Large Filing Separator Sheet

Case Number: 09-1066-EL-BGN

File Date: 12/21/09

Section: 3

Number of Pages: 197

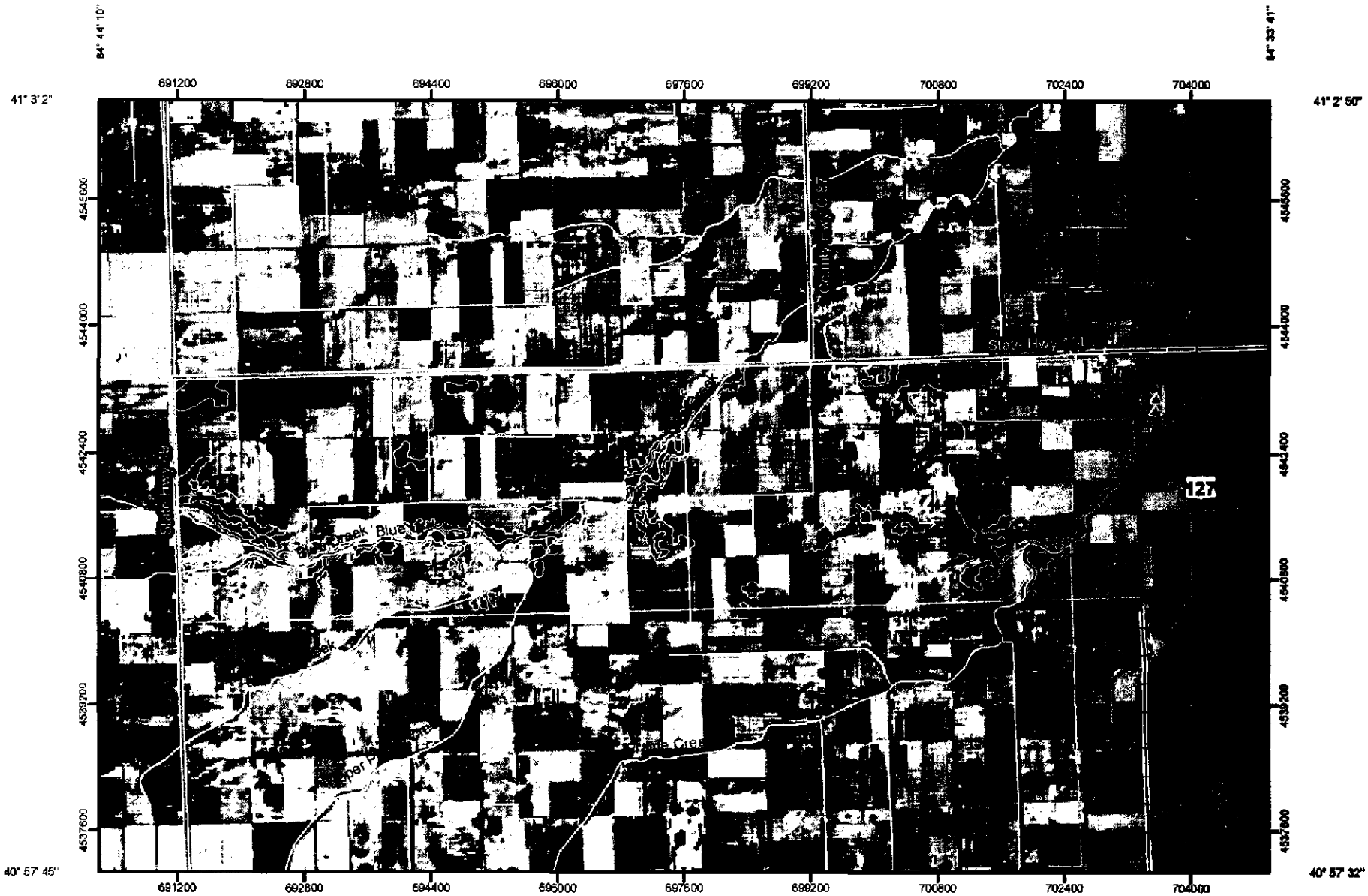
Description of Document: Application
Volume 2

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options: Surface Layer

Soil Map—Paulding County, Ohio
(NW area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:70,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

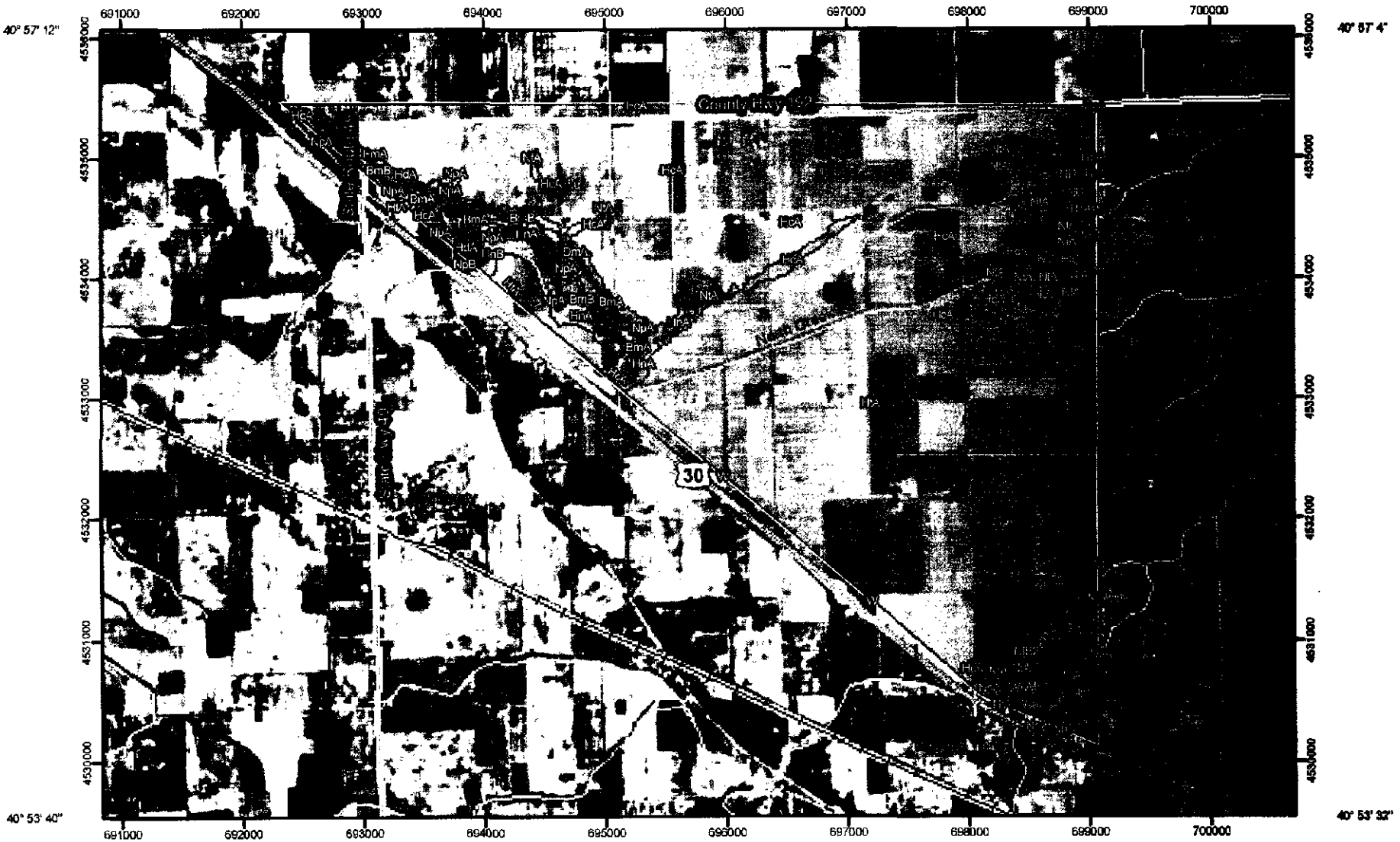
Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Paulding County, Ohio (OH125)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	272.6	2.8%
HkA	Haskins loam, 0 to 2 percent slopes	31.5	0.3%
HkB	Haskins loam, 2 to 6 percent slopes	21.4	0.2%
HtA	Hoytville silty clay, 0 to 1 percent slopes	6,396.6	65.7%
Lb	Latty silty clay loam	114.1	1.2%
Lc	Latty silty clay	1,890.4	19.4%
Me	Mermill loam	20.9	0.2%
NnA	Nappanee loam, 0 to 2 percent slopes	19.8	0.2%
NpA	Nappanee silty clay loam, 0 to 2 percent slopes	498.1	5.1%
NpB	Nappanee silty clay loam, 2 to 6 percent slopes	18.4	0.2%
NpB2	Nappanee silty clay loam, 2 to 6 percent slopes, eroded	48.4	0.5%
Sb	Saranac silty clay loam, occasionally flooded	266.6	2.7%
Sh	Shoals silt loam, occasionally flooded	9.2	0.1%
To	Toledo silty clay	70.0	0.7%
Uc	Udorthents, clayey, hilly	50.9	0.5%
W	Water	4.7	0.0%
Totals for Area of Interest		9,733.4	100.0%

Erosion Hazard (Off-Road, [illegible]rail)—Van Wert County, Ohio
(SW Area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:46,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Off-Road, Off-Trail)

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BmA	Belmore loam, 0 to 2 percent slopes	Slight	Belmore (100%)		34.7	0.7%
BmB	Belmore loam, 2 to 6 percent slopes	Slight	Belmore (100%)		43.7	0.9%
DmA	Digby loam, 0 to 2 percent slopes	Slight	Digby (90%)		1.3	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	Slight	Hoytville (91%)		338.8	7.2%
			Nappanee (9%)			
HdA	Haney loam, 0 to 2 percent slopes	Slight	Haney (99%)		5.3	0.1%
HdB	Haney loam, 2 to 6 percent slopes	Slight	Haney (100%)		3.0	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	Slight	Haskins (92%)		20.6	0.4%
HnB	Haskins loam, 2 to 6 percent slopes	Slight	Haskins (88%)		4.4	0.1%
Hs	Hoytville silty clay loam, moderately shallow variant	Slight	Hoytville Variant (100%)		0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		4,145.3	87.6%
			Nappanee (8%)			
Md	Mermill silt loam	Slight	Mermill (100%)		0.8	0.0%
Me	Millgrove silt loam	Slight	Millgrove (99%)		0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		32.0	0.7%
NpB	Nappanee silt loam, 2 to 6 percent slopes	Slight	Nappanee (91%)		2.0	0.0%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (92%)		63.3	1.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	Slight	Nappanee (96%)		2.3	0.0%
Qu	Quarry	Not rated	Quarry (100%)		1.7	0.0%
W	Water	Not rated	Water (100%)		5.3	0.1%
Wa	Wabasha silty clay loam	Slight	Wabasha (100%)		1.4	0.0%
Wh	Wabasha silty clay	Slight	Wabasha (100%)		24.1	0.5%
Totals for Area of Interest					4,731.0	100.0%

Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Slight	4,724.5	99.9%
Null or Not Rated	7.0	0.1%
Totals for Area of Interest	4,731.0	100.0%

Description

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

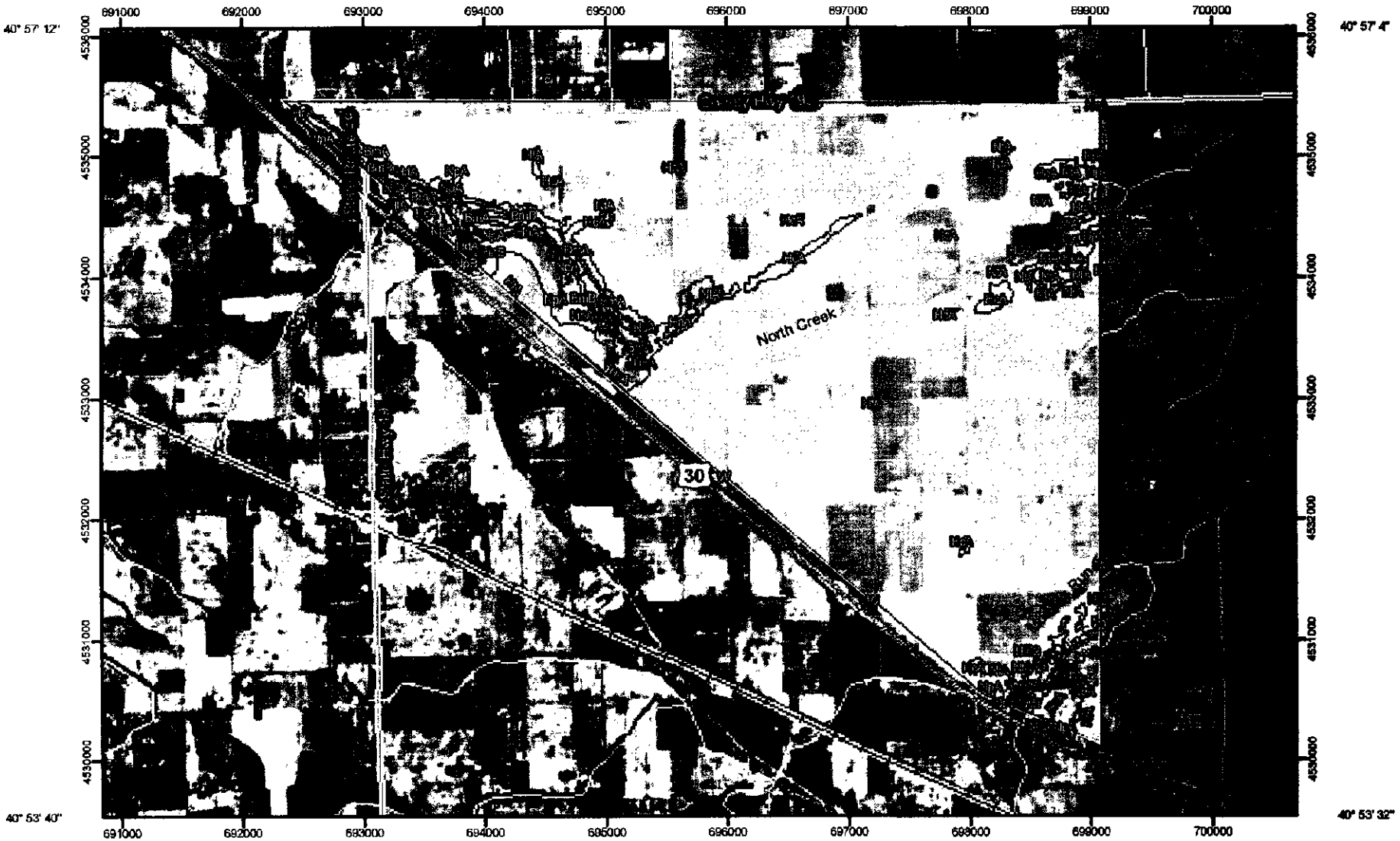
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole So an Wert County, Ohio
(SW Area Blue Creek Wind Farm)



Map Scale: 1:46,800 if printed on A size (8.5" x 11") sheet.

N

Meters
0 500 1,000 2,000 3,000

Feet
0 2,500 5,000 10,000 15,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:46,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BmA	Belmore loam, 0 to 2 percent slopes	.32	34.7	0.7%
BmB	Belmore loam, 2 to 6 percent slopes	.32	43.7	0.9%
DmA	Digby loam, 0 to 2 percent slopes	.32	1.3	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	.24	338.8	7.2%
HdA	Haney loam, 0 to 2 percent slopes	.32	5.3	0.1%
HdB	Haney loam, 2 to 6 percent slopes	.32	3.0	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	.37	20.6	0.4%
HnB	Haskins loam, 2 to 6 percent slopes	.37	4.4	0.1%
Hs	Hoytville silty clay loam, moderately shallow variant	.28	0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	4,145.3	87.6%
Md	Mermill silt loam	.32	0.6	0.0%
Me	Millgrove silt loam	.28	0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	.37	32.0	0.7%
NpB	Nappanee silt loam, 2 to 6 percent slopes	.37	2.0	0.0%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	63.3	1.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	.43	2.3	0.0%
Qu	Quarry		1.7	0.0%
W	Water		5.3	0.1%
Wa	Wabasha silty clay loam	.32	1.4	0.0%
Wh	Wabasha silty clay	.32	24.1	0.5%
Totals for Area of Interest			**4,731.0**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

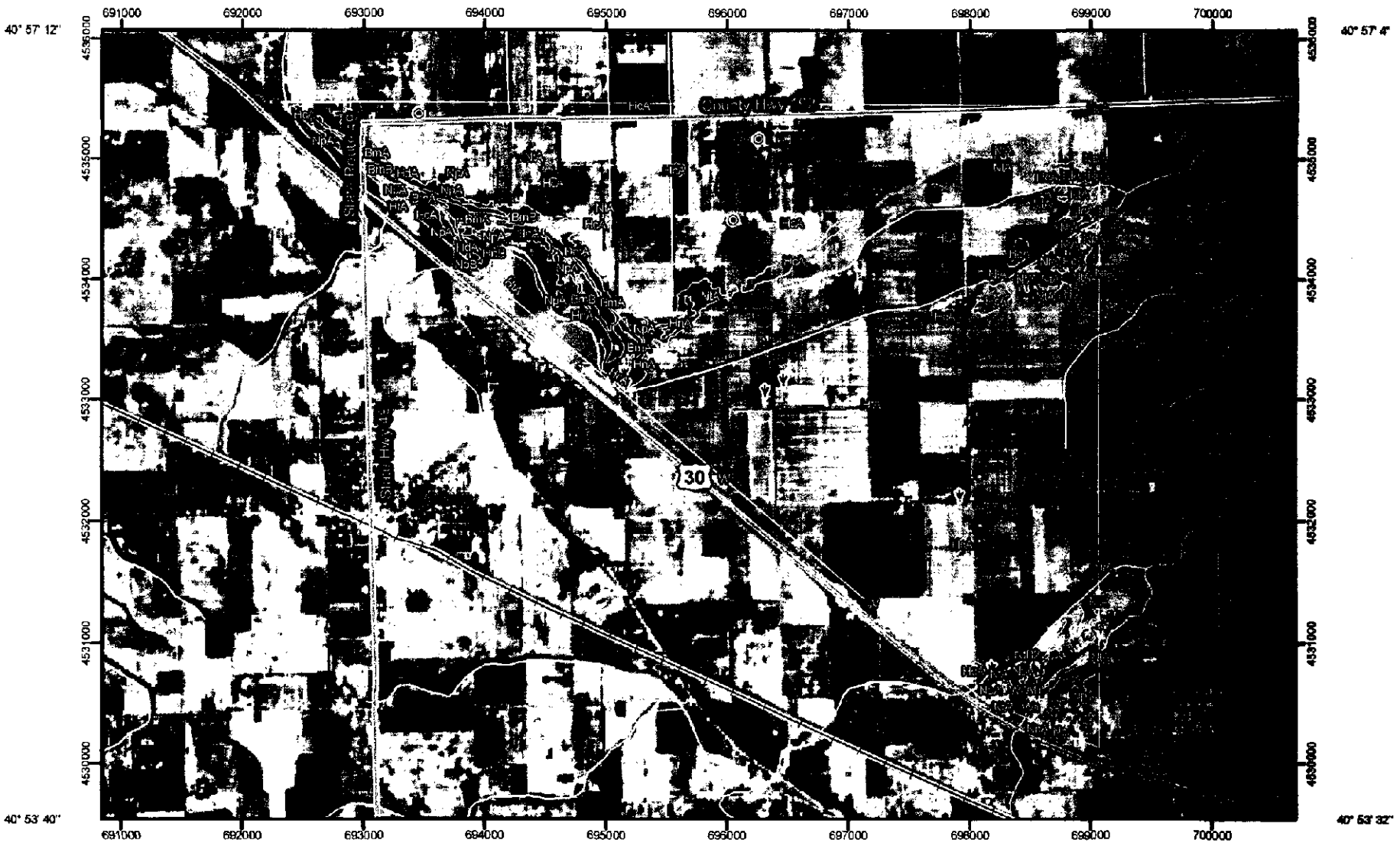
Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options: Surface Layer

Soil Map—Va[illegible]rt County, Ohio
(SW Area Blue Creek Wind Farm)



Map Scale: 1:46,800 if printed on A size (8.5" x 11") sheet.

N

Meters
0 500 1,000 2,000 3,000

Feet
0 2,500 5,000 10,000 15,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:46,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Van Wert County, Ohio (OH161)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BmA	Belmore loam, 0 to 2 percent slopes	34.7	0.7%
BmB	Belmore loam, 2 to 6 percent slopes	43.7	0.9%
DmA	Digby loam, 0 to 2 percent slopes	1.3	0.0%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	338.8	7.2%
HdA	Haney loam, 0 to 2 percent slopes	5.3	0.1%
HdB	Haney loam, 2 to 6 percent slopes	3.0	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	20.6	0.4%
HnB	Haskins loam, 2 to 6 percent slopes	4.4	0.1%
Hs	Hoytville silty clay loam, moderately shallow variant	0.7	0.0%
HtA	Hoytville silty clay, 0 to 1 percent slopes	4,145.3	87.6%
Md	Mermill silt loam	0.8	0.0%
Me	Millgrove silt loam	0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	32.0	0.7%
NpB	Nappanee silt loam, 2 to 6 percent slopes	2.0	0.0%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	63.3	1.3%
NtB2	Nappanee silty clay loam, 2 to 6 percent slopes, moderately eroded	2.3	0.0%
Qu	Quarry	1.7	0.0%
W	Water	5.3	0.1%
Wa	Wabasha silty clay loam	1.4	0.0%
Wh	Wabasha silty clay	24.1	0.5%
Totals for Area of Interest		**4,731.0**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)—Van Wert County, Ohio
(Westren Area Blue Creek Wind Farm)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:39,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Erosion Hazard (Off-Road, Off-Trail)

Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Van Wert County, Ohio						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
BmB	Belmore loam, 2 to 6 percent slopes	Slight	Belmore (100%)		5.2	0.1%
DmA	Digby loam, 0 to 2 percent slopes	Slight	Digby (90%)		9.9	0.1%
DmB	Digby loam, 2 to 6 percent slopes	Slight	Digby (90%)		4.8	0.1%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	Slight	Hoytville (91%)		559.6	7.1%
			Nappanee (9%)			
HdB	Haney loam, 2 to 6 percent slopes	Slight	Haney (100%)		4.2	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	Slight	Haskins (92%)		19.1	0.2%
HnB	Haskins loam, 2 to 6 percent slopes	Slight	Haskins (88%)		12.6	0.2%
Hs	Hoytville silty clay loam, moderately shallow variant	Slight	Hoytville Variant (100%)		44.2	0.6%
HtA	Hoytville silty clay, 0 to 1 percent slopes	Slight	Hoytville (92%)		6,812.8	86.2%
			Nappanee (8%)			
Md	Mermill silt loam	Slight	Mermill (100%)		4.0	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	Slight	Nappanee (91%)		88.9	1.1%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	Slight	Nappanee (92%)		223.7	2.8%
Qu	Quarry	Not rated	Quarry (100%)		112.4	1.4%
W	Water	Not rated	Water (100%)		2.0	0.0%
Totals for Area of Interest					**7,904.3**	**100.0%**

Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Slight	7,789.9	98.6%
Null or Not Rated	114.3	1.4%
Totals for Area of Interest	**7,904.3**	**100.0%**

Description

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "*moderate*," "*severe*," or "*very severe*." *A rating of "slight" indicates that erosion is* unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

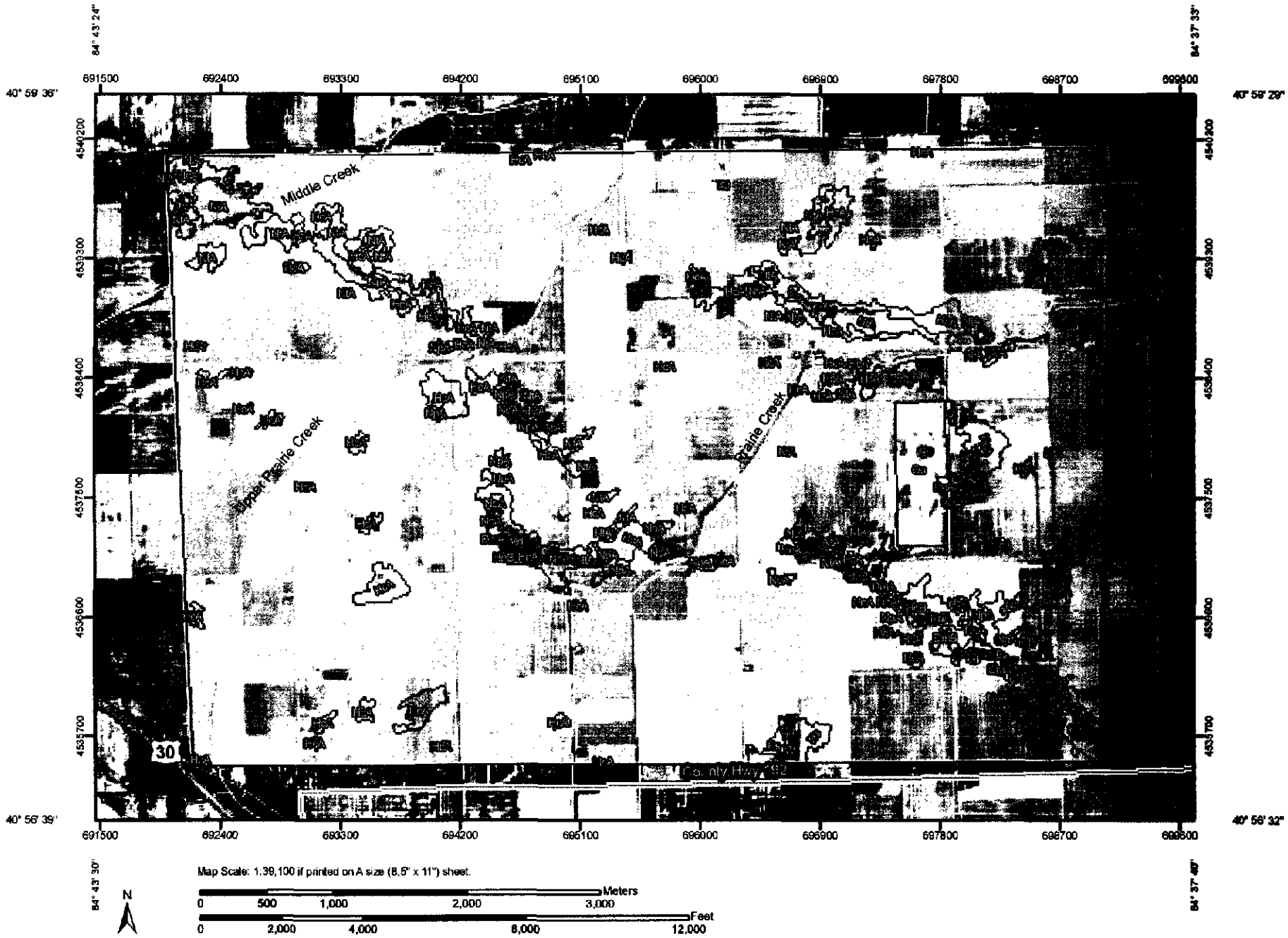
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

K Factor, Whole Soil—Van Wert County, Ohio
(Westren Area Blue Creek Wind Farm)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- .02
- .05
- .10
- .15
- .17
- .20
- .24
- .28
- .32
- .37
- .43
- .49
- .55
- .64
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:39,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Van Wert County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BmB	Belmore loam, 2 to 6 percent slopes	.32	5.2	0.1%
DmA	Digby loam, 0 to 2 percent slopes	.32	9.9	0.1%
DmB	Digby loam, 2 to 6 percent slopes	.32	4.8	0.1%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	.24	559.6	7.1%
HdB	Haney loam, 2 to 6 percent slopes	.32	4.2	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	.37	19.1	0.2%
HnB	Haskins loam, 2 to 6 percent slopes	.37	12.6	0.2%
Hs	Hoytville silty clay loam, moderately shallow variant	.28	44.2	0.6%
HtA	Hoytville silty clay, 0 to 1 percent slopes	.20	6,812.8	86.2%
Md	Mermill silt loam	.32	4.0	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	.37	0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	.37	88.9	1.1%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	.43	223.7	2.8%
Qu	Quarry		112.4	1.4%
W	Water		2.0	0.0%
Totals for Area of Interest			7,904.3	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options: Surface Layer

Soil Map—Van Wert County, Ohio
(Westren Area Blue Creek Wind Farm)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:39,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Van Wert County, Ohio (OH161)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BmB	Belmore loam, 2 to 6 percent slopes	5.2	0.1%
DmA	Digby loam, 0 to 2 percent slopes	9.9	0.1%
DmB	Digby loam, 2 to 6 percent slopes	4.8	0.1%
HcA	Hoytville silty clay loam, 0 to 1 percent slopes	559.6	7.1%
HdB	Haney loam, 2 to 6 percent slopes	4.2	0.1%
HnA	Haskins loam, 0 to 2 percent slopes	19.1	0.2%
HnB	Haskins loam, 2 to 6 percent slopes	12.6	0.2%
Hs	Hoytville silty clay loam, moderately shallow variant	44.2	0.6%
HtA	Hoytville silty clay, 0 to 1 percent slopes	6,812.8	86.2%
Md	Mermill silt loam	4.0	0.1%
NaA	Nappanee loam, 0 to 2 percent slopes	0.8	0.0%
NpA	Nappanee silt loam, 0 to 2 percent slopes	88.9	1.1%
NtA	Nappanee silty clay loam, 0 to 2 percent slopes	223.7	2.8%
Qu	Quarry	112.4	1.4%
W	Water	2.0	0.0%
Totals for Area of Interest		7,904.3	100.0%

Van Wert County, Ohio

HcA—Hoytville silty clay loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 570 to 800 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 155 to 220 days

Map Unit Composition

Hoytville and similar soils: 91 percent
Minor components: 9 percent

Description of Hoytville

Setting

Landform: Flats, depressions, drainageways
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Wave-planed wisconsinan till

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 46 to 70 inches to dense material
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Land capability (nonirrigated): 2w

Typical profile

0 to 9 inches: Silty clay loam
9 to 38 inches: Clay
38 to 58 inches: Clay loam
58 to 80 inches: Clay loam

Minor Components

Nappanee

Percent of map unit: 9 percent
Landform: Rises on lake plains
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Linear

Across-slope shape: Convex

Data Source Information

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Paulding County, Ohio

Lc—Latty silty clay

Map Unit Setting

Elevation: 570 to 990 feet
Mean annual precipitation: 27 to 39 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 140 to 165 days

Map Unit Composition

Latty and similar soils: 95 percent
Minor components: 5 percent

Description of Latty

Setting

Landform: Flats, drainageways, depressions
Parent material: Clayey glaciolacustrine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Available water capacity: Moderate (about 6.4 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 11 inches: Silty clay
11 to 42 inches: Clay
42 to 80 inches: Silty clay

Minor Components

Fulton

Percent of map unit: 3 percent
Landform: Lake plains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex

Nappanee

Percent of map unit: 2 percent
Landform: Lake plains
Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear

Data Source Information

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Paulding County, Ohio

NpA—Nappanee silty clay loam, 0 to 2 percent slopes

Map Unit Setting

Elevation: 600 to 800 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 140 to 170 days

Map Unit Composition

Nappanee and similar soils: 90 percent
Minor components: 10 percent

Description of Nappanee

Setting

Landform: Lake plains
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 10 inches: Silty clay loam
10 to 27 inches: Silty clay
27 to 80 inches: Silty clay loam

Minor Components

Latty

Percent of map unit: 10 percent

Landform: Depressions, drainageways

Data Source Information

Soil Survey Area: Paulding County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Van Wert County, Ohio

HtA—Hoytville silty clay, 0 to 1 percent slopes

Map Unit Setting

Elevation: 710 to 800 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 155 to 220 days

Map Unit Composition

Hoytville and similar soils: 92 percent
Minor components: 8 percent

Description of Hoytville

Setting

Landform: Flats, depressions, drainageways
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Wave-planed wisconsinan till

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 48 to 75 inches to dense material
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Available water capacity: Moderate (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 2w

Typical profile

0 to 8 inches: Silty clay
8 to 39 inches: Clay
39 to 60 inches: Silty clay loam
60 to 80 inches: Clay loam

Minor Components

Nappanee

Percent of map unit: 8 percent
Landform: Rises on lake plains
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Linear

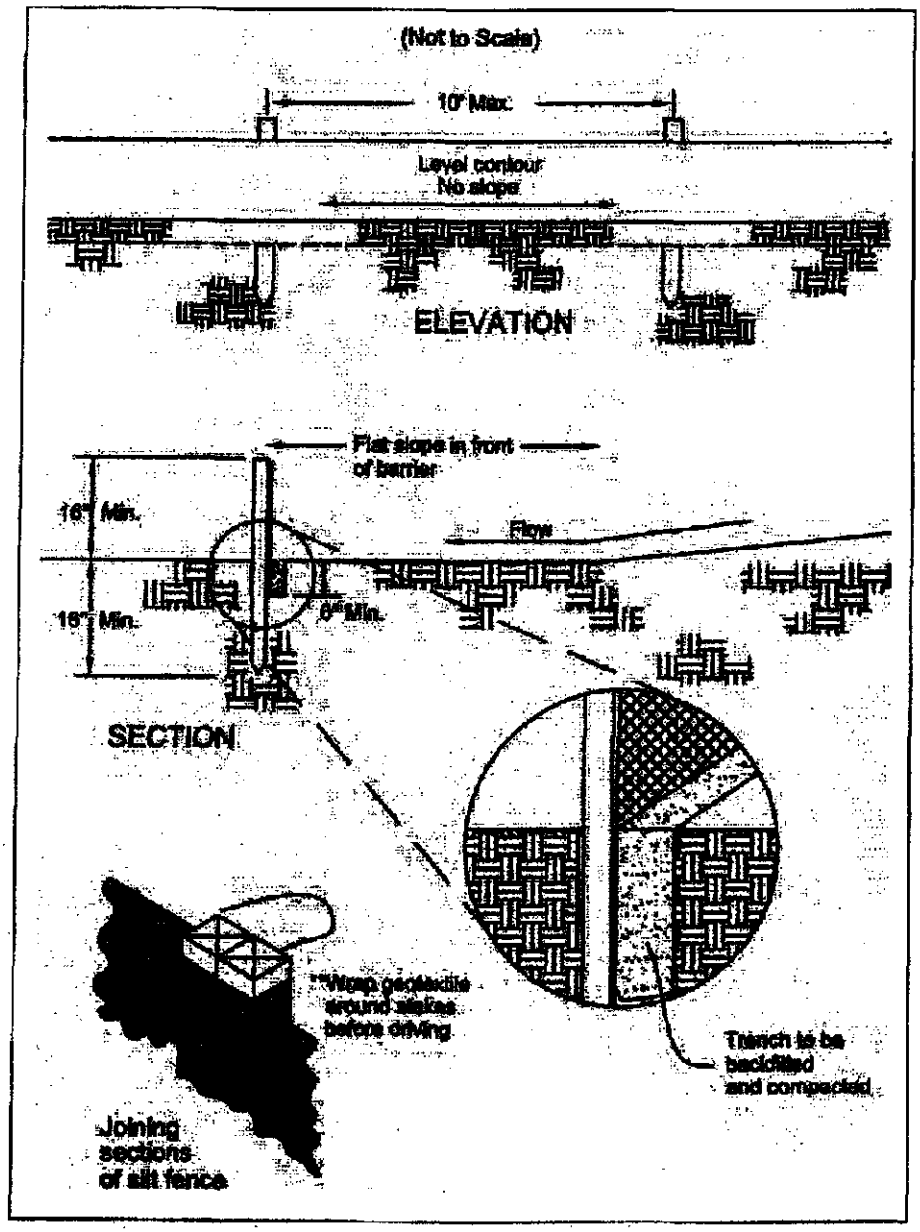
Across-slope shape: Convex

Data Source Information

Soil Survey Area: Van Wert County, Ohio
Survey Area Data: Version 9, Sep 16, 2009

Specifications
for

Silt Fence



Specifications
for

Silt Fence

1. Silt fence shall be constructed before upslope land disturbance begins.
2. All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
3. Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
4. Silt fence shall be placed on the flattest area available.
5. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
6. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.
7. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
8. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.
9. Seams between sections of silt fence shall be spliced together only at a support post with a minimum 6-in. overlap prior to driving into the ground, (see details).
10. Maintenance—Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flows under the fabric or around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

    Sediment deposits shall be routinely removed when the deposit reaches approximately one-half of the height of the silt fence.

    Silt fences shall be inspected after each rainfall and at least daily during a prolonged rainfall. The location of existing silt fence shall be reviewed daily to ensure its proper location and effectiveness. If damaged, the silt fence shall be repaired immediately.

Criteria for silt fence materials

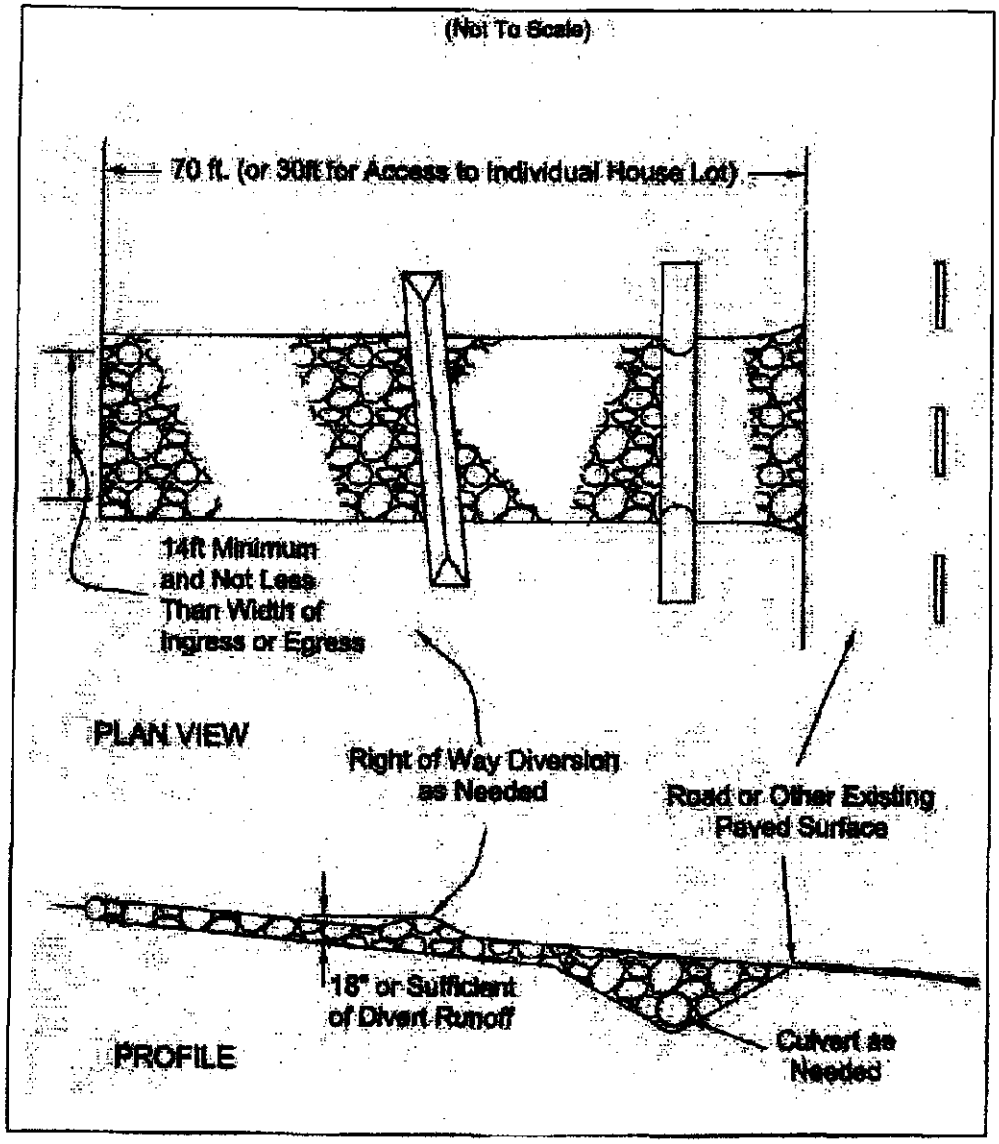
1. Fence post – The length shall be a minimum of 32 inches. Wood posts will be 2-by-2-in. nominal dimensioned hardwood of sound quality. They shall be free of knots, splits and other visible imperfections, that will weaken the posts. The maximum spacing between posts shall be 10 ft. Posts shall be driven a minimum 16 inches into the ground, where possible. If not possible, the posts shall be adequately secured to prevent overturning of the fence due to sediment/water loading.
2. Silt fence fabric – See chart below.

Table 6.3.2 Minimum criteria for Silt Fence Fabric (ODOT, 2002)

Fabric Properties	Values	Test Method
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	1X10-2 sec.-1	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

Specifications
for

Construction Entrance



Specifications
for

Construction Entrance

1. Stone Size—ODOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.
2. Length—The Construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to single residence lots).
3. Thickness -The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.
4. Width -The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.
5. Geotextile -A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the following specifications:

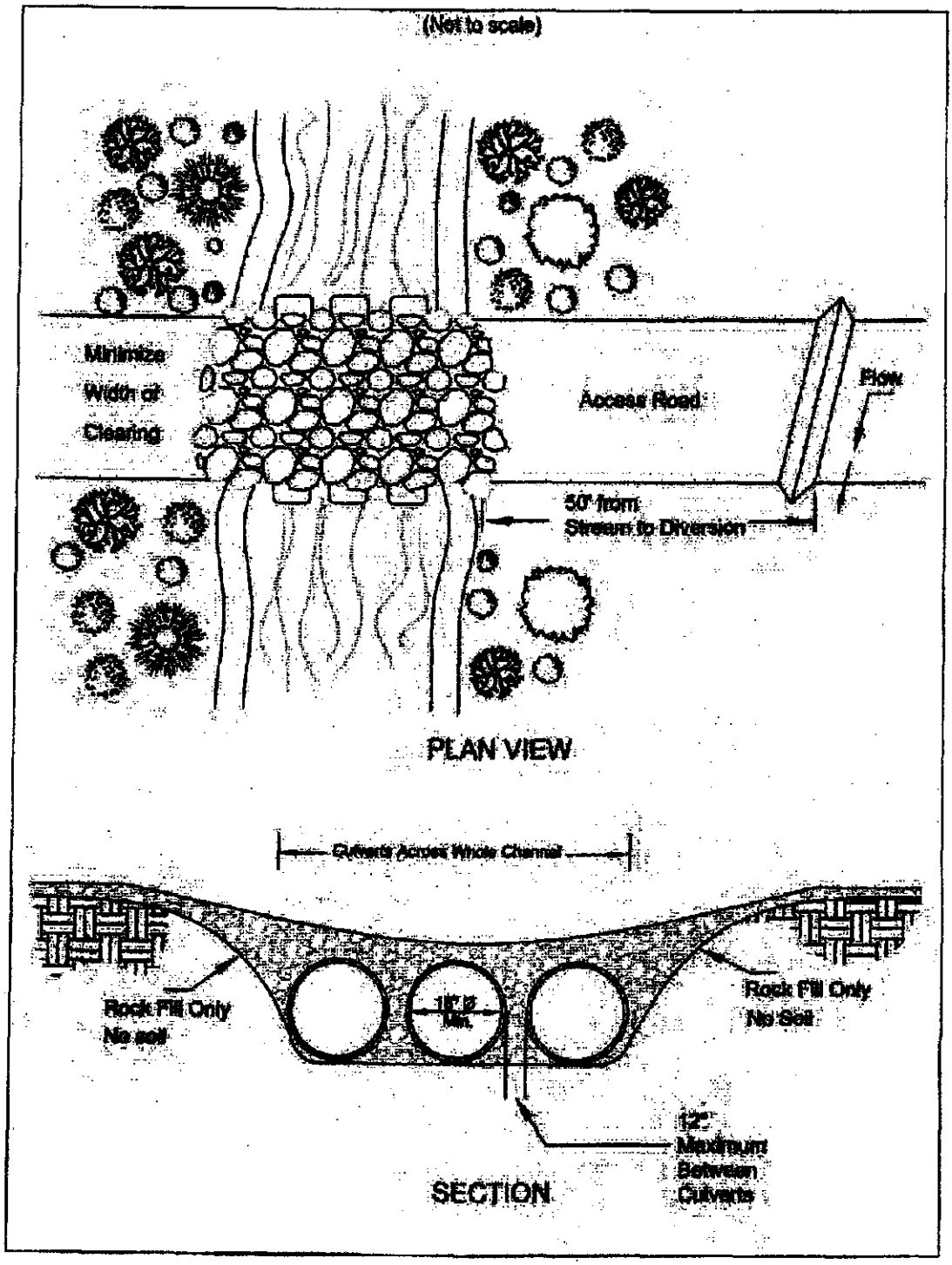
Figure 7.4.1

[illegible]	
Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm.
Permittivity	1×10-3 cm/sec.

6. Timing—The construction entrance shall be installed as soon as is practicable before major grading activities.
7. Culvert -A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.
8. Water Bar -A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.
9. Maintenance -Top dressing of additional stone shall be applied as conditions demand. Mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal shall be accomplished by scraping or sweeping.
10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter and leave the construction-site shall be restricted from muddy areas.
11. Removal—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

Specifications
for

Culvert Stream Crossing



Specifications
for

Culvert Stream Crossing

1. Stream Disturbance -Disturbance to the stream shall be kept to a minimum. Streambank vegetation shall be preserved to the maximum extent practical and the stream crossing shall be as narrow as practical.
2. Clearing shall be done by cutting NOT grubbing. The roots and stumps shall be left in place to help stabilize the banks and accelerate revegetation.
3. To minimize interference with fish spawning and migration, crossing construction should be avoided where practical from March 15 through June 15.
4. Water shall not be allowed to flow along the road directly to the stream. Diversions and swales shall direct runoff away from the access road to a sediment-control practice.
5. Placement -Culverts shall be placed on the existing streambed to avoid a drop or waterfall at the downstream end of the pipe, which would be a barrier to fish migration. Crossings shall be made in shallow areas rather than deep pools where possible.
6. Culvert Size -Culvert diameter shall be at least three times the depth of normal stream flow at the point of the stream crossing. If the crossing must be placed in deep, slow-moving pools, the culvert diameter may be reduced to twice the depth of normal stream flow. The minimum size culvert that may be used is 18 in.
7. Number of Culverts -There shall be sufficient number of culverts to completely cross the stream channel from streambank to streambank with no more than a 12-in. space between each one.
8. Fill and Surface Material -All material placed in the stream channel, around the culverts and on the surface of the crossing shall be stone, rock or aggregate. ODOT No. 1 shall be the minimum acceptable size. To prevent washouts, larger stone and rock may be used and they may be placed in gabion mattresses. NO SOIL SHALL BE USED IN THE CONSTRUCTION OF A STREAM CROSSING OR PLACED IN THE STEAM CHANNEL.
9. Removal -Aggregate stone and rock used for this structure does not need to be removed. Care should be taken so that any aggregate left does not create an impoundment or impede fish passage. All pipes, culverts, gabions or structures must be removed.
10. Stabilization -Streambanks shall be stabilized. Plantings shall include woody vegetation where practical.

5.7 Dewatering Measures

Description

Dewatering measures provide a stable area for receiving and treating water pumped from excavation or work areas prior to being released off the site. These practices reduce sediment impacts to downstream water resources.

Conditions Where Practice Applies

De-watering measures are used whenever water, either surface or subsurface, prevents or hinders construction activities and has the potential of contributing sediment to streams. This practice is appropriate for any kind of pumping used in conjunction with construction activities.

Planning Considerations

Construction activities often require that water be pumped from an area to facilitate work. This water often has large amounts of suspended sediments. Rather than discharge this water directly to a stream, a means to settle or remove sediment must be provided.

A dewatering plan should be prepared utilizing ground water conditions and soils information to predict areas where de-watering will likely occur. Plans should include the length of time de-watering will occur, the method of de-watering (pumping, siphon...), the discharge point(s), methods to control sediment impacts and the contents of a written log to be kept on-site. These plans may need to be approved by local authorities prior to construction.

All dewatering discharges with suspended solids should pass through a practice to remove sediments. While a vegetated filter areas may be sufficient for some situations (e.g. short duration low pumping rates) many will need additional measures, such as sediment traps.

filter bag or flocculation. All structures must have adequate outlet protection to prevent gully erosion. Please note that the Ohio Environmental Protection Agency will find turbid discharges to the stream resulting from any dewatering activity a violation of Ohio Revised Code 6111.04 independent of the methods employed. Therefore even if one method is selected, additional measures may be required to fully treat turbid water.

The particle size distribution, that is the relative proportion of sands, silts and clays, of a soil that is suspended will determine the difficulty of removing sediments. Soils with coarser particle size distributions (large proportion of sand) will be easier to settle out with filter strips and settling ponds. Finer particle size distributions (predominantly silt and clays) will be increasingly difficult and may need a series of measures.

Ground Water Lowering: Often dewatering wells are established to lower the ground water table for utility installation or construction. Generally, this water is free from suspended solids and may be discharged to waters of the state provided the water is not contaminated.

Measures should be taken to ensure the discharge from the de-watering wells does not flow over disturbed areas and suspend sediments, resulting in contaminated discharge. Waterways established to transport dewatering flow should be protected from erosion from the point of discharge all the way to waters of the state. Extending hoses to waters of the state will ensure the discharge remains free from suspended solids. This practice is recommended for discharges of short duration.

Water pumped from wells is about 55^{0} F, which may cause thermal impacts in some situations. High pumping rates near small streams in summer will have major changes in stream metabolism, i.e., throw off spawning. Where this potential occurs, groundwater should not be discharged directly to the stream but roughed through settling ponds or other shallow holding ponds.

The Ohio Department of Natural Resources, Division of Water requires a Water Withdraw Registration for the de-watering activities in the event the facility has the capacity of pumping in excess of 100, 000 gallons per day. This registration must be submitted to ODNR within 90 days following the completion of the project. A water withdraw registration can be obtained by contacting ODNR, Division of Water at 614-265-6735. Assistance regarding proper well installation and abandonment is also available.

Design Criteria

Vegetated Filter Areas: Densely vegetated areas may offer sufficient conditions to treat short duration discharges provided that: flow is not channelized directly to a water resource and the area encourages infiltration, slow overland flow and settling. A minimum of 100 feet is required to utilize a vegetated area. Dense grass or areas with natural depressions will provide the best conditions. Critical areas like wetlands (e.g. vernal pools) or areas with sensitive vegetation that will be damaged (smothering) by sedimentation should not be used.

Sediment trap or basin: In most cases, contaminated discharge should be directed to a sediment trap where the suspended solids can settle/filter out prior to the discharge to waters of the state. Sediment traps should have sufficient storage to receive all the discharged water from pumping and detain this water a minimum of 24 hours. The sediment storage volume is directly related to the pumping capacity and the amount of turbidity. The sediment pond should be designed to optimize the amount of travel time through the impoundment.

The sediment pond should not be more than 4 feet deep with the distance between the intake and outlet maximized to the extent practical.

Pump intakes should withdraw water from the surface of the trench or work area in order not to re-suspend or continually mix water. Continually drawing water from the floor of the area will draw the muddiest water and increase the amount of sediment that must be removed.

Geotextile Filter Bags are a increasingly common way to remove sediment from dewatering discharge. Commonly discharge is pumped into a filter bag chosen for the predominant sediment size. Filter bags are manufactured products made typically from woven monofilament polypropylene textile (coarse materials, e.g. sands) or non-woven geotextile (silts/clays). They are single use products that must be replaced when they become clogged or half full of sediment.

While they may be useful, they are generally high flow products, which have limited ability to treat fine-grained sediments. Gravity drained filter bags should apply the following:

- They should place outside of a vegetated filter area and not in close proximity to the stream or water resource.
- They must sit on a relatively flat grade so that water leaving the bag does cause additional erosion. Placing the bag on a flat bed of aggregate will maximize the flow and useful surface area of the bag.
- They should be used in conjunction with a large vegetative buffer or a secondary pond or barrier

Enhanced Treatment Through Multiple Practices. The need for further reduction in turbidity will likely require more than one treatment measure. The following are devices or measures that when used in sequence with others will reduce turbidity.

Filter bags (gravity flow) are highly variable depending on the pore size and flow rate. Typically filter bags are limited to removing large particles (small sands and large silts).

Sediment traps, weir tanks, filter boxes are effective for the removal of large particles such as sand. Their effective increases as detention times increase.

Sand Media Filters effective for removal of smaller particles such as sand and large silts. These often have the ability to backflush and thus maintain effectiveness and flow rate.

Some commercially available additives are available for further decreasing turbidity. Chitosan and chitin based additives have been shown to significantly increase the effectiveness of filtration and settling. Chitosan (Poly-D-glucosamine) is a low-toxicity product extracted from Chitin (Poly-N-acetyl-D-glucosamine), a by-product of the shellfish industry. Other products such as anionic polyacrylamide (anionic PAM) are commercially available to increase settling. Often these are utilized through wet or dry dosing mechanisms or as water runs over a gel block upstream of a settling or filtration practice. Each product should be utilized within the manufacturers specifications and tailored to the soil and site conditions.

Particulate filter units utilizing cartridges or enclosed filter bags can remove smaller particles depending on the filter size. This type of measure is usually necessary to treat clays. Filters may be need to be changed daily or more frequently.

An example of an enhanced treatment might include: dewatering a trench with a trash pump to a settling tank or pit then pumping from the settling practice to a sand media filter or to a particulate filter.

Common Problems/Concerns

Complete settling of solids within the Sediment Basin does not occur prior to discharge. The length to width ratio of the pond must be increased to lengthen travel time through the structure. In addition, flocculent may be necessary to promote settlement.

Water discharged from subsurface/ground water pumping maybe significantly lower in temperature than that of the receiving stream. The water will need pre-conditioned in order to minimize the biological affects on the stream.

References

Virginia Department of Conservation and Recreation, 2002. *Erosion & Sediment Control Technical Bulletin #2: Application of Anionic Polyacrylimide for soil stabilization and stormwater management.* http://www.dcr.state.va.us/sw/docs/anolnic.pdf

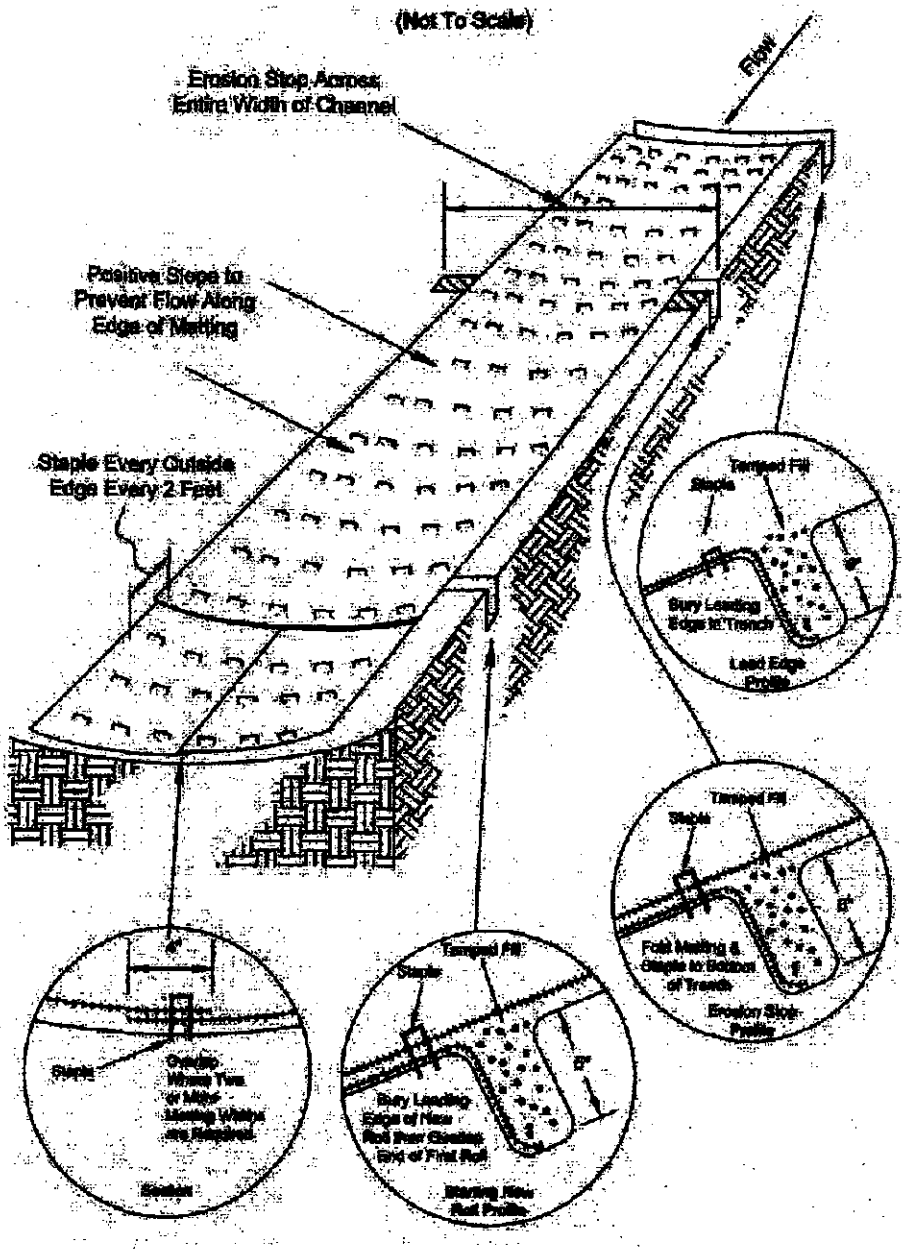
Specifications
for

De-Watering

1. A de-watering plan shall be developed prior to the commencement of any pumping activities.
2. The de-watering plan shall include all pumps and related equipment necessary for the dewatering activities and designate areas for placement of practices. Outlets for practices shall be protected from scour either by riprap protection, fabric liner, or other acceptable method of outlet protection.
3. Water that is not discharged into a settling/treatment basin but directly into waters of the state shall be monitored hourly. Discharged water shall be within +/- 5° F of the receiving waters.
4. Settling basins shall not be greater than four (4) feet in depth. The basin shall be constructed for sediment storage as outlined in Chapter 6, SEDIMENT BASIN OR SEDIMENT TRAP. The inlet and outlet for the basin shall be located at the furthest points of the storage. A floating outlet shall be used to ensure that settled solids do not re-suspend during the discharge process. The settling basin shall be cleaned out when the storage has been reduced by 50% of its original capacity.
5. All necessary National, State and Local permits shall be secured prior to discharging into waters of the state

Specifications
for

Temporary Rolled Erosion Control Product



Specifications
for

Temporary Rolled Erosion Control Product

1. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2"-3" of topsoil above final grade. Incorporate amendments such as lime and fertilizer into soil. Remove all rocks, clods, vegetation or other debris so that installed RECP will have direct contact with the soil surface.
2. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

Slope Installation

3. Excavate top and bottom trenches (12"x6"). Intermittent erosion check slots (6"x6") may be required based on slope length. Excavate top anchor trench 2' x 3' over crest of the slope.
4. If intermittent erosion check slots are required, install RECP in 6"x6" slot at a maximum of 30' centers or the mid point of the slope. RECP should be stapled into trench on 12" centers.
5. Install RECP in top anchor trench, anchor on 12" spacings, backfill and compact soil.
6. Unroll RECP down slope with adjacent rolls overlapped a minimum of 3". Anchor the seam every 18". Lay the RECP loose to maintain direct soil contact, do not pull taught.
7. Overlap roll ends a minimum of 12" with upslope RECP on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12".
8. Install RECP in bottom anchor trench (12"x6"), anchor every 12". Place all other staples throughout slope at 1 to 2.5 per square yard dependant on slope. Refer to manufacturer's anchor guide.

Channel Installation

9. Excavate initial anchor trench (12"x6") across the lower end of the project area.
10. Excavate intermittent check slots (6"x6") across the channel at 30' intervals along the channel.
11. Excavate longitudinal channel anchor slots (4"x4") along both sides of the channel to bury the edges. Whenever possible extend the RECP 2'-3' above the crest of channel side slopes.
12. Install RECP in initial anchor trench (downstream) anchor every 12", backfill and compact soil.
13. Roll out RECP beginning in the center of the channel toward the intermittent check slot. Do not pull taught. Unroll adjacent rolls upstream with a 3" minimum overlap (anchor every 18") and up each channel side slope.
14. At top of channel side slopes install RECP in the longitudinal anchor slots, anchor every 18".
15. Install RECP in intermittent check slots. Lay into trench and secure with anchors every 12", backfill with soil and compact.
16. Overlap roll ends a minimum of 12" with upstream RECP on top for a shingling effect. Begin all new rolls in an intermittent check slot, double anchored every 12".
17. Install upstream end in a terminal anchor trench (12"x6"); anchor every 12", backfill and compact.
18. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Longer anchors may be required in loose sandy or gravelly soils.

Specifications
for

Mulching

1. Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.
2. Mulch shall consist of one of the following:

- Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/ac. or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sq.ft. sections and place two 45-lb. bales of straw in each section.
- Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
- Other - Acceptable mulches include mulch mattings and rolled erosion control products applied according to manufacturer's recommendations or wood mulch/chips applied at 10-20 tons/ac.

3. Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch.

- Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
- Mulch Nettings - Use according to the manufacturer's recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
- Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equal may be used at rates recommended by the manufacturer. All applications of Synthetic Binders must be conducted in such a manner where there is no contact with waters of the state.
- Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

Specifications
for

Temporary Seeding

Table 7.8.1 Temporary Seeding Species Selection

Seeding Dates	Species	Lb/1000 ft2	Lb/Acre
March 1 to August 15	Oats	3	128 (4 Bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Ryegrass	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Annual Ryegrass	1.25	55
	Perennial Ryegrass	3.25	142
	Creeping Red Fescue	0.4	17
	Kentucky Bluegrass	0.4	17
	Oats	3	128 (3 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
August 16th to November	Rye	3	112 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Wheat	3	120 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Rye	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Annual Ryegrass	1.25	40
	Perennial Ryegrass	3.25	40
	Creeping Red Fescue	0.4	40
	Kentucky Bluegrass	0.4	
November 1 to Feb. 29	Use mulch only or dormant seeding		

Note: Other approved species may be substituted.

1. Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.
2. Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These idle areas shall be seeded within 7 days after grading.
3. The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if ideal seedbed preparation is not possible.
4. Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.
5. Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cultipacker seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.

Specifications
for

Temporary Seeding

Mulching Temporary Seeding

1. Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seedings made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.

2. Materials:

- Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./ 1,000 sq. ft. (2-3 bales)
- Hydroseeders—If wood cellulose fiber is used, it shall be used at 2000 lbs./ ac. or 46 lb./ 1,000-sq.-ft.
- Other—Other acceptable mulches include mulch mattings applied according to manufacturer's recommendations or wood chips applied at 6 ton/ ac.

3. Straw Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods:

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturers recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates recommended by the manufacturer.
- Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

Specifications
for

Permanent Seeding

Site Preparation

1. Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. (Maximizing infiltration will help control both runoff rate and water quality.) Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
2. The site shall be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding.
3. Topsoil shall be applied where needed to establish vegetation.

Seedbed Preparation

1. Lime—Agricultural ground limestone shall be applied to acid soil as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
2. Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1000 pounds per acre of a 10-10-10 or 12-12-12 analyses.
3. The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

Seeding Dates and Soil Conditions

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seedbed preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, see the following section on dormant seeding.

Dormant Seedings

1. Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
2. The following methods may be used for "Dormant Seeding":

- From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type of seeding.
- From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilize, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
- Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
- Where feasible, except when a cultipacker type seeder is used, the seedbed should be firmed following seeding operations with a cultipacker, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

Mulching

1. Mulch material shall be applied immediately after seeding. Dormant seeding shall be mulched. 100% of the ground surface shall be covered with an approved material.
2. Materials

- Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically applied so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
- Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
- Other—Other acceptable mulches include rolled erosion control mattings or blankets applied according to manufacturer's recommendations or wood chips applied at 6 tons per acre.

3. Straw and Mulch Anchoring Methods

Straw mulch shall be anchored immediately to minimize loss by wind or water.

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but, generally, be left longer than 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Asphalt Emulsion—Asphalt shall be applied as recommended by the manufacture or at the rate of 160 gallons per acre.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equivalent may be used at rates specified by the manufacturer.
- Wood Cellulose Fiber—Wood cellulose fiber shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water with the mixture containing a maximum of 50 pounds cellulose per 100 gallons of water.

Irrigation

Permanent seeding shall include irrigation to establish vegetation during dry weather or on adverse site conditions, which require adequate moisture for seed germination and plant growth.

Irrigation rates shall be monitored to prevent erosion and damage to seeded areas from excessive runoff.

Table 7.10.2 Permanent Seeding

Seed Mix	Seeding Rate		Notes:
	Lbs./acre	Lbs./1,000 Sq. Feet	
General Use			
Creeping Red Fescue Domestic Ryegrass Kentucky Bluegrass	20-40 10-20 20-40	1/2-1 1/4-1/2 1/2-1	For close mowing & for waterways with <2.0 ft/sec velocity
Tall Fescue	40-50	1-1 1/4	
Turf-type (dwarf) Fescue	90	2 1/4	
Steep Banks or Cut Slopes			
Tall Fescue	40-50	1-1 1/4	
Crown Vetch Tall Fescue	10-20 20-30	1/4-1/2 1/2-3/4	Do not seed later than August
Flat Pea Tall Fescue	20-25 20-30	1/2-3/4 1/2-3/4	Do not seed later than August
Road Ditches and Swales			
Tall Fescue	40-50	1-1 1/4	
Turf-type (Dwarf) Fescue Kentucky Bluegrass	90 5	2 1/4 0.1	
Lawns			
Kentucky Bluegrass Perennial Ryegrass	100-120	2 2	
Kentucky Bluegrass Creeping Red Fescue	100-120	2 1-1/2	For shaded areas

Note: Other approved seed species may be substituted.

Specifications
for

Dust Control

1. Vegetative Cover and/mulch – Apply temporary or permanent seeding and mulch to areas that will remain idle for over 21 days. Saving existing trees and large shrubs will also reduce soil and air movement across disturbed areas. See Temporary Seeding; Permanent Seeding; Mulching Practices; and Tree and Natural Area Protection practices.
2. Watering – Spray site with water until the surface is wet before and during grading and repeat as needed, especially on haul roads and other heavy traffic routes. Watering shall be done at a rate that prevents dust but does not cause soil erosion. Wetting agents shall be utilized according to manufacturers instructions.
3. Spray-On Adhesives – Apply adhesive according to the following table or manufacturers' instructions.

Table 7.6a Adhesives for Dust Control

[illegible]	[illegible] (Adhesive:Water)	[illegible] Type	[illegible] Rate Gal/Ac
Latex Emulsion	12.5:1	Fine	235
Resin in Water Acrylic Emulsion (No-traffic)	4:1	Fine	300
Acrylic Emulsion (No-traffic)	7:1	Coarse	450
Acrylic Emulsion (Traffic)	3.5:1	Coarse	350

4. Stone – Graded roadways and other suitable areas will be stabilized using crushed stone or coarse gravel as soon as practicable after reaching an interim or final grade. Crushed stone or coarse gravel can be used as a permanent cover to provide control of soil emissions.
5. Barriers – Existing windbreak vegetation shall be marked and preserved. Snow fencing or other suitable barrier may be placed perpendicular to prevailing air currents at intervals of about 15 times the barrier height to control air currents and blowing soil.
6. Calcium Chloride - This chemical may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage. Application rates should be strictly in accordance with suppliers' specified rates.
7. Operation and Maintenance - When Temporary Dust Control measures are used; repetitive treatment should be applied as needed to accomplish control.

   Street Cleaning - Paved areas that have accumulated sediment from construction should be cleaned daily, or as needed, utilizing a street sweeper or bucket -type endloader or scraper.

Specifications
for

Additional Construction Site Pollution Controls

1. Construction personnel, including subcontractors who may use or handle hazardous or toxic materials, shall be made aware of the following general guidelines regarding disposal and handling of hazardous and construction wastes:
   - Prevent spills
   - Use products up
   - Follow label directions for disposal
   - Remove lids from empty bottles and cans when disposing in trash
   - Recycle wastes whenever possible
   - Don't pour into waterways, storm drains or onto the ground
   - Don't pour down the sink, floor drain or septic tanks
   - Don't bury chemicals or containers
   - Don't burn chemicals or containers
   - Don't mix chemicals together
2. **Containers shall be provided for the proper collection of all waste material including construction debris, trash, petroleum products and any hazardous materials used on-site.** Containers shall be covered and not leaking. All waste material shall be disposed of at facilities approved for that material. Construction Demolition and Debris (CD&D) waste must be disposed of at an Ohio EPA approved CD&D landfill.
3. **No construction related waste materials are to be buried on-site.** By exception, clean fill (bricks, hardened concrete, soil) may be utilized in a way which does not encroach upon natural wetlands, streams or floodplains or result in the contamination of waters of the state.
4. **Handling Construction Chemicals.** Mixing, pumping, transferring or other handling of construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.
5. **Equipment Fueling and Maintenance,** oil changing, etc., shall be performed away from watercourses, ditches or storm drains, in an area designated for that purpose. The designated area shall be equipped for recycling oil and catching spills. Secondary containment shall be provided for all fuel oil storage tanks. These areas must be inspected every seven days and within 24 hrs. of a 0.5 inch or greater rain event to ensure there are no exposed materials which would contaminate storm water. Site operators must be aware that Spill Prevention Control and Countermeasures (SPCC) requirements may apply. An SPCC plan is required for sites with one single above ground tank of 660

gallons or more, accumulative above ground storage of 1330 gallons or more, or 42,000 gallons of underground storage. Contaminated soils must be disposed of in accordance with Item 8.

6. **Concrete Wash Water** shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance. A sump or pit with no potential for discharge shall be constructed if needed to contain concrete wash water. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged. For small projects, truck chutes may be rinsed away from any water conveyances.

7. **Spill Reporting Requirements:** Spills on pavement shall be absorbed with sawdust or kitty litter and disposed of with the trash at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA, the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills which contact waters of the state must be reported to Ohio EPA.

8. **Contaminated Soils.** If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto the soil, the soil should be dug up and disposed of at licensed sanitary landfill or other approved petroleum contaminated soil remediation facility. (not a construction/demolition debris landfill). Note that storm water run off associated with contaminated soils are not be authorized under Ohio EPA's General Storm Water Permit associated with Construction Activities.

9. **Open Burning.** No materials containing rubber, grease, asphalt, or petroleum products, such as tires, autoparts, plastics or plastic coated wire may be burned (OAC 3745-19). Open burning is not allowed in restricted areas, which are defined as: 1) within corporation limits; 2) within 1000 feet outside a municipal corporation having a population of 1000 to 10,000; and 3) a one mile zone outside of a corporation of 10,000 or more. Outside of restricted areas, no open burning is allowed within a 1000 feet of an inhabited building on another property. Open burning is permissible in a restricted area for: heating tar, welding, smudge pots and similar occupational needs, and heating for warmth or outdoor barbeques. Outside of restricted areas, open burning is permissible for landscape or land-clearing wastes (plant material, with prior written permission from Ohio EPA), and agricultural wastes, excluding buildings.

10. **Dust Control or dust suppressants** shall be used to prevent nuisance conditions, in accordance with the manufacturer's specifications and in a manner, which prevent a discharge to waters of the state. Sufficient distance must be provided between applications and nearby bridges, catch basins, and other waterways. Application (excluding water) may not occur when rain is imminent as noted in the short term forecast. Used oil may not be applied for dust control.

11. **Other Air Permitting Requirements:** Certain activities associated with construction will require air permits including but not limited to: mobile concrete batch plants, mobile asphalt plants, concrete crushers, large generators, etc. These activities will require specific Ohio EPA Air Permits for installation and operation. Operators must seek authorization from the corresponding district of Ohio EPA. For demolition of all

commercial sites, a Notification for Restoration and Demolition must be submitted to Ohio EPA to determine if asbestos corrective actions are required.

12. **Process Waste Water/Leachate Management.** Ohio EPA's Construction General Permit only allows the discharge of storm water and does not include other waste streams/discharges such as vehicle and/or equipment washing, on-site septic leachate concrete wash outs, which are considered process wastewaters. All process wastewaters must be collected and properly disposed at an approved disposal facility. In the event, leachate or septage is discharged; it must be isolated for collection and proper disposal and corrective actions taken to eliminate the source of waste water.

13. **A Permit To Install (PTI)** is required prior to the construction of all centralized sanitary systems, including sewer extensions, and sewerage systems (except those serving one, two, and three family dwellings) and potable water lines. Plans must be submitted and approved by Ohio EPA. Issuance of an Ohio EPA Construction General Storm Water Permit does not authorize the installation of any sewerage system where Ohio EPA has not approved a PTI.

ATTACHMENT B

Ohio EPA Permit No.: OHC000003

Effective Date: April 21, 2008
Expiration Date: April 20, 2013

OHIO ENVIRONMENTAL PROTECTION AGENCY

AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et. seq. hereafter referred to as "the Act") and the Ohio Water Pollution Control Act [Ohio Revised Code ("ORC") Chapter 6111], dischargers of storm water from sites where construction activity is being conducted, as defined in Part I.B of this permit, are authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA," to discharge from the outfalls at the sites and to the receiving surface waters of the State identified in their Notice of Intent ("NOI") application form on file with Ohio EPA in accordance with the conditions specified in Parts I through VII of this permit.

It has been determined that a lowering of water quality of various waters of the State associated with granting coverage under this permit is necessary to accommodate important social and economic development in the state of Ohio. In accordance with OAC 3745-1-05, this decision was reached only after examining a series of technical alternatives, reviewing social and economic issues related to the degradation, and considering all public and intergovernmental comments received concerning the proposal.

This permit is conditioned upon payment of applicable fees, submittal of a complete NOI application form and written approval of coverage from the director of Ohio EPA in accordance with Ohio Administrative Code ("OAC") Rule 3745-38-06.

Laura H. Powell

Laura H. Powell
Assistant Director

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: _____ Date: 4-21-08

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PART I. COVERAGE UNDER THIS PERMIT

A. Permit Area.

This permit covers the entire State of Ohio.

B. Eligibility.

1. Construction activities covered. Except for storm water discharges identified under Part I.B.2, this permit may cover all new and existing discharges composed entirely of storm water discharges associated with construction activity that enter surface waters of the State or a storm drain leading to surface waters of the State.

   For the purposes of this permit, construction activities include any clearing, grading, excavating, grubbing and/or filling activities that disturb one or more acres of land. Discharges from trench dewatering are also covered by this permit as long as the dewatering activity is carried out in accordance with the practices outlined in Part III.G.2.g.iv of this permit. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale.

   This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

   a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;

   b. The support activity is not a commercial operation serving multiple unrelated construction projects and does not operate beyond the completion of the construction activity at the site it supports;

   c. Appropriate controls and measures are identified in a storm water pollution prevention plan (SWP3) covering the discharges from the support activity; and

   d. The support activity is on or contiguous with the property defined in the NOI (off-site borrow pits and soil disposal areas, which serve only one project, do not have to be contiguous with the construction site);

Part I.B

2. Limitations on coverage. The following storm water discharges associated with construction activity are not covered by this permit:

   a. Storm water discharges that originate from the site after construction activities have been completed, including any temporary support activity, and the site has achieved final stabilization. Industrial post-construction storm water discharges may need to be covered by an NPDES permit;

   b. Storm water discharges associated with construction activity that the director has shown to be or may reasonably expect to be contributing to a violation of a water quality standard; and

   c. Storm water discharges authorized by an individual NPDES permit or an alternative NPDES general permit;

3. Waivers. After March 10, 2003, sites whose larger common plan of development or sale have at least one, but less than five acres of land disturbance, which would otherwise require permit coverage for storm water discharges associated with construction activities, may request that the director waive their permit requirement. Entities wishing to request such a waiver must certify in writing that the construction activity meets one of the two waiver conditions:

   a. **Rainfall erosivity waiver.** For a construction site to qualify for the rainfall erosivity waiver, the cumulative rainfall erosivity over the project duration must be five or less and the site must be stabilized with at least a 70 percent vegetative cover or other permanent, non-erosive cover. The rainfall erosivity must be calculated according to the method in U.S. EPA Fact Sheet 3.1 Construction Rainfall Erosivity Waiver dated January 2001. If it is determined that a construction activity will take place during a time period where the rainfall erosivity factor is less than five, a written waiver certification must be submitted to Ohio EPA at least 21 days before construction activity is scheduled to begin. If the construction activity will extend beyond the dates specified in the waiver certification, the operator must either: (a) recalculate the waiver using the original start date with the new ending date (if the R factor is still less than five, a new waiver certification must be submitted) or (b) submit an NOI application form and fee for coverage under this general permit at least seven days prior to the end of the waiver period (see Attachment A); or

Part I.B.3

b. **TMDL (Total Maximum Daily Load) waiver.** Storm water controls are not needed based on a TMDL approved or established by U.S. EPA that addresses the pollutant(s) of concern or, for non-impaired waters that do not require TMDLs, an equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. The pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the director of Ohio EPA that the construction activity will take place, and storm water discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. A written waiver certification must be submitted to Ohio EPA at least 21 days before the construction activity is scheduled to begin.

4. Prohibition on non-storm water discharges. All discharges covered by this permit must be composed entirely of storm water with the exception of the following: discharges from fire fighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footing drains where flows are not contaminated with process materials such as solvents. Dewatering activities must be done in compliance with Part III.G.2.g.iv of this permit. Discharges of material other than storm water or the authorized non-storm water discharges listed above must comply with an individual NPDES permit or an alternative NPDES general permit issued for the discharge.

   Except for flows from fire fighting activities, sources of non-storm water listed above that are combined with storm water discharges associated with construction activity must be identified in the SWP3. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

Part I.B

5. Spills and unintended releases (Releases in excess of Reportable Quantities). This permit does not relieve the permittee of the reporting requirements of 40 CFR Part 117 and 40 CFR Part 302. In the event of a spill or other unintended release, the discharge of hazardous substances in the storm water discharge(s) from a construction site must be minimized in accordance with the applicable storm water pollution prevention plan for the construction activity and in no case, during any 24-hour period, may the discharge(s) contain a hazardous substance equal to or in excess of reportable quantities.

   40 CFR Part 117 sets forth a determination of the reportable quantity for each substance designated as hazardous in 40 CFR Part 116. The regulation applies to quantities of designated substances equal to or greater than the reportable quantities, when discharged to surface waters of the State. 40 CFR Part 302 designates under section 102(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, those substances in the statutes referred to in section 101(14), identifies reportable quantities for these substances and sets forth the notification requirements for releases of these substances. This regulation also sets forth reportable quantities for hazardous substances designated under section 311(b)(2)(A) of the Clean Water Act (CWA).

C. Requiring an individual NPDES permit or an alternative NPDES general permit.

1. The director may require an alternative permit. The director may require any operator eligible for this permit to apply for and obtain either an individual NPDES permit or coverage under an alternative NPDES general permit in accordance with OAC Rule 3745-38-04. Any interested person may petition the director to take action under this paragraph.

   The director will send written notification that an alternative NPDES permit is required. This notice shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the operator to file the application. If an operator fails to submit an application in a timely manner as required by the director under this paragraph, then coverage, if in effect, under this permit is automatically terminated at the end of the day specified for application submittal.

Part I.C

2. Operators may request an individual NPDES permit. Any owner or operator eligible for this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the director in accordance with the requirements of 40 CFR 122.26. If the reasons adequately support the request, the director shall grant it by issuing an individual NPDES permit.

3. When an individual NPDES permit is issued to an owner or operator otherwise subject to this permit or the owner or operator is approved for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the alternative general permit, whichever the case may be.

D. Permit requirements when portions of a site are sold

If an operator obtains a permit for a development, and then the operator (permittee) sells off lots or parcels within that development, permit coverage must be continued on those lots until a Notice of Termination (NOT) in accordance with Part IV.B is submitted. For developments which require the use of centralized sediment and erosion controls (i.e., controls that address storm water runoff from one or more lots) for which the conveyance of permit coverage for a portion of the development will either prevent or impair the implementation of the controls and therefore jeopardize compliance with the terms and conditions of this permit, the permittee will be required to maintain responsibility for the implementation of those controls. For developments where this is not the case, it is the permittee's responsibility to temporarily stabilize all lots sold to individual lot owners unless an exception is approved in accordance with Part III.G.4. In cases where permit coverage for individual lot(s) will be conveyed, the permittee shall inform, in writing, the individual lot owner of the obligations under this permit and ensure that the Individual Lot NOI application is submitted to Ohio EPA.

E. Authorization

1. Obtaining authorization to discharge. Operators that discharge storm water associated with construction activity must submit an NOI application form in accordance with the requirements of Part II of this permit to obtain authorization to discharge under this general permit. As required under OAC Rule 3745-38-06(E), the director, in response to the NOI submission, shall notify the applicant in writing that he/she has been granted general permit coverage to discharge storm water associated with construction activity under the terms and conditions of this permit or that the applicant must apply for an individual NPDES permit or coverage under an alternate general NPDES permit as described in Part I.C.1.

Part I.E

2. No release from other requirements. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations. Other permit requirements commonly associated with construction activities include, but are not limited to, section 401 water quality certifications, isolated wetland permits, permits to install sanitary sewers or other devices that discharge or convey polluted water, permits to install drinking water lines, single lot sanitary system permits and disturbance of land which was used to operate a solid or hazardous waste facility (i.e., coverage under this NPDES general permit does not satisfy the requirements of OAC Rule 3745-27-13 or ORC Section 3734.02(H)). This permit does not relieve the permittee of other responsibilities associated with construction activities such as contacting the Ohio Department of Natural Resources, Division of Water, to ensure proper well installation and abandonment of wells.

Part II. NOTICE OF INTENT REQUIREMENTS

A. Deadlines for notification.

Initial coverage: Operators who intend to obtain initial coverage for a storm water discharge associated with construction activity under this general permit must submit a complete and accurate NOI application form and appropriate fee at least 21 days prior to the commencement of construction activity. If more than one operator, as defined in Part VII of this general permit, will be engaged at a site, each operator shall seek coverage under this general permit. Where one operator has already submitted an NOI prior to other operator(s) being identified, the additional operator shall request modification of coverage to become a co-permittee. In such instances, the co-permittees shall be covered under the same facility permit number. No additional permit fee is required.

Individual lot transfer of coverage: Operators must each submit an individual lot notice of intent (Individual Lot NOI) application form (no fee required) to Ohio EPA at least seven days prior to the date that they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous permittee. The original permittee may submit an Individual Lot NOT at the time the Individual Lot NOI is submitted. Transfer of permit coverage is not granted until an approval letter from the director of Ohio EPA is received by the applicant.

B. Failure to notify.

Operators who fail to notify the director of their intent to be covered and who discharge pollutants to surface waters of the State without an NPDES permit are in violation of ORC Chapter 6111. In such instances, Ohio EPA may bring an enforcement action for any discharges of storm water associated with construction activity.

Part II

C. Where to submit an NOI.

Operators seeking coverage under this permit must submit a signed NOI form, provided by Ohio EPA, to the address found in the associated instructions.

D. Additional notification.

The permittee shall make NOIs and SWP3s available upon request of the director of Ohio EPA, local agencies approving sediment and erosion control plans, grading plans or storm water management plans, local governmental officials, or operators of municipal separate storm sewer systems (MS4s) receiving drainage from the permitted site. Each operator that discharges to an NPDES permitted MS4 shall provide a copy of its Ohio EPA NOI submission to the MS4 in accordance with the MS4's requirements, if applicable.

E. Renotification.

Upon renewal of this general permit, the permittee is required to notify the director of his intent to be covered by the general permit renewal. Permittees covered under the previous NPDES general permits for storm water discharges associated with construction activity (NPDES permit numbers OHR100000 and OHC000002) shall have continuing coverage under this permit. The permittees covered under OHR100000 or OHC000002 shall submit a letter within 90 days of receipt of written notification by Ohio EPA expressing their intent that coverage be continued. There is no fee associated with these letters of intent for continued coverage. Permit coverage will be terminated after the 90-day period if the letter is not received by Ohio EPA. Ohio EPA will provide instructions on the contents of the letter and where it is to be sent within the notification letter.

PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)

A. Storm Water Pollution Prevention Plans.

A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. The SWP3 shall be a comprehensive, stand-alone document, which is not complete unless it contains the information required by Part III.G of this permit. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants in storm water discharges during construction and pollutants associated with post-construction activities to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.

B. Timing

A SWP3 shall be completed prior to the timely submittal of an NOI and updated in accordance with Part III.D. Upon request and good cause shown, the director may waive the requirement to have a SWP3 completed at the time of NOI submission. If a waiver has been granted, the SWP3 must be completed prior to the initiation of construction activities. The SWP3 must be implemented upon initiation of construction activities.

Permittees continuing coverage from the previous generations of this permit (OHR100000 and OHC000002) that have initiated construction activity prior to the receipt of the first written notification from Ohio EPA to submit a letter of intent to continue coverage, as required in Part II.E, are not required to update their SWP3 as a result of this renewal (OHC000003). Permittees continuing coverage from the previous generations of this permit (OHR100000 and OHC000002) that have not initiated construction activity prior to the receipt of the first written notification from Ohio EPA to submit a letter of intent to continue coverage, as required in Part II.E, are required to update their SWP3 as a result of this renewal (OHC000003).

C. SWP3 Signature and Review.

1. Plan Signature and Retention On Site. The SWP3 shall include the certification in Part V.H., be signed in accordance with Part V.G., and be retained on site during working hours.

Part III.C

2. Plan Availability

   a. On-site: The plan shall be made available immediately upon request of the director or his authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit also shall be made available at the site.

   b. By written request: The permittee must provide a copy of the SWP3 within 10 days upon written request by any of the following:

      i. The director or the director's authorized representative;

      ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or

      iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.

   c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.

3. Plan Revision. The director or authorized representative, may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director (or as otherwise provided in the notification) or authorized representative, the permittee shall make the required changes to the SWP3 and, if requested, shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

D. Amendments

The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the State or if the SWP3 proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.

Part III

E. Duty to inform contractors and subcontractors

The permittee shall inform all contractors and subcontractors not otherwise defined as "operators" in Part VII of this general permit, who will be involved in the implementation of the SWP3, of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created and signatures of each individual contractor shall be obtained prior to their commencement of work on the construction site.

F. Total Maximum Daily Load (TMDL) allocations

If a TMDL is approved for any waterbody into which the permittee's site discharges and requires specific BMPs for construction sites, the director may require the permittee to revise his/her SWP3.

G. SWP3 Requirements

Operations that discharge storm water from construction activities are subject to the following requirements and the SWP3 shall include the following items:

1. Site description. Each SWP3 shall provide:

   a. A description of the nature and type of the construction activity (e.g., low density residential, shopping mall, highway, etc.);

   b. Total area of the site and the area of the site that is expected to be disturbed (i.e., grubbing, clearing, excavation, filling or grading, including off-site borrow areas);

   c. An estimate of the impervious area and percent imperviousness created by the construction activity;

   d. A calculation of the runoff coefficients for both the pre-construction and post construction site conditions;

   e. Existing data describing the soil and, if available, the quality of any discharge from the site;

   f. A description of prior land uses at the site;

Part III.G.1

g. An implementation schedule which describes the sequence of major construction operations (i.e., grubbing, excavating, grading, utilities and infrastructure installation) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;

h. The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project. For discharges to an MS4, the point of discharge to the MS4 and the location where the MS4 ultimately discharges to a stream or surface water of the State must be indicated;

i. For subdivided developments where the SWP3 does not call for a centralized sediment control capable of controlling multiple individual lots, a detail drawing of a typical individual lot showing standard individual lot erosion and sediment control practices.

This does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones.

j. Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;

k. A copy of the permit requirements (attaching a copy of this permit is acceptable);

l. A cover page or title identifying the name and location of the site, the name and contact information of all construction site operators, the name and contact information for the person responsible for authorizing and amending the SWP3, preparation date, and the estimated dates that construction will start and be complete;

m. A log documenting grading and stabilization activities as well as amendments to the SWP3, which occur after construction activities commence; and

n. Site map showing:

Part III.G.1.n

i. Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3;

ii. Soils types should be depicted for all areas of the site, including locations of unstable or highly erodible soils;

iii. Existing and proposed contours. A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres;

iv. Surface water locations including springs, wetlands, streams, lakes, water wells, etc., on or within 200 feet of the site, including the boundaries of wetlands or stream channels and first subsequent named receiving water(s) the permittee intends to fill or relocate for which the permittee is seeking approval from the Army Corps of Engineers and/or Ohio EPA;

v. Existing and planned locations of buildings, roads, parking facilities and utilities;

vi. The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during the course of site development;

vii. Sediment and storm water management basins noting their sediment settling volume and contributing drainage area;

viii. Permanent storm water management practices to be used to control pollutants in storm water after construction operations have been completed.

ix. Areas designated for the storage or disposal of solid, sanitary and toxic wastes, including dumpster areas, areas designated for cement truck washout, and vehicle fueling;

x. The location of designated construction entrances where the vehicles will access the construction site;

xi. The location of any in-stream activities including stream crossings;

Part III.G

2. Controls. The SWP3 must contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) must implement such controls. The SWP3 must clearly describe for each major construction activity identified in Part III.G.1.g: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). The SWP3 shall identify the subcontactors engaged in activities that could impact storm water runoff. The SWP3 shall contain signatures from all of the identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the SWP3. Ohio EPA recommends that the primary site operator review the SWP3 with the primary contractor prior to commencement of construction activities and keep a SWP3 training log to demonstrate that this review has occurred.

   Ohio EPA recommends that the erosion, sediment, and storm water management practices used to satisfy the conditions of this permit should meet the standards and specifications in the current edition of Ohio's Rainwater and Land Development (see definitions) manual or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

   a. **Non-Structural Preservation Methods.** The SWP3 must make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving riparian areas adjacent to surface waters of the State, preserving existing vegetation and vegetative buffer strips, phasing of construction operations in order to minimize the amount of disturbed land at any one time and designation of tree preservation areas or other protective clearing or grubbing practices. The recommended buffer that operators should leave undisturbed along a surface water of the State is 25 feet as measured from the ordinary high water mark of the surface water.

   b. **Erosion Control Practices.** The SWP3 must make use of erosion controls that are capable of providing cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to restabilize disturbed areas after grading or construction shall be included in the SWP3. The SWP3 must provide specifications for stabilization of all disturbed areas of the site and provide guidance as to which method of stabilization will be employed for any time of the year. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, use of construction entrances and the use of alternative ground cover.

Part III.G.2.b

i. **Stabilization.** Disturbed areas must be stabilized as specified in the following tables below. Permanent and temporary stabilization are defined in Part VII.

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the State and at final grade	Within two days of reaching final grade
Any other areas at final grade	Within seven days of reaching final grade within that area

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the State and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 21 days
For all construction activities, any disturbed areas that will be dormant for *more than 21 days but less than one year,* and not within 50 feet of a surface water of the State	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed.

ii. **Permanent stabilization of conveyance channels.** Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the current edition of the Rainwater and Land Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.

c. ***Runoff Control Practices.*** The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices shall divert runoff away from disturbed areas and steep slopes where practicable. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected.

d. **Sediment Control Practices.** The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, silt fences, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control practice unless those are used in conjunction with a sediment settling pond.

The SWP3 must contain detail drawings for all structural practices.

i. Timing. Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven days from the start of grubbing. They shall continue to function until the up slope development area is restabilized. As construction progresses and the topography is altered, appropriate controls must be constructed or existing controls altered to address the changing drainage patterns.

ii. Sediment settling ponds. A sediment settling pond is required for any one of the following conditions:
- concentrated storm water runoff (e.g., storm sewer or ditch);
- runoff from drainage areas, which exceed the design capacity of silt fence or other sediment barriers;
- runoff from drainage areas that exceed the design capacity of inlet protection; or
- runoff from common drainage locations with 10 or more acres of disturbed land.

Part III.G.2.d.ii

The permittee may request approval from Ohio EPA to use alternative controls if the permittee can demonstrate the alternative controls are equivalent in effectiveness to a sediment settling pond.

The sediment settling pond volume consists of both a dewatering zone and a sediment storage zone. The volume of the dewatering zone shall be a minimum of 1800 cubic feet (ft^3) per acre of drainage (67 yd^3/acre) with a minimum 48-hour drain time for sediment basins serving a drainage area over 5 acres. The volume of the sediment storage zone shall be calculated by one of the following methods: Method 1: The volume of the sediment storage zone shall be 1000 ft^3 per disturbed acre within the watershed of the basin. OR Method 2: The volume of the sediment storage zone shall be the volume necessary to store the sediment as calculated with RUSLE or a similar generally accepted erosion prediction model. The accumulated sediment shall be removed from the sediment storage zone once it's full. When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by construction activity must be included unless runoff from these areas is diverted away from the sediment settling pond and is not co-mingled with sediment-laden runoff. The depth of the dewatering zone must be less than or equal to five feet. The configuration between inlets and the outlet of the basin must provide at least two units of length for each one unit of width (> 2:1 length:width ratio), however, a length to width ratio of 4:1 is recommended. When designing sediment settling ponds, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls must be used where site limitations would preclude a safe design. The use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal is encouraged.

iii. Silt Fence and Diversions. Sheet flow runoff from denuded areas shall be intercepted by silt fence or diversions to protect adjacent properties and water resources from sediment transported via sheet flow. Where intended to provide sediment control, silt fence shall be placed on a level contour downslope of the disturbed area. This permit does not preclude the use of other sediment barriers designed to control sheet flow runoff. The relationship between the maximum drainage area to silt fence for a particular slope range is shown in the table below.

Part III.G.2.d.iii

Maximum drainage area (in acres) to 100 linear feet of silt fence	Range of slope for a particular drainage area (in percent)
0.5	< 2%
0.25	≥ 2% but < 20%
0.125	≥ 20% but < 50%

Placing silt fence in a parallel series does not extend the size of the drainage area. Storm water diversion practices shall be used to keep runoff away from disturbed areas and steep slopes where practicable. Such devices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

iv. Inlet Protection. Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems, unless the storm drain system drains to a sediment settling pond. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.

v. Surface Waters of the State Protection. If construction activities disturb areas adjacent to surface waters of the State, structural practices shall be designed and implemented on site to protect all adjacent surface waters of the State from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond) shall be used in a surface water of the State. For all construction activities immediately adjacent to surface waters of the State, it is recommended that a setback of at least 25-feet, as measured from the ordinary high water mark of the surface water, be maintained in its natural state as a permanent buffer. Where impacts within this setback area are unavoidable due to the nature of the construction activity (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the setback area are minimized.

vi. Modifying Controls. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee must replace or modify the control for site conditions.

Part III.G.2

e. **Post-Construction Storm Water Management Requirements.** So that the receiving stream's physical, chemical, and biological characteristics are protected and stream functions are maintained, post-construction storm water practices shall provide perpetual management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 must contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale must address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality. Post-construction BMPs cannot be installed within a surface water of the State (e.g., wetland or stream) unless it's authorized by a CWA 401 water quality certification, CWA 404 permit, or Ohio EPA non-jurisdictional wetland/stream program approval. Note: localities may have more stringent post-construction requirements.

Detail drawings and maintenance plans must be provided for all post-construction BMPs. Maintenance plans shall be provided by the permittee to the post-construction operator of the site (including homeowner associations) upon completion of construction activities (prior to termination of permit coverage). For sites located within a community with a regulated municipal separate storm sewer system (MS4), the permittee, land owner, or other entity with legal control of the property may be required to develop and implement a maintenance plan to comply with the requirements of the MS4. Maintenance plans must ensure that pollutants collected within structural post-construction practices, be disposed of in accordance with local, state, and federal regulations. To ensure that storm water management systems function as they were designed and constructed, the post construction operation and maintenance plan must be a stand-alone document, which contains: (1) a designated entity for storm water inspection and maintenance responsibilities; (2) the routine and non-routine maintenance tasks to be undertaken; (3) a schedule for inspection and maintenance; (4) any necessary legally binding maintenance easements and agreements; and (5) a map showing all access and maintenance easements. Permittees are not responsible under this permit for operation and maintenance of post-construction practices once coverage under this permit is terminated.

Post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit (one example is storm water discharges from regulated industrial sites).

Part III.G.2.e

Construction activities that do not include the installation of any impervious surface (e.g., soccer fields), abandoned mine land reclamation activities regulated by the Ohio Department of Natural Resources, stream and wetland restoration activities, and wetland mitigation activities are not required to comply with the conditions of Part III.G.2.e of this permit. Linear construction projects, (e.g., pipeline or utility line installation), which do not result in the installation of additional impervious surface, are not required to comply with the conditions of Part III.G.2.e of this permit. However, linear construction projects must be designed to minimize the number of stream crossings and the width of disturbance and achieve final stabilization of the disturbed area as defined in Part VII.H.1.

Large Construction Activities. For all large construction activities (involving the disturbance of five or more acres of land or will disturb less than five acres, but is a part of a larger common plan of development or sale which will disturb five or more acres of land), the post construction BMP(s) chosen must be able to detain storm water runoff for protection of the stream channels, stream erosion control, and improved water quality. The BMP(s) chosen must be compatible with site and soil conditions. Structural (designed) post-construction storm water treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume (WQv) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The WQv shall be equivalent to the volume of runoff from a 0.75-inch rainfall and shall be determined according to the following equation:

$WQv = C * P * A / 12$
where:
WQv = water quality volume in acre-feet
C = runoff coefficient appropriate for storms less than 1 inch
(Either use the following formula: $C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$, where i = fraction of post-construction impervious surface or use Table 1)
P = 0.75 inch precipitation depth
A = area draining into the BMP in acres

Part III.G.2.e

Table 1
Runoff Coefficients Based on the Type of Land Use

Land Use	Runoff Coefficient
Industrial & Commercial	0.8
High Density Residential (>8 dwellings/acre)	0.5
Medium Density Residential (4 to 8 dwellings/acre)	0.4
Low Density Residential (<4 dwellings/acre)	0.3
Open Space and Recreational Areas	0.2

Where the land use will be mixed, the runoff coefficient should be calculated using a weighted average. For example, if 60% of the contributing drainage area to the storm water treatment structure is Low Density Residential, 30% is High Density Residential, and 10% is Open Space, the runoff coefficient is calculated as follows (0.6)(0.3) + (0.3)(0.5) + (0.1)(0.2) = 0.35.

An additional volume equal to 20 percent of the WQv shall be incorporated into the BMP for sediment storage. Ohio EPA recommends that BMPs be designed according to the methodology included in the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA.

The BMPs listed in Table 2 below shall be considered standard BMPs approved for general use. However communities with a regulated MS4 may limit the use of some of these BMPs. BMPs shall be designed such that the drain time is long enough to provide treatment, but short enough to provide storage for successive rainfall events and avoid the creation of nuisance conditions. The outlet structure for the post-construction BMP must not discharge more than the first half of the WQv or extended detention volume (EDv) in less than one-third of the drain time. The EDv is the volume of storm water runoff that must be detained by a structural post-construction BMP. The EDv is equal to 75 percent of the WQv for wet extended detention basins, but is equal to the WQv for all other BMPs listed in Table 2.

Part III.G.2.e

Table 2
Structural Post-Construction BMPs & Associated Drain (Drawdown) Times

Best Management Practice	Drain Time of WQv
Infiltration Basin^	24 - 48 hours
Enhanced Water Quality Swale	24 hours
Dry Extended Detention Basin*	48 hours
Wet Extended Detention Basin**	24 hours
Constructed Wetland (above permanent pool)+	24 hours
Sand & Other Media Filtration	40 hours
Bioretention Cell^	40 hours
Pocket Wetland#	24 hours
Vegetated Filter Strip	24 hours

* Dry basins must include forebay and micropool each sized at 10% of the WQv
** Provide both a permanent pool and an EDv above the permanent pool, each sized at 0.75 * WQv
+ Extended detention shall be provided for the full WQv above the permanent water pool.
^ The WQv shall completely infiltrate within 48 hours so there is no standing or residual water in the BMP.
# Pocket wetlands must have a wet pool equal to the WQv, with 25% of the WQv in a pool and 75% in marshes. The EDv above the permanent pool must be equal to the WQv.

The permittee may request approval from Ohio EPA to use alternative post-construction BMPs if the permittee can demonstrate that the alternative BMPs are equivalent in effectiveness to those listed in Table 2 above. Construction activities shall be exempt from this condition if it can be demonstrated that the WQv is provided within an existing structural post-construction BMP that is part of a larger common plan of development or if structural post-construction BMPs are addressed in a regional or local storm water management plan. A municipally operated regional storm water BMP can be used as a post-construction BMP provided that the BMP can detain the WQv from its entire drainage area and release it over a 24 hour period.

Transportation Projects The construction of new roads and roadway improvement projects by public entities (i.e., the state, counties, townships, cities, or villages) may implement post-construction BMPs in compliance with the current version (as of the effective date of this permit) of the Ohio Department of Transportation's "Location and Design Manual, Volume Two Drainage Design" that has been accepted by Ohio EPA as an alternative to the conditions of this permit.

Part III.G.2.e

Offsite Mitigation of Post-Construction Ohio EPA may authorize the offsite mitigation of the post-construction requirements of Part III.G.2.e of this permit on a case by case basis provided the permittee clearly demonstrates the BMPs listed in Table 2 are not feasible and the following criteria is met: (1) a maintenance agreement or policy is established to ensure operations and treatment in perpetuity; (2) the offsite location discharges to the same HUC-14 watershed unit; and (3) the mitigation ratio of the WQv is 1.5 to 1 or the WQv at the point of retrofit, whichever is greater. Requests for offsite mitigation must be received prior to receipt of the NOI applications.

Redevelopment Projects Sites that have been previously developed where no post-construction BMPs were installed shall either ensure a 20 percent net reduction of the site impervious area, provide for treatment of at least 20 percent of the WQ_v, or a combination of the two. A one-for-one credit towards the 20 percent net reduction of impervious area can be obtained through the use of pervious pavement and/or green roofs. Where projects are a combination of new development and redevelopment, the total WQv that must be treated shall be calculated by a weighted average based on acreage, with the new development at 100 percent WQv and redevelopment at 20 percent WQv.

Non-Structural Post-Construction BMPs The size of the structural post-construction can be reduced by incorporating non-structural post-construction BMPs into the design. Practices such as preserving open space will reduce the runoff coefficient and, thus, the WQv. Ohio EPA encourages the implementation of riparian and wetland setbacks. Practices which reduce storm water runoff include permeable pavements, green roofs, rain barrels, conservation development, smart growth, low-impact development, and other site design techniques contained in the Ohio Lake Commission's Balanced Growth Program (see www.glc.org/landuse/ohroundtable/ohiobgi.html). In order to promote the implementation of such practices, the Director may consider the use of non-structural practices to demonstrate compliance with Part III.G.2.e of this permit for areas of the site not draining into a common drainage system of the site, i.e., sheet flow from perimeter areas such as the rear yards of residential lots, for low density development scenarios, or where the permittee can demonstrate that the intent of pollutant removal and stream protection, as required in Part III.G.2.e of this permit is being addressed through non-structural post-construction BMPs based upon review and approval by Ohio EPA.

Part III.G.2.e

Use of Alternative Post-Construction BMPs This permit does not preclude the use of innovative or experimental post-construction storm water management technologies. However, the Director may require these practices to be tested using the protocol outlined in the Technology Acceptance Reciprocity Partnership's (TARP) Protocol for Stormwater Best Management Practice Demonstrations (see http://www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp).

The Director may require discharges from such structures to be monitored to ensure compliance with Part III.G.2.e of this permit. Permittees must request approval from Ohio EPA to use alternative post-construction BMPs if the permittee can demonstrate that the alternative BMPs are equivalent in effectiveness to those listed in Table 2 above. To demonstrate this equivalency, the permittee must show that the alternative BMP has a minimum total suspended solids (TSS) removal efficiency of 80 percent. Also, the WQv discharge rate from the practice must be reduced to prevent stream bed erosion and protect the physical and biological stream integrity unless there will be negligible hydrological impact to the receiving surface water of the State. The discharges will have a negligible impact if the permittee can demonstrate that one of the following four conditions exist:

i. The entire WQv is recharged to groundwater;

ii. The larger common plan of development or sale will create less than one acre of impervious surface;

iii. The project is a redevelopment project within an ultra-urban setting (i.e., a downtown area or on a site where 100 percent of the project area is already impervious surface and the storm water discharge is directed into an existing storm sewer system); or

iv. The storm water drainage system of the development discharges directly into a large river (fourth order or greater) or to a lake and where the development area is less than 5 percent of the watershed area upstream of the development site, unless a TMDL identified water quality problems in the receiving surface waters of the State.

Part III.G.2.e

The Director shall only consider the use of alternative BMPs on projects where the permittee can demonstrate that the implementation of the BMPs listed in Table 2 is infeasible due to physical site constraints that prevent the ability to provide functional BMP design. Alternative practices may include, but are not limited to, underground detention structures, vegetated swales and vegetated filter strips designed using water quality flow, natural depressions, rain barrels, permeable pavements green roofs, rain gardens, catch basin inserts, and hydrodynamics separators. The Director may also consider non-structural post-construction approaches where no local requirement for such practices exist.

Small Construction Activities. For all small land disturbance activities (which disturb one or more, but less than five acres of land and is not a part of a larger common plan of development or sale which will disturb five or more acres of land), a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWP3. Structural measures should be placed on upland soils to the degree attainable. Such practices may include, but are not limited to: storm water detention structures (including wet basins); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWP3 shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed pre-development levels.

f. **Surface Water Protection.** If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state non-jurisdictional stream and wetland requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee must contact the appropriate U.S. Army Corps of Engineers District Office. (CAUTION: Any area of seasonally wet hydric soil is a potential wetland - please consult the Soil Survey and list of hydric soils for your County, available at your county's Soil and Water Conservation District. If you have any questions about Section 401 water quality certification, please contact the Ohio Environmental Protection Agency, Section 401 Coordinator.)

Part III.G.2.f

U.S. Army Corps of Engineers (Section 404 regulation):
Huntington, WV District (304) 399-5210 (Muskingum River, Hocking River, Scioto River, Little Miami River, and Great Miami River Basins)
Buffalo, NY District (716) 879-4191 (Lake Erie Basin)
Pittsburgh, PA District (412) 395-7154 (Mahoning River Basin)
Louisville, KY District (502) 315-6733 (Ohio River)

Ohio EPA 401/404 and non-jurisdictional stream/wetland coordinator can be contacted at (614) 644-2001 (all of Ohio)

Concentrated storm water runoff from BMPs to natural wetlands shall be converted to diffuse flow before the runoff enters the wetlands. The flow should be released such that no erosion occurs downslope. Level spreaders may need to be placed in series, particularly on steep sloped sites, to ensure non-erosive velocities. Other structural BMPs may be used between storm water features and natural wetlands, in order to protect the natural hydrology, hydroperiod, and wetland flora. If the applicant proposes to discharge to natural wetlands, a hydrologic analysis shall be performed. The applicant shall attempt to match the pre-development hydroperiods and hydrodynamics that support the wetland. The applicant shall assess whether their construction activity will adversely impact the hydrologic flora and fauna of the wetland. Practices such as vegetative buffers, infiltration basins, conservation of forest cover, and the preservation of intermittent streams, depressions, and drainage corridors may be used to maintain wetland hydrology.

g. **Other controls.** The SWP3 must also provide BMPs for pollutant sources other than sediment. Non-sediment pollutant sources, which may be present on a construction site, include paving operations, concrete washout, structure painting, structure cleaning, demolition debris disposal, drilling and blasting operations, material storage, slag, solid waste, hazardous waste, contaminated soils, sanitary and septic wastes, vehicle fueling and maintenance activities, and landscaping operations.

   i. **Non-Sediment Pollutant Controls.** No solid or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the State. Under no circumstance shall concrete trucks wash out directly into a drainage channel, storm sewer or surface waters of the State. No exposure of storm water to waste materials is recommended.

   ii. **Off-site traffic.** Off-site vehicle tracking of sediments and dust generation shall be minimized.

Part III.G.2.g

iii. **Compliance with other requirements.** The SWP3 shall be consistent with applicable State and/or local waste disposal, sanitary sewer or septic system regulations, including provisions prohibiting waste disposal by open burning and shall provide for the proper disposal of contaminated soils to the extent these are located within the permitted area.

iv. **Trench and ground water control**. There shall be no turbid discharges to surface waters of the State resulting from dewatering activities. If trench or ground water contains sediment, it must pass through a sediment settling pond or other equally effective sediment control device, prior to being discharged from the construction site. Alternatively, sediment may be removed by settling in place or by dewatering into a sump pit, filter bag or comparable practice. Ground water dewatering which does not contain sediment or other pollutants is not required to be treated prior to discharge. However, care must be taken when discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.

v. **Contaminated Sediment.** Where construction activities are to occur on sites with contamination from previous activities, operators must be aware that concentrations of materials that meet other criteria (is not considered a Hazardous Waste, meeting VAP standards, etc.) may still result in storm water discharges in excess of Ohio Water Quality Standards. Such discharges are not authorized by this permit. Appropriate BMPs include, but are not limited to:

- The use of berms, trenches, and pits to collect contaminated runoff and prevent discharges;
- Pumping runoff into a sanitary sewer (with prior approval of the sanitary sewer operator) or into a container for transport to an appropriate treatment/disposal facility; and
- Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the material.

Operators should consult with Ohio EPA Division of Surface Water prior to seeking permit coverage.

h. **Maintenance.** All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up slope areas they control are permanently stabilized. The SWP3 shall be designed to minimize maintenance requirements. The applicant shall provide a description of maintenance procedures needed to ensure the continued performance of control practices.

Part III.G.2

i. **Inspections.** At a minimum, procedures in an SWP3 shall provide that all controls on the site are inspected at least once every seven calendar days and within 24 hours after any storm event greater than one-half inch of rain per 24 hour period. The inspection frequency may be reduced to at least once every month if the entire site is temporarily stabilized or runoff is unlikely due to weather conditions (e.g., site is covered with snow, ice, or the ground is frozen). A waiver of inspection requirements is available until one month before thawing conditions are expected to result in a discharge if all of the following conditions are met: the project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month); land disturbance activities have been suspended; and the beginning and ending dates of the waiver period are documented in the SWP3. Once a definable area has been finally stabilized, you may mark this on your SWP3 and no further inspection requirements apply to that portion of the site. The permittee shall assign "qualified inspection personnel" to conduct these inspections to ensure that the control practices are functional and to evaluate whether the SWP3 is adequate and properly implemented in accordance with the schedule proposed in Part III.G.1.g of this permit or whether additional control measures are required.

Following each inspection, a checklist must be completed and signed by the qualified inspection personnel representative. At a minimum, the inspection report must include:

i. the inspection date;
ii. names, titles, and qualifications of personnel making the inspection;
iii. weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
iv. weather information and a description of any discharges occurring at the time of the inspection;
v. location(s) of discharges of sediment or other pollutants from the site;
vi. location(s) of BMPs that need to be maintained;
vii. location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
viii. location(s) where additional BMPs are needed that did not exist at the time of inspection; and
ix. corrective action required including any changes to the SWP3 necessary and implementation dates.

Part III.G.2.i

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for pollutants entering the drainage system. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

The permittee shall maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection, names(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3 and a certification as to whether the facility is in compliance with the SWP3 and the permit and identify any incidents of non-compliance. The record and certification shall be signed in accordance with Part V.G. of this permit.

i. **When practices require repair or maintenance.** If the inspection reveals that a control practice is in need of repair or maintenance, with the exception of a sediment settling pond, it must be repaired or maintained within three days of the inspection. Sediment settling ponds must be repaired or maintained within 10 days of the inspection.

ii. **When practices fail to provide their intended function.** If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the SWP3 must be amended and the new control practice must be installed within 10 days of the inspection.

iii. **When practices depicted on the SWP3 are not installed.** If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained in Part III.G.1.g of this permit, the control practice must be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control practice is not needed, the record must contain a statement of explanation as to why the control practice is not needed.

Part III.G

3. **Approved State or local plans.** All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee must certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.

4. **Exceptions.** If specific site conditions prohibit the implementation of any of the erosion and sediment control practices contained in this permit or site specific conditions are such that implementation of any erosion and sediment control practices contained in this permit will result in no environmental benefit, then the permittee shall provide justification for rejecting each practice based on site conditions. Exceptions from implementing the erosion and sediment control standards contained in this permit will be approved or denied on a case-by-case basis.

   The permittee may request approval from Ohio EPA to use alternative methods to satisfy conditions in this permit if the permittee can demonstrate that the alternative methods are sufficient to protect the overall integrity of receiving streams and the watershed. Alternative methods will be approved or denied on a case-by-case basis.

PART IV. NOTICE OF TERMINATION REQUIREMENTS

A. *Failure to notify.*

The terms and conditions of this permit shall remain in effect until a signed Notice of Termination (NOT) form is submitted. Failure to submit an NOT constitutes a violation of this permit and may affect the ability of the permittee to obtain general permit coverage in the future.

B. When to submit an NOT

1. Permittees wishing to terminate coverage under this permit must submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is

Part IV.B

submitted. Prior to submitting the NOT form, the permittee shall conduct a site inspection in accordance with Part III.G.2.i of this permit and have a maintenance agreement is in place to ensure all post-construction BMPs will be maintained in perpetuity.

2. All permittees must submit an NOT form within 45 days of completing all permitted land disturbance activities. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:

   a. Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);

   b. Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;

   c. For residential construction only, temporary stabilization has been completed and the lot, which includes a home, has been transferred to the homeowner. (Note: individual lots without housing which are sold by the developer must undergo final stabilization prior to termination of permit coverage.); or

   d. An exception has been granted under Part III.G.4.

C. How to submit an NOT

Permittees must use Ohio EPA's approved NOT form. The form must be completed and mailed according to the instructions and signed in accordance with Part V.G of this permit.

PART V. STANDARD PERMIT CONDITIONS.

A. Duty to comply.

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of ORC Chapter 6111. and is grounds for enforcement action.

2. Ohio law imposes penalties and fines for persons who knowingly make false statements or knowingly swear or affirm the truth of a false statement previously made.

B. Continuation of an expired general permit.

An expired general permit continues in force and effect until a new general permit is issued.

Part V

C. Need to halt or reduce activity not a defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty to provide information.

The permittee shall furnish to the director, within 10 days of written request, any information which the director may request to determine compliance with this permit. The permittee shall also furnish to the director upon request copies of records required to be kept by this permit.

F. Other information.

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, SWP3, NOT or in any other report to the director, he or she shall promptly submit such facts or information.

G. Signatory requirements.

All NOIs, NOTs, SWP3s, reports, certifications or information either submitted to the director or that this permit requires to be maintained by the permittee, shall be signed.

1. These items shall be signed as follows:

    a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        i. A president, secretary, treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation; or

Part V.G.1.a

ii. The manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal or other public agency: By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).

2. All reports required by the permits and other information requested by the director shall be signed by a person described in Part V.G.1 of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part V.G.1 of this permit and submitted to the director;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator of a well or well field, superintendent, position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

c. The written authorization is submitted to the director.

Part V.G

3. Changes to authorization. If an authorization under Part V.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 of this permit must be submitted to the director prior to or together with any reports, information or applications to be signed by an authorized representative.

H. Certification.

Any person signing documents under this section shall make the following certification:

> *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

I. Oil and hazardous substance liability.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under section 311 of the CWA or 40 CFR Part 112. 40 CFR Part 112 establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable surface waters of the State or adjoining shorelines.

J. Property rights.

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. Severability.

The provisions of this permit are severable and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

Part V

L. Transfers.

Ohio NPDES general permit coverage is transferable. Ohio EPA must be notified in writing sixty days prior to any proposed transfer of coverage under an Ohio NPDES general permit. The transferee must inform Ohio EPA it will assume the responsibilities of the original permittee transferor.

M. Environmental laws.

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper operation and maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWP3s. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

O. Inspection and entry.

The permittee shall allow the director or an authorized representative of Ohio EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

PART VI. REOPENER CLAUSE

A. If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with construction activity covered by this permit, the permittee of such discharge may be required to obtain coverage under an individual permit or an alternative general permit in accordance with Part I.C of this permit or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to ORC Chapter 6111.

PART VII. DEFINITIONS

A. "Act" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117 and Pub. L. 100-4, 33 U.S.C. 1251 et. seq.

B. "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices (both structural and non-structural) to prevent or reduce the pollution of surface waters of the State. BMP's also include treatment requirements, operating procedures and practices to control plant and/or construction site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage.

C. "Commencement of construction" means the initial disturbance of soils associated with clearing, grubbing, grading, placement of fill or excavating activities or other construction activities.

D. "Concentrated storm water runoff" means any storm water runoff which flows through a drainage pipe, ditch, diversion or other discrete conveyance channel.

E. "Director" means the director of the Ohio Environmental Protection Agency.

F. "Discharge" means the addition of any pollutant to the surface waters of the State from a point source.

G. "Disturbance" means any clearing, grading, excavating, filling, or other alteration of land surface where natural or man-made cover is destroyed in a manner that exposes the underlying soils.

H. "Final stabilization" means that either:

1. All soil disturbing activities at the site are complete and a uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the area has been established on all unpaved areas and areas not covered by permanent structures or equivalent stabilization measures (such as the use of landscape mulches, rip-rap, gabions or geotextiles) have been employed. In addition, all temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or

2. For individual lots in residential construction by either:

    a. The homebuilder completing final stabilization as specified above or

Part VII.H.2

b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the State and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria in (1) or (2) above.

I. "Individual Lot NOI" means a Notice of Intent for an individual lot to be covered by this permit (see parts I and II of this permit).

J. "Larger common plan of development or sale"- means a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

K. "MS4" means municipal separate storm sewer system which means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) that are:

1. Owned or operated by the federal government, state, municipality, township, county, district(s) or other public body (created by or pursuant to state or federal law) including special district under state law such as a sewer district, flood control district or drainage districts or similar entity or a designated and approved management agency under section 208 of the act that discharges into surface waters of the State; and

2. Designed or used for collecting or conveying solely storm water,

3. Which is not a combined sewer and

4. Which is not a part of a publicly owned treatment works.

L. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the CWA. The term includes an "approved program."

Part VII

M. "NOI" means notice of intent to be covered by this permit.

N. "NOT" means notice of termination.

O. "Operator" means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with an SWP3 for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

As set forth in Part II.A, there can be more than one operator at a site and under these circumstances, the operators shall be co-permittees.

P. "Owner or operator" means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

Q. "Permanent stabilization" means the establishment of permanent vegetation, decorative landscape mulching, matting, sod, rip rap and landscaping techniques to provide permanent erosion control on areas where construction operations are complete or where no further disturbance is expected for at least one year.

R. "Percent imperviousness" means the impervious area created divided by the total area of the project site.

S. "Point source" means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or the floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

T. "Qualified inspection personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.

Part VII

U. "Rainwater and Land Development" is a manual describing construction and post-construction best management practices and associated specifications. A copy of the manual may be obtained by contacting the Ohio Department of Natural Resources, Division of Soil & Water Conservation.

V. "Riparian area" means the transition area between flowing water and terrestrial (land) ecosystems composed of trees, shrubs and surrounding vegetation which serve to stabilize erodible soil, improve both surface and ground water quality, increase stream shading and enhance wildlife habitat.

W. "Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

X. "Sediment settling pond" means a sediment trap, sediment basin or permanent basin that has been temporarily modified for sediment control, as described in the latest edition of the Rainwater and Land Development manual.

Y. "State isolated wetland permit requirements" means the requirements set forth in Sections 6111.02 through 6111.029 of the ORC.

Z. "Storm water" means storm water runoff, snow melt and surface runoff and drainage.

AA. "Surface waters of the State" or "water bodies" means all streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.

BB. "SWP3" means storm water pollution prevention plan.

CC. "Temporary stabilization" means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.

DD. "Water Quality Volume (WQ_v)" means the volume of storm water runoff which must be captured and treated prior to discharge from the developed site after construction is complete. WQ_v is based on the expected runoff generated by the mean storm precipitation volume from post-construction site conditions at which rapidly diminishing returns in the number of runoff events captured begins to occur.

ATTACHMENT C

November 25, 2009

Name / Title: _____
Company: _____

Re: Delegating an "Authorized Representative" for Blue Creek Wind Project to perform stormwater / NPDES site inspections and to sign stormwater inspection reports
NPDES # ( )

Dear_____:

This letter designates you or your alternate, as the _____for the project reference above to serve as Iberdrola Renewables authorized representative to perform storm water site inspections and to prepare, sign, and certify inspection reports as required by the applicable NPDES storm water construction general permit as the project.

This authorization does not include authority to sign an application for coverage under a NPDES General Permit (NOI) or a notice of termination (NOT). This authorization will continue in effect until the earlier of:

1. Completion of construction and final stabilization at the site listed above; OR
2. Until further written notice from Iberdrola Renewables.

.

I certify under penalty of law, this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Signed:_____

Name:_____

Title:_____

Company: _____

General Contractor and Subcontractor / Operator Certification Statement

Stormwater Water Discharge Associated with Industrial Activity for Construction Activities

City: Near Van Wert County: Paulding and Van Wert County

Project Name: Blue Creek Wind Project *Project NPDES Number:* _____

Subcontractor / Operator Certification Statement

"I certify that I, as a representative of the company for which I am employed, have been informed and understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) and project SWPPP that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification and the responsibilities of compliance with the NPDES permit".

"I certify under penalty of law, this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations."

Name: _____ Company: _____

Title: _____ Phone #: _____

Company Address: _____

_____

Signature: _____ Date: _____

SWPPP Certification and Signature

Introduction

The Storm Water Pollution Prevention Plan (SWPPP) is prepared to address construction activities and stormwater management for the following project / site:

Name: Blue Creek Wind Project

City or Township: Paulding and Van Wert County, Ohio

Location: The project is located in the following portions of Paulding and Van Wert County:
Township (T) 1 North (N) Range (R) 2 East (E) Section (S) 25-29, 31-36; T 1 N, R 3 E, S 28-33; T 1 S, R 1 E, S 1, 12, 13, 24, 25; T 1 S, R 2 E, S 1-24, 28-30, 32, T 1 S, R 3 E, S 5-8, 16-19

Latitude / Longitude: 40.9608, -84.6111

Generally, the project is located with the boundary upon the north by Highway 114, the western boundary is located near Highway 30 and Convoy-Heller Road, the southern boundary near Convoy Road, and the eastern boundary located near Hoaglin Center Road. The approximate midpoint of the project is located at the intersection of Feasby Wisener Road and John Brown Road.

This SWPPP is for: Iberdrola Renewables

This SWPPP addresses the NPDES requirements provided by the Storm Water Construction General Permit (CGP) for: The State of Ohio, State Operating Permit.

The SWPPP is designed to:

1. Identify all potential sources of pollution which may reasonably be expected to affect storm water discharges from the site;
2. Describe the practices to be used to reduce pollutants in storm water discharges from the site;
3. Assure compliance with the terms and conditions of the CGP, a copy of which is provided in Attachment Section B of this SWPPP.

As required and defined by the CGP, the SWPPP will be implemented at the site from the commencement of construction activity until the completion of activity and final stabilization of the site.

The application for coverage under the CGP and, where provided, a copy of the documentation of authorization to discharge is described under the State CGP, the application for coverage is made by submitting the Application for General Storm Water Permit for Construction Activity. By submitting the Notice of Intent (NOI); the site is authorized to discharge stormwater under the State CGP. Copies of the application / NOI are included in Attachment Section B of the SWPPP.

The storm water discharges from the site listed above are not subject to MS4 requirements.

If subject to MS4 requirements, the requirements of the MS4 are covered in the SWPPP located in Attachment Section K and ordinances are included in Section K of the SWPPP.

Owner Certification

I certify under penalty of law, this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Owner Name: _____ Company: _____

Owner Title: _____ Company Address: _____

Signature: _____ _____

Date: _____ Company Phone #: _____

November 25, 2009

Ohio Environmental Protection Agency
Office of Fiscal Administration
P.O. Box 1049
Columbus, OH 43216-1049

Re: Delegating an "Authorized Representative" for **Blue Creek Wind Project**
NPDES # (_____)

To Whom It May Concern:

This letter serves to designate the specifically described position as an authorized person for signing reports and performing certain activities requested by the Director of required by the NPDES Construction General Permit until further notice is provided in writing. This authorization cannot be used for signing a NPDES permit application (e.g., Notice of Intent (NOI) in accordance with 40 CFR 122.22. The following position is hereby authorized to perform storm water site inspections and to prepare, sign, and certify storm water inspection reports.

The _____for the project known as Blue Creek Wind Farm

I certify under penalty of law, this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Signed:_____

Name:_____

Title:_____

Company: _____

ATTACHMENT D

Sample Inspection Report

Instructions

This sample inspection report has been developed as a helpful tool to aid you in completing your site inspections. This sample inspection report was created consistent with EPA's Developing Your Stormwater Pollution Prevention Plan. You can find both the guide and the sample inspection report (formatted in Microsoft Word) at www.epa.gov/npdes/swpppguide

This inspection report is provided in Microsoft Word format to allow you to easily customize it for your use and the conditions at your site. You should also customize this form to help you meet the requirements in your construction general permit related to inspections. **If your permitting authority provides you with an inspection report, please use that form.**

Using the Inspection Report
This inspection report is designed to be customized according to the BMPs and conditions at your site. For ease of use, you should take a copy of your site plan and number all of the stormwater BMPs and areas of your site that will be inspected. A brief description of the BMP or area should then be listed in the site-specific section of the inspection report. For example, specific structural BMPs such as construction site entrances, sediment ponds, or specific areas with silt fence (e.g., silt fence along Main Street; silt fence along slope in NW corner, etc.) should be numbered and listed. You should also number specific non-structural BMPs or areas that will be inspected (such as trash areas, material storage areas, temporary sanitary waste areas, etc).

You can complete the items in the "General Information" section that will remain constant, such as the project name, NPDES tracking number, and inspector (if you only use one inspector). Print out multiple copies of this customized inspection report to use during your inspections.

When conducting the inspection, walk the site by following your site map and numbered BMPs/areas for inspection. Also note whether the overall site issues have been addressed (customize this list according to the conditions at your site). Note any required corrective actions and the date and responsible person for the correction in the Corrective Action Log.

Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications	Insert qualifications or add reference to the SWPPP. (See Section 5 of the SWPPP Template)		
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		❑Yes ❑No	❑Yes ❑No	
2		❑Yes ❑No	❑Yes ❑No	
3		❑Yes ❑No	❑Yes ❑No	
4		❑Yes ❑No	❑Yes ❑No	
5		❑Yes ❑No	❑Yes ❑No	
6		❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	
8		❑Yes ❑No	❑Yes ❑No	
9		❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	
11		❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
12		❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	
14		❑Yes ❑No	❑Yes ❑No	
15		❑Yes ❑No	❑Yes ❑No	
16		❑Yes ❑No	❑Yes ❑No	
17		❑Yes ❑No	❑Yes ❑No	
18		❑Yes ❑No	❑Yes ❑No	
19		❑Yes ❑No	❑Yes ❑No	
20		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ **Date:** _____

Subcontractor Authorization Log

Project Name: _____ **Owner:** _____

Operator: _____ **NPDES Permit ID:** _____

Inspector: _____

Date	Subcontractor Name	Description of Activities (i.e. Access Roads, Turbine Excavation, Collection System, O&M Building, etc)	Certification Form Completed?

SWPPP Inspection and Rain Event Log

Project Name: _____ **Owner:** _____

Operator: _____ ***NPDES Permit ID:*** _____

Inspector: _____

Date of Inspection	Type of Inspection		Date/Amount of Last Rain	Date of Inspection	Type of Inspection		Date/Amount of Last Rain	Date of Inspection	Type of Inspection		Date/Amount of Last Rain
	Weekly	Event			Weekly	Event			Weekly	Event	

BMP INSTALLATION LOG

Project Name: _____ **Owner:** _____

Operator: _____ **NPDES Permit ID:** _____

Inspector: _____

Date	Description of Installation	Location and/or Extent	Owner or Operator Initials

BMP Maintenance / Corrective Action LOG

Project Name: _____ **Owner:** _____

Operator: _____ **NPDES Permit ID:** _____

Inspector: _____

Date Complete	Description of Maintenance	Location and/or Extent	Person / Co. Completing

GRADING ACTIVITY/STABILIZATION LOG

Project Name: _____ **Owner:** _____

Operator: _____ **NPDES Permit ID:** _____

Inspector: _____

Location	Date Construction Started	Date of Temporarily Ceased Construction	Date Construction Permanently Ceased	Date of Temporary Stabilization Measures	Date of Final Stabilization Measures

SWPPP Amendment Log

Project Name: _____ **Owner:** _____

Operator: _____ **NPDES Permit ID:** _____

Inspector: _____

Item #	Date of Change	Description of Change (Reference Plan Sheet Number)	Initial

ATTACHMENT E

Notice of Termination (NOT) of Coverage Under Ohio Environmental Protection Agency General Permit

(Read accompanying instructions carefully before completing this form)

Submission of this NOT constitutes notice that the party identified in Section II of this form is no longer authorized to discharge into state waters under the NPDES general permit program. NOTE: All necessary information must be provided on this form. Do not use correction fluid on this form. Forms transmitted by fax will not be accepted. There is no fee associated with submitting this form.

I. Permit Information:

NPDES general permit number: OH _____ Facility General Permit Number: _____

II. Owner/Applicant Information/Mailing Address:

Company Name: _____

Contact Person: _____ Phone: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

II. Facility/Site Location Information:

Facility Name: _____

Facility Contact Person: _____ Phone: _____

Facility Address/Location: _____

City: _____ State: _____ Zip Code: _____

County: _____ Township: _____ Section: _____

IV. Reason for Termination:

_____ Transfer of Ownership _____ Cease to Discharge _____ Facility Closed _____ Project Completed

_____ Obtained Individual Permit

Standard Certification:

I certify under penalty of law that all discharges authorized by the NPDES general permit have been eliminated or that I am no longer the operator of the facility. I understand that by submitting this NOT, I am no longer authorized to discharge under this general permit and that discharging pollutants to waters of the state without a NPDES permit is unlawful under ORC 6111.

Name (typed): _____

Signature: _____ Date: _____

Industrial Storm Water and Coal Mining Activity Certification Only:

I certify under penalty of law that all discharges associated with the identified facility that are authorized by the above referenced NPDES general permit have been eliminated, that I am no longer the operator of the facility, or in the case of a coal mine that the SMCRA bond has been released by ODNR-Division of Reclamation. I understand that, by submitting this NOT, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that all discharging pollutants in storm water associated with industrial activity to waters of the state is unlawful under ORC 6111 where the discharge is not authorized by a NPDES permit.

Name (typed): _____

Signature: _____ Date: _____

Storm Water Construction Activity Certification Only:

I certify under penalty of law that all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated. I understand that, by submitting this NOT, I am no longer authorized to discharge storm water associated with construction activity by the general permit, and that discharging pollutants in storm water associated with construction activity to waters of the state is unlawful under ORC 6111 where the discharge is not authorized by a NPDES permit.

Name (typed): _____

Signature: _____ *Date:* _____

Click to clear all entered information

Notice of Intent (NOI) For Coverage Under Ohio Environmental Protection Agency General Permit

(Read accompanying instructions carefully before completing this form)

Submission of this NOI constitutes notice that the party identified in Section I of this form intends to be authorized to discharge into state surface waters under Ohio EPA's NPDES general permit program. Becoming a permittee obligates a discharger to comply with the terms and conditions of the permit. Complete all required information as indicated by the instructions. Forms transmitted by fax will not be accepted. A check for the proper amount must accompany this form and be made payable to "Treasurer, State of Ohio." (See the fee table in Attachment D of the NOI instructions for the appropriate processing fee)

I. Applicant Information/Mailing Address

Company (Applicant) Name: _____

Mailing (Applicant) Address: _____

City: _____ State: _____ Zip Code: _____

Contact Person: _____ Phone: _____ Fax: _____

Contact E-Mail Address: _____

II. Facility/Site Location Information

Facility Name: _____

Facility Address/Location: _____

City: _____ State: _____ Zip Code: _____

County(ies): _____ Township(s): _____

Facility Contact Person: _____ Phone: _____ Fax: _____

Facility Contact E-Mail Address: _____

Quarter: _____ Section(s): _____ Range: _____

Receiving Stream or MS4: _____

If aware of a state nature preserve within 1,000 feet of the facility/site, check here: ☐

Enter river code here, if discharge is to a river designated scenic, wild, or recreational, or to a tributary within 1,000 feet (see instructions): _____

General Permit Number: OH _____ Initial Coverage: ☐ Renewal Coverage: ☐

Type of Activity: _____

SIC Code(s): - _____ - _____ - _____ - _____

Existing NPDES Permit Number: _____

ODNR Coal Mining Application Number: _____

Outfall	Design Flow (MGD)	Latitude	Longitude

For Ohio EPA Use Only

Check ID (OFA): _____

Person: _____

Place: _____

DOC #: _____

ORG #: _____

Rev. ID #: _____

Other DSW Permits Required: _____

Proposed Project Start Date (MO DY YR): _____ Estimated Completion Date: (MO DY YR): _____

Total Land Disturbance (Acres): _____ MS4 Drainage Area (Square Miles): _____

Payment Information: Check # _____ Check Amount: _____ Date of Check: _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant Name: _____ Title: _____

Applicant Signature: _____ Date: _____

FOR CONSTRUCTION STORM WATER, ATTACH LOCATION MAP

Click to clear all entered information CLEAR

Notice of Termination (NOT) of Coverage Under Ohio Environmental Protection Agency General Permit

(Read accompanying instructions carefully before completing this form)

Submission of this NOT constitutes notice that the party identified in Section II of this form is no longer authorized to discharge into state waters under the NPDES general permit program. NOTE: All necessary information must be provided on this form. Do not use correction fluid on this form. Forms transmitted by fax will not be accepted. There is no fee associated with submitting this form.

I. Permit Information:

NPDES general permit number: OH _____ Facility General Permit Number: _____

II. Owner/Applicant Information/Mailing Address:

Company Name: _____

Contact Person: _____ Phone: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

II. Facility/Site Location Information:

Facility Name: _____

Facility Contact Person: _____ Phone: _____

Facility Address/Location: _____

City: _____ State: _____ Zip Code: _____

County: _____ Township: _____ Section: _____

IV. Reason for Termination:

_____ Transfer of Ownership _____ Cease to Discharge _____ Facility Closed _____ Project Completed

_____ Obtained Individual Permit

Standard Certification:

I certify under penalty of law that all discharges authorized by the NPDES general permit have been eliminated or that I am no longer the operator of the facility. I understand that by submitting this NOT, I am no longer authorized to discharge under this general permit and that discharging pollutants to waters of the state without a NPDES permit is unlawful under ORC 6111.

Name (typed): _____

Signature: _____ Date: _____

Industrial Storm Water and Coal Mining Activity Certification Only:

I certify under penalty of law that all discharges associated with the identified facility that are authorized by the above referenced NPDES general permit have been eliminated, that I am no longer the operator of the facility, or in the case of a coal mine that the SMCRA bond has been released by ODNR-Division of Reclamation. I understand that, by submitting this NOT, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that all discharging pollutants in storm water associated with industrial activity to waters of the state is unlawful under ORC 6111 where the discharge is not authorized by a NPDES permit.

Name (typed): _____

Signature: _____ Date: _____

Storm Water Construction Activity Certification Only:

I certify under penalty of law that all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated. I understand that, by submitting this NOT, I am no longer authorized to discharge storm water associated with construction activity by the general permit, and that discharging pollutants in storm water associated with construction activity to waters of the state is unlawful under ORC 6111 where the discharge is not authorized by a NPDES permit.

Name (typed): _____

Signature: _____ Date: _____

Click to clear all entered information

ATTACHMENT F

ATTACHMENT G

ATTACHMENT H

ATTACHMENT I

ATTACHMENT J

CPESC

The
Application Review Committee
certifies that

Aaron Robert Mlynek

Subscribes to the Code of Ethics and has met the requirements
Established by the CPESC Council as a

Certified Professional in Erosion and Sediment Control

Certification No.: 3344
Certification Date: January 6, 2006

Executive Director, CPESC, Inc.

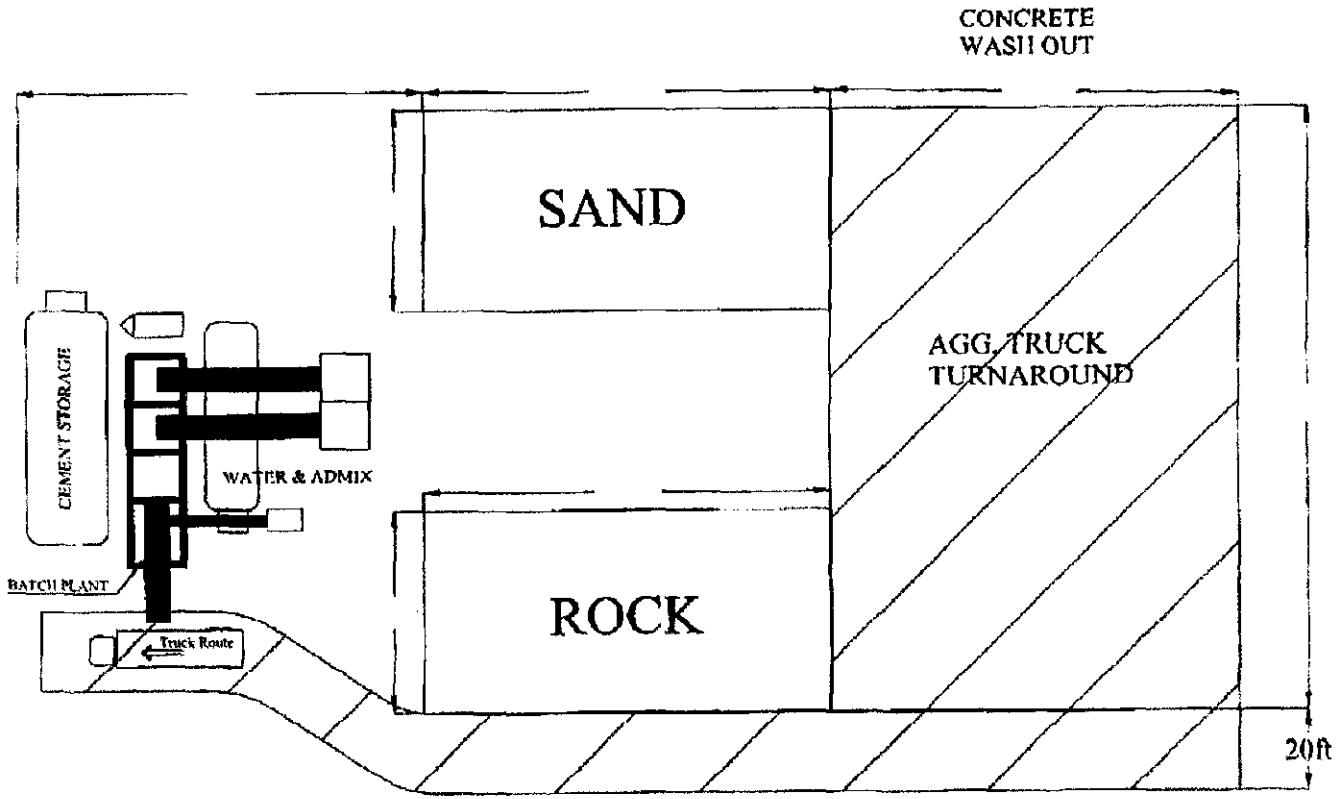
Chair, Application Review Committee

SOIL AND WATER CONSERVATION SOCIETY

IECA

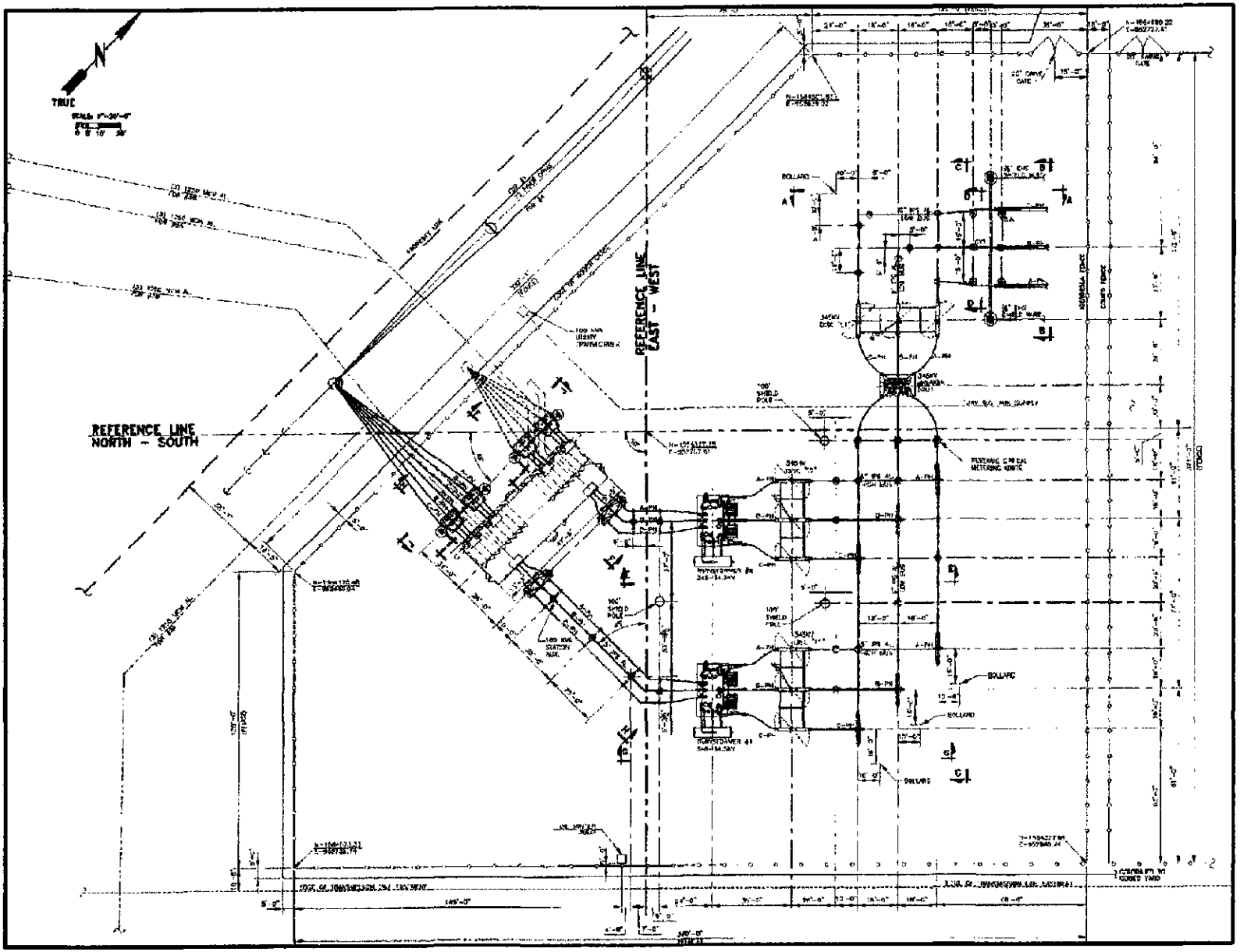
ATTACHMENT K

ATTACHMENT L



IBERDROLA
RENEWABLES

Typical Batch Plant
BLUE CREEK WIND FARM

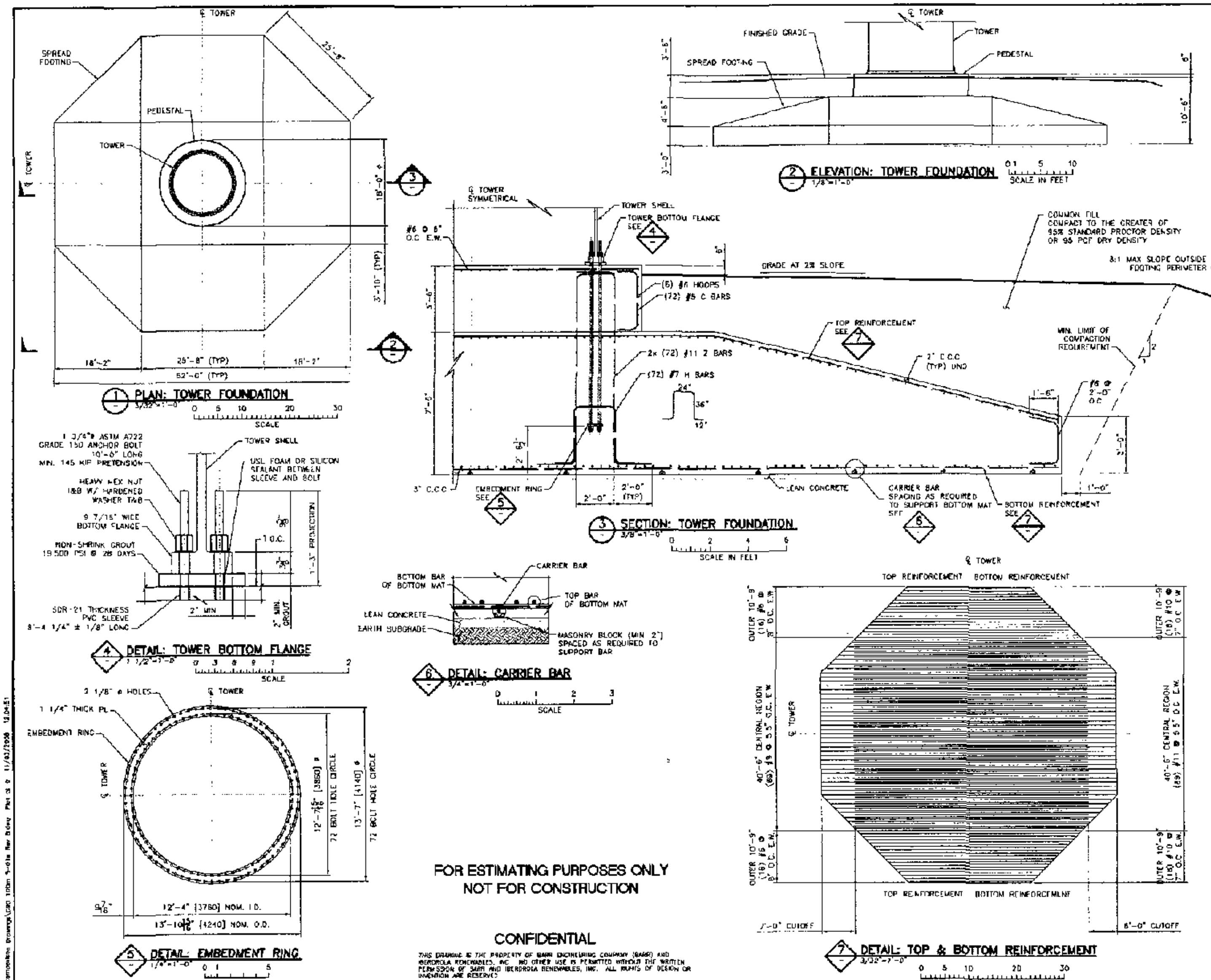


Typical Substation

Blue Creek Wind Farm

Modify Date: 8/12/2009

IBERDROLA
RENEWABLES



BUILDING AND DESIGN CODES:

INTERNATIONAL BUILDING CODE 2006. INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS

BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318, 2008. AMERICAN CONCRETE INSTITUTE

WIND TURBINE AND TOWER:

MANUFACTURER: GAMESA EOLICA
MODEL: GAMESA G90
POWER OUTPUT: 2.0 MW
TURBINE HUB HEIGHT: 100m

DESIGN SERVICE LOADS:

UNFACTORED SERVICE LOADS DUE TO EXTREME WIND CONDITION CLASS IEC-IIIA (CRITICAL)

OVERTURNING MOMENT, Mxy = 79,767 kN-m = 58,833 ft-kips
HORIZONTAL BASE SHEAR, Hxy = 813 kN = 183 kips
VERTICAL TOWER LOAD, Wz = 3,412 kN = 767 kips

FOUNDATION DESIGN DATA:

MIN. FACTOR OF SAFETY OVERTURNING >1.5
MIN. FACTOR OF SAFETY SLIDING >1.5
MIN. FACTOR OF SAFETY AGAINST BEARING CAPACITY FAILURE >2.25 ON EXTREME

REFERENCE DOCUMENTS:

1. GAMESA EOLICA, "LOADS FOR FOUNDATION OF G90 2MW IIA 100M HUB HEIGHT", DATED 13/09/2007

2. BARR ENGINEERING COMPANY, "FINAL PRELIMINARY GEOTECHNICAL ENGINEERING REPORT, CAYUGA RIDGE WIND PROJECT, LASALLE AND LIVINGSTON COUNTIES, ILLINOIS", JUNE 2008

MIN. 28-DAY COMPRESSIVE STRENGTH OF CONCRETE FOOTING:
5000 PSI

MIN. 28-DAY COMPRESSIVE STRENGTH OF CONCRETE PEDESTAL:
8,000 PSI

MIN. YIELD POINT STRENGTH OF REINFORCING BAR:
60 KSI

MIN. STRENGTH OF ANCHOR BOLTS:
TENSILE STRENGTH 150 KSI YIELD STRENGTH 125 KSI

MIN. COMPRESSIVE STRENGTH OF NON-SHRINK GROUT:
19,500 PSI @ 28 DAYS

MIN. YIELD POINT STRENGTH OF EMBEDMENT PLATE:
36 KSI

MAX. AGGREGATE SIZE NO LESS THAN:
1.5 INCHES

ESTIMATED VOLUME OF CONCRETE:
689 CUBIC YARDS

ESTIMATED WEIGHT OF STEEL REINFORCING:
58 TONS

ALLOWABLE SOIL BEARING CAPACITY:
3500 PSF

MIN. SHEAR WAVE VELOCITY:
760 FT/SEC

ABBREVIATIONS:

B.O.	BOTTOM OF	O.C.	ON CENTER
C.C.C.	CLEAR CONCRETE COVER	O.D.	OUTSIDE DIAMETER
℄	CENTER LINE	R	RADIUS
EL	ELEVATION	T&B	TOP AND BOTTOM
E.W.	EACH WAY	T.O.C.	TOP OF CONCRETE
EX	EXISTING	TYP	TYPICAL
I.D.	INSIDE DIAMETER	UNO	UNLESS NOTED OTHERWISE
MAX.	MAXIMUM	W/	WITH
MIN.	MINIMUM	⌀	DIAMETER
NOM.	NOMINAL		

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	JAD2	JAD2	DMH	21-JUN-08	RELEASE FOR ESTIMATING PURPOSES ONLY
B	DMH2	JAD2	DMH	31-OCT-08	REDESIGN USING 1.2 WIND LOAD FACTOR & REC AA LOADS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF ILLINOIS

SIGNATURE ____ PRINTED NAME ____ DATE ____ REG. NO. ____

CLIENT: BID / CONSTRUCTION — RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR — Project Office: BARR ENGINEERING CO. 4700 WEST 77TH STREET MINNEAPOLIS, MN. 55435-4803 Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Scale	AS SHOWN
Date	31/OCT/08
Drawn	DMH2
Checked	JAD2
Designed	JAD2
Approved	CAK

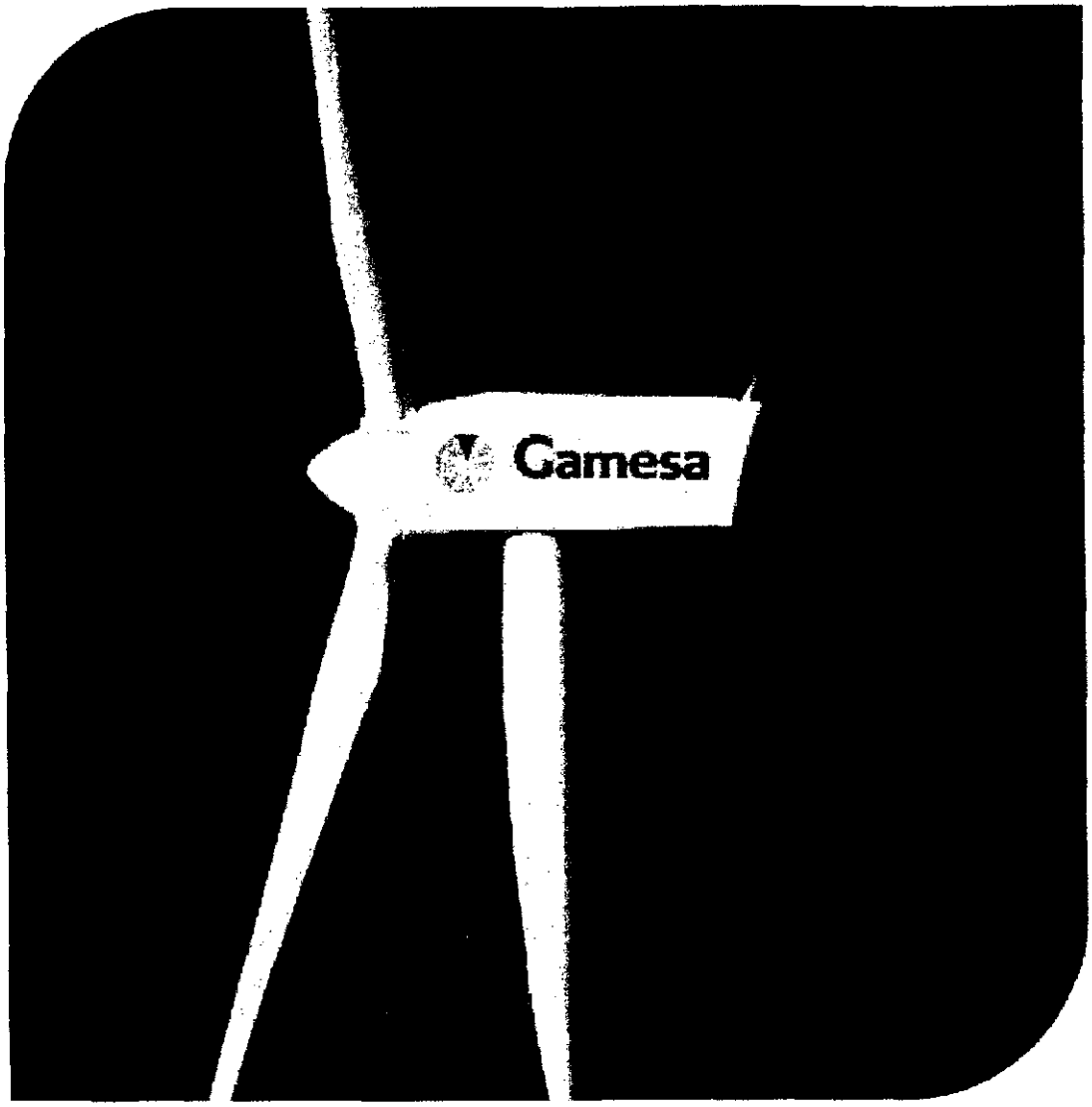
IBERDROLA RENEWABLES, INC.
RADNOR, PENNSYLVANIA

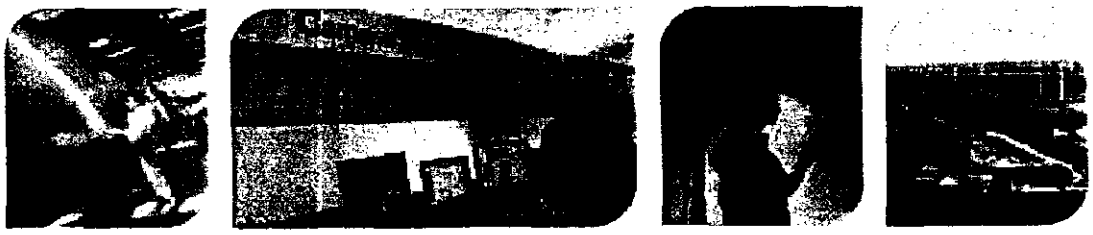
CAYUGA RIDGE WIND PROJECT
LASALLE AND LIVINGSTON COUNTIES, ILLINOIS

G90 100m SPREAD FOOTING FOUNDATION PLAN, ELEVATION, SECTION & DETAILS

BARR PROJECT No. 13/52-003
CLIENT PROJECT No. —
DWG. No. S-01a — REV. No. B

GAMESA G90-2.0 MW





Gamesa

BENEFITS

Maximum output at minimum cost per kWh for low wind sites

- Class IIIA/WZII.
- Pitch and variable speed technology to maximize energy production.
- Production of lighter blades using fiberglass, carbon fiber and prepreg method.
- Compliance with the main international Grid Codes.
- Aerodynamic design and Gamesa NRS™ control system to minimize noise emissions.
- Gamesa SGIPE: Remote monitoring and control system with Web access.

Rotor

Diameter	90 m
Swept area	6,362 m²
Rotational speed	9.0 - 19.0 rpm
Rotational direction	Clock Wise (front view)
Weight (incl. Hub)	Approx. 36 T
Top head mass	Approx. 106 T

Blades

Number of blades	3
Length	44 m
Airfoils	DU (Delft University) + FFA-W3
Material	Preimpregnated epoxy glass fiber + carbon fiber
Total blade weight	5,800 kg

Tubular Tower

Modular type	**Height**	**Weight**
3 sections	67 m*	153 T
4 sections	78 m	203 T
5 sections	100 m	255 T

* Availability depending on the site

Gearbox

Type	1 planetary stage / 2 parallel stages
Ratio	1:100.5 (50 Hz)
Cooling	Oil pump with oil cooler
Oil heater	2.2 kW

Generator 2.0 MW

Type	Doubly- fed machine
Rated power	2.0 MW
Voltage	690 V ac
Frequency	50 Hz
Protection class	IP 54
Number of poles	4
Rotational speed	900:1,900 rpm (rated 1,680 rpm) (50Hz)
Rated Stator Current	1,500 A @ 690 V
Power factor (standard)	0.98 CAP - 0.96 IND at partial loads and 1 at nominal power. *
Power factor (optional)	0.95 CAP - 0.95 IND throughout

Mechanical design

Drive train with main shaft supported by two spherical bearings that transmit the side loads directly to the frame by means of the bearing housing. This prevents the gearbox from receiving additional loads, reducing malfunctions and facilitating its service.

Brake

Aerodynamic primary brake by means of full-feathering blades. In addition, a hydraulically-activated mechanical disc brake for emergencies is mounted on the gearbox high speed shaft.

Lightning protection

The Gamesa G90 -2.0 MW wind turbine generator uses the "total lightning protection" system, in accordance with standard IEC 61024-1. This system conducts the lightning from both sides of the blade tip down to the root joint and from there across the nacelle and tower structure to the grounding system located in the foundations. As a result, the blade and sensitive electrical components are protected from damage.

Control System

- The Generator is a doubly fed machine (DFM), whose speed and power is controlled through IGBT converters and PWM (Pulse Width Modulation) electronic control.
- Benefits:
  - Active and reactive power control.
  - Low harmonic content and minimal losses.
  - Increased efficiency and production.
  - Prolonged working life of the turbine.

Gamesa SGIPE

Gamesa SGIPE and its new generation Gamesa WindNet™ (wind farm control systems), developed by Gamesa, that allow realtime operation and remote control of wind turbines, meteorological mast and electrical substation via satellite-terrestrial network. Modular design with control tools for active and reactive energy, noise, shadows and wake effects. TCP/IP architecture with a Web interface.

SMP Predictive Maintenance System

Predictive Maintenance System for the early detection of potential deterioration or malfunctions in the wind turbine's main components.

- Benefits:
  - Reduction in major corrective measures.
  - Increase in the machine's availability and working life.
  - Preferential terms in negotiations with insurance

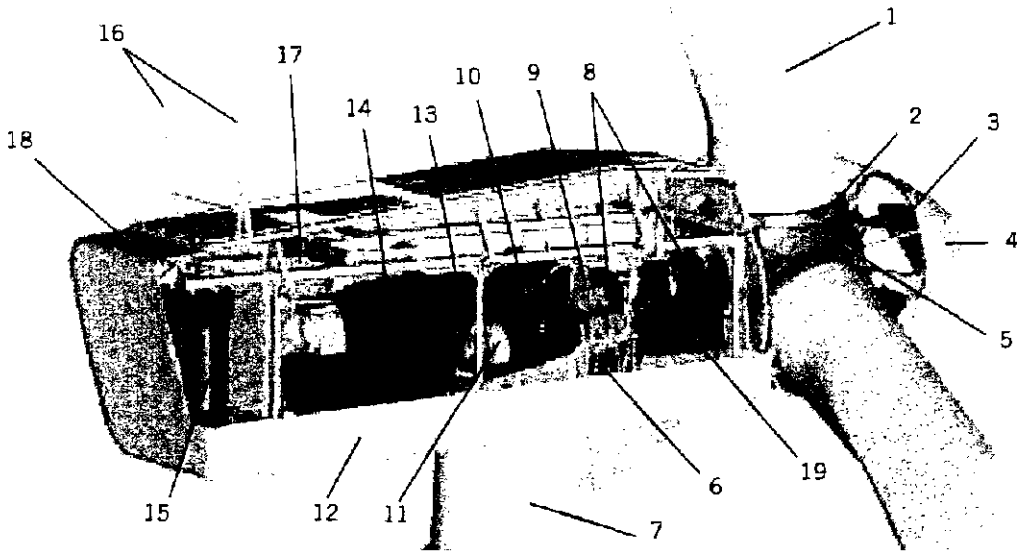
Noise control

Aerodynamic blade tip and mechanical component design minimize noise emissions. In addition, Gamesa has developed the Gamesa NRS *noise control* system, which permits programming the noise emissions according to criteria such as date, time or wind direction. This achieves the goals of local regulation compliance as well as maximum production.

Grid connection

Gamesa's doubly-fed wind turbines and Active Crowbar and over sized converter technologies ensure the compliance with the most demanding grid connection requirements.

Low voltage ride-through capability and dynamic regulation of active and reactive power.

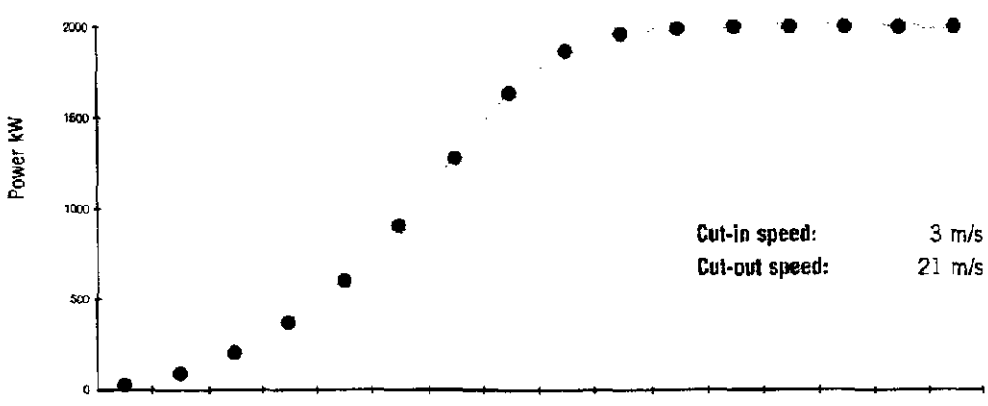


1. **Blade**
2. **Blade bearing**
3. **Hydraulic pitch actuator**
4. **Hub cover**
5. **Hub**
6. **Active yaw control**
7. **Tower**
8. **Main shaft with two bearing houses**
9. **Shock absorbers**
10. **Gearbox**
11. **Main disc brake**
12. **Nacelle support frame**
13. **Transmission: High speed shaft**
14. **Doubly-fed generator**
15. **Transformer**
16. **Anemometer and wind vane**
17. **Top controller**
18. **Nacelle cover**
19. **Hydraulic unit**

Power Curve Gamesa G90-2.0 MW (for an air density of 1,225 kg/m³)

Power curve calculation based on DU (Delft University) and FFAW3 airfoils.

Calculation parameters: 50 Hz grid frequency; tip angle pitch regulated; 10% turbulence intensity and a variable rotor speed ranging from 9.0-19.0 rpm.



Cut-in speed: 3 m/s
Cut-out speed: 21 m/s

Speed (m/s)	Power (kW)
3	21.3
4	84.9
5	197.3
6	363.8
7	594.9
8	900.8
9	1274.4
10	1633.0
11	1863.0
12	1960.4
13	1990.4
14	1997.9
15	1999.6
16	1999.9
17	2000.0

Gamesa

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Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

Community Energy (Interconnection Customer) proposes to install a 350 MW wind generating facility (PJM Project #R60) to the American Electric Power (AEP) transmission system. These facilities will connect via a new 345 kV switching station in the Convoy-Robison Park 345 kV AEP line in 2009. The connection request specifies that 70 MW of the project is to be a Capacity Resource, with the balance to be an Energy Resource.

Attachment Facilities

The proposed connection involves the construction of a new 345 kV in-line switching station in the Convoy-Robison Park 345 kV line. This new station is to consist of three (3) 345 kV circuit breakers in a ring bus arrangement with 345 kV metering (See Exhibit 1). AEP will retain ownership of the proposed substation facilities. The Interconnection Customer will be responsible for all costs associated with this construction. Note that the new generating plant switching station and the 345 kV line from the new 345 kV switching station to the generating station were not included in the cost estimate. These are assumed to be the Interconnection Customer's responsibility.

Minor 345 kV line work will be required to provide connection from the existing tower line in and out of the new station. Since the exact station location is not known at this time, 0.25 miles of additional line was assumed. Additionally, it is expected that any right-of-way for the line extension as well as a station site (approximately 400' x 400') will be provided by the Interconnection Customer.

The AEP construction scope includes:

- Construction of a new switching station connecting to the Convoy-Robison Park 345 kV line, including 3-345 kV circuit breakers, relays (including required circuit terminal relays), 345 kV metering, SCADA, and associated equipment.

  Estimated Cost (2007 Dollars)*: **$4,500,000**

- Construction of 0.25 miles of 345 kV line facilities to loop in and out of the new switching station from the Convoy-Robison Park 345 kV line.

  Estimated Cost (2007 Dollars)*: **$600,000**

*The estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination with the Interconnection Customer to determine final construction requirements. It will take approximately one year after obtaining the authorization to construct the facilities as outlined above.

Local Impacts

The impact of the proposed generating facility on the AEP System was assessed for adherence with applicable reliability criteria. AEP planning criteria require that the transmission system meet performance criteria in accordance with the AEP FERC Form 715. Table 1 from that document is provided below for reference. These criteria were used to assess the impact of the proposed facility on the AEP System.

Table 1
AEP Transmission Planning Criteria
(Steady State System Performance)

Transmission System Condition	Maximum Facility Loading (Rating)	Minimum Bus Voltage	
		EHV	138 kV
All facilities in service	Normal	95%	95%
One facility out of service	Emergency (1) Normal (2) Emergency (3)	90%	92%
Two facilities out of service	Emergency	90%	92%

(1) Operational planning criteria before operating procedure implemented.
(2) Facility planning criteria (EHV facilities).
(3) Facility planning criteria (138 kV facilities).

Additional generation projects have also been proposed in the region. Since the status of many of these projects is unknown at this time, this Feasibility Study addresses only the impact of the #R60 generation on the system as projected in 2009. The effect of other generation projects on the #R60 connection will be addressed in the System Impact Study as needed. Additionally, stability studies were not performed as part of this Feasibility Study and are not normally performed as part of a Feasibility Study effort. The stability assessments are part of the System Impact Study. Based upon the results of this future System Impact Study, the extent of system upgrades could change and the associated costs could be significantly different.

Network Impacts

The #R60 project was studied as a 350 MW (70 MW of Capacity) interconnection at the Robison Park – Convoy 345 kV line in the AEP system. Project #R60 was evaluated for compliance with reliability criteria for summer peak conditions in 2011. Potential network impacts were as follows:

Generator Deliverability
No problems were identified

Multiple Facility Contingency
No problems were identified

Short Circuit
No problems identified

Contribution to Previously Identified Overloads

No problems were identified

New System Reinforcements

None

Contribution to Previously Identified System Reinforcements

None

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

As a result of the aggregate energy resources in the area, the following violations were identified:

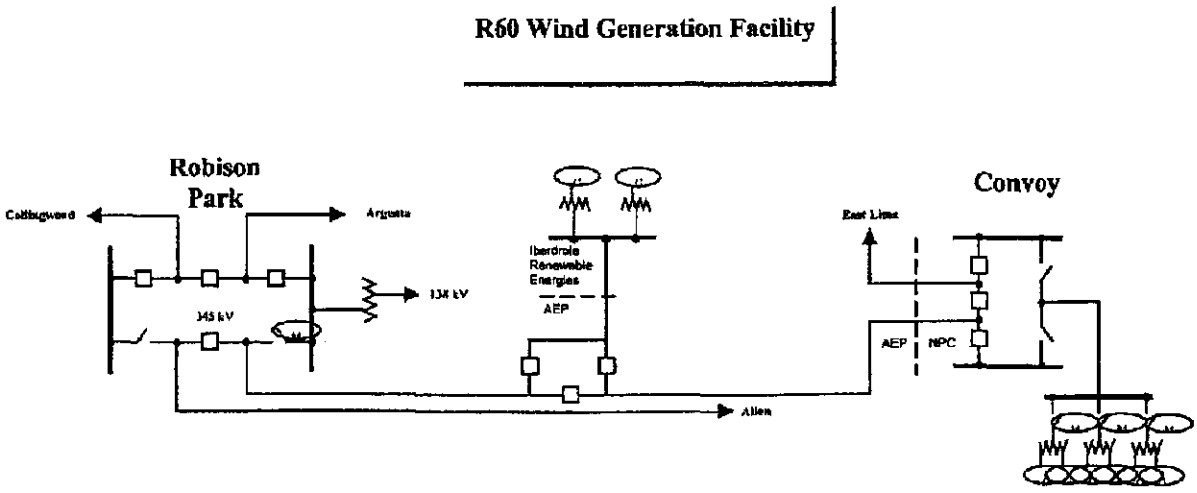
1. The Kammer 765/500 kV transformer is overloaded at 105% of its emergency rating (2094 MVA) for the outage of Kammer – South Canton 765 kV line (Cont. AEP380). The R60 project contributes approximately 34 MW to this overload.

   The replacement of the Kammer transformer is estimated to cost $18,000,000.

Coordination with MISO

Evaluation of whether the installation of this project impacts any facilities in the MISO system will be done in the Impact Study.

Exhibit 1: Simplified connection diagram



PJM Generator Interconnection Request
Queue #R60
Robison Park-Convoy 345kV
Impact Study

504744
September 2008

R60 Robison Park-Convoy 345kV Impact Study

General

Iberdrola Renewable Energies USA, Ltd. (Interconnection Customer) proposes to install a 350 MW wind generating facility (PJM Project #R60), comprised of 175 2 MW wind turbines, to the American Electric Power (AEP) transmission system. The project is in Allen County, Indiana. These facilities will connect via a new 345 kV switching station in the Convoy-Robison Park 345 kV AEP line in 2009. The connection request specifies that 70 MW of the project is to be a Capacity Resource, with the balance to be an Energy Resource.

The intent of the Impact study is to determine system reinforcements and associated costs and construction time estimates required to facilitate the addition of the new generating plant to the transmission system. The reinforcements include the direct connection of the generator to the system and any network upgrades necessary to maintain the reliability of the transmission system.

Direct Connection

The attachment facilities will consist of a new in-line switching station located in Allen County, Indiana between AEP's Robison Park and Convoy stations. The new station would consist of three 345 kV circuit breakers configured in a ring-bus arrangement with 345 kV metering. AEP will retain ownership of the proposed in-line station facilities. A preliminary one-line diagram of these facilities is shown in Figure 2.1. It is understood that Iberdrola will be responsible for all costs associated with this construction, as well as facilities associated with connecting the generation facilities to the in-line facilities.

It is expected that any right-of-way for line extensions, as well as a 400' x 400' (minimum) substation site will be provided to AEP by Iberdrola. Note that the Iberdrola station facilities and any facilities outside the new station were not included in the cost estimate. These are assumed to be Iberdrola's responsibility.

The AEP construction scope for the attachment facilities:

- Construction of a new switching station connecting to the Convoy – Robison Park 345 kV line, including three 345 kV circuit breakers, relays, 345 kV metering, SCADA, and associated equipment.

  Estimated Cost:* ***$8,000,000***

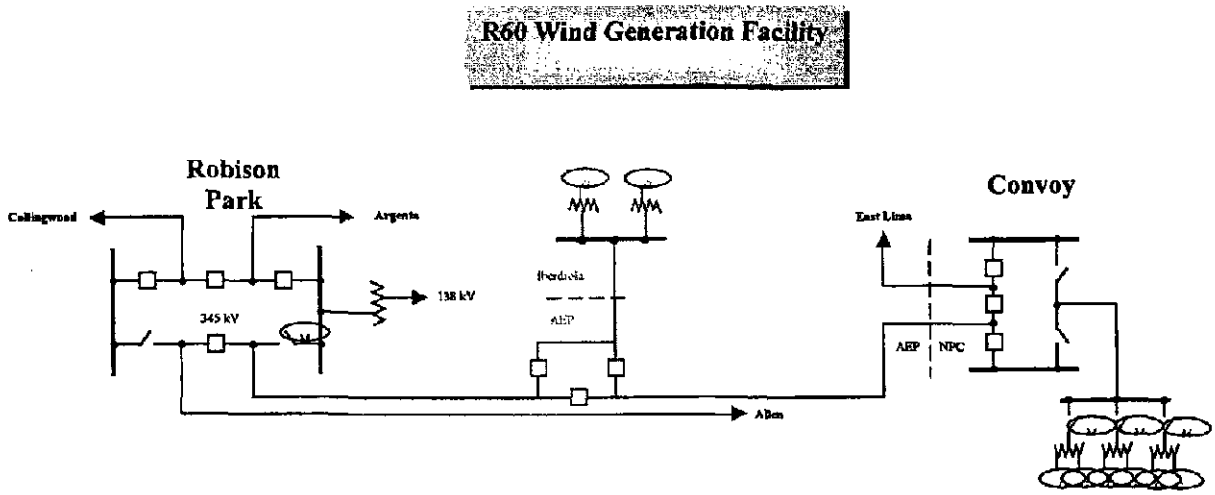
- Construction of an assumed 0.25 miles of 345 kV line facilities to loop in and out of the new switching station from the Convoy – Robison Park 345 kV line.

  Estimated Cost:* ***$500,000***

Total Attachment Facilities Cost*: **$8,500,000**

**The estimates are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. It will take approximately one year after obtaining the authorization to construct the facilities as outlined above.*

Figure 2.1: Preliminary One-line Diagram of Interconnection Facilities



Network Impacts

The Queue Project #R60 was studied as a(n) 350MW(70 MW of Capacity) interconnection at the Robinson Park – Convoy 345 kV line in the AEP system. Project #R60 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)
None

Multiple Facility Contingency

(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)
None

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

None

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

None

Stability

Stability analysis was performed at 2011 summer peak load condition and for maximum gross generation output of 350 MW for the proposed R60 project. See Attachment #1 for the fault cases evaluated. The range of contingencies evaluated was limited to that necessary to assess expected compliance with MAAC Stability criteria.

The Study shows with the turbines specified: GAMESA 2.0 MW (175 units) and operating in power factor control mode it will be transiently stable and meet the voltage ride through requirement when the **controlled power factor at 34.5 KV collector bus is 0.985 lagging (turbines supplying VARS) and with the following voltage trip levels and times :**

Voltage at the terminal of the generator:

0.85 pu or lower for 10 seconds
0.75 pu or lower for 1 second
0.70 pu or lower for 0.35 second
0.30 pu or lower for 0.15 second
1.10 pu or higher for 1.1 second
1.15 pu or higher for 0.2 second
1.3 pu or higher for 0.02 second

Whenever R60 wind farm plant was islanded with a load, we recommend the following values for trip settings at the interconnection point:

Voltage at the point of interconnection:

0.8 pu or lower for 2 seconds
1.11 pu or higher for 0.1 second
1.2 pu or higher for 0.02 second

Frequency at the point of interconnection:

57Hz or lower for 0.05 seconds
62Hz or higher for 0.05 second

Note: While the stability analysis has been performed at expected extreme system conditions, there is a potential that evaluation at different level of generator MW and/or MVAR output at different load levels and operating conditions would disclose unforeseen stability problems. The

regional reliability analysis routinely performed to test all system changes will include one such evaluation. Any problems uncovered in this or other operating or planning studies will need to be resolved.

Moreover, when the proposed generating station is designed and unit specific dynamics data for the turbine generators and its controls are available, and if it is different than the data provided for this study, a transient stability analysis at a variety of expected operating conditions using the more accurate data shall be performed to verify impact on the dynamic performance of the system. As more accurate or unit specific dynamics data for the proposed facility, as well as Plant layout becomes available, it must be forwarded to PJM.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. Network Impacts, initially caused by the addition of this project generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)

None

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
As a result of the aggregate energy resources in the area, the following violations were identified:

None

Coordination with MISO

PJM evaluation has shown that there are no impacts to MISO facilities due to the interconnection of this project. Those results have been communicated to MISO.

Attachment #1

R60

2011 Summer Light/Peak Load Case Stability Faults

BREAKER CLEARING TIMES (CYCLES)

Station		Primary (3ph/slg)	Stuck Breaker (total)	Zone 2 (total)
Generating	345 kV	4	15	15
Non-generating	345 kV	4	15	15

All cases are stable.

1a. 3ph @ R61 – Hiple 345 KV line
1c. slg @ R61 – Hiple 345 KV line, 80% from R61, Zone 2 clearing

2a. 3ph @ Hiple – Leesburg 345 KV line
2c. slg @ Hiple – Leesburg 345 KV line, 80% from Hiple, Zone 2 clearing

3a. 3ph @ Robison Park – Argenta 138 KV line
$3b_{1\text{-}K1}$. slg @ Robison Park – Argenta 138KV line, BF @ Hiple
$3b_{1\text{-}KM}$. slg @ Robison Park – Argenta 138KV line, BF @ Hiple

4a. 3ph @ Hiple – Cook 345 KV line
$4b_{1\text{-}24\text{-}25}$. slg @ Hiple – Cook 138 KV line, BF @ Hiple
$4b_{1\text{-}25\text{-}26}$. slg @ Hiple – Cook 138 KV line, BF @ Hiple
4c. slg @ Hiple – Cook 345 KV line, 80% from Hiple, Zone 2 clearing

5a. 3ph @ R61 – Collingwood 345 KV line
5c. slg @ R61 - Collingwood 345 KV line, 80% from R61, Zone 2 clearing

6a. 3ph @ R60 – Robison Park 345 KV line
6c. slg @ R60 – Robison Park 345 KV line, 80% from R60, Zone 2 clearing

7a. 3ph @ Robison Park - Collingwood345 KV line
$7b_{1\text{-}KM}$. slg @ Robison Park – Collingwood 138 KV line, BF @ Robison Park
$7b_{1\text{-}K2}$. slg @ Robison Park – Collingwood 138 KV line, BF @ Robison Park
7c. slg @ Robison Park – Collingwood 345 KV line, 80% from Robison Park, Zone 2 clearing

8a. 3ph @ R60 – Convoy 345 KV line
8c. slg @ R60 – Convoy 345 KV line, 80% from Robert P. Mone, Zone 2 clearing

9a. 3ph @ Convoy – East Lima 345 KV line

9c. slg @ Convoy – East Lima 345 KV line, 80% from Robert P. Mone, Zone 2 clearing

10a. 3ph @ East Lima – Fostoria Central 345 KV line
$10b_{1\text{-}M2}$. slg @ East Lima – Fostoria Central 138 KV line, BF @ East Lima
$10b_{1\text{-}P2}$. slg @ East Lima – Fostoria Central 138 KV line, BF @ East Lima

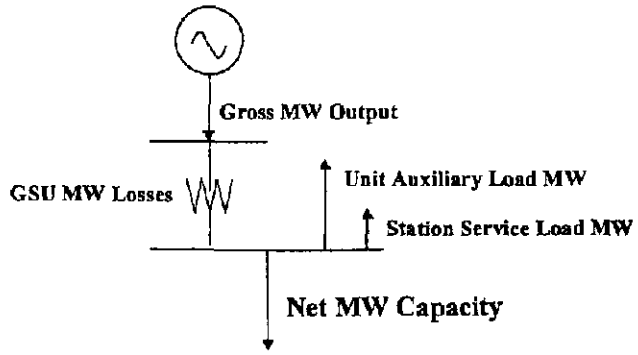
11a. 3ph @ East Lima – Southwest Lima 345 KV line
$11b_{1P}$. slg @ East Lima – Southwest Lima 138 KV line, BF @ East Lima
$11b_{1P1}$. slg @ East Lima – Southwest Lima 138 KV line, BF @ East Lima
11c. slg @ East Lima – Southwest Lima 345 KV line, 80% from East Lima, Zone 2 clearing

12a. 3ph @ East Lima – Marysville 345 KV line
$12b_{1\text{-}M1}$. slg @ East Lima – Marysville 138 KV line, BF @ East Lima
$12b_{1\text{-}P1}$. slg @ East Lima – Marysville 138 KV line, BF @ East Lima
12c. slg @ East Lima – Marysville 345 KV line, 80% from East Lima, Zone 2 clearing

13a. 3ph @ Robison Park – Allen 345 KV line
13b. slg @ Robison Park – Allen 345 KV line, BF @ Robison Park
13c. slg @ Robison Park – Allen 345 KV line, 80% from Robison Park, Zone 2 clearing

ATTACHMENT #2

Unit Capability Data



Net MW Capacity = (Gross MW Output - GSU MW Losses* – Unit Auxiliary Load MW - Station Service Load MW)

Queue Letter/Position/Unit ID: _____ R60

Primary Fuel Type: _____ Wind /Gamesa G87

Maximum Summer (92° F ambient air temp.) Net MW Output**: _____ 350/2.0 per turbine

Maximum Summer (92° F ambient air temp.) Gross MW Output: _____ 350/2.0 per turbine

Minimum Summer (92° F ambient air temp.) Gross MW Output: _____ 0

Maximum Winter (30° F ambient air temp.) Gross MW Output: _____ 350/2.0 per turbine

Minimum Winter (30° F ambient air temp.) Gross MW Output: _____ 0

Gross Reactive Power Capability at Maximum Gross MW Output – Please include Reactive Capability Curve (Leading and Lagging): _____ N/A

Individual Unit Auxiliary Load at Maximum Summer MW Output (MW/MVAR): _____ 0.24

Individual Unit Auxiliary Load at Minimum Summer MW Output (MW/MVAR): _____ N/A

Individual Unit Auxiliary Load at Maximum Winter MW Output (MW/MVAR): _____ 0.48

Individual Unit Auxiliary Load at Minimum Winter MW Output (MW/MVAR): _____ N/A

Station Service Load (MW/MVAR): _____ 0.1125

* GSU losses are expected to be minimal.

** Your project's declared MW, as first submitted in Attachment N, and later confirmed or modified by the Impact Study Agreement, should be based on either the 92°F Ambient Air Temperature rating of the unit(s) or, if less, the declared Capacity rating of your project.

Unit Generator Dynamics Data

Queue Letter/Position/Unit ID: R60

MVA Base (upon which all reactances, resistance and inertia are calculated): 2.197

Nominal Power Factor: 1.0

Terminal Voltage (kV): 0.69

Unsaturated Reactances (on MVA Base)

- Direct Axis Synchronous Reactance, $X_{d(i)}$: 4.63
- Direct Axis Transient Reactance, X'd(i): 0.214
- Direct Axis Sub-transient Reactance, X"d(i): 0.152
- Quadrature Axis Synchronous Reactance, Xq(i): 4.63
- Quadrature Axis Transient Reactance, X'q(i): 0.214
- Quadrature Axis Sub-transient Reactance, X"q(i): 0.152
- Stator Leakage Reactance, Xl: 1.07
- Negative Sequence Reactance, X2(i): 0.212
- Zero Sequence Reactance, X0: 0.410

Saturated Sub-transient Reactance, X"d(v) (on MVA Base): 0.152

Armature Resistance, Ra (on MVA Base): 0.015

Time Constants (seconds)

- Direct Axis Transient Open Circuit, T'_{do}: 1.4
- Direct Axis Sub-transient Open Circuit, T''_{do}: 0.0025
- Quadrature Axis Transient Open Circuit, T'_{qo}: 1.4
- Quadrature Axis Sub-transient Open Circuit, T''_{qo}: 0.0025
- Inertia, H (kW-sec/kVA, on KVA Base): 3.25

Speed Damping, D: N/A

Saturation Values at Per-Unit Voltage [S(1.0), S(1.2)]: N/A

Units utilize a *Generator model*

Unit GSU Data

Queue Letter/Position/Unit ID: R60

Generator Step-up Transformer MVA Base: 2.1

Generator Step-up Transformer Impedance (R+jX, or %, on transformer MVA Base): 8.8%

Generator Step-up Transformer Reactance-to-Resistance Ration (X/R): N/A

Generator Step-up Transformer Rating (MVA): 2.1

Generator Step-up Transformer Low-side Voltage (kV): 0.69

Generator Step-up Transformer High-side Voltage (kV): 34.5

Generator Step-up Transformer Off-nominal Turns Ratio: N/A

Generator Step-up Transformer Number of Taps and Step Size: +/- 2.5%, +/- 5%

Main Transformer Data

Queue Letter/Position/Unit ID: R60

Generator Step-up Transformer MVA Base: 3 x 110

Generator Step-up Transformer Impedance (R+jX, or %, on transformer MVA Base): 12.5%

Generator Step-up Transformer Reactance-to-Resistance Ration (X/R): N/A

Generator Step-up Transformer Rating (MVA): 3 x 110

Generator Step-up Transformer H-side Voltage (kV): 345

Generator Step-up Transformer X-side Voltage (kV): 34.5

Generator Step-up Transformer Off-nominal Turns Ratio: N/A

Generator Step-up Transformer Number of Taps and Step Size: +/-2.5% 4 steps

Noise Analysis of the Blue Creek Wind Farm Project

TO: Heartland Wind, LLC Blue Creek Project Team

FROM: Mark Bastasch, P.E./CH2M HILL

DATE: December 14, 2009

Summary

This memorandum documents a noise analysis conducted for Heartland Wind, LLC's proposed Blue Creek Wind Farm (the Facility) in Paulding and Van Wert counties, Ohio. This assessment covered 167 Gamesa G90 wind turbines (G-90) on 100- meter-tall towers and the associated electrical substations, as shown in Figure 1[1]. Once the final turbine locations have been identified, the noise analysis will be updated. The expected operational noise levels predicted at residences within the Project area range from less than 30 dBA to 53 dBA (these results are inclusive of a +2 dBA adjustment). An introduction to acoustics and technical vocabulary is presented in Attachment A.

Methods

Standard acoustical engineering methods were used in this analysis. The noise propagation factors used were adopted from ISO 9613-2, *Acoustics – Sound Attenuation During Propagation Outdoors, Part 2: General Method of Calculation* (International Organization for Standardization [ISO], 1993) and VDI 2714, *Outdoor Sound Propagation* (Verein Deutscher Ingenieure [VDI], 1988). Atmospheric absorption for conditions of 10°C and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, *Acoustics – Sound Attenuation During Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere* (ISO, 1993).

Each wind turbine was considered to have an overall noise power level of 108.4 dBA and was modeled on an octave band basis for the nine standard octave bands from 31.5 to 8000 Hz. This overall noise power level represents the maximum turbine noise level determined in accordance with IEC61400-11, *Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques* (International Electrotechnical Commission [IEC], 2006) and includes a +2 dBA adjustment to account for typical vendor warranty, uncertainty or declared noise power levels. Although it is statistically unlikely that all of the turbines would simultaneously exceed the expected maximum value of 106.4 dBA, the +2 dBA adjustment was included in the modeling as a conservative measure. This maximum noise power level used in this analysis is realized at wind speeds of 6 meters per second (m/s) (13.4 mph) or greater. The 6 m/s wind speed is referenced to a 10-meter (32.8 feet) height, which is equivalent to a hub height wind speed of 8.7 m/s (19.5 mph) in accordance with

[1] The proposed Facility will have up to 175 turbines, for a maximum potential output of 350 megawatts. The specific locations for 167 turbines and other related Facility infrastructure are identified in Figure 1. An additional eight turbines will be located in an area along the eastern portion of the project area boundary. The Applicant will provide the locations of these turbines in the shaded area on Figure 1 with appropriate site-specific information by April 1, 2010 in sufficient time for the Ohio Power Siting Board (OPSB) staff to consider the information in the Staff Report.

the IEC 61400-11 standard. In addition, a mixed ground factor of G=0.5 was used with a receptor height of 4 meters. These parameters are similar to those recommended by the Ontario Ministry of the Environment, which identifies a ground factor of G=0.7 and receptor height of 4.5 meters. The modeling parameters used in this analysis yielded similar results to hard ground conditions (G=0), with a receptor height of 1.5 meters when the +2 dBA term is not considered. Atmospheric propagation is not strongly dependent on temperature, and the 70 percent relative humidity is a representative of favorable propagation (that is, higher predicted levels). *All results are expressed in terms of energy average,* L_{eq}.

The combination of the modeling parameters used and the inclusion of the +2 dBA term are expected to result in a reasonable and conservative assessment of the maximum project levels. When winds are slower than those that correspond to maximum noise emissions, the noise levels will be less.

Four Facility substations, each with a maximum noise power level of 100 dBA, were also included in the analysis.

In summary, the following conservative components were incorporated into the analysis to ensure that predicted receptor levels were not minimized:

- Use of maximum noise output of the turbines, even though different conditions will result in lower noise levels
- Inclusion of a 2 dBA margin
- Use of atmospheric conditions conducive to noise propagation
- Use of mixed ground factors and elevated receivers

Construction Noise Levels

The noise levels would vary during the construction period, depending on the phase of construction and number and locations of operating construction equipment. Construction activities are not expected to be constant at any individual location throughout the entire construction period. Therefore, some locations may experience a few weeks of significant activity that would then progress to a different portion of the Project area. Although the turbines are located more than 1,200 feet from residential structures, construction of roads and other Facility components will be located at closer distances, but no closer than 624 feet[2].

The *Roadway Construction Noise Model (RCNM) User's Guide* is one of the most comprehensive guides ever developed in the U.S. (Federal Highway Administration, 2006). Equipment noise levels from Table 1 in the RCNM User's Guide are shown in Table 1 below. All listed noise levels are maximum A-weighted noise pressure levels at a reference distance of 50 feet. The acoustical usage factor is the fraction of time that the equipment generates noise at the maximum level.

[2] Setback distances from other public roads and rights-of-way will be 1.31 times the turbine height (476 feet) for a setback of 624 feet (assuming use of the G-90 turbine).

TABLE 1
RCNM Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Specified L_{max} @ 50 ft (dBA)	Actual Measured L_{max} @ 50 ft (dBA)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	50	85	-- N/A --	0
Auger Drill Rig	20	85	84	36
Backhoe	40	80	78	372
Bar Bender	20	80	-- N/A --	0
Blasting	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	50	80	83	1
Chain Saw	20	85	84	46
Clam Shovel (dropping)	20	93	87	4
Compactor (ground)	20	80	83	57
Compressor (air)	40	80	78	18
Concrete Batch Plant	15	83	-- N/A --	0
Concrete Mixer Truck	40	85	79	40
Concrete Pump Truck	20	82	81	30
Concrete Saw	20	90	90	55
Crane	16	85	81	405
Dozer	40	85	82	55
Drill Rig Truck	20	84	79	22
Drum Mixer	50	80	80	1
Dump Truck	40	84	76	31
Excavator	40	85	81	170
Flat Bed Truck	40	84	74	4
Front End Loader	40	80	79	96
Generator	50	82	81	19
Generator (<25kVA, VMS signs)	50	70	73	74
Gradall	40	85	83	70
Grader	40	85	-- N/A --	0
Grapple (on backhoe)	40	85	87	1
Horizontal Boring Hydr. Jack	25	80	82	6
Hydra Break Ram	10	90	-- N/A --	0
Impact Pile Driver	20	95	101	11
Jackhammer	20	85	89	133
Man Lift	20	85	75	23
Mounted Impact Hammer (hoe ram)	20	90	90	212
Pavement Scarifier	20	85	90	2

TABLE 1
RCNM Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Specified L_{max} @ 50 ft (dBA)	Actual Measured L_{max} @ 50 ft (dBA)	No. of Actual Data Samples (Count)
Paver	50	85	77	9
Pickup Truck	40	55	75	1
Pneumatic Tools	50	85	85	90
Pumps	50	77	81	17
Refrigerator Unit	100	82	73	3
Rivet Buster/chipping gun	20	85	79	19
Rock Drill	20	85	81	3
Roller	20	85	80	16
Sand Blasting (Single Nozzle)	20	85	96	9
Scraper	40	85	84	12
Shears (on backhoe)	40	85	96	5
Slurry Plant	100	78	78	1
Slurry Trenching Machine	50	82	80	75
Soil Mix Drill Rig	50	80	-- N/A --	0
Tractor	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	40	85	85	149
Vacuum Street Sweeper	10	80	82	19
Ventilation Fan	100	85	79	13
Vibrating Hopper	50	85	87	1
Vibratory Concrete Mixer	20	80	80	1
Vibratory Pile Driver	20	95	101	44
Warning Horn	5	85	83	12
Welder / Torch	40	73	74	5

Source: Federal Highway Administration, 2006

L_{max} = maximum noise level

As the table shows, the loudest equipment generally emits noise in the range of 80 to 90 dBA at a distance of 50 feet. The closest and loudest equipment dominates noise at any specific receptor. As noted above, the types and numbers of construction equipment near any specific receptor location would vary over time. The construction noise estimates were based on conservative assumptions of multiple pieces of loud equipment operating close to each other. This is believed to be a realistic scenario.

Additional assumptions include the following:

- One piece of equipment generating a reference noise level of 85 dBA (at a distance of 50 feet with a 40 percent usage factor) located 50 feet from the point of reception

- Two pieces of equipment generating reference 85 dBA noise levels located an additional 50 feet farther away (100 feet from point of reception)
- Two more pieces of equipment generating reference 85 dBA noise levels located 100 feet farther away (150 feet from point of reception)

Table 2 presents construction equipment noise levels at various distances based on the above assumptions. This extrapolation is conservative because it only considers geometric spreading and does not account for atmospheric absorption.

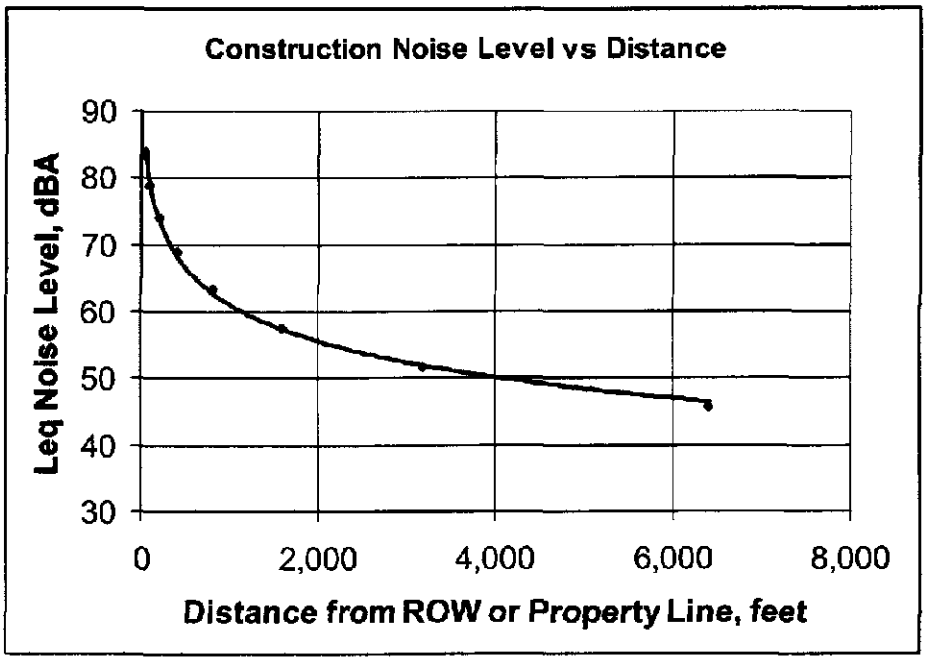
TABLE 2
Construction Equipment Noise Levels versus Distance

Distance from Right of Way or Property Line (feet)	L_{eq} Noise Level (dBA)
50	83
100	79
200	74
400	69
800	63
1,600	58
3,200	52
6,400	46

L_{eq} = equivalent sound level

Figure 2 plots the data in Table 2. The expected average construction noise levels from proposed construction activities at any particular location may be estimated using this figure. As noted in Table 1, some variation in construction equipment noise levels is to be expected.

FIGURE 2
Estimated Construction Noise Levels



It is anticipated that most of the heavy construction activities will be conducted during the day and that the character of the noise would be similar to agricultural or road construction equipment operations, sources with which the communities in the Project area are generally familiar. Therefore, temporary increases in noise levels resulting from construction activities are not anticipated to present a significant impact.

The heavy construction equipment – such as backhoes, cranes, bulldozers, and excavators – will produce noise levels very similar to agricultural equipment such as tractors, combines, and grain dryers, which are all regularly used within the Facility area now.

Project Operating Noise Levels

The cumulative level from all turbines and the substation operating at their maximum noise power levels (inclusive of the + 2 dBA turbine noise power level adjustment) is presented in Attachment B. Attachment B contains four sets of information:

- Model results (Table B-1)
- Receptor coordinates (identified residential structures, schools, hospitals, nursing homes or assisted-living and health-care facilities, religious institutions and public libraries) (Table B-1)
- Source coordinates (Table B-2)
- Predicted noise level contour maps (Figure B-1)

The range in expected operational noise levels presented in Appendix B varies from less than 30 dBA to 53 dBA. Table 3 summarizes the number of receptors within specific noise pressure level ranges.

TABLE 3
Summary of Predicted Project Noise Levels

Noise Level	# of Receptors
50 dBA or greater	53
45 - 50 dBA	279
40 - 45 dBA	226
35 - 40 dBA	402

Low Frequency Noise

There has been some confusion regarding the presence of significant levels of low frequency noise from modern utility-scale upwind turbines. High levels of low frequency noise can be associated with simple-cycle combustion turbines or natural gas compressor stations. High levels of low frequency noise were common in earlier downwind wind turbines. However, the level of low frequency noise emitted from modern upwind turbines is significantly less than from other sources. The swishing noise associated with the rotation of turbine blades is often mistaken for low frequency noise. The frequency content of the swish is typically within the 500 to 1,000 hertz range, which is entirely within the audible range and appropriately characterized by the A-weighting.

For wind turbines, the measurement of low frequency noise is complicated by the presence of wind and the resulting wind-induced noise (self-noise) through microphone windscreens. Recent wind tunnel testing of various windscreens (Hessler et al., 2008; Hessler 2009) concludes that:

> any casual measurement of sound using a standard windscreen in a windy field will yield ostensibly high levels of low frequency or infrasonic noise—whether a wind turbine is present or not. Such measurements, taken at face value, may be one of the reasons wind turbines are widely, but mistakenly, believed to be significant sources of low frequency noise.

Mitigation Measures

The following mitigation measures will be incorporated to minimize construction noise emissions:

- Exhaust mufflers will satisfy manufacturer requirements or be promptly replaced.
- Contractors will be required to comply with federal limits on truck noise and comply with local speed limits.
- To the extent practicable, nighttime construction will be limited to relatively quiet activities. In the event of limited nighttime activities, the surrounding neighbors will be notified in advance.
- Contractors will be required to notify the community in advance of any blasting or pile-driving activity. This activity would only be conducted during the day.
- A telephone number will be established for the public to report any significant undesirable noise conditions associated with the construction of the Facility.

These results are representative of the expected operational noise levels, and an overall reduction in Facility noise levels is expected to be realized through the micro-siting process. An overall reduction is expected to be realized even if a turbine with higher noise power

level, such as the Mitsubishi, is selected. The following mitigation measures will be implemented by Heartland Wind, LLC to minimize operating noise emissions:

- Using 1,200 feet for a minimum residential setback instead of the OPSB-mandated 750 feet.
- Ensuring that any minor adjustments made to turbine positions as part of the standard micro-siting process closer to construction will not result in higher noise levels than presently predicted. Additional modeling of the final layout and turbine selection will be conducted.
- Publishing a phone number for the Plant Manager so area residents can report excessive noise that might be caused by malfunctioning turbines.
- Offering Good Neighbor Agreements to the owners of all residences within one-half mile of a proposed wind turbine to give financial compensation to affected residents. Special efforts will be made to contact residences that will experience predicted noise levels of greater than 50 dBA.

References

Federal Highway Adminstration. 2006. *Roadway Construction Noise Model (RCNM) User's Guide*.FHWA-HEP-05-054, DOT-VNTSC-FHWA-05-01). January.

Hessler, G. F., Hessler, D. M., Brandstätt, P., Bay, K. 2008. "Experimental Study to Determine Wind-Induced Noise and Windscreen Attenuation Effects on Microphone Response for Environmental Wind Turbine and Other Applications," *Noise Control Engineering Journal*. J.56. July-August.

Hessler, D.M. 2009. "Wind Tunnel Testing of Microphone Windscreen Performance Applied to Field Measurements of Wind Turbines", Proceedings of the Third International Meeting on Wind Turbine Noise, Aalborg Denmark. 17-19 June.

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Verein Deutscher Ingenieure (VDI). 1988. *Outdoor Sound Propagation*. VDI 2714, Verlag GmbH, Dussledorf, Beuth Verlag, Berlin, Koln, Germany.

Attachment A

Fundamentals of Acoustics

It is useful to understand how noise is defined and measured. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table 1 summarizes the technical noise terms typically discussed in environmental noise analysis.

TABLE 1
Definitions of Acoustical Terms

Term	Definitions
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals.
A-weighted sound pressure level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Sound Level (L_{eq})	The L_{eq} integrates fluctuating sound levels over a period of time to express them as a steady-state sound level. As an example, if two sounds are measured and one sound has twice the energy but lasts half as long, the two sounds would be characterized as having the same equivalent sound level.
Day–Night Level (L_{dn} or DNL)	The Day-Night level (L_{dn} or DNL) is a 24-hour average L_{eq}, where 10 dBA are added to nighttime levels between 10 p.m. and 7 a.m. For a continuous source that emits the same noise level over a 24-hour period, the L_{dn} will be 6.4 dB greater than the L_{eq}.
Statistical noise level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time).

Table 2 depicts the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 2
Typical Sound Levels Measured in the Environment and Industry

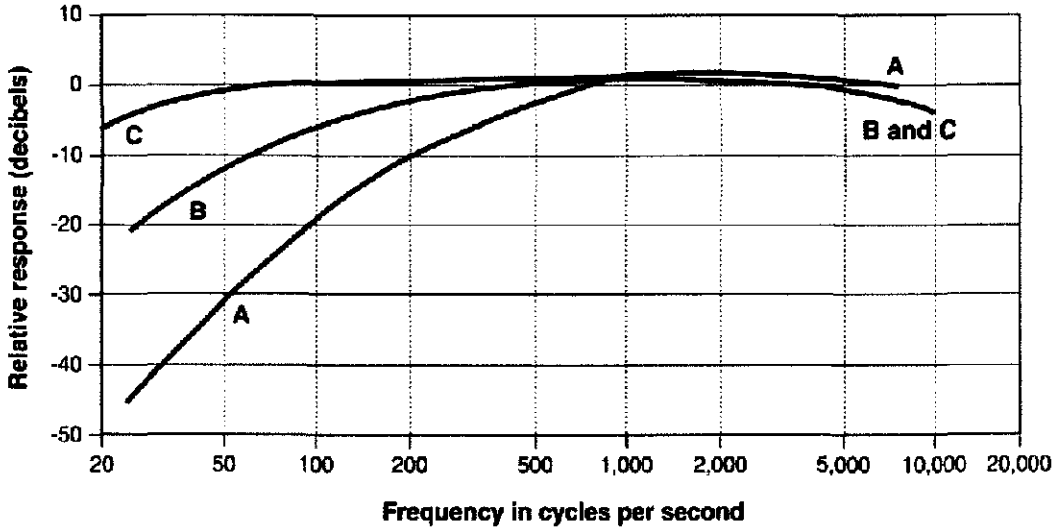
Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Carrier Deck Jet Operation	140	
	130	Pain threshold
Jet takeoff (200 feet)	120	
Auto Horn (3 feet)	110	Maximum Vocal Effort
Jet takeoff (2000 feet) Shout (0.5 feet)	100	
N.Y. Subway Station Heavy Truck (50 feet)	90	Very Annoying Hearing Damage (8-hour, continuous exposure)
Pneumatic drill (50 feet)	80	Annoying

TABLE 2
Typical Sound Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Freight Train (50 feet) Freeway Traffic (50 feet)	70	Intrusive Telephone Use Difficult
Air Conditioning Unit (20 feet)	60	
Light auto traffic (50 feet)	50	Quiet
Living Room Bedroom	40	
Library Soft whisper (5 feet)	30	Very Quiet
Broadcasting Studio	20	Recording studio
	10	Just Audible

The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a fashion similar to how a person perceives or hears sound, thereby typically yielding a good correlation in terms of how to evaluate acceptable and unacceptable sound levels.

Figure 1
NOISE METRICS—FREQUENCY RESPONSE



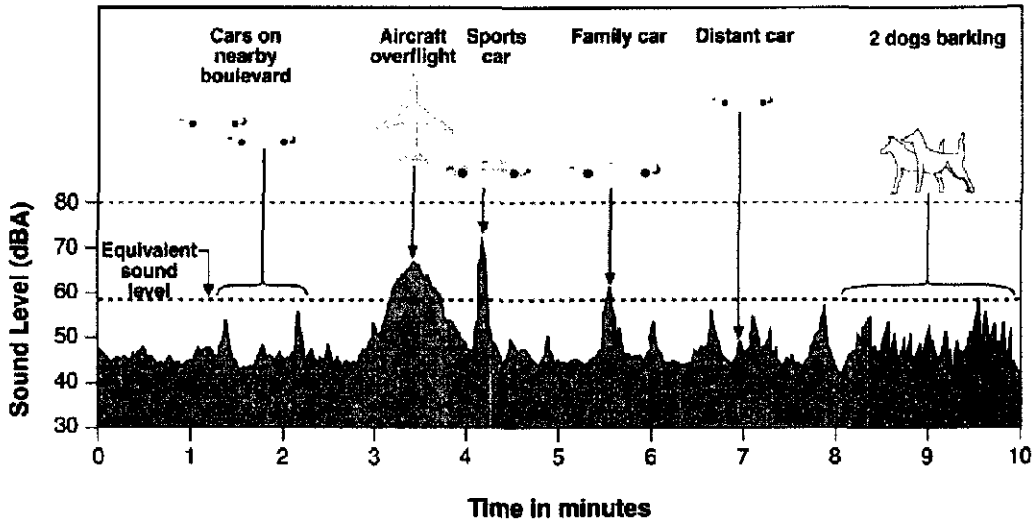
Source: A. Peterson and E. Gross, *Handbook of Noise Control*, West Concord: General Radio Company, 1967.

The measurement of sound is not a simple task. Consider typical sounds in a suburban neighborhood on a normal or "quiet" afternoon. If a short time in history of those sounds is plotted on a graph, it would look very much like Figure 2. In Figure 2, the background, or

residential sound level in the absence of any identifiable noise sources, is approximately 45 dB. During roughly three-quarters of the time, the sound level is 50 dB or less. The highest sound level, caused by a nearby sports car, is approximately 70 dB, while an aircraft generates a maximum sound level of about 68 dB. The following provides a discussion of how variable community noise is measured.

Figure 2

NOISE METRICS—COMPARATIVE NOISE LEVELS



Source: *Protective Noise Levels, Condensed Version of EPA Levels Document.* United States Environmental Protection Agency, November 1978.

One obvious way of describing noise is to measure the maximum sound level (L_{max})—in the case of Figure 2, the nearby sports car at 70 dBA. The maximum sound level measurement does not account for the duration of the sound. Studies have shown that human response to noise involves both the maximum level and its duration. For example, the aircraft in this case is not as loud as the sports car, but the aircraft sound lasts longer. For most people, the aircraft overflight would be more annoying than the sports car event. Thus, the maximum sound level alone is not sufficient to predict reaction to environmental noise.

A-weighted sound levels typically are measured or presented as equivalent sound pressure level (L_{eq}), which is defined as the average noise level, on an equal energy basis for a stated period of time, and is commonly used to measure steady-state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by L_{xx}, where xx represents the percentile of time the sound level is exceeded. The L_{90} is a measurement that represents the noise level that is exceeded during 90 percent of the measurement period. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period.

It is critical to understand the difference between a sound pressure level (or noise level) and a sound power level. A sound power level (commonly abbreviated as PWL or Lw) is analogous to the wattage of a light bulb; it is a measure of the acoustical energy emitted by

the source and is, therefore, independent of distance. A sound pressure level (commonly abbreviated as SPL or Lp) is analogous to the brightness or intensity of light experienced at a specific distance from a source. Sound pressure levels are similarly to intensity of light in that they are attenuated by distance. Sound pressure levels are measured directly with a sound-level meter. Sound pressure levels always should be specified with a location or distance from the noise source.

Sound power level data are used in acoustic models to predict sound pressure levels. This is because sound power levels take into account the size of the acoustical source and account for the total acoustical energy emitted by the source. For example, the sound pressure level 15 feet from a small radio and a large orchestra may be the same, but the sound power level of the orchestra will be much larger because it emits sound over a much larger area. Similarly, a 2-horsepower (hp) and 2,000-hp pumps can both achieve 85 dBA at 3 feet (a common specification), but the 2,000-hp pump will have a significantly larger sound power level, so the noise from the 2,000-hp pump will travel farther. A sound power level can be calculated from a sound pressure level if the distance from and dimensions of the source are known. Sound power levels will always be greater than sound pressure levels, and sound power levels should never be compared to sound pressure levels. The sound power level of a wind turbine typically will vary between 104 and 110 dBA. This will result in a sound pressure level of about 65 dBA at 130 feet (similar in level to a normal conversation at 3 feet).

Attachment B

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R239	52.7	196647.07	4540680.88
HOME	R296	52.6	197156.19	4542271.7
HOME	R285	52.5	197749.97	4542097.66
HOME	R728	52	197831.68	4541248.8
HOME	R238	51.9	197759.96	4540640.92
HOME	R234	51.8	198504.99	4540619.85
HOME	R301	51.8	196734.64	4542316.4
HOME	R211	51.4	193313.36	4539980.49
HOME	R317	51.4	194615.41	4542788.31
HOME	R167	51.3	197118.63	4539061.67
HOME	R230	51.3	197018.19	4540605.38
HOME	R237	51.3	197197.16	4540653.63
HOME	R375	51.3	196587.75	4543847.09
HOME	R378	51.3	199736.21	4543814.26
HOME	R386	51.3	197173.8	4543894.06
HOME	R45	51.2	192728.42	4536569.18
HOME	R107	51.2	190947.7	4538348.17
HOME	R374	51.2	200244.84	4543782.71
HOME	R44	51	192789.69	4536526.97
HOME	R170	51	196918.34	4539068.96
HOME	R245	51	193677.51	4540768.08
HOME	R212	50.9	191344.22	4540054.71
HOME	R318	50.9	197776.22	4542814.92
HOME	R447	50.9	194120.71	4545550.02
HOME	R334	50.8	199495.46	4543374.16
HOME	R166	50.8	192991.65	4539114.23
HOME	R186	50.7	190907.84	4539267.07
HOME	R273	50.7	199361.09	4541559.53
HOME	R316	50.7	194596.38	4542619.08
HOME	R236	50.7	193803.78	4540712.97
HOME	R310	50.6	190646.91	4542540.71
HOME	R331	50.6	194548.13	4543240.68
HOME	R110	50.5	191211.05	4538393.91
HOME	R112	50.5	191602.23	4538439.44
HOME	R181	50.5	190508.14	4539223.2
HOME	R307	50.5	199368.99	4542354.39
HOME	R459	50.5	199581.71	4545950.98
HOME	R172	50.4	195033.03	4539112.79
HOME	R87	50.3	191154.32	4537562.84
HOME	R217	50.3	196126.45	4540099.68
HOME	R221	50.3	197694.18	4540254.34
HOME	R160	50.3	192187.45	4539105.41
HOME	R168	50.2	196700.25	4539068.24
HOME	R153	50.1	196569.09	4539009.44
HOME	R222	50.1	196024.83	4540287.09
HOME	R263	50.1	190152.02	4542196.85
HOME	R436	50.1	193080.92	4545432.59
HOME	R182	50.1	192561.41	4539195.02
HOME	R152	50.1	192886.22	4539067.02
HOME	R113	50	192068.91	4538445.16
HOME	R146	50	197362.96	4538974.2

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R175	50	194809.48	4539131.26
HOME	R736	50	196651.96	4539066.9
HOME	R214	49.9	197650.66	4540036.42
HOME	R265	49.9	196104.05	4541251.17
HOME	R335	49.9	194617.93	4543503.82
HOME	R359	49.9	200369.18	4543726.89
HOME	R279	49.8	199430.98	4541705.2
HOME	R429	49.8	194670.31	4545022.3
HOME	R438	49.8	199001.17	4545378.24
HOME	R440	49.8	198757.35	4545392.72
HOME	R137	49.7	191220.74	4539037.91
HOME	R209	49.7	197976.4	4539831.28
HOME	R210	49.7	197645.32	4539855.08
HOME	R320	49.7	196216.69	4542933.85
HOME	R41	49.7	192702.21	4536307.45
HOME	R176	49.7	194743.09	4539133.25
HOME	R371	49.6	197815.06	4543812.97
HOME	R443	49.6	200780.02	4545403.28
HOME	R124	49.5	197631.53	4538511.25
HOME	R324	49.5	197782.18	4543065.53
HOME	R373	49.5	199485.49	4543796.22
HOME	R439	49.5	198855.55	4545390.18
HOME	R150	49.5	197437.78	4538981.19
HOME	R100	49.4	194264.41	4538091.44
HOME	R290	49.4	199458.25	4542127.15
HOME	R327	49.4	196167.38	4543166.77
HOME	R104	49.4	192770.27	4538268.98
HOME	R264	49.3	194478.25	4541272.53
HOME	R361	49.3	199433.3	4543758.24
HOME	R457	49.3	202145.1	4545856.1
HOME	R126	49.2	196067.42	4538562.02
HOME	R173	49.2	194663.18	4539126.34
HOME	R252	49.2	191450.01	4540880.45
HOME	R383	49.2	197910.01	4543858.71
HOME	R183	49.1	190035.59	4539250.81
HOME	R190	49.1	191467.03	4539331.2
HOME	R278	49.1	196180.39	4541723.79
HOME	R289	49.1	199556.22	4542129.54
HOME	R297	49.1	194605.24	4542313.04
HOME	R299	49.1	193981.18	4542333.87
HOME	R426	49.1	199550.64	4544811.83
HOME	R450	49.1	192407.76	4545626.8
HOME	R451	49.1	194598.53	4545593.3
HOME	R19	49	192102.39	4535928.92
HOME	R23	49	191713.67	4535955.44
HOME	R36	49	192133.67	4536007.25
HOME	R129	49	194470.24	4538739.19
HOME	R177	49	195337.77	4539126.03
HOME	R240	49	195968.44	4540706.14
HOME	R321	49	198588.22	4542942.28
HOME	R424	49	197942.09	4544665.14

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R460	49	199522.64	4546180.09
CHURCH	R1177	48.9	189401.6	4544181.15
HOME	R96	48.9	194374.92	4537789.09
HOME	R98	48.9	194378.08	4537855.66
HOME	R198	48.9	197662.46	4539455.85
HOME	R269	48.9	196095.39	4541494.16
HOME	R358	48.9	199331.36	4543740.78
HOME	R33	48.8	192237.77	4535976.93
HOME	R184	48.8	190150.44	4539250.03
HOME	R243	48.8	194478.11	4540744.33
HOME	R298	48.8	194514.36	4542315.66
HOME	R404	48.8	189328.31	4544195.49
HOME	R738	48.8	188978.78	4538472.49
HOME	R131	48.7	194480.07	4538929.15
HOME	R163	48.7	193823.05	4539088.1
HOME	R332	48.7	198680.68	4543266.66
HOME	R377	48.7	195109.91	4543887.51
HOME	R389	48.7	196100.29	4543925.16
HOME	R266	48.6	191335.21	4541414.3
HOME	R425	48.6	197848.69	4544789.04
HOME	R732	48.6	194572.4	4542257.68
HOME	R109	48.5	189297.62	4538407.93
HOME	R117	48.5	195997.39	4538425.29
HOME	R200	48.5	194494.88	4539694.37
HOME	R268	48.5	191350.41	4541453.39
HOME	R430	48.5	199484.04	4545193.41
HOME	R135	48.4	194465.22	4538978.85
HOME	R164	48.4	197610.96	4539026.29
HOME	R311	48.4	189576.14	4542581.75
HOME	R102	48.3	189459.96	4538260.63
HOME	R121	48.3	190009.08	4538576
HOME	R313	48.3	190927.14	4542590.06
HOME	R441	48.3	197342.33	4545440.48
HOME	R106	48.2	194452.35	4538264.58
HOME	R111	48.2	195986.29	4538310.25
HOME	R118	48.2	189147.51	4538546.98
HOME	R127	48.2	189163.36	4538730.58
HOME	R215	48.2	194452.88	4540091.86
HOME	R302	48.2	193701.82	4542390.62
HOME	R72	48.1	192767.16	4537479.84
HOME	R178	48.1	194486.08	4539143.59
HOME	R241	48.1	192093.31	4540768.59
HOME	R251	48.1	191032.61	4540876.45
HOME	R271	48.1	190087.05	4541717.25
HOME	R286	48.1	194569.92	4542153.22
HOME	R420	48.1	190193.34	4544594.02
HOME	R99	48.1	194449.32	4538037.1
HOME	R114	48.1	199317.06	4538351.47
SCHOOL	R1179	48.1	194412.27	4538987.57
HOME	R103	48	189493.51	4538300.53
HOME	R115	48	190004	4538509.25

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R123	48	189162.64	4538636.56
HOME	R225	48	194464.34	4540463.34
HOME	R226	48	194529.99	4540537.71
HOME	R306	48	189416.94	4542527.99
HOME	R116	48	199305.13	4538361.06
HOME	R196	47.9	190047.18	4539525.04
HOME	R224	47.9	199316.25	4540342.93
HOME	R362	47.9	199037.36	4543769.54
HOME	R387	47.9	193607.59	4543953.31
HOME	R731	47.9	194422.67	4539484.72
HOME	R132	47.9	199781.2	4538871.59
HOME	R108	47.8	189998.2	4538368.87
HOME	R191	47.8	194040.06	4539306.56
HOME	R232	47.8	192477.69	4540707.89
HOME	R246	47.8	190965.69	4540828.36
HOME	R294	47.8	199932.74	4542177.72
HOME	R394	47.8	194962.37	4543971.58
HOME	R452	47.8	195932.7	4545569.36
HOME	R531	47.8	195739.42	4547191
HOME	R35	47.8	192558.45	4535991.28
HOME	R88	47.8	192824.28	4537565.45
CHURCH	R1181	47.7	188765.31	4538511.63
CHURCH	R1183	47.7	199295.5	4538188.77
HOME	R50	47.7	191135.22	4536856.08
HOME	R52	47.7	191200.45	4537031.03
HOME	R55	47.7	189939.33	4537192
HOME	R231	47.7	192288.83	4540711.88
HOME	R233	47.7	192385.34	4540709.38
HOME	R364	47.7	198094.56	4543793.31
HOME	R376	47.7	200631.36	4543789.51
HOME	R382	47.7	194579.19	4543917.32
HOME	R385	47.7	199036.74	4543844.58
HOME	R421	47.7	196225.23	4544490.87
HOME	R733	47.7	194561.06	4543893.88
HOME	R95	47.7	192834.85	4537801.77
HOME	R77	47.6	194355.74	4537468.03
HOME	R253	47.6	190715.68	4540894.93
HOME	R270	47.6	191412.65	4541610.97
HOME	R282	47.6	194515.72	4542047.3
HOME	R333	47.6	191486.63	4543412.2
HOME	R174	47.5	195670.93	4539113.95
HOME	R384	47.5	198982.99	4543847.76
HOME	R32	47.4	192605.39	4535975.31
HOME	R120	47.4	188759.89	4538582.34
HOME	R71	47.3	194358.17	4537430.43
HOME	R276	47.3	191414.3	4541725.92
HOME	R337	47.3	198474.54	4543478.03
HOME	R341	47.3	198571.87	4543572.29
HOME	R366	47.3	198227.51	4543796.87
HOME	R458	47.3	193042.83	4546055.26
HOME	R101	47.3	199299.41	4538053.41

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R119	47.2	188718.4	4538575.94
HOME	R277	47.2	194564.46	4541698.24
HOME	R338	47.2	198291.19	4543486.88
HOME	R370	47.2	198265.46	4543800.46
HOME	R407	47.2	198384.5	4544078.73
HOME	R413	47.2	198443.48	4544127.69
HOME	R446	47.2	195659.22	4545504.09
HOME	R462	47.2	202773.74	4546271.06
HOME	R463	47.2	199586.42	4546372.52
HOME	R89	47.1	189962.4	4537616.45
HOME	R258	47.1	189014.2	4540977.37
HOME	R275	47.1	200090.89	4541562.82
HOME	R339	47.1	198339.56	4543519.65
HOME	R340	47.1	198476.64	4543568.72
HOME	R342	47.1	198376.33	4543590.39
HOME	R345	47.1	198277.79	4543617.02
HOME	R346	47.1	198530.76	4543630.43
HOME	R348	47.1	198293.99	4543670.53
HOME	R368	47.1	198317.52	4543805.19
HOME	R380	47.1	198320.94	4543843.86
HOME	R391	47.1	198331.43	4543903.23
HOME	R400	47.1	198374.15	4543989.15
HOME	R408	47.1	198431.61	4544078.77
HOME	R415	47.1	198508.51	4544157.87
HOME	R416	47.1	198585.65	4544158.67
HOME	R244	47.1	194973.45	4540743.85
HOME	R57	47	189876.28	4537209.42
HOME	R242	47	195157.39	4540722.55
HOME	R349	47	198337.35	4543680.93
HOME	R365	47	198380.68	4543792.02
HOME	R369	47	198346.57	4543791.43
HOME	R390	47	198385.38	4543877.59
HOME	R402	47	198432.48	4544007.95
HOME	R403	47	198483.39	4544035.79
HOME	R410	47	198523.55	4544075.92
HOME	R412	47	198577.95	4544124.11
HOME	R417	47	198639.85	4544163.58
HOME	R453	47	196184.43	4545575.07
HOME	R105	47	199246.86	4538181.84
HOME	R414	47	198636.45	4544120.03
HOME	R319	46.9	191413.73	4542980.2
HOME	R351	46.9	198435.2	4543719.25
HOME	R354	46.9	198482.18	4543743.05
HOME	R356	46.9	198525.83	4543747.72
HOME	R357	46.9	198442.81	4543748.82
HOME	R367	46.9	198409.11	4543795.13
HOME	R379	46.9	198461.85	4543838.04
HOME	R381	46.9	198616.55	4543844.71
HOME	R388	46.9	198477.4	4543878.73
HOME	R392	46.9	198432.51	4543907.01
HOME	R395	46.9	191121.07	4544053.72

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R396	46.9	198476.32	4543939.44
HOME	R401	46.9	198517.53	4544003.77
HOME	R405	46.9	198628.25	4544038.05
HOME	R406	46.9	198522.94	4544053.01
HOME	R409	46.9	198629.48	4544072.51
HOME	R411	46.9	198587.28	4544098.7
HOME	R437	46.9	203936.95	4545265.57
HOME	R165	46.9	197992.09	4539027.82
HOME	R671	46.9	200304.35	4537239.25
HOME	R29	46.8	192755.47	4535955
HOME	R31	46.8	192787.95	4535966.45
HOME	R53	46.8	189833.74	4537100.8
HOME	R61	46.8	189890.1	4537434.13
HOME	R91	46.8	189848.37	4537691.85
HOME	R93	46.8	189779.36	4537786.84
HOME	R248	46.8	190553.25	4540846.68
HOME	R393	46.8	198578.85	4543904.37
HOME	R398	46.8	198582.06	4543930.83
HOME	R399	46.8	198582.28	4543958.62
HOME	R444	46.8	195498.59	4545494.76
HOME	R30	46.7	192822.88	4535961.72
HOME	R59	46.7	194351.4	4537350.86
HOME	R192	46.6	188355.54	4539410.67
HOME	R461	46.6	197972.99	4546305.39
HOME	R122	46.5	188593.27	4538620.12
HOME	R343	46.5	191438.06	4543710.98
HOME	R445	46.5	195115.38	4545508.45
HOME	R448	46.5	197073.23	4545519.17
HOME	R449	46.5	196342.62	4545549.97
HOME	R97	46.4	188499.86	4537912.31
HOME	R260	46.4	200276.72	4540967.72
HOME	R454	46.4	191179.91	4545740.36
HOME	R125	46.3	188555.31	4538668.77
HOME	R262	46.2	190065.96	4541282.64
HOME	R220	46	190074.25	4540280.55
HOME	R247	46	190318.86	4540836.42
HOME	R352	46	191405.79	4543851.58
HOME	R143	46	199443.04	4538931.46
HOME	R161	46	198275.12	4539011.83
HOME	R442	45.9	196728.47	4545461.43
HOME	R466	45.9	194650.51	4546655.16
HOME	R303	45.8	193249.26	4542412.48
HOME	R272	45.7	200285.82	4541544.18
HOME	R427	45.7	202711.03	4544795.33
HOME	R149	45.7	198395.84	4538962.23
HOME	R284	45.6	192950.7	4542165.76
HOME	R879	45.6	189822.4	4536585.55
HOME	R158	45.6	198368.5	4538998.01
HOME	R15	45.5	193239.29	4535868.26
HOME	R147	45.5	199325.9	4538930.92
HOME	R249	45.4	190103.12	4540852.93

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R274	45.4	189295.86	4541741.38
HOME	R434	45.4	204123.32	4545199.65
HOME	R13	45.3	192757.08	4535700.24
HOME	R254	45.3	188628.66	4540943.12
HOME	R256	45.3	190049.65	4540956.86
HOME	R511	45.3	196895.55	4547089.74
HOME	R713	45.3	201233.48	4546856.59
HOME	R140	45.3	199259.55	4538916.67
HOME	R151	45.3	200122.4	4538927.73
HOME	R159	45.3	198509.06	4538999.98
HOME	R148	45.3	198520.66	4538958.4
HOME	R28	45.2	193459.74	4535938.73
HOME	R288	45.2	200332.42	4542097.04
HOME	R154	45.2	199319.3	4538973.61
CHURCH	R1178	45.1	193052.78	4542425.25
HOME	R250	45.1	189982.55	4540867.82
HOME	R397	45.1	193071.65	4544023.74
HOME	R1041	45.1	188606.45	4537570.69
HOME	R304	45.1	193026.52	4542429.72
HOME	R157	45.1	198573.11	4538991.66
HOME	R257	45	189903.31	4540959.89
HOME	R372	45	201138.23	4543756.91
HOME	R464	45	193116.31	4546546.32
HOME	R1036	45	188718.05	4537462
HOME	R155	45	199257.26	4538974.96
HOME	R169	45	199336.68	4539027.92
HOME	R259	44.9	189651.34	4540971.43
HOME	R305	44.9	191628.65	4542475.41
HOME	R145	44.9	198635.71	4538948.68
HOME	R156	44.9	198626.41	4538987.99
HOME	R672	44.9	200424.6	4537215.63
HOME	R56	44.8	194425.56	4537127.75
HOME	R467	44.8	199449.49	4546665.05
HOME	R500	44.8	201096.14	4546937.43
HOME	R134	44.8	198736.99	4538896.44
HOME	R94	44.6	197653.72	4537669.93
HOME	R144	44.6	198895.46	4538937.55
HOME	R469	44.5	199548.21	4546723.29
HOME	R497	44.5	201299.46	4546915.26
HOME	R1037	44.5	188731.26	4537397.89
HOME	R1039	44.5	188820.09	4537351.56
HOME	R204	44.5	199359	4539673.99
HOME	R674	44.5	199784.1	4537252.89
HOME	R70	44.4	196907.71	4537389.54
HOME	R128	44.3	188235.24	4538824.13
HOME	R308	44.3	188970.17	4542538.56
HOME	R465	44.3	193141.08	4546659.95
HOME	R180	44.3	200124.69	4539053.15
HOME	R673	44.3	199756.18	4537252.89
HOME	R336	44.2	201107.68	4543396.77
HOME	R468	44.2	198842.12	4546717.08

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R197	44.2	199343.34	4539403.82
HOME	R51	44.1	194348.13	4536899.77
HOME	R292	44.1	200569.41	4542140.17
HOME	R330	44.1	192979.96	4543257.24
HOME	R1038	44.1	188729.54	4537353.11
HOME	R92	44.1	197652.43	4537578.83
HOME	R84	44	195975.02	4537465.02
HOME	R300	44	192051.96	4542392.17
HOME	R422	44	202708.61	4544480.86
HOME	R82	43.9	197260.67	4537430.72
HOME	R207	43.9	199756.28	4539750.89
HOME	R423	43.9	191355.16	4544679.12
HOME	R83	43.9	197299.08	4537437.06
HOME	R472	43.8	198839.49	4546789.64
HOME	R293	43.7	200660.16	4542141.58
HOME	R470	43.7	191426.99	4546889.85
HOME	R1040	43.7	188581.77	4537409.98
HOME	R85	43.6	195759.93	4537481.87
HOME	R473	43.6	198844.4	4546808.7
HOME	R474	43.6	198811.28	4546811.4
HOME	R80	43.6	197379.78	4537419.18
HOME	R189	43.6	200131.99	4539176.41
HOME	R60	43.5	195016.04	4537345.75
HOME	R312	43.5	188810.6	4542611.93
HOME	R326	43.5	201102.65	4543067
HOME	R419	43.5	202695.1	4544358.41
HOME	R1031	43.5	188842.67	4537222.46
HOME	R86	43.5	195481.13	4537491.63
HOME	R201	43.4	199893.33	4539662.82
HOME	R475	43.4	198861.54	4546844.56
HOME	R476	43.4	198887.93	4546847.91
HOME	R477	43.4	198947.09	4546848.75
HOME	R478	43.4	198903.8	4546846.55
HOME	R90	43.4	199206.6	4537503.71
HOME	R62	43.3	195959.44	4537336.92
HOME	R329	43.3	201169.07	4543104.17
HOME	R479	43.3	198808.28	4546859.3
HOME	R512	43.3	200440.82	4547031.45
HOME	R1032	43.3	188765.69	4537237.12
HOME	R471	43.2	202843.22	4546690.11
HOME	R490	43.2	201786.56	4546884.82
HOME	R1030	43.2	188842.92	4537181.45
HOME	R194	43.2	200137.89	4539259.9
HOME	R482	43.1	198910.58	4546903.38
HOME	R483	43.1	198950.85	4546907.04
HOME	R484	43.1	198884.96	4546909.46
HOME	R486	43.1	198843.73	4546906.46
HOME	R487	43.1	198866.3	4546907.64
HOME	R1033	43.1	188764.16	4537203.78
HOME	R11	43	192675.15	4535109.9
HOME	R485	43	198792.11	4546912.31

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R488	43	198814.45	4546909.5
HOME	R510	43	201602.59	4546989.51
HOME	R1029	43	188855.41	4537131.66
HOME	R69	43	197561.64	4537365.11
HOME	R195	42.9	187959.92	4539485
HOME	R491	42.9	198945.06	4546946.5
HOME	R1034	42.9	188765.56	4537174.2
HOME	R47	42.9	194421.65	4536613.74
HOME	R418	42.8	202740.19	4544231.63
HOME	R432	42.8	204351.86	4545150.63
HOME	R492	42.8	198844.33	4546948.68
HOME	R494	42.8	198872.76	4546950.08
HOME	R495	42.8	198812.44	4546951.08
HOME	R496	42.8	198909.91	4546950.92
HOME	R498	42.8	198895.39	4546963.05
CHURCH	R1176	42.7	204358.66	4545165.37
HOME	R576	42.7	196372.79	4547632.31
HOME	R868	42.7	189812.56	4536010.63
HOME	R208	42.6	200235.12	4539754.38
HOME	R501	42.6	198743.29	4546973.33
HOME	R519	42.6	199666.91	4547048.89
HOME	R1028	42.6	188851.67	4537080.24
HOME	R1035	42.6	188776.99	4537117.75
HOME	R65	42.6	199262.21	4537312
HOME	R291	42.5	200933.47	4542129.57
HOME	R363	42.5	202034.15	4543715.54
HOME	R504	42.5	198852.94	4547000.82
HOME	R505	42.5	199149.34	4547016.73
HOME	R517	42.5	199635.89	4547059.08
HOME	R1027	42.5	188864.35	4537040.93
HOME	R67	42.5	197776.04	4537346.46
HOME	R68	42.5	197820.23	4537355.89
HOME	R130	42.4	187936.41	4539036.29
HOME	R507	42.4	198894.01	4547032.36
HOME	R516	42.4	199398.41	4547063.69
HOME	R63	42.4	197722.47	4537313.03
HOME	R856	42.4	190923.82	4535166.59
HOME	R74	42.4	198091.18	4537398.04
HOME	R493	42.3	193133.33	4547048.64
HOME	R506	42.3	198537.96	4547034.69
HOME	R508	42.3	198642.96	4547043.23
HOME	R509	42.3	198629.18	4547038.82
HOME	R513	42.3	199048.84	4547064.82
HOME	R520	42.3	199310.2	4547067.22
HOME	R521	42.3	199162.55	4547069.08
HOME	R522	42.3	199215.25	4547073.63
HOME	R523	42.3	199264.32	4547070.88
HOME	R79	42.3	198190.6	4537404.4
HOME	R64	42.3	199202.93	4537301.34
HOME	R218	42.2	187996.16	4540262.36
HOME	R489	42.2	202784.78	4546845.27

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R514	42.2	198966.72	4547065.49
HOME	R515	42.2	199011.31	4547066.53
HOME	R518	42.2	198989.81	4547068.91
HOME	R1026	42.2	188843.73	4537006
HOME	R78	42.2	198243.12	4537398.76
HOME	R75	42.2	198283.4	4537396.23
HOME	R524	42.1	198953.61	4547086.22
HOME	R533	42.1	199563.77	4547135.01
HOME	R73	42.1	198318.73	4537389.9
HOME	R76	42.1	198351.62	4537389.55
HOME	R202	42	187862.13	4539858.9
HOME	R529	42	199102.31	4547120.13
HOME	R1025	42	188844.92	4536964.03
HOME	R525	42	197930.13	4547106.91
HOME	R81	42	198410.14	4537395.43
HOME	R39	41.9	194389.98	4536249.3
HOME	R503	41.9	202400.43	4546933.89
HOME	R526	41.9	197893.09	4547118.11
HOME	R527	41.9	199011.84	4547128.16
HOME	R528	41.9	198956.48	4547129.75
HOME	R530	41.9	199051.42	4547128.33
HOME	R535	41.9	193940.95	4547241.75
HOME	R433	41.8	190232.82	4545404.31
HOME	R66	41.8	198317.98	4537333.25
HOME	R727	41.8	198368.6	4537330.45
HOME	R142	41.7	187804.07	4539125.21
HOME	R431	41.7	190166.93	4545398.01
HOME	R537	41.7	198911.13	4547170.21
HOME	R538	41.7	198954.82	4547168.93
HOME	R539	41.7	199115.63	4547179
HOME	R203	41.6	200483.97	4539650.26
HOME	R344	41.6	188154.77	4543781.66
HOME	R435	41.6	190235.88	4545478.57
HOME	R502	41.6	202850.25	4546918.7
HOME	R541	41.6	198915.58	4547168.38
HOME	R542	41.6	198896.13	4547191.5
HOME	R557	41.6	199546.92	4547228.46
HOME	R347	41.5	188144.7	4543810.67
HOME	R551	41.4	198865.84	4547226.69
HOME	R552	41.4	198813.13	4547227.7
HOME	R554	41.4	198957.42	4547227.69
HOME	R555	41.4	198917.07	4547229.99
HOME	R34	41.3	194307.88	4535954.86
HOME	R261	41.3	201025.13	4540965.5
HOME	R558	41.3	199157.11	4547258.82
HOME	R559	41.3	199106.05	4547263.94
HOME	R1024	41.3	188894.95	4536767.72
HOME	R58	41.3	199253.52	4537065.89
HOME	R162	41.2	187720	4539182.75
HOME	R267	41.2	201092	4541289.43
HOME	R544	41.2	191960.25	4547315.85

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R560	41.2	198910.67	4547266.77
HOME	R561	41.2	198965.99	4547275.58
HOME	R548	41.1	192804.01	4547321.57
HOME	R564	41	199014.59	4547316.25
HOME	R566	41	198913.27	4547321.9
HOME	R567	41	198812.92	4547326.55
HOME	R568	41	198964.63	4547319.63
HOME	R734	41	194314.66	4535891.45
HOME	R206	41	200690.83	4539704.43
HOME	R26	40.9	194375.62	4535904.71
HOME	R171	40.9	187679.63	4539231.31
HOME	R235	40.9	187955.23	4540808.98
HOME	R569	40.9	199062.04	4547357.21
HOME	R179	40.8	187645.06	4539265.72
HOME	R570	40.8	199012.38	4547369.31
HOME	R571	40.8	198970.38	4547370.46
HOME	R572	40.8	198912.16	4547371.99
HOME	R866	40.7	189812.53	4535599.86
HOME	R54	40.7	199200.21	4536956.99
HOME	R48	40.6	196003.21	4536713.89
HOME	R228	40.6	201049.96	4540440.7
HOME	R263	40.6	188133.97	4541331.79
HOME	R532	40.6	191432.2	4547288.79
HOME	R573	40.6	199556.8	4547443.78
HOME	R693	40.6	204454.7	4545657.95
HOME	R883	40.6	189072.25	4536365.9
HOME	R188	40.5	187601.96	4539376.54
HOME	R536	40.5	191383.86	4547293.78
HOME	R185	40.4	187588.13	4539309.6
HOME	R223	40.4	201046.17	4540305.95
HOME	R534	40.4	191336.48	4547292.29
HOME	R546	40.3	191415.27	4547336.66
HOME	R870	40.3	189649.04	4535648.1
HOME	R880	40.3	189257.23	4536041.11
HOME	R882	40.3	189170.11	4536159.72
HOME	R14	40.2	194368.45	4535703.79
HOME	R187	40.2	187532.98	4539363.08
HOME	R355	40.2	202908.75	4543667.7
HOME	R575	40.2	199560.34	4547546.2
HOME	R867	40.2	189686.53	4535591.53
CHURCH	R1180	40.1	201187.67	4540427.3
HOME	R550	40.1	191371.89	4547349.33
HOME	R871	40.1	189512.13	4535716.87
HOME	R872	40.1	189424.32	4535795.28
HOME	R556	40	191327.6	4547358.58
HOME	R848	40	191709.09	4534382.7
HOME	R869	40	189596.02	4535614.05
HOME	R881	40	189115.31	4536123.95
HOME	R553	39.9	191286.54	4547360.79
HOME	R694	39.9	204443.89	4545960.13
HOME	R49	39.9	197552.92	4536702.36

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R9	39.8	192695.97	4534521.9
HOME	R205	39.8	201029.11	4539694.28
HOME	R314	39.8	188025.86	4542650.22
HOME	R873	39.8	189419.9	4535741.17
HOME	R25	39.8	194772.51	4535905.98
HOME	R847	39.7	191814.22	4534323.65
HOME	R1023	39.7	188653.92	4536537.45
HOME	R1144	39.7	187876.38	4537454.73
HOME	R864	39.6	189901.48	4535281.96
HOME	R874	39.6	189413.67	4535683.59
HOME	R193	39.5	187403.02	4539458.95
HOME	R739	39.5	201792.73	4542078.39
HOME	R875	39.5	189416.39	4535638.1
HOME	R849	39.5	191528.17	4534322.48
HOME	R737	39.4	187383.68	4539541.76
HOME	R865	39.4	189828.12	4535284.96
HOME	R2	39.3	192413.14	4534325.4
HOME	R12	39.3	194294.79	4535357.33
HOME	R748	39.3	204743.91	4545242.98
HOME	R876	39.3	189412.33	4535604.96
HOME	R1	39.2	192425.38	4534314.24
HOME	R540	39.2	190966.23	4547318.79
HOME	R877	39.2	189411.73	4535570.01
HOME	R863	39.2	189858.23	4535205.78
HOME	R40	39.1	195908.07	4536244.43
HOME	R229	39.1	201467.6	4540492.46
HOME	R353	39.1	203563.44	4543653.53
HOME	R578	39.1	200031.81	4547828.17
HOME	R1022	39.1	188459.58	4536547.13
HOME	R1160	39.1	187394.05	4538625.57
HOME	R17	39	195104.8	4535872.98
HOME	R878	39	189407.4	4535521.14
HOME	R884	39	188819.2	4536134.33
HOME	R1143	39	187815.95	4537287.36
HOME	R499	38.9	203975.01	4546885.71
HOME	R846	38.9	192478.65	4534262.21
HOME	R850	38.9	191140.68	4534355.32
HOME	R885	38.9	188778.5	4536133.12
HOME	R1016	38.9	188405.61	4536513.1
HOME	R735	38.9	195146.69	4535840.15
HOME	R323	38.8	202659.88	4542964.95
HOME	R886	38.8	188748.04	4536136.19
HOME	R931	38.8	188799.3	4536085.73
HOME	R1015	38.8	188428.39	4536470.12
HOME	R1017	38.8	188377.52	4536505.95
HOME	R20	38.7	195331.77	4535879.98
HOME	R37	38.7	195920.63	4536110.42
HOME	R360	38.7	203784.46	4543655.21
HOME	R887	38.7	188717.54	4536136.71
HOME	R1014	38.7	188400.85	4536457.88
HOME	R1042	38.7	188759.38	4536088.32

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R22	38.6	195396.02	4535890.86
HOME	R845	38.6	192536.4	4534221.86
HOME	R888	38.6	188685.8	4536139.16
HOME	R1018	38.6	188356.33	4536493.6
HOME	R1142	38.6	187870.07	4537064.76
HOME	R27	38.6	195450.94	4535889.14
HOME	R930	38.6	188702.75	4536089.29
HOME	R46	38.6	199252.49	4536465.29
HOME	R8	38.5	192921.78	4534349.38
HOME	R753	38.5	204687.58	4544361.11
HOME	R889	38.5	188648.88	4536135.98
HOME	R1013	38.5	188366.91	4536443.2
HOME	R1019	38.5	188332.56	4536478.75
HOME	R24	38.5	195521.97	4535888.07
HOME	R21	38.4	195575.86	4535884.7
HOME	R199	38.4	187174.96	4539635.77
HOME	R428	38.4	188264.58	4545043.98
HOME	R890	38.4	188623.44	4536135.14
HOME	R891	38.4	188597.39	4536135.59
HOME	R929	38.4	188652.55	4536090.15
HOME	R1012	38.4	188336.8	4536429.73
HOME	R1020	38.4	188309.5	4536468.34
HOME	R1140	38.4	187863.35	4536985.5
HOME	R1141	38.4	187844.86	4537012.63
HOME	R255	38.3	187406.63	4540993.36
HOME	R843	38.3	192582.29	4534185.3
HOME	R892	38.3	188572.62	4536136.65
HOME	R928	38.3	188617.62	4536092.02
HOME	R1011	38.3	188310.48	4536414.29
HOME	R1021	38.3	188286.45	4536458.56
HOME	R675	38.3	201178.64	4537278.87
HOME	R893	38.2	188540.23	4536138.47
HOME	R926	38.2	188583.99	4536095.77
HOME	R927	38.2	188560.54	4536099.35
HOME	R1109	38.2	187856.36	4536932.34
HOME	R1145	38.2	187387.48	4537817.39
HOME	R42	38.2	197603.98	4536232.6
HOME	R481	38.1	204262.67	4546801.4
HOME	R579	38.1	193100.36	4548047.55
HOME	R894	38.1	188506.56	4536139.68
HOME	R895	38.1	188488.13	4536140
HOME	R932	38.1	188584.25	4536036.65
HOME	R896	38	188467.34	4536150.52
HOME	R924	38	188495.72	4536100.46
HOME	R925	38	188516.05	4536100.11
HOME	R934	38	188559.01	4536047.25
HOME	R1001	38	188208.84	4536417.94
HOME	R1002	38	188247.09	4536387.41
HOME	R1010	38	188281.46	4536353.13
HOME	R1108	38	187853.59	4536854.09
HOME	R1110	38	187792.13	4536939.88

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R16	38	195975.04	4535855.06
HOME	R43	38	199235.85	4536292.74
HOME	R897	37.9	188448.11	4536141.32
HOME	R898	37.9	188422.73	4536143.66
HOME	R923	37.9	188472.22	4536101.5
HOME	R933	37.9	188580.37	4535995.4
HOME	R935	37.9	188537.84	4536036.17
HOME	R940	37.9	188553.04	4535995.87
HOME	R941	37.9	188516.85	4536035.26
HOME	R1000	37.9	188189.62	4536409.37
HOME	R1003	37.9	188231.02	4536376.88
HOME	R1004	37.9	188214.34	4536368.27
HOME	R1111	37.9	187790.44	4536882.7
HOME	R1114	37.9	187757.03	4536936.54
HOME	R456	37.8	189038.32	4545852.62
HOME	R861	37.8	190170.02	4534630.61
HOME	R862	37.8	190295.86	4534527.08
HOME	R899	37.8	188399.82	4536142.14
HOME	R921	37.8	188417.6	4536104.34
HOME	R922	37.8	188444.26	4536101.97
HOME	R936	37.8	188537.17	4535996.78
HOME	R937	37.8	188514.32	4535998.44
HOME	R942	37.8	188477.5	4536038.48
HOME	R943	37.8	188477.92	4536063.26
HOME	R964	37.8	188576.3	4535943.35
HOME	R999	37.8	188169.08	4536397.64
HOME	R1107	37.8	187839.55	4536806.77
HOME	R1113	37.8	187753.79	4536893.34
HOME	R1115	37.8	187727.37	4536937.41
HOME	R1146	37.8	187326.16	4537759.98
HOME	R900	37.8	188378.21	4536142.51
HOME	R1112	37.8	187787.22	4536840.92
HOME	R10	37.7	194262.85	4534804.87
HOME	R695	37.7	204467.83	4546669
HOME	R749	37.7	204988.62	4545220.52
HOME	R901	37.7	188359.17	4536144.11
HOME	R902	37.7	188343.3	4536145.65
HOME	R919	37.7	188377.59	4536106.29
HOME	R920	37.7	188397.92	4536105.31
HOME	R938	37.7	188493.35	4535998.8
HOME	R944	37.7	188443.61	4536063.85
HOME	R945	37.7	188438.79	4536042.32
HOME	R963	37.7	188548.36	4535945.1
HOME	R965	37.7	188569.9	4535903.41
HOME	R998	37.7	188144.06	4536384.09
HOME	R1005	37.7	188181.59	4536348.49
HOME	R1078	37.7	187832.72	4536742.17
HOME	R1106	37.7	187837.07	4536766.41
HOME	R1116	37.7	187695.23	4536939.75
HOME	R1124	37.7	187726.89	4536888.43
HOME	R138	37.7	201597.36	4538870.68

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R939	37.7	188473.01	4535999.15
HOME	R962	37.7	188522.94	4535945.53
HOME	R1006	37.7	188163.65	4536340.53
HOME	R903	37.6	188324.87	4536145.33
HOME	R918	37.6	188352.79	4536105.45
HOME	R946	37.6	188400.03	4536042.98
HOME	R961	37.6	188499.49	4535949.11
HOME	R966	37.6	188543.23	4535905.14
HOME	R997	37.6	188121.03	4536375.58
HOME	R1007	37.6	188147.66	4536334.45
HOME	R1072	37.6	187830.79	4536712.53
HOME	R1077	37.6	187833.23	4536730.01
HOME	R1105	37.6	187790.69	4536772.21
HOME	R1117	37.6	187666.65	4536940.95
HOME	R956	37.6	188436.17	4536000.41
HOME	R227	37.5	201966.38	4540407.68
HOME	R480	37.5	204409.78	4546792.51
HOME	R860	37.5	190258.08	4534464.8
HOME	R904	37.5	188291.88	4536149.08
HOME	R905	37.5	188268.34	4536148.21
HOME	R917	37.5	188334.39	4536107.67
HOME	R957	37.5	188417.79	4536003.9
HOME	R958	37.5	188395.59	4536006.83
HOME	R960	37.5	188472.79	4535948.93
HOME	R967	37.5	188517.81	4535905.58
HOME	R968	37.5	188497.49	4535906.56
HOME	R996	37.5	188097.86	4536358.82
HOME	R1009	37.5	188376.58	4536042.59
HOME	R1070	37.5	187829.73	4536671.43
HOME	R1071	37.5	187832.29	4536696.06
HOME	R1075	37.5	187789.53	4536725.39
HOME	R1076	37.5	187790.55	4536743.25
HOME	R1118	37.5	187635.59	4536943.63
HOME	R1122	37.5	187663.68	4536892.73
HOME	R1123	37.5	187693.62	4536887.22
HOME	R1166	37.5	188134.15	4545188.89
HOME	R906	37.4	188249.93	4536149.16
HOME	R947	37.4	188338.38	4536043.4
HOME	R948	37.4	188335.6	4536066.97
HOME	R954	37.4	188413.71	4535951.22
HOME	R955	37.4	188430.88	4535951.56
HOME	R959	37.4	188373.98	4536006.56
HOME	R969	37.4	188467.65	4535908.98
HOME	R995	37.4	188079.27	4536349.6
HOME	R1008	37.4	188104.12	4536316.12
HOME	R1067	37.4	187829.71	4536628.88
HOME	R1073	37.4	187788.75	4536700.38
HOME	R1074	37.4	187787.7	4536681.09
HOME	R1119	37.4	187604.49	4536944.16
HOME	R1121	37.4	187634.73	4536893.59
HOME	R1125	37.4	187693.9	4536841.09

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R1159	37.4	186985.47	4538651.79
HOME	R994	37.4	188058.16	4536341.7
HOME	R707	37.3	202664.81	4542036.65
HOME	R907	37.3	188223.89	4536150.87
HOME	R908	37.3	188205.5	4536153.1
HOME	R949	37.3	188342.86	4536008.36
HOME	R952	37.3	188368.65	4535955.16
HOME	R953	37.3	188389.58	4535952.26
HOME	R970	37.3	188442.25	4535910.05
HOME	R971	37.3	188413.03	4535911.18
HOME	R975	37.3	188145.45	4536205.45
HOME	R978	37.3	188103.7	4536254.47
HOME	R979	37.3	188102.3	4536283.74
HOME	R980	37.3	188070.81	4536300.8
HOME	R993	37.3	188043.38	4536332.42
HOME	R1066	37.3	187825.37	4536605
HOME	R1068	37.3	187787.27	4536634.97
HOME	R1069	37.3	187784.72	4536653.25
HOME	R1126	37.3	187660.74	4536846.3
HOME	R1129	37.3	187690.95	4536793.94
HOME	R1136	37.3	187574.78	4536942.17
HOME	R1147	37.3	187158.4	4537844.64
HOME	R842	37.3	197047.34	4535822.9
HOME	R38	37.3	199229.6	4536116.1
HOME	R676	37.3	201396.59	4537271.36
SCHOOL	R1182	37.3	188289.86	4536039.99
HOME	R594	37.2	195531.87	4548770.39
HOME	R844	37.2	192624.49	4533932.94
HOME	R859	37.2	190310.52	4534362.52
HOME	R909	37.2	188182.66	4536155.39
HOME	R910	37.2	188167.38	4536154.38
HOME	R911	37.2	188153.39	4536153.99
HOME	R915	37.2	188197.86	4536115.09
HOME	R916	37.2	188218.82	4536114.09
HOME	R950	37.2	188335.42	4535981.79
HOME	R951	37.2	188336.37	4535963.34
HOME	R972	37.2	188388.91	4535913.5
HOME	R974	37.2	188150.15	4536182.49
HOME	R976	37.2	188102.33	4536211.27
HOME	R977	37.2	188110.29	4536230.84
HOME	R981	37.2	188050.97	4536292.88
HOME	R986	37.2	188068.19	4536259.53
HOME	R992	37.2	188020.97	4536322.63
HOME	R1059	37.2	187837.45	4536558.31
HOME	R1060	37.2	187826.4	4536581.74
HOME	R1065	37.2	187785.79	4536611.04
HOME	R1083	37.2	187744.76	4536658.23
HOME	R1084	37.2	187745.36	4536672.52
HOME	R1120	37.2	187598.54	4536889.2
HOME	R1127	37.2	187632.1	4536844.29
HOME	R1128	37.2	187664.45	4536791.53

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R309	37.1	187288.67	4542566.73
HOME	R601	37.1	196572.8	4548786.38
HOME	R858	37.1	190384.38	4534286.09
HOME	R912	37.1	188137.52	4536154.89
HOME	R913	37.1	188122.27	4536155.16
HOME	R914	37.1	188162.95	4536118.23
HOME	R973	37.1	188099.37	4536187.17
HOME	R982	37.1	188033.69	4536286.18
HOME	R984	37.1	188066.3	4536223.33
HOME	R985	37.1	188065.95	4536239.86
HOME	R990	37.1	187984.21	4536328.98
HOME	R991	37.1	188001.76	4536314.7
HOME	R1043	37.1	187956.89	4536357.65
HOME	R1057	37.1	187784.28	4536564.94
HOME	R1058	37.1	187784.34	4536588.9
HOME	R1061	37.1	187822.92	4536524.6
HOME	R1080	37.1	187744.44	4536618.54
HOME	R1081	37.1	187744.28	4536629.99
HOME	R1082	37.1	187744.86	4536643.21
HOME	R1087	37.1	187712.59	4536658.42
HOME	R1135	37.1	187568.95	4536894
HOME	R1137	37.1	187516.98	4536949.23
HOME	R1062	37.1	187825.02	4536500.6
HOME	R592	37	197171.63	4548712.47
HOME	R857	37	190407.92	4534231.5
HOME	R983	37	188068.43	4536199.14
HOME	R987	37	188005.43	4536268.87
HOME	R988	37	187960.8	4536298.23
HOME	R989	37	187983.12	4536302.3
HOME	R1044	37	187924.6	4536364.88
HOME	R1051	37	187824.98	4536477.66
HOME	R1055	37	187781.62	4536513.86
HOME	R1056	37	187780.57	4536535.69
HOME	R1079	37	187745.36	4536588.85
HOME	R1086	37	187716.76	4536630.82
HOME	R1088	37	187699.74	4536659.71
HOME	R1089	37	187685.08	4536659.6
HOME	R1094	37	187692.84	4536633.01
HOME	R1134	37	187540.02	4536895.92
HOME	R1138	37	187485.54	4536950.49
HOME	R1148	37	187085.05	4537836.78
HOME	R1133	37	187510.71	4536896.42
HOME	R455	36.9	188644.22	4545850.3
HOME	R580	36.9	199590.1	4548487.41
HOME	R1045	36.9	187897.81	4536359.62
HOME	R1047	36.9	187926.34	4536327.67
HOME	R1048	36.9	187948.6	4536291.05
HOME	R1050	36.9	187820.7	4536450.56
HOME	R1054	36.9	187779.88	4536495.66
HOME	R1085	36.9	187710.54	4536601.6
HOME	R1090	36.9	187683.73	4536602.06

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R1095	36.9	187665.36	4536635.63
HOME	R1097	36.9	187645.04	4536660.29
HOME	R1132	36.9	187482.12	4536896.91
HOME	R1139	36.9	187445.93	4536955.46
HOME	R287	36.8	202893.85	4542022.19
HOME	R1046	36.8	187867.27	4536358.23
HOME	R1049	36.8	187823.18	4536400.46
HOME	R1052	36.8	187780.74	4536441.65
HOME	R1053	36.8	187780.35	4536460.61
HOME	R1063	36.8	187740.6	4536498.47
HOME	R1064	36.8	187721.39	4536504.52
HOME	R1091	36.8	187670.52	4536603
HOME	R1092	36.8	187654.78	4536602.56
HOME	R1096	36.8	187652.86	4536636.56
HOME	R1098	36.8	187605.66	4536698.86
HOME	R1099	36.8	187620.05	4536683.6
HOME	R1100	36.8	187620.54	4536670
HOME	R1101	36.8	187620.29	4536655.71
HOME	R1102	36.8	187620.39	4536640.33
HOME	R1164	36.8	186761.96	4539410.65
HOME	R855	36.8	190522.91	4534107.18
HOME	R831	36.8	201339.67	4536922.26
HOME	R599	36.7	194793.86	4548839.32
HOME	R1093	36.7	187639.41	4536602.82
HOME	R1103	36.7	187618.74	4536627.49
HOME	R1104	36.7	187619.91	4536612.45
HOME	R1131	36.7	187439.56	4536896.57
HOME	R841	36.7	197999.69	4535808.36
HOME	R852	36.6	190806.56	4533931.03
HOME	R854	36.6	190570.52	4534029.46
HOME	R581	36.5	201222.49	4548491.8
HOME	R590	36.5	198698.11	4548652.47
HOME	R595	36.5	194350.47	4548796.86
HOME	R1130	36.5	187440.55	4536807.88
HOME	R1149	36.5	186984.22	4537711.13
HOME	R708	36.5	202686.32	4541243.01
HOME	R853	36.5	190637.63	4533967.13
HOME	R547	36.4	190056.32	4547365.59
HOME	R588	36.4	200935.13	4548553.71
HOME	R1150	36.4	186947.36	4537766.73
HOME	R840	36.4	198188.86	4535729.96
HOME	R586	36.3	201294.67	4548542.87
HOME	R1157	36.3	186704.4	4538570.95
HOME	R1158	36.3	186710.84	4538640.76
HOME	R18	36.3	199140.82	4535811.3
HOME	R7	36.2	194327.99	4534307.73
HOME	R591	36.2	200642.44	4548638.86
HOME	R598	36.1	199621.07	4548745.13
HOME	R3	36.1	194394.11	4534290.37
HOME	R596	36	193504.03	4548811.96
HOME	R604	36	193844.89	4548883.02

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R1151	36	186851.34	4537703.21
HOME	R1152	36	186804.48	4537832.19
HOME	R4	36	194485.91	4534298.03
HOME	R6	35.9	194549.8	4534299.06
HOME	R597	35.9	193451.19	4548829.63
HOME	R612	35.9	194749.34	4549071.91
HOME	R750	35.9	205351.3	4545202.91
HOME	R851	35.9	191219.04	4533621.59
HOME	R136	35.9	202192.72	4538855.39
HOME	R824	35.9	199136.09	4535680.45
HOME	R602	35.8	193583.44	4548882.42
HOME	R611	35.8	199700.51	4548872.99
HOME	R696	35.8	204500.97	4547268.52
HOME	R1153	35.8	186742.3	4537834.06
HOME	R1154	35.8	186769.04	4537782.65
HOME	R1163	35.8	186482.76	4539412.75
HOME	R5	35.8	194645.79	4534297.1
HOME	R692	35.7	204345.29	4543066.42
HOME	R823	35.7	199912.6	4535707.36
HOME	R829	35.7	201390.75	4536536.86
HOME	R830	35.7	201399.9	4536561.18
HOME	R213	35.6	186458.55	4540218.08
HOME	R325	35.6	204296.69	4542986.58
HOME	R543	35.6	189696.33	4547350.36
HOME	R751	35.6	205416.31	4545222.93
HOME	R1155	35.6	186675.36	4537840.04
HOME	R216	35.5	186410.75	4540259.18
HOME	R133	35.5	202336.57	4538841.78
HOME	R219	35.4	186386.89	4540336.22
HOME	R574	35.4	204435.77	4547452.71
HOME	R582	35.4	202561.16	4548484.55
HOME	R1156	35.4	186612.8	4537835.48
HOME	R1161	35.4	186346.15	4539494.8
HOME	R1165	35.4	186353.32	4539286.08
HOME	R1167	35.4	188036.25	4545900.27
HOME	R828	35.4	201399.62	4536442.33
HOME	R549	35.3	189575.46	4547382.14
HOME	R600	35.3	192551.59	4548875.31
HOME	R1162	35.3	186341.86	4539400.66
HOME	R577	35.1	189980.2	4547847.36
HOME	R139	35.1	202512.11	4538857.31
HOME	R615	35	194826.16	4549418.55
HOME	R281	34.9	186491.04	4542129.17
HOME	R606	34.9	192273.95	4548939.46
HOME	R740	34.9	205108.94	4546830.89
HOME	R141	34.9	202587.46	4538861.65
HOME	R709	34.9	202516.5	4538622.2
HOME	R607	34.8	192168.64	4548958.06
HOME	R697	34.8	204503.89	4547612.4
HOME	R1174	34.8	204341.39	4542584.74
HOME	R280	34.7	186383.71	4542067.52

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R315	34.7	204273.61	4542428.19
HOME	R593	34.7	191558.95	4548812.53
HOME	R609	34.7	191971.15	4548967.12
HOME	R617	34.7	196390.32	4549639.86
HOME	R710	34.7	202586.28	4538636.16
HOME	R328	34.6	186495.57	4543335.06
HOME	R711	34.6	202498.09	4538230.81
HOME	R816	34.6	200662.66	4535619.38
HOME	R827	34.6	201378.45	4536124.59
HOME	R322	34.4	186433.66	4543205
HOME	R350	34.4	186530.35	4543900.35
HOME	R545	34.4	189097.03	4547375.95
HOME	R605	34.4	191499.24	4548934.91
HOME	R1169	34.4	187581.57	4545915.78
HOME	R620	34.3	196469.42	4549800.08
HOME	R1168	34.3	187475.76	4545834.73
HOME	R822	34.3	199978.96	4535295.49
HOME	R295	34.2	204327.07	4542143.54
HOME	R622	34.2	196469.59	4549842.21
HOME	R589	34.1	203538.88	4548533.92
HOME	R603	34.1	191224.9	4548924.51
HOME	R752	34.1	205784.4	4545131.72
HOME	R565	34	188971.86	4547493.17
HOME	R624	34	196483.28	4549904.1
HOME	R814	34	200664.29	4535407.86
HOME	R826	34	201191.57	4535724.04
HOME	R691	33.9	204319.16	4541869.76
HOME	R712	33.9	202566.65	4537601.54
HOME	R832	33.9	201866.88	4536374.91
HOME	R815	33.9	200960.29	4535546.12
HOME	R626	33.8	196457.4	4550015.79
HOME	R757	33.8	205452.11	4543529.72
HOME	R613	33.7	191588.62	4549249.64
HOME	R563	33.6	188728.4	4547478.83
HOME	R587	33.6	203908.35	4548498.58
HOME	R623	33.6	199650.95	4549794.03
HOME	R821	33.6	199180.71	4534814.5
HOME	R585	33.5	204017.58	4548497.19
HOME	R618	33.5	201275.27	4549576.8
HOME	R628	33.5	197299.59	4550075.03
HOME	R1170	33.5	187113.65	4545842.9
HOME	R677	33.5	202537.01	4537179.86
HOME	R820	33.5	199185.05	4534761.99
HOME	R834	33.5	202136.34	4536494.39
HOME	R583	33.4	204081.14	4548485.6
HOME	R614	33.4	202888.27	4549107.03
HOME	R742	33.4	205607.72	4546807.13
HOME	R819	33.4	199180.66	4534709.63
HOME	R833	33.4	202081.89	4536376.47
HOME	R562	33.3	188539.95	4547475.22
HOME	R610	33.3	190640.64	4549018.04

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R745	33.3	205981.11	4545666.6
HOME	R754	33.3	205938.9	4544467.22
HOME	R825	33.3	201390.48	4535601.78
HOME	R746	33.2	205998.22	4545735.72
HOME	R755	33.2	205933.8	4544323.9
HOME	R756	33.2	205901.24	4544164.62
HOME	R635	33.1	196507.55	4550315.35
HOME	R690	33.1	204278.85	4540875.8
HOME	R835	33.1	202438.84	4536705.94
HOME	R637	33	195769.57	4550377.95
HOME	R747	33	206004.48	4546071.95
HOME	R584	32.9	204365.09	4548479.41
HOME	R608	32.9	190233.05	4548991.28
HOME	R636	32.9	195014.6	4550360.21
HOME	R639	32.9	196384.06	4550417.69
HOME	R689	32.9	204336.83	4540759.85
HOME	R730	32.9	197114.31	4550390.68
HOME	R616	32.8	191529.93	4549642.13
HOME	R638	32.8	195023.34	4550394.24
HOME	R687	32.8	204185.46	4540369.39
HOME	R813	32.8	200044.23	4534717.58
HOME	R627	32.7	201336.22	4549937.27
HOME	R641	32.7	194897.65	4550452.61
HOME	R698	32.7	204529.96	4548472.97
HOME	R726	32.7	199754.09	4550213.88
HOME	R729	32.7	198132.2	4550407.03
HOME	R688	32.7	204255.25	4540317.86
HOME	R817	32.6	199807.04	4534543.36
HOME	R632	32.5	200558.94	4550198.12
HOME	R836	32.5	202494.25	4536369.41
HOME	R744	32.4	206020.62	4546590.3
HOME	R761	32.4	205160.81	4541836.49
HOME	R837	32.4	202495.07	4536315.22
HOME	R642	32.3	193798.87	4550484.74
HOME	R743	32.3	206020.7	4546736.83
HOME	R1172	32.3	188249.52	4547833.39
HOME	R621	32.1	202900.92	4549705.73
HOME	R633	32.1	201286.1	4550229.7
HOME	R634	32.1	201129.01	4550236.05
HOME	R686	32.1	204244.62	4539490.57
HOME	R741	32	206042.34	4546903.56
HOME	R765	32	204617.28	4540297.44
HOME	R818	32	199379.62	4534078.74
HOME	R838	32	203019.66	4536737.95
HOME	R699	31.9	204558.95	4548822.98
HOME	R762	31.9	205422.79	4541750.25
HOME	R811	31.9	201273.93	4534876.58
HOME	R758	31.8	205879.99	4542642.32
HOME	R763	31.8	205136.41	4541147.86
HOME	R678	31.8	203323.48	4537142.45
HOME	R810	31.8	201329.4	4534849.41

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R685	31.7	204205.49	4538821.76
HOME	R808	31.7	201429.09	4534852.95
HOME	R809	31.7	201394.05	4534848.31
HOME	R725	31.6	199669.73	4550758.06
HOME	R759	31.6	205649.12	4541941.53
HOME	R1171	31.6	186632.94	4546530.94
HOME	R630	31.5	191639.41	4550299.92
HOME	R648	31.5	194819.64	4551018.42
HOME	R684	31.5	204134.63	4538492.14
HOME	R803	31.5	202454.05	4535611.45
HOME	R760	31.3	205797.64	4541874.84
HOME	R767	31.2	204480.09	4538758.06
HOME	R812	31.2	201211.15	4534475.65
HOME	R683	31.1	204171.45	4537958.87
HOME	R805	31.1	201834.4	4534842.52
HOME	R629	31	203309.74	4550063.2
HOME	R682	31	204185.41	4537884.78
HOME	R801	31	202466.44	4535314.11
HOME	R681	30.9	204198.3	4537744.13
HOME	R644	30.8	191630.77	4550676.59
HOME	R764	30.8	205837.54	4541315.07
HOME	R1173	30.8	188273.55	4548824.1
HOME	R679	30.8	204095.92	4537520.95
HOME	R631	30.7	203552.42	4550125.43
HOME	R649	30.7	193192.27	4551192.5
HOME	R804	30.7	202041.05	4534763.83
HOME	R619	30.6	189466.02	4549821.51
HOME	R646	30.6	191621.18	4550798.69
HOME	R839	30.6	203934.66	4536994.94
HOME	R806	30.6	201536.89	4534309.28
HOME	R651	30.5	193276.59	4551335.16
HOME	R680	30.5	204109.88	4537160.2
HOME	R783	30.4	204266.74	4537313.65
HOME	R802	30.4	202273.35	4534754.62
HOME	R654	30.3	194846.56	4551688.26
HOME	R700	30.3	204514.68	4549757.28
HOME	R714	30.3	201391.14	4551163.34
HOME	R768	30.3	205032.49	4538737.85
HOME	R769	30.3	205010.86	4538656.84
HOME	R776	30.3	204917.92	4538447.7
HOME	R807	30.3	201388.89	4534035.66
HOME	R647	30.2	191578.73	4551043.68
HOME	R655	30.2	194922.06	4551796.09
HOME	R770	30.2	205075.27	4538654.91
HOME	R656	30.1	194923.97	4551839.71
HOME	R771	30.1	205071.5	4538603.34
HOME	R782	30.1	204544.3	4537461.81
HOME	R784	30.1	204304.68	4537092.93
HOME	R653	30	193286.63	4551643.86
HOME	R657	30	196288.75	4551954.61
HOME	R766	30	205795.95	4540087.24

TABLE B-1
Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R779	30	204916.71	4538041.78
HOME	R780	29.9	204914.99	4537925.13
HOME	R659	29.8	195733.58	4552055.36
HOME	R660	29.8	195793.99	4552054.22
HOME	R777	29.8	205147.69	4538365.81
HOME	R772	29.8	205358.98	4538721.52
HOME	R774	29.8	205300.03	4538597.64
HOME	R778	29.8	205132.92	4538256.66
HOME	R775	29.7	205360.22	4538572.17
HOME	R1175	29.7	205403.66	4538626.52
HOME	R800	29.7	202860.32	4534737.59
HOME	R625	29.6	188803.91	4550065.65
HOME	R706	29.6	203035.54	4550985.22
HOME	R773	29.6	205475.64	4538652.14
HOME	R724	29.5	200230.77	4551887.61
HOME	R705	29.4	203034.46	4551099.03
HOME	R723	29.4	200527.14	4551875.78
HOME	R799	29.4	203841.34	4535584.22
HOME	R652	29.3	191598.87	4551606.23
HOME	R658	29.3	193251.54	4552079.63
HOME	R715	29.3	201341.54	4551746.54
HOME	R781	29.3	205328.51	4537932.07
HOME	R786	29.2	204988.25	4537164.17
HOME	R662	29.1	193000.22	4552145.74
HOME	R716	29.1	201399.52	4551856.05
HOME	R717	29.1	201502.59	4551832.43
HOME	R785	29.1	204959.89	4537038.21
HOME	R788	29.1	205056.07	4537158.18
HOME	R718	29	201689.41	4551822.77
HOME	R719	29	201835.43	4551761.57
HOME	R722	29	201678.78	4551857.23
HOME	R787	29	205093.36	4537047.63
HOME	R798	29	202834.31	4534173.09
HOME	R661	28.9	192534.3	4552115.37
HOME	R720	28.9	201914.37	4551808.98
HOME	R721	28.9	201961.61	4551812.2
HOME	R640	28.8	188768.71	4550562.22
HOME	R789	28.8	205286.56	4537142.78
HOME	R790	28.8	204803.12	4536365.47
HOME	R791	28.8	204661.15	4536147.04
HOME	R643	28.7	188765.3	4550653.86
HOME	R669	28.7	192197.16	4552199.11
HOME	R703	28.6	202830.93	4551703.42
HOME	R704	28.6	202567.89	4551797.9
HOME	R794	28.5	203816.65	4534753.73
HOME	R702	28.4	202961.92	4551783.94
HOME	R645	28.2	188350.46	4550757.05
HOME	R793	28.2	204080.35	4534796.88
HOME	R792	28.2	204758.92	4535546.36
HOME	R663	28.1	191001.55	4552193.64
HOME	R797	28.1	203374.51	4533985.9

TABLE B-1

Noise Results and Receptor Locations

Structure Type	Residence ID	Sound Pressure Level (dBA)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
HOME	R664	28	190736.16	4552202.74
HOME	R650	27.9	188869.65	4551352.46
HOME	R667	27.9	190650	4552214.83
HOME	R796	27.9	204062.38	4534442.86
HOME	R701	27.7	204196.8	4551655.05
HOME	R795	27.6	204038.18	4534142.98
HOME	R665	27.2	189510.02	4552228.48
HOME	R666	27.2	189512.74	4552238.04
HOME	R668	27.2	189520.32	4552244.27
HOME	R670	27.1	189405.12	4552248.8

TABLE B-2
Noise Source Locations

Source ID	Source Sound Power Level (dBA)	Height (m)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
Substation 1	100	4	198371.8	4538246.86
Substation 2	100	4	192927.35	4538687.54
Substation 3	100	4	200167.4	4537067.41
Substation 4	100	4	200167.4	4537067.41
WTG_1	108.4	100	189115.81	4543882.01
WTG_2	108.4	100	189122.14	4543565.58
WTG_3	108.4	100	189615.91	4542203.14
WTG_4	108.4	100	189794.66	4543933.75
WTG_5	108.4	100	189977.95	4543275
WTG_6	108.4	100	190455.41	4544318.05
WTG_7	108.4	100	190470.43	4543892.22
WTG_8	108.4	100	190497.6	4543603.72
WTG_9	108.4	100	191108.54	4543333.04
WTG_10	108.4	100	190359.09	4542794.82
WTG_11	108.4	100	190526.5	4542186.53
WTG_12	108.4	100	190633.77	4541927.83
WTG_13	108.4	100	190777.05	4541626.53
WTG_14	108.4	100	190914.85	4541399.93
WTG_15	108.4	100	188961.02	4540601.83
WTG_16	108.4	100	188900.81	4539804.84
WTG_17	108.4	100	188953.26	4539545.45
WTG_18	108.4	100	188874.51	4539143.96
WTG_19	108.4	100	188944.02	4538076.36
WTG_20	108.4	100	189134.81	4537941.11
WTG_21	108.4	100	189725.83	4539024.03
WTG_22	108.4	100	190683.04	4539861.48
WTG_23	108.4	100	190732.81	4539604.32
WTG_24	108.4	100	190640.47	4538864
WTG_25	108.4	100	190893.86	4538732.24
WTG_26	108.4	100	190605.93	4538097.21
WTG_27	108.4	100	190655.75	4537839.12
WTG_28	108.4	100	190372.5	4537037.95
WTG_29	108.4	100	190502.65	4536779.3
WTG_30	108.4	100	190551.62	4536523.83
WTG_31	108.4	100	191600.48	4540531.19
WTG_32	108.4	100	191650.52	4540274.9
WTG_33	108.4	100	191749.3	4539877.68
WTG_34	108.4	100	192107.89	4539760.32
WTG_35	108.4	100	192276.5	4539481.31
WTG_36	108.4	100	191817.26	4538750.4
WTG_37	108.4	100	191439.89	4537999.67
WTG_38	108.4	100	191489.81	4537743.87
WTG_39	108.4	100	192221.66	4537984.49
WTG_40	108.4	100	192164.75	4536941.38
WTG_41	108.4	100	192239.06	4536685.45
WTG_42	108.4	100	192289.38	4536428.77
WTG_43	108.4	100	191705.18	4535578.82
WTG_44	108.4	100	191964.24	4535477.14
WTG_45	108.4	100	192971.81	4536883.66
WTG_46	108.4	100	193201.2	4536784.07
WTG_47	108.4	100	193254.28	4536518.5
WTG_48	108.4	100	193147.43	4541381.94

TABLE B-2
Noise Source Locations

Source ID	Source Sound Power Level (dBA)	Height (m)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
WTG_49	108.4	100	193416.39	4541334.72
WTG_50	108.4	100	193680.81	4541271.74
WTG_51	108.4	100	193942.96	4541208.91
WTG_52	108.4	100	194156.83	4541028.81
WTG_53	108.4	100	193114.09	4540562.26
WTG_54	108.4	100	193499.01	4540313.75
WTG_55	108.4	100	193075.74	4539690.07
WTG_56	108.4	100	193206.63	4539426.72
WTG_57	108.4	100	193463.73	4539340.56
WTG_58	108.4	100	193039.16	4538542.82
WTG_59	108.4	100	193908.91	4537961.85
WTG_60	108.4	100	194004.21	4537700.43
WTG_61	108.4	100	195015.81	4540047.42
WTG_62	108.4	100	195065.62	4539791.92
WTG_63	108.4	100	195116.57	4539536.61
WTG_64	108.4	100	194885.94	4538763.11
WTG_65	108.4	100	194935.94	4538506.37
WTG_66	108.4	100	191555.32	4546240.72
WTG_67	108.4	100	191605.93	4545981.94
WTG_68	108.4	100	192415.19	4546261.57
WTG_69	108.4	100	192465.8	4546002.79
WTG_70	108.4	100	192731.23	4545140.8
WTG_71	108.4	100	193463.28	4545396.06
WTG_72	108.4	100	193513.89	4545137.28
WTG_73	108.4	100	194208.62	4546183.95
WTG_74	108.4	100	194257.92	4545927.03
WTG_75	108.4	100	194278.88	4545200.96
WTG_76	108.4	100	194299.96	4544933.14
WTG_77	108.4	100	193944.56	4544549.65
WTG_78	108.4	100	193940.44	4544260.41
WTG_79	108.4	100	193986.53	4542967.18
WTG_80	108.4	100	194037.17	4542710.79
WTG_81	108.4	100	194934.14	4543301.55
WTG_82	108.4	100	194984.72	4543044.48
WTG_83	108.4	100	194990.67	4542781.58
WTG_84	108.4	100	195029.06	4542523.61
WTG_85	108.4	100	195579.52	4543685.14
WTG_86	108.4	100	195630.15	4543428.75
WTG_87	108.4	100	195653.66	4546783.48
WTG_88	108.4	100	195703.13	4546527.15
WTG_89	108.4	100	195753.71	4546269.55
WTG_90	108.4	100	195803.18	4546013.23
WTG_91	108.4	100	196464.04	4546662.94
WTG_92	108.4	100	196503.72	4546403.7
WTG_93	108.4	100	196771.02	4544405.32
WTG_94	108.4	100	196820.83	4544147.22
WTG_95	108.4	100	197540.1	4544371.33
WTG_96	108.4	100	197589.92	4544113.23
WTG_97	108.4	100	196834.87	4543560.4
WTG_98	108.4	100	196883.72	4543302.63
WTG_99	108.4	100	196941.88	4543019.39
WTG_100	108.4	100	196424.35	4542538.65

TABLE B-2
Noise Source Locations

Source ID	Source Sound Power Level (dBA)	Height (m)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
WTG_101	108.4	100	197294.44	4542857.4
WTG_102	108.4	100	197343.84	4542600.2
WTG_103	108.4	100	197593.14	4542438.21
WTG_104	108.4	100	197391.16	4541976.31
WTG_105	108.4	100	196749.8	4541935.98
WTG_106	108.4	100	196762.36	4541671.41
WTG_107	108.4	100	196453.61	4541112.51
WTG_108	108.4	100	196726.18	4541049.81
WTG_109	108.4	100	197431.92	4541175.2
WTG_110	108.4	100	197483.93	4540916.36
WTG_111	108.4	100	196382.24	4540411.31
WTG_112	108.4	100	196618.19	4540300.09
WTG_113	108.4	100	196669.32	4540044.2
WTG_114	108.4	100	197045.85	4539951.35
WTG_115	108.4	100	197095.26	4539695.24
WTG_116	108.4	100	197145.68	4539437.96
WTG_117	108.4	100	196490.24	4538590.68
WTG_118	108.4	100	196539.69	4538332.41
WTG_119	108.4	100	196590.56	4538076.58
WTG_120	108.4	100	197042.76	4538690.83
WTG_121	108.4	100	197093	4538433.67
WTG_122	108.4	100	197986.87	4538378.96
WTG_123	108.4	100	198084.41	4541855.07
WTG_124	108.4	100	198134.38	4541599.21
WTG_125	108.4	100	198106.52	4540798.81
WTG_126	108.4	100	198175.67	4540398.51
WTG_127	108.4	100	198233.41	4540119.85
WTG_128	108.4	100	199166.55	4543194.22
WTG_129	108.4	100	199215.3	4542936.48
WTG_130	108.4	100	198816.36	4542390.14
WTG_131	108.4	100	198801.74	4541990.87
WTG_132	108.4	100	198851.71	4541735.02
WTG_133	108.4	100	198766.95	4541263.19
WTG_134	108.4	100	198764.24	4540905.64
WTG_135	108.4	100	199672.34	4542584.16
WTG_136	108.4	100	199620.97	4541273.74
WTG_137	108.4	100	199615.56	4541023.11
WTG_138	108.4	100	199676.43	4540712.71
WTG_139	108.4	100	199746.76	4538495.44
WTG_140	108.4	100	199796.33	4538239.41
WTG_141	108.4	100	199846.81	4537983.33
WTG_142	108.4	100	197661.7	4545655.38
WTG_143	108.4	100	198352.15	4545876.47
WTG_144	108.4	100	198403.27	4545613.78
WTG_145	108.4	100	198435.06	4544811.08
WTG_146	108.4	100	199192.93	4545916.51
WTG_147	108.4	100	199260.77	4545659.96
WTG_148	108.4	100	199687.75	4544393.08
WTG_149	108.4	100	199964.52	4544335.74
WTG_150	108.4	100	200012.59	4544080.88
WTG_151	108.4	100	199973.41	4543514.46
WTG_152	108.4	100	200131.87	4543296.88

TABLE B-2
Noise Source Locations

Source ID	Source Sound Power Level (dBA)	Height (m)	Coordinates (UTM NAD 83 Z17N) X (m)	Y (m)
WTG_153	108.4	100	200063.27	4545992.55
WTG_154	108.4	100	200159.73	4545733.84
WTG_155	108.4	100	200512.53	4544910.49
WTG_156	108.4	100	200714.74	4544740.47
WTG_157	108.4	100	200971.11	4546364.69
WTG_158	108.4	100	201375.91	4545946.58
WTG_159	108.4	100	201369.98	4545692.61
WTG_160	108.4	100	201340.38	4545136.77
WTG_161	108.4	100	201639	4545023.7
WTG_162	108.4	100	201746.54	4544735.91
WTG_163	108.4	100	202518.09	4545748.56
WTG_164	108.4	100	202567.77	4545491.54
WTG_165	108.4	100	203142.65	4545889.91
WTG_166	108.4	100	203244.45	4545616.59
WTG_167	108.4	100	203766.6	4544915.23