

*Addendum to the EIA for a 24 MW Wind
Farm at Great Valley, Manchester by
CAEL*

February 2013



Environmental & Engineering Managers Ltd.

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1 Introduction

Clean Alternative Energy Limited (CAEL) has submitted an application for an environmental permit to the National Environment and Planning Agency (NEPA) to construct eight (8) 3MW wind turbines for the development of a wind farm in Great Valley Manchester. The wind farm is part of CAEL's intent to develop a green energy facility in central Jamaica that produces electricity from wind to be supplied to the local grid for distribution.

CAEL submitted an environmental impact assessment (EIA) in support of the application. The NEPA has since reviewed the EIA, along with other agencies and has compiled a list of issues that need to be addressed to facilitate the continued processing of the application submitted by CAEL.

This addendum has been prepared in response to the issues raised by the reviewing agencies, including the NEPA.

2 Addendum: General Concerns

Land Use and Turbine Siting

Comment #1

From the "Manchester Local Sustainable Development Plan 2030 and beyond," the area is proposed to be a regional cemetery, conservation and farming use. See Figure 6. These uses and the Wind Turbines can coexist, but further consultation/dialogue is needed between the Council and CAEL as to the way forward.

Response: CAEL has engaged in dialogue/consultation with the Manchester Parish Council (see letter sent from CAEL to the Manchester Parish Council dated February 19, 2013 at Appendix 1). At the same time it should be noted that the land proposed for the wind farm was leased from the National Land Agency (NLA) and no information was communicated about the proposed future use of the land as a cemetery by the Agency. Additionally, a "no objection letter" was received from the Jamaica Bauxite Institute (JBI) for use of the land, which is also the subject of a Special Mining Lease (Refer to Appendix 1) with no reference to the possible use of said lands as a cemetery.

Comment #2

The turbines should be no less than 200 metres from the centre line of the parochial road. Turbine 5 and 6 as shown on Figure 4 would have to be repositioned to meet recommended distance.

Response: Turbines will be positioned to ensure compliance with all local planning standards and requirements and to ensure limited or no impact on sensitive environmental receptors. The initially considered locations for Turbines 5, 6 and 7 will be relocated based on the recommendations of the environmental impact assessment and this will also satisfy the recommendation made by the Manchester Parish Council.

Comment #3

The property should be adequately secured to avoid students from the neighbouring school property from venturing on to the site.

Response: CAEL will erect perimeter fencing around the entire property to prevent unwanted access to the property and ensure the protection of users of and visitors to the site. Signage will also be erected on the property and along its boundaries notifying the public of the rules governing access to and use of the property.

Comment #4

Roadways that are being proposed on site for heavy vehicles should be built with adequate drainage features (storm water pits) so as to intersect and reduce storm water runoff that may affect developments below the hill of Great Valley being Alligator Pond. Also this will help reduce the effect of hillside erosion

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #5

Total clearance of trees on property is prohibited.

Response: Approximately 8.8 hectares of vegetation will be removed from the site during the construction phase of the project (see pages 110-111 of EIA report). Only 3.5 hectares will be permanently removed to accommodate the turbines and access roads. However replanting exercises will be undertaken, with approximately 5.3 hectares being replanted following construction activities. During the operation phase of the project additional vegetation will be planted as part of mitigation measures to protect avifauna and bat species. Additionally, most of the vegetation to be cleared permanently is scrub.

Geology and Soils

Comment #6

The Division..., wishes to recommend that a pre-blasting study should be done of residential buildings and water tanks that are in close proximity to the site.

Response: CAEL will ensure that the company hired to conduct blasting exercises has the requisite skills and expertise to undertake blasting exercises and pre-blasting studies. We expect that the activities related to blasting will be a condition of the permit.

Comment #7

We would like to find out from the Clean Alternative representative if any geological study was done by them and if so request the findings and data and request permission for the deliverables to be released to Alpart.

Response: Representatives of CAEL and JBI met on February 12, 2013, where all matters raised by JBI were discussed and satisfactorily addressed. We have been advised by the JBI that NEPA has been apprised of the satisfactory responses by CAEL.

Mining Rights and Access to Property

Comment #8

Clean Alternative Energy Limited...site does fall within a Special Mining Lease (SML) held by Alpart. Alpart requests the usual stipulation that we retain mining rights to the property once it is in our SML.

Response: Alpart will retain its mining rights to the property and will have full access to the property for mining as stipulated in their SML. This matter was satisfactorily addressed in a meeting held on February 12, 2013 between the representatives of JBI and CAEL.

Comment #9

The proposed windmill sites seem to sit on the hills. Alpart will have no objection to them being sited there once any cables and other infrastructure do not impact their ability to mine any bauxite that may be discovered on that property in the future.

Response: The proposed wind farm site will have underground cables; however none are located within areas having deposits. This matter was satisfactorily addressed in a meeting held on February 12, 2013 between the representatives of JBI and CAEL. Appendix 1 includes a letter previously sent to CAEL from the JBI indicating their “no objection” to the siting of the turbines.

Drainage

Comment #10

The change in runoff volumes expected from the site including proposed roads

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #11

The management of the increased runoff as well as the possible impacts downstream of the proposed development

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #12

Surface drainage plans for the proposed access roads

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #13

Existing hydraulic features and structures including gullies, sinkholes or soak-aways on the property should be highlighted

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #14

The state and capacity of the culverts along the main road downstream of the proposed development

Response: Please refer to Appendix 2, which presents information on drainage.

Comment #15

A sediment management plan for the construction and operation phases of the development

Response: Pages 140-141, Table 45, Items #4 and 8 in the construction phase outlines the mitigation measures that will be undertaken as part of the sediment plan for the wind farm. The measures proposed are being implemented to prevent soil erosion. Further details are provided in the information included at Appendix 2.

Regulatory Framework and Legislation

Comment #16

It is noted that there is inconsistent recording of some statutes (for example, Natural Resources Conservation Authority Act and Wild Life Protection Act) in the EIA provided.

Response: The recommended changes are noted and will be made.

Comment #17

Page 35- The information stated in the EIA with respect to the Natural Resources Conservation Authority being embodied within the NEPA is inaccurate.

Response: This information has been included in a number of EIAs submitted for the past five (5) years. Kindly indicate the correct information.

Project Alternatives

Comment #18

It is noted that a discussion of project alternatives was not undertaken in the document, highlighting the 'No project alternative,' 'Alternative Sites' or 'Technology Alternatives.'

Response: Section 3 of this Addendum outlines the Project Alternatives

Heritage Sites

Comment #19

Page 65, Section 4.5.3-Heritage Sites- The information provided on Warwick Yard is not accurate. It has not been established that there is a Heritage Site known as Canoe Valley Park in Manchester. The applicant should seek the comments of the Jamaica National Heritage Trust on the areas to be impacted by the development.

Response: The information provided in the EIA on Warwick Yard was taken from the Manchester Parish Council's Sustainable Development Profile: Cross Keys Development Area Profile. The Parish Council has confirmed that site is considered a local heritage site and the information provided in the Development Area Profile is accurate. The Jamaica National Heritage Trust (JNHT) has confirmed that Canoe Valley Park is considered a local heritage site, though it has not been declared an official national heritage site by the Trust. The Canoe Valley Park is being considered as a national heritage site given that archaeologists have had a keen interest in the area as a Taino site. The JNHT has also confirmed that several studies were conducted in the past by archaeologists from the Trust and NEPA within Canoe Valley Park.

Noise Emissions

Comment #20

It is recommended that utmost consideration be given to the activities at the nearby Broughton Primary and Basic school as it regards noise emissions particularly during the construction phases.

The report indicates that turbines should be located 2km or more away from schools and residences. What is the mitigation measure to be implemented if this distance cannot be maintained?

Response: The report states in Table 45, page 141, that where possible wind turbines should be located 2km or more away from schools and residences. However other mitigation measures were proposed, which includes limiting noise levels to 55dBA (daytime) and 50dBA (night time). It was also recommended that turbines located within >500m of schools were to be re-sited.

All these recommendations have been considered in the final design of the wind farm. No turbine will be within 500km of sensitive receptors.

Impacts and Mitigation

Comment #21

Wind power generates three (3) categories of environmental impacts: visual impacts; noise pollution; wildlife impacts. These impacts can vary considerably from site to site. The level of impact for this specific project however will largely be dependent upon the siting of the turbines and the adequacy of mitigation measures.

Response: Wind turbines generate several environmental impacts, not limited to those identified. In siting turbines all environmental impacts were considered, particularly those related to noise, flickering and impacts on bats and avifauna. CAEL and Vestas have ensured that the sites chosen for the eight (8) 3 MW turbines will have the least impact on the environment, while at the same time efficiently harnessing and optimising the energy of the wind.

Comment #22

The EIA did not provide adequate mitigation measures for potential biological, environmental, socio-economic and health impacts.

Response: Tables 45 and 46 outline several mitigation measures related to the likely environmental impacts that have been identified by the EIA. Adverse environmental impacts in this document include biological and physical impacts as well as socio-economic and health impacts.

Comment #23

Page 78, Social Assessment of Impacts - It is noted that a discussion of the social impacts of the development were identified and discussed. However, this section was not included in the mitigation measures discussed in Table 45; under Section 7.0 Mitigation Measures.

Response: Table 45, pages 140-143 addresses various negative social impacts identified in the social impact assessment section of the EIA.

The following sections under the Operation Phase in Table 45 outlines mitigation measures related to the negative social impacts identified:

- Item #1 outlines mitigation measures for noise,
- Item#3 outlines mitigation measures for diffraction/shadowing, reflection, scattering
- Item#7 outlines mitigation measures for shadow flickering

Section 6.1.1 item # 3 of the report (page 84) addresses concerns related to the displacement of farmers and potential destruction of farm lands. Table 45 indicates that prior to any construction activities a meeting should be held with farmers to discuss the siting of the turbines and any other matter that may arise. Additionally the management and monitoring plan outlined in Table 46 item #3 includes a monitoring programme for farmers and protection of their crops.

Comment #24

Page 129, Section 3 Oil Spills/leaks-It is not clear why the following “Avoidable with good maintenance practices” has been included under the sub-section “REVERSIBILITY.” This statement should be removed from this section.

Response: The recommended change will be made.

Comment #25

Page 143, Table 45 Maintenance, #3: Maintenance work- The mitigation measure outlined with respect to “accidents causing death or injury” states that workers are to be provided with Personal Protective Equipment (PPE). It is recommended therefore that measures of ensuring that workers wear the PPE provided should be included in this section as the provision of the equipment does not guarantee use.

Response: All workers and contractors at the wind farm will be required to comply with company policies, including those concerning worker safety and adherence to company rules.

Bat Mortality Rate

Comment #26

It was stated that the wind farm will pose significant threats to the bats, but no mitigation measures were proposed for review. All bat species recorded are insectivorous and reports have indicated that wind turbines can act as insect aggregating devices; this means that it is very likely that the bats which roost in the Smokey Hole Cave may frequent the wind farm.

The proponent should prepare and submit to the National Environment and Planning Agency the following:

- A plan outlining how the mortality of the bat species will be kept to a minimum including mitigation measures that will be explored to reduce bird and bat mortality during the operational phase (the use of technologies such as radar technology should be explored by the proponent as these may aid in the reduction of bird and bat mortality at turbine sites.
- A map illustrating the location of the caves in relation to the location.

Response: Page 142, Table 45 item #2 of the Operation Phase outlines the mitigation measures proposed for the protection of bat and bird species, including the use of radar technology i.e. ultrasound blasters. However because there is insufficient information on the behaviour of bats as it relates to the proposed site, it was proposed that a bat monitoring plan be developed for the three (3) phases of the proposed development. This plan is outlined in section 9.3 item #2, pages 148-150. The undertaking of a bat monitoring plan in the pre-construction phase will allow for more detailed information to be collected on the various bat species and their possible interaction with the site. This will allow for more informed decisions to be taken on the types of mitigation measures that will be most suited to protecting the species. For example the use of the acoustic survey, as proposed in the bat monitoring plan, will take into account how effective radar technologies are in protecting bat species, prior to the erection of the turbines.

All the latest technologies will be explored in the development of the mitigation plan for protecting bat species.

The illustration showing the location of the caves in relation to the proposed wind farm site is included in Appendix 3.

General Comments

Comment #27

The Agency recognises that reference to some images in the document has not been provided, included but not limited to references to the images of bats, butterflies and spiders.

Response: A review has been undertaken and the changes will be made: (Refer to Appendix 4)

Comment #28

Page 119-127- It is not clear what is meant by ‘-‘ in the Column “Significant Impact Assessment Criteria” in Tables 42 and 43: Significant Impact Assessment- negative and Positive respectively. It should be indicated “Not applicable” and “none” as appropriate, as used in other instances.

Response: The recommendation offered by NEPA has been accepted and the changes will be made: - (Refer to Appendix 4)

Comment #29

Table 21- The document incorrectly cited the names of local bat species. These are the Jamaican Fruit bat, the Antillean Ghost-faced Bat, the Cuban Funnel-eared Bat and the macleay's Mustached Bat.

Response: Comments have been noted and the following changes have been made:

- Jamaica Fruit Bat to **Jamaican** Fruit Bat
- Cuba Funnel-eared Bat to **Cuban** Funnel eared Bat
- Leachy's Mustached Bat to **Macleay's** Mustached Bat

Comment #30

Geographical Coordinates: The geographical coordinates presented in the document should all be in the same format and the projection clearly stated.

Response: The difference in the geographical coordinates is noted, however in the one instance where the coordinates differed (Page 23 of the EIA) the information was provided from a specific source and as such it would not have been appropriate to make changes.

Miscellaneous

Comment #31

A public sensitization plan should be submitted to:

- Advise the public of the proposed Traffic/Route changes required for the transportation of equipment and material during the construction phase of the project and;
- Determine perceptions regarding wind farms and long term acceptance of the proposed project.

Response: A public sensitization plan will be prepared by CAEL that will take into consideration the results of the perception survey undertaken as part of the social impact assessment. We are requesting that this requirement be made a condition of the permit.

Comment #32

The entire research team is to be identified.

Response: The Team members include:

1. Mrs. Ianthe Smith – Team Leader and EIA Report compilation
2. Ms. Kamille Dwyer – EIA Report compilation and social impact assessment

3. Mr. Ernie Smith – Assessment of potential interference between wind turbines and wireless communication devices
4. Miss Kim Campbell – Assessment of potential interference between wind turbines and wireless communication devices
5. Mr. Marlon Beale – Flora and Fauna Survey
6. Mr. Paul Henry – Geology, Soils and Hydrogeology

3 Project Alternatives

Three (3) types of alternatives were examined:

1. “Do Nothing” Alternative
2. Alternative Sites
3. Alternative Technology

Do Nothing Alternative

The “do nothing” alternative is not an option as it is not in keeping with the Government of Jamaica’s policy on increasing the percentage of renewable sources in the energy mix supply to 20% by 2030. The Jamaica Generation mix data supplied by the Petroleum Corporation of Jamaica (PCJ) and the Office of Utilities Regulation (OUR) for 2010 showed that 9% of Jamaica’s energy mix came from renewable sources. The Government of Jamaica’s renewable energy target for electricity generation from renewables was 10% by 2010 (Potopsingh, 2009)¹.

The GOJ has since revised its target to 30% of electricity being supplied by renewable sources by 2030. If the proposed targets are to be met the GOJ must increase the generating capacity of renewable energy projects over the next decade.

The proposed 24MW project will increase the renewable sources by approximately 1-2%; contributing to the proposed target of 30% by 2030.

Alternative Sites

Jamaica has a reasonable wind potential, however not all areas of the island offer sufficient wind intensity. There are five (5) locations across the island that offer the highest and best wind speeds to generate enough energy to be supplied to the grid. These include Blenheim, Spur Tree, and Wigton in Manchester, Green Castle in St. Mary and Palisadoes in Kingston. The proposed area for the CAEL Great Valley Wind Farm is located in close proximity to the Wigton area; an area considered one of the five (5) best areas for the location of wind farms in Jamaica given the wind potential in the area.

The proposed location in addition to its wind potential offers several other benefits:

¹ Potopsingh, Ruth (2009). Accelerating Advanced Energy Technologies: Wind Energy Development Jamaica. World Bank Energy Week 2009. http://siteresources.worldbank.org/INTENERGY/Resources/335544-1232567547944/5755469-1239633250635/Ruth_Potopsingh.pdf

1. Good accessibility given the existing road infrastructure
2. Sufficient land space for a wind farm
3. Suitable topography
4. Proximity to the JPS high voltage transmission grid
5. Suitability of soil conditions for turbine foundations
6. Site not heavily forested

Alternative Technology

Two types of renewable projects were considered for the proposed site:

1. Wind
2. Solar

Jamaica because of its location and topography has reasonable wind and solar potential. The site offered several benefits that supported the installation of wind turbines and/or solar panels to generate electricity to supply to the national grid. However the site did not support the most important input, required for solar panels being that of sufficient daylight hours. The number of daylight hours received at the site was not sufficient for a solar farm to be cost effective. Additionally, the power output per footprint from wind is generally found to be greater than solar.

Other benefits of the site that supported the use of wind technologies when compared to solar technologies included:

1. Wind turbines require less land space than solar panels
2. Wind farms are more cost effective and efficient than solar panels for commercial scale production for the national grid
3. Wind farms are less costly to maintain

The proposed technology to be used for the proposed CAEL Great Valley wind farm is the latest technology by Vestas, makers of the V90-3.0 MW turbines. The technology is an improved technology over that currently used in the English speaking Caribbean and is similar to that used in the Dutch countries. The Netherlands is one of the most advanced countries in the world in the development of wind energy, particularly as it relates to wind energy generated using offshore wind technology.

Appendix 1: Correspondence from the Jamaica Bauxite Institute and to the Manchester Parish Council



February 19, 2013

Mr. Dewaine Larmond
Director of Planning
Manchester Parish Council
32 Hargreaves Avenue.,
Mandeville, Manchester.

WITHOUT PREJUDICE

Dear Mr. Dewaine Larmond:

RE: CLEAN ALTERNATIVE ENERGY LIMITED

Clean Alternative Energy Limited (CAEL) is a Jamaican company incorporated under the Companies Act of Jamaica with objectives to pursue all types of businesses, including build, own and operate power facilities that provide green energy solutions for the country.

CAEL through its proposed operating subsidiary intends to develop a green energy facility at Great Valley, Manchester, Jamaica to produce electricity from wind turbine equipment. This electricity producing facility will supply its total output of low costing energy to the local grid for onward distribution to the wider population of the island. A twenty five (25) years lease agreement was executed in 2011 between CAEL and the National Land Agency (NLA) for the use of the property for a wind farm.

The proposed wind park will have a total installed capacity of 24MW comprising 8 wind turbines, a sub-station and access roads on land situated at Great Valley, Manchester. The development also involves the erection of an overhead pole mounted grid connection line from the site sub-station to the nearest JPSCO substation. The wind turbines will be placed on ridges at the selected site. Each year the wind farm should feed into the local grid system approximately 68.30GWh, enough to meet the overall electrical energy requirements of around 31,916 homes. Construction is expected to commence as soon as approval has been granted by the Office of Utilities Regulation (OUR) and it is estimated that the project may become operational within 12 months thereafter.

The project will also support the Governments objectives as per The Jamaica National Energy Policy, **Goal 3:** "Jamaica realizes its energy resource potential through the development of renewable

energy sources and enhances its international competitiveness, energy security whilst reducing its carbon footprint.”

In this regard the project will be:

- Developing a renewable energy source, with one of the key renewable technologies listed being wind.
- Assisting the nation in its effort to reduce its reliance on fossil fuel imports and developing indigenous power resources, which will provide added economic benefits.
- Utilizing idle/available land into productive mode.

To date CAEL has attained several goals towards the realization of its objective of developing the first privately owned renewable powered plant in Jamaica. These include:

- Receiving No Objection letter from the Petroleum Corporation of Jamaica as that entity previously held the rights to renewable energy development in Jamaica under statute.
- No Objection letter from Jamaica Bauxite Institute (JBI) – see attachment.
- Entered long term lease for use of suitable land for the development of the wind farm.
- Received approval letter from The Jamaica Civil Aviation Authority.
- Established the distance from the proposed site to the nearest grid.
- Collected wind data from four sources.
- Executed NDA with wind turbine manufacturer as well as secured quotation for the equipment.
- Received Supply contract from wind turbine manufacture regarding procurement, manufacturing, delivery, installation and commissioning of equipment.
- Held meetings with the Office of Utilities Regulation regarding application for generation license.
- Held initial meetings with representatives of Jamaica Public Service Company (JPSCo) regarding commercial terms for power purchase agreement.
- Engaged the services of consultants to conduct Environment Impact Assessment (EIA) study.
- The public Stakeholders meeting was held November 13, 2012 at New Broughton Primary School.
- Prepared business plan for project.
- Held discussions with financiers.
- Identified potential balance of plant project developers.

CAEL’s team has the demonstrated competence to execute this project and indeed its members were at the forefront of the first commercial wind park (Wigton Windfarm) in Jamaica as well as the successful negotiations of the executed Emission Reduction Purchase Agreement (ERPA).

“Manchester Local Sustainable Development Plan 2030 and beyond”

We have been made aware via letter dated January 3, 2013 from the Manchester Parish Council (MPC) to NEPA that that under the “Manchester Local Sustainable Development Plan 2030 and beyond” it had been proposed that sections of the leased property has been earmarked for a cemetery.

We were surprised to learn through the above mentioned letter that a part of the property was earmarked for a cemetery in the future as this information was not conveyed to us during our negotiations for lease of the land.

To the best of our knowledge the target property should contain bauxite deposits and as such we were advised by Jamaica Bauxite Institute (JBI) letter dated February 28, 2011 (see attachment) to explore the

limestone ridges of said property so as not to impair any bauxite deposits. CAEL has complied with JBI's recommendation and as such a wind farm layout was designed by a major wind turbine supplier. Subsequently, Collaboration Agreements have been executed with wind turbine suppliers for equipment to be utilized in the wind project.

Recommendations numbered (2) -(5) stated in MPC letter dated January 3, 2013 will be fully adhered to by CAEL and its agents, consultants, etc.

Given the advanced stage of CAEL's work towards the successful development of the first privately owned wind project for Jamaica, as well as the need to complete its NEPA permit application we respectfully ask your organization's favourable consideration regarding our project that is slated to produce low costing electricity from an environmentally friendly source for the benefit of Jamaica.

Your organization's kind assistance and cooperation will be greatly appreciated.

We wish to thank you for the generosity of your time in reading our correspondence and we look forward to hearing from you soon .

Please note however that should you need any additional information do not hesitate to contact us via telephone and/or electronic mail.
Sincerely,

CLEAN ALTERNATIVE ENERGY LIMITED

W McLeod
Wesley McLeod
Managing Director

**C: Messrs: Christopher Townsend, Director – Clean Alternative Energy Limited
Roger Williams, Director – Clean Alternative Energy Limited**

Encls.



JAMAICA BAUXITE INSTITUTE

Hope Gardens
P.O. Box 355, Kingston 6, Jamaica W.I.

Telephone: (876) 927-2073-9
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Email: info@jbi.org.jm

February 28, 2011

Mr. Roger Williams
CAEL
4 Duke Street
Kingston

Dear Mr. Williams,

**RE: LOCATION OF POTENTIAL SITES FOR WIND TURBINES,
GREAT VALLEY, MANCHESTER**

Subsequent to our field visit to the Great Valley area on February 24, 2011, pleased be advised that the JBI has no objection to the chosen sites, the coordinates of which are listed in the attached Excel file. As a general guideline, as long as the turbines are sited on the limestone ridges and the access to the sites does not impair any bauxite deposits, the JBI has no objection to their location within the bauxite areas. We would request however, that once you begin to clear access to the actual sites, you notify us so we can make a final inspection of the chosen locations.

Regards,

.....
Yolanda Drakapoulos
Geologist
Jamaica Bauxite Institute
Hope Gardens
Kingston 6.

DIRECTORS: Dr. Carlton E. Davis, O.J., C.D., Chairman; Mr. Parris A. Lyew-Ayee, C.D.; Dr. Neville Swaby,
Dr. Glenda Simms, Rev. Dr. Sheila McKeithen, Mr. Wensworth Skeffrey, Dr. Devon Gardner

Appendix 2: Drainage Information



Yenada
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REAL ESTATE DEVELOPERS • DESIGNERS
PROJECT MANAGEMENT & CIVIL WORKS

SUITE 29
WINCHESTER BUSINESS CENTRE
15 HOPE ROAD, KINGSTON 10

February 23, 2013

Mr. Wesley Mcleod, Managing Director
Clean Alternative Energy Limited
4 Duke Street
Kingston, CSO, Jamaica
Re: Environmental Impact Assessment
Cael Wind Farm
Great Valley Manchester

Dear Mr. Mcleod:

With regard to the questions raised by The National Works Agency (NWA), we have reviewed the above referenced EIA and offer the following responses. Each question is included herein with our response with our response highlighted in bold below.

1. The change in runoff volume expected from the site including the proposed roads.

The increase in impervious coverage at the site will result in an increase in the volume and runoff rate of storm-water from the site. The change in impervious coverage will be due to the installation of the following proposed features

- Paved access road
- Concrete pad for crane utilization
- Any required parking spaces for maintenance personnel

The preliminary design of the access roads will result in the following volumetric increase of storm-water from the site

1 hr, 2 yr storm = 46,548 cubic feet (1,318.1 cubic meter)
1 hr, 10 yr storm = 64,444 cubic feet (1,818.6 cubic meter)
2 hr, 2 yr storm = 56,520 cubic feet (1,600.5 cubic meter)
2 hr, 10 yr storm = 80,280 cubic feet (2,273.3 cubic meter)

2. The management of the increased runoff as well as the possible impacts downstream of the proposed development.

In order to minimize the effect of increased storm-water runoff from the site various storm-water management principles will be implemented, including storm-sewer systems, drainage swales and a detention basin or basins, to control volume and the rate of runoff from the site. Discharge from the site under post development conditions will be equal or less than predevelopment runoff. This will ensure no negative impact on properties downstream of the development

Your Inspiration Our Creation

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Directors: Barry A. Edwards, MBSA, BSc. Chem. Eng. • Donovan T. Thompson, P.E., AIF.M., ASCE



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SUITE 29
WINCHESTER BUSINESS CENTRE
15 HOPE ROAD, KINGSTON 10

3. Surface drainage plans for the proposed access roads.

Roads will be crowned to ensure storm water runoff. Storm-water will be collected by roadside swales or drainage inlets and piped storm sewer systems and conveyed to a detention basin or other stable outfall.

4. Existing hydraulic features including gullies, sinkholes or soak-aways on the property should be highlighted.

We will perform a site visit to document all existing drainage features. An appendix to the Environmental Impact Assessment will be issued showing our findings.

5. The state and capacity of the culverts along the main road downstream of the proposed development.

This information will be supplied under separate cover as part of the appendix to be provided. We will calculate culvert capacity using Manning's Equation or other acceptable engineering standards and make a determination if the existing culverts need to be upgraded or can remain in their current state.


6. A sediment management plan for the construction and operation phases of the development.

We will prepare a soil erosion and sediment control plan as part of the civil engineering construction documents. This plan will address engineering and vegetative standards to address sediment control. We will include dust control measures, silt fence installation, construction entrances, tree protection fencing, protection of existing waterways, sediment basins, (if warranted) rip rap installation for slope protection, temporary and permanent soil stabilization by seeding, protection of stockpiled excavated material, and any other necessary sediment control standards.

We trust these responses and inclusions address the NWA's concerns. Should you have any questions or require additional information, please contact this office.

Very truly yours,

YENADA LIMITED

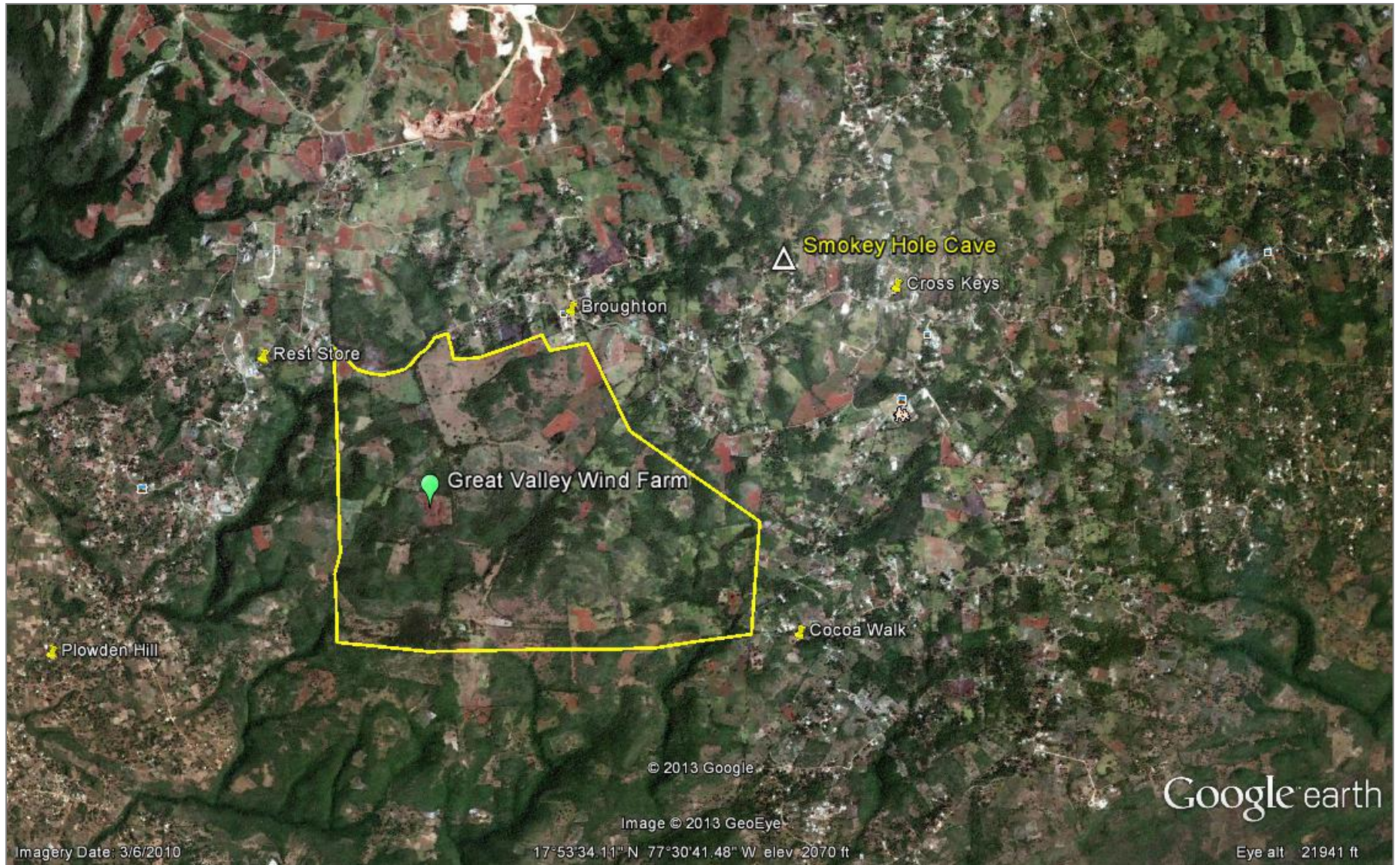

Donovan Thompson P.E.
Managing Director

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Directors: Barry A. Edwards, MBA, BSc. Chem. Eng. • Donovan T. Thompson, P.E., A.E.M., ASCE

Appendix 3: Location Map showing Smokey Hole Cave



Appendix #4: Document Changes

References (comment #27)

The following reference changes were made:

- Figure 12: Layout and Access Routes to Turbine, page 30
Source: Geo-Edge Limited, 2011
- Figure 18: Vegetation Specie on Proposed Development Site, page 52
Source: EEM, 2012
- Figure 20: Local Bat Species, page 55
Source: www.nhptv.org/wild/mormoopidae.asp
- Figure 21: Butterfly Goat-weed Specie and Native Spider, page 57
Source: EEM, 2012
- Figures 30-33, pages 96, 102-104
Source: Google with modifications by EEM, 2012
- Figures 22-26, pages 67, 69, 71, 74-75
Source: EEM, 2012

Assessment of Impacts (comment #28)

The following changes were made:

1. Table 42: Significant Impact Assessment-Negative (Construction Phase)
 - Item #3 Loss of productive Farm lands and Temporary Displacement of Farmers, page 110: Intensity “-‘ to “not applicable” and Acceptability “-“ to “not applicable”
 - Item #10 Construction work, pages 115-116: Secondary impact “-“ to “unknown”
 - Item #11 Use of Water, page 116: Affected numbers“-“ to “unknown” and secondary impacts “-“ to “unknown.”
2. Table 42: Significant Impact Assessment-Negative (Operation Phase)
 - Item #2: Disruption in Avifauna Flight Patterns, page 119: Secondary Impacts “-“ to “unknown”
 - Item #3: Diffraction/Shadowing/Reflection, Scattering, page 120: Secondary impacts “-‘ to “not applicable”
 - Item #10: Vibration and Noise, page 125: Secondary Impacts “-“ to “not applicable”
3. Table 42: Significant Impact Assessment-Negative (Maintenance Phase)

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- Item #4: Maintenance work, page 127: Secondary impacts “-“ to “not applicable”

4. Table 43- Significant Impact Assessment-Positive (Maintenance Phase)

Item #1: Maintenance Activities, page 136: Affected numbers “-“ to unknown”