

APPENDICES

Environmental Impact Assessment for Coral Springs Residential Development



Prepared for:
Gore Developments Ltd
2c Braemar Avenue
Kingston 10

Prepared by:
Environmental Solutions Ltd.
89 Hope Road
Kingston 6

Submitted: July 2012



Existing Coral Springs Subdivision



Land for proposed development



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APPENDIX I – CORRESPONDENCES WITH AGENCIES

APPENDIX II – TERMS OF REFERENCE



NATIONAL ENVIRONMENT & PLANNING AGENCY

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Ref.: 2012-07017-EP00101

20 June 2012

Dr. Barry Wade
Principal Consultant
Environmental Solutions Limited
89 Hope Road
Kingston 6

Dear Dr. Wade,

Re: Revised Terms of Reference for Coral Spring Housing Development, Trelawny

Reference is made to your letter dated 19 June 2012. Please be advised that the National Environment and Planning Agency (NEPA) having reviewed the final draft of the revised Terms of Reference for the above captioned, is satisfied that the document now incorporates the relevant information required for conducting the Environmental Impact Assessment.

The Agency therefore offers no objection to the commencement of the Environmental Impact Assessment study. Kindly note that upon completion of the report twelve (12) hard copies and a digital copy should be submitted to the agency for review. If there are any queries please do not hesitate to contact the undersigned or Errol Morris at 754-7540 extension 2169 or by email at emorris@nepa.gov.jm.

Sincerely
National Environment and Planning Agency


Aisha Bedasse
Acting Manager, Applications Processing Branch
for Chief Executive Officer

AB/em

Cc. Mr. Chris Gore, Director, Gore Developments Limited

Any reply or subsequent reference to this communication should be addressed to the Chief Executive Officer, to the attention of the officer dealing with the matter, and the reference quoted where applicable.

*Managing and protecting Jamaica's land, wood and water
A Government of Jamaica Agency*



21 Years of Service

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June 19, 2012

Mr. Peter Knight
Chief Executive Officer
National Environment and Planning Agency
10 & 11 Caledonia Avenue
Kingston 5.

Dear Mr. Knight,

Re: Terms of Reference for Environmental Impact Assessment for Coral Springs Housing Development, Trelawny

Following review of the letter on 13 June 2012, we have revised the last Draft Terms of References (TORs) to reflect the points on the flood impact assessment and the slope assessment at the site. In relation to the third bullet point of your letter, please note that Section 7.5 of the TORs refers to the impacts on heritage, archaeological and cultural resources that have been identified in Section 6.4 which already reads as suggested.

We hope the TORs have now satisfied your requirements and await your approval.

Please do not hesitate to contact us if you have any queries.

Yours truly,

ENVIRONMENTAL SOLUTIONS LIMITED

A handwritten signature in black ink, appearing to read 'Barry A. Wade', is written over a horizontal line.

Barry A. Wade, PhD, OD, JP
Chairman

Comprehensive Services in Environmental Management
Directors: Eleanor B. Jones, M.A., Managing Director ; Barry A. Wade, Ph.D., O.D., JP, Chairman;
George A. Campbell, M.Sc. (Econ) B.Sc.; Sharonmae Shirley, M.Phil., CP-FS

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APPENDIX III – POLICY, LEGISLATION AND REGULATION

National Legislation – Natural Environment

Natural Resources Conservation Authority Act (1991)

The Natural Resources Conservation Authority Act was passed in the Jamaican Parliament in 1991 and provided the basis for the establishment of the Natural Resources Conservation Authority (NRCA) with primary responsibility for ensuring sustainable development in Jamaica through the protection and management of Jamaica's natural resources and control of pollution. Sections 9 and 10 of the NRCA Act stipulate that an Environmental Impact Assessment (EIA) is required for new projects and existing projects undergoing expansion.

The body is also responsible for investigating the effect on the environment of any activity that may cause pollution or which involves waste management. Sections of the Act that relate specifically to pollution control state that:

- (i) No person shall discharge on or cause or permit the entry into waters, on the ground or into the ground, of any sewage or trade effluent or any poisonous noxious or polluting matter.
- (ii) No person is allowed to construct or reconstruct or alter any works designed for the discharge of any effluent.

The Act also empowers the authority to require of any owner or operator of a pollution control facility information on the performance of the facility, the quantity and condition of effluent discharged and the area affected by the discharge of such effluent.

The Authority has the right to consult with any agency or department of Government having functions in relation to water or water resources to carry out operations to:

- (a) Prevent pollutants from reaching water bodies.
- (b) Remove and dispose of any polluting matter or remedy or mitigate any polluted water body in order to restore it.

Environmental Review and Permitting Process (1997)

The Environmental Permit and License System (P&L), introduced in 1997, is a mechanism to ensure that all developments in Jamaica meet required standards in order to minimize negative environmental impacts. The P&L System is administered by NEPA, through the Applications Section (formerly the Permit and License Secretariat). Permits are required by persons undertaking new development which fall within a

prescribed category. Under the NRCA Act of 1991, the NRCA is authorized to issue, suspend and revoke permits and licences if facilities are not in compliance with the environmental standards and conditions of approval stipulated. An applicant for a Permit or License must complete an application form as well as a Project Information Form (PIF) for submission to the NRCA.

Wildlife Protection Act (1945)

The Wildlife Protection Act of 1945 prohibits removal, sale or possession of protected animals, use of dynamite, poisons or other noxious material to kill or injure fish, prohibits discharge of trade effluent or industrial waste into harbours, lagoons, estuaries and streams, and authorizes the establishment of Game Sanctuaries and Reserves. Protected under the Wildlife Protection Act are six species of sea turtle, one land mammal, one butterfly, three reptiles and several species of birds including rare and endangered species and game birds.

The Endangered Species (Protection, Conservation and Regulation of Trade) Act (2000)

This Act deals with restriction on trade in endangered species, regulation of trade in species specified in the schedule, suspension and revocation of permits or certificates, offences and penalties, and enforcement. Many species of reptile, amphibian and birds that are endemic to Jamaica but not previously listed under national protective legislation, or under international legislation, are listed in the Appendices of this Act.

The Natural Resources (Prescribed Areas) (Prohibition of Categories of Enterprise, Construction and Development) Order (1996)

The island of Jamaica and the Territorial Sea of Jamaica have been declared a Prescribed Area. No person can undertake any enterprise, construction or development of a prescribed description or category except under and in accordance with a permit. The Natural Resources Conservation (Permits and Licenses) Regulations (1996) give effect to the provisions of the Prescribed Areas Order.

Water Resources Act (1995)

The Water Resources Act of 1995 established the Water Resources Authority (WRA). This Authority is mandated to regulate, allocate, conserve and manage the water resources of the island. The Authority is also responsible for water quality control and is required under Section 4 of the Act to provide upon request to any department or agency of Government, technical assistance for any projects, programmes or activities relating to development, conservation and the use of water resources.

It is the responsibility of the WRA as outlined in Section 16 to prepare, for the approval of the Minister, a draft National Water Resources Master Plan for Jamaica. Areas to be covered in this Draft Master Plan of 1990 included objectives for the development, conservation and use of water resources in Jamaica with

consideration being given to the protection and encouragement of economic activity, and the protection of the environment and the enhancement of environmental values.

Section 25 advises that the proposed user will still have to obtain planning permission, if this is a requirement, under the Town and Country Planning Act. In addition, Section 21 of the Act stipulates that if the water to be used will result in the discharge of effluents, an application for a license to discharge effluents will have to be made to the Natural Resources Conservation Authority or any other relevant body as indicated by the Minister.

With regard to underground water, Section 37 states that it is unlawful to allow this water to go to waste. However, if the underground water "interferes or threatens to interfere with the execution or operation of any underground works", it will not be unlawful to allow the water to go to waste in order to carry out the required works provided that there is no other reasonable method of disposing of the water. The Authority also has the power to determine the safe yield of aquifers (Section 38).

Quarries Control Act (1983)

The Quarries Control Act of 1983 established the Quarries Advisory Committee, which advises the Minister on general policy relating to quarries as well as on applications for licenses. The Act provides for the establishment of quarry zones, and controls licensing and operations of all quarries. The Minister may on the recommendation of the Quarries Advisory Committee declare as a specified area any area, in which quarry zones are to be established and establish quarry zones within any such specified area.

Section 5 of the Act states that a licence is required for establishing or operating a quarry, though this requirement may be waived by the Minister if the mineral to be extracted is less than 100 cubic metres. Application procedures are outlined in Section 8. The prescribed form is to be filed with the Minister along with the prescribed fee and relevant particulars. The applicant is also required to place a notice in a prominent place at the proposed site for a period of at least 21 days starting from the date on which it was filed.

Clean Air Act (1964)

This act refers to premises on which there are industrial works, the operation of which is in the opinion of an inspector likely to result in the discharge of smoke or fumes or gases or dust in the air. An inspector may enter any affected premise to examine, make enquiries, make tests and take samples of any substance, smoke, fumes, gas or dust as he considers necessary or proper for the performance of his duties.

Noise Standards

Jamaica has no national legislation for noise, but World Bank guidelines have been adopted by the National Environment and Planning Agency (NEPA) and are used for benchmarking purposes along with the

National Noise Standard. The guidelines for daytime perimeter noise are 75 decibels and 70 decibels for nighttime noise.

Trade Effluent and Sewage Regulations (1996) (Draft)

Jamaica has draft regulations governing the quality of the effluent discharged from facilities to public sewers and surface water systems. These draft regulations were gazetted in 2006. The draft guidelines require the facility to meet certain basic water quality standards for trade effluent including sewage (Table 3.1.11). The requisite permits and licenses are required to install and operate sewage treatment facilities.

Table 3.1.11: NRCA Sewage Effluent Standards

Immediate Technology Based Effluent Standards - Existing Plants	
Parameter	Effluent Standard
BOD ₅	20 mg/l
TSS	30 mg/l
Nitrates (as Nitrogen)	30 mg/l
Phosphates	10 mg/l
COD	100 mg/l
pH	6-9
Faecal Coliform	1000 MPN/100ml
Residual Chlorine	1.5 mg/l
Proposed Sewage Effluent Standards – New Plants	
BOD ₅	20 mg/l
TSS	20 mg/l
Total Nitrogen	10 mg/l
Phosphates	4 mg/l
COD	100 mg/l
pH	6-9
Faecal Coliform	1000 MPN/100ml
Residual Chlorine	1.5 mg/l
Natural Resources Conservation Authority (NRCA) Interim Sewage Effluent Irrigation Standards	
Parameter	Standard Limit
Oil & Grease	10 mg/L

Immediate Technology Based Effluent Standards - Existing Plants	
Parameter	Effluent Standard
Total Suspended Solids (TSS)	15 mg/L
Residual Chlorine	0.5 mg/L
Biochemical Oxygen Demand (BOD)	15 mg/L
Chemical Oxygen Demand (COD)	<100 mg/L
Faecal Coliform	12 MPN/100mL

National Legislation – Socio-Economic Environment

Town and Country Planning Act (1958)

Section 5 of the Town and Country Planning Act authorizes the Town and Country Planning Authority to prepare, after consultation with any local authority, the provisional development orders required for any land in the urban or rural areas, so as to control the development of land in the prescribed area. In this manner, the Authority will be able to coordinate the development of roads and public services and conserve and develop the resources in the area.

Any person may, under Section 6 of the Act, object to any development order on the grounds that it is:

- impractical and unnecessary;
- against the interests of the economic welfare of the locality.

However, if the Minister is satisfied that the implementation of the provisional development order is likely to be in the public interest, he may, under Section 7 (2) of the Act, confirm it with or without modification by publishing a notice in the Gazette. Section 8 of the Act also gives the Minister the authority to amend a confirmed development order.

Section 10 of the Act states that a development order must include:

- clearly defined details of the area to be developed;
- regulations regarding the development of the land in the area specified;
- formal granting of permission for the development of land in the area.

If the provisions of section 9A of the Natural Resources Conservation Authority (NRCA) Act apply to the development, the application can only be approved by the Planning Authority after the NRCA has granted a permit for the development (Section 11 (1A)). The Authority may impose a "tree preservation order" under

Section 25 of the Act if it considers it important to make provision for the preservation of trees and woodlands in the area of the development. This order may:

- prohibit the cutting down, topping, lopping or willful destruction of trees;
- secure the replanting of any section of the woodland area in which trees were felled during the forestry operations permitted under the order.

The tree preservation order is not applicable to the cutting down of trees which were already dead, dying or had become dangerous and the order can take effect only after it has been confirmed by the Minister.

The Minister can, under Section 26 of the Act, make regulations to restrict and regulate the display of advertisements in any area to be developed if he considers this to be in the interest of public safety. Section 28 of the Act empowers the local authority to require the owner or occupier of land in the development area to take the steps necessary to ensure its proper maintenance.

Land Development and Utilization Act (1966)

Under Section 3 of the Land Development and Utilization Act (1966), the Land Development and Utilization Commission is authorized to designate as agricultural land, any land which because of its "situation, character and other relevant circumstances" should be brought into use for agriculture. However, this order is not applicable to land, which has been approved under the Town and Country Planning Act for development purposes other than that of agriculture. Among the duties of the Commission outlined in Section 14 of the Act is its responsibility to ensure that agricultural land is "as far as possible, properly developed and utilized".

Public Health Act (1976)

The Public Health (Air, Soil and Water Pollution) Regulations 1976, aim at controlling, reducing, removing or preventing air, soil and water pollution in all possible forms. Under the regulations given:

- i. No individual or corporation is allowed to emit, deposit, issue or discharge into the environment from any source.
- ii. Whoever is responsible for the accidental presence in the environment of a contaminant must advise the Environmental Control Division of the Ministry of Health and Environmental Control, without delay.
- iii. Any person or organization that conducts activities which release air contaminants such as dust and other particulates is required to institute measures to reduce or eliminate the presence of such contaminants.
- iv. No industrial waste should be discharged into any water body which will result in the deterioration of the quality of the water.

Country Fires Act (1942)

Section 4 of the Country Fires Act of 1942 prohibits the setting of fire to trash without prior notice being given to the nearest police station and the occupiers of all adjoining lands. In addition, a space of at least fifteen feet in width must be cleared around all trash to be burnt and all inflammable material removed from the area. Section 6 of the Act empowers the Minister to prohibit, as may be necessary, the setting of fire to trash without a permit.

Offences against this Act include:

- Setting fire to trash between the hours of 6.00 p.m. and 6.00 a.m. (Section 5a);
- Leaving open-air fires unattended before they have been completely extinguished (Section 5b);
- Setting fires without a permit and contrary to the provisions outlined in Section 6 (Section 8);
- Negligent use or management of a fire which could result in damage to property (Section 13a);
- Smoking a pipe, cigar or cigarette on the grounds of a plantation which could result in damage to property (Section 13b).

The National Solid Waste Management Authority Act (2001)

The National Solid Waste Management Authority Act (2001) is “an act to provide for the regulation and management of solid waste; to establish a body to be called the National Solid Waste Management Authority and for matters connected therewith or incidental thereto”. The Solid Waste Management Authority (SWMA) is to take all steps as necessary for the effective management of solid waste in Jamaica in order to safeguard public health, ensure that waste is collected, sorted, transported, recycled, reused or disposed of, in an environmentally sound manner and to promote safety standards in relation to such waste. The SWMA also has responsibility for the promotion of public awareness of the importance of efficient solid waste management, to advise the Minister on matters of general policy and to perform other functions pertaining to solid waste management.

Jamaica National Heritage Trust Act (1985)

The Jamaica National Heritage Trust Act of 1985 established the Jamaica National Heritage Trust (JNHT). The Trust's functions outlined in Section 4 include the following responsibilities:

- To promote the preservation of national monuments and anything designated as protected national heritage for the benefit of the Island;

- To carry out such development as it considers necessary for the preservation of any national monument or anything designated as protected national heritage;
- To record any precious objects or works of art to be preserved and to identify and record any species of botanical or animal life to be protected.

Section 17 further states that it is an offence for any individual to:

- willfully deface, damage or destroy any national monument or protected national heritage or to deface, damage, destroy, conceal or remove any mark affixed to a national monument or protected national heritage;
- alter any national monument or mark without the written permission of the Trust;
- remove or cause to be removed any national monument or protected national heritage to a place outside of Jamaica.

Land Acquisition Act (1947)

Section 3 of the Land Acquisition Act (1947) empowers any officer authorized by the Minister to enter and survey land in any locality that may be needed for any public purpose. This may also involve:

- Digging or boring into the sub-soil;
- Cutting down and clearing away any standing crop, fence, bush or woodland;
- Carrying out other acts necessary to ascertain that the land is suitable for the required purpose.

The Minister is authorized under Section 5 of the Act to make a public declaration under his signature if land is required for a public purpose provided that the compensation to be awarded for the land is to be paid out of the:

- Consolidated Fund or loan funds of the Government;
- Funds of any Parish Council, the Kingston and St. Andrew Corporation or the National Water Commission.

Once the Commissioner enters into possession of any land under the provisions of this Act, the land is vested in the Commissioner of Lands and is held in trust for the Government of Jamaica in keeping with the details outlined in Section 16. The Commissioner shall provide the Registrar of Titles with a copy of every notice published as well as a plan of the land. The Commissioner will also make an application to the Registrar of Titles in order to bring the title of the land under the operation of the Registration of Titles Act.

Registration of Titles Act (1989)

The Registration of Titles Act of 1989 is the legal basis for land registration in Jamaica, which is carried out using a modified Torrens System (Centre for Property Studies, 1998). Under this system, land registration is not compulsory, although once a property is entered in the registry system the title is continued through any transfer of ownership.

The Housing Act (1968)

The Jamaica Housing Act of 1968 is the legal basis for housing in Jamaica. The Act outlines the primary roles of the Minister of Housing; the procedures for acquisition of land required for schemes, the preparation and approval of schemes; and the preparation, approval, and completion of schemes prepared by housing associations.

The Housing Act established the Minister responsible for Housing as a Corporation Sole, which allows him to have perpetual succession and to acquire, hold and dispose of land and other property of whatever kind.

The Minister is advised under section 9 of the Act; that before approving a scheme, information be furnished to the Local Authority within whose area the scheme is to be operative. The particulars to be furnished shall include specifications and estimates, and particulars relating to roads, water supply, sewerage and lighting, if appropriate to the scheme.

The Minister before approving a scheme should also consider any objections or representations made to him in pursuance of this section and shall afford the Local Authority making such objections or representations an opportunity to be heard.

International Legislative and Regulatory Considerations

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (1983)

Adopted in March 1983 in Cartagena, Colombia, the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, also known as the Cartagena Convention, is the only legally binding environmental treaty for the Wider Caribbean. The Convention came into force in October 1996 as a legal instrument for the implementation of the Caribbean Action Plan and represents a commitment by the participating governments to protect, develop and manage their common waters individually and jointly.

Ratified by twenty countries, the Cartagena Convention is a framework agreement which sets out the political and legal foundations for actions to be developed. The operational Protocols, which direct these

actions, are designed to address special issues and to initiate concrete actions. The Convention is currently supported by three Protocols. These are:

- *The Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region* (The Oil Spills Protocol), which was adopted and entered into force at the same time as the Cartagena Convention;
- *The Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region* (The SPAW Protocol), which was adopted in two stages, the text in January, 1990 and its Annexes in June, 1991. The Protocol entered into force in 2000;
- *The Protocol Concerning Pollution from Land-based Sources and Activities in the Wider Caribbean Region* (LBS Protocol), which was adopted in October, 1999.

Convention on Biological Diversity

The objectives of the Convention on Biological Diversity are "the conservation of biological diversity, sustainable use of its components and the fair equitable sharing of the benefits arising out of the utilization of genetic resources". This is the first global, comprehensive agreement which has as its focus all aspects of biological diversity: genetic resources, species and ecosystems. The Convention acknowledges that the "conservation of biological diversity is a common concern of humankind and an integral part of the development process". In order to achieve its goals, the signatories are required to:

- Develop plans for protecting habitat and species.
- Provide funds and technology to help developing countries provide protection.
- Ensure commercial access to biological resources for development.
- Share revenues fairly among source countries and developers.
- Establish safe regulations and liability for risks associated with biotechnology development.

Jamaica's Green Paper Number 3/01, entitled *Towards a National Strategy and Action Plan on Biological Diversity in Jamaica*, speaks to Jamaica's continuing commitment to its obligations as a signatory to the Convention.

APPENDIX IV – THE EIA STUDY TEAM

Barry Wade PhD, Environmental Scientist – EIA Team Leader

Dr. Wade is an environmental scientist with over 40 years' experience in teaching, research, consulting and management. Educated in Jamaica and the USA, he has held senior technical and management appointments in the environmental, energy and financial sectors. Currently he is Chairman and Consulting Principal of Environmental Solutions Ltd., Jamaica.

Dr. Wade's specialist skills are in ecology, coastal zone management, pollution control, institutional and community development and total quality management. He has produced several major works including his landmark study on the pollution ecology of Kingston Harbour. He has also fulfilled consulting assignments in science and management throughout the Caribbean and the Americas and has lectured at the University of the West Indies, the University of Technology and the Caribbean Graduate School of Theology as well as conducted training of Caribbean Chief Executives and Senior Managers in Sustainable Development, Environmental Management Systems, and Total Quality Management.

As the EIA team leader Dr. Wade was responsible for the overall project management.

Kimberly Bryan MSc – EIA Coordinator

Ms. Bryan is a senior environmental analyst at ESL with experience in coordinating, managing and conducting environmental studies such as environmental impact assessments, strategic environmental assessment, phase one and two environmental assessments, community consultations and stakeholder assessments, among others. She was responsible for the day to day management and coordination of the Coral Springs project including mobilization of field assessments. Ms. Bryan led to collection of baseline water and air quality for the study. She also completed the environmental permit applications as required by NEPA for the various aspects of the development.

George Campbell MSc – Socioeconomist

Mr. Campbell is a director and principal consultant at ESL. He serves as an economist and management consultant in environmental sciences. Mr. Campbell has provided a comprehensive range of social surveys, economic studies and financial services to numerous governmental, quasi- governmental and private sector organizations as well as international agencies in diverse fields such as agriculture, economic development, housing and tourism, manufacture and commerce, manpower training and education, transport and telecommunications. An expert in community research and development issues, Mr. Campbell has worked on many projects that have involved relocation of individuals and communities. He was responsible for the conduct of community surveys and oversight of social impacts.

Marlon Beale PhD Candidate - Avifaunal Specialist

Mr. Beale is an ecologist with the Jamaica Conservation Development Trust (JCDDT). He has extensive fieldwork experience involving censusing of land birds (residents, endemics and migrant species) across Jamaica and has been involved in avifaunal aspects of several EIA projects. He undertook the avifaunal survey for the Coral Springs EIA study. He is currently conducting his PhD research on land birds in Eastern Jamaica.

Simone Lee MSc – Ecologist

Ms. Lee is an ecologist at Environmental Solutions Limited. She was responsible for assessing and mapping the terrestrial ecology of the Coral Springs site and also participated in the collection of water and air baseline data.

Roderick Ebanks MPhil – Cultural Heritage Specialist

Mr. Ebanks has over 40 years' experience in the field of Cultural Heritage Resource Management especially in the areas of archaeology, museology and museography, having spent 13 years managing the Museums Division of the Institute of Jamaica and another 22 managing the Archaeology Division of the Jamaica National Heritage Trust. Over the 40 year period he has been involved in every major archaeological project in Jamaica covering all the major time periods of the island's history including Taino, Spanish, English, African and Jamaican. Mr. Ebanks conducted the cultural and archaeological study for the Coral Springs EIA.

APPENDIX V - HYDROLOGY, GEOTECHNICAL AND ENGINEERING REPORTS

APPENDIX VI – WATER QUALITY METHODOLOGY, RESULTS CERTIFICATES AND CALIBRATION CERTIFICATES

WATER QUALITY METHODOLOGY

Water samples were collected from eight locations within and in the vicinity of the project area. The samples were collected below the surface of the water to an appropriate depth depending on the depth of the water column at the time of sampling. Depending on the parameters being tested for, some of the sample containers were rinsed thrice with the water to be sampled before the actual sample was collected. The samples were collected where the water is well mixed, far enough from points of significant inflows.

Samples were collected directly into pre-cleaned and pre-labeled polyethylene or glass bottles (depending on the analysis). Bacterial samples were collected in sterilized 100 ml glass bottles. After collection the samples were immediately stored on ice and analyzed within 24 hours.

WATER QUALITY ANALYTICAL TECHNIQUES

Environmental Solutions Limited (ESL) Laboratory analyzed or supervised the analysis of all parameters. All the methods used in the ESL lab are approved standard methods.

pH

Sampling

pH measurement can be performed *in situ* and/or a sample collected in a clean Polyethylene bottle or Teflon beaker. The temperature of the sample is lowered to 4°C using an ice filled igloo. The sample upon reaching the laboratory is analyzed immediately (maximum holding time 6 hours).

Method Used

Electro-chemical: A pH meter is used in conjunction with a combination of glass plus reference electrode, which develops a voltage potential in response to the hydrogen-ion activity without interference from most other ions. The instrument is calibrated regularly using buffer solutions of pH 4, 7, and 10; this ensures proper operation of the instrument.

Conductivity

Sampling

Conductivity measurements can be performed *in situ* and/or a sample collected in a clean Polyethylene bottle or Teflon beaker. The temperature of the sample is lowered to 4°C using an ice filled igloo. The sample upon reaching the laboratory is analyzed immediately.

Method Used

HACH Direct Measurement Method: A voltage is applied between the two electrodes placed in the sample and the voltage dropped measured due to the resistance of the sample is used to calculate its conductivity per centimeter.

Phosphates

Sampling

Samples are collected in clean pretreated Polyethylene or glass bottles. Samples are analyzed immediately after collection, to preserve samples for up to 48 hours if the samples are filtered immediately and stored at 4 °C.

Method Used

PhosVer 3(Ascorbic Acid) Method: Orthophosphate reacts with molybdate in an acidic medium to produce a phosphomolybdate complex which in turn is reduced by ascorbic acid to form a blue coloured analyte which is read by a spectrophotometer as mg/L Phosphates.

Nitrates

Sampling

Samples are collected in clean Polyethylene or glass bottles. The samples are analysed as soon as possible or can be stored at 4 °C or lower for 2 days. With treatment by sulfuric acid to a pH of less than 2 the samples can be stored up to 14 days.

Method Used

Cadmium Reduction Method: Cadmium metal reduces nitrates present in the sample to nitrite. The nitrite ions reacts in an acidic medium with sulphanic acid to form an intermediate diazonium salt. This salt couples to gentisic acid to form an intermediate diazonium salt. This salt couples to gentisic acid to form an analyte whose concentration is read as mg/L nitrate by a spectrophotometer.

Chloride

Sampling

Samples for chlorine are collected into clean glass or Polyethylene bottles. The samples are analyzed as soon as possible but can be stored up to 7 days at temperatures at or below 4 °C.

Method Used

HACH Mercuric Nitrate Method: The sample is titrated under acidic conditions using a standardized Mercuric Nitrate solution and Diphenylcarbazone indicator. At the reaction end point the indicator forms a pink-purple complex with excess mercuric ions. The concentration of chloride in the sample in mg/L is calculated from volume of titrant used

Total Coliforms

Sampling

Samples are collect in special coliform glass bottles. These containers are pretreated before collection of samples and kept sterile until sample collection. Samples are analyzed as soon as possible with the 6 hours at 4 °C holding time in perspective.

Method Used

Most Probable Number: Shake the sample to ensure homogeneity and sanitize the container by wiping it with a clean paper towel saturated with 70% alcohol. Inoculated Lauryl Tryptose Broth with required sample volume and incubated at 35°C for 48 hours. Following incubation all tubes showing growth, acid and or gas production is recorded and submitted to the confirmatory test. To confirm Total Coliforms, Brilliant Green Bile Broth is inoculated and incubated with test sample at 35.5 +/- 0.5°C for 48 hours. Gas production of any quantity in the inverted tube constitutes a positive test. The MPN value is then calculated using the MPN Tables.

Faecal Coliforms

Sampling

Samples are collected in special coliform bottles or bags. These containers are pre-treated before collection of samples and kept sterile until sample collection. Samples are analysed as soon as possible with the 6 hours at 4 °C holding time in perspective.

Method Used

Most Probable Number (SM 9221): The sample is shaken to ensure homogeneity and the container sanitized by wiping it with a clean paper towel saturated with 70% alcohol. Inoculated Lauryl Tryptose Broth with required sample volume and incubated at 35°C for 48 hours. Following incubation all tubes showing growth, acid and or gas production is recorded and submitted to the confirmatory test. To confirm Faecal Coliforms, EC Broth is inoculated and incubated at 44.5 +/- 0.2°C for 24 hours. Gas production of any quantity in the inverted tube constitutes a positive test. The MPN value is then calculated using MPN Tables.

Biological Oxygen Demand (BOD₅)

Sampling

Sampling for BOD samples is done using special BOD (amber glass/polyethylene) sample bottles. Samples are analyzed as soon as possible but can be stored for 24 hours at 4 °C or colder. Special sampling procedures must be adhered to.

Method Used

HACH BODTrack Method: This BOD method measures the amount of oxygen used by bacteria as they oxidized organic matter in the sample. The sample is placed in BODTrack bottles with an ample amount of air left above the sample. As the bacteria use the dissolved oxygen in the sample it releases carbon dioxide which is absorbed by a hydroxide causing a drop in the pressure above the sample which is read as milligram per litre BOD.

Total Suspended Solids

Sampling

Samples for total suspended solids are collected in clean high density Polyethylene bottle or glass bottles. Samples are analyzed as soon as possible but can be stored for seven days by cooling to 4 °C.

Method Used

Gravimetric Method (SM 2540-D): The determination of TSS is done by filtering a measured volume of sample under vacuum using 0.45 µm membrane or glass fibre filters which has been preconditioned. The residue on the filter is dried to constant weight in an oven set at between 103 -105 °C. The difference in weight between the final filter weight and the preconditioned weight divided by the volume of sample filtered gives the concentration of suspended sediments in the sample.

Fats, Oils and Grease

Sampling

Samples are collected in wide-mouth glass bottles. If analysis is delayed for more than four hours the sample pH is adjusted to less than 2 using sulphuric or hydrochloric acid and store at 4 °C.

Method Used

Partition Gravimetric Method: Sample is acidified and the oils are extracted using one of the approved extraction methods (sohxlet, N-Hexane etc.). The extraction is concentrated and then gravimetrically treated. The amount of FOG present is then determined from the sample volume used.

Metals

Sampling

Samples are collected in a cleaned polyethylene or glass bottle. The samples are acidified with nitric acid until their pH is 2 or less. Samples can be stored up to six months using this method.

Method Used

Atomic Absorption Spectroscopy: The sample is first digested using a mixture of acids over a hotplate. After digestion the sample's pH is increased to between 4-6 and the sample diluted. The metal concentration is then determined using Atomic Absorption Spectroscopy

Dissolved Oxygen

Sampling

Dissolved oxygen is best measured in situ using a DO meter as dissolved oxygen. If water samples are collected at all the dissolved oxygen should be fixed immediately on collection. Three samples should be taken. The recorded DO value will be the average of least two readings that are within 0.5 of each other. Holding time for DO samples ranges from 4 to 8 hours after preservation method have being executed.

Method Used

Luminescence (ASTM D888-09 Method): A dissolved oxygen meter consisting of a probe is used to measure dissolved oxygen in a sample. The probe is a sensor consisting of an oxygen-permeable, luminophore-embedded sensing layer. A modulated light beam emitted from an LED is sent through the luminophore-embedded sensing layer of the probe exciting the luminophore molecules. The excited molecules relaxes by emitted the excess energy as light. The time taken between excitation and emitting light by the luminophore molecules is called the luminescence lifetime. This lifetime is quantitative known and is affected by several factors, one being the oxygen. The degree by which the oxygen in the sample affects the luminescence lifetime of the luminophore molecules can quantitatively determine and correlated to the concentration of dissolved oxygen in the sample.

Salinity

Sampling

Salinity measurement can be performed *in situ* and/or a sample collected in a clean Polyethylene bottle or Teflon beaker. The temperature of the sample is lowered to 4°C using an ice filled igloo. The sample upon reaching the laboratory is analysed immediately.

Method Used

Electrical Conductivity Method: The conductivity and temperature of the sample is measured using an electrode of a commercial salinity meter. Conductivity is a temperature sensitive parameter which is measured using a conductivity meter. The conductivity meter measures the resistance occurring in an area of the test solution defined by the probes physical design. Voltage is applied between the two electrodes immersed in the solution, and the voltage drop caused by the resistance of the solution is used to calculate conductivity per centimeter.

All salinity measurements are carried out in reference to the conductivity of standard seawater at 15°C.

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Attention: Kimberly Bryan
Environmental Solutions Ltd.

**RESULTS CERTIFICATE
NO.: CSP/01/12**

Specific Handling:	None	Report Date:	March 2, 2012
Analysis Started:	February 3, 2012	Analysis completed:	March 2, 2012
Number of samples:	4	Sample Type:	Ground and Surface
Sample Condition on Arrival: on Ice			

Sample Collection Date: February 2, 2012

PARAMETERS	TEST METHOD	SAMPLE				NRCA AMBIENT WATER STANDARD
		DBH	DTS	S South	S North	
pH	DR	7.83	7.95	7.91	7.80	7.00 – 8.40
Conductivity (mS/cm)	DR	0.28	0.28	0.46	0.23	0.150-0.600
Biochemical Oxygen Demand (mg/L)	H-8043	1.6	23.2 †	2.1	2.9	0.8 – 1.7
Total Suspended Solids (mg/L)	SM-2540D	15.2	5.4	<2.5	3.6	-
Nitrate (mg/L)	H-8039	0.9	0.4	0.9	0.4	0.10 – 7.5
Phosphate (mg/L)	H-8048	0.02	0.05	0.10	0.11	0.01 – 0.8
Sulphate (mg/L)	H-8051	4	4	4	4	3.0 – 10.0
Faecal Coliform (MPN/100ml)	SM-9221	1100	460	240	240	-
Total Coliform (MPN/100ml)	SM-9221	≥2400	≥2400	460	≥2400	-
Lead (µg/L)	F-AAS	<20	<20	<20	<20	-
Iron (µg/L)	F-AAS	212	91	41	85	-
Copper (µg/L)	F-AAS	<10	<10	<10	<10	-
Zinc (µg/L)	F-AAS	<10	<10	<10	<10	-
Dissolved Oxygen (mg/L)	DR	7.91	7.91	7.17	7.71	-
Oil and Grease (mg/L)	PT/GRV	<1	1	<1	<1	-

KEY:
 H - HACH Water Analysis Handbook 5th Edition
 DR - Direct Reading
 SM - Standard Method for the Examination of Water and Wastewater 21st Edition
 F-AAS - Flame Atomic Absorption Spectroscopy
 PT/GRV - Partition /Gravimetry

Quality Control – Analytical and Field Duplicates, Standard Reference Materials.

Prepared by: *G. McIntosh*
Abigail McIntosh, Project Officer

Approved by: *Rashidah Khan-Haqq*
Rashidah Khan- Haqq, Technical Manager

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**RESULTS CERTIFICATE
NO.: CSP/02/12**

Specific Handling: None	Report Date: June 13, 2012
Analysis Started: May 17, 2012	Analysis completed: June 13, 2012
Number of samples: 4	Sample Type: Ground and Surface
Sample Condition on Arrival: on Ice	

Sample Collection Date: May 16, 2012

PARAMETERS	TEST METHOD	SAMPLE				NRCA AMBIENT WATER STANDARD
		DBH	DTS	S South	S North	
pH	DR	7.83	7.72	7.80	7.77	7.00 – 8.40
Conductivity (mS/cm)	DR	0.537	0.434	0.462	0.456	0.150-0.600
Biochemical Oxygen Demand (mg/L)	H-8043	2.9	6.3	2.7	2.5	0.8 – 1.7
Total Suspended Solids (mg/L)	SM-2540D	19.7	14.4	<2.5	<2.5	-
Nitrate as Nitrogen (mg/L)	H-8039	-	<0.3	-	-	-
Nitrate (mg/L)		3.1	-	2.2	1.8	0.10 – 7.5
Phosphate (mg/L)	H-8048	0.07	0.04	0.03	0.07	0.01 – 0.8
Sulphate (mg/L)	H-8051	4	6	7	6	3.0 – 10.0
Faecal Coliform (MPN/100ml)	SM-9221	280	1600	540	430	-
Total Coliform (MPN/100ml)	SM-9221	>1600	>1600	>1600	>1600	-
Lead (µg/L)	F-AAS	<20	87	<20	<20	-
Iron (µg/L)	F-AAS	37	407	82	64	-
Copper (µg/L)	F-AAS	<10	<10	<10	<10	-
Zinc (µg/L)	F-AAS	<10	15	<10	<10	-
Oil and Grease (mg/L)	PT/GRV	2	1	<1	1	-

KEY:
 H - HACH Water Analysis Handbook 5th Edition
 DR - Direct Reading
 SM - Standard Method for the Examination of Water and Wastewater 21st Edition
 F-AAS - Flame Atomic Absorption Spectroscopy
 PT/GRV - Partition /Gravimetry

Quality Control – Analytical and Field Duplicates, Standard Reference Materials.

Prepared by... *AmcIntosh*
Abigail McIntosh, Project Officer

for Approved by... *Rashidah Khan-Haqq*
Rashidah Khan-Haqq, Technical Manager

Baseline Noise Data

Sample ID	Location	Monitoring Results dBA	NEPA Daytime Guideline dBA
		07.02.12	
Site #1	~ 100 m up on Spring Hill (eastern hill slope) in the eastern end near the north eastern boundary; area cleared by surveying team.	67.2	75
Site #2	Top of south eastern slope ~ 10 m from southeastern border; tall open dry limestone forests	68.4	
Site #3	At the rear of second residential property in western section of original subdivision. The site conditions were unchanged on the second visit.	63.7	
Site #4	In the western central section of the property ~ 100 m east of the western boundary. The site conditions were unchanged on the second visit.	63.4	



3M Occupational Health and Environmental Safety Division

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Certificate of Calibration

Certificate No: 1084042QII050083

Submitted By: IEES SUB. PROV. DE RIESGOS DE

Serial Number: QII050083 Date Received: 6/28/2011
Customer ID: Date Issued: 7/5/2011
Model: QC-10 CALIBRATOR Valid Until: 7/5/2012

Test Conditions: Model Conditions:
Temperature: 18°C to 29°C As Found: IN TOLERANCE
Humidity: 20% to 80% As Left: IN TOLERANCE
Barometric Pressure: 890 mbar to 1050 mbar

SubAssemblies: Description: Serial Number:

Calibrated per Procedure: 56V981

Reference Standard(s):		Last Calibration Date	Calibration Due
I.D. Number	Device		
ET0000556	B&K ENSEMBLE	7/21/2010	7/21/2011
T00230	FLUKE 45 MULTIMETER	2/3/2010	2/3/2012

Measurement Uncertainty:
+/- 1.1% ACOUSTIC (0.1DB) +/- 1.4% VAC +/- 0.012% HZ
Estimated at 95% Confidence Level (k=2)

Calibrated By: S. Vanhemert 7/5/2011
SHAWN VANHEMERT Service Technician

This report certifies that all calibration equipment used in the test is traceable to NIST, and applies only to the unit identified under equipment above. This report must not be reproduced except in its entirety without the written approval of Quest Technologies.

APPENDIX VII – SPECIES LISTS

Plants

The following list presents the plant species assemblage at Coral Springs. A DAFOR rating is also included for each species.

D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare

Family	Common Name	Scientific Name	Growth Habit	Provenance	Habitat	Abundance
Compositae	Pigeon Coop	<i>Spilanthes urens</i>	Herb	Native	Cultivated Domestic	D
Turneraceae	Ram Goat Dashalong	<i>Turnera ulmifolia</i>	Herb	Native	Cultivated Domestic	F
Rubiceae	Ixora	<i>Ixora coccinea</i>	Herb	Introduced	Cultivated Domestic	R
Verbenaceae		<i>Lippia nodiflora</i>	Herb	Native	Cultivated Domestic	R
Mimosaceae	Guango	<i>Samanea saman</i>	Large tree	Native	Cultivated Domestic	A
Nyctaginaceae	Bougainvillea	<i>Bougainvillea glabra</i>	Shrub	Introduced	Cultivated Domestic	R
Caesalpiniaceae	Logwood	<i>Haemotoxylum campechianum</i>	Small tree	Introduced	Cultivated Domestic	A
Leguminosae	Indian Coral Tree	<i>Erythrina variegata</i>	Tree	Introduced	Cultivated Domestic	O
Leguminosae	Braziletto	<i>Caesalpinia violaceae</i>	Tree	native	Cultivated Domestic	R
Malpighiaceae	West Indian Cherry	<i>Malpighia puniceifolia</i>	Tree	Introduced	Cultivated Domestic	R
Rutaceae	Orange tree	<i>Citrus sinensis</i>	Tree	Introduced	Cultivated Domestic	R
Sapindaceae	Ackee	<i>Blighia sapida</i>	Tree	Introduced	Cultivated Domestic	R
Menispermaceae	Velvet Leaf	<i>Cissampelos pareira</i>	Vine	Native	Cultivated Domestic	O
Cucurbitaceae	Cerasee	<i>Momordica charantia</i>	Vine		Cultivated Domestic	R
Rutaceae	Lime tree	<i>Citrus aurantifolia</i>	Small tree	Introduced	Cultivated Domestic	R
Cucurbitaceae	Pumpkin	<i>Cucurbita sp</i>	Vine		Cultivated Domestic	

Family	Common Name	Scientific Name	Growth Habit	Provenance	Habitat	Abundance
Apocynaceae	Oleander	<i>Nerium oleander</i>	Herb	Introduced	Cultivated Domestic	R
Acanthaceae	Asystasia	<i>Asystasia gangetica</i>	Scrambler	Introduced	Dry Limestone Forest	O
Acanthaceae	White Nightshade	<i>Thunbergia fragrans</i>	Vine	Introduced	Dry Limestone Forest	O
Amaranthaceae	Calaloo	<i>Amaranthus viridis</i>	Herb	Introduced	Dry Limestone Forest	R
Cactaceae	God Okra	<i>Hylocereus triangularis</i>	climber	Endemic	Dry Limestone Forest	F
Poaceae (Gramineae)	Guinea Grass	<i>Panicum maximum</i>	Grass	Introduced	Dry Limestone Forest	O
Commelinaceae	Moses in the Cradle	<i>Rhoeo spathacea</i>	Herb	Introduced	Dry Limestone Forest	A
Malvaceae		<i>Abutilon trisulcatum</i>	Herb		Dry Limestone Forest	D
Caesalpiniaceae	Dandelion	<i>Cassia occidentalis</i>	Herb	Native	Dry Limestone Forest	F
Malvaceae	Broomweed	<i>Sida acuta</i>	Herb	Native	Dry Limestone Forest	F
Papilionaceae	Blue Rattleweed	<i>Crotalaria verrucosa</i>	Herb	Native	Dry Limestone Forest	F
Compositae	Bitterbush	<i>Eupatorium villosum</i>	Shrub	Native	Dry Limestone Forest	R
Verbenaceae	Vervine	<i>Stachytarpheta jamaicensis</i>	Herb	Native	Dry Limestone Forest	F
Euphorbiaceae	Castor Oil	<i>Ricinus communis</i>	Shrub	Introduced	Dry Limestone Forest	R
Bignoniaceae	African Tulip	<i>Spathodea campanulata</i>	Large tree	Introduced	Dry Limestone Forest	R
Mimosaceae	Wild Tamarind	<i>Pithecellobium arboreum</i>	Large tree	Native	Dry Limestone Forest	O
Acanthaceae	Duppy Gun	<i>Ruellia tuberosa</i>	Herb	Native	Dry Limestone Forest	O
Mimosaceae	Shame-me-lady	<i>Mimosa pudica</i>	Herb	Native	Dry Limestone Forest	O
Amaranthaceae	Devil's horse whip	<i>Achyranthes indica</i>	Herb	Native	Dry Limestone Forest	O
Boraginaceae	Scorpionweed	<i>Heliotropium indicum</i>	Herb	Native	Dry Limestone Forest	O
Capparaceae	Wild Caia	<i>Cleome viscosa</i>	Herb	Introduced	Dry Limestone Forest	O
Compositae	Spanish Needle	<i>Bidens pilosa</i>	Herb	Native	Dry Limestone Forest	O
Euphorbiaceae	Belly-ache bush	<i>Jatropha gossypifolia</i>	Herb	Native	Dry Limestone Forest	O
Malvaceae	Ballard Bush	<i>Urena lobata</i>	Herb	Native	Dry Limestone Forest	O
Malvaceae		<i>Sida paniculata</i>	Herb		Dry Limestone Forest	O
Moringaceae	Leaf of Life	<i>Bryophyllum pinnatum</i>	Herb	Native	Dry Limestone Forest	O
Phytolaccaceae	Guinea Hen Weed	<i>Petiveria alliacea</i>	Herb		Dry Limestone Forest	O
Poaceae	Bermuda/ bahama	<i>Cynodon dactylon</i>	Herb		Dry Limestone Forest	O

Family	Common Name	Scientific Name	Growth Habit	Provenance	Habitat	Abundance
(Gramineae)	grass					
Poaceae (Gramineae)	Yard grass	<i>Eleusine indica</i>	Herb		Dry Limestone Forest	O
Rubiceae	Strongback	<i>Morina royoc</i>	Herb	Native	Dry Limestone Forest	O
Scrophilariaceae		<i>Stemodia maritima</i>	Herb	Native	Dry Limestone Forest	O
Verbenaceae		<i>Lantana reticulata</i>	Herb	Native	Dry Limestone Forest	O
Acanthaceae		<i>Blechum pyramidatum</i>	Herb	Introduced	Dry Limestone Forest	R
Apocynaceae	Oleander	<i>Nerium oleander</i>	Herb	Introduced	Dry Limestone Forest	R
Compositae	Cupids Shaving Brush	<i>Emilia javanica</i>	Herb	Native	Dry Limestone Forest	R
Mimosaceae	Shame-me-lady	<i>Mimosa pudica</i>	Herb	Native	Dry Limestone Forest	R
Orchidaceae		<i>Broughtonia sanguinea</i>	Herb	Endemic	Dry Limestone Forest	R
Papaveraceae	Mexican Poppy	<i>Argemone mexicana</i>	Herb	Native	Dry Limestone Forest	R
Plumbaginaceae		<i>Plumbago scandens</i>	Herb		Dry Limestone Forest	R
Poaceae (Gramineae)		<i>Chloris barbata</i>	Herb		Dry Limestone Forest	R
Anacardiaceae	Mango	<i>Mangifera indica</i>	Large tree	Introduced	Dry Limestone Forest	F
Papilionaceae	Dogwood	<i>Piscidia piscipula</i>	Large tree	Native	Dry Limestone Forest	F
Sapindaceae	Guinep	<i>Melicoccus bijugatus</i>	Large tree	Introduced	Dry Limestone Forest	O
Bromeliaceae	Ping Wing	<i>Bromelia pinguin</i>	Shrub	Native	Dry Limestone Forest	F
Apocynaceae	Nightshade	<i>Urechites lutea</i>	Shrub	Native	Dry Limestone Forest	O
Bignoniaceae	Torchwood	<i>Tecoma stans</i>	Shrub	Native	Dry Limestone Forest	O
Nyctaginaceae	Wait-a-bit	<i>Pisonia aculeata</i>	Shrub	Native	Dry Limestone Forest	O
Verbenaceae	Lantana	<i>Lantana camara</i>	Shrub	Native	Dry Limestone Forest	O
Agavaceae	Maypole	<i>Agave sobolifera</i>	Shrub	Native	Dry Limestone Forest	R
Mimosaceae	Wild Popanax	<i>Acacia tortuosa</i>	Small tree	Native	Dry Limestone Forest	F
Mimosaceae	Lead Tree	<i>Leucaena leucocephala</i>	Small tree	Native	Dry Limestone Forest	F
Papilionaceae	Quick Stick	<i>Gliricidia sepium</i>	Small tree	Introduced	Dry Limestone Forest	O
Bignoniaceae	Calabash	<i>Crescentia cujete</i>	Small tree	Native	Dry Limestone Forest	R
Sterculiaceae	Bastard Cedar	<i>Guazuma ulmifolia</i>	Small tree	Native	Dry Limestone Forest	R

Family	Common Name	Scientific Name	Growth Habit	Provenance	Habitat	Abundance
Anacardiaceae	Burnwood	<i>Metopium brownii</i>	Tree	Native	Dry Limestone Forest	A
Bignoniaceae	Torchwood	<i>Tecoma stans</i>	Shrub	Native	Dry Limestone Forest	O
Caesalpiniaeeae	Bull HooF	<i>Bauhinia divaricata</i>	Tree	Native	Dry Limestone Forest	A
Burseraceae	Red Birch	<i>Bursera simaruba</i>	Tree	Native	Dry Limestone Forest	D
Boraginaceae	Scorpionweed	<i>Heliotropium indicum</i>	Herb	Native	Dry Limestone Forest	O
Palmae (Arecaceae)	Broom Thatch	<i>Thrinax parviflora</i>	Tree	Endemic	Dry Limestone Forest	F
Anacardiaceae	Maiden Plum	<i>Comocladia pinnatifolia</i> Tree	Tree	Native	Dry Limestone Forest	O
Mimosaceae	Cashaw	<i>Prosopid juliflora</i>	Tree	Native	Dry Limestone Forest	O
Verbenaceae	Vervine	<i>Stachytarpheta jamaicansis</i>	Herb	Native	Dry Limestone Forest	O
Piperaceae	Black Jointer	<i>Piper amalago</i>	Tree	Native	Dry Limestone Forest	O
Verbenaceae	Clammy bur	<i>Priva lappulacea</i>	Herb		Dry Limestone Forest	O
Bombacaceae	Silk Cotton	<i>Ceiba pentandra</i>	Tree	Native	Dry Limestone Forest	R
Boraginaceae	Clammy Cherry	<i>Cordia collococca</i>	Tree	Native	Dry Limestone Forest	R
Caricaceae	Papaya, Papaw	<i>Carica papaya</i>	Tree	Introduced	Dry Limestone Forest	R
Convolvulaceae	Wild Potato, Wild Slip	<i>Ipomoea tiliacea</i>	Vine	Native	Dry Limestone Forest	F
Polygonaceae	Coralita	<i>Antogonon leptopus</i>	Vine	Introduced	Dry Limestone Forest	F
Compositae	Quacko Bush	<i>Mikania micrantha</i>	Vine	Native	Dry Limestone Forest	O
Araceae		<i>Philodendron spp</i>	Vine	Native	Dry Limestone Forest	R
Papilionaceae	John Crow Bead	<i>Arbus precatorius</i>	Vine	Native	Dry Limestone Forest	R
Bromeliaceae		<i>Hohenbergia sp</i>	Shrub	Endemic	Riverine	R
Moraceae	Breadfruit		Large tree	Introduced	Riverine	R
Annonaceae	Sweet Sop	<i>Annona squamosa</i>	Tree	Introduced	Riverine	O
Sapotaceae	Wild Star Apple	<i>Chrysophyllum oliviforme</i>	Tree	Native	Riverine	O
Poaceae	Bamboo	<i>Bambuseae sp.</i>	Grass	Introduced	Riverine	D
Rosaceae	Almond tree	<i>Prunus dulcis</i>	Tree	Introduced	Riverine	F

Birds

No.	Species	Common Name	Provenance
1	<i>Amazona collaria</i>	Yellow Billed Parrot	Endemic
2	<i>Araucana nana nana</i>	Olive Throated Parakeet	Endemic Sub-Species
3	<i>Cathartes aura</i>	Turkey Vulture	Resident
4	<i>Coccyzus minor</i>	Mangrove Cuckoo	Resident
5	<i>Coereba flaveola</i>	Bananaquit	Resident
6	<i>Columbina passerina</i>	Common Ground Dove	Resident
7	<i>Corvus jamaicensis</i>	Jamaican Crow	Endemic
8	<i>Dendroica caerulescens</i>	Black Throated Blue Warbler	Migratory
9	<i>Dendroica discolor</i>	Prairie Warbler	Migratory
10	<i>Dendroica petechia</i>	Yellow Warbler	Resident
11	<i>Euneornis campestris</i>	Orangequit	Endemic
12	<i>Euphonia jamaica</i>	Jamaican Euphonia	Endemic
13	<i>Helmitheros vermivorum</i>	Worm Eating Warbler	Migratory
14	<i>Icterus leucopteryx</i>	Jamaican Oriole	Endemic Sub-Species
15	<i>Leptotila jamaicensis</i>	Caribbean Dove	Resident
16	<i>Loxigilla violacea</i>	Greater Antillean Bullfinch	Resident
17	<i>Loxipasser anoxanthus</i>	Yellow-Shouldered Grassquit	Endemic
18	<i>Melanerpes radiolatus</i>	Jamaican Woodpecker	Endemic
19	<i>Mellisuga minima</i>	Vervain Hummingbird	Resident
20	<i>Mimus polyglottos</i>	Northern Mockingbird	Resident
21	<i>Mniotilta varia</i>	Black and White Warbler	Migratory
22	<i>Myiarchus barbirostris</i>	Sad Flycatcher	Endemic
23	<i>Myiarchus stolidus</i>	Stolid Flycatcher	Resident
24	<i>Pandion haliaetus</i>	Osprey	Migratory
25	<i>Parula americana</i>	Northern Parula	Migratory
26	<i>Patagioenas leucocephala</i>	White Crowned Pigeon	Resident
27	<i>Petrochelidon fulva</i>	Cave Swallow	Resident
28	<i>Saurothera vetula</i>	Jamaican Lizard Cuckoo	Endemic
29	<i>Setophaga ruticilla</i>	American Redstart	Migratory
30	<i>Spindalis nigricephala</i>	Jamaican Striped-headed Tanager	Endemic
31	<i>Tiaris olivaceus</i>	Yellow Faced Grassquit	Resident
32	<i>Todus todus</i>	Jamaican Tody	Endemic
33	<i>Trochilus polytmus</i>	Red-billed Streamertail	Endemic
34	<i>Turdus aurantius</i>	White Chinned Thrush	Endemic
35	<i>Tyrannus caudifasciatus jamaicensis</i>	Loggerhead Kingbird	Endemic Sub-Species
36	<i>Vireo modestus</i>	Jamaican Vireo	Endemic
37	<i>Zenaida asiatica</i>	White-winged Dove	Resident

Butterflies

No.	Common Name	Scientific Name	Provenance
1	Julia	<i>Dryas julia iulia delila</i>	Native
2	Tropical Silverspot	<i>Dione vanillae insularis</i>	Native
3	Giant Antillean White	<i>Ascia josephina paramaryllis</i>	
4	Jamaican Zebra	<i>Heliconius charitonius simulator</i>	Native
5	Jamaican White Peacock	<i>Anartia jatrophae jamaicensis</i>	
6	Dorcas	<i>Mestra dorcas</i>	Endemic
7	Cloudless Sulphur	<i>Phoebis senae senae</i>	Native
8	Jamaican Albatros	<i>Appias drusilla jacksoni</i>	Native
9	Cuban Swallowtail	<i>Papilio andraemon</i>	Native
10	Buckeye	<i>Junonia (Precis) genoveva (Cramer)</i>	Native
11	Barred Yellow	<i>Eurema दौरa palmira</i>	Native
12	Butler's Jamaican Skipper	<i>Astrartes jaira (Butler)</i>	Endemic
13	Tropical Fritillary	<i>Euptoieta hegesia hegesia</i>	Native
14	Esmerleda Long Tail Butterfly	<i>Urbanus Esmereldus</i>	

APPENDIX VIII – DATA TABLES AND QUESTIONNAIRES

Data Tables:

Table 1: Adequacy of water supply in communities within the project location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adequate	177	88.5	92.7	92.7
	Inadequate	3	1.5	1.6	94.2
	Sometimes adequate	11	5.5	5.8	100.0
Total		191	95.5	100.0	
Missing	System	9	4.5		
Total		200	100.0		

Table 2: Main land use in communities surrounding the project site

Main Land Use	Number of Persons	Percentage of Total
Farming	60	31.7
Commercial building	91	48.1
Recreation	26	13.8
Housing	120	63.5
Mining	4	2.1
Not utilized	3	1.6
Hotel	24	12.7
Total	189	100.0

Table 3: Community approval of the Project

Project Approval		Frequency of Responses	Percent
Valid	Highly approved	91	53
	Approved	73	43
	Not highly approved	3	2
	Unapproved	4	2
Total		171	100.0

Table 4: Perception of community views in respect of the Project

Opinion	Frequency	Percent
Very necessary	113	65.0
Necessary	50	29.0
Not very necessary	6	4.0
Unnecessary	4	2.0
Total	173	100.0

Table 5: Expected benefits from the Project

Benefits of Project	Number of Responses	Percentage of Total
Employment opportunities	137	72
Better Housing opportunities	26	14
Better services like Education	10	5
Community recognition	8	4
Improved general relationships	6	3
No benefits	2	2
Total	189	100.0

Table 6: Environmental Fears Associated with the Project

Environmental Negatives	Number of Responses	Percentage of Total
Effect of Pollution of all types	46	40
Deforestation	28	25
Sewage disposal	12	10
None	28	25
Total	114	100.0

Table 7: Main Reported Sources of Employment in the five Communities of Interest

Ranked	Community Perceptions (2012) on Employment
First	Construction
Second	Tourism
Third	Tourism
Total Interviewed	173

Questionnaires

Coral Springs EIA
& Near Communities
WINDSCREEN OBSERVATIONS

Date of Observation: ____ / ____ / ____ 012

Community: _____ Estim ED # ____ Near Boundary N E S W

Type of Community: 1) Unplanned Residential [] 2) Planned Residential []

3) Housing Scheme [] 4) Hotels 5) Squatter []

Socio-economic classification: 1) Upper [] 2. Middle [] 3. Lower []

Land-use & livelihoods: 1) Agricultural [] 2) Commercial [] 3) Industrial []

4) Residential [] 5 Tourism []

Civic Amenities 1) Clinic [] 2) Basic School [] 3) Other Schools []

4) Police [] 5) Church [] 6) Market []

Developments Underway: _____

Evidence of Growth in Housing Stock Yes [] No []

Evidence of Tourism Elements Yes [] No []

Water source & storage: _____

Waste management: _____

Other features/observations:

Contact Names of Community Leaders:

Likely Relationship to Project:

NO _____

**COMMUNITY QUESTIONNAIRE
CORAL SPRINGS**

Community Name: _____ Interviewed Persons Name: _____
Contact # _____

Community Demographics

1. Main Occupations 1. _____ 2. _____ 3. _____
2. Main Land Use 1. _____ 2. _____ 3. _____

Water Consumption

3. Water Sources Main Source: _____ Other: _____
4. Is service adequate? 1. Yes 2. No 3. Sometimes

Explain if no/sometimes _____

The Project (please outline)

5. Do you think that this Project would meet the approval of your community?

1. Highly approved 2. Approved 3. Not highly approved 4. Unapproved

If 3 or 4 probe for reasons _____

6. Do you perceive that the community views this Project as being:

1. Very Necessary 2. Necessary 3. Not Very Necessary 4. Unnecessary

7. If 3 or 4 please probe for reasons _____

8. Please identify any specific fears or reservations you feel fellow community members may have about the Project

9. Please identify the main **benefits** you see arising for your community from the project.

10. What would be the main environmental concerns that the community would have regarding the project _____

11. What alternative land use do you think the community would prefer for the intended project site, if

any? None or _____

12. What do you think your community can offer to the project?

13. Do you see flooding a serious problem for the project Yes No Don't Know ___

Explain your answer _____

14. How bad is flooding in your community? Very bad ____ Not Very ____ Not bad ____

15 Describe what floods out in your community _____

16 What is the main source of this flooding in your community.

17. What is the main generator of employment in your community

18. How would you describe unemployment in this community VERY HIGH ____ HIGH
____ NOT VERY HIGH ____ LOW ____.

19. Is this community GROWING IN SIZE ____ DECLINING IN SIZE ____
What are some of the main reasons for this ?

20. Are there any known heritage sites near your community? Yes ___ No ____

Describe _____

21. Who would you recommend as a person being very knowledgeable about this community ?

_____ Contact _____

Thank You

APPENDIX IX – COMPLIANCE PLANS
