PHOTO 1: Looking west from County Road 82 (Quarry Road) toward turbine location F07.

PHOTO 2: Looking south from County Road 32 toward turbine location C14.

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Apex Clean Energy, Inc.
Proposed Republic Wind Project

Site Photographs

Sandusky and Senenca Counties, Ohio

Date: MARCH 2017

Project Number: ACX002

File Name: ACX002.0001.xlsx

PHOTO 3: Looking south from Miller Straub Road toward turbine location A50.

PHOTO 4: Looking north from County Road 62 (Seneca Co. Line Road) toward turbine locations G02 & G03.

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APPENDIX D

General Earthwork Recommendations

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GENERAL EARTHWORK RECOMMENDATIONS

Earthwork is most efficiently accomplished using large, heavy-duty equipment, unimpeded by obstacles. Consequently, it is preferable to complete as much of this work as is possible prior to initiating other phases of construction, such as footing excavation and installation of underground utilities. The following are general recommendations concerning earthwork construction and may not be applicable to site-specific conditions. Furthermore, the contractor is responsible in selecting and implementing the most appropriate construction techniques (e.g., construction means, methods, sequences or procedures, or for safety precautions or programs) for each site-specific condition(s).

1. Stripping, clearing and grubbing

In areas where fill is to be placed to support structures, drive and parking areas, the following is proposed:

Strip and remove all sod, topsoil, and organic contaminated soils.

Remove all trees and shrubs, designated to be cleared, inclusive of grubbing roots of larger trees.

Remove all trash, debris, rubble, existing random fill, soil softened by standing water, and any other soft soil as determined necessary by the geotechnical engineer. The fill placement should begin on firm, relatively unyielding foundation material.

The fill foundation should be stripped and cleared beyond the limits of the structure by a distance equal to not less than the thickness of the fill below the structure foundation plus 10 feet. For drives and parking areas, the fill foundation should be stripped and cleared for a distance of at least 5 feet beyond the limits of the pavement.

2. Fill Material – Composition

Material satisfactory for use as fill includes clayey silt and silty (lean) clay soils or sand and gravel, free of topsoil, organic or other decomposable matter, rocks having a major dimension greater than 6 inches, or frozen soil.

Soils having a maximum dry density of less than 90 pounds per cubic foot as determined by the moisture-density relationship are not considered suitable for use as fill.

Soils described as SILT (USCS ML, MH or ODOT A-4B) are considered questionably suitable for use as fill material because the stability of these materials is very sensitive to increases in moisture. These soils should not be placed within three feet of the top of the subgrade.

3. Fill Material – Moisture

Predominately fine grained fill materials (lean clayey soils) are recommended to contain moisture contents within 3 percent (above or below) the optimum moisture as determined by the moisture-density relationship (ASTM International D698), or less if found to be needed to obtain stability below the compaction equipment. This provides the best assurance of establishing not only adequate density for ultimate support of construction but also provides stability of the compacted soil under the dynamic loading induced by the heavyweight construction equipment during placement.

Sand and gravel fill material is not as sensitive to moisture content with regards to stability. Therefore, we recommend no specified limitation, as long as specified density and stability can be established.

4. Moisture Adjustment

If the moisture content of the material from the fill source or native subgrade is not appropriate to establish density, moisture adjustment of the material will be required.

If the moisture content of the fill being placed or the native subgrade is too high, appropriate adjustment entails spreading and exposing to the sun and wind for drying and using equipment such as a disc and/or a grader. This may not be feasible during wet seasonal conditions. Wet soils will pump and may cause excessive rutting under heavy equipment traffic. Therefore, improvements to the subgrade may be achieved by undercutting and replacing with suitable fill (possibly in combination with a non-woven geotextile or biaxial geogrid) or stabilization with lime or cement. The most appropriate subgrade improvement technique should be determined at the time of construction.

If the moisture content of the fill is too low, a water truck with a sprinkler bar may be required. After sprinkling, the soil should be thoroughly mixed with a disc and/or a grader.

5. Equipment

Equipment to compact the fill should be heavy duty with a steel drum roller having a minimum effective unit weight of 10 tons. For example:

Fine-grained materials (clayey silts and lean clays) may be efficiently compacted using a sheepsfoot roller comparable to a Caterpillar 815 self-propelled roller.

Coarse-grained materials (sand and gravel) having little or no silt and clay sizes may be efficiently compacted using a heavy, self-propelled, vibratory smooth wheel roller.

Coarse-grained materials having about 10% or more silt and clay sizes may be efficiently compacted using a sheepsfoot roller comparable to a Caterpillar 815 self-propelled sheepsfoot roller.

6. Lift Thickness

Fill should be placed in horizontal layers, 8-inch loose thickness, compacted uniformly to approximately 6-inch thickness.

If equipment is used which is lighter weight than recommended above, lift thickness should be appropriately thinner.

7. Fill Density

In areas to support access roads and within the pad, the fill and backfill should be compacted to the density requirements as recommended in the main body of the report

8. Season of Earthwork

Weather conditions are very important to efficiency in working soils. Generally, earthwork is accomplished most efficiently between May and November. Cold periods may hamper moisture adjustment. If the temperature is below 32 degrees Fahrenheit (°F) for prolonged periods, frozen

material on the fill surface must be removed before subsequent lifts may be placed. Also, densification of fill is more difficult when air temperatures are below freezing. Granular material, such as bank run sand and gravel is somewhat less sensitive to weather conditions but is not immune from difficulties that may be presented by precipitation and low temperatures.

9. Trench Backfill

Trench backfill should be controlled compacted fill, placed in accordance with recommendations presented above and as engineered for thermal properties in collection systems

It is recommended that suitable granular material be used to backfill trenches that traverse beneath buildings, drives, or parking areas.

10. Proof Rolling

Upon completion of stripping, clearing, and grubbing; the areas planned to support pavement or building floor slab shall be proof rolled in accordance with ODOT Item 204 to identify any soft, weak, loose, or excessively wet subgrade conditions. At a minimum, the proof rolling should be completed with a minimum 20-ton loaded tandem axle dump truck. The vehicle should pass in each of two perpendicular directions covering the proposed work area. Any observed unsuitable materials should be undercut and replaced with suitable fill as directed by the geotechnical engineer.

11. General

All fill should be placed and compacted under continuous observation and testing by a soils technician under the general guidance of the geotechnical engineer.

APPENDIX E

Generalized Geotechnical Exploration Work Plan

APPENDIX E

GENERALIZED GEOTECHNICAL EXPLORATION WORK PLAN

A geotechnical engineer shall prepare a proposal for a geotechnical site exploration in general accordance with the suggested scope of work provided below. The geotechnical engineer shall be qualified in geotechnical investigations. The geotechnical exploration program suggested below (e.g., boring frequency, location and depth) should be adjusted by the geotechnical engineer based on their experience and to allow for specific geological, topographic, and drainage conditions of the site.

PROJECT DESCRIPTION

A geotechnical exploration will be performed at the proposed Project Boundary in Seneca and Sandusky Counties, Ohio. The project involves planned construction of wind turbine generators at various locations (Sites) for the Republic Wind Farm Project. Upon completion of the geotechnical exploration suitable foundation systems will be reviewed that will work with the Site conditions as determined by the geotechnical exploration and design preferences provided by the Client. The foundation types that will be considered include spread footings, ring foundation, P&H foundations, and pile supported foundations.

The purpose of the geotechnical exploration is to obtain geologic information and to determine relevant engineering properties of the Site soils. A review of generalized geologic references, including ODNR Well Logs and ODNR Groundwater Resource Maps, suggest the Project Boundary is underlain by lacustrine and ground moraine deposits with dolomite, limestone, and shale bedrock depths ranging from less than 10 feet in the eastern portion of the site and approximately 150 feet below existing ground surface in the western portion of the Project Area.

PROPOSED SCOPE OF WORK

Reconnaissance, Planning and Boring Layout

The following will be conducted as part of this task:

1. A review of pertinent, readily available subsurface geotechnical information for the Site that is provided to the Geotechnical Engineer will be performed.

2. A site visit will be performed to lay out the borings and clear underground utilities at the boring locations. The landowner will be consulted to provide the geotechnical engineer with information and the locations of all private utilities at the site. The geotechnical engineer will be responsible for locating the boring, which should be surveyed and staked on the site prior to drilling.

3. The Ohio Utility Protection Service (OUPS) and Ohio Oil & Gas Producers Underground Protection Service (OGPUPS) will be notified a minimum of 48-hours prior to the commencement of drilling services.

Drilling and Sampling

After the geotechnical engineer has reviewed all available desktop information, they will determine the number of borings to be drilled at turbine locations. The borings will extend to the proposed depth or competent bedrock, whichever is encountered first.

For all borings, the following will be performed:

1. Split-barrel sampling of soil will be performed in accordance with ASTM International D 1586 for each boring in increments of 2.5 feet to the depth of 10 feet and at five-foot intervals below 10 feet to the depth of the borings. In all the borings, Standard Penetration Test (SPT) data will be developed and representative samples preserved.

2. It is anticipated that the drilling will be accessible with and performed by a truck-mounted drilling rig. Provisions shall be made by the Geotechnical Engineer based on the time of year the fieldwork will occur in using an ATV drill rig if the borings cannot be accessed with a truck-mounted drilling rig.

3. Water observations in the boreholes will be recorded during and at the completion of drilling.

4. All borings will be backfilled at the completion of drilling with bentonite chips and drill cuttings.

Geotechnical Laboratory Testing

A laboratory testing program will be established by the geotechnical engineer based on the observations made during the drilling activities and experience. The following laboratory tests shall be performed on samples retained during the drilling activities:

1. All samples will be classified in the laboratory based on the visual-manual examination (ASTM International D 2488) Soil Classification System and the laboratory test results. Formal boring logs will be prepared using the field logs and the laboratory classifications.

2. Laboratory testing will include moisture content, particle-size analyses, and Atterberg limits of a limited number of samples considered to be representative of the foundation materials encountered by the borings. Unconfined compression and consolidation tests will be performed if low strength and/or highly compressible cohesive soils are encountered as deemed necessary by the geotechnical engineer.

3. All laboratory testing will be performed in accordance with ASTM International or other specified standards.

Geotechnical Exploration Report

The geotechnical engineer will prepare a Geotechnical Exploration Report that will include the findings, conclusions and recommendations concerning proposed geotechnical related design-construction considerations and foundation design recommendations. The report shall also include an Appendix, which will include a boring location plan, a legend of the boring log terminology, the boring logs, and the results of any laboratory tests. Three (3) copies of the report will be presented by the Geotechnical Engineer.

Summary: Application Exhibit F - Part 6 of 6 electronically filed by Teresa Orahood on behalf of Sally W. Bloomfield