December 3, 2010

Iberdrola Renewables
201 King of Prussia Road, Suite 500
Radnor, PA 19087

Attn: Mr. Jebby Varughese, P.E., CFM, CPESC, CPSWQ
P: [484] 654 1880
F: [484] 654 1069
E: Jebby.Varughese@Iberdrolaren.com

Re: Preliminary Karst Condition Assessment
Horse Creek Wind Farm
Clayton, Jefferson County, New York
Terracon Project No. J2105236

Dear Mr. Varughese:

Terracon Consultants, Inc. (Terracon) is pleased to provide this letter regarding our preliminary evaluation of potential Karst conditions at the above-referenced project site. The purpose of our evaluation was to observe and document the ground surface and/or exposed bedrock conditions at and proximal to each wind turbine location and along the planned access drive routes for indications of Karst conditions, review available historic documentation for indication of Karst conditions, review available information regarding the subsurface conditions and site geology, and to provide our recommendations for remediation and/or recommendations for additional investigation. Our work was completed in general accordance with our revised proposal dated October 29, 2010. The scope of work did not include an environmental evaluation of site conditions.

PROJECT INFORMATION AND PREVIOUS REPORTS

The project site, totaling about 18 square miles, is located on either side of NY Route 12 between the Hamlets of Depauville and Gunns Corners in the Town of Clayton, New York. The project site also extends into the Town of Orleans, New York at the east boundary of the site. The project site is mainly agricultural fields and the associated residential/farming structures. Large areas of the site are also undeveloped and moderately to heavily wooded. Topography of the site is rolling. Buttermilk Creek and Horse Creek extend generally northeast to southwest through the project site. There is a pond northeast of NY Route 12, approximately 9,000 feet southeast of Depauville. Additional wetlands, flagged by others, and various unnamed streams are located throughout the project site. Access throughout the site is mainly provided by NY State roads and paved rural county roads.

A Preliminary Geotechnical Engineering Assessment, prepared by GZA GeoEnvironmental of New York (GZA), of Buffalo, New York, dated January 26, 2007 was prepared for the site. The Preliminary Geotechnical Engineering Assessment included the collection and review of readily available information regarding the subsurface soil, bedrock, and groundwater conditions in the study area; subsurface investigations were not included in the GZA scope of work. Based on our review of the GZA Preliminary Geotechnical Engineering Assessment, the mapped subsurface soil conditions at the project site generally consist of fine-grained marine/glaciolacustrine soils over limestone bedrock, which is part of the Black River Group. The Black River Group consists of the Pamelia Formation, the Lowville Limestone, and the Chaumont Limestone. The bedrock was expected to be within 3 to 9 feet of the ground surface, with sporadic outcrops.

GZA provided presumed recommendations for foundation design including net allowable and ultimate bearing pressures, lateral earth pressure coefficients, sliding resistance, shear values, and soil/bedrock properties. GZA indicated that because of the relatively shallow bedrock depths, the project site would likely fall into Site Class B for seismic design. GZA also provided recommendations for construction procedures, dewatering, and a preliminary blasting plan.

A Report of Preliminary Subsurface Investigation and Geotechnical Evaluation (Preliminary Evaluation), prepared by Atlantic Testing Laboratories, Limited (Atlantic) of Canton, New York, dated December 26, 2007, was prepared for the site. The Preliminary Evaluation consisted of advancing test pits at six proposed tower locations in order to provide recommendations related to preliminary foundation design and construction. Additionally, laboratory testing including Atterberg limits, particle size analysis, moisture content, and moisture-density relationship, was completed on representative samples of the recovered soil. Chemical testing, including pH, chloride, and soluble sulfate testing, was also performed.

TERRACON EVALUATION

Historical Research

On November 10, 2010, Terracon visited the New York State Library, located at the Cultural Education Center in Albany, New York. Readily available historical USGS topographic maps were reviewed to identify topography anomalies or significant changes in topography. Reviewed historical topographic maps are summarized below:

- Clayton, New York, published 1900 (1:63,360)
- Clayton, New York, published 1903 (1:63,360)
- Clayton, New York, published 1908 (1:63,360)
- Clayton, New York, published 1958 (1:24,000)
- Dexter, New York, published 1958 (1:24,000)
- Brownville, New York, published 1958 (1:24,000)
- La Fargeville, New York, published 1958 (1:24,000)

The USGS topographic maps depict the site as similar to today with mostly undeveloped land and sporadic residences and farms. The topography is rolling farmland with areas of drainage swale erosion. Sinkholes or large growing depressions were not ascertainable based on our visual comparison of the historical topographic maps and recent USGS maps.

Historical aerial photographs from the New York Department of Transportation aerial photograph collection were requested for Jefferson County, New York. The aerial photographs were reviewed to obtain information regarding the historical ground cover and potential sinkhole activity throughout the site. The reviewed aerial photographs are listed below:

- Dexter Quadrangle, 1957 (1:20,000)
- Dexter Quadrangle, April 16, 1968 (1:24,000)
- Dexter Quadrangle, September 23, 1978 (1:24,000)
- La Fargeville Quadrangle, September 13, 1978 (1:40,000)
- La Fargeville Quadrangle, 1994 (1:40,000)

The historical aerial photographs depict the site as similar to today with mostly farmland and various patches of undeveloped wooded land. Areas of concern were identified on a plan for visual observation in the field. These areas consisted of apparent visual topographic anomalies or apparent depressions/ponds. These areas were proximal to wind turbine Nos. 22, 54, and 46, and near O&M Facility No. 2.

Visual Observations

Between November 10 and 14, 2010, Robert W. Olah, P.E. of Terracon visited the site to visually review existing ground conditions at wind turbine locations and along the access drives. Wind turbine Nos. 10, 11, and 17 could not be reviewed because of heavy brush and wooded land.

Visual inspection was completed by walking routes of proposed access roads from their intersection with existing roadways to each wind turbine. Observations regarding the presence of sinkholes, depressions, exposed bedrock, or other anomalies indicative of Karst conditions were noted during the walk along the proposed access roads and at proposed wind turbines; however, some access roads were not traversed because of the presence of wooded land, wetlands, or fencing. The attached Exhibit A-2 indicates the wind turbines investigated and the walking route, if different from the proposed access route. Exhibit A-1 also shows areas of anomalies observed during the reconnaissance.

During the site reconnaissance, depressions and sinkholes were observed proximal to wind turbine Nos. 5, 46, 38, 41, 46, 54, and 58. Depressions and sinkholes were also observed along the proposed access road between wind turbine Nos. 49 and 50, 23 and 58, and from Depauville Road to wind turbine Nos. 5 and 6. The sinkholes ranged in size from a few inches to over 10 feet in diameter and extended to depths ranging from about 1 to 4 feet.

A significant amount of exposed bedrock was observed throughout the site. Based on these observations, the top of bedrock is likely above a depth of about 10 feet below ground surface throughout the site.

Evaluation

Based on results of our observations, published data, and previous investigations, the site is underlain by limestone bedrock that is at or near the ground surface throughout the site. Surficial materials above the bedrock are mainly tilled agricultural soils and/or glaciolacustrine soil and glacial till consisting of silt and clay, which have very low permeabilities. Slow infiltration rates of surficial soils will impede downward movement of rainwater into the underlying bedrock, significantly slowing erosion of the limestone. This was evident during the site reconnaissance where farmland was very wet. Standing water was observed at numerous locations through the farmland, even after four days of dry weather. Areas where the bedrock was observed at or near the ground surface were dry, likely because of rainwater draining directly into the bedrock through conduits, joints, fractures in the rock, or through more permeable overburden soils.

Sinkholes were observed at various locations throughout the site. Based on the shallow depth of the bedrock and the observed near vertical primary and/or secondary joint set of the exposed rock, the sinkholes are mainly classified as solution sinkholes. Solution can occur at the exposed bedrock surface, along bedrock joints, and within fractures of the rock that are constantly exposed to slightly acidic rainwater. Dissolved limestone and fine-grained overburden soil eventually migrate deeper into the bedrock with the flow of water. The solution sinkholes will eventually enlarge as more limestone dissolves and additional conduits for water and soil are formed. Solution sinkholes generally result in a gradual depression and subsidence of the ground surface, but rarely cause abrupt or catastrophic ground collapse.

Large collapsing sinkholes are an area of concern where limestone bedrock is located near the ground surface. The risk for large collapsing sinkholes is dependent on the size and depth of the formed solution cavity (void) below the ground surface. A collapsing sinkhole occurs when the solution cavity becomes so large from that the cover material and remaining bedrock above the cavity cannot adequately support and bridge the weight of the overburden materials. These types of sinkholes usually occur quickly and have the potential to be catastrophic.

From a development standpoint, solution sinkholes generally pose a limited risk for long-term damage because of surficial indications, such as depressions and ground subsidence, become evident prior to significant movement. When evidence is discovered, solution cavities can typically be mitigated and controlled by the use of grout or lean concrete at relative low cost. Observation for ground subsidence should be included as part of the regular maintenance activities.

Collapsible sinkholes pose a greater risk to long-term development of the site, since collapsible sinkholes typically do not exhibit signs of distress until collapse is imminent. Based on our review of available historical research, interviews with various property owners, and observations of the overall topography, large collapsing sinkholes do not appear to have occurred within the past 100 years, or so. However, large sinkhole formation typically occurs over geologic time, i.e., hundreds to thousands of years of constant erosion.

Of particular concern at the site are areas of “disappearing streams” noted at two locations during the site reconnaissance. These streams channel surface water from the surrounding farmland into the bedrock. These disappearing streams, or “drains”, have the potential to focus a significant amount of water into the underlying bedrock, increasing the rate of erosion and dissolution of underlying bedrock. Drains were observed at the planned O&M Facility No. 1 and near wind turbine No. 54. Consideration should be given to move development away from these areas.

RECOMMENDATIONS

At this time, we recommend that a geophysical survey be completed to further evaluate the areas of concern (wind turbine Nos. 5, 6, 38, 41, 48, 49, 50, 54, and 58) identified during the site reconnaissance. However, because of the risk of additional karst features at other turbine locations that did not indicate surficial anomalies, consideration should be given to completing geophysical surveys at each turbine location. The geophysical survey should include electrical imaging (EI) to provide a cross-sectional image of the subsurface conditions to a depth of about 50 feet below existing grade. The EI survey is effective in identifying solution cavities or voids, which are not propagating to the ground surface. Following the EI survey, we recommend that soil borings and bedrock coring be completed to further define the subsurface conditions. The borings would be completed at locations that exhibited abnormal subsurface conditions, as determined by the EI survey. The purpose of the borings would be to further evaluate the subsurface conditions and categorize them as they relate to long-term risk for the proposed development. The EI survey and borings will assist in evaluating these risks and providing an estimated cost for remediation. Additionally, the completed soil borings will be used to provide preliminary geotechnical engineering recommendations for the project.

We trust this letter satisfies your needs at this time. If you have questions, or require additional information, please contact the undersigned at our Rocky Hill (Hartford), Connecticut office.

Sincerely,
Terracon Consultants, Inc.

Robert W. Olah, P.E.
Senior Staff Engineer

Jerry G. Salsgiver, P.E.
Senior Geotechnical Engineer/
Office Manager

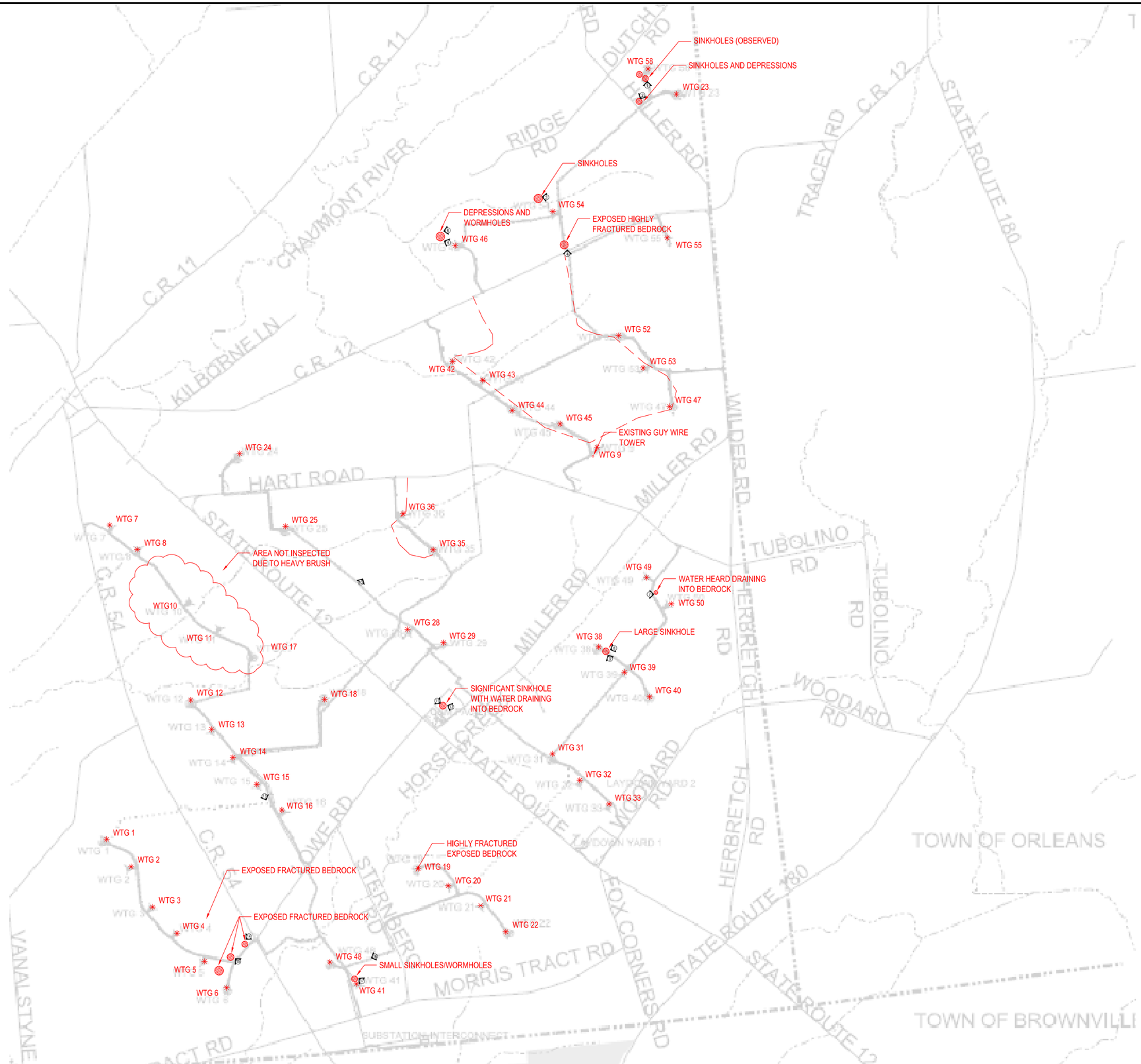
Ryan R. Roy, P.E.
Principal/Division Manager

/ekc/J2105236

Attachments: Appendix A – Site Diagram/Anomaly Photographs
Appendix B – Tower Center Photographs (47 Pages)

Appendix A

Site Diagram/Photographs



NOTES:

1. THIS DIAGRAM WAS PREPARED FROM A FISHER ASSOCIATES, P.E., L.S., P.C. OF ROCHESTER, NEW YORK, PLAN TITLED: "ACCESS ROAD GENERAL PLAN", SHEET: GP-2, DATED: JANUARY 2011.

2. THE EXISTING SITE CONDITIONS WERE VISUALLY REVIEWED BY A TERRACON FIELD ENGINEER BETWEEN NOVEMBER 8 AND NOVEMBER 12, 2010.

3. THE TURBINE LOCATIONS VISUALLY REVIEWED AS PART OF OUR SCOPE OF WORK WERE LOCATED IN THE FIELD USING A GLOBAL POSITIONING SYSTEM AND COORDINATES PROVIDED BY IBERDROLA RENEWABLES. ACCESS ROADS WERE LOCATED BASED ON PLANS PROVIDED BY IBERDROLA RENEWABLES.

4. USE OF THIS DIAGRAM IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATIONS OF PERTINENT SITE FEATURES. ANY OTHER USE OF THIS DIAGRAM WITHOUT PERMISSION FROM TERRACON IS PROHIBITED.

LEGEND

- TURBINE CENTER VISUALLY REVIEWED (TYP)
- GROUND ANOMALY (TYP)
- PHOTOGRAPH LOCATION AND DIRECTION (TYP)
- VISUAL REVIEW WALKING DIRECTION

REV.	DATE	BY	DESCRIPTION

SITE DIAGRAM

HORSE CREEK WIND PROJECT

JEFFERSON COUNTY

NEW YORK

CLAYTON

Terracon
Consulting Engineers and Scientists
201 HAMMER MILL ROAD
PH. (860) 721-1900
ROCKY HILL, CT
FAX. (860) 721-1939

N

DESIGNED BY:	RWO
DRAWN BY:	RWO
APPVD. BY:	JGS
SCALE:	NOT TO SCALE
DATE:	11-30-10
JOB NO.	J2105236
ACAD NO.	J2105236.002
EXHIBIT.:	A-1

1) 16-inch diameter by 2.5-foot deep sinkhole

2) 2-foot diameter by 1.5-foot deep sinkhole

3) 8-foot deep depression with water flowing into bedrock

4) Fractured bedrock at ground surface

5) 1-foot diameter by 8-inch deep sinkhole

6) 2 foot diameter by 6-inch deep sinkhole

7) Exposed bedrock where significant water flow was heard

8) 4-foot diameter by 2-foot deep sinkhole

9) 10-foot diameter by 4 foot deep sinkhole

10) Pond located proximal to access drive

11) Large void and bedrock drain

12) Large void and bedrock drain

13) Typical drainage swale located throughout agricultural fields

14) Exposed bedrock fracture with voids

15) Exposed bedrock with voids

16) Exposed bedrock fracture with voids

17) 4-inch diameter by 2-foot deep wormhole

Appendix B

Tower Center Photographs

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

Horse Creek Wind Farm
Clayton, New York
Terracon No. J2105236

Terracon

Location:
Turbine Number 4

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

Horse Creek Wind Farm
Clayton, New York
Terracon No. J2105236

Terracon

Location:
Turbine Number 8

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

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View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking East Toward Turbine Site Approximately 150 Feet Away

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

Horse Creek Wind Farm
Clayton, New York
Terracon No. J2105236

Terracon

Location:
Turbine Number 39

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

View Looking South

View Looking West

Horse Creek Wind Farm
Clayton, New York
Terracon No. J2105236

Terracon

Location:
Turbine Number 42

View Looking North

View Looking East

View Looking South

View Looking West

Horse Creek Wind Farm
Clayton, New York
Terracon No. J2105236

Terracon

Location:
Turbine Number 43

View Looking North

View Looking East

View Looking South

View Looking West

View Looking North

View Looking East

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