floodplain downstream by avoiding embankments along the water course and allow the water to spread.
- The development by the Drainage Division of national guidelines for the design of hydraulic structures, in order to obtain a more consistent approach country-wide.
- Trintoplan would, in hindsight, give greater attention to analysis of sheet flows and

assessment of the impact of the quality of the limited available hydrological data

7.4 Summary of Observations

It is noted that the historic channelization and embankment of watercourses in the South Oropouche Swamp has considerably eliminated the natural meandering character of the lower reaches of the watercourses and therefore altered the characteristics of the wetland system of the South Oropouche Swamp.

The highway crosses rivers and wetland areas which are considered part of the South Oropouche Swamp. It is observed that the characteristics of these wetlands (function, connectivity, ecology, storage and drainage) and the potential impact of the highway on these characteristics is not sufficiently addressed in the preliminary design report and the EIA and therefore require detailed analyses in the detailed design phase.

As part of Best Practices, required by the CEC, an Integrated Watershed Management Plan for the South Oropouche River Basin is required to assess the impact of alterations to the river and drainage system and develop a Wetland Management Plan for the South Oropouche Swamp. This would include the potential impact of any infrastructure and developments including the proposed highway and identify required mitigation measures.

It is noted that the preliminary design is based on a limited assessment of the sheet flows during flood events and their function for the ecology of the wetlands. The final design is required to include a detailed analysis of the sheet flow as part of the development of the Water Management Plan (part of the CEC conditions). The analysis may potentially result in significant changes to the proposed preliminary design to mitigate any unacceptable negative impacts. These could include e.g. construction of a causeway to cross flood plains instead of flood relief culverts and/or the construction of ponds along the alignment which act as retention basins as well as wetland preservation measures.

Any large infrastructural and/or development project crossing a river and flood plain should include a dam break analysis of any reservoir dam upstream in order to assess the impact of the project and to update the emergency response plan. In this case this would include Moora Dam, which is approximately 4 km upstream of the highway crossing of the Coora River. This impact assessment should not halt the project, however it should have been included in the CEC conditions and can be carried out while the project is implemented.

The natural character of the South Oropouche River Basin is such that large areas are inundated on a regular seasonal basis and therefore benefit from deposits of sediment. Prevention of overflow from the rivers, due to embankments or blockage of flows by for example infrastructure (roads, highways), has an impact on the natural character and development of these flood plains and wetlands. It is therefore essential that a Sediment Management Plan (SMP) is developed as part of the Integrated Watershed Management Study for the South Oropouche River Basin. This SMP will be instrumental in assessing the

impacts of any developments, including the highway, on the sediment balance in the watercourses, the flood plains and the wetlands.

Some of the areas, where the highway is crossing, are agricultural lands which are under water and are served with a network of internal small drains. Inundation takes place from local rainfall which is impeded from draining towards the watercourses due to low gradients and high water levels in the courses. The construction of the highway may actually include the risk that the drainage along the highway might improve drainage of the surrounding areas and therefore change the character of these areas. This could potentially be both positive for agriculture as well as negative for natural wetlands. It is noted that most of the areas along the route are in agricultural use.

Noticeably lacking was an assessment of impacts on the groundwater and the impacts of groundwater on the river basin in particular the wetlands in terms of both quantity and quality.

A concern expressed by PN (HRM) is that the highway may trigger development which will have an impact on the hydrologic character of the area. The HRC noted that this has not been sufficiently addressed in the EIA and in the preliminary design. The assumption of 26% increase in urbanization need to be re-evaluated in the detailed design phase considering the impact on the runoff and resulting design flows.

There was no justification given for correlating the peak flow periods to a rainfall event (this should have stated 'return period) e.g. 1:25 or 1:50 rainfall event. Only return periods of single 24-hour rainfall events were considered which are not equivalent to flood events with the same return periods. Reality shows that the most severe flood events are multiple-day rainfall events. Detailed design requires much more detailed analysis.

While the EIA describes the drains to be constructed and expected peak flows, it does not include the return period and calculations used to develop the drainage (stormwater) plan. The Drainage Division flagged this in the EIA review and the EMA described this deficiency in its Review and Assessment Report. The responsibility for this seems to have been shifted towards the CEC conditions, which require a detailed Water Management Plan and a detailed Stormwater Management Plan.

It is unusual to grant a CEC without the detailed plans and designs but this is the result of an approach with an (preliminary) EIA and a Design-Build Tender based on preliminary designs, which do not include detailed stormwater designs. This practice should not be accepted by the EMA.

Trintoplan indicated that many engineering judgements had to be made due to the lack of data or the poor quality of the available data. Since the highway is built in a relatively flat area, small changes in topography and calculated peak water levels would have significant influence on the flows in the watercourses and the resulting flood patterns on the flood plains and in the wetlands. Detailed topographic data through LIDAR is considered a must for detailed design Best Practices. The present resulting conservative approach may result in significant extra costs for the construction of the structures and embankments of the highway.

The final design may significantly differ from the preliminary design however it is not assessed in the Environmental Impact Assessment nor is it subject to publicly available reviews and approvals. No public

information is available on the final designs, which would be normal in case of an EIA based on the final design. It therefore it does not stand up to public scrutiny.

The Highway Review Committee believes that the preliminary design sufficiently addresses the concerns expressed for hydrology; however the Environmental Impact Assessment should have included more detailed assessment of the impacts on the wetland system and identification and assessment of mitigation measures. The available information is not sufficient to make a judgement on the final designs and the impact on the wetlands.

The Committee expects, after analyses of the proposed alignment, that the concerns put forward by the Highway Reroute Movement concerning hydrology, will be properly addressed in the detailed design phase using Best Practices and design standards such as AASHTO, to minimize the impact on the hydrology. HRC also acknowledges that those concerns were not sufficiently addressed at the preliminary design stage and in the EIA.

7.5 General Conclusions and Recommendations

The Hydrology Report ([2], 2007), as part of the Feasibility Study, fulfilled the objectives of determining the hydrological information required as input to the hydraulics for bridge and culvert preliminary designs at the points of intersection of the highway and river crossings. However, the analyses are not carried out in the context of an Integrated Watershed Management Plan for the South Oropouche River basin. This study, which has been in the planning since 2006, but has still not commenced, is considered to be part of the use of Best Practices for such a river basin and nationally important highway project.

Groundwater impact assessment was not a focus for this project at feasibility stage but is an important consideration in the context of integrated watershed management, the assessment of the impacts of the Highway infrastructure and the impacts on the characteristics of the wetlands. The EIA did not address this sufficiently.

Projects of this nature must be undertaken in a more comprehensive and holistic manner. The Hydrology of a Highway project or any type of project that has such a great environmental impact given the types of land uses and impacts in the area, requires an Integrated Watershed Management Plan.

Effective stakeholder participation is required in the decision making process including discussing all hydrology concerns. What has transpired with this project may not have occurred if an appropriate process for incorporating stakeholder involvement was applied. From interaction with officials of the Regional Corporation it followed that they are not sufficiently aware of their responsibilities concerning reviews and approvals.

There is need for quality control in the EIA process for ensuring that relevant and appropriate comments provided by reviewing organizations are incorporated – apparently not all comments from reviewing

organizations were addressed by the EMA at the required level of detail.

Considering the required detailed design studies and high investment in this infrastructural project it is astonishing that the quality of the available hydrological data is not at the required levels and therefore is considered to have a significant impact on the implementation risks, the (conservative) designs and subsequently increased implementation time & costs.

More updated maps e.g. detailed topographic maps to do 2d analysis are needed. LIDAR topographical data is an imperative for a river basin with such extensive flood plains and wetland as the South Oropouche River Basin. Small changes in ground levels determine the drainage, the sheet flow patterns and the sedimentation for extensive areas and detailed topographical data is therefore a critical requirement to achieve the required level of assessment of the hydrology of such areas and subsequently the sensitivity of the ecology and agriculture to changes.

Updated land use maps are required and development projections based on a National Physical Plan or at least based on the Regional Development Plans should be included. The estimated urbanization increase of 26% by the year of 2055, which is used in the determination of impervious surfaces for the hydrological calculations, has to be revisited and done in the context of several realistic development scenarios for different areas in the watershed.

More reliable hydrologic data and information in terms of rainfall, rainfall distribution and intensity duration frequency curves, and stream flow data are needed, therefore an improved water resources monitoring system is required. This data gathering exercise is only a fraction of the extra cost that can result from a conservative approach to design due to a lack of proper data. Hence a proper hydrological and water quality monitoring system for this river basin, including the wetland, needs to be established. The EMA should have insisted in the implementation of a proper hydrological and water quality data monitoring programme as a condition of the CEC and in advance of the implementation of the highway.

Rainfall correction factors are based on engineering judgements. However they should be based on a consistent national approach. This also applies to the proposed effect of Climate Change which should follow from a National Policy, regarding the impact of Climate Change on sea level rise and rainfall patterns, which is not present at this moment.

Lack of Stormwater Design Standards (Drainage Code) in Trinidad & Tobago is a recurrent problem for all drainage and river management plans and designs. This leads to inconsistent approach between similar projects across the country depending on the individual consultants involved as well as the individual representatives of the Drainage Division who are responsible for reviews and approvals.

Flooding is addressed in flood disaster preparedness and mitigation plans and should include the assessment of dam break analysis for reservoirs, such as the Moora Dam, in the various catchments.

Considering the observations and conclusions in this hydrology review report, it is clear that there are a number of risks in granting a CEC based on a preliminary EIA which is based on a preliminary design.

The Design-Build approach is considered suitable for well-defined projects with a clearly defined scope of works and list of requirements e.g. buildings. In the case of infrastructural works, such as highways, Design-Build should only be applied in cases where detailed designs and plans are already available at Tendering Phase, and the design tasks will be limited mainly to value engineering.

The available preliminary design, and the EIA which is based on this, are not sufficiently detailed to assess the impacts of the highway and the identification and design of the required mitigation measures. The consequence is that identified mitigation measures during the detailed design may not be in direct interest of the D-B contractor as it may potentially lead to delays and extra costs. Any proposed changes to the original scope are also expected to naturally encounter “approval resistance” of the Client since it will tend to avoid having to explain any delays and extra costs to Cabinet. This tendency is considered in conflict with the requirement to use Best Practices, as indicated in the conditions of the CEC.

The Committee therefore concludes that the Design-Build approach for this infrastructural project should not have been used as the implementation risks are in direct conflict with Best Practices and therefore not in the interest of the people of Trinidad and Tobago. It is doubtful that these concerns can be addressed sufficiently via the conditions of the CEC.

7.6 Main Conclusions for the Present Project

It is the opinion of the Highway Review Committee that many concerns related to hydrology that were brought forward by the Highway Reroute Movement, are a logical result of the limited available information based on the preliminary designs and the Environmental Impact Assessment, which were both based on the results of the Feasibility Study.

The CEC is also based on the same information from the Feasibility Study and the EIA and has not included reviews of the detailed designs, different plans and construction methodologies. The result is that this CEC has extensive conditions which directly and indirectly address this lack of detail at the time of the application. A significant amount of work still has to be carried out to obtain approvals prior to commencement of ANY site activities.

The detailed design, including the many required plans such as the Stormwater Management Plan, is subject to approvals by the relevant state entities before any site activities can start. This process also involves stakeholder consultation and feedback via the Working Group which has to be formed as part of the CEC conditions. This approval process has to be done in an appropriate manner and can take significant time which is considered normal for such a large project.

The Design-Build approach for the implementation of (large) infrastructural projects includes a major risk with respect to construction delays as it is dependent on the approvals of the detailed designs and required plans by numerous approval agencies and the involvement of stakeholder consultation.

The AASHTO design codes for Highway Design include hydrology and hydraulic design standards for e.g. the design of stormwater systems, river crossings, flood relief culverts and crossings of flood plains and wetlands. Following these design codes may result in significant changes to the preliminary designs

and require detailed reviews and approvals of relevant entities. It is expected by the Highway Review Committee that once this code and other conditions of the CEC are followed, that identified potentially negative impacts would be sufficiently addressed and mitigated. It is the responsibility of the CEC Applicant that the Design Engineer follows these design codes. Potential delays and/or resulting extra costs as a result of significant design changes will have to be agreed upon between the Applicant (the Highway Division, MOWI) and the Design-Build Contractor.

A large infrastructural project like this highway should not be undertaken without an Integrated Watershed Management Plan, which appropriately addresses the different interest of different stakeholders and provides a balanced approach to the water resources management and stormwater management in the watershed. Only in the context of an overall Integrated Watershed Management Plan can a proper hydrological assessment be carried out as part of the EIA and as support for the assessment of different routes and subsequently the detailed designs.

The implementation of the highway requires that all the approvals are obtained and all conditions of the CEC are met. This includes the submission of the approved detailed designs and plans such as the Storm Water Management Plan and the Water Management Plan. As the detailed design may considerably differ from the preliminary design, these should be available for public stakeholder consultation and they require review by the appropriate approval agencies.

The Highway Review Committee has been advised that the Drainage Division (MOEWR) has not issued any formal approvals for the temporary and final drainage designs (e.g. river crossings, stormwater systems and erosion control). The start of construction activities are subject to having these approvals in place (per each CEC).

Further, the legally required compliance by the Applicant to the CEC conditions is, at present, not sufficiently checked by the EMA which has the legal obligation under the Environmental Management Act.

7.7 Main Conclusions for Future Similar Projects

All large infrastructural projects should be designed in the context of an Integrated Watershed Management Plan considering the potential impacts on the hydrology of the whole watershed.

Appropriate monitoring systems must be established to allow designs to be based on reliable data and information.

It is the opinion of the Highway Review Committee that Design-Build approach is not the appropriate implementation strategy for future (large) infrastructural projects. Main reasons are:

- Approvals are generally dependent on detailed designs, which may cause significant delays and extra costs due to design changes compared to the tendered design.

- Large infrastructural projects are of national importance, require significant investments and must involve proper stakeholder participation, including in the detailed design phase, to ensure the required quality and adequate attention to the interests of different stakeholders
- The final Environmental Impact Assessment should not be based on preliminary design but on detailed design, and a final CEC should not be granted with so many outstanding issues.
- At most a preliminary CEC can be granted based on preliminary designs, which will not guarantee that a final CEC will be granted for the implementation of the project since final approval will be subject to the results of the detailed analysis, detailed designs, final Environmental Impact Assessment and approval of proposed mitigation measures.
- A large part of detailed hydrology and hydraulic designs are dependent on the availability of detailed data, which is often not available at feasibility and preliminary design phase. This also applies to the Environmental Impact Assessment.
- Any of the recommended major design changes which are identified as part of the detailed design and which result from detailed analysis, and which incur in extra delays and costs, will encounter “approval resistance” with most parties involved (especially the Client, the implementation agency, the Engineer’s representative and the Design-Build Contractor). This resistance potentially may stand in the way of Best Practices and achieving the optimum design in the interest of the People of Trinidad and Tobago.

The legally required compliance by the Applicant to the CEC conditions is at present not sufficiently checked by the EMA, which is their legal obligation under the Environmental Management Act. The EMA needs therefore to improve on their fulfilment of their responsibility to enforce the Environmental Management Act and obtain the required resources to do so.

7.8 Road Design Standards

The Civil Engineer operated as part of the Engineering Design, Hydrology and Hydraulics group of consultants.

1. SOURCE OF INFORMATION.

The report is based entirely on the Lea-Trintoplan *Final Report on Feasibility Investigations Vol.1 Engineering and Economic Feasibility* and sent to the Ministry of Works and Transport on May 14th 2006. The referenced sections include Chapter 3 - *Modification to Design Standards* and Chapter 6 - *Preliminary Designs*.

Trintoplan is no longer involved with the Debe to Mon Desir segment of the Solomon Hochoy Highway extension project and the HRC consultant was unable to access design data from NIDCO or Halcrow although these were requested.

2. DESIGN DETAIL.

Engineering specifications have been done to ASTM and AASHTO requirements. Design criteria were based on roadway classification and speed and a four lane highway is classified as arterial or freeway.

The design standards are set out in Chapter 6 -Preliminary Engineering, Table#6.5 and are as agreed with the project proponent, the Ministry of Works and Transportation. This sets out acceptable criteria for:- Design and posted speeds, stopping controls, horizontal controls, vertical controls with maximum and minimum gradients, curves, clearances, cross sectional elements and clear zones.

3. STABILITY ANALYSIS.

The note at the bottom of Table 3.1 from the section on 'Modification to Design Standards' states that cut and fill slopes outside of clear zones will be 1:3 or flatter depending on geotechnical considerations, however, Chapter 6, 6.2.3.1-'Slope Stability', states that; *"for major roads, the side slopes should not exceed 1:4 for safety reasons so that vehicles leaving the road unintentionally have a chance to recover."*

This does not appear to have been followed in all of the cases in which the slopes were designed by 'Slope stability Analysis' as shown in Table 6.1-'Side Slopes for Route A-K' . These show slopes varying from 1:1.5 for a 3m cut to 1:3.4 for a 10m cut and from 1:2 for a 2m fill to 1:3 for a 10m fill.

This consultant observes that the source of fill material and soils characteristics, are not stated in the note.

The soils in the area under review consist of clays with some mix of silts and sands and are highly compressible which will lead to settlement. The project consultants proposed that the section from Debe to the S.S Erin Road south west of Penal should be pre-loaded to a height of 1.5 to 2.0m above ground level for a period of about three years.

This consultant observes that Wick piles would accelerate the consolidation process by faster dissipation of the pore water pressure.

4. PAVEMENT DESIGN.

The design soaked CBR value of 2% for the sub-grade was obtained from test pits dug along the route. Axle loads used in the design conforms to 'Overseas Road note # 31-Loading.' On the basis of this criteria, the recommended pavement designs varied between 75-150mm Asphaltic Concrete, 175-250mm Aggregate Base course, 250mm Aggregate Sub base and 300-350mm Capping layer dependant on the location.

5. BRIDGES.

The duelling of the 'Princess Margaret Highway' (now the Butler Highway) introduced the use of BS 153: Part 3 A which was eventually supplemented by BS 5400 and the loading included the application of 37.5 units of HB loading. This gives a heavier loading than the AASHTO HS-20 truck and HS 25 truck used in some jurisdictions in the U.S.

The use of HB loading has been recommended for this project.

Bridge foundations will require piling to an anticipated average length of 25m.

6. CONSULTANT'S FINDINGS AND RECOMMENDATIONS

- i. The design standards used for the Geometric and Pavement designs are standard for highways of this nature.
- ii. The loading used for bridge designs of 37.5 units of HB loading allows for the predicted heavy industrial traffic.
- iii. The proposed maximum design slopes of cut and fill of 1:4 to allow for possible recovery of traffic running off the highway has not been followed.
- iv. The source of fill material is not mentioned and the soils characteristics therefore unknown.
- v. The area from which the fill material is to be sourced should have been investigated to determine the possible deleterious effect of dust and destruction of local roads on residents.
- vi. Wick drains are an alternative method to preloading the existing weak soils and causes consolidation in much faster time and should be considered.

8.0 LAND TENURE AND ACQUISITION

8.1 Terms of Reference

The Senior Acquisition/Valuation Consultant is required to *inter alia*:

1. Review all documents submitted by the NIDCO and affiliated agencies;
2. Review the relevant municipal level Regional Plans;
3. Review implications of resettlement, including alternative routes, on the acquisition process including acquisition cost;
4. Examine compliance with existing laws, policies and basic public service management principles;

8.2 Background

The extension of the Butler (formerly Princess Margaret) Highway to Cedros was initially conceived in the 1960s. It was not intended to be built as a single project but in **stages** as the need arose. It was an integral part of a highways policy incorporated in The Highways Act Ch 48:01. The policy included provisions to facilitate improvement of other public roads, adoption of private roads and provisions to optimize the carrying capacity and safety of all roads. It contained more sophisticated land acquisition provisions than the then Land Acquisition Act (LAA).

The Highways Act was an integral part of a national land reform initiative including the Town and Country Planning Act (TCP Act) and the Valuation of Land Act, and included a national Information Management System. Initiated in the 1960s, its aim was to facilitate a multi-disciplinary approach to national planning.

The Valuation Division (VD) plotted every parcel of land in the country with detailed data on each plot of land available, on maps supplied by the Director of Surveys (DOS). Many State agencies utilized the data which was especially useful in Section 3 valuation reports.

The Chief Technical Officer (CTO) of the Ministry of Works & Transport (MOWT) chaired a standing “Highways Committee” representing the various public service entities, agencies, contractors, consultants, special advisors and other experts. The Committee was effective in dealing with legitimate concerns although it sometimes fell victim to interference. Each representative submitted a monthly status report. The VD submitted valuation reports relevant under Section 3 and Section 5(*Appendix 6*) When claims were received, the status of each claim was included. It is important to note that the onus is on claimants to submit a claim within one year of the Section 5 date and that no compensation is paid before a claim is made. Claimants must prove their entitlement at their expense.⁷

⁷ Supporting references and discussion of legislation cited in the report, can be found in Appendix 6.

8.3 Issues Raised by Highway Re-Route Movement (HRM)

Following are the land issues raised by the Highway Reroute Movement:

- a) Thousands of acres of agricultural land would be destroyed by construction of the highway, including land used for domestic-scale agriculture which is practiced in most homes in the area;
- b) Thirteen communities would be split by the proposed alignment;
- c) Hundreds of buildings including homes, schools, and businesses would be demolished
- d) Urban sprawl would occur in the Fyzabad, Siparia, Penal and Debe areas;
- e) Property owners are not being given sufficient information relevant to State acquisition of their land.
- f) There is a lack of consistency in the advice being given to property owners with some residents being given verbal notice without regard to the strict conditions laid out in the formal process;
- g) Inconsistency in quantum of compensation paid.
- h) Inconsistency in the selection of person being paid compensation.

These issues were reiterated at a meeting HRC/HRM on 10th January 2013:

- 1) Many property owners in the affected communities are confused about the status of their homes and land as a result of the often incomprehensible quality of Statutory notices. (*See Appendix IV*), In some cases, their anxiety has intensified as a result of being verbally informed about the State's intention to acquire their property.
- 2) Public consultations have not been effective enough in addressing the residents' concerns about their property because of the inadequacies of the resource team.
- 3) A lack of transparency in the calculation of compensation for some who have agreed to be relocated.

8.4 Review of the Issues

On the 9th of January 2013, a meeting was held with the HRC/NIDCO where many of the HRM issues above were raised. Because of the importance of this matter and the inconclusive nature of the discussions, a subsequent meeting was arranged with NIDCO on the 25th January 2013 to specifically address the Land Tenure and Acquisition issues as stated above and the provision of any outstanding documentation. The relevant extract of the document 'The Highway Review Committee-Questions and Observations to be raised with NIDCO and Request for additional documentation', which guided discussions on the 9th January 2013, was tabled for discussion.

Some verbal responses were provided by NIDCO officials but those were inconsistent and offered little by way of rationale. Up to the time of concluding this report, NIDCO had not provided written documentation to the HRC consultant as discussed and promised in that meeting.

With respect to resettlement, the MOWT position as understood by this consultant is that more information on resettlement was simply not available at the EIA stage and is to date still unavailable, even after contracts have been awarded for the highway construction.

As reported, despite the fact that the majority of persons at the public consultations expressed a preference for finding their own relocation site, an expensive controversial relocation exercise has been initiated for which no documented policy seems to be available. This could have serious implications for making the land available for the project, with the possibility of significant and expensive delay.

At the meeting of January 25, 2013, NIDCO/HRC, at which this consultant was present, NIDCO representatives admitted that such delays were likely to attract substantial claims for damages from the contractors. Further, given that the relevant Section 3 Notice was not issued until February 03, 2012, it would be important to establish how the provisions for alternative accommodation for displaced persons appeared in the Certificate of Environmental Clearance (CEC) April 2010. For, without the issuance of this notice, the Commissioner of Valuation (COV) would have no authority to enter properties in order to calculate their values.

In addition, the decision to resettle affected residents on 5,000 square foot plots is inconsistent with the larger plot sizes which obtain in this rural area. The HRC consultant has found no evidence that estimates of acquisition cost were factored into the feasibility reports, especially in assessing alternative routes. No evidence was found of detailed land use information relating to all of the buildings in the path of the alignment with the estimated cost of acquisition of each stage.

Claimants are entitled to be reimbursed “the reasonable costs incurred in the preparation and submission of claims and negotiating the quantum payable”. This does not include legal costs or costs related to submitting or proving title. Like any prudent purchaser, the acquiring authority will check the title documents provided at its own expense. If the State sub-contracts this task it will have to bear the cost of this only. The preparation and submission of claims and negotiation of the quantum payable is a land economy function and the maximum reimbursement is the reasonable fee of the reputable valuer.

NIDCO stated that its contracts in respect of compensation are in the main awarded to legal firms on condition that they employ qualified valuers. Information gleaned by this consultant suggests that fees paid by NIDCO include the cost of provision and proving of title in addition to the “checking” of title. It is conceivable that this change in approach may be related to the amendments to the LAA in 2000 and for the use of Private Treaty.

The relatively recent decision of the State to make *ex gratia* payments without a clear transparent policy is alarming. *Ex gratia* awards are normally made by the State to persons with a legitimate right to an asset/benefit which was lost by their failure to conform to “procedure” and where the State has obtained the asset/benefit (See Appendix 6). In cases involving squatters who do not qualify according to law or official policy, *ex gratia* awards are not recommended.

8.5 Findings

1. The NIDCO claim to be operating under the “Shadow of Complusory Purchase” cannot be accepted. (*See Appendix 6*).
2. It appears that there has been failure to observe due process in the following instances;
 - a) Section 3 notices were issued on 3rd Feb 2012, but entry for activities permitted under Section 3 were said to be conducted up to six years previously.
 - b) Improper treatment of “crops” in the valuation process which has increased abuse
 - c) Improper treatment of encroachers onto road reserves, squatters and unauthorized development which has had the effect of increasing abuse.
 - d) Improper treatment of accommodation works (including resettlement, injurious affection, severance and betterment which too, has increased abuse of the process.
3. State agencies are using policies relating to land acquisition of which professional bodies are unaware, thereby negatively affecting the ability of affected persons to obtain proper professional advice.
4. The Highways Committee is no longer limited to administrative, technical or professional representation but now includes non-experts.
5. The absence of a national Information Management policy has created a critical data void.
6. The departure from established procedures and rules is having detrimental consequences on the delivery of quality public services within the confines of the law, the required timescales and budgets.
7. Amendments to the LAA and the State Lands Act are causing serious problems in land acquisition and state land management.
8. It appears that payment is being made for relatively large acreages of crops on the unit value normally ascribed to a few plants which will result in excessive payment. (*See Appendix 6, III*)
9. It appears that vegetation over a substantial portion of the ROW is being destroyed before the Section 5 Notice or the exercise of Section 4 presidential authority or payment for the damage as described above. Unless such damage was necessary in the proper exercise of Section 3, such payments will be excessive. If this is being done outside of Section 3 authority it is unacceptable as it represents the State’s illegal interference with the Constitutional right of the citizen to enjoyment of property without interference, other than as allowed by exercise of law.
10. Improper land acquisition procedures could be the cause of substantial delays. This seems to be the result of an improper definition of the term “acquisition under the shadow of CP” and the deployment of persons in positions for which they do not have the necessary expertise. In consequence, precedents may have been set that are beyond the State agencies’ capacity to manage properly. The extension of the Butler (formerly Princess Margaret) Highway to Cedros was initially conceived in the 1960s in a period of acute shortage of professional and technical staff at the VD and a COSL with inadequate Land Economy (LE) expertise. .
11. The decision to build the entire highway from Golconda to Point Fortin as a single stage was beyond the capacity of the State agencies.

12. The State's consultation methodology is unsatisfactory, in both the reform of its land acquisition policies and its development of this particular project.
13. The policy and criteria for the recent award of *ex gratia* awards in many cases is unknown, which is unsatisfactory.
14. Highway "authorities" do not appear to appreciate that the Highways Act assumed a co-ordinated approach to "access" under the "technical authority" of the Chief Technical Officer MOWT, as it includes provisions to facilitate road improvement, road safety and optimizing traffic capacity on roads.
15. The procedure for reimbursing costs in accordance to the LAA or Highways Act, could not be ascertained.

8.6 Recommendations

1. That the GORTT ensures that all Public Service agencies, including state companies, abide by the law and official policy.
2. That all Public Service agencies, including companies, report officially to (or through) the Permanent Secretary and not directly to the Minister or political advisors.
3. That all official policies of which the public and/or their professional advisors should be aware should be made readily available on TT Connect or a similar facility to the public and to the professional organizations.
4. That the Highways Committee be restricted to technical/professional persons involved in the process and include representation from the relevant agencies such as the T&CPD, the VD and the DOS with appropriate administrative, technical or professional expertise .
5. That the State reinstate a national Information Management policy and the VD be empowered to update their data base. That maximum use is made of data in the VD.
6. That SPAs and other state agencies whose functions are better suited to the Public Service be phased back in to the Public Service. That where their functions include "land management", they be required to operate in accordance with the policies of the State "authorities" such as the T&CPD, the DOS, The COV and MOWT, subject to Cabinet's over riding policies. This must also apply to departments of the public service such as the COSL, the VD, the Property and Real Estate Services Division of the Ministry of Public Administration, the Land Settlement Agency.
7. Require all State agencies to review their activities annually in consultation with major stakeholders where advisable. Consideration should be given to posting their recommendations on a facility such as TTConnect, subject to security and confidentiality provisions. .
8. That Government commitment to review the LAA and the State Land Act be undertaken urgently and include an examination of the reasons for the amendments in 2000 with a critical review of the consequences of the amendments including improper reimbursement of funds and the improper use of Private Treaty.
9. That all relevant State agencies together review their policy for the assessment of damage at Section 3. This must include the COSL, MOWT, VD and the Ministry of Food Production. It is recommended that the Institute of Surveyors of Trinidad and Tobago (ISTT) be consulted and consideration be given to including the Agricultural Society and the Law Association. That the COV ensure proper compliance with the law and LE principles.

10. That more consideration must be given to dealing with mega projects in manageable stages where feasible.
11. That the State needs to improve its consultation methodology in conjunction with NGOs especially the professional associations.
12. That the State needs to learn from the mistakes made in the Guaymare and Oropune resettlements and develop a proper resettlement policy less conducive to manipulation.
13. That the State needs to make a proper policy in respect of *ex gratia* awards which must be readily available to all; at least on TT connect.

III. REPORT OF RESOURCE CONSULTANTS

**REVIEW OF THE CEC/EIA PROCESS OF THE
FOR THE
ESTABLISHMENT OF A HIGHWAY ALIGNMENT
FROM DEBE TO MON DESIR**

JANUARY 2013

By:

**Eden A. Shand
Environmental Impact Assessment Resource Consultant**

A. INTRODUCTION

As a result of demands for an independent technical review of the SHHE Project: Debe to Mon Desir Segment, this writer was tasked with reviewing the CEC/EIA documentation of the subject project with a view to advising on the relevant salient issues. In the course of conducting the review, it became apparent that salient issues of the EIA Report were not the only items of concern. The whole CEC/EIA process itself begged for closer examination. Two reports were generated as a result of the documentation review. Report 1 concerned itself with a review of the EIA Report, while Report 2 is concerned with a review of the CEC/EIA process. This instant report is Report 2.

This review of the CEC/EIA Process was undertaken with a view to making recommendations for the improvement of the process. It was conducted under the headings of the recognized stages in the process, namely:

1. Screening
2. Scoping
3. Preparation of Terms of Reference
4. EIA Preparation
5. Public Consultations
6. EIA Review
7. Monitoring
8. Auditing

The report hereunder presents under each heading the findings of an examination of the CEC/EIA Process for the instant project.

B. SCREENING

Screening is the procedure initiated at the beginning of the EIA process to identify all possible interactions between a project proposal and the environment, and to determine if the project should be subject to EIA. Criteria for this determination include the nature and magnitude of the project and the sensitivity of the receiving environment. Some projects in some jurisdictions, by their very nature and magnitude, automatically require an EIA. Such is the situation in Trinidad and Tobago, where positive lists of projects for which EIA is mandatory have been incorporated into EIA regulations via the CEC (Designated Activities) Order, 2001.

In the designated activities, thresholds of size are often used to define the magnitude of a project. Activity 33(a), the establishment of a road more than 1 km in length, is applicable to the SHHE project.

The use of thresholds can create problems from three sources, namely:

1. The general wording may not be adequate to deal with a highly specific and unusual proposal.
2. It does not take into account cumulative impacts.
3. It takes no account of location and the environmental sensitivity attached thereto.

Happily, these problems did not arise in the case of the SHHE project, since it did not escape the EIA requirement net, having easily qualified on the grounds of nature and magnitude.

C. SCOPING

Scoping is a vital and underestimated stage in the EIA process. It refers to the activity of identifying from a broad range of potential problems, those key issues that should be addressed by an EIA. It attempts to focus the assessment on a manageable number of important questions.

For the instant EIA, a scoping exercise was conducted before the application for a CEC was submitted. The exercise relied on existing data and limited field reconnaissance to describe the affected environment, and the use of general checklists to identify areas of environmental concern. Much of the existing data came from the report on the Prefeasibility Study for this highway extension, prepared in 1999 by Eco engineering Consultants for Lea Trintoplan. The Environmental Scoping Report, which took the form of an Environmental Feasibility Report, was completed in 2006 and accompanied the application for a CEC.

The Environmental Scoping Report bore no evidence of a consultative exercise to shortlist key issues. It was in fact an Initial Environmental Evaluation (IEE) based on old overly comprehensive generic EIA Terms of Reference put out by the EMA. Such an approach is useful when a full-blown EIA is inevitable and an upgraded IEE might suffice. However, this approach invited the EMA, having reviewed the totality of the CEC application, to issue their standard cumbersome boiler-plate Terms of Reference for a full-blown EIA before they could grant a CEC. An opportunity to get the EMA to be more flexible in Terms of Reference was lost.

For the future, it is recommended that a CEC application be submitted without a Scoping Report. This would provide the opportunity and basis for a collaborative effort by the environmental consultants and the EMA to jointly produce a Scoping Report. So that both parties could get on the same page at the very outset.

The joint exercise could take the following standard steps:

1. Conduct a field reconnaissance of the Project Area and the identified Study Area.
2. Develop a communication plan – Identify key stakeholders and construct a timetable for making contact. A consultative meeting for stakeholders might be an option.
3. Assemble information that will be the starting point of discussions.
4. Make the information available to stakeholders.
5. Identify the issues of concern to stakeholders.
6. Organize information according to issues, including grouping, combining and setting priorities.
7. Develop a strategy for addressing each key issue and prepare Terms of Reference.

D. PREPARATION OF TERMS OF REFERENCE

The EMA has imported generic EIA Terms of Reference formats from foreign institutions such as the World Bank. There appears to be no native intelligence applied to these imports. Moreover, there appears to be little or no tailoring of generic Terms of Reference to specific projects. Under the present system, the EMA should do its own scoping exercise based on the CEC application and prepare Terms of Reference to suit. There is little evidence that this ideal is ever observed, and certainly not in the SHHE Project. The result is that site-specific issues do not get the necessary emphasis and boiler plate Terms of Reference are issued.

Generic Terms of Reference that attempt to be comprehensive stipulate the collection of a large amount of baseline data. Some observers regard the excessive demand for baseline data, often irrelevant, as madness. But there is perhaps some method to this madness. The EMA is a relatively young institution. It was gestated by World Bank loan conditionalities at a time when environmental awareness in Trinidad and Tobago was in its infancy and environmental baseline information was sorely lacking. It is opined that the wide and detailed EIA Terms of Reference was the means by which the EMA compiled its in-house national database of environmental information. The EMA has now been in charge of the EIA process for more than 15 years and it is now high time for all the baseline data collected over this period to be properly compiled and organized and made available to all EIA preparers in the EMA Information Centre. Use of GIS technology might be useful. The preparers could then judiciously extract that which is relevant to their study, supplementing it with additional field work, as required. Judicious extraction will prevent the wholesale regurgitation of baseline data in report after report.

On the subject of regurgitation, it is baffling how the EMA's Terms of Reference for all projects invite a playback of a description the Regulatory Framework for environmental management. One might expect such a requirement for an externally commissioned EIA, say, by the World Bank, because they might wish to satisfy themselves about the integrity of environmental management in a borrower country. This surely does not apply to an indigenous institution like the EMA, already seized of knowledge about the legislative and institutional framework for environmental management.

In May 2006, the EMA provided Terms of Reference for an EIA of the SHHE: Debe to Mon Desir Segment. In response the environmental sub-consultants upgraded their Scoping Report or IEE in 2007/2009 and presented it as a full-blown EIA. It must have been carelessly done, for all copies of the EIA Report submitted were returned by the EMA in February 2009 with the observation that a number of items in the final Terms of Reference were not addressed in the Report. At length, after discussion with the EMA and further work, a revised EIA Report was submitted in June 2009. This formed the basis for the preparation of a revised EIA Report.

E. EIA PREPARATION

The essence of EIA Preparation is the scientific and objective analysis of the scale, significance and importance of impacts identified. Various techniques and methods are employed in the conduct of an

EIA. Technique refers to a mechanism for predicting future changes in specific environmental parameters (e.g. an air pollutant dispersion model). The technique is evaluative when the magnitude of the effect is quantified. Method refers to a structured aid which guides collection, manipulation and comparison of impact data through use of various EIA techniques. Effectively, methods are the organizational principle of the EIA process, e.g. check lists and matrices.

The end result of EIA preparation is an EIA Report. In some jurisdictions, such as the U.K, this is called an Environmental Impact Statement (EIS). This latter terminology is preferable to the former, because it connotes focus and brevity. The word “Report” in this context invokes images of pages and pages of printed matter and endless appendices

Shortcomings in techniques and methods in the instant EIA Report, particularly those of a quantitative nature, have already been identified in Report 1.

F. EIA REVIEW

Review of an EIA will usually comprise two parallel elements – the public review and the technical review.

In the public review, the public is afforded an opportunity to comment on the EIA Report. The public may comment on the adequacy of the EIA Report in terms of addressing their concerns and may raise questions that arise from the information provided in the EIA Report.

The public review process in Trinidad and Tobago is satisfactory. Public access to the EIA Report is allowed through its open placement, not only at the EMA offices, but also at strategic locations across the country. Mandatory public consultations after the EIA Report has been prepared are also specified in the Terms of Reference. It should be emphasized that these post-EIA public consultations are not meant to replace the meaningful consultations that should take place during EIA preparation. It should also be pointed out that the public review process is not a replacement for the technical review.

Technical reviews are conducted by the EMA and based on these reviews; top management makes a decision of the granting of a CEC, invariably with conditions attached. Decision-making is sometimes regarded with public mistrust. The EMA is seen as a State body, without real independence, since its Board is appointed on the recommendation of the Cabinet. Political interference in the decision-making of the institution is feared. One former Chairman did not have his tenure extended because he described the Government action of paving the Queen’s Park Savannah as illegal and immoral. A former Managing Director was publicly accused of bowing to political dictates by putting his signature to the CEC for the construction of the massive out-of-scale NAPA, without the benefit of a public consultation.

And now, one is witnessing the case of the Highway Reroute Movement which clamored for an independent technical review. They have displayed serious mistrust of the Government, perhaps with some justification. The EMA review of the EIA Report regarded as a deficiency the treatment of the drainage/flooding issues of the proposed highway development. A somewhat impertinent response from the proponent, MOWT, dismissed the EMA criticism and sharply declared that what they had put forward

was sufficient. After a lapse of two months with no apparent further exchanges between the parties, a CEC was granted. How the EMA was persuaded to do this is unclear.

This report is being written because Government succumbed to the demand for an independent technical review and agreed to such a review under the auspices of the JCC. This is a fortuitous occurrence, for by so doing, Government has laid the foundation for technical reviews to be done by independent panels instead of the EMA. It is recommended that this practice be regularized through the appropriate administrative arrangements.

G. MONITORING

Monitoring is normally adopted as a mechanism to either check that any conditions imposed on the project are being enforced or to check the quality of the affected environment. Current EIA Terms of Reference contain adequate provision for the development of monitoring plans as part of the EIA Report. The proponent is primarily responsible for the monitoring function during both the construction and operation phase of the project. It is not known how much the EMA oversees this monitoring or how much it delegates this oversight function to specialized agencies. The EMA has been known to be unable to police Consent Order undertakings for one reason or another. Monitoring programmes need to be more strictly overseen since they provide the necessary and essential input into auditing.

H. AUDITING

Auditing, in the context of EIA, refers to the activity involved in synthesizing impact monitoring data, over a range of impacts, and then comparing the actual impacts with the predictions made. Until now audits have, almost exclusively, been implemented in the developed countries. They certainly have not been done in the Trinidad and Tobago EIA culture, largely because of paucity of quantitative impact methodologies and predictions already alluded to. Auditing in the Trinidad and Tobago system must necessarily be deferred until such time that EIA techniques become more sophisticated.

I. SUMMARY OF RECOMMENDATIONS

The CEC/EIA process in Trinidad & Tobago, though adequately framed, could be improved by implementing the following recommendations:

1. Establishment of the joint preparation of a Scoping Report, by the EMA and the environmental consultants of the proponent.
2. Joint preparation of more focused EIA Terms of Reference, based on the Scoping Report.
3. Commissioning of an exercise to consolidate, organize and make available to EIA preparers all the acceptable baseline environmental data presented to the EMA over the years in EIA Reports. The use of GIS technology should be explored for this exercise.
4. Making permanent the practice of independent technical reviews to replace EIA Report reviews done by the EMA.

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**REVIEW OF THE SOCIAL COMPONENTS OF THE
ENVIRONMENTAL IMPACT ASSESSMENT
FOR THE
TRUNK ROADS EXPANSION PROJECT
HIGHWAY EXTENSION TO POINT FORTIN: DEBE TO MON DESIR**

JANUARY 2013

1 INTRODUCTION

Based on the terms of reference (TOR) provided, the consultant was required to undertake four tasks:

1. Set out a brief of critical baseline indicators pertaining to social impact assessments within the context of major infrastructure works and human settlements development projects, along with processes for the conduct of an SIA accordingly.
2. Review the Environmental Impact Assessment for the Mon Desir to Debe segment of the Highway, particularly the Terms of Reference prescribed by the EMA, to determine the procedures and treatment of social impact considerations and mitigation of impacts.
3. Provide advisory briefs to the Chairman on any issues pertaining to the SIA process.
4. Review the findings on the SIA review by local personnel and advise the Chairman on implications for inclusion in the Final Report.

This report addresses items 1, 2 and 3. Findings by local personnel have not been sent to facilitate the completion of item 4.

The indicators are provided in section 2. This is followed by a full review of the SIA in section 3. A summary brief explaining the findings to the Chairman concludes the report.

2 INDICATORS

The following indicators were selected to indicate the requirements for an SIA to meet international best practice. The first indicator focuses on the terms of reference:

Indicator	Explanation
Were appropriate TORs established for the SIA?	This indicator is necessary to ensure that proper guidelines were given for the conduct of the SIA. Failure to provide appropriate TOR for the study could lead to critical gaps in the data and this would impact negatively on the decision making process.

The next indicator focuses on the relationship between the TOR and the SIA. It seeks to ensure that the SIA meets the requirements of the TOR.

Indicator	Explanation
Did the SIA comply with the requirements of the TORs?	This indicator is necessary to ensure that the SIA undertook all of the tasks as delineated within the TOR. Failure to do so would lead to critical gaps in the data and this would impact negatively on the decision making process.

The next set of indicators addresses the quality of the SIA. They consider whether best practice was followed in the methods selected and utilised; and in the way the data was analysed.

Indicators	Explanation
Were fully qualified professionals engaged to conduct the SIA?	The impact assessment should be undertaken by suitably qualified and experienced professionals who can provide the expertise required to address the issues identified in the TOR.
Were the potentially impacted communities and development described?	The study area and buffer zones should reflect the extent and range of the potential impacts.
Were appropriate methods utilised in the conduct of the SIA?	The methods selected should be based on the type and size of the proposed development and the nature of the likely impacts.
Were appropriate public consultation approaches utilised? Was the diverse set of potentially impacted stakeholders involved?	The public consultation process must be inclusive of all potentially affected parties. It should be open and transparent to allow for a fair exchange of information about the proposed project.
Does the SIA address equity issues?	The impact assessment must identify who will win and who will lose, and emphasise the vulnerability of under-represented groups.

Indicators	Explanation
Are both the beneficial and adverse effects clearly explained?	All of the characteristics of the potential impacts (i.e. nature, magnitude, extent, timing, duration and likelihood) must be described. The significance must also be determined (i.e. compliance with existing standards or criteria)
Were the risks of adverse consequences evaluated?	If the TOR required it, a risk assessment must be undertaken. This is usually a requirement for large infrastructural developments such as highways.
What alternatives are considered: no project? Other sites? Other technologies?	A critical aspect of the justification for a project in the decision making process is whether it is more or less beneficial to implement it as opposed to doing nothing or something else.
EMP? What mitigation measures are proposed, and who is responsible for implementing them?	The impact assessment report must contain a management plan that details how the projected impacts will be mitigated as well as contingency plans should the impacts exceed the expectations or the mitigation fail.
Monitoring: What are the parameters to be monitored so that the state of the environment can be studied throughout the project	The most critical aspect of the impact assessment process is implementation. If the conditions that are set for the operation of the project are not undertaken, then the likelihood of negative impacts increases.

The final set of indicators address the relevance of the SIA to the decision making process. They seek to ensure that the data contained within the SIA is appropriate for decision making.

Indicators	Explanation
Are the key findings complete and satisfactory?	The purpose of the impact assessment is to provide information that would facilitate a decision about the proposed development. It is therefore critical that the information contained in the report not only be accurate but decision relevant, i.e. the report must present information that would facilitate the choice between alternate courses of action.
Is the information clearly presented and understandable by decision makers and the public?	
Is the information relevant and sufficient for the purpose of decision making and condition setting?	

3 REVIEW OF THE SOCIAL ASPECTS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

3.1 *The adequacy of the TOR*

First of all it must be acknowledged that the TOR, though thorough, did not require a separate social impact assessment (SIA). However, it detailed most of the areas necessary to meet international best practice for incorporating social data into the EIA, including but not limited to:

- The instruction that the proposed highway be considered in the context of land use policy for the area; the nature and sensitivity of the area; the development initiatives scheduled for the area; and the potential to open up subsequent development – this established the broad based parameters within which the EIA should be undertaken.
- The full description of the proposed route of the highway and the likely associated works – this directed the impact studies to address the relevant issues in the potentially affected areas.
- Related highway extension works from other applications – this directed the EIA to address potential cumulative impacts.
- The fact that there would be resettlement and relocation of residents – this would facilitate investigation of the impact on this category of residents
- The need for the description of the study area to identify all communities and developments, existing and proposed that could be affected by the proposed highway construction – this directed the EIA to focus on all potentially affected communities/developments present and planned.
- The details included under the subsections: socio-cultural environment; impacts on human beings; impacts of dust, air quality and noise; traffic, utilities and cumulative impacts were thorough.
- The request for a quantitative risk assessment indicated a recognition of the potential risk to human life and the need to include this in the decision making process.
- The requirements for the environmental management and the monitoring plan were fully acceptable.
- The request for a resettlement plan demonstrated best practice.
- The details included in the section on consultation public participation were exceedingly detailed.

Therefore, based on the requirements contained within the TOR, the consultants were given clear guidance for the undertaking of the social aspects of the EIA.

However, notwithstanding the preparation of the feasibility study in 2006, the TOR should have included a requirement for more detailed economic analysis once the fuller impacts had been identified and quantified. Given that one of the objectives of the highway is to: *“To stimulate social and economic development in the South west Region. This would be achieved by the increased distribution of economic activities, the improvement in services to the area, and increased employment and income levels,”* there therefore should have been a requirement for:

1. A cost-benefit analysis, comparing the economic costs of the various alignment alternatives that were assessed.
2. A more detailed and updated economic assessment of the development of the highway beyond what was contained in the 2006 feasibility study.
3. An economic assessment of the adverse effects to provide a comparison against the economic benefits of the highway development.

3.2 Compliance with the TOR

In this section the relevant components of the TOR are extracted to highlight the areas that should have been addressed in the social components of the EIA. It provides an indication of whether these tasks were completed but not an assessment of the quality. That will be conducted in subsection 3.3.

TOR requirements <i>(extracts of the sections relevant to the SIA)</i>	Compliance or non-compliance
The study area should be determined by the extent of direct and indirect impacts on the.... and social environments....as well as surrounding communities in and adjacent to the project site that can be affected by noise, dust, surface runoff and traffic during site preparation. The study area should also identify adjacent and proposed developments that can influence the proposed project with special reference to the industrial developments in southwest Trinidad.	✓
The study area should be properly identified and described with accompanying aerial photographs maps and diagrams at easily understood scales to illustrate the spatial extent of the project and the impact area....data for the study area shall be presented in separate themes for: property holdings....built environment....existing land use...	✓
Conduct studies to determine the baseline conditions of the study area during the wet and dry seasons, as they relate to the ...and socio-cultural environments	✓
Describe the project area in terms of past and present land use as well as development plans	✓
Identification and location of all human settlements (including ribbon development) impacted by the proposed project as well as support activities.....	✓
Determination of socio-economic and cultural activities that take place presently in the project related area (year round and seasonal)	✓
Description and qualification of the area in terms of past, present and proposed planning and land use. This should Include a statement on the compatibility of the highway design with the areas where it is proposed to be located.	✓
Identification of occupants of parcels located In the project area subject to relocation/resettlement.....	✓
Employment and labour market – indicate opportunities for employment generation and the availability of such employment in affected communities;	There is limited discussion of the range of opportunities for employment generation beyond what will be provided during the construction phase
Compatibility of the proposed highway alignment in the context of industrial development and existing infrastructure with particular emphasis on the oil and gas sector, as well as related downstream industries	✓
Customs aspirations and attitudes – indicate the acceptability of the proposed project to nearby communities such as South Oropouche, Debe (with particular reference to Bunsee Trace and San Francique Road), Avocat, Pluck, Thick and Mon Desir as well as other stakeholders who use the area for commercial and recreational activities, environmental non-governmental organizations and community-based organizations.	The focus was on the communities closest to the highway development. Therefore the perspectives of the wider range of stakeholders who use the area are not reflected in the report and there was no indication that this was used as part of the baseline.

Agricultural and fishing activities (with details of acreages and types of crops/species harvested).	✓
Determination of emergency resources, indicating if existing resources can adequately respond to a potential increase in emergencies.	✓
Existing and proposed infrastructure including but not limited to.....water, electricity, telephones....etc.	✓
Assessment of archaeological artefacts/historic sites in the wider study area.	✓
Traditional uses of the study area, access routes, planned and approved future activities.	✓
<p>Potential impacts to be determined to include but are not limited to human beings:</p> <ul style="list-style-type: none"> • Relocation and resettlement, loss of property, disruption of daily life; • Disruption of traditional access routes and uses of the area during and subsequent to the project such as agriculture, fishing, recreation, community facilities and institutions; • Labour force (short and long term); • Archaeological and cultural resources; • Disruption to the quality of life as perceived by resident communities and other stakeholders; • Suitability of the use of pesticides, fertilizers and other project-related chemicals for use near human settlements; • Loss of crops and livestock due to possible flooding resulting from project-based activities; • Disruption to utility services, including but not limited to water and electricity 	<p>The was limited assessment of: Disruption of traditional access routes and uses of the area during and subsequent to the project such as agriculture, fishing, recreation, community facilities and institutions. Disruption to life of stakeholders other than those being relocated.</p> <p>There was no assessment of: Suitability of the use of pesticides, fertilizers and other project-related chemicals for use near human settlements. Loss of crops and livestock due to possible flooding resulting from project-based activities.</p>
Dust - impact of dust during site preparation and construction on activities.	✓
Air quality - vehicular and equipment emissions during the pre-and construction, as well as operational phases of the highway extension project	✓
The impacts of noise, lighting and vibration on humans, human activity and buildings.	✓
Traffic - during construction and operation.... as well as loss of traditional access routes	✓
Estimation of the demand on utilities as well as resources for stages of the project....	✓
The cumulative impacts.	✓
Conduct a Quantitative Risk Assessment.	✓
Describe reasonable alternative that were examined to achieve the same objectives.	✓
The Environmental Management Plan must address both the natural and social environments.	The consultant did not receive or review the EMP
The EMP must contain a conceptual Resettlement Action Plan addressing the social and economic issues arising from the need to relocate occupants presently located in the proposed project site	The consultant did not receive or review the EMP
Development of a Monitoring Plan	The consultant did not receive or review the monitoring plan
Consultation and Public Participation – see TOR for details	✓

3.3 *Quality of the SIA*

This section assesses the quality of the social components against the indicators that were listed in section 2.

3.3.1 Social assessment professionals

The Annex to Appendix A lists a summary of the environmental assessment preparers. The list as provided does not include anyone with social or economic qualifications or expertise. It indicates that professionals qualified and experienced in a diversity of engineering, natural science and environmental fields worked on the EIA. Collectively the group has an impressive number of years working on EIAs. However, the members of the group with the social and economic skills should be made explicit.

3.3.2 The description of the affected population

The study area and buffer zones should reflect the extent and range of the potential impacts. Therefore, the definition of the study area is critical in deciding what baseline data will be collected. At a broad environmental level the EIA has determined that for this development the study area varies between environmental components, ranging from 100 m to national. This is based on the Terms of Reference stipulation that "the study area be determined by the extent of direct and indirect impacts on the physical, biological and social environments." (EIA Vol.1: p. ES9) The stated purpose of the study is to: "improve accessibility to the Counties of Victoria and St. Patrick." (EIA Vol 1: p.2) However the population study area is defined in Table 4-1 as:

Firstly, the Debe/Penal and Siparia Regional Corporations, but focused on the communities closest to the proposed alignment such as Ghandi Village, Debe proper, Penal, Pluck Village, San Francique, Thick Village, Avocat, Pepper Village, Delhi Settlement, Fyzabad and Mon Desir. (EIA Vol.1: p.88)

The definition of the affected population for both positive benefits as well as those who could be affected adversely should be at a minimum the wider population of the Counties of Victoria and St. Patrick, or indeed the south western region. Therefore, Table 4-1 should be amended to also acknowledge the wider population of focus and not only those most immediately in the vicinity of highway construction impacts.

Likewise In section 4.4.2.1, which focuses on population, it is important to emphasise the fact that while there are communities that will bear the brunt of the adverse construction effects, there are others such as the residents of the two counties or indeed the entire south west region that will benefit. Fortunately, the data on employment and labour markets in 4.4.2.2 reflects the wider counties.

The primary focus in the report on those who will most likely be adversely affected by relocation and construction impact, has resulted in less emphasis being placed on the positive and negative impacts that will be felt by the wider range of stakeholders.

3.3.3 Methods utilised in the conduct of social components

The methods selected should be based on the type and size of the proposed development and the nature of the likely impacts. There are some issues pertaining to the methods used in the EIA that are of concern: (i) the narrow focus on the groups being relocated; (ii) the absence of data collection on the commuter

population among the most highly impacted groups; (iii) the methods used during the focus group sessions; (iv) the inconsistent reporting of the size of the survey sample in the report and appendices.

3.3.3.1 Narrow focus on relocated group

The data that was collected on the attitudes concerning the highway (section 4.4.3) only reflect the narrower group of residents, businesses and institutions that will be relocated. This meant that the collection of baseline data focused on surveys with the residents, businesses and institutions that are to be relocated; and focus groups with the village councils of the afore-mentioned areas; and meetings with the Penal/Debe Regional Corporation and the Siparia Regional Corporation. While the wider population did attend the 4 public consultations, these meetings were not for the purpose of baseline data, but to obtain responses to the results of the already completed EIA.

Data on the attitudes of persons within the wider population of the two counties is also relevant for consideration in the decision making process and should have been collected and used in the assessment of the social conditions. Methods that could have been utilised include:

- The internet and social media sites could have been set up to provide details about the project and to collect views.
- Small representative sample surveys could have been undertaken in a selection of the wider communities in the two counties/south west region.
- Open house sessions could have been conducted at various locations throughout the wider study area. Posters displaying maps of the highway development; as well as computer images could have been made available for viewing. Such open houses could have been half day or whole day events depending on the nature of the population. These would have provided information on the project as well as have been an opportunity to collect data using a shortened questionnaire.
- Field trips could have been taken to familiarise residents of critical aspects of the development – e.g. to demonstrate why some alignments were not feasible. In this regard it is important to note that the point was made at the public meeting at the meeting at the Fyzabad Regional Complex on 8 February 2007 that many people are unfamiliar with maps and find them difficult to understand. Alternative methods such as field trips and open houses provide opportunities for people to fully understand the information and make more informed comments.

3.3.3.2 Data on the commuter population

Another gap in the collection of the baseline data is that there is no clear indication of what percentage of the population that is in closest proximity to the proposed highway, currently commute long distances from their neighbourhoods. For example, only rough estimates of how many persons commute for education purposes or work are provided based on comments made by the village council participants at the focus group discussions of the village councils. Among the residents to be relocated who were interviewed, they reported that the majority (no indicated of actual percentage) of the respondents worked within their communities or in the surrounding areas.” They also state that only 9% are tertiary vocational students who might leave the area. Therefore, there is no sense of how many persons in the most immediately impacted communities would benefit from a commuting perspective.

3.3.3.3 Focus groups

Focus groups were used during the public consultation. This is a good approach. However, the participants were divided into two groups and asked two different sets of questions. One set focused on traditional uses of the area and the other road conditions. While the separation of the focus group participants in this way allowed for discussion of a greater number of issues in a shorter time, it also had draw backs:

- Information was being collected on the issues from smaller groups, meaning that the representativeness of the wider population was diminished. This problem was compounded by the fact that the numbers of participants in the three focus groups ranged from 25, 13 to 4 at Delhi Road Hindu School. This raises the question of whether the four participants were also divided into two groups of two persons each, and whether this could be considered a fair representation of the views of those communities upon which to base a social analysis.
- The selection of the topics in this case polarised the opinions on the project. The persons who discussed the traditional uses were more likely to emphasise the negative impacts of the changes that would come as a result of the project. On the other hand, those who spoke about the road conditions (which were apparently not of the highest standard) were asked questions that caused them to list all the negative features of the existing roads (question 1 – 11); and then they were asked how the highway would improve things. Indeed the ordering of the questions on road conditions could be described as leading the respondents to acknowledge the improvements that the highway would bring.

ROAD CONDITIONS (questions posed during the focus group)

1. Describe current road conditions in this area.
2. Are these roads adequate for the present volume of traffic?
3. Are there any specific “accident black spots” in this general area?
4. Estimate the average vehicle ownership per household in this area.
5. How has this changed over the last generation (since about 1975)?
6. How do you see this changing in the future?
7. How do the road conditions affect your quality of life?
8. Roughly what proportion of workers travel out of the area to their jobs?
9. Roughly what proportion of students travel out of the area to go to school?
10. Estimate the response time for emergency services (police, fire, ambulance) in each community.
11. Do road conditions affect this response time?
12. Will the construction of the proposed highway improve quality of life in this area? In what way?
13. Are there any problems that you anticipate during the construction or the operation of the highway? Please explain.

The focus groups and the responses, especially those of the final group comprising 4 participants could be deemed unreliable. The data would have been more valid and reliable if (i) fewer, more strategic and objective questions were posed to the entire group; (ii) the number of participants was representative of the council members who had been invited.

3.3.3.4 Inconsistent reporting of the survey sample size

The stated number of residents in the survey changes multiple times in the various reports and appendices. On page 5 of the hand out in Appendix T it says that 125 homes were interviewed; this number is also given on page 5 of the notes of the meeting held in the Debe Community Centre, on 13 Feb 2007. However, on page L 21 of Appendix L it states that “*the occupants of 122 of those houses were interviewed. The remaining 28 were not interviewed for a number of reasons...*” In the executive summary of Vol.1, it states that 150 houses are to be acquired; however, in section 5.2- Acquisition Issues it states that 156 houses are to be acquired; and just below in section 5.2.1 - Acquisition of Houses it again states that there are 150 houses in the path of the proposed highway.

3.3.4 Quality of the public consultation

The TOR provided very detailed requirements for the public consultation process and the reports provided indicate that these requirements were met for the most part. However, the public consultation process must be inclusive of all potentially affected parties. As expected, the consultants prioritised the stakeholders who would be relocated as a result of the highway. Undoubtedly the impacts on this group outweigh the impacts on any other stakeholder. Consequently this group were selected for surveys and interviews and there was a good baseline established for this segment of the population. However, there are deficiencies in the baseline data provided, as well as the impacts assessed for the wider stakeholders.

3.3.4.1 Data on the wider stakeholder groups

The TOR specifically required that stakeholders be identified that could assist in the provision of relevant information to the project and their input into its feasibility sought as it relates to the impact assessment process. Groups that were listed in the TOR included:

- People living in the vicinity of the project that could be affected by the project, e.g. traditional users of the area
- Industrial stakeholders, particularly in the south western region of Trinidad who use the existing infrastructure for access to and from Point Fortin.
- Environmental and other non-governmental organisations
- Other companies engaged in oil and gas exploration and production
- Environmental experts
- Other business interests that could be affected by the project

Neither the main report nor Appendix T which focuses on public consultation provides reports of the meetings with these groups. It is clear that they were invited to, and some representatives attended the public consultation meetings which focused on the results of the EIA. However, there are no reports of how they were engaged during the assessment process and how their concerns were integrated into the study.

There is therefore no baseline of the people living in the vicinity of the project that could be affected other than those to be relocated. Other than population figures for the affected communities and the employment statistics for the counties of Victoria and St. Patrick, the customs, attitudes and aspirations are only reported for those who will be relocated.

3.3.4.2 Agriculture stakeholders

It is reported that the major land use in the area is for agriculture. Therefore it is a primary activity in a number of the affected communities. For example, in the focus group at Debe it was reported that 60-70% of the population depended on agriculture; at the second focus group held at the Fyzabad Regional Community Complex, it was reported that: *“in Fyzabad, 25% depend on agriculture, while in Avocat and Siparia, 10% of the population use agriculture as a means of income. In San Francique 30% of the population depend on agriculture.”* At the third meeting at the Delhi Road Hindu School, only 25 to 30% of the population depend on agriculture for a livelihood.

Despite the continued importance of agriculture to these communities, the fact that the majority of the highway alignment passes through agricultural lands; and that there are 119 parcels of private agricultural land to be acquired for the highway development; there was no focus group or any separate meeting with the stakeholders engaged in agriculture. In fact at the public consultation meeting held at the Fyzabad Regional Complex on 8 February 2008, there was mention of agriculture research with regional implications that could be lost.

In response to a query about the fact that the agriculture sector had not been properly consulted, the EIA consultant at the public meeting stated that *“the emphasis was put on the residences and businesses to be acquired, so only now are the searches being done for persons who own agricultural lands.”* However, there was no requirement in the TOR for persons scheduled for relocation to be prioritised over other affected groups. The TOR stated that the consultants should *“identify occupants of parcels located in the project area subject to relocation/resettlement.....”* It also stated that they should *“identify and locate human settlements (including ribbon development) impacted by the proposed project as well as support activities...”* Therefore, if there was a decision to prioritise the stakeholders scheduled for relocation, then the rationale for that decision should be made explicit in the report. As such the report contains no substantive data and analysis of the agriculture in the affected area.

3.3.4.3 The business sector

Based on the data collected from the focus group participants and the surveys, a picture emerges that local business is important for the communities in the area. For example, at the focus group meeting held at the Debe Community Centre on 29 July 2006, it was reported that *“Local area businesses were extremely important in Debe since many people in the area patronize the groceries, tyre shops, bars, market, variety stores and parlours located in Debe.”* At the one held at the Fyzabad Regional Community Complex on 12 August 2006, it was stated that *“the residents depend heavily on local businesses like the groceries because they help lessen traffic congestion. People do not have to travel outside of the community.”* Only in Delhi Road Hindu School on 19th August 2006 was it stated that *“most of the residents tend to go out of the area to seek employment.”* Among the residents who will be relocated, the respondents reported that in 23% of instances, their properties are also used for commercial purposes reported. However, only the 13 businesses that are scheduled to be relocated were interviewed.

In the Final Report on Feasibility Investigations: Volume 3 - Potential Socio-economic Impact, mention is made of *“the potential impact of changing the traditional south western flow of traffic upon own account workers and micro-enterprises; the “roadside vendors” who depend heavily on the patronage of the travelling public and who would be adversely affected when commuters use alternative routes.”* In Volume 1 of the EIA report it states that: *“In all the communities mentioned, there are small commercial establishments along the main roads. These serve the host communities, but also cater to motorists passing through for some of their trade. A few of these establishments rely heavily on passing motorists*

and are unlikely to be viable without this source of income.” However there is no discussion of how the highway will impact on these enterprises. The report has not provided analytical discussion of the range of businesses that are likely to be positively or negatively affected by the development. In fact one of the objectives of the highway development is: *“To stimulate social and economic development in the South west Region. This would be achieved by the increased distribution of economic activities, the improvement in services to the area, and increased employment and income levels.”* Hence more focus on business was required in the report.

3.3.4.4 Handouts

The hand outs were a good public consultation tool, though they were insufficient to distribute at the public meetings. Some of the information in the handout was also misleading. In the handout it claims on page 4 that: *“the majority agreed that the new highway would improve the quality of life in the area.”* However, a thorough read of the results of the focus group sessions, the surveys and the meetings suggests quite the opposite. The half of each focus group that was asked to comment on who the road would benefit and who would suffer adverse effects stated:

Debe Community Center - *“The main benefactors of the proposed highway were expected to be people from Point Fortin and Siparia who are travelling to San Fernando. Those adversely affected were thought to be the villagers as they see this highway as an avenue for criminal elements outside of the community. They see the highway providing an easy access into their community for these criminal elements. They also believe that the people of the Debe community will be adversely affected, in that some of them may have to vacate their houses. They also believe that there cannot be a dollar value assigned to people’s livelihoods, houses and the environment.”*

Fyzabad Regional Community Complex – *“The main benefactors would be the commuters. Those being adversely affected include those who have to be moved out of their homes. Crime infiltration was a concern.”*

Only the participants at the Delhi Road Hindu School had different a opinion (4 respondents) - *The owners of the land and the people living around the area would be the main benefactors. The respondents believe that no one would be adversely affected.*

3.3.4.5 The discussion of relocation

Comments made by persons in the public consultations suggest that there had been little communication to them by the relevant government departments about the relocation. It is therefore of concern that the consultants were required to obtain the stakeholders’ views on issues pertaining to relocation such as form of negotiation and type of compensation, prior to communication between the government and the parties earmarked for relocation. Clearly the responses made cannot be considered to be informed comments, when individuals had not yet been properly informed and educated about the process and procedures.

3.3.4.6 Emergency resources

The consultant did not receive, and therefore did not review Appendix R, the Emergency Response Plan. The EIA was required to determine the whether the existing emergency resources could adequately respond to a potential increase in emergencies. The information contained in Vol. 1 only reflected the perspectives of the focus group participants and the survey respondents, many of the latter admitting that they had limited knowledge/use of these services. A brief summary of the assessment of the emergency

resources, which would have been undertaken by the qualified member of the EIA team, should be included in Vol.1.

3.3.5 Equity issues

The impact assessment must identify who will win and who will lose, and emphasise the vulnerability of under-represented groups. The presentation of the report definitely emphasises the adverse impacts on the residents, businesses and institutions that will be relocated. However, there is far less analysis and discussion of the benefits that could accrue from this project. More discussion of the benefits would provide a more balanced report.

3.3.6 Characterisation of the social impacts

All of the characteristics of the potential impacts (i.e. nature, magnitude, extent, timing, duration and likelihood) must be described. The significance must also be determined (i.e. compliance with existing standards or criteria).

In this study impacts were characterised based on extent, intensity and duration, and they were given a classification of low, moderate, high or extreme. However, there is no economic or financial assessment of these impacts. There are a number of areas of the report that would be enhanced by an economic analysis. For example:

1. A number of statements are made in the report that suggests that benefits will accrue from the highway, for example:

“It is expected that the highway will bring about social and economic development and progress in southwest Trinidad.”

“There would be increase in potential for agricultural production and distribution.”

“There would be increase in residential, industrial, and domestic and foreign tourism development.”

While it is accepted that projects of this nature create opportunities, it would be advantageous to the decision makers to have access to economic projections of the jobs, revenue, taxes etc., which the project could realise.

2. In the discussion of the impacts on the human environment during the site preparation and construction phase, the loss of agricultural livelihoods is assessed as follows in subsection 5.3.3.3 that: *“However, the permanent loss of this agricultural land is an unavoidable consequence of this highway extension and it would be inappropriate to classify this impact “with mitigation.”* However, there should be an economic assessment of the acreage of lands loss; the level of productivity loss at the national level and the economic impact this portends.
3. The discussion of human impacts in section 5.4 – operations phase, focuses on issues such as squatting and severing communities, and loss of agricultural land. There is no discussion of the potential economic opportunities or any of the other concerns that were raised by the Village Councils such as the possibility for an increase in crime.

3.3.7 Risk assessment

Risk assessments are usually a requirement for large infrastructural developments such as highways. Although Appendix O was not received and therefore not reviewed by the consultant, the summary provided in Vol. 1 suggested that a thorough risk assessment was undertaken.

3.3.8 Alternatives

A critical aspect of the justification for the project in the decision making process is whether it is more or less beneficial to implement it as opposed to doing nothing or something else. Based on the discussion on Vol. 1, a good range of alternatives were considered, including the “no project” option. However, the analysis of the alternatives would have been greatly enhanced with the inclusion of economic and financial comparisons of the options.

3.3.9 Environmental management plan

Appendix Q was not received and therefore not reviewed by the consultant. Therefore no comment can be made regarding how the projected impacts will be mitigated as well as contingency plans should the impacts exceed the expectations or the mitigation fail. In particular, no comments can be made on the proposed resettlement plan.

3.3.10 Monitoring

The most critical aspect of the impact assessment process is implementation. If the conditions that are set for the operation of the project are not undertaken, then the likelihood of negative impacts increases. However, Appendix Q was not received and therefore not reviewed by the consultant.

3.3.11 Decision relevance of the data

The purpose of the impact assessment is to provide information that would facilitate a decision about the proposed development. It is therefore critical that the information contained in the report not only be accurate but decision relevant, i.e. the report must present information that would facilitate the choice between alternate courses of action. Therefore there are three criteria that the report must meet:

1. Are key findings complete and satisfactory?
2. Is the information clearly presented and understandable by decision makers and the public?
3. Is the information relevant and sufficient for the purpose of decision making and condition setting?

Of utmost importance is the Executive Summary, which must convey the rationale for the project, the major impacts, the major benefits and the recommended mitigation measures. From a social perspective, the Executive Summary must also reflect the range of viewpoints expressed by the varied stakeholders. In this regard there is a wealth of information contained in the notes of the public meeting in Appendix T that is not adequately reflected in the summaries provided in the main body of the report. There are also other instances where the presentation of the data could be enhanced, for example:

1. On page ES-32 in the list of issues raised at the public consultations, agriculture is not included. Neither is the summary of the concerns raised by the participants of the focus groups reported on pages ES-27 and ES-28 a complete sharing of the issues that were identified. For example, there is no reflection of the perspective that the communities feel that they are paying a price for the benefit of others. Nor is there mention of concerns such as the possibility of the increase of crime.

2. The items listed in the executive summary of the comments attributed to the Regional Councils need to be expanded so that the meaning is clear (See also section 4.4.3.2 where the list is repeated). For example:

“Employment of small local contractors.” Were they asking for the employment of small contractors?

“Construction (pavement, disruption of water supply).” What does this refer to?

“Operation (travel time).” What does this refer to?

“Present bottleneck at Mosquito Creek.” Are they asking if the highway would alleviate this?

3. There is some laxity in the use of language in the reporting of the survey data. No percentages under 50% should be described as “most” or “the majority”; they may represent the largest proportion who gave a particular response. The use of the words “majority”, “most”, “some of”... are not sufficiently precise, especially when the data is available: The following extracts from Section 4.4.3.3.2 of Vol 1 of the EIA illustrate the point:

Overall, adults (ages 30 to 59) represented the largest cadre in both years, with a larger percentage in 2008 than in 2006. The next largest cadre in both years was young adults (ages 18 to 29). Children (ages 0 to 17) accounted for about a quarter of the population in 2006, and about one-fifth in 2008. Finally, persons of retirement age (over 60) accounted for 9% of the population in both surveys.

Based on this there is really no comprehension of the distribution of the sample by age group.

The majority of persons were employed at their present jobs for less than 5 years, mainly within their respective communities or in the surrounding areas, while some of them worked in San Fernando and Port of Spain. Most of the respondents had occupations other than those listed in Table L-15 in Appendix L in Volume 2, while construction (9%) and unskilled labourers (8%) were the next most popular occupations. In this survey, students in kindergarten, primary or secondary schools tended to attend schools fairly close to their villages. However, those who were in tertiary institutions or vocational schools attended schools some distance away.

Again there is no way to be sure what the status of employment is based on this paragraph. Also the students who are studying “some distance away” could be in Port of Spain or elsewhere. Therefore, the survey results should be edited to address these ambiguous comments.

- The data listed in 4.4.3.1.3 based on the 2006 and 2008 responses from the Village Councils: there is a listing of the issues raised at the meetings. However, there is no analysis of the list. For example the list should be sorted by topics/issues; it should separate the positive from the negative perspectives. The issues listed from 2008 also require analysis as mentioned in the previous point.

The greatest concern about the report is that in focusing heavily on the stakeholders that will be relocated there is limited discussion of the effects of the proposed highway on other stakeholder groups and of the wider social and economic benefits of the project. Therefore, the reader/decision maker will be well informed of the plight of those who are to be relocated, but somewhat challenged to assess this in the wider context of: who else is adversely impacted and what is the full range of benefits.

SUMMARY OF THE REVIEW OF THE SOCIAL COMPONENTS

The following statement was made at one of the public consultations:

“Dislocating people far outweighs any benefits of a highway.”

The development of a highway is a major undertaking and requires a full comprehensive EIA. The fact that persons are to be relocated adds an emotional and potentially politically polarising dimension that requires careful attention to the social issues. Ideally, in a case such as this, a separate social impact assessment should have been required, with the instruction that personnel with qualifications and expertise in social impact projects be a part of the wider EIA team. This was only one of two gaps in the otherwise very thorough terms of reference set for the EIA. The other gap was not requesting an economic analysis of the impacts and benefits.

Overall the social components of the EIA were compliant with the terms of reference. Areas that were not addressed were:

- There is limited discussion of the range of opportunities for employment generation beyond what will be provided during the construction phase
- The focus was on the communities closest to the highway development. Therefore the perspectives of the wider range of stakeholders who use the area were not fully reflected in the report and there was no indication that this was used as part of the baseline.
- There was limited assessment of the impacts of:
 - Disruption of traditional access routes and uses of the area during and subsequent to the project such as agriculture, fishing, recreation, community facilities and institutions;
 - Disruption to life of stakeholders other than those being relocated;
- There was no assessment of:
 - Suitability of the use of pesticides, fertilizers and other project-related chemicals for use near human settlements;
 - Loss of crops and livestock due to possible flooding resulting from project-based activities

Given the sensitive nature of relocation, it is not surprising that the EIA team focused heavily on the residents, institutions and businesses that were scheduled for relocation. The information that has been provided on these groups in the report is more than adequate. However, at the same time, there was a need to also address the agriculture stakeholders who would also be affected by the loss of their lands; the non-relocated business people who would be affected by the highway; as well the impacts on the wider stakeholders who would either benefit or be adversely affected by the project. The report does not place sufficient emphasis on these other groups. Indeed the definition of the study area was focused on those communities in closest proximity to the proposed highway, as opposed to reflecting the wider impacts that would occur across the south west region.

The methods used, i.e. surveys, focus groups and interviews are standard SIA approaches. The only area of weakness was in the implementation of the focus groups. The decision to split already limited numbers of people into two groups and give them separate questions to answer was not prudent. The focus group attempted to cover too many questions and the list of questions, in the case of road conditions was not

objectively designed or sequenced. Given the limited numbers, especially at the third group and the quality of the questions, it is felt that this data was not as reliable and valid as it could be.

Good alternatives were compared, and a risk assessment was conducted, in keeping with the nature of the project. In characterising the impacts, the study focused on the criteria of extent, intensity and duration, and they gave a classification of low, moderate, high or extreme. However, the analysis of the impacts and the benefits would have been greatly enhanced with an economic or financial assessment.

The report as presented contains a wealth of data, but it requires some editing to improve its comprehensibility and usefulness for decision making purposes. Foremost is the need to provide a more accurate and thorough representation of the summaries of the views of the stakeholders in the Executive Summary; to make the presentation of findings more precise by eliminating the use of words such as “majority”, “most of”, “some of” etc., and replacing them with the actual statistics; and most importantly, to give a better reflection of the wider adverse effect and benefits that will accrue from this project, beyond the impacts on those scheduled to be relocated.

Specific recommendations for edits/amendments to the report are as follows:

1. Amend the terms of reference to require an economic assessment as follows:
 - a. A cost-benefit analysis, comparing the economic costs of the various alignment alternatives that were assessed.
 - b. A more detailed and updated economic assessment of the development of the highway beyond what was contained in the 2006 feasibility study.
 - c. An economic assessment of the adverse effects to provide a comparison against the economic benefits of the highway development.
2. Edit the sections of the report that list the EIA preparers to clearly identify the members of the team who possess the social and economic qualifications and experience.
3. Edit the description of the study area and affected population to acknowledge the wider range of stakeholders who will be affected by the project.
4. Use existing data collected for the study as well as other secondary sources to provide information on the commuter patterns in the most affected communities; as well as information on the wider range of stakeholders, in particular the agriculture and business sectors.
5. Resolve the inconsistent reports of the number of houses that participated in the household survey as well as the number of houses to be acquired.
6. Edit Vol. 1 of the EIA to enhance the summary provided on the emergency resources.
7. Enhance the discussion of the benefits that will accrue from the development of the highway. In particular, include an economic assessment to demonstrate the costs of the adverse effects compared to the projected benefits.
8. Edit the report to better reflect the range of issues raised by the varied stakeholder groups.
9. Enhance the report to make the presentation of findings more precise by eliminating the use of words such as “majority”, “most of”, “some of” etc., and replacing them with the actual statistics.

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Extension of the Solomon Hochoy Highway – San Fernando to Point Fortin

**Technical review of Terms of Reference for Environmental Assessment - Debe to Mt Desir
Submitted by**

**Eleanor Jones
Environmental Resource Consultant**

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1 Background

The Government of Trinidad and Tobago has embarked on the construction of a 50 km extension of the Solomon Hochoy Highway from San Fernando to Point Fortin. Detailed designs were completed between 2005-07, and tenders invited for a design build approach in February 2010. The contract was awarded and construction began in September 2011. The proposed 15.2 km alignment of the segment from Debe to Mt Desir became the subject of strong opposition, and there has been a call for realignment based on social, economic and environmental concerns as follows: too costly, is conceptually flawed, will cause undue flooding, will destroy agricultural lands and have other negative environmental impacts, will displace households in well-established communities, including places of worship and businesses, and thereby have negative socio-cultural impacts. A Highway Review Committee (HRC) comprising a multi-disciplinary team of consultant professionals has been established to conduct *inter alia* a qualitative review and analysis of selected technical elements of the disputed Mon Desir to Debe segment using the benchmark of international best practice. The Committee is charged to provide a report, including recommendations, for consideration.

2 Consultant's Terms of Reference

Under Contract with the Joint Consultative Committee the Environmental Resource Consultant was contracted to serve as an environmental resource and to undertake the following tasks in four days over a two month period :

5. Review the Terms of Reference for the CEC/EIA Report in relation to the Highway Extension Project, particularly the Mon Desir to Debe segment.
6. Consider the extent to which the EIA may be adequate for a project of this magnitude, or ways in which aspects of such assessments might be improved to meet international best practice, also drawing on any informative experiences in Jamaica.
7. Provide technical backstopping advice/comments to the Chairman, as an external reviewer, on the findings/conclusions of the Final Draft Report of the Highway Review Committee.

Further discussion with the Chairman of the committee highlighted the following specific needs of the committee:

- Technical impressions on the comparative adequacy of the TOR in relation to known best practice.
- Do the terms of reference address the range of sectoral requirements for a project of this type?
- Do the statutory arrangements as set out by the EMA meet the needs for assessing such a project?
- How do these TOR compare to the experience of Jamaica?

- Any consideration which might enhance the practice in Trinidad and Tobago as a neighbouring Caribbean Small Island Developing State

This document presents a professional opinion on the adequacy of the Terms of reference for the CEC/EIA Report in relation to the Highway Extension Project, particularly the Mon Desir to Debe segment.

3 Approach

JCC provided the consultant with some project docs relevant to the task assignment. These were reviewed to ascertain the details of the project, the environmental setting and the issues to be handled. In the interest of best practice review, the consultant examined the environmental and social safeguard policies of the World Bank and the IADB, the addition of Strategic environmental and social Assessment to the tools of the Multilateral Banks, studies for major internationally funded highway development , and the statutory context for environmental assessments in Jamaica. Reports on the environmental management framework in TT and in Jamaica were also reviewed.

3.1 Documents reviewed

The consultant reviewed the following documents provided by JCC/HRC:

- ✓ Application submitted to EMA for Certificate of environmental Clearance
- ✓ Terms of reference for the EIA provided by the EMA to the applicant
- ✓ Land Acquisition Act Ch 58:01_28 (1994. Amended 2000)
- ✓ EIA Vol I - Highway Extension To Point Fortin: Debe To Mon Desir
- ✓ JCC Committee For Review of The Extension of The Solomon Hochoy Highway - TOR

Other documents consulted to help inform opinion

- ✓ Environmental and Social Safeguard Policy - Road construction - World Bank
- ✓ Environmental and Social Safeguard Policy - Road construction - Inter American Development Bank
- ✓ Strategic Environmental Assessment Highway 2000 Toll road, Jamaica
- ✓ Environmental Impact Assessments of Segments of Highway 2000, Jamaica
- ✓ Environmental assessment s and Resettlement program north Coast Highway Improvement Project , Jamaica
- ✓ NRCA Act, Jamaica

4 Observations

4.1 Application for Certificate of Environmental Clearance (CEC)

The application form for the CEC was submitted to the EMA in February 2006 by the Highways Division, Project Implementation Unit, Ministry of Works and Transport. The form is in keeping with that of other jurisdictions in terms of request for information to guide decision-making with respect to environmental studies required to support issuance of a CEC. The sections included:

1. General Information which outlined activities of project by designated categories– these were three in number : Clearing, Excavation, Grading and Filling; Infrastructure for land transport; and Drainage and Irrigation. The Purpose of Development was stated and a Description of the site presented.
2. The second section provided a more detailed description of Intended Activity with attachments to support.
3. The third section addressed issues of confidentiality.

On the basis of the application the EMA determined that an EIA would be required as there were significant potential environmental impacts. Terms of Reference were therefore provided for the conduct of the EIA.

4.2 Statutory context

The EIA is being conducted in the framework of the Environmental Management Act, the Rules for Certificate of Environmental Clearance, (CEC Rules 2001), and other policies, standards and guidelines as stated in the TORs “Requirements for EIA”

- Water Quality guidelines
- Air quality Guidelines
- Environmentally Sensitive Areas Rules. 2001
- Environmentally Sensitive Species Rules. 2001
- Noise Pollution Control Rules. 2001
- National Environmental Policy
- National Wetlands Policy

It should be noted that with reference to the above the EMA published six pieces of that subsidiary legislation and these were enacted under the Environmental Management Act aimed at environmental protection in Trinidad and Tobago

- i. Certificate of Environmental Clearance Rules, 2001
- ii. Environmentally Sensitive Areas Rules, 2001
- iii. Environmentally Sensitive Species Rules, 2001
- iv. Noise Pollution Control Rules, 2001
- v. Draft Air Pollution Rules, 2005
- vi. Draft Water Pollution Rules, 2005

The TORs suggested that international standards should also be consulted.

In the section on legislative and regulatory requirements there is further reference to a list of partner agencies who may play a role in permitting. It was noted that the requirements should be ascertained and these included in the report. The statutory framework for interrelatedness of agencies is unclear and perhaps reflects the compartmentalization of environmental management. Such compartment-talization limits best output, and collaboration toward sustainable development.

It is useful to note that two specific challenges regarding environmental management and relevant to this project were noted in a recent report (ESL, 2011) :

Environmental Management Act

- To date only Matura Forest has been declared environmentally sensitive but the Environmental Management Authority has taken steps to declare Aripo Savannahs, Nariva Swamp and Buccoo Reef as environmentally sensitive.
- This Act requires the establishment of disposal design and operating norms and emission standards, as well as the **establishment of necessary licensing and permitting systems**.

Forest Act

- The Forest Act enables the designation of Forest Reserves and Prohibited Areas, and for the regulation of the exploitation of timber and non-wood forest products from state lands. The **designation of areas as Forest Reserves does not impose any restrictions on access** to these areas. Restricted access is imposed on areas designated *Prohibited Areas* under the Act. The following areas have been designated prohibited areas under the Forests Act: Aripo Savannahs; Northern Range, Bush and Trinity Hills Wildlife Sanctuaries; Matura, Fishing Pond and Grande Riviere Beaches. It is to be noted that access to Matura, Fishing Pond and Grande Riviere Beaches is prohibited only during the turtle nesting period.

The Land Acquisition Act is important to construction of roadways. A comparative review with the corresponding legislation in Jamaica revealed no substantive variance. The issue of relocation and resettlement remains a challenge in both countries and for this project where a substantial change of use is suggested, these issues loom large. In Jamaica as well as other places the matter of identifying parcels required and negotiated for acquisition through purchase or otherwise is often a vexed issue as it is left too late in the process. Project development is often delayed as a result.

4.3 Reference to Selected Other Jurisdictions

- **Canadian Environment Protection Act** - The Canadian Environmental Protection Act 1999 seeks to contribute to sustainable development through pollution prevention and to protect the environment home life and health from risks associated with toxic substances.
- **Victoria, Australia Environment Protection Act 1970** - was at its inception only the second Act in the world to deal with the whole of the environment in a systematic and integrated way. The Act is outcome oriented, with a basic philosophy of preventing pollution and environmental damage by setting environmental quality objectives and establishing programs to meet them. Over the years the Act has evolved to keep pace with the world's best practice in environment protection regulation and to meet the needs of the community.
- **The Victorian Government's Environment Protection (Amendment) Act 2006** - This amendment brings in a range of changes to the Environment Protection Act 1970. These changes strengthen EPA's role in helping Victorians to live sustainably, and help the Environmental Protection Authority (EPA) achieve its purpose of protecting, caring for and improving the environment. In addition, the legislative changes make some key reforms to waste management to keep Victoria at the forefront of resource efficiency.

- **The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)** - is the Australian Government's key piece of environmental legislation which commenced 16 July 2000. This Act enables the Australian Government to join with the states and territories in providing a truly national scheme of environment and heritage protection and biodiversity conservation. The EPBC Act focuses Australian Government interests on the protection of matters of national environmental significance, with the states and territories having responsibility for matters of state and local significance.
- **New Zealand Environment Act 1986** - established the Ministry for the Environment and the Office of the Parliamentary Commissioner for the Environment. The Commissioner is an officer of Parliament appointed for a five-year term to provide an independent check on the system of environmental management and the performance of public authorities on environmental matters. The functions of the Ministry for the Environment, as set out in the Environment Act 1986, are:
 - To advise the Minister on all aspects of environmental administration,
 - To obtain information, and to conduct and supervise research, so it may advise the Government on environmental policies.
 - To provide the Government, its agencies, and other public authorities with advice
 - To facilitate and encourage the resolution of conflict in relation to policies and proposals which may affect the environment.
 - To provide and disseminate information and services to promote environmental policies, including environmental education and effective public participation in environmental planning.
 - Generally to provide advice on matters relating to the environment.
 - To carry out functions specified under any other enactment (this includes for example the Ministry's functions under the Resource Management Act (RMA)).
- **New Zealand Resource Management Act (RMA)1991** - The RMA regulates access to natural and physical resources such as land, air and water, with sustainable management of these resources being the overriding goal. New Zealand's Ministry for the Environment describes the RMA as New Zealand's principal legislation for environmental management. Under the RMA virtually all significant uses of land, air, coastal, or water-related resources are regulated by provisions of the RMA or by rules in regional or district plans or by decisions on consent applications. Plans are to achieve the purpose of the RMA which is 'sustainable management' of natural and physical resources.

5 Terms of Reference (TOR) for the EIA – Debe to Mt Desir

The TOR as presented is an exhaustive document with respect to what is required for study. It was noted in the introductory statement that the TORs are intended to guide the conduct of the EIA and preparation of an EIA report that will outline the scope of the project, potential impacts and suggested mitigation measures.

The Background spoke to the proposed alignment as occupying 160 ha including an impervious surface of approximately 37 ha. It was noted that there were spurs and additional routes being contemplated and that these would intersect the Debe to Mt Desir segment. The alignment of the Debe to Mt Desir segment it was noted passes through an ecologically sensitive area, crosses forested lands, oil fields, a major

pipeline corridor,(runs parallel for most of way) , industrial sites, water courses , agricultural lands and human settlements. The phases of the project include site preparation, construction and operation. The associated works are listed below , and it is assumed that this information was taken from the project documents that supported the application:

- Pre-construction clearing and site preparation
- Removal of contaminated soils for remediation
- Plugging of 61 oil wells
- Cut and fill
- Bridge construction – 9 river crossings
- 15 culverts
- Grade separated intersections
- Abstraction of water from 3 rivers
- Diversion of rivers – use of coffer dams
- Pile drivers

The objectives of the EIA as stated include not only assessment of impact and mitigation measures, but also cumulative impacts from on-going or planned developments in southwest Trinidad. A management plan, monitoring plan and hazard risk analysis should form part of the EIA submission.

The contents of the EIA assessment and report are laid out in keeping with standard practice :*Description of Study area* - an exhaustive list of approaches is presented

Project Description- land use, land use planning policy, site and situation and full description of project components . Some of the criteria are somewhat misplaced and lead to repetition in other sections.

Description of the environment -this section describes the existing physical, biological and sociocultural parameters. Details with respect to methodology are included here.

Legislative and Regulatory context -list of partner agencies provided and reference to the need to consult and to determine requirements for permitting.

Determination of Potential Impacts of the Proposed Project- These form the core of the report and set the stage for subsequent action. The impacts are categorized and several issues listed. There is no need for this elaborate listing under each category. It would have been sufficient to highlight the headings and to allow for the professional EIA specialist to determine what the potential impacts were. Hazard analysis is included in this section.

Analysis of alternatives

Development of Management Plan to Mitigate Negative Impacts – this is a limited perspective in that the management Plans should guide optimal performance of the project. For example the Environmental Management Plan should establish Environmental Quality Objectives and actions to achieve the proposed outcome. The Emergency Response Plan, Rehabilitation Plan, Sediment and Drainage Plan are other components. A Resettlement Plan is a key consideration for this and any other project that disrupts settlements and livelihoods.

Monitoring Plan

Consultation and Public Participation - this section is highly contradictory in that whereas it is suggested that consultations can be important to the data gathering phase it is placed in bold that consultations should take place only after the study has been completed. This is not best practice.

The EIA Report- The Table of contents provided is aligned with best practice and is similar to the requirements in Jamaica. The requirement for 25 hard copies is excessive and contrary to resource efficiency.

5.1 In summary

The Terms of Reference are detailed, repetitious in part and could have been more succinct with respect to requirements. Reference to methodology is dispersed throughout. The consultant could have benefitted from a focus on methodology required. Some of the approaches would have needed to be discussed in terms of practicality and resources. This project is major and multi-dimensional with respect to the environmental aspects and potential impacts. A strategic approach would have been beneficial to identification of issues, cumulative impacts, stakeholder consultations and development guidelines. This approach is discussed below

6 Approach to the Environmental Assessment

It is interesting to note that the World Bank and the IADB have introduced Strategic Environmental and Social Assessments as a tool for early analysis of Category A projects, which are those that have significant potential impacts. This SESA can be integrated into the road planning cycle so that the issues are identified as part of the project identification and pre-feasibility stages and levels of analysis scoped for detailed assessment. Road alignment could benefit from what has been termed “least constraining methodology” where the many challenges are identified and minimized through changes in routes. This can be a detailed process and should include a multi-disciplinary team of not only engineers and highway designers but all the relevant professionals including the environmental and planning team.

Design of the 230km Toll road referred to as Highway 2000 in Jamaica benefitted from this approach and where there was deviation considerable challenges arose. The environmental specialists and engineers engaged in an iterative process that examined the physical, biological and sociocultural/economic parameters of the proposed routes. The SEA served as a guide as development guidelines were presented. Where issues were deemed to require more detailed analysis, they were referred to an EIA process. Extensive stakeholder consultations were beneficial as part of the data gathering exercise, and they served to provide information on the project that helped to increase understanding and to answer questions.

The focus on environmental clearance militates against achieving environmental quality and sustainable development. For example, hazard risk and vulnerability analysis is germane to construction projects in the Caribbean and indeed in Trinidad and Tobago. The hazards attendant on this project are both natural and built and therefore greater emphasis could have been placed on these considerations during the design phase.

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**REVIEW OF THE EIA
FOR
THE ESTABLISHMENT OF A HIGHWAY ALIGNMENT
FROM
DEBE TO MON DESIR**

January 2013

By

**Eden A. Shand
Resource Consultant**

A. INTRODUCTION

As a result of demands for an independent technical review of the SHHE Project, this writer was tasked with reviewing the CEC/EIA documentation of the subject project with a view to advising on the relevant salient issues. Although the review represents an input into the decision making process, it is not meant to include the decision itself nor give direction on the decision as to whether a project should proceed. Two reports were generated as a result of the documentation review. Report 1 concerns itself with a review of the EIA Report, while Report 2 is concerned with a review of the CEC/EIA process. This instant report is Report 1.

This review of the EIA Report took the form of an appraisal of the document for its accuracy and coverage of the key issues. The appraisal was conducted with reference to relevant documents other than the EIA Report and they are all catalogued in the list of references.

The review methodology is adapted from the Manchester review package (Lee and Colley, 1990). It is based on a system of review criteria which provide a framework for undertaking the review and grading the most salient sections of the EIA Report on the basis of three quality gradings. Although the gradings represent a continuum in value, order of magnitude words are used rather than numbers to discourage crude aggregation of the assessment criteria.

The report hereunder presents the assessment framework, the grading of salient issues and comments on these issues.

B. ASSESSMENT FRAMEWORK

The framework for the review is presented in the form of a matrix shown at Appendix 1. The first column lists the assessment criteria in uppercase and bold type with the salient issues in lower case. These criteria are generic and apply to all reviews of EIA Reports. The salient issues are also largely generic, but there is some specific tailoring to the instant project based on the literature cited.. The next three columns show the quality gradings resulting from the appraisal. The final column provides a reference number for comments on the salient issues where a fuller explanation of the grading seemed requisite. These comments are detailed in the following section.

C. COMMENTS ON SALIENT ISSUES

1. Titling of EIA Report

The EIA Report Title should be consistent with the titling of other reports on the development. Although the title of the EIA Report is clear that the development concerns the extension of an existing highway to a named destination, it should give the name of the existing highway, namely the Solomon Hochoy

Highway. Precision in titling eliminates confusion on the purpose and intent of the development. NIDCO, the proponent of the development, created problems for itself when, in a document created by its Community Outreach Centre, entitled the project the San Fernando to Point Fortin Highway. The Press, given to abbreviation, has seized upon this nomenclature. Critics of the route for the proposed highway can be forgiven for asking why a highway so named does not take the most direct route that avoids the problems associated with road construction in wetlands.

2. Explanation of Purpose and Objectives

Although the body of the Report contains sufficient detail about the purpose and objectives of the development, this is not reflected in the Executive Summary. Here the language used is “accessibility to the Counties of Victoria and St. Patrick”. The Executive Summary is all that some decision-makers read and, therefore, vital information must not be omitted. More specific language mentioning accessibility to the settlements of Debe, Penal, Siparia and Fyzabad was required, since this was key to assessment of alternative routes and alignments..

3. Quantification of needed materials

This was not done, for the EIA Terms of Reference did not require this. However, for a highway construction project, it is important to assess how the demand for, say, aggregate would impact on areas far removed from the Project Area or the Study Area, e.g. the northern quarries.

4. Quantification and treatment of waste matter and residual materials

Quantification was only done for contaminated soil. Description of the treatment of waste matter and residual materials did not go beyond where they would be stored.

5. Importance of area relative to surroundings

Data gathering was not comprehensive enough to facilitate an assessment of the importance of the Study Area with respect to the surroundings and the region as a whole.

6. Analysis of ecosystem dynamics

Under the rubric of “Ecology”, a comprehensive listing of all the species in the various biological categories was done, but that was as far as it went. Ecology, however, is about species relationships, but there was no analysis of the relationships and the overall dynamics of the ecosystem.

7. Analysis of hydrological issues

A good map of the flood-prone areas was reproduced, though the EMA reviewers were of the opinion that flood-prone areas, not directly situated in the proposed highway alignment were considered. A WASA comment in a letter to the EMA, signed by Marilyn Crichlow, noted that the map identified as Figure 4.2 did not show all areas prone to flooding. WASA also commented on the inadequate evaluation of the

impact of routing the road through the Oropouche Lagoon, a view which is shared by the EMA and this reviewer. There is also insufficient treatment of the wetland ecology.

MOWT was very dismissive of the above observations, countering that the information provided was adequate for the purposes of an EIA. It is noteworthy that the successor proponent to MOWT, the special purpose State company, NIDCO, *pari passu* with highway construction, is in the process of undertaking detailed engineering studies of the South Oropouche River Basin, during which detailed designs for mitigation of flooding will be addressed. It would appear that MOWT/NIDCO, with the concurrence of the EMA, has proceeded with confidence in post-EIA engineering feasibility of flood mitigation measures. Whether or not this confidence is well-placed is better answered by the engineers on the Technical Review Team.

8. Significance to human well-being

A lifeless listing of socio-cultural data was presented with no analysis of how the environment shaped the way of life of the people. Agricultural activity as a way of life amounted to a mere cursory description of agriculture in overall land use. The traditional uses of the area by the local population deserve analysis and discussion as opposed to a bullet-point listing.

9. Consideration of impacts on human well-being

There was insufficient discussion on the effects of the development on the way of life of the affected population.

10. Consideration of ecosystem changes

A lack of consideration of ecosystem changes followed from the paucity of analysis of ecosystem dynamics.

11. Methodology and prediction of impact size

As is the custom in the Trinidad and Tobago EIA culture, impacts are rarely quantified, so that in this instance there is no methodology to assess. Qualitative description of impacts, often subjective, is the norm.

12. Assessment of impact significance

Qualitative descriptions of impact significance were good, but there is room for making quantitative references to qualitative descriptions (e.g. flooding impacts will be insignificant, where insignificant means no more than a one foot rise in average water levels). This was somewhat absent from the EIA Report.

13. Assessment of alternatives

Consideration of advantages and disadvantages of alternative routes and alignments was competently done. A clear case was made for the route and alignment finally selected. The justification for the chosen route on the grounds of accessibility for the settlements of Debe, Penal, Siparia and Fyzabad was indisputable.

14. Stakeholder consultation mechanisms

The post-EIA structure and number of consultations prescribed in the EIA Terms of Reference were strictly observed. However, although there was wide and serious consultation, a significant segment of the affected population appeared to have been insufficiently consulted. This is evidenced by the birth of the Highway Reroute Movement. When prescribed consultations run the risk of excluding stakeholders of consequence, it is incumbent on the EIA preparers to devise alternative, perhaps unorthodox methods of communication (e.g. establishing temporary focal points in remote settlements during the EIA preparation) to take their views on board and offer explanations. The post-decision establishment of a Community Outreach Centre by NIDCO might be a model worth examining.

15. Style of EIA Report

The style of the EIA Report is cumbersome, in that it violates one of the cardinal rules of EIA Report writing, namely, the avoidance of encyclopedic documents. Much of the baseline information is either irrelevant or superfluous. This sort of content bears little relationship to the needs of the decision-maker. However, preparers could mount a vigorous defense by pointing to the burdensome requirements of the EIA Terms of Reference. Such a defense, however, will not absolve them from the essential task of writing a concise readable summary.

16. Non-technical summary

The preparers failed to rise to the challenge of writing a readable non-technical summary. Instead, one got a technical Executive Summary, almost as encyclopedic as the main Report. Given that decision-makers are often lay policy-crafters with busy schedules, they are not likely to read beyond the summary. Therefore, it is imperative that a brief, though complete, non-technical summary of a page or two be written with the succinctness one can find in a Note for Cabinet. Whether or not the Terms of Reference call for this, the preparers owe it to themselves and to their readers to observe this standard.

D. CONCLUSIONS AND RECOMMENDATIONS

Notwithstanding the above deficiencies, the EIA is acceptable insofar that it contains enough information, though deeply buried, to enable a decision on the project. This was indeed done on the strength of a CEC granted by the EMA in April 2010. The MOWT held a Public Consultation in October 2010 and announced its decision to proceed. Given this *fait accompli* it is imperative that the impending presentation of detailed designs for drainage and flood mitigation be meticulously scrutinized by the authorities named in the CEC and that monitoring plans be adjusted to take these new measures into consideration.

Also given this *fait accompli*, it is now inevitable that some people's lives will be disrupted, even to the extent of having to pull up roots and move elsewhere. It is imperative that such disruption be mitigated in a manner that leaves the affected persons no worse off than before the arrival of the highway. Ideally, the lives of such affected persons should be of higher quality after mitigation interventions.

EIA REVIEW MATRIX SALIENT ISSUES

ASSESSMENT CRITERIA AND SALIENT ISSUES	QUALITY GRADING			COMMENT #
	HIGH	MEDIUM	LOW	
DESCRIPTION OF DEVELOPMENT				
1. Titling of EIA Report		X		1
2. Explanation of purpose and objectives		X		2
3. Quantification of needed materials			X	3
SITE DESCRIPTION				
1. Quality of mapping	X			
2. Delineation of Project and Affected area	X			
RESIDUALS				
1. Quantification of waste matter and residual materials		X		4
2. Treatment prescriptions for waste and residuals		X		4
BASELINE DESCRIPTION				
1. Importance of area relative to surroundings addressed			X	5
2. Analysis of ecosystem dynamics			X	6
3. Adequacy of analysis of hydrological issues			X	7
4. Significance to human well-being			X	8
IDENTIFICATION OF IMPACTS				
1. Appropriateness of methods used	X			
2. Classification of impacts	X			
3. Consideration of impacts on human well-being		X		9
4. Consideration of ecosystem changes			X	10
5. Consideration of archaeological impacts	X			
PREDICTION OF IMPACT MAGNITUDE				
1. Prediction of impact size as deviation from baseline			X	11
2. Adequacy of quantification methodology			X	11
3. Assessment of impact significance		X		12
ASSESSMENT OF ALTERNATIVES				
1. Consideration of advantages and disadvantages	X			13
2. Justification of final choice	X			13
MITIGATION				
1. Completeness of proposed measures	X			
2. Effectiveness of proposed measures	X			
3. Scheduling of measures	X			
4. Monitoring of mitigation effectiveness	X			
STAKEHOLDER CONSULTATIONS				

1. Execution of prescribed consultations	X			
2. Use of other mechanisms		X		14
COMMUNICATION OF RESULTS				
1. Style			X	15
2. Balance between positive and negative impacts	X			
3. Provision of Glossary	X			
4. Non-technical summary			X	16

IV. REFERENCES

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 - [1c] Volume 3 – Potential Socio-Economic Impact
 - [1d] Volume 4 – Institutional and Maintenance Assessment

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 - [3a] *Appendix A - CEC Appl. & TOR*
 - [3b] *Appendix B- Aerial Survey-Photography*
 - [3c] *Appendix F - Climate*
 - [3d] *Appendix G - Water Quality*
 - [3e] *Appendix J - Ecology*
 - [3f] *Appendix K - IMA Wetland Report*
 - [3g] *Appendix M - Potential Impacts*
 - [3h] *Appendix Q - Environmental Management Plan*

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ABBREVIATIONS

SECTION 7: Hydrology and Hydraulics

AASHTO	American Association of State Highway and Transportations Officials (AASHTO)
CEC	Certificate of Environmental Clearance
DD	Drainage Division (part of MOEWR, formerly part of MOWI)
EIA	Environmental Impact Assessment
EMA	Environmental Management Agency
HRM	Highway Reroute Movement
HRC	Highway Review Committee
MOWI	Ministry of Works and Infrastructure (formerly also known as MOWT)
MOEWR	Ministry of Environment and Water Resources (includes DD)
NIDCO	National Infrastructure Development Company
PN	Dr. Pramenath Narinesingh
RAR	Review and Assessment Report
SMP	Stormwater Management Plan
TOR	Terms of Reference
WASA	Water and Sewerage Authority
WMP	Water Management Plan
WRA	Water Resources Agency

V. APPENDICES

APPENDIX 1

Independent Review Committee Members - *Technical Staff*

COMMITTEE MEMBER NAME	DESIGNATION
James Armstrong	Chairman
Louis Bertrand	Social Impact Assessment Specialist
Marilyn Crichlow	Water Resources Specialist
Nico Kersting	Water Resources Specialist
Marlene Attz	Cost/Benefit Consultant
Frances Hanson Lewis	Environmental Consultant
Ken Subran	Senior Property Valuation / Acquisition Adviser
Grace Les Fouris	Senior Urban-Regional Consultant
Peter Harris	Archaeologist
Trevor Townsend	Traffic/Transportation Planning Specialist
Philbert Morris	Traffic/Transportation Planning Specialist
William Agard	Chair – Engineering Design and Hydrology/ Hydraulics Group
Ivan Laughlin	Housing/Settlements Specialist
Carla Herbert	Legal Advisor
Eleanor Jones	Environment Resource Consultant
Eden Shand	Environmental Impacts Assessment Resource Consultant
Janice Cumberbatch	Social Impact Assessment Resource Consultant

APPENDIX 1

Independent Review Committee Members - *Support Staff*

COMMITTEE MEMBER NAME	DESIGNATION
Valerie Taylor	Executive Documentation Officer
Sunity Maharaj	Communications Advisor
Kieron Prince	Administrator
Kerneisha Prince	Senior Administrator

APPENDIX 1

Independent Review Committee Members - *Biographies*

James Armstrong

James Armstrong, M. Sc., Ph. D. in Urban and Regional Planning has had a distinguished career in development planning as a Chief Technical Advisor at the United Nations Centre for Human Settlements based in Nairobi, Kenya, where he resided for 12 of his 25 years with the UN. He has worked in numerous countries around the world providing technical advisory services to governments. Since his return to Trinidad and Tobago in 2001 he has worked as an independent consultant in the area of planning and development. He has been an Independent Senator in the Parliament of Trinidad and Tobago since March 2010.

Grace Les Fouris

Grace Les Fouris, BSc. (Hons), has served as the Assistant Director of the Town and Country Division of Trinidad and Tobago and has held similar portfolios within the Caribbean region; serving as the Director of Physical Planning – Turks and Caicos Islands and Manager/Planner responsible for the preparation of a National Physical Development Plan for St. Vincent and the Grenadines. Locally, Grace has worked as a consultant for the Ministry of Works and Transport, Ministry of Local Government, and the Ministry of Planning and Sustainable Development

Frances Hanson-Lewis

Frances is a Geologist with 17 years professional experience. During that time she has worked at the Water Resources Agency, the Institute of Marine Affairs, the Environmental Management Authority and BG Trinidad and Tobago Ltd. She has done free-lance consulting since 2005 and has worked on a number of significant projects in both the construction and energy sectors, particularly as they pertain to Environmental Impact Assessment and Certificates of Environmental Clearance.

Louis Bertrand

Mr Bertrand BSc. (Management), MBA (Marketing) has conducted quantitative and qualitative studies for a number of national and international organizations. As part of his social research assignments he has project managed a variety of studies; some very large scale (A sample size of over 50,000); studies on very sensitive issues (AIDS in St. Lucia and condom use in T&T); and studies utilizing sophisticated analytical techniques (conjoint measurement, multi-dimensional scaling, factor analysis). Mr Bertrand has also been responsible for the design and implementation of the ACT Computerised Agricultural Information System, the development of forecasting models and for conducting feasibility studies in the Agricultural sector throughout the Caribbean.

Ivan Laughlin

Ivan Laughlin is a Human Settlement Consultant and Practitioner and Land Surveyor. These practices constitute a field of development activity related to the living environment – land and people, village and town, community and work. They involve an all-embracing approach to physical, social and economic development and therefore incorporate a wide range of the living environment activities – land ownership, land use, land development – “how you shape the land so will you shape the civilization” -

productive economic activity, the quality of relationships within the community - either existing or to be established - the development of infrastructure and the provision of social and communal services. It is an approach which requires integration, co-ordination and co-operation and which makes paramount the need for community assessment, participation and viability.

Marlene Attzs

Marlene Attzs, PhD, is the Ag. Coordinator of the Sustainable Economic Development Unit (SEDU), a specialized research Unit in the Department of Economics, at the University of the West Indies (UWI), Trinidad and Tobago. She also is a Lecturer in the Economics. Dr Attzs' primary research interest is in the area of economic development, particularly in the context of Caribbean Island states. The impetus for her research interest lies in the challenge faced by so many island states, that is, how to achieve economic growth in a way that simultaneously focuses on improving the wellbeing of our societies. Dr Attzs has served as a local, regional and international Consultant in the aforementioned areas having worked with Governmental and Non-Governmental agencies in Trinidad and Tobago, regional institutions such as the Caribbean Development Bank and internationally with the Inter American Development Bank (IDB), Washington, and the UK Department for International Development (DFID).

Trevor Townsend

Dr Trevor Townsend BSc., M.Sc. Civil Engineering majoring in Transportation Engineering and Ph.D. in Transportation Systems Engineering, is a Registered Engineer and a Fellow of the Association of Professional Engineers of Trinidad and Tobago as well as a Member of the Institute of Transportation Engineers. He worked for twenty years in the public sector in both the central government, where he rose to the position of Chief Traffic Engineer in 1981, and in the P.T.S.C. where he was General Manager for the period 1988 – 1998. He has worked extensively in the areas of traffic, public transportation and public policy with regard to infrastructural development. Dr Townsend has been engaged as a private consultant on a number of transportation policy, transportation planning and traffic impact assessment studies.

Philbert Morris

Philbert Morris is a mathematician working in combinatorics and optimization. Since the 70s he has been applying his methods to a variety of areas, notably traffic and transportation. He has worked on software to balance judges' case- loads in the Supreme Court, as part of a team to co-ordinate the procurement of drugs in Trinidad & Tobago, to optimize the production of blocks in a clay-block factory. Dr Morris was at one time Head of the department of Mathematics and also Vice Dean of the Faculty of Natural Sciences at the University of the West Indies, St Augustine. In 1996 he left the university, as a Senior Lecturer, to work fulltime on his consulting. He has been Chairman of the Public Transport Service Corporation, and was responsible for the traffic design of CityGate. He has presented papers on this topic, where the problem is to design a facility for random arrivals. Since the nineties he has worked on a range of transportation projects, mainly in Trinidad & Tobago, but also in Antigua and Tortola, with Dr Trevor Townsend.

Nicolaas Kersting

Mr Nicolaas Kersting holds a Master's Degree in Civil Engineering with almost 20 years' experience in engineering and project management of infrastructural projects including coastal and river projects, drainage, and highway design with additional specialization and professional training in Integrated River Basin Management, Sediment Management and Flood Management. Mr Kersting has work experience in several countries, including The Netherlands, Trinidad and Tobago, Suriname, Barbados, Belize, Guyana, Dominica, India, Morocco, Antigua and Grenada. He is a member of the Royal Dutch Institute of

Engineers and member of the Association of Professional Engineers of Trinidad and Tobago. Project experience in Trinidad, since 2000, includes responsibility for hydrology & hydraulics for stormwater and river engineering projects (e.g. Caroni River, Caparo River, Mamoral Dam, St Ann's River, South Oropouche River, Port-of-Spain Flood Alleviation Project) and for several major infrastructural projects (Highway Designs and Trinidad Rapid Rail Project) as well as civil engineering & project management projects.

Marilyn Crichlow

Mrs. Marilyn Crichlow, Hydrologist and Water Resources Specialist, has thirty (30) years' experience in the Water Sector of which twenty-two (22) years are at Senior and Executive Management levels. Mrs. Crichlow has operated at the highest policy, operational and regulatory levels, with organizations such as; the World Water Council Project, the Global Water Partnership, the World Meteorological Organization for Trinidad & Tobago, the Water and Sewerage Authority of Trinidad and Tobago, the Water Resources Agency, and the Ministry of Public Utilities. Some of Mrs. Crichlow's qualifications include a Master of Philosophy (MPhil.) in Physics, a Master of Science in Hydrological Engineering (Holland), a Bachelor of Science (Honours) in Physics, Applied/Environmental Physics and Mathematics, a Postgraduate Diploma in Computer Systems Analysis and Design, a Certificate in Planning and Project Management, and a Certificate in Advanced Leadership Skills. Mrs. Crichlow has extensive experience in integrated water resources management and studies pertaining to water resources (surface water and groundwater) monitoring and assessment and environmental impact assessment in Trinidad and Tobago. At present, Mrs. Crichlow operates as a Consultant supporting local and regional clients.

William Agard

William Agard is a Civil Engineer. Who holds a Bsc. from Dlc - Loughborough University. He is a member of the Fellow Association of professional Engineers of Trinidad and Tobago and is also a Registered Engineer. He has worked in the United Kingdom with experience in the design of Dams, Spillways, Reservoirs, and Pipelines etc. In Trinidad he has been involved in projects such as the Port of Spain B Power station, Dualling of Princess Margaret Highway (Now Butler Highway) including river crossings and over passes, the development of roads drainage, water supply and sewerage works for various land development schemes in Trinidad, Tobago, Grenada and Barbados. He has also prepared Flood analyses and reports for the Barataria Roundabout-Fernandez Compound areas, La Pai Settlement-Caroni, preliminary drainage designs for the new Piarco Airport Hydrological and hydraulic analysis and designs for repairing the banks due to scour of the Roseau River in Dominica and for the Leyou River restoration after massive hill slide which severely blocked the river bed.

Peter Harris

Peter Harris is a professional archaeologist with over 40 years' field experience in Trinidad and Tobago. He holds an MA in Anthropology and Archaeology from University of Gainesville, Florida (1994). He currently works with UTT as Senior Research Fellow in First Peoples Studies and has a long relationship with Banwari, the oldest human settlement in the Caribbean. In 1969-70 he led an excavation with the Trinidad and Tobago Historical Society (South Section) and in 1971 was co-leader of a joint Historical Society and Museo del Hombre Dominicano team which excavated the Banwari burial site, (one of earliest in the Caribbean). In 2005-6 he co-led a UWI excavation to upgrade data quality, with most of the material collected still awaiting overseas analysis.

Kenneth Subran

Land Acquisition consultant Kenneth Subran entered the Valuation Division as Valuation Assistant I Trainee in 1976 and retired as in 2003 as Commissioner of Valuations. During this time he obtained a Diploma in Rural Estate Management in 1972 and a Professional Associate of the Royal Institution of Chartered Surveyors (General Practice) in the late 70's. He was a member of the former Professional Valuation and Land Economy Surveyors of T&T and served later as an Executive Member of the Institute of Surveyors Of Trinidad and Tobago (ISTT) until he retired in 2003. He served on a number of Multidisciplinary Standing Committees such as the Highways, Lands, Reclamation (land), Central Administrative Services Tobago (CAST) Heads of Sections, and a number of ad hoc Committees dealing with revision of Land laws, revision of Cabinet (land) policies, Large Acquisition projects etc. He advised the San Fernando Corporation on Property Taxation and also performed as an expert witness on Estate Management and Property Taxation matters before the courts. He has made submissions to Public Commissions dealing with Estate Management and Property Taxation matters.

APPENDIX 2

TOR of the Independent Review Committee

Position: Administrative Support Services

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Administrative Support Services

Duration: Seven Weeks (With possibility of extension of selected services)

Commencement: 10 December 2012

Duty Station: To be Determined.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochtay Highway as set out in separate Terms of Reference. In this connection, the Committee needs to engage Administrative Support Services for a period of seven weeks.

Duties: Under the direction of the Chairman of the Committee, the Services will include:

1. A principal administrative officer providing general administrative support to the Committee at the office location on a full time basis, but also being able to respond to ad-hoc support requirements which may be delegated to other officers within an installed service provider capability on an as needed basis.
2. Set up an office for the operations of the Committee, including arrangements for furnishings, stationary supplies, fax and photo-copying services, delivery/collection service.
3. Arrange for meetings, interviews and field visits.
4. Record all oral submissions and interviews and transcribe the information received.
5. Format all reports submitted by consultants and stakeholders; prepare interim reports after editing and approval, and disseminate as instructed.

APPENDIX 2

TOR of the Independent Review Committee

Position: Administrative Support Services (Cont'd)

6. Undertake word-processing for the compilation of a combined final Report of the Committee.
7. Create an e-mail address; establish and manage cell phone account/s and or land phone lines.
8. Maintain day-to-day accounting of revenue and expenditure.
9. Prepare press releases and advertisements as directed and undertake delivery to respective media outlets.
10. Provide related administrative services to facilitate the smooth running of an office and the operations/work of the Committee.

Qualifications and Experience: The principal administrative officer will have professional qualifications related to administrative support services and have charge of an installed administrative service delivery capability. Basic accounting will be required.

APPENDIX 2

TOR of the Independent Review Committee

Position: Archaeologist

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Archaeologist

Duration: Five Working Days over a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochtay Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an Archaeologist.

Duties: Under the coordination of the Chairman of the Committee, the Archaeologist will:

1. Review any paleoecological information of relevance to the area.
2. Based on knowledge of the area, list an inventory of archaeological assets and also advise on prospective implications for mitigation measures in relation to construction of the Highway.
3. Based on the knowledge of ethnographic records advise on implications and procedures which should be observed.
4. Comment on implications in respect of the Banwari site and any other sites/monuments of interest in relation to the specified alignment for the Highway, in relation to and consideration for alternative routing which might enhance mitigation measures.

APPENDIX 2

TOR of the Independent Review Committee

Position: Archaeologist (Cont'd)

5. Participate in inter-disciplinary meetings to consider and advise on related engineering/hydrological implications of the project.
6. Provide specialist advice to the other consultants within the group
7. Prepare an objective technical assessment of findings and recommendations for inclusion in the Final Report of the Committee.
8. Review the Final Report to ensure that the archaeological issues are adequately reflected.

Qualifications and Experience: The Archaeologist will have professional qualifications in the field and extensive experience in the Trinidad and Tobago environment.

Deliverables: The Archaeologist will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy for inclusion in the final Report. The submission may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Archaeologist will work from his/her base, attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released prematurely or interviews granted without the expressed knowledge of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Chairman – Highway Review Committee

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Chairman – Highway Review Committee

Duration: Thirty-five Working Days, within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Chairman of the Committee.

Duties: Reporting to the JCC and related Civil Society Groups, the Chairman will:

1. Identify, interview and engage, on behalf of the JCC, an interdisciplinary team of specialists consultants and support staff to undertake the required Review of the Debe to Mon Desir segment of the Solomon Hochoy Highway.
2. Identify and engage off-shore resource consultants in specific areas to provide advice and technical backstopping on critical issues.
3. Prepare terms of reference and contracts for the Committee-members and supervise their individual contributions to the exercise.

APPENDIX 2

TOR of the Independent Review Committee

Position: Chairman – Highway Review Committee (Cont'd)

4. Chair meetings of the Committee with principal focal points in the Government, such as the executing agency – NIDCO – and on the other hand, the Highway Reroute Movement.
5. Chair meetings of the Committee and direct the intersectoral deliberations as set out in the Terms-of-Reference for the HRC.
6. Vet submissions to the HRC from the public and direct same to the respective consultants for consideration.
7. Supervise the compilation of an integrated Final Report to reflect the findings and recommendations of the Committee.

Qualifications and Experience: The Chairman should have an advanced degree in a development related discipline and extensive experience at the technical management level. He/she must be able to exercise independent judgement.

Deliverables: The Chairman will deliver to the JCC and related civil society groups an electronic copy of the Final Report, along with ten hard copies within 60 days of commencement of the exercise.

APPENDIX 2

TOR of the Independent Review Committee

Position: Communications Advisor

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Communications Advisor

Duration: Six Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Communications Advisor.

Duties: Under the coordination of the Chairman of the Committee, Communications Advisor will:

1. Advise on communications strategies in relation to the various media houses.
2. Prepare Press Releases for public information, as may be requested/ required.
3. Arrange for press conferences.
4. Arrange for public consultations to solicit information from stake holders.
5. Undertake related information dissemination and gathering as may be required, including advertisements to invite oral and written submissions to the Committee.

Qualifications and Experience: The Communications Officer will have appropriate qualifications in the communications field and extensive experience in dealing with the media.

APPENDIX 2

TOR of the Independent Review Committee

Position: Communications Advisor (cont'd)

Organisation of the Exercise: While the Communications Officer/Editor will work from his/her base, attendance at briefing meetings will be required. Where appropriate, much of the communication requirements in this regard could be done electronically.

APPENDIX 2

TOR of the Independent Review Committee

Position: Cost/ Benefit Analysis - Economist

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Cost/Benefit Analysis - Economist

Duration: Six Working Days, within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an economist to consider the cost/benefit implications.

Duties: Under the direction of the Chairman of the Committee, the economist will:

1. Set out a listing of criteria/indicators and methodology normally employed in the consideration of major infrastructure projects.
2. Review documentation for any available cost/benefit considerations in respect of the Solomon Hochoy Highway extension to Pt. Fortin, or with respect to the Mon Desir to Debe segment.
3. Review relevant oral/written submissions to further inform the Review.
4. Comment on the process employed in any cost/benefit analysis.

APPENDIX 2

TOR of the Independent Review Committee

Position: Cost/ Benefit Analysis – Economist (Cont'd)

5. Consider the cost/benefit implications and any mitigation measures for the Mon Desir to Debe segment, taking into consideration the following:
 - Overall assessment of the direct/indirect and cumulative costs and impacts of the project.
 - A contract has already been awarded for the entire project.
 - Implications for consideration of any realignment.
6. Prepare an objective technical assessment of findings and recommendations for inclusion in the Final Report of the Committee

Qualifications and Experience: An advanced degree in economics with extensive experience in cost/benefit analyses of sustainable development and projects of the type under consideration.

Deliverables: The Economist will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy for inclusion in the final Report. The submission may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the economist will work from his/her base, attendance at technical meetings of the group will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and maps at the project office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: EIA Resource Consultant

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: EIA Resource Consultant

Duration: Four Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an EIA Resource Consultant.

Duties: Under the coordination of the Chairman of the Committee, EIA Resource Consultant will:

1. Review the CEC/EIA documentation in relation to the Highway Extension Project, particularly the Mon Desir to Debe segment.
2. Advise the Chairman on the salient issues of relevance to the Review.
3. Advise the Chairman from time to time on findings and recommendations of principal consultants, which should also serve to generally improve/inform similar exercises in the future.
4. Provide a summary report of recommendations.

APPENDIX 2

TOR of the Independent Review Committee

Position: EIA Resource Consultant (Cont'd)

Qualifications and Experience: The EIA Resource Consultant will have advanced degree qualifications in a natural science field and extensive experience in the conduct of EIAs, with knowledge of the environment under consideration.

APPENDIX 2

TOR of the Independent Review Committee

Position: Engineering Design and Hydrology/Hydraulics Group

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Post: Engineering Design and Hydrology/Hydraulics Group (Comprising three consultants)

Duration: Thirty-five Working Days (Collectively) within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultants' base, with attendance at consultations as may be required.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Water Resources Management Team.

Duties: Under the direction of the Chairman of the Committee, the WRM Sub-committee (Team) will include expertise in hydrology, drainage and environmental issues related to water management, and will be coordinated by a specialist of the Team. The Sub-committee will:

1. Review all relevant documentation including survey data, maps, engineering designs, particularly the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to glean an appreciation of all water management issues.

APPENDIX 2

TOR of the Independent Review Committee

Position: Engineering Design and Hydrology/Hydraulics Group (Cont'd)

Specifically, this will include:

Water Management

- Determination of the Integrated Water Management (IWM) issues of the present route and design, compared to the alternative proposed alignment.
- Assessment of whether the IWM concerns of the present route and design were sufficiently addressed during successive stages (preliminary design, EIA and detailed design).
- Recommendations in respect of the route selection, design and mitigation measures
- Assessment of the roles of the different stakeholders, including (e.g.), Drainage Division, EMA, in consideration of the route selection and design process.

Original Design:

- Identify the required and used standards (and considerations) for Hydrology and Hydraulics (H&H) and IWM.
- Review the pros and cons of the standards and their impact on routes and design.
- Review the design approach (methodology).
- Review the impact of IWM considerations on the routes and design.
- Consider sensitivity analysis of IWM ASSUMPTIONS AND DATA ON THE ROUTES AND DESIGN.
- Consider route design options and mitigation options accordingly.
- Consider and advise on route design options, likely impacts and mitigation measures as may be required.
- Consider best route design options based solely on IWM considerations.
- Assess the role/influence of IWM stakeholders.

EIA Review

- Assess the IWM scope of works as set out in the by the EMA for the EIA.
- Assess the weight of IWM considerations compared to other elements (social, economic, etc.)
- Assess the suitability of proposed EIA mitigation in respect of IWM.
- Consider sensitivity analysis and assumptions and their impacts on the route.
- Assess the role/influence of the EMA on the decision process and quality.

APPENDIX 2

TOR of the Independent Review Committee

Position: Engineering Design and Hydrology/Hydraulics Group (Cont'd)

OAS/Halcrow Design

- Assess the appropriateness of the design requirements set out by NIDCO (suitability, comprehensiveness, impact)
- Consider possible modifications, particularly in respect of the Mon Desir/Debe segment, as compared to current alignment/design.
- Advice on mitigation measures in respect of the recommendations.

Summary of Issues to be Addressed

- Was IWM taken into consideration at a sufficient level?
- What are the IWM impact assessments of the alternative feasible routes?
- Are the mitigation measures for the present route adequate?
- Are there any shortcomings of the EIA terms of reference and the EIA itself and what could be the implications?
- Does the detailed design by Halcrow sufficiently address IWM concerns of the present route?
- What are the present IWM recommendations for the present route/design and any alternative?
- Does the present route/design require changes to implement mitigation measures, or should an alternative route for the segment in question be considered?
- What are the recommendations to improve IWM consideration in the present design process?

Qualifications and Experience: The Water Resources Management Sub-committee will consist of professionally qualified specialists with extensive experience in hydrology, drainage and related engineering and EIA experience.

Deliverables: The Subcommittee, through its coordinator, will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy for inclusion in the final Report. The submission may be edited, without omission of the substantive issues, to fit into the overall Report.

APPENDIX 2

TOR of the Independent Review Committee

Position: Engineering Design and Hydrology/Hydraulics Group(Cont'd)

Organisation of the Exercise: While the members of the team will work from their respective offices, attendance of members will be expected at technical meetings in Port of Spain as may be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Environmental Consultant

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Environmental Consultant

Duration: Fifteen Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochtay Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an environmental specialist.

Duties: Under the direction of the Chairman of the Committee, the EIA consultant will:

1. Review any related CEC; the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to glean an appreciation of the various environmental issues as may be applicable to the extension of the Sir Solomon Highway, particularly the Mon Desir to Debe segment, and advise on any points of interest for the Review.
2. Obtain from the EMA the Administrative Record for each CEC granted for the SHHE and provide written advise on any points of interest.
3. Comment on the extent to which the EIA has addressed the various environmental issues, particularly noting that it was completed some years ago.

APPENDIX 2

TOR of the Independent Review Committee

Position: Environmental Consultant (Cont'd)

4. Consider likely environmental impacts of the Mon Desir-Debe segment of the Highway and advise on the adequacy of mitigation measures as may be prescribed in the EIA.
5. Examine and comment on the compliance with statutory requirements.
6. Comment on any environmental issues or mitigation measures yet to be addressed.
7. Liaise with the engineer and transportation consultants to advise on likely impacts of any considered realignment of the route.
8. Consider written and oral submissions on environmental issues.
9. Prepare a report of findings and recommendations, segments of which will be included in the Final Report.
10. Undertake any related review of environmental concerns.

Qualifications and Experience: The Environmental Consultant will have an advanced degree in the required discipline and extensive experience in the conduct of EIAs.

Deliverables: The Environmental Consultant will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy to inform the Final Report. The submissions may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Environmental Consultant will work from his/her base, attendance at technical meetings at the HRC office will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Environmental Resource Consultant

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Environmental Resource Consultant

Duration: Four Working Days, within a two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an Environment Resource Consultant.

Duties: Under the coordination of the Chairman of the Committee, Environment Resource Consultant will:

1. Review the Terms of Reference for the CEC/EIA Report in relation to the Highway Extension Project, particularly the Mon Desir to Dede segment.
2. Consider the extent to which the EIA may be adequate for a project of this magnitude, or ways in which aspects of such assessments might be improved to meet international best practice, also drawing on any informative experiences in Jamaica.

APPENDIX 2

TOR of the Independent Review Committee

Position: Environmental Resource Consultant (Cont'd)

3. Provide technical backstopping advice/comments to the Chairman, as an external reviewer, on the findings/conclusions of the Final Draft Report of the Highway Review Committee.

Qualifications and Experience: The Environment Resource Consultant will have advanced degree qualifications in a natural science field and extensive experience in the conduct of EIAs in Small Island Developing States.

APPENDIX 2

TOR of the Independent Review Committee

Position: Executive Documentation Officer

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Executive Documentation Officer

Duration: Ten Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an Executive Documentation Officer.

Duties: Under the coordination of the Chairman of the Committee, Executive Documentation Officer will:

1. Research and appreciate the various articles/comments published by media houses in relation to the Highway extension.
2. Review public participation video material on file in relation to the Highway extension.
3. Participate in selected meetings and prepare summary reports of the substantive issues, particularly as they may pertain to the inter-sectoral/inter-disciplinary nature of the Review and the need to rationalise the compilation of the Report.
4. Analyse and summarise selected written submissions.
5. Assist in the editing of documents and the structuring of the findings and recommendations to be summarised in the Final Report.

APPENDIX 2

TOR of the Independent Review Committee

Position: Executive Documentation Officer (Cont'd)

6. Assist in the publishing of documents developed by the Review Committee.
7. Provide advisory editorial support to consultants for consistency in the preparation of documentation.
8. Advise office staff on all matters related to the compilation of the overall document.
9. Provide related editorial assistance as may be required.

Qualifications and Experience: The Executive Documentation Officer will have strong analytical skills and an advanced degree demonstrating research and writing skills. Extensive executive level experience and report writing are required.

Organisation of the Exercise: While the Executive Documentation Officer will work from his/her base, attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Housing/ Settlements Specialist

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Housing/Settlements Specialist

Duration: Five Working Days within a Two-month Period

Commencement: 20 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Housing/Human Settlements Specialist.

Duties: Under the coordination of the Chairman of the Committee, Housing/Human Settlements Specialist will:

1. Review the human settlements structure of the communities within the Debe to Mon Desir segment of the highway alignment.
2. Consider the tradeoffs of resettlement of displaced families in the proposed Petit Morne settlement, or other designated areas.
3. Prepare an advisory report of findings and recommendations, with the implications and any options.
4. Provide advice to other consultants, in this connection, as may be appropriate.

APPENDIX 2

TOR of the Independent Review Committee

Position: Housing/ Settlements Specialist (Cont'd)

Qualifications and Experience: The Housing/Human Settlements Specialist will have advanced qualifications in a human settlements related field, with considerable experience in housing and settlements planning and development.

Organisation of the Exercise: While the Housing/Human Settlements Specialist will work from his/her base, attendance at technical meetings at the project office will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Legal Advisor

JOINT CONSULTATIVE COUNCIL

for the

CONSTRUCTION INDUSTRY

COMMITTEE FOR REVIEW OF the Debe/Mon Desir Segment of
THE SOLOMON HOCHOY HIGHWAY Extension

TERMS OF REFERENCE

Position: Legal Advisor

Duration: Four Working Days, within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Legal Advisor:

Duties: Under the coordination of the Chairman of the Committee, the Legal Advisor will:

1. Consider issues raised by consultants in relation to property valuation and acquisition and advise on compliance procedures as may apply to the Mon Desir to Debe segment of the Highway.
2. Advise on statutory requirements in respect of any legislation which may pertain to approvals for development.

APPENDIX 2

TOR of the Independent Review Committee

Position: Legal Advisor (Cont'd)

3. Provide advice to the Chairman on related matters.

4. Provide any written legal observation which should be included in the Final Report.

Qualifications and Experience: The Legal Advisor will be registered to practice law in Trinidad and Tobago and will be familiar with legislation pertaining to environment and land/property transactions.

Deliverables: The Legal Advisor will provide interim written advice and any final notation as may be required.

Organisation of the Exercise: While the Legal Advisor will work from his/her base, attendance at technical meetings may be required.

APPENDIX 2

TOR of the Independent Review Committee

Position: Senior Property Valuation/Acquisition Adviser

JOINT CONSULTATIVE COUNCIL

for the

CONSTRUCTION INDUSTRY

COMMITTEE FOR REVIEW OF the Debe/Mon Desir Segment of
THE SOLOMON HOCHOY HIGHWAY Extension

TERMS OF REFERENCE

Position: Senior Property Valuation/Acquisition Adviser

Duration: Twelve Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochtay Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Senior Property Valuation/Acquisition Adviser.

Duties: Under the coordination of the Chairman of the Committee, the Senior Property Valuation/Acquisition Adviser will:

1. Review the Terms of Reference for the property valuations carried out by or on behalf of NIDCO in relation to this segment of the project.

APPENDIX 2

TOR of the Independent Review Committee

Position: Senior Property Valuation/Acquisition Adviser (Cont'd)

2. Review the application of the Land Acquisition Act 1994 to the acquisition of private property for the execution of this segment of the project and related works. That review to include the service of notices, conduct of surveys and settlement of compensation claims. Particular reference to a comparison of the ranges of values with the actual settlements.
3. Review the private treaty acquisition of private property in relation to this segment of this project. Particular reference to a comparison of the ranges of values with the actual settlements.
4. Prepare a Report on the overall land acquisition implications as referenced above, components of which are to be included in the Final Report.
5. Assist in the conduct of interviews and assessment of written submissions.
6. Assist in compiling the overall Final Review Report.
7. Review the Final Report to ensure that land tenure issues are adequately addressed.
8. Undertake related tasks as required to support the interdisciplinary teamwork.

Qualifications and Experience: The Property Valuation/Acquisition Adviser will have professional qualifications as a valuer and be a member of the Institute of Surveyors of Trinidad and Tobago. He/she will have extensive experience in property valuation and land acquisition practice in Trinidad and Tobago.

Deliverables: The Property Valuation/Acquisition Adviser will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy to inform the Final Report. The submissions may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Property Valuation/Acquisition Adviser will work from his/her base, attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents, maps or plans at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the prior written consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Senior Urban-Regional Planner Consultant

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Senior Urban-Regional Planner Consultant

Duration: Fifteen Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of an A Senior Urban-Regional Planner.

Duties: Under the coordination of the Chairman of the Committee, the Senior Urban-Regional Planner will:

1. Review the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to glean an appreciation of the spatial development implications of the proposed Highway extension, within the context of National Human Settlements Development.
2. Review the National Physical Development Plan of 1984, which, although dated, would still have implications in relation to the earlier decision to extend the Solomon Hochoy Highway.

APPENDIX 2

TOR of the Independent Review Committee

Position: Senior Urban-Regional Planner Consultant (Cont'd)

3. Review the relevant municipal level Regional Plans for implications/consistency with ongoing/proposed spatial development projects.
4. Review implications of the resettlement requirements resulting from the current alignment of the Highway extension, with consideration of any alternative, and land use implications thereto.
5. Ascertain the compliance of ongoing/proposed land use, including the resettlement schemes, with statutory requirements.
6. Consider the extent to which public participation/consultation techniques might have been employed in the decision to extend the Highway, with recognition of any best practice, or recommendations for improvements in this and other similar major developments.
7. Prepare a Report on the overall land use implications as referenced above, components of which are to be included in the Final Report.
8. Assist in the conduct of interviews and assessment of written submissions.
9. Assist in compiling the overall Final Review Report.
10. Review the Final Report to ensure that land use issues are adequately addressed.
11. Undertake related tasks as required to support the interdisciplinary teamwork.

Qualifications and Experience: The Urban/Regional Planner will have professional qualifications in planning and be a member of the Trinidad and Tobago Society of Planners. He/she will have extensive experience in land use planning and human settlements development practice in Trinidad and Tobago.

Deliverables: The Urban/Regional Planner will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy to inform the Final Report. The submissions may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Hydrologist will work from his/her base, attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Social Impacts Assessment Resource Consultant

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Social Impacts Assessment Resource Consultant

Duration: Four Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in attached Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Social Impact Assessment Resource Consultant to provide technical backstopping and advisory services to the Chairman of the Committee.

Duties: Under the direction of the Chairman of the Committee, the SIA Resource Consultant will:

1. Set out a brief of critical baseline indicators pertaining to social impact assessments within the context of major infrastructure works and human settlements development projects, along with processes for the conduct of an SIA accordingly.
2. Review the Environmental Impact Assessment for the Mon Desir to Debe segment of the Highway, particularly the Terms of Reference prescribed by the EMA, to determine the procedures and treatment of social impact considerations and mitigation of impacts.
3. Provide advisory briefs to the Chairman on any issues pertaining to the SIA process.

APPENDIX 2

TOR of the Independent Review Committee

Position: Social Impacts Assessment Resource Consultant (Cont'd)

4. Review the findings on the SIA review by local personnel and advise the Chairman on implications for inclusion in the Final Report.

Qualifications and Experience: The Social Impact Assessment Resource Consultant will have an advanced degree in a social science related field and at least five years' experience directly related to Social Impact Assessments outside of Trinidad and Tobago

Deliverables: The Resource Consultant will provide written observations to the Chairman as required and submit a final overview of findings and recommendations electronically.

Organisation of the Exercise: While the Resource Consultant will work from his/her base, attendance at a technical meetings in Port of Spain may be considered. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Social Impacts Assessment - Review Specialist

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Social Impacts Assessment - Review Specialist

Duration: Ten Working Days over a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of a Social Impact Assessment Specialist.

Duties: Under the direction of the Chairman of the Committee, the SIA Specialists will:

1. Set out a brief of critical baseline indicators pertaining to social impact assessments within the context of major infrastructure works and human settlements developments in Trinidad and Tobago, along with processes for the conduct of an SIA accordingly.
2. Review all relevant documentation/survey data, particularly the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to determine the procedures and treatment of social impact considerations and consequences of Comment on implications of pros and cons of the social impacts of the current alignment in relation to proposed alternatives

APPENDIX 2

TOR of the Independent Review Committee

Position: Social Impacts Assessment - Review Specialist (Cont'd)

3. Evaluate written and oral submissions from interested parties with respect to social impact implications of the Highway Project, and in particular the section between Debe and Mon Desir.
4. Participate in inter-disciplinary meetings to consider and advise on social impact assessment implications of the project.
5. Provide specialist advice to the other consultants within the group
6. Prepare an objective technical assessment of findings and recommendations for inclusion in the Final Report of the Committee

Qualifications and Experience: The Social Impact Assessment Specialist will have an advanced degree in a social science related field and at least five years' experience directly related to Social Impact Assessments as independent exercises, or within the context of Environment Impact Assessments which require particular consideration of social consequences and mitigation measures.

Deliverables: The SIA Specialist will provide interim written findings and advice. He/she will deliver ten hard copies of his/her report and an electronic copy for inclusion in the final Report. The submission may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Specialist will work from his/her base, attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and maps at the project office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 2

TOR of the Independent Review Committee

Position: Transportation/Traffic Planning Specialists

JOINT CONSULTATIVE COUNCIL

COMMITTEE FOR REVIEW OF THE EXTENSION OF
THE SOLOMON HOCHOY HIGHWAY

TERMS OF REFERENCE

Position: Transportation/Traffic Planning Specialists (Two)

Duration: Twenty Working Days within a Two-month Period

Commencement: 10 December 2012

Duty Station: At the consultant's base, with attendance at consultations as may be required.

Background: The Joint Consultative Council (JCC) has established a Committee to undertake a technical review of aspects of the extension of the Solomon Hochoy Highway as set out in separate Terms of Reference. An inter-disciplinary team comprising, *inter alia*, hydrology, transportation, planning and land management, ecology, archaeology, etc., has been established to review specific components of the Highway Project and to collaborate in the compilation of a Technical Review Report within two months. In this connection, the JCC wishes to engage the services of two Transportation/Traffic Planning Specialists.

Under the coordination of the Chairman of the Committee, the Transportation/Traffic Planning Specialists shall:

1. Review the Terms of Reference for the Environmental Impact Assessment as prescribed by the EMA, as well as the resulting EIA, to glean an appreciation of the transportation/traffic management implications of the proposed Highway extension, within the framework of national transportation planning, road network development and settlement structure.
2. Liaise with the Project's Urban Regional Planner to consider transportation/traffic issues within the framework of regional and national spatial development, taking into consideration the

APPENDIX 2

TOR of the Independent Review Committee *Position: Transportation/Traffic Planning Specialists (Cont'd)*

- current structure of the economy and stated investment opportunities and socio-economic development.
3. Consider and advise on the transportation/traffic implications of the route selection alternatives, particularly taking into consideration the segment between Mon Desir and Debe.
 4. Consider and advise on connectivity issues in relation to existing and planned communities for displaced families.
 5. Review the current alignment in relation to the existing settlements structure, land tenure and land acquisition issues, cost implications of alternatives, particularly in respect of the Debe to Mon Desir segment, taking into consideration investments to date and contractual obligations of the government.
 6. Make recommendations on options which may be considered to mitigate any adverse consequences to the existing or alternative route/s.
 7. Assist in the conduct of interviews and assessment of written submissions in relation to transportation/traffic.
 8. Prepare a Report of findings and recommendations to inform the Final Report.
 9. Review the Final Report to ensure that the transportation/traffic issues are adequately reflected.
 10. Undertake related tasks as required to support the interdisciplinary teamwork.

Qualifications and Experience: The Transportation/Traffic Planning Specialists will have professional qualifications in transportation/traffic planning and management. They will have extensive experience in and knowledge of transportation/traffic conditions in Trinidad and Tobago.

Deliverables: The Transportation/Traffic Planning Specialist will provide interim written findings and advice. They will deliver ten hard copies of their report and an electronic copy to inform the Final Report. The submissions may be edited, without omission of the substantive issues, to fit into the overall Report.

Organisation of the Exercise: While the Transportation/Traffic Planning Specialists will work from their base(s), attendance at technical meetings in Port of Spain will be required. Where appropriate, documents will be circulated electronically. However, it might become necessary to review selected documents and large scale maps at the project-office. Confidentiality is essential and no unauthorised information is to be released or interviews granted without the expressed consent of the Chairman.

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee

MEETING DETAILS		ATTENDEES
MEETING:	CHAIRMAN (HRC) AND DR. WAYNE KUBLALSINGH (HRM)	Armstrong, James (Chairman)
DATE:	December 15, 2012	Arthur, Desiree
TIME:	-	Boodhai, Sheeren
LOCATION:	JCC Board Room, Fitzblackman Drive, Wrightson Road, Port of Spain	Kublalsingh, Wayne

MEETING DETAILS		ATTENDEES
MEETING:	HIGHWAY REVIEW COMMITTEE (HRC)	Armstrong, James (Chairman)
DATE:	December 20, 2012	Agard, William
TIME:	5:00-7:05pm	Attz, Marlene
LOCATION:	HRC Office, Edward Street, Port of Spain	Crichlow, Marilyn
		Hanson-Lewis, Frances
		Laughlin, Ivan
		Les Fouris, Grace
		Maharaj, Sunity
		Morris, Philbert
		Prince, Kerneisha
		Prince, Kieron
		Subran, Kenneth
		Taylor, Valerie
		Toney, Michael
		Townsend, Trevor

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS		ATTENDEES
MEETING:	HIGHWAY REVIEW COMMITTEE (HRC)	Armstrong, James <i>(Chairman)</i>
DATE:	January 3, 2013	Bertrand, Louis
TIME:	5:00-7:30pm	Crichlow, Marilyn
LOCATION:	HRC Office, Edward Street, Port of Spain	Hanson-Lewis, Frances
		Harris, Peter
		Les Fouris , Grace
		Maharaj , Sunity
		Morris, Philbert
		Prince, Kerneisha
		Prince, Kieron
		Ramnath, Natasha
		Subran, Kenneth
		Townsend, Trevor

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS		ATTENDEES
MEETING: DATE: TIME: LOCATION:	HIGHWAY REVIEW COMMITTEE (HRC) AND NIDCO January 9, 2013 5:00-8:10pm NIDCO, Melbourne Street, Port of Spain	<p><i>Organization: HRC</i></p> <hr/> Armstrong, James (<i>Chairman</i>) <hr/> Agard, William <hr/> Attz, Marlene <hr/> <hr/> Bertrand, Louis <hr/> Crichlow, Marilyn <hr/> Hanson-Lewis, Frances <hr/> Harris, Peter <hr/> Laughlin, Ivan <hr/> Les Fouris , Grace <hr/> Morris, Philbert <hr/> Prince, Kieron <hr/> Taylor, Valerie <hr/> <p><i>Organization: NIDCO</i></p> <hr/> Charles, Carson <hr/> Furlonge, Rae <hr/> Garibsingh, Steve <hr/> Goodial, Helda <hr/> Wilson, Earl <hr/> <p><i>Organization: MOWT</i></p> <hr/> Doolar Ramlal <hr/> Wayne Quintal <hr/> <p><i>Organization: ECOENGINEERING</i></p> <hr/> Debbie Reyes <hr/> George Sammy <hr/> <p><i>Organization: TRINTOPLAN</i></p> <hr/> Reynold Nurse <hr/>

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS		ATTENDEES
MEETING: DATE: TIME: LOCATION:	HIGHWAY REVIEW COMMITTEE (HRC) AND TRINTOPLAN January 9, 2013 1:30pm Trintoplan Offices	<hr/> Organization: Trintoplan <hr/> Abel, Andrea <hr/> Cooper, Vincent <hr/> Nurse, Ronald <hr/> Shrivastava, Gyan <hr/> Organization: HRC <hr/> Agard, William <hr/> Crichlow, Marilyn <hr/> Harris, Peter <hr/> Kersting, Nico <hr/> Morris, Philbert <hr/> Townsend, Trevor

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS	ATTENDEES
<p>MEETING: HIGHWAY REVIEW COMMITTEE (HRC) AND HIGHWAY REROUTE MOVEMENT</p> <p>DATE: January 10, 2013</p> <p>TIME: 5:15-11:35pm</p> <p>LOCATION : JCC Board Room, Fitzblackman Drive, Wrightson Road, Port-of Spain</p>	<p><i>Organization: HRC</i></p> <hr/> <p>Armstrong, James (Chairman)</p> <hr/> <p>Agard, William</p> <hr/> <p>Attz, Marlene</p> <hr/> <p>Hanson-Lewis, Frances</p> <hr/> <p>Laughlin, Ivan</p> <hr/> <p>Les Fouris , Grace</p> <hr/> <p>Maharaj , Sunity</p> <hr/> <p>Morris, Philbert</p> <hr/> <p>Prince, Kerneisha</p> <hr/> <p>Prince, Kieron</p> <hr/> <p>Subran, Kenneth</p> <hr/> <p>Townsend, Trevor</p> <hr/> <p><i>Organization: HRM</i></p> <hr/> <p>Boodhai, Terrence</p> <hr/> <p>Abraham, Haniff</p> <hr/> <p>Boodhai, Khemraj</p> <hr/> <p>Boodhai, Leela</p> <hr/> <p>Boodhai, Shereen</p> <hr/> <p>Boodhai, Vandana</p> <hr/> <p>Boodhai, Vanita</p> <hr/> <p>Boodhai, Vishal</p> <hr/> <p>Creese, Elton</p> <hr/> <p>Dookie , Harripersad</p> <hr/> <p>Kublalsingh, Wanye</p> <hr/> <p>Rambharose, Elizabeth</p> <hr/> <p>Sharma, Tara</p> <hr/> <p>Siew, Baliram</p> <hr/> <p>Suklal, Alfred</p>

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS		ATTENDEES
MEETING:	HIGHWAY REVIEW COMMITTEE (HRC) AND HIGHWAY REROUTE MOVEMENT	<i>Organization: HRC</i>
DATE:	January 21, 2013	Armstrong, James (Chairman)
TIME:	5:00-9:00pm	Herbert, Carla
LOCATION:	JCC Board Room, Fitzblackman Drive, Wrightson Road, Port-of Spain	Prince, Kieron Subran, Kenneth
		<i>Organization: HRM</i>
		Farmer, Rosanna
		Rambharose, Elizabeth
		Sankersingh, Lennox
		Sinanan, Jolynna
		Sudama, Trevor

MEETING DETAILS		ATTENDEES
MEETING:	HIGHWAY REVIEW COMMITTEE (HRC) AND NIDCO	<i>Organization: HRC</i>
DATE:	January 25, 2013	Armstrong, James (Chairman)
TIME:	11:00-1:35pm	Les Fouris , Grace
LOCATION:	NIDCO, Melbourne Street, Port of Spain	Prince, Kieron
		Taylor, Valerie Subran, Kenneth
		<i>Organization: NIDCO</i>
		Ramkissoon, Divanath
		Thompson, Mervyn

APPENDIX 3

Schedule of Meetings and Consultations held by the Independent Review Committee (Cont'd)

MEETING DETAILS		ATTENDEES
<p>MEETING: HIGHWAY REVIEW COMMITTEE (HRC) AND PENAL/ DEBE CORPORATION (PDC)</p> <p>DATE: January 31, 2013</p> <p>TIME: 10:30-12:30am</p> <p>LOCATION: JCC Board Room, Fitzblackman Drive, Wrightson Road, Port-of-Spain</p>		<p><i>Organization: HRC</i></p> <hr/> <p>Armstrong, James (Chairman)</p> <hr/> <p>Herbert, Carla</p> <hr/> <p>Kersting, Nico</p> <hr/> <p>Maharaj, Sunity</p> <hr/> <p>Prince, Kerneisha</p> <hr/> <p>Taylor, Valerie</p> <hr/> <p><i>Organization: PDC</i></p> <hr/> <p>Awardy, Skafté</p> <hr/> <p>Jaimungal-Khan, Marsja</p> <hr/> <p>Julien, Brian</p> <hr/> <p>Rampersadsingh, Hyacinth</p> <hr/> <p>Siew, Maleene</p> <hr/> <p>Sookoo, Premchand</p> <hr/> <p>Maharaj, Gowtam</p>

MEETING DETAILS		ATTENDEES
<p>MEETING: HIGHWAY REVIEW COMMITTEE (HRC)</p> <p>DATE: January 31, 2013</p> <p>TIME: 5:30-11:30pm</p> <p>LOCATION: HRC Office, Edward Street, Port of Spain</p>		<p>Armstrong, James (Chairman)</p> <hr/> <p>Agard, William</p> <hr/> <p>Attz, Marlene</p> <hr/> <p>Bertrand, Loius</p> <hr/> <p>Kersting, Nico</p> <hr/> <p>Harris, Peter</p> <hr/> <p>Herbert, Carla</p> <hr/> <p>Les Fouris, Grace</p> <hr/> <p>Maharaj, Sunity</p> <hr/> <p>Morris, Philbert</p> <hr/> <p>Prince, Kerneisha</p> <hr/> <p>Subran, Kenneth</p> <hr/> <p>Taylor, Valerie</p> <hr/> <p>Toney, Michael</p> <hr/> <p>Townsend, Trevor</p>

**Schedule of Meetings and Consultations held by the Independent Review Committee
(Cont'd)**

MEETING DETAILS		ATTENDEES
MEETING:	SUBMISSION – PATRICK BYNOE	Armstrong, James (Chairman)
DATE:	January 31, 2013	Bynoe, Patrick
TIME:	-	Herbert, Carla
LOCATION:	HRC Office, Edward Street, Port-of-Spain	Prince, Kerneisha
		Taylor, Valerie

APPENDIX 4

List of Submission from the Public of the Independent Review Committee

4.1 *Highway Reroute Movement (HRM)*

1. Affidavits:
 - a. CV2012-03205 Affidavit of Harripersad Dookie
 - b. CV2012-03205 Affidavit of Heidi W. Weiskel
 - c. CV2012-03205 Affidavit of Dr Wayne Kublalsingh
 - d. CV2012-03205 Pramenath Narinesingh

2. Claims:
 - a. Fixed Date Claim Form/Originating Motion
 - b. Affidavits of the Claimants

3. Articles:
 - a. Reroute Revisited (part 1) by Trevor Sudama
 - b. Reroute Revisited (part 2) by Trevor Sudama
 - c. Reroute Revisited (part 3) by Trevor Sudama
 - d. Reroute Revisited (part 4) by Trevor Sudama
 - e. Reroute Revisited - Conclusion by Trevor Sudama
 - f. Road Network Priority by Trevor Sudama
 - g. Roads and Traffic Congestion by Trevor Sudama
 - h. The Non-Priority Highway by Trevor Sudama

4. Maps:
 - a. Portion of the New Highway Expansion

5. Other:
 - a. A CHRONOLOGY
 - b. Appendix 1 Siew's Statement on History
 - c. Appendix 2 Moonilal's Hansard Statement
 - d. Appendix 3 HRM position public consultation Feb 2007
 - e. Appendix 4 Letter from Blackwater Village Council to Minister Warner
 - f. Appendix 5 Letter between Blackwater Village Council and PM Kamla Persad Bissessar
 - g. Appendix 6 Letter from Minister Warner to Dr Charles
 - h. Appendix 7 Letter from Debe to San Francique HAG and Blackwater VC to MP Stacey Roopnarine
 - i. Appendix 8 Letter from Blackwater Farmers to Minister Vasant Bharath
 - j. Appendix 9 Second Letter from Blackwater farmers to Minister Bharath
 - k. Appendix 10 Letter from Dookie to Minister Roopnarine critiquing NIDCO Report
 - l.

APPENDIX 4

List of Submission from the Public of the Independent Review Committee

4.1 *Highway Reroute Movement (HRM) (Cont'd)*

- m. Appendix 11 Letter from Dookie to PM, stating adverse impacts of Highway
 - n. Appendix 12 Letter to R Maharaj from HRM requesting support
 - o. Appendix 13 Three Letters from HRM Mr Tancoo requesting meeting with PM
 - p. Appendix 14 Letters from HRM to Ministry officials requesting rationale for Highway
 - q. Appendix 15 Minister of Finance Dookeran tells of Highway Budget Reduction
 - r. Appendix 16 Letter and Report from HRM to Prakash Ramadhar
 - s. Appendix 17 B Cover Letter for Report and Letter
 - t. Appendix 17 HRM delivers Letter and Report to PM
 - u. Appendix 18 Three Hundred Castles Set for Demolition, Shereen Boodhai
 - v. Appendix 19 Letter from PM to HRM
 - w. Appendix 20 Press Conference Notice
 - x. Appendix 21 Letter to Joth Singh
 - y. Appendix 22 Emails from Merle Brown to HRM
 - z. Appendix 23 Freedom of Information Request and Reply
 - aa. Appendix 24 Letters from HRM to Lisa Ghany
 - bb. Appendix 25 Programme
 - cc. Appendix 26 Letter from Minister Warner Inviting HRM to Meeting
 - dd. Appendix 27 Letter from HRM to PM Reminding of Agreement to Review
 - ee. Appendix 28 Letter to Minister Warner requesting copy of NIDCO Report
 - ff. Appendix 29 Letter from HRM to PM Requesting Meeting with HRM Women
 - gg. Appendix 30 Press Release on Fyard Hosein
 - hh. Appendix 31 Letter to PM delivered to Office Reminding of Agreement to Review
 - ii. Appendix 32 Technical Review Agreement Documents
6. Presentations:
- a. Highway Reroute Movement Traffic Congestion Presentation
 - b. Social Impact Assessment (Debe to Mon Desir) - Terrence Boodhai (HRM)
 - c. Social Impact Assessment_10-Jan-2013
 - d. Transportation Issues in the Debe to Mon Desir Area Final
 - e. Debe Mon Desir Godineau Swamp Hydrology 2013 Narinesingh
 - f. MonDesir Debe EIA 2012 Final Edited14th 4th Prame dec 2013
 - g. Extract from, "The Land"
 - h. Extract from Roads & Environment Handbook"
 - i. Extract from Roads & Environment Handbook – Early Planning of the EA"
 - j. Extract from "Laws of Trinidad and Tobago"

APPENDIX 4

List of Submission from the Public of the Independent Review Committee

4.1 *Highway Reroute Movement (HRM) (Cont'd)*

- k. Poetry extracts from Naipaul, V.S. Scott
 - l. AN ASSESSMENT OF THE IMPACT OF THE DEBE TO MON DESIR HIGHWAY PROJECT ON THE MENTAL HEALTH OF THE AFFECTED RESIDENTS
 - m. ANALYSIS FOR PROJECTED STRATEGIC CBA
 - n. cost and benefit inputs and solution, route, alternative
 - o. DSC_1122
 - p. DSC_1126
- SIA and social factors_Jolynna Sinanan

APPENDIX 4

List of Submissions from:

4.2 *Joint Consultative Council (JCC)*

1. Letter JCC to PM Bissessar Re Proposal to end HRM Impasse
2. Letter JCC To President Max Richards Re copy of Ltr to PM
3. Letter JCC to Min. Jack Warner re: Transport Sector
4. Letter JCC to PS MoWI re: Land Acquisition in Point Fortin
5. Letter MoWI to Institute of Surveyors of Trinidad and Tobago
6. Comments on the Request for Expressions of Interest requested by the National Infrastructure Development Company Limited for Design-Build Contracting Services for the Trinidad National Network of Highways Project (NNHP)
Novation in Design Build in Trinidad and Tobago

APPENDIX 4

List of Submissions from:

4.3 NIDCO

1. Debe to Mon Desir Segment Report
2. Appendix 1.1 - Certificate of Environmental Clearance from EMA
3. Appendix 1.2 - Certificate of Environmental Clearance from EMA
4. Appendix 2 - Discontinuation of the Debe to Mon Desir Segment
5. Debe to Mon Desir EIA Volume 2 – Appendices:
 - a. Prefatory Pages
 - b. Appendix A- CEC Application & TOR
 - c. Appendix B-Aerial Survey Photography
 - d. Appendix C-Letters to Service & Utility Companies
 - e. Appendix D-Landscaping
 - f. Appendix E-Slope Gradient Analysis
 - g. Appendix F-Climate
 - h. Appendix G-Water Quality
 - i. Appendix H-Air Quality
 - j. Appendix I-Noise Monitoring & Modelling
 - k. Appendix J-Ecology
 - l. Appendix K-IMA Wetland Report
 - m. Appendix L-Attitudes Survey
 - n. Appendix M-Potential Impacts
 - o. Appendix N-Classification of Impacts
 - p. Appendix O-Risk Assessment
 - q. Appendix P-Route Comparison
 - r. Appendix Q-Environmental Management Plan
 - s. Appendix R-Emergency Response Plan
 - t. Appendix S-Acquisition Principles
 - u. Appendix T-Public Consultation
6. Debe to Mon Desir Project Description
7. Debe to Mon Desir EIA Volume 1
8. Executive Summary
9. Response to Review & Assessment-CEC 1372_2006- EIA for Debe to Mon Desir
10. Claim Processing Flowchart
NIDCO Comprehensive Land Transport Program -San Fernando to Point Fortin

APPENDIX 4

List of Submissions from:

4.4 *Trintoplan Consultants Limited*

1. Debe to San Francique Road Route Comparison Report
2. Terms of Reference for Feasibility Studies and Design Consultancy Services for the Trunk Road Expansion Component, IDB Loan No. 932/OC-TT – Ministry of Works and Transport
3. Solomon Hochoy Highway Extension to Point Fortin Project History
4. Final Report on Feas Invest Vol 1
5. Final Report on Feas Invest Vol 2
6. Final Report on Feas Invest Vol 3
7. Final Report on Feas Invest Vol 4

National Highway Programme Trunk Road Expansion Component Solomon Hochoy Highway Extension – H1-H7 Hydraulic and Hydrology Reports

APPENDIX 4

List of Submissions from:

4.4 *Halcrow*

1. Traffic Volumes and Operational Analysis
2. St. Mary's Interchange Comparison of Design Options
3. Golconda Interchange Verification of Design
4. Debe Interchange Comparison of Design Options
5. Penal Interchange Verification of Design
6. Siparia Interchange Verification of Design
7. Fyzabad Interchange Verification of Design
8. Mon Desir Interchange Verification of Design

APPENDIX 4

List of Submissions from:

4.6 *Rae Furlonge*

1. C-040-CROSS CROSSING INTERCHANGE
2. Traffic Feasibility Study and Urban Traffic Management Plan for Debe to Siparia and Surrounding Areas: Problem Diagnosis REVISED
3. Traffic Feasibility Study and Urban Traffic Management Plan for Debe to Siparia and Surrounding Areas: Traffic Assignment
Optimal Route Analysis Using GIS

APPENDIX 4

List of Submissions from:

4.7 *Ministry of Local Government*

1. Final Consultation Report Siparia
2. Final Situation Report 1 Siparia
3. Final Situation Report 2 Siparia
4. PDRC Municipal Investment Plan Town Regeneration and Branding – Penal-Debe
5. Municipal Investment Plan Upgrade of Recreational Facilities – Point Fortin
6. SRC Municipal Investment Plan – Urban Enhancement focused on Domestic Tourism
7. Siparia Draft Regional Development Plan Technical Report TR1
8. Siparia Draft Regional Development Plan Technical Report TR2
9. Siparia Draft Regional Development Plan Technical Report TR3
10. Siparia Draft Regional Development Plan Technical Report TR4
11. Siparia Draft Regional Development Plan Technical Report TR5
12. Siparia Final Draft Municipal Development Plan
13. Appendices for Supplemental Report
14. Situation Report 1 Appendix
15. Penal/Debe Draft Regional Development Plan Situation Report 1
16. Supplementary Report
Letter to Dr James Armstrong

APPENDIX 4

List of Submissions from:

4.8 *Public*

NAME	DOCUMENT SUBMITTED
<ul style="list-style-type: none">• Tyrone Kalpee	<ol style="list-style-type: none">1. Comments on the Environmental Impact Assessment for proposed highway from Debe to Mon Desir – updated
<ul style="list-style-type: none">• Patrick Bynoe	<ol style="list-style-type: none">1. Proposal for the select committee on the Sir Solomon Hchoy Highway extension2. Letter to the Chairman of the Committee on the Debe to Mon Desir Leg of the Solomon Hchoy Highway3. Maps of San Francisco Bay Bridge and surrounding areas
<ul style="list-style-type: none">• David Bertrand/Kasso Dowlath	<ol style="list-style-type: none">1. Letter the Chairman of the Highway Review Committee: “Submission for the Attention of the Highway Review Committee”2. NIDCO Interview Sheet and Contact Form3. Correspondence sent to Mr Moodie4. Map Showing proposed Route of Highway as referenced in correspondence to Mr Moodie5. Map referred to in correspondence

APPENDIX 5

List of Tables and Diagrams:

SECTION 1: URBAN AND REGIONAL PLANNING

Figure 1.1: National Physical Development Plan, Proposals Map

Figure 1.2: Point Fortin Development Strategy

Figure 1.3: Location of land at Petit Morne

Figure 1.4: Location of land at Golconda

SECTION 5: ECONOMIC COST BENEFIT CONSIDERATIONS

Figure 5.1: General Process of an ECBA

Figure 5.2: Table of Economic Analysis, and the Project Cycle

Figure 5.3: Choice of Valuation Technique

SECTION 6: TRAFFIC AND TRANSPORTATION

Figure 6.1: Golconda to Point Fortin Highway Segments

Figure 6.2: Golconda to Point Fortin Highway and Alternative Route Proposed by the HRM

Figure 6.3: Golconda to Point Fortin Highway, Possible Route Options

APPENDIX 6

Land Acquisition and Valuation References

I. LAWS AFFECTING LAND ACQUISITION

1. THE LAND ACQUISITION ACT (LAA) CH 58:01 governs compulsory Purchase (CP) of land for public purposes. It was completely revised in 1994 by Act #28 of 1994 after extensive consultation. (see Highways Act below).

SECTION 3 NOTICE. This is published when the acquiring authority is uncertain of the precise external boundaries of the lands it intend to acquire. It *gives permission to enter the lands described to conduct surveys, tests etc.* to determine the boundaries of the lands to be acquired. Payment is promptly made for damage on entry. If the lands are subsequently acquired then such sums **MUST** be deducted from total compensation for the property acquired in its **UNDAMAGED** state. Claimants will *not normally be compensated in respect of any improvements executed after the publication of a section 3 notice.* The Act indicates how this is to be administered. *It is important that the notice be published as soon as it is practical.*

AUTHORITY. The lands may be entered to *execute the project (as distinct from tests, surveys etc.)* before formal acquisition (Section 5 Notice) with the permission of the President under Section 4 of the Act. This authority is exercised by service on the owner of the lands. *Before the Act was revised in 1994 "owners" had no statutory right to compensation at this stage. In order to prevent hardship Cabinet would normally allow negotiations by "private treaty under the shadow of compulsory purchase". This meant in accordance with the provisions of the LAA i.e. if properly administered, total payments will be no different to under CP*

SECTION 5 NOTICE. Publication vested the lands in the State and all "rights to the land" are converted into the right to compensation under the Act.

COMPENSATION. All our CP legislation entitles claimants to be reimbursed the reasonable costs incurred in the preparation and submission of their claims under all admissible heads of claim.

2. THE HIGHWAYS ACT .Local Government bodies, some Utilities etc. have some CP powers but they are required to use the provisions of the LAA which they **EXERCISED** through the Sub-Intendent of State Lands (now Commissioner of State Lands). The major exception was The Highways Act (THA) Ch 48:01 which gave the Ministry of Works (MOW) power to acquire lands in respect of Highways. This Act had some more sophisticated land acquisition provisions than the pre 1994 LAA in respect of general acquisition in addition to other powers in special cases peculiar to highways (improvements to roads, up-grading of roads, adoption of roads etc.) The THA was never used to acquire lands for these purposes up to 2003 on the grounds that the MOW did not have the Land Economy (LE) expertise although they were advised of the procedure used by the other authorities. The revised LAA in 1994 incorporated the more sophisticated general acquisition provisions of the THA. The case for using the THA is now weaker but the usefulness of the other provisions remains high.

3. THE TOWN AND COUNTRY ACT (T&CPA) Ch 35:01. The LAA requires due consideration to the T&CPA as regards compensation. Section 5 (3) (c) of the T&CPA allows for lands to be designated as subject to compulsory acquisition. The T&PC Division's policy was not to allow improvements or sub division in respect of such lands. This designation was applicable to the proposed highway extension from Coagulants to Cedros.

4. THE SECURITY OF TENURE ACT (Squatters) (TSOTSQA) Ch 57: 05 ;

This only applies to lands used for residential purposes before 1st January 1998 in designated areas. In 1998 Government announced an official policy in respect of agricultural squatters who were in occupation for 5 years i.e. prior to 1st January 1993. If the policy has changed ISTT must be advised. *Other squatters do not qualify for regularisation.*

5. ACQUISITION PROCEDURE.

1. Pre legal steps (conceptualization) Administratively this was done by the acquiring authority by the use of expertise and resources available in all State agencies not needing authority to enter private lands.
2. The agency managing the project (could be changed later) consulted the DOS who controlled the Sub-Intendent of State Lands (the predecessor to the COSL), where they identified the lands needed for the project on available maps.
3. The acquiring authority arranged for the publication of the Section 3 Notice which was regarded as notice to the world that the lands described were likely to be acquired for a public purpose. The notice had to be served on owners but include affixing to the land; failure to comply with this aspect would not affect the legality of the published notice. The Notice under sub section “ (5) allowed that the Commissioner may, after fourteen days, not including Saturdays, Sundays and public holidays, from the date of publication referred to in subsection (1)(a) have elapsed and whether or not a representation has been made under subsection (3), to enter upon the land for investigative purposes only and do all or any of the following things:(a) survey and take levels of any land in any locality to which the public purposes relate;(b) dig or bore into the subsoil of such land;(c) do all other acts necessary to ascertain whether the land is adaptable to the purposes for which it is required;(d) set out the boundaries of the land intended to be acquired and the intended line of the works, if any, proposed to be done thereon;(e) mark levels, boundaries and lines by placing marks and cutting trenches; (f) cut down and clear away any standing crop, fence, tree or bush, where otherwise the survey cannot be completed, the levels taken or the boundaries or line of the works marked;(g) set up and maintain gauges in any stream or watercourse, and have access to the same from time to time for purposes of observation; and (h) do all such other acts as may be incidental to or necessary for any of the purposes aforesaid” and under subsection . “(6) The Commissioner shall not enter into any building, or into or upon any enclosed yard, court or garden attached to a dwelling house, except—(a) with the consent of the occupier thereof; or (b) after giving to the occupier at least twenty-four hours notice in writing of his intention to do so.” And under sub section “(7) Compensation shall be paid to any person interested in the land so entered for any actual damage or injury resulting to him by reason of the exercise of the powers conferred by

this section and shall be assessed—(a) in so far as it relates to land, the acquisition of which is subsequently abandoned under section 8 or deemed to be abandoned under section 9, in the manner provided by this Act; or (b) in so far as it relates to land, the compulsory acquisition of which is completed under section 5, as though it were part of the compensation for the acquisition of the land”

Under this section the VD prepared a “Section 3” or preliminary Report and Valuation to assist in feasibility consideration which described the location, topography, shape, details of all improvements, cultivation, owner/occupier and related land data with photographs... This was critical as compensation is not normally payable for development or improvements carried out after the Section 3 date. Payment in respect of any damage caused on Section 3 entry required prompt payment. Full details was supplied to the acquiring authority who normally forward a copy to the COV as all such payments had to be taken into account in the assessment of final compensation payable i.e. deducted from the value of the “undamaged property”. It is important to note that the unit value ascribed to a few plants is usually considerably higher than the unit value ascribed to the entire orchard or plantation. In addition where final compensation is assessed on a higher than existing use, the value of the undamaged property will not normally reflect any value attributable to the damaged items but any payment made must be deducted. It is exceptionally rare for large portions of cultivation or vegetation to *be damaged at the Section 3 stage (The consultant is not aware of any locally since 1967)*. The Section 3 valuation exercise was sometimes utilized to collect *basic data needed by other parties to minimise time and effort*.

4. ENTRY FOR EXECUTION OF THE PROJECT. If it becomes necessary to enter private lands to execute the project the President’s Authority must be obtained under Section 4 of the LAA. which reads;

“4. (1) No earlier than two months after the date of publication of a Notice referred to in section 3(1) (a) the President may, if satisfied that the circumstances of the case justify such action, issue an Order authorising the Commissioner, without waiting for the formal vesting of the land in the State under section 5, to take possession of the land and apply it for any purpose connected with the use to which it is intended to be put on acquisition.

(2) An Order issued under subsection (1) shall—

(a) be under the hand of the Secretary to the Cabinet, or his authorised agent;

(b) be in the prescribed form;

(c) indicate the place where any person interested may obtain a more detailed description of the land to which the Order relates; and

(d) be published and served in the same manner as that required for a Notice referred to in section 3(1) and (2) respectively.

(3) Upon publication and service of an Order under subsection (2)—

(a) the Commissioner may proceed forthwith to carry out any works on the land connected with the use to which it is intended to be put on

acquisition; and (b) any person interested becomes entitled, as from

the date of the taking of possession referred to in subsection (1), to compensation upon the same basis as if a declaration had been made under section 5 on that date, and section 6(2)(c) and (d) apply *mutatis mutandis* to an Order issued under subsection (1).

(4) If the Commissioner fails to take possession of the land within six months of the publication of an Order issued under subsection (1)—

(a) the said Order lapses and the powers of the Commissioner thereupon cease to have any effect; and

(b) any person entitled to the land becomes entitled to repayment of all expenses reasonably incurred by him as a result of the publication of the Notice under section 3(1)(a), up to the date of publication under subsection (2) of this section, but no compensation is payable in any such case for loss of bargain or for damages for breach of contract.’

To be effective, notice must be served on the owner (or the land). Before the 1994 Act the ‘effective date of entry’ set the date of entitlement for the head of claim ‘ “loss of use” which could only be legally submitted at the Section 5(vesting) stage. This was usually delayed for considerable periods (which was aggravated by another unexplained ‘secret’ amendment in 2000; this time to the State Lands Act. These amendments were passed in the Senate without formal debate. This clearly illustrate the need for technical justifications, feasibilities, pre feasibilities etc. before any “undue influence” ; to be made available to Parliament where relevant. The decision to up grade the northern route to freeway status is a classic example, which is one of major causes of the problems for the delays. The VD was advised when the authority was obtained. They revisited the site to determine their field report should be revised). Cabinet would accede to proceed by way Private Treaty (under the shadow of CP) on account of these.

5. SECTION 5 NOTICE. Delays (see Appendix III),

This vested the land in the State and all private interests in the lands were converted into rights to submit claims for compensation under the Act within 18 months or the right was lost. In consequence many lost the right to compensation. A Cabinet policy advised that in any such case it was prepared to make an *exgratia* award equal to the Commissioner of Valuation’s estimate of the amount of compensation payable under all admissible heads of claim that would have been payable at the date of acquisition. No interest is payable as the delay was the fault of the claimant and assessment of the quantum could not be appealed. (See Appendix III)

6. COMPENSATION.

The various statements on compensation in NIDCO original documents are recommendations generally in conformity with the law. In practice there is ample leeway for differences in opinion even among experienced qualified valuers as in any discipline dealing mainly with opinion. The consultant is of the view that some of the statements he heard from Ministers and NIDCO on the airwaves could mislead. NIDCO has not provided access to valuations, claims and settlements nor have they kept their word to submit a copy of their “offer to treat” form letter ; so the claims by the HRM and others in the media and included the HRC requests could not be investigated . It is therefore difficult to place reasonable reliance upon NIDCO’s position. Some of the

HRRM's claims are that (i) NIDCO reneged on oral agreements,(ii) NIDCO changed the terms of offers with no reason provided,(ii) NIDCO offered (and delivered) improper inducements for protestors to change sides. (iv) They refused to reduce their claims (on no proper basis) and NIDCO caved in (v) NIDCO had un pressure exerted on the VD, to accept "questionable settlements as arms length evidence, assessment principles inconsistent with the law,official policy or LE principles, inappropriate principles for determining the appropriate planning assumptions, unlawful criteria for determining "payments" to squatters, trespassers and unauthorized development contrary to law,official policy or LE principles."

II . Private Treaty

Although the State is free to purchase land by private treaty (PT), it is foolhardy to rely solely on *normal* Private Treaty when one needs a specific property or where time is of the essence as the owner may not be prepared to settle at a reasonable price, resulting in delay. It would be detrimental to depend on it for strips of land comprising multiple ownership as the MOWI has been doing for some time. Prior to the 1994 Act it was normal for Cabinet to grant permission for the use of PT after Section 3 notice (lands may be required) but before the Section 5 notice (vesting date) to minimize hardship in cases where the section 5 notice is delayed and the State was reasonably certain of the lands needed as there was *no legal right to make a claim before publication of the Section 5 notice*. The relevant procedure was termed "*Private Treaty under the shadow of Compulsory Purchase*" (*PTSCP*) as these negotiations were *always conducted in strict accordance with the LAA*. If the negotiations succeeded, the transaction was completed as any other PT transaction. If not CP procedure completed the matter. The 1994 LAA now allow for claims to be submitted at the Section 4 stage (entry to execute the project) so there is no longer any need for PT in these cases and *PT not in accordance the LAA*.

Pure PT can sometimes expedite matters where a specific site is not critical, but in matters like the highway , CP procedure is by far quicker if under the control of competent persons qualified in Estate Management(EM) ; this has not been the case for at least half a century.

III LEGAL NOTICE NO.15

REPUBLIC OF TRINIDAD AND TOBAGO [Section 3(1)] THE LAND ACQUISITION ACT, CHAP. 58:01

NOTICE OF LANDS LIKELY TO BE REQUIRED FOR A PUBLIC PURPOSE

NOTICE is hereby given that it appears to the President that the parcels of land described in the Schedule and situate in the Counties of Victoria and St. Patrick are lands likely to be needed for a purpose which, in the opinion of the President, is a public purpose, namely the expansion of the trunk road network of Trinidad and Tobago by the construction of a highway between San Fernando and Point Fortin.

APPENDIX 7

Note on the Archaeological Significance of the Oropouche Lagoon

I. The Oropouche Lagoon in Historical Context

1.1 The Lagoon has a long human history, which dates back to est. 7000 BC. Three surface scatters of chert flakes and cores in southwest coastal Trinidad (Pitch Lake, Fyzabad, Savaneta near Claxton Bay) suggest pre-settlement visits from outside the island.

Two hilltop shell deposits on the south shore of the Lagoon (St John, Banwari) represent Trinidad's first human settlements. The Banwari excavation shows 3 strata. Shell food remains suggest the Lagoon is freshwater during the Early occupation (BC 6000-5580). The second stratum suggests abandonment: 75 cm of excavation with the same date (BC 5100), presumably while rising sea level following the Last Glacial is reaching its maximum. The shell remains in Late Banwari (BC 5100-est 4350) suggest a mangrove lagoon.

The Lagoon's location in southwest Trinidad and an absence of earlier mainland remains, suggest the people came from the previously undocumented Warao nation of the Orinoco Delta. According to Warao mythology, Haburi, the ancestral Maker of the First Canoe fled in time immemorial, via the Caño Macareo to Trinidad in time with his two mothers; and their spirits still reside on Naparima Hill in San Fernando. The Warao name of this hill is Naba Rima, *Guardian of the Coastal Waters*.

Typical Banwarian stone artifacts include a probable canoe-maker's adze as well as pestles made from Lesser Antilles rock. These probably attest to the navigational knowledge and skills of early Warao leaders. Any of our early sites near or in the Lagoon could be the factual basis of the Haburi myth.

1.2. The Grand Lagoon was first mapped in 1797 (Mallet 1802). Its waters almost fill the Oropouche drainage, and extend around 27 km inland as far as the present-day Moruga Road. Its swampy soils preserve a subsurface image of the Lagoon, which requires interpretation by a Civil Engineer.

2. Treatment of Cultural Heritage by the EMA

It would appear that the EMA is set up for Environmental Heritage only. However the meaningful management of Cultural Heritage is sadly lacking at this time in Trinidad and Tobago. In theory this is the responsibility of the National Trust. However the Development plans for Siparia, Point Fortin and Penal circulated to HRC suggest that the development of cultural heritage sites fit within the Local Government framework, and that GORTT policy appears to tacitly endorse this approach. The Corporations obviously each require a Heritage Officer, but at the moment this work is being supplied by consultants.

The National Trust clearly needs to interview for a panel of resource persons with recognised knowledge of our Cultural Sectors. Equally the position of National Trust Chairman should be filled by interview, not as at present by political appointment.

All this work falls within the portfolio of the Minister of National Diversity and Social Integration. Ideally a small Planning Committee should be established to recommend long term establishment of a National Cultural Institute, which would coordinate the views of Cultural Sector leaders, scholars, and selected Government representatives.