AGRICULTURAL IMPACT STATEMENT

CAPX 2020 345 kV Transmission Line Project
Alma – Holmen
Buffalo, Trempealeau, and La Crosse Counties

Xcel Energy, Dairyland Power Cooperative and WPPI Energy

Wisconsin Department of Agriculture,
Trade and Consumer Protection

DATCP # 3804 Publication Date: June 25, 2012

Agricultural Impact Statement

Wisconsin Department of Agriculture,
Trade and Consumer Protection

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Agricultural Impact Statement

CAPX 2020 Transmission Line Project
Buffalo, Trempealeau and La Crosse Counties
PSC Docket # 5-CE-136

INTRODUCTION

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) has prepared this agricultural impact statement (AIS) in accordance with §32.035, Wisconsin Statutes. The AIS is an informational and advisory document that describes and analyzes the potential effects of the project on farm operations and agricultural resources, but cannot stop a project.

The DATCP is required to prepare an AIS when the actual or potential exercise of eminent domain powers involves an acquisition of interest in more than 5 acres of land from any farm operation[1]. The DATCP may choose to prepare an AIS if an acquisition of 5 or fewer acres will have a significant impact on a farm operation. Significant impacts could include the acquisition of buildings, the acquisition of land used to grow high-value crops, or the severance of land. The DATCP should be notified of such projects regardless of whether the proposing agency intends to use its condemnation authority in the acquisition of project lands. The proposing agency may not negotiate with or make a jurisdictional offer to a landowner until 30 days after the AIS is published.

The DATCP is not involved in determining whether or not eminent domain powers will be used or the amount of compensation to be paid for the acquisition of any property. The AIS reflects the general objectives of the DATCP in its recognition of the importance of conserving important agricultural resources and maintaining a healthy rural economy.

Prior to completion of this report, the Public Service Commission (PSC) approved the project and selected the route. The route selected for the proposed transmission line is the Q-1 Galesville Route. Much of this report was completed prior to route selection and discusses the agricultural impacts of the various routes. The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) provided an executive summary of this report that was included in the Final Environmental Impact Statement for the project. This can be found at the PSC Website at http://psc.wi.gov/ and case number 5-CE-136.

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[1]The term *farm operation* includes all owned and rented parcels of land; buildings and equipment; livestock; and personnel used by an individual, partnership, or corporation under single management to produce agricultural commodities.

In addition, DATCP submitted written comments to the PSC supporting the Q-1 Route or the Q-1 Hwy 35 Route alternatives. This report discusses in greater detail the agricultural impacts of the project and the basis for DATCP's support of the Q-1 Route and the Q-1 Hwy 35 Route alternatives.

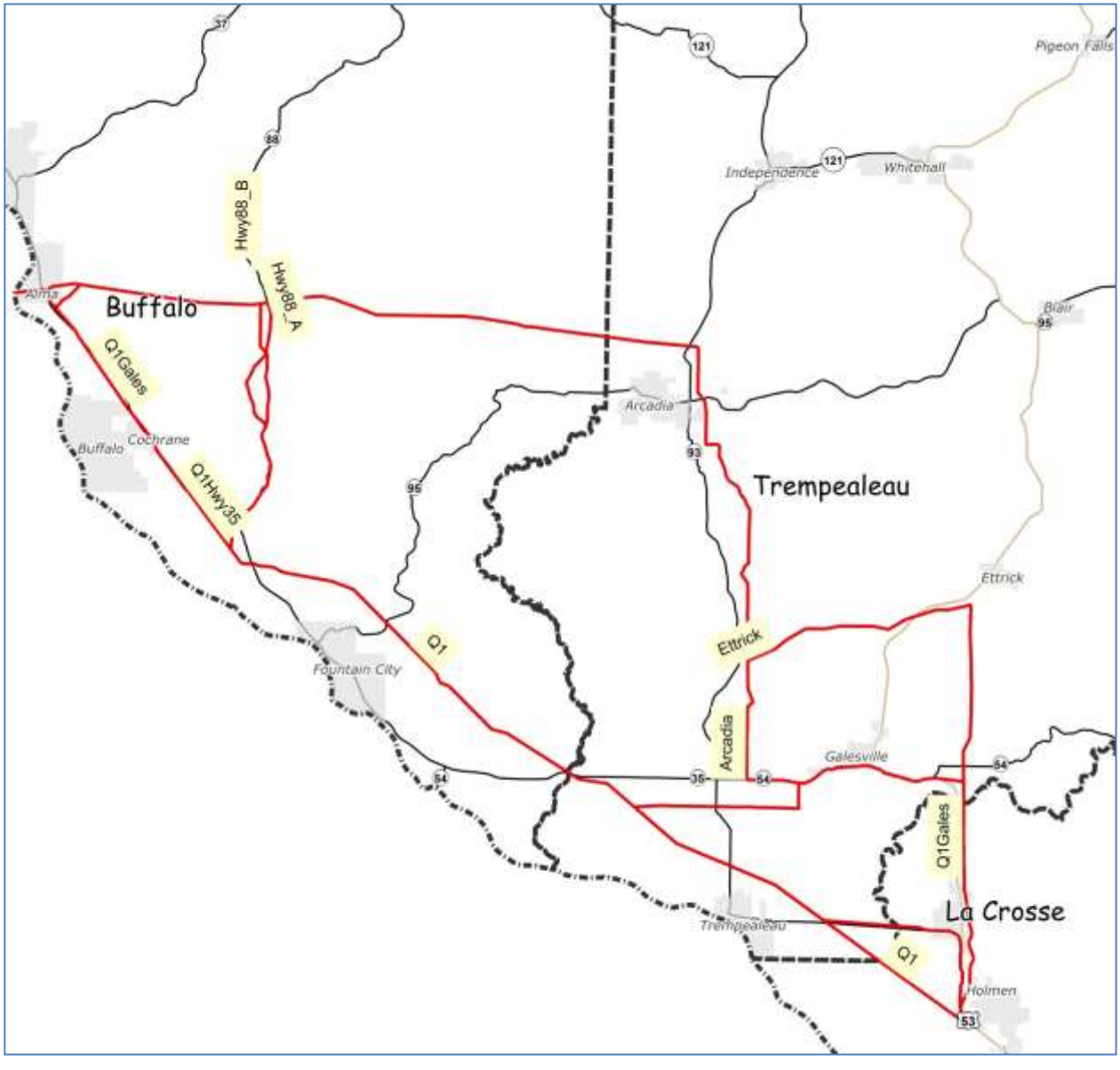
Sources of information used to prepare this statement include the Wisconsin 2011 Agricultural Statistics and other yearly issues; the 2007 and 2002 Census of Agriculture; the Buffalo County Farmland Preservation Plan, Trempealeau County Farmland Preservation Plan and La Crosse County Farmland Preservation Plan; the Soil Survey of Buffalo County; Soil Survey of Trempealeau County, Soil Survey of La Crosse County; the Joint Application for Public Service Commission of Wisconsin Certificate of Public Convenience and Necessity, Hampton – Rochester to La Crosse 345 kV Transmission Project; the Draft Environmental Impact Statement; Alma-La Crosse 345 kV Transmission Line Project; the Public Service Commission of Wisconsin; Xcel Energy; and selected farmland owners potentially affected under each route.

The Applicants have received approval from the Public Service Commission of Wisconsin (PSC) and the Wisconsin Department of Natural Resources (DNR) to construct the Wisconsin portion of the 345 kV line. Their application for approval can be found at: http://psc.wi.gov/ and case number 5-CE-136.

Northern States Power Company (Xcel Energy), Dairyland Power Cooperative (Dairyland), and WPPI Energy (WPPI), the Applicants, plan to construct the Wisconsin portion of the 345 kilovolt (kV) transmission line from Alma, Wisconsin, where it crosses the Mississippi River from Minnesota, to a new transmission substation located near Holmen. The proposed project, located in Buffalo, Trempealeau, and La Crosse Counties would be approximately 40 to 55 miles long depending on the final route selected. The PSC selected the Q-1 Galesville Route. The proposed project would also include construction of a new substation near Holmen and a 161 kV transmission line connecting the proposed 345 kV line to the proposed substation.

Initially, the Applicants proposed three route alternatives between Alma and the substation near Holmen: the Q1-Highway 35 Route, the Arcadia Route and the Q1-Galesville Route. The PSC evaluated a 1.3-mile Arcadia-Alma Option that could replace a 1.7 mile section of the Arcadia Route.

Project Location



At the request of the PSC, DNR and Wisconsin Department of Transportation (WisDOT), the Applicants developed three additional connector options: the WI-88 Option A Connector, the WI-88 Option B Connector, and the Arcadia-Ettrick Connector. These connector options would be combined with portions of the three proposed routes to complete the connection.

The PSC evaluated an additional alternative route that was not included in the Application. The Q-1 Route was originally considered by the Applicants but dismissed by the Applicants due to its impacts to the Black River and its forested floodplain near Holmen. Federal lands located on the southern portion of the Q-1 Route are part of the Mississippi National Wildlife Refuge.

Each route begins with the Mississippi River crossing at Alma and terminates at a new Briggs Road substation near the intersection of USH-53 and Briggs Road in the town of Onalaska near Holmen. Each route, connector and option is composed of smaller segments. It appears that there are nine possible combinations of segments that could have been used to construct the transmission line between Alma and Holmen. These include:

- Q-1 Route
- Q-1 Galesville Route
- Q-1 Galesville Route and Hwy 88A Connector
- Q-1 Galesville Route and Hwy 88B Connector
- Q-1 Hwy 35 Route
- Q-1 Hwy 35 Route and Hwy 88A Connector
- Q-1 Hwy 35 Route and Hwy 88B Connector
- Arcadia Route
- Arcadia Route and Ettrick Option

OVERVIEW OF PROPOSED PROJECT ROUTES

The Q1 Route has the least acreage impact on farmland, requiring new easements on 174.8 acres of farmland, which includes 172.8 acres of cropland. The Q1 Galesville with 88 B Option requires the acquisition of easements on 269 acres of farmland, the largest impact on cropland. The Q1 Route represents the most direct corridor between Alma and Holmen.

	Table 1 – New/ Existing Easements on Land Uses Affected on Transmission Line Routes (acres)				
Route`	**All Land Uses**	**All Agricultural Land**	**Cropland**	**Pasture Land**	**Specialty Ag Land**
Q1	**378.5/398.7**	**174.9/163.8**	**172.8/161.5**	**2.1/2.3**	**0.0/0.0**
Q1 Hwy 35	**398.2/392.3**	**192.9/141.6**	**186.4/140.0**	**6.5/1.6**	**0.0/0/0**
Q1 Hwy 35 w 88A	**508.5/407.8**	**244.5/157.6**	**226.9/150.0**	**17.6/7.6**	**0.0/0.0**
Q1 Hwy 35 w 88B	**538.6/364.3**	**268.6/151.9**	**256.7/145.2**	**11.9/6.8**	**0.0/0.0**
Arcadia	**523.5/494.1**	**252.4/203.8**	**230.9180.2**	**16.6/20.1**	**4.9/3.5**
Arcadia Alma	**523.8/487.8**	**261.7/203.8**	**240.2/180.2**	**16.6/20.1**	**4.9/3.5**
Arcadia Ettrick	**536.1/512.9**	**252.3216.2**	**233.6/194.7**	**17.3/21.0**	**1.4/0.5**
Q1 Galesville	**495.0/402.5**	**269/113.7**	**265.6/110.1**	**2.0/3.1**	**1.4/0.5**
Q1 Galesville w 88A	**605.3/418.0**	**320.7/129.7**	**306.1/120.0**	**13.2/9.2**	**1.4/0.5**
Q1 Galesville w 88B	**635.4/374.5**	**344.8/124.0**	**336.0/115.2**	**7.4/8.3**	**1.4/0.5**

The following section summarizes the various routes that were considered.

Q1-Galesville

The *Q1-Galesville Route* was selected by the PSC for construction of the transmission line. It begins at Alma and generally follows the existing Dairyland Q1 161 kV transmission line corridor to south of Highway 54. From there it extends to the east past Centerville and Galesville to Highway 53 and south to Holmen.

The *Q1-Galesville Route* is 48.4 miles long, beginning at the Mississippi River crossing at Alma and ending at the proposed new Briggs Road Substation. It shares 79 percent of its length and 45.3 percent of its area with existing easements.

The new right-of-way required for the *Q1-Galesville Route* totals about 495 acres, which includes 269 acres of agricultural land. This includes about 265 acres of cropland, 2 acres of pasture, and 1.4 acres of specialty crops. The 268 acres of farmland on new right-of-way needed for the *Q1-Galesville Route* is comprised of about 116 acres of prime soils, 3.3 acres of prime soils where drained, and 27 acres of soils of statewide importance. About 101 acres of highly erodible agricultural land would be affected by new and existing easements on the *Q1-Galesville Route*. This represents about 26 percent of the total agricultural acreage affected by the route. It is estimated that 153 transmission line structures would be located in agricultural land on this route.

Q1 Route

The Q1 Route represents the most direct corridor between Alma and Holmen and has the least new agricultural impacts due to its sharing of the existing Dairyland Q1 161 kV transmission line corridor. The Q1 Route extends for about 41.3 miles. It shares 96 percent of its length and 51.3 percent of its area with existing easements. The Q1 Route was one of the two routes recommended by DATCP.

Holmen and has the least new agricultural impacts due to its sharing of the existing Dairyland Q1 161 kV transmission line corridor. The Q1 Route extends for about 41.3 miles. It shares 96 percent of its length and 51.3 percent of its area with existing easements.

New easements for the proposed transmission line would affect a total of 378 acres of all lands and about 175 acres of farmland. The farmland consists of 173 acres of cropland and 2 acres of pasture. The 175 acres of new easements on farmland affected by the Q1 Route is comprised of about 60 acres of prime soils, 0.56 acres of prime farmland where drained, and 17 acres of soils of statewide importance.

About 113 acres of highly erodible agricultural land would be affected by new and existing easements on the Q1 Route. This represents about 33 percent of the total agricultural acreage affected by the Q1 Route. DATCP identified three parcels on the Q1 Route where organic farming practices were followed. It is estimated that 138 transmission line structures would be located in agricultural land on this route.

Q1-35 Route

This route follows the existing Dairyland 161 kV transmission line corridor to the south, on single-pole structures along Highway 35 to the mouth of Waumandee Creek. From that point, the route shifts inland from the Mississippi River, continuing to follow the existing Dairyland 161 kV corridor. East of the Trempealeau River, this route diverges and follows a different path to avoid various resource impacts. The Q1-35 Route was the second route recommended by DATCP.

The proposed Q1-35 Route parallels the existing Dairyland 161 kV transmission line from Alma to Highway 35 east of the village of Trempealeau. It shifts from this corridor to avoid wetlands

managed by the U.S. Fish and Wildlife Service. The existing 161 kV transmission line would be double-circuited on metal, single pole structures. From this point, it follows Highway 53 to the south to the proposed substation near Briggs Road.

The Q1-35 Route extends for about 43 miles. It shares 93.5 percent of its length and 43.2 percent of its area with existing corridors. New easements for the proposed transmission line would affect a total of 398 acres of all lands and about 193 acres of farmland. The farmland consists of 186 acres of cropland and 7 acres of pasture.

The 193 acres of farmland on new right-of-way needed for the Q1-35 Route is comprised of about 51 acres of prime soils, 0.5 acres of prime soils where drained, and 16 acres of soils of statewide importance. About 109 acres of highly erodible agricultural land would be affected by new and existing easements on the Q1-35 Route. This represents about 33 percent of the total agricultural acreage affected by the route. DATCP identified two parcels where organic farming practices were followed on the Q1-35 Route. It is estimated that 140 transmission line structures would be located on agricultural land on this route.

Q1-35 with Hwy 88A Route

The *Q1-35 with Hwy 88A Route* extends for 49.7 miles. It shares 90 percent of its length and 44.5% percent of its area with existing easements. The new right-of-way required for the *Q1-35 with Hwy 88A* Route totals about 509 acres, which includes 245 acres of agricultural land. This includes about 227 acres of cropland and 18 acres of pasture.

The 245 acres of farmland on new right-of-way needed for the *Q1-35 with Hwy 88A Route* is comprised of about 84 acres of prime soils, 0.5 acres of prime farmland where drained, and 34 acres of soils of statewide importance. About 171 acres of highly erodible agricultural land would be affected by new and existing easements on the *Q1-35 with Hwy 88A Route*. This represents about 43 percent of the total agricultural acreage affected by the *Q1-35 with Hwy 88A Route.*

DATCP identified two parcels where organic farming practices were followed on the *Q1-35 with Hwy 88A Route*. It is estimated that 153 transmission line structures would be located in agricultural land on this route.

Q1-35 with Hwy 88B

The *Q1-35 with Hwy 88B Route* extends for 49 miles. It shares 79 percent of its length and 40.3 percent of its area with existing easements. The new right-of-way required for the *Q1-35 with Hwy 88B Route* totals about 539 acres, which includes 268 acres of agricultural land. This includes about 257 acres of cropland and 12 acres of pasture.

The 268 acres of farmland on new right-of-way needed for the *Q1-35 with Hwy 88B Route* is comprised of about 84 acres of prime soils, 0.5 acres of prime soils where drained, and 34 acres of soils of statewide importance. About 184 acres of highly erodible agricultural land would be affected by new and existing easements on the *Q1-35 with Hwy 88B Route*. This represents about 44 percent of the total agricultural acreage affected by this route.

DATCP identified two parcels where organic farming practices were followed on the *Q1-35 with Hwy 88B Route*. It is estimated that 150 transmission line structures would be located in agricultural land on this route.

Q1-Galesville with Hwy 88A

The *Q1-Galesville with Hwy 88A* Route extends for about 55 miles. It shares 78 percent of its length and 41.2 percent of its area with existing easements. The new right-of-way required for the *Q1-Galesville with Hwy 88A Route* totals about 605 acres, which includes 321 acres of agricultural land. This includes about 306 acres of cropland, 14 acres of pasture, and 1.4 acres of specialty crops.

The 321 acres of farmland on new right-of-way needed for the *Q1-Galesville Route with Hwy 88A* is comprised of about 150 acres of prime soils, 3.3 acres of prime soils where drained, and 44 acres of soils of statewide importance. About 158 acres of highly erodible agricultural land would be affected by new and existing easements on the *Q1-Galeseville with Hwy 88A Route*. This represents about 35 percent of the total agricultural acreage affected by this route. It is estimated that 166 transmission line structures would be located in agricultural land on this route.

Q1-Galesville with Hwy 88B

The *Q1-Galesville with Hwy 88B Route* extends for about 54.4 miles. It shares 67 percent of its length and 37.4 percent of its area with existing easements. The new right-of-way required for the *Q1-Galesville with Hwy 88B Route* totals about 635 acres, which includes 345 acres of agricultural land. This includes about 336 acres of cropland, 7 acres of pasture, and 1.4 acres of specialty crops.

The 345 acres of farmland on new right-of-way needed for the *Q1-Galesville Route with Hwy 88B* is comprised of about 165 acres of prime soils, 3.3 acres of prime soils where drained, and 49 acres of soils of statewide importance.
About 167 acres of highly erodible agricultural land would be affected by new and existing easements on the *Q1-Galesville with Hwy 88B*. This represents about 36 percent of the total agricultural acreage affected by this route. It is estimated that 162 transmission line structures would be located in agricultural land on this route.

Arcadia

The *Arcadia Route* extends for about 54.8 miles. It shares 90 percent of its length and 49 percent of its area with existing easements. The new right-of-way required for the Arcadia Route totals about 523 acres, which includes 252 acres of agricultural land. This includes about 231 acres of cropland, 16 acres of pasture, and 5 acres of specialty crops.

The 252 acres of farmland on new right-of-way needed for the *Arcadia Route* is comprised of about 87 acres of prime soils, 14 acres of prime soils where drained, and 45 acres of soils of statewide importance. About 245 acres of highly erodible agricultural land would be affected by new and existing easements on the *Arcadia Route*. This represents about 54 percent of the total agricultural acreage affected by the route.

DATCP identified six parcels where organic farming practices were followed on the *Arcadia Route* and two parcels in the process of converting to organic farming. It is estimated that 151 transmission line structures would be located in agricultural land on this route.

Arcadia Ettrick

The Arcadia Ettrick Route extends for about 57 miles. It shares 88 percent of its length and 48.9 percent of its area with existing easements. The new right-of-way required for the Arcadia Ettrick Route totals about 536 acres, which includes 252 acres of agricultural land. This includes about 234 acres of cropland, 17 acres of pasture, and 1.4 acres of specialty crops. The 252 acres of farmland on new right-of-way needed for the Arcadia Ettrick Route is comprised of about 85 acres of prime soils, 14 acres of prime soils where drained, and 54 acres of soils of statewide importance.

About 253 acres of highly erodible agricultural land would be affected by new and existing easements on the Arcadia Ettrick Route. This represents about 54% of the total agricultural acreage affected by the route. DATCP identified six parcels where organic farming practices were followed on the Arcadia Ettrick Route and two parcels in the process of converting to organic farming. It is estimated that 149 transmission line structures would be located in agricultural land on this route.

CURRENT AND PLANNED TRANSMISSION STRUCTURES AND LINES

For most of the proposed route, the utilities would install single-pole steel structures on concrete foundations. The poles would oxidize to a brown color. The exceptions would be along the Great River Road (GRR) corridor and where the line would follow an angle to make a turn. Along the GRR, the line would be installed on gray galvanized steel poles to minimize visual impacts. Where the angle of a turn is greater than 30 degrees, the utilities will use a two-pole configuration to minimize foundation diameters. The hilly coulee region would also require multiple structures for additional strength where long spans between hilltops are crossed. The poles for the proposed line could range from 80 to 200 feet tall depending on their location and engineering requirements, but the typical

height will range from 145 to 165 feet tall. The typical span between poles would range from 700 to 950 feet. Spans could range from 600 to 2,500 feet depending on conditions.

The majority of poles are expected to be installed on steel reinforced concrete foundations. The diameter of a typical foundation could range from 6 to 10 feet wide with a depth of 25 to 50 feet depending on the surrounding soil conditions.

The proposed line would be a three-phase (three conductors), 345,000 kilovolt (345 kV) line. Where it follows existing transmission line right-of-way, the existing 161 kV and 69 kV lines would be moved to the new poles and the existing support structures would be removed. The proposed line would also include two shield wires to protect the line from lightning.

PROJECT NEED

The CapX2020 utilities have indicated that the Hampton-Rochester-La Crosse 345 kV Transmission Project is proposed to address three needs:

- Address the necessity for additional transmission facilities to provide reliable service to the growing communities in the Winona/La Crosse and Rochester areas.
- Support generation development by providing foundation facilities to enable future power transfers between Minnesota and Wisconsin.
- Strengthen the transmission network to meet additional demand for electrical power anticipated in Wisconsin, Minnesota and parts of surrounding states.

To meet these needs, various options were considered in both local and regional studies: (1) alternative lower voltage transmission lines; (2) a "do-nothing" alternative; (3) generation alternatives; and (4) the proposed Hampton-Rochester-La Crosse 345 kV Transmission Project.

The CapX2020 utilities determined that the 345 kV project was the best way to meet the identified needs. The issue of project need is discussed in greater detail in the CapX2020 Alma–La Crosse 345 kV Transmission Project, Volume 1, Final Environmental Impact Statement. URL Address: http://psc.wi.gov, ERF#158958.

FARMLAND OWNER COMMENTS

DATCP surveyed a sample of farmland owners on the various route segments to assess their concerns regarding the possible impacts that the proposed transmission line could have on their farm operation. This section summarizes their comments.

SEGMENTS 2B, 2D, 2E, 2F, 2G, AND 2I

Ronald and Elaine Flury

Mr. Flury indicated that on his property, the line would pass through a swampy area and would not have much of an impact on his farmland. He does have livestock (beef cows) and pivot irrigation on his farm, but he does not think these would be affected by the proposed project.

Warren Bechly

Mr. Bechly and his son raise dairy heifers and Holstein steers. They also grow corn, soybeans, alfalfa, and rye. There is an existing line that follows the railroad track on the Bechly property. Mr. Bechly indicated that he does not think a new line would have much impact on his farm where it follows the existing line. However, where it turns to follow segment 2F, it would be on new right-of-way through some of his fields. He is concerned that this could interfere with farming because of pole placement in fields. He estimates that the new line (where it follows existing right-of-way) would be about 300 to 400 feet from his buildings. He is concerned that the proximity of the new line could cause stray voltage on his or other farms. There is contour stripping on this farm that could be affected.

Mr. Bechley is very concerned that the project will have a negative effect on his property values. He is also concerned that the transmission line could discourage any potential buyer of land for residential development. Mr. Bechly indicated that he and his son had considered putting in irrigation in the past, but had decided against it for the time being because the prices of grain and beans make it unnecessary at this point. The proposed line could interfere with aerial spraying if they were to incorporate that into their operation. He is also concerned about the project's potential impact on wildlife and whether this project is needed or not.

Rita Bechly

Ms. Bechly rents her land to her cousin and there is currently no livestock on this land. Of all the buildings on her property, the line would run the closest to her house. The line could also affect some woods. Ms. Bechly is concerned that the line would make it impossible to sell her land. She is also concerned about the potential health effects on people and wildlife caused by electric transmission lines.

Rodney Bagniewski

Rodney Bagniewski leases his land on shares for growing crops. There is currently no livestock on this farm. This farm has contour strips and grassed waterways. His renter uses precision farming technology. Mr. Bagniewski's primary concern about the project is that it would not benefit the local population, but he and his neighbors are the ones who would have to bare the burden of the project.

Marlene Rolbiecki

Marlene's daughter Peggy said that some of their land is certified organic and it is used to grow corn, hay, and barley. They also raise beef cattle and grow nonorganic hay. They do not have contour strips but they do have dams on this property to slow the movement of surface water and minimize erosion. Also, the proposed line would be about 100 feet from their barn.

Peggy is concerned about the potential effects on human and animal health as well as impacts on other aspects of the environment such as groundwater.

Peggy's father indicated that when Dairyland Power built the existing line 15 to 20 years ago, the crews left wire and other debris where they had been working. His equipment was damaged by that debris when he cut hay. Also, Dairyland has not done a good job of keeping the trees from growing into the lines.

Wendell Klein

Mr. Klein milks 45 cows. He bought this farm in 1994. He indicated that his farm has significant electrical problems. The existing Excel Energy line is 1,000 feet from the barn. Riverland Energy provides electricity to this farm. Mr. Klein said that Excel's feeder line goes around the barn to get to the substation, but the electricity takes the shortest path to the substation through the barn. He said that he and others working in the barn get shocks from the milking pipeline. He also said that the cows have sores on their feet, they have a lot of trouble with mastitis, and it's difficult to get the cows bred, even the heifers. In the barn, the cows are very jumpy and kick. He indicated that his vet cannot find any reason for these health problems. Mr. Klein said that Riverland did a stray voltage test and said all of the problems were on the farm end. They told him to rewire the farm from its current three-wire set-up to a four-wire configuration. Mr. Klein says this would cost $15,000. He asked Riverland to guarantee that this would solve the problems, but they would not.

Mr. Klein said Excel is currently adding on to their substation and rebuilding part of the line that connects to the substation. He is concerned that the proposed project would add to his electrical problems. Mr. Klein is also concerned that the proposed project would affect pivot irrigation systems on his farm.

SEGMENTS 3 AND 4

Beatrice Stellpflug

Ms. Stellpflug rents her land to Donald and Alice Brenengen (Brenengen Trust). Some of the Brenengen property would also be affected by the proposed project.

Todd Roessler, Elmaro Farms, Inc.

The affected land belongs to Mr. Roessler's father-in-law. The proposed line would cross a vineyard, conventional cropland, and a small area of woods on this property. There is drip irrigation on the vineyard and the cropland is used to grow corn and soybeans.

Mr. Roessler is very concerned that the proposed project would have negative impacts on his family's winery. This winery had its grand opening in November of 2011. The proposed transmission line would follow an existing transmission line easement on this property. However, the existing transmission line is supported by poles that are screened by the trees, so it is not visible from the winery. In addition to drawing tourists, part of the winery's business will be to host outdoor events such as weddings. Mr. Roessler is concerned that the taller transmission line support structures would detract from the property's aesthetics and deter visitors. He is also concerned that the line might negatively affect other local attractions like the national wildlife refuge and state park.

Mr. Roessler indicated that he has two small children and he is concerned about the potential health risks this line might cause them and other children in the area.

Brenengen Trust

Donald and Alice Brenengen farm this land as well as the Beatrice Stellpflug property. There is no livestock on the Brenengens' property.

There is pivot irrigation on this property. Alice Brenengen indicated that the irrigation system has been modified so that is reverses direction before reaching the existing transmission line that crosses their cropland. The new line with longer spans between poles could make it easier for them to irrigate their land if the new poles can be placed outside of the irrigation circle.

The Brenengens also use precision farming technology and aerial spraying on their cropland. Mrs. Brenengen did not identify any concerns about the proposed project.

Leslie and Connie Lakey

The Lakeys operate a dairy farm on their property. There is pivot irrigation on the cropland that would be affected by the project. Mr. Lakey indicated that because of the existing transmission line, they cannot make a complete circle with the irrigation equipment. When the pivot arm gets close to the line, it must reverse directions.

Mr. Lakey said that he would prefer to see the new transmission line follow the Interstate Highway. This would give the power company easy access to the line and it would avoid disrupting the fields and other property along the other routes.

Thurman and Janice Towner

The proposed line would affect cropland and pasture. The Towners grow organic corn, soybeans, and alfalfa. They also pasture beef cattle under the existing line.

Mr. Towner indicated that the existing line runs between their buildings and is very close to the barn, he estimates 200 feet. He is concerned that the new line might be moved even closer to the barn. He also indicated that the project would cross three good fences. He is concerned about accessing the fields and pasture while the line is under construction. Delays in planting, chemical application, and harvest can affect crop yields.

He is also concerned about the impacts the project might have on human health, especially for children living near the line.

SEGMENT 6

Roman Lilla

Mr. Lilla indicated that the existing power line on his property is buried. He does not have a lot of information about the proposed project and where it might affect his land.

Mr. Lilla indicated that he does not have any livestock or irrigation. He is considering putting in irrigation in the near future. He did not identify any concerns about the project or its impacts on his property.

Bruce Brenengen

Mr. Brenengen indicated that there are two existing pivot irrigation systems on his property that have been adjusted to work around the existing line. He uses precision farming technology in his operation. He also said that when vegetables are planted on his cropland, aerial spraying is used. Mr. Brenengen indicated that his primary concern about the proposed project is its potential impact on his irrigation systems.

Sonsalla Farms, Inc.

Mrs. Sonsalla indicated that they rent their farmland out. They do not have any livestock on their farm, but chicken manure might be spread on the land that would be affected by the proposed project.

The existing line affects two pivot irrigation systems and has required that they be adjusted to avoid hitting the line. The existing buildings are not currently near the existing line. However, the Sonsallas

are considering building a new house and the site they are considering is close to the existing line. The proposed line might also affect some low ground that may be tiled.

Mrs. Sonsalla indicated that she is not sure about all of the impacts that the project could have on her property. She is concerned that the project could have negative impacts on human health.

SEGMENTS 88A, 88B, AND 88C

Dennis Reglin

Mr. Reglin raises Holstein young stock. He has constructed dams on his land to minimize erosion. Mr. Reglin was not aware of the project, but he is very concerned about a transmission line running through the middle of his farm. He would prefer to see it follow an existing power line easement if it must be built. He does not want to have power line poles in the middle of his fields because of the difficulty of farming around them. He is concerned that this line might cause stray voltage and he has seen the devastating impacts that stray voltage has had on neighbors' herds.

Gerald Suhr

Mr. Suhr runs a dairy operation on his farm. The land that would be affected by the project is mostly flat cropland with a few contour strips and grassed waterways. Some woodland might also be affected. Mr. Suhr indicated that he would prefer not to have the proposed line on his property.

Fred Gleiter

There are cattle on this farm. Mr. Gleiter also indicated that there are contour strips, drainage tiling, and grassed waterways on this land. The project may also affect woodland. Mr. Gleiter is concerned that this route would pass very close to his house and dairy barn, and it would pass through the middle of his pasture. He is also concerned about the loss of cropland due to access roads and poles in fields. He indicated that all of the land is needed for cattle feed.

Mr. Gleiter indicated that he is not in favor of having this project on his property. There is an airstrip and a licensed airplane on this property and Mr. Gleiter is concerned that transmission lines could interfere with the safe operation of both of these.

SEGMENT 10C

Richard Hawes

Mr. Hawes has beef cows and he grows corn, alfalfa, and oats. This land has contour strips and grassed waterways. He said that it's a pain to farm around the existing line's support structures. Mr. Hawes is concerned that the project will not benefit the La Crosse area. In addition, he is concerned

that the project will lower his property values, but he will not see a comparable reduction in his property taxes. Rather than a one-time payment for the easement, he would prefer to receive regular payments based on the amount of electricity that passes through the line on his property.

Marcel Pronschinske

Mr. Pronschinske raises chickens but the manure is not spread on the existing transmission line right-of-way. There are grassed waterways on this property. The existing line is about 100 feet from his barn.

Mr. Pronschinske said that his renter uses precision farming technology but he is not aware of any interference caused by the existing transmission line. Mr. Pronschinske did not identify any concerns he has about the proposed project.

William and Ann Boberg

Ann Boberg said that their land is rented and that the renter raises feeder cattle. This property has been part of a watershed project. The existing line passes through woodland, so any construction or widening of the easement would affect additional woodland. Ms. Boberg did not identify any other concerns about the proposed project or its effects on her property.

Daryl Schlesser

Mr. Schlesser runs a dairy operation and raises corn, oats, soybeans, and alfalfa. The cropland is no-till to minimize erosion and there are waterways on this land.

The proposed line would follow an existing transmission line on the Schlesser property. Mr. Schlesser indicated that farming near the existing line has not been a problem. His son uses precision farming technology, but Mr. Schlesser is not aware of any problems the line has caused for the use of this equipment.

Robert Tuxen

Mr. Tuxen does not have any livestock. There are contour strips and grassed waterways on this property. Mr. Tuxen wonders if the project is needed and he is concerned about the potential effects of transmission lines on human health.

Bruce Huber

Mr. Huber grows corn, soybeans, alfalfa, and oats on this certified organic farm. He does not raise any livestock. The proposed line would follow an existing transmission line right-of-way on this property. Mr. Huber said that the proposed line would not affect his cropland. The poles for the

existing line are on neighbors' land. However, he indicated that the existing line is not aesthetically pleasing and he is concerned that the new line might negatively affect his property.

Joel Wolfe

This farm is certified organic. Mr. Wolfe grows hay, corn, and winter wheat and he has dairy cattle. Mr. Wolfe indicated that there are contour strips and grassed waterways on his property. The proposed transmission line would follow an existing line on this land. Mr. Wolfe did not identify any concerns he may have about the proposed project and he indicated that he does not have any trouble farming near the existing line.

SEGMENT 11B AND 11G

John and Kaylyn Wiemer

If the proposed project crosses the Wiemer property, it would mostly affect cropland and pasture as well as a small amount of woodland. Mr. and Mrs. Wiemer have a dairy operation and their farm is certified organic. The Wiemers have incorporated several erosion and runoff control measures on their farm. These include contour strips, riprap and fencing along their creek, a cattle lane to move their cattle to and from pasture, and grassed waterways.

Mr. Wiemer indicated that he does not want another transmission line on his property. He is concerned that his land could be a potential site for a new substation for the Badger-Coulee project, which would run from La Crosse to Middleton. A substation could affect as much as 40 acres. He indicated that they have had problems with stray voltage in the past. However, their electricity provider, Riverland Coop, was very helpful in addressing this problem.

Fergusons Morningside Orchard

The owner, Tom Ferguson, indicated that the orchard receives 25,000 to 30,000 visitors each fall. The orchard offers pick-your-own apples, wagon rides, and other activities to entice customers.

Mr. Ferguson indicated that there is an 8-foot tall woven wire fence near the existing line. There are also wire trellises that support the trees near the line. Some of these are perpendicular to the existing line and some are parallel. He has not had any problems with the fence and trellises and the existing line, but he wants to make sure that any new line would not create any problems, particularly induced currents. Mr. Ferguson is very concerned about the project's aesthetic impacts on his business. The line would pass through the middle of the children's play area.

Leroy Sobotta

Mr. Sobatta raises cattle on the affected land. He indicated that the proposed line would be very close to his cattle shed and machine shed. There is also a creek on this land that could be affected by the project. Mr. Sobotta did not identify any other concerns he has about the proposed project.

Robert and Larayne Kupietz

Larayne Kupietz indicated that in the summer, they pasture horses on some of the land that would be affected by the project. Their cropland is rented out. Mrs. Kupietz indicated that she is strongly opposed to the proposed transmission line project. She is concerned that the line might increase the cancer rate in the area. She is also concerned that the project might cause stray voltage.

Robert and Mary Jane Hilton

The proposed line could affect two parcels of the Hiltons' property, one near Galesville and one near Centerville. They grow crops and have horses on their land. This property has grassed waterways and contour strips.

The Hiltons' house and barn are on one side of the road and their machine sheds are on the opposite side. If the line follows this route it will follow the road and run between these buildings. The line would also affect woodland on their property.

The Hiltons have a plumbing business with trucks that access their buildings frequently. Mrs. Hilton has heard that a transmission line will drain vehicle batteries.

Mary Jane Hilton indicated that she is very strongly opposed to the proposed project. She is not convinced that this project is the best way to provide energy for people or that it is even needed. She is also very concerned about interference with radio and television from the proposed line.

Ray Weltzien

Mr. Weltzien indicated that the proposed project would affect pasture, cropland, and woodland on his property. He participates in a conservation program that covers his entire farm. There are also grassed waterways on his land except on the flat areas. He grows vegetables and said that the canning company periodically uses aerial spraying on these crops. Mr. Weltzien recently began using precision farming technology and he is concerned that the proposed line could interfere with it. He is also concerned about the lack of information provided about this project at the local level. He would like to see more direct contact made with affected property owners.

SEGMENTS 1ET, 2ET, 3ET, 4ET

Byron and Lorna Anderson

The Andersons have a dairy operation. They use organic practices on their farm and they expect to become certified in 2012. They have also incorporated many conservation practices in their operation including contour strips, rip rap, cattle crossings, and grassed waterways. On the Andersons' land, the line would mostly cross cropland as well as a small amount of pasture behind their home. If this route is selected, the line would be about 150 feet from their house.

Mr. Anderson is very concerned about the continuing loss of farmland and the creation of wasteland. He would prefer to see the line run through the wildlife refuge. He indicated that it would initially be more expensive to put it through the refuge because of the wetlands, but once it's in, it would be less disruptive. He is also concerned that the line might be placed on the route with the fewest complainers, whether or not that is the best route.

Richard and Judith Fuchs

The Fuchs raise dairy calves and heifers. There are contour strips, grassed waterways, and cement barriers to minimize erosion on this farm. The owners also use precision farming technology. Judith Fuchs is strongly opposed to the project and she says her neighbors are also opposed to it. She is very concerned about the line causing an increase in the risk of cancer and the negative effect the line would have on property values.

Kenneth and Debra Congdon

The proposed line would follow an existing transmission line on the Congdons' property. Debra Congdon indicated that the existing line is an obstacle to farming. She also indicated that there is a drainage ditch and tiling on the affected land. They use precision farming technology in their operation. The proposed project will also affect woodland on this property. Ms. Congdon is opposed to the project. She is concerned about the potential health effects from EMF and the negative impacts the project could have on the environment. She also questions the need for the project.

Ron and Karen Weltzien

There are two potential routes that could affect this property. One would follow an existing transmission line (4ET) and the other would cross the Weltzien land on new right-of-way to connect with the existing line (13E). The affected land is cropland and manure is spread on this land. The Weltziens use a 590 Plan and a Nutrient Management Plan.

The Weltziens are in the process of installing irrigation equipment on their land that could be affected by the project. Installation will be completed by January 1, 2012 and it has been in the works for two

years. If the new line follows the existing right-of-way, the project would not interfere with the irrigation significantly. The pivot would follow a windshield wiper motion to avoid the transmission line poles. If the existing right-of-way is followed, it could be advantageous for the Weltziens if the support structures for the line could be placed outside of the pivot's circle. However, if the route on new right-of-way is followed, this would significantly interfere with the new pivot system.

Mr. Weltzien indicated that he currently does not use aerial spraying for his crops. However, after the pivot irrigation system is installed, he may switch that field to vegetable crops and he might then use aerial spraying.

Curtis Sahlstrom

The land that would be affected on the Sahlstrom property includes cropland, pasture, and woodland. Mr. Sahlstrom grows corn and hay and he also raises beef cattle. He uses no-till on his cropland to minimize erosion and there are grassed waterways on this land. Mr. Sahlstrom indicated that he would not like to lose more land because of the proposed project.

SEGMENT 13A, B1, B2, C, D, E

Jens and Jill Vosseteig

Jill Vosseteig indicated that they grow corn, soybeans, hay, and canning crops on the affected land. They also have horses on their farm. Ms. Vosseteig indicated that the barn and house are about 100 yards from the existing line. They use precision farming technology on their cropland. When canning crops are grown, they also use aerial spraying.

Joyce Cielecki

Most of the land that would be affected by the project on the Cielecki property is cropland that is currently used to grow corn. The proposed project would be on new right-of-way. Ms. Cielecki has grown farm market vegetables on this land in the past and she may start this business again in 2012. Her land is not certified organic, but she would use organic practices to grow the vegetables. There is one grassed waterway on the affected land.

The proposed project would be near two buildings on the Cielecki property. One is the farm market shed, which would be a little more than 75 feet from the proposed line and the other is Ms. Cielecki's home, which would be less than 75 feet from the proposed line. She uses precision farming technology in her operation.

Ms. Cielecki has several concerns about the proposed project including the loss of property values, the aesthetic impacts on her land, and the long-term impacts on human health. She is also concerned that this project is being proposed without sufficient need in the area. She indicated that combines

and trucks load and unload near the site of the proposed line and she is concerned about the safety of using large farm equipment near the line. She is also concerned about the proposed line draining vehicle batteries. She has read that vehicles parked near a transmission line should be grounded with a metal chain to avoid this happening.

Ms. Cielecki observed that farmers are prohibited from applying pesticides closer than 8 feet from a well head to avoid groundwater contamination according to ATCP 29. She is concerned that the deep foundations needed to support the transmission line poles could provide a pathway for pesticides to enter the groundwater.

Steven and Lenore Wright

The proposed project would primarily affect cropland on the Wright property. The Wrights grow vegetables for a canning company. There are two pivot irrigation systems on the Wright property that could be affected by the proposed project. Mr. Wright indicated that there are currently no obstacles for these systems and each pivot can make a complete circle. He is concerned that a new transmission line could interfere with their operation.

Mr. Wright also said that that there is a ditch along the south side of Highway 54/93 on his property that accommodates water from the Little Tamarac Creek. Transmission line construction or the placement of transmission line support structures could interfere with the flow of surface water in this ditch and cause flooding problems on adjacent land.

The canning company that contracts with the Wrights to grow vegetables uses a helicopter for aerial spraying on the Wrights' cropland. Steven Wright also indicated that he uses precision farming technology in his operation. The Wright farm follows a nutrient management plan that incorporates chicken manure from Steven and Lenore's son Greg Wright's operation. The chicken barn is located on the north side of Highway 54/93. Steven Wright indicated that his closest structures to the proposed line would be his grain bins, which are about a ¼ mile away from Highway 54/93.

Steven Wright is concerned that the proposed project may not be needed. He is also concerned about the potential for interference with the operations of the emergency medical helicopter MedLink. He indicated that there has been concern about cell towers in the area interfering with MedLink's operation and he is concerned that a new transmission line could also be a threat to this service.

Todd and Linda Halverson

The Halversons rent out their cropland. The proposed line would be very close to their house and pole shed. Mr. Halverson did not identify any other concerns about the proposed project.

SEGMENT 18D, 18E, 18F

Richard Daffinson

Mr. Daffinson's cropland is rented out. The proposed project would affect woodland including windbreaks. He said this farm has been in his family for four generations. Mr. Daffinson is very concerned about the proposed project's potential impacts on his ability to develop his land. He is planning to develop an RV park that would include rentable cabins, and other businesses. He indicated that the proposed line would also affect a Native American burial ground and powwow ground that have been recorded by the State Historical Society. The existing Dairyland Power Coop easement touches these sites, but an expanded easement for a new line could damage them.

Mr. Daffinson would prefer to see the new power line follow the west side of Highway 53 to Briggs Road. He indicated that this would avoid many negative impacts to property owners and the community of Holmen.

Leo Waldenberger

Most of the land that would be affected by the project is cropland that Mr. Waldenberger rents to his neighbor. It is flat and there are no conservation practices where the line would cross.

ORGANIC PRODUCERS

The following landowners were included under the appropriate segment heading, but are listed here because they are, or soon will be, certified organic producers.

Marlene Rolbiecki (Segment 2I)

Marlene's daughter Peggy said that some of their land is certified organic and it is used to grow corn, hay, and barley. They also raise beef cattle and grow nonorganic hay. They do not have contour strips but they do have dams on this property to slow the movement of surface water and minimize erosion. Also, the proposed line would be about 100 feet from their barn.

Peggy is concerned about the potential effects on human and animal health as well as impacts on other aspects of the environment such as groundwater. Peggy's father indicated that when Dairyland Power built the existing line 15 to 20 years ago, the crews left wire and other debris where they had been working. His equipment was damaged by that debris when he cut hey. Also, Dairyland has not done a good job of keeping the trees from growing into the lines.

Thurman and Janice Towner (Segment 4)

The proposed line would affect cropland and pasture. The Towners grow organic corn, soybeans, and alfalfa. They also pasture beef cattle under the existing line.

Mr. Towner indicated that the existing line runs between their buildings and is very close to the barn, he estimates 200 feet. He is concerned that the new line might be moved even closer to the barn. He also indicated that the project would cross three good fences. He is concerned about accessing the fields and pasture while the line is under construction. Delays in planting, chemical application, and harvest can affect crop yields.

He is also concerned about the impacts the project might have on human health, especially for children living near the line.

Bruce Huber (Segment 10C)

Mr. Huber grows corn, soybeans, alfalfa, and oats on this certified organic farm. He does not raise any livestock. The proposed line would follow an existing transmission line right-of-way on this property. Mr. Huber said that the proposed line would not affect his cropland. The poles for the existing line are on neighbors' land. However, he indicated that the existing line is not aesthetically pleasing and he is concerned that the new line might negatively affect his property.

Joel Wolfe (Segment 10C)

This farm is certified organic. Mr. Wolfe grows hay, corn, and winter wheat and he has dairy cattle. Mr. Wolfe indicated that there are contour strips and grassed waterways on his property. The proposed transmission line would follow an existing line on this land. Mr. Wolfe did not identify any concerns he may have about the proposed project and he indicated that he does not have any trouble farming near the existing line.

John and Kaylyn Wiemer (Segment 11B)

If the proposed project crosses the Wiemer property, it would mostly affect cropland and pasture as well as a small amount of woodland. Mr. and Mrs. Wiemer have a dairy operation and their farm is certified organic.

The Wiemers have incorporated several erosion and runoff control measures on their farm. These include contour strips, riprap and fencing along their creek, a cattle lane to move their cattle to and from pasture, and grassed waterways.

Mr. Wiemer indicated that he does not want another transmission line on his property. He is concerned that his land could be a potential site for a new substation for the Badger-Coulee project,

which would run from La Crosse to Middleton. A substation could affect as much as 40 acres. He indicated that they have had problems with stray voltage in the past. However, their electricity provider, Riverland Coop, was very helpful in addressing this problem.

Byron and Lorna Anderson (Segment 2ET)

The Andersons have a dairy operation. They use organic practices on their farm and they expect to become certified in 2012. They have also incorporated many conservation practices in their operation including contour strips, rip rap, cattle crossings, and grassed waterways. On the Andersons' land, the line would mostly cross cropland as well as a small amount of pasture behind their home. If this route is selected, the line would be about 150 feet from their house.

Mr. Anderson is very concerned about the continuing loss of farmland and the creation of wasteland. He would prefer to see the line run through the wildlife refuge. He indicated that it would initially be more expensive to put it through the refuge because of the wetlands, but once it's in, it would be less disruptive. He is also concerned that the line might be placed on the route with the fewest complainers, whether or not that is the best route.

CONSTRUCTION PROCESS

The CapX2020 utilities will contract with a construction company to build the transmission line and proposed substation. This contractor will subcontract some of the construction activities to other company(ies) to complete the surveying and clearing of the right-of-way, for example. It is important that the contractor and subcontractors are made aware of the requirements in the CapX2020 Agricultural Impact Mitigation Plan and any requirements included in the PSC's Final Oder. This will require pre-construction training for all employees that will be involved in the construction process.

OVERHEAD TRANSMISSION LINES CONSTRUCTION PROCESS

The following is a general description of the transmission line construction process. Additional information about this process can be found in Section 2.5 of the CPCN Application for Hampton to Rochester to La Crosse 345 kV Project and in Chapter 5 of the Environmental Impact Statement for the CapX2020 project.

If construction were done during the winter months, some of the negative impacts of construction could be minimized by avoiding the growing season and working while the ground is frozen and less susceptible to damage from soil compaction and soil mixing.

Surveying and Staking the Right-of-way: Crews will survey the centerline and stake the right-of-way limits. Typically, the right-of-way width required will be a total of 150 feet wide. This includes both existing right-of-way and newly acquired easements. A few exceptions where the proposed right-of-

way is narrower or wider exist. A temporary construction easement might also be wider than the permanent easement. (Source: CapX2020 Application; June, 2011; Appendix A)

Right-of-way Access: Construction-related disturbance of the ground will be mostly confined to the right-of-way and along access routes. The CapX2020 utilities will use existing roads or rights-of-way and/or arranged access locations where that would be more efficient. Most disturbances will likely occur in the area immediately surrounding transmission line support structures. However, it is likely that construction at each pole site would temporarily occupy an area outside the established right-of-way. In areas where access cannot be gained from existing roads, some disturbance along access routes from vehicle traffic may also occur. Typically, access routes will need to be 16 feet wide. Some areas may require wider access routes to accommodate two lanes of traffic.

Materials hauled to and from the construction locations will be transported on existing roads or rights-of-way, and/or arranged access locations. A construction site is usually active for four to eight weeks and construction is usually done in 2-mile segments. However, conditions encountered at the time of construction may cause deviations from the norm. If construction mats are used, they may be left in place for the entire time of construction or they may be moved after a short period of time based on conditions at the time of construction. Vehicle tracking pads, silt fences, and other applicable erosion control measures will be installed as right-of-way access is gained. Because disturbance of the access path will be intermittent, seeding and mulching of the access path will be performed if the anticipated time between disturbance-causing activities is expected to be extended.

Right-of-way Clearing and Preparation: Typically, the easement width is cleared of trees and brush to allow access for construction and maintenance equipment and to eliminate future conductor-to-vegetation contacts. Normally, vegetation is cut at or slightly above the ground surface but no root removal is done. Tall-growing species will not be permitted to regrow under the transmission line.

Brush or trees that are cleared are disposed of in accordance with the property owner's wishes, either by removing the cleared material or storing it on the easement or adjoining land. Wisconsin Statutes, §182.017(7)(3), states that landowners shall retain title to all trees cut by the utility. In upland areas, some vegetative material (cuttings) may be chipped and spread on the right-of-way if permitted by the property owner. Hand clearing of selected woody species may be required. Refer to the section titled Hazards to Livestock from Surveying and Construction Debris in this Agricultural Impact Statement for additional information about clearing black walnut trees. Clearing adjacent to waterways requires the preservation of a vegetative buffer of approximately 50 feet.

At new pole locations, access is necessary along with a level working area. Therefore, some grading may be required. Erosion control measures will be put in place on down slopes of the cleared areas where construction will disturb soils. Areas that will be cleared and further disturbed during the construction of the project will be permanently restored (seeded and mulched or matted) after construction is completed.

If conditions do not allow access using standard utility construction equipment, construction mats or low ground pressure tracked equipment may be used to reduce impacts based on site conditions at the time of construction. The goal of these alternative construction methods is to prevent or minimize the temporary construction-related ground disturbances in order to reduce the potential for creating conditions that would be conducive to introducing non-native plants or disrupting desirable plant communities.

Construction during wet conditions can cause soil rutting and erosion. If soil rutting occurs, the ruts should be smoothed when soil conditions are sufficiently dry. Construction should be halted or mats should be used when extremely wet soil conditions exist. Construction under wet soil conditions can also increase the likelihood of soil compaction.

Matting may also be installed as needed during the clearing process to ensure stable working conditions in wetlands or to provide temporary bridges across waterways. Timber is the most common type of matting material used, but composite plastic mats are also available. In many instances, these mats will be left in place during the entire transmission line construction process.

Where transmission line or distribution line corridors are followed, existing structures will need to be removed prior to installation of the new transmission line structures.

Temporary Staging and Materials Storage Areas: Silt fences will be placed on the down-slope sides of staging and storage areas where the soil is disturbed. If access to the storage areas is from a public road, a vehicle-tracking pad will be placed at the intersection.

Support Structure Installation: The utilities will use soil borings to determine the size of foundations needed. The diameter and depth of the excavation and the method of installing footings will vary depending on the soil capability at each structure location and the load that the structure will need to support. In general, the excavated holes will range from 6 to 10 feet in diameter and may be 25 to 50 feet deep. This step in the construction process has the greatest potential for compaction of soil. The concrete trucks that cross agricultural land generally have the greatest potential for soil compaction.

Excess soil from foundation holes would be offered to the landowner for placement at an appropriate place on the property within reasonable proximity to the construction site. If on-site disposal is not permitted, the excess soil would be completely removed from the site and disposed of appropriately, such as at neighboring properties requiring fill. Gravel pits or construction sites are examples of nearby properties that may accept fill. No soils would be disposed of in wetlands or other sensitive areas. Soils disposal locations would not be subject to concentrated stormwater flows and would not be located adjacent to surface waters, storm sewer or sanitary sewer inlets or manholes, recreational areas, wetlands, areas critical to endangered or threatened species, or other sensitive areas. Where appropriate, on-site soil disposal areas would be seeded and mulched within seven days of the last

construction activity at the disposal location. Appropriate stormwater management practices would be employed until disturbed areas are stabilized.

Except for topsoil, this material has little or no organic-matter content and will likely contain coarse material, gravel, and rocks. This material should not be spread on cropland.
In any areas where conditions may be conducive to erosive losses (erodible soils, slopes, wetlands, or streams adjacent to the site), appropriate erosion control measures as described in the most recent WDNR Construction Site Best Management Practices (BMPs) will be installed and maintained until final restoration and revegetation is complete.

For direct embedded poles (no foundation required), a hole is excavated to the appropriate depth. The base of the structure is placed into the excavated hole and the area around the pole is backfilled with clean granular fill (typically gravel) to within one foot of the surface. The balance of the excavation is backfilled with native soils.

For structures requiring a foundation, the required hole is excavated with a large auger. Concrete caissons are formed using reinforcing steel and an anchor bolt cage that is placed in the excavated hole. Concrete is then poured to cover the cage leaving the bolts exposed. The completed caisson is allowed to cure to develop the necessary strength. Then, the support structure is mounted on the caisson using the exposed bolts.

If poor soil conditions are encountered, such that direct embedding or a concrete foundation is not practicable, a vibration method of structure installation will be used. At locations where vibration techniques are used, the upper four feet of soil is removed with a backhoe and disposed of. A steel caisson up to 60 feet long is then advanced (buried) using vibration methods. When the caisson has been fully advanced, a platform is bolted onto the caisson and the base of the steel transmission structure is mounted on the platform.

The presence of ground water at or near the soil surface can affect the construction procedures used when auguring holes. If groundwater flowing into an excavation results in the excavation becoming unsuitable, it is often necessary to install a casing to support the walls of the excavation and/or to dewater the excavation. Depending on site conditions, the extracted groundwater may be de-silted and discharged to a nearby water body or to an upland area where it is allowed to re-infiltrate. In some situations it may be possible to augur the hole and use casings to maintain the stability of the hole without dewatering the site during excavation. In this situation, the groundwater is removed as it is displaced by concrete pushed into the excavated hole. This water may contain solids from the auguring process or from contact with the fresh concrete, and is often pumped out of the hole and transported by appropriate tanker truck either to a treatment facility or to an upland site where it can be allowed to settle and re-infiltrate.

In the event that shallow bedrock is encountered, modifications to the standard footing designs by either shortening the footing length and socketing into solid bedrock or anchoring directly into

bedrock may be required. Another option would be removing the rock via blasting or special drilling methods to develop the full footing length.

Pole Installation: After the foundation is in place, the top sections of the structure are assembled on the ground and insulators and other hardware is attached. The pole is then put in place using a crane. The insulator strings may already be in place on these structure sections, or they may be installed just prior to conductor installation.

Conductor Installation: After blocks are installed at an adequate number of structures, the phase conductors are pulled in place using the pulling lines and blocks. The conductor is then tensioned and clipped to the insulator strings. Helicopters may be used for conductor installation in special situations where access is limited.

Site Access: It is common practice to use a bucket truck to lift workers and the required hardware (insulator strings, pulling dollies, etc.) to their location on each structure to allow the work to be accomplished efficiently. In most areas where bucket trucks can be used to access the construction location, much of the work will be done using this equipment and method. In areas where this type of vehicle access would be difficult, such as in unfrozen wetlands or where access is otherwise limited, alternative methods of construction will be used. The alternative methods still require that workers and the required hardware be able to obtain access to each structure to perform the work. However, the workers may be able to walk in or use lighter equipment (ATVs, tracked equipment, etc.) to access the structure. In these situations, ladders and climbing equipment may be used to gain access to the conductors and perform the work.

When the ground is not frozen, low-impact machinery with wide tracks can be used in unavoidable wetland areas and protective mats can also be used in areas where the ground is unstable. To minimize potential impacts, protective mats can be used as ramps in areas of steep slopes or to cross wetlands or waterways.

Cleanup and Restoration of the Right-of-way: Cleanup and permanent restoration will occur as soon as practicable following completion of the land-disturbing activities. Seed mixes used will be consistent with industry standards and regulatory requirements. Mulching and matting will be used as appropriate. Silt fences will remain in place until adequate vegetation is achieved.

UNDERGROUND TRANSMISSION LINE CONSTRUCTION PROCESS

No underground transmission line construction is proposed as part of this project at this time. In some areas, the project would follow existing distribution line right-of-way. In these locations, the distribution lines would be relocated on overhead lines or buried.

Underground distribution lines would be installed using a vibratory plow and directional drilling as necessary. The vibratory plow method is typically used in open areas while directional drill is used to cross roads.

AGRICULTURAL SETTING

Agriculture's contribution to the economies of the three project area counties[2] is significant according to a 2011 report prepared by the University of Wisconsin-Extension. Researchers estimated that agriculture provides jobs for 4,062 La Crosse County residents, which represent 5.1 percent of the county's workforce. Agriculture business sales were $1.37 billion or 13.6 percent of La Crosse County's total business sales. Agriculture contributes $48.6 million in taxes. This does not include property taxes for local school districts.

In Trempealeau County 4,778 jobs or 28.3 percent of the county's workforce were provided by agriculture. Agriculture's business sales in Trempealeau County were $786 million or 33.3 percent of the county's total business sales. Agriculture contributed $17.1 million in Trempealeau County tax revenue not including property taxes for schools.

The number of Buffalo County jobs associated with agriculture was 3,045 or 36.1 percent of the county's workforce. Agriculture generated $528 million in business sales, which represented 48.7 percent of all business sales in Buffalo County. Agriculture also contributed $13.2 million of Buffalo County taxes not including property taxes for schools.

AGRICULTURAL PRODUCTIVITY

In 2010[3], La Crosse County farmers harvested 28,100 acres of corn for grain, 13,900 acres of soybeans, 13,000 acres of alfalfa hay, 4,600 acres of corn for silage, and 1,100 acres of oats. They also raised 28,500 head of cattle and calves. Fifteen years earlier, La Crosse County farmers harvested 32,800 acres of alfalfa hay, 26,700 acres of corn for grain, 6,100 acres of corn for silage, 5,100 acres of soybeans, and 2,100 acres of oats. They also raised 42,000 head of cattle and calves.

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2 The Economic Impacts of Agriculture in Wisconsin Counties, University of Wisconsin-Extension, Cooperative Extension program areas of Agriculture and Natural Resources and Community, Natural Resources, and Economic Development, Deller and Williams, March 2011.
http://www.aae.wisc.edu/pubs/misc/docs/deller.economic%20impacts.03.11.pdf

3Wisconsin 2011 Agricultural Statistics, Wisconsin Agricultural Statistics Service, National Agricultural Statistics Service USDA, Wisconsin Department of Agriculture, Trade and Consumer Protection, November 2011, pp. 18 through 54.

Buffalo County farmers harvested 57,400 acres of corn for grain, 27,100 acres of alfalfa hay, 23,900 acres of soybeans, 9,900 acres of corn for silage, and 2,800 acres of oats in 2010. They also raised 64,000 head of cattle and calves. In 1995, Buffalo County farmers harvested 63,400 acres of alfalfa hay, 47,800 acres of corn for grain, 8,900 acres of corn for silage, 8,000 acres of soybeans, and 4,600 acres of oats. They also raised 73,500 head of cattle and calves. In 2010, Trempealeau County farmers harvested 73,900 acres of corn for grain, 29,500 acres of soybeans, 24,800 acres of alfalfa hay, 10,400 acres of corn for silage, and 3,200 acres of oats. They also raised 62,000 head of cattle and calves. Fifteen years earlier they harvested 80,900 acres of alfalfa hay, 65,400 acres of corn for grain, 16,400 acres of soybeans, 12,800 acres of corn for silage, and 5,600 acres of oats. They also raised 80,000 head of cattle and calves.

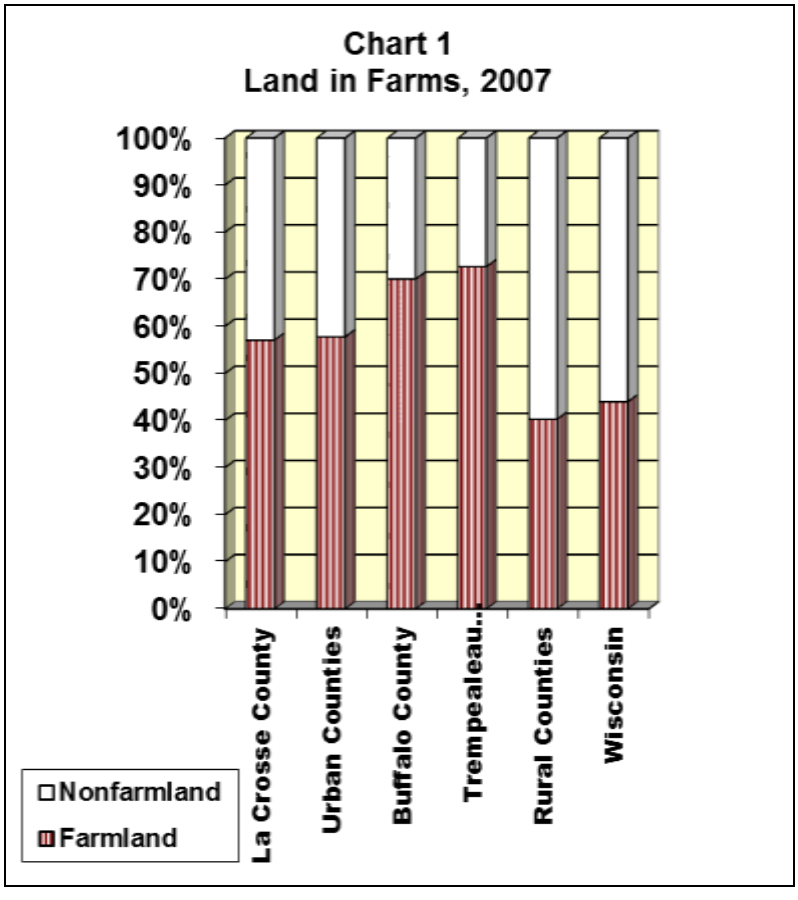
LAND IN FARMS, NUMBER OF FARMS, AND AVERAGE SIZE OF FARMS

La Crosse County is classified as an urban county, which is defined as having an average of 100 or more residents per square mile. According to the 2007 Census of Agriculture, La Crosse County has 165,368 acres of land in farms,[4] which represents 57.1 percent of the total land area. The average for urban counties is 196,635 acres of land in farms or 58.7 percent of the total county land area. Buffalo and Trempealeau Counties are classified as rural counties, meaning they have an average of less than 100 residents per square mile. Buffalo County has 307,035 acres of land in farm or 70.1 percent of its total land area, and Trempealeau County has 341,370 acres of land in farms or 72.7 percent of the total land area. On average, rural counties have 220,284 acres of land in farms representing 40.3 percent of their total land area. These can be compared to the average of 213,955 acres or 44.0 percent of land in farms among all Wisconsin counties. Refer to Chart 1 for a graphic comparison of the percentage of land in farms in La Crosse County, urban counties, Buffalo County, Trempealeau County, rural counties, and Wisconsin.

According to the Census of Agriculture, La Crosse County gained 56 farms (a 7.1 percent increase) between 1992 and 2007 as the total number rose from 789 to 845. Buffalo County gained 247 farms (a 25.2 percent increase) as the total rose from 982 to 1,229. The number of farms in Trempealeau County increased by 297 (a 20.9 percent rise) as the total went from 1,424 to 1,721 farms. Wisconsin as a whole gained 10,504 farms (a 15.5 percent increase) as the total number of farms in the state rose from 67,959 to 78,463 during the same period.

[4]Land in farms consists primarily of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland not actually under cultivation or used for pasture or grazing, providing it was part of the farm operator's total operation.

The amount of land in farms decreased from 182,339 to 165,368 acres (a 9.3 percent decrease) in La Crosse County. In Buffalo County, the amount of land in farms decreased from 323,482 to 307,035 acres (a 5.1 percent loss) and from 348,602 to 341,370 (a 2.1 percent loss) in Trempealeau County. In Wisconsin as a whole, the amount of land in farms declined from 15.5 to 15.2 million acres (a 1.8 percent loss) during this fifteen-year period.



The average size of farms fell from 231 to 196 acres in La Crosse County, from 329 to 250 acres in Buffalo County, from 245 to 198 acres in Trempealeau County, and from 228 to 194 acres in Wisconsin as a whole.

SIZE DISTRIBUTION OF FARMS

Table 1 shows the percentage of farms in each size category for La Crosse County, urban counties, Buffalo County, Trempealeau County, rural counties, and all Wisconsin counties.[5] Proportionately, La Crosse County has more farms that are larger than 50 acres in size compared to the averages for urban counties and proportionately more farms that are between 50 and 500 acres in size compared to the averages for all Wisconsin counties. Buffalo County has proportionately more farms that are larger than 180 acres compared to the averages for both rural counties and all Wisconsin counties.

Trempealeau County has proportionately more farms that are between 50 and 500 acres in size compared to the averages for rural counties and for all Wisconsin counties.

[5] *2007 Census of Agriculture*, U.S. Department of Agriculture, Wisconsin Agricultural Statistics Service, 2009.

Table 1 – Farm Size Distribution

Acres per Farm	% of La Crosse County Farms	% of Urban County Farms	% of Buffalo County Farms	% of Trempealeau County Farms	% of Rural County Farms	% of All Wisconsin Farms
0-49	23.3%	41.0%	20.5%	21.2%	28.1%	31.6%
50-179	42.0%	33.0%	34.3%	45.8%	39.8%	37.9%
180-500	27.0%	18.4%	33.7%	25.6%	24.3%	22.7%
More than 500	7.7%	7.6%	11.5%	7.4%	7.8%	7.8%

PROPERTY TAXES AND VALUES

Table 2 lists the average property tax, assessed value, and sale price per acre of agricultural land in La Crosse County, urban counties, Buffalo County, Trempealeau County, rural counties, and all Wisconsin counties. The assessed values and property taxes are based on the "use value" of agricultural land. Wisconsin Statutes define agricultural land as "land, exclusive of buildings and improvements that is devoted primarily to agricultural use." In 2010/11, average property taxes[6] on La Crosse County agricultural land were 31.9 percent lower than the average for urban counties and 24.3 percent lower than the average for all counties. The average property tax on Buffalo County farmland is 14.9 percent lower than the average for rural counties and 18.9 percent lower than the average for all counties. In Trempealeau County, the average property tax on farmland is 13.4 percent lower than the average for rural counties and 17.5 percent lower than the average for all Wisconsin counties.

Table 2 - Farmland Taxes and Values

	2010/2011 Dollars per Acre of Farmland		
	Average Tax	Assessed Value	Sale Value
La Crosse County	$2.56	$148	$5,943
Urban Counties	3.76	221	5,901
Buffalo County	2.74	140	3,000
Trempealeau County	2.79	136	3,106
Rural Counties	3.22	178	3,407
All Counties	3.38	188	4,028

[6]Wisconsin Department of Revenue, Division of Research and Analysis, Bureau of Local Fiscal Policy.

On average, the assessed value of farmland in La Crosse County was 33.0 percent lower than the average for all urban counties and 21.3 percent lower than the average for all Wisconsin counties. The average assessed value of farmland in Buffalo County was 21.3 percent lower than the average for rural counties and 25.5 percent lower than the average for all Wisconsin counties. In Trempealeau County, the average assessed values of farmland was 23.6 percent lower than the average for rural counties and 27.7 percent lower than the average for all Wisconsin counties.

The average sale price[7] of farmland in La Crosse County was 0.7 percent higher than the average for urban counties and 47.5 percent higher than the average for all counties. The average sale price of farmland sold in Buffalo County was 11.9 percent lower than the average for rural counties and 25.5 percent lower than the average for all Wisconsin counties. On average the sale price of Trempealeau County farmland was 8.9 percent lower than the average for rural counties and 22.9 percent lower than the average for all Wisconsin counties. These values do not include farmland sold for nonfarm purposes.

FARMLAND PROTECTION PROGRAMS

Farmland Preservation

The La Crosse, Buffalo, and Trempealeau County Farmland Preservation Plans were all certified in 1980. The plans identify farmland preservation areas in the counties and provide tax credit eligibility to farmers who wish to participate in the Farmland Preservation program. The state of Wisconsin is currently transitioning from the old Farmland Preservation program to the Working Lands Initiative that was included in the 2009/2011 state budget. The new Farmland Preservation Law went into effect on July 1, 2009. The new program increases the amount of tax credits per acre on land that is zoned for exclusive agricultural use.

Under the new law, agricultural land must be within an Agricultural Enterprise Area to be eligible for a Farmland Preservation Agreement. There are no Agricultural Enterprise Areas within the proposed project area. Consequently, any parcels with agreements affected by the proposed transmission line would be governed by the old Farmland Preservation Law. See former Wis. Stats. 91.13(8)(a) and 91.13(8)(c). Farmland owners with the earlier Farmland Preservation Agreements can receive 80 percent of the available tax credit under the old Farmland Preservation program. Utility uses are a permitted use under Wisc. Stats. 91.13(8)(c).

[7] Wisconsin 2011 Agricultural Statistics, Wisconsin Agricultural Statistics Service, National Agricultural Statistics Service USDA, Wisconsin Department of Agriculture, Trade and Consumer Protection, November 2011, pp. 10 and 11.

Another way to participate in the Farmland Preservation Program is through exclusive agricultural zoning. There is no exclusive agricultural zoning in Buffalo County or Trempealeau County. The towns of Holland and Onalaska in La Crosse County have adopted exclusive agricultural zoning ordinances under the former Farmland Preservation program. Therefore, eligible farmland owners in these towns can receive $7.50 per acre of farmland zoned for exclusive agricultural use.

Table 3 summarizes the number of parcels and the acres associated with Farmland Preservation Agreements for each route alternative.

Table 3- Extent of Impact of Each Route on Farmland Preservation (FP) Agreements

Route	# FP Parcels	Length FP (Mi)	Length Route (Mi)	Length %	Acres Ag FPP	Acres Ag Route	Ag Acreage % FP
Q1	20	2.8	41.3	6.9%	25.0	338.7	7.4%
Q1 Hwy 35	21	3.1	43.0	7.1%	24.9	334.5	7.5%
Q1 Hwy 35 w 88A	25	5.2	49.7	10.4%	40.8	402.1	10.1%
Q1 Hwy 35 w 88B	25	4.2	49.0	8.7%	32.9	420.5	7.8%
Arcadia	40	5.5	54.8	10.1%	66.7	455.3	14.7%
Arcadia Ettrick	40	5.9	57.0	10.4%	69.0	468.6	14.7%
Q1 Galesville	16	2.1	48.4	4.3%	14.2	381.8	3.7%
Q1 Galesville w 8A	20	4.2	55.0	7.6%	30.0	449.5	6.7%
Q1 Galesville w 8B	20	3.3	54.4	6.0%	22.1	467.9	4.7%
Hwy88A Only	4	2.1	18.8	11.1%	15.9	145.1	10.9%
Hwy88B Only	4	1.2	18.3	6.4%	7.9	167.7	4.7%
Ettrick Only	13	1.5	19.3	8.0%	16.5	124.0	13.3%

The loss of farmland enrolled in the federal government's various commodity programs could affect a farmer's base acreage resulting in lower revenue from these programs.

Conservation Reserve Program (CRP)

The Conservation Reserve Program (CRP) is a voluntary federal program that protects highly erodible cropland. In exchange for retiring highly erodible land for a 10-15 year period, the landowner is paid a per-acre annual rent and one-half the cost of establishing a permanent cover.

The Natural Resource Conservation Service (NRCS) awards contracts based on the following factors:

- Water Quality
- Air Quality
- Soil Erosion
- Wildlife Enhancement
- Enduring Benefits

Construction of the proposed transmission line could threaten compliance with a CRP contract if above-listed factors are jeopardized. In addition, CRP contracts would need to be revised to reflect the area occupied by the pole and foundation. This area would need to be removed from the contract. A minimum of one-tenth of an acre for each pole would need to be removed. All moneys received on that area would need to be repaid. Repayments would include the annual rental payments, cost-share payments, signing incentives, practice incentives, CR 23, and liquidated damages.

Access to information about the location of farmland enrolled in the CRP is restricted. Consequently, the only way to determine the location is to ask the landowner whether the acreage affected by the proposed transmission line is enrolled in the CRP.

Conservation Reserve Enhancement Program (CREP)

CREP is an offshoot of the Conservation Reserve Program (CRP) and is very similar to CRP. It is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP is administered by the NRCS.

Like CRP, CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production. The program is a partnership among producers; tribal, state, and federal governments; and, in some cases, private groups.

If poles are located on farmland with CREP contracts, the contracts would need to be revised to reflect the area occupied by the pole. This area would need to be removed from the contract. A minimum of one-tenth of an acre for each pole would need to be removed. All moneys received on that area would need to be repaid to the NRCS. Additional repayment would need to be made to other partners in the contract.

Soils Impacted

The proposed transmission line project is located in an area of Wisconsin not affected by the glaciers. It is characterized by a varied topography with high ridges, long narrow valleys and steep sloping areas in between. Loess, alluvium, and colluvium form the uppermost geologic deposits and, in addition to the bedrock, are the parent materials for many of the soils in these counties. Soil types

range from shallow silty clay loams on steep rocky land to deep silt loams on the valley bottoms, with smaller areas of sandy outwash soils.

The following table summarizes the amount and percent of prime soils on farmland affected by new easements on each route.

	Table 4 - Soil Classes on New/Existing Easements on Agricultural Land Affected on Transmission Line Routes				
Routes	**Total Farmland on New/Existing Right-of-Way Along the Route (acres)**	**Prime Farmland Soil Area on New/Existing ROW Along Routes (acres)**	**Area of Farmland of Statewide Importance on New/Existing ROW Along Routes (acres)**	**Prime when Drained Soil on New/Existing ROW Along Routes (acres)**	**Other Soils on Farmland on New/Existing ROW Along Routes (acres)**
Q1	**174.9/163.8**	**59.8/63.9**	**17.2/20.9**	**0.46/0.58**	**97.4/78.3**
Q1Hwy35	**192.9/141.6**	**51.28/45.0**	**16.5/20.1**	**0.46/0.58**	**124.7/75.9**
Q1Hwy35 w88A	**244.5/157.6**	**84.0/50.3**	**33.6/30.6**	**0.46/0.58**	**126.5/76.2**
Q1Hwy35 w88B	**268.6/151.9**	**99.3/46.2**	**38.3/30.0**	**0.47/0.58**	**130.5/75.1**
Arcadia	**252.4/203.8**	**86.8/57.2**	**44.6/48.7**	**14.0/8.2**	**107.0/89.8**
Arcadia Ettrick	**252.3/216.2**	**85.1/68.6**	**53.9/53.0**	**13.8/10.1**	**99.7/84.5**
Q1 Gales	**269.1/113.7**	**116.8/35.2**	**27.1/28.9**	**3.3/0.35**	**121.9/171.1**
Q1 Gales 88A	**320.7/129.7**	**149.6/39.8**	**44.1/39.5**	**3.3/0.35**	**123.7/50.0**
Q1 Gales 88B	**344.8/124.0**	**164.9/35.8**	**48.9/38.9**	**3.3/0.35**	**127.8/48.9**

Overview of Soils

Segments 2A-2E

All of the Q1 Routes share the same corridor and segments through Buffalo County. These segments include 1, 2A1, 2A2, 2A3, 2B, 2C, 2D, 2E, 2F, 2G, 2H, and 2I. Segments 2A3 through 2E primarily affect sandy loam and fine sand soils. The predominant soils are Dakota fine sandy loam and Sparta loamy fine sand. Segment 2A3 crosses some very steep Fayette soils.

Dakota soils are found on terraces along streams. This soil is somewhat excessively drained. The surface layer is dark brown, friable fine sandy loam that is 8-14 inches thick. The subsoil is dark brown fine sandy loam or loam with a depth of 24- 36 inches. These soils are irrigated on the Gaylord Lewis parcel on Segment 2B.

Sparta soils also are found on terraces of streams and are excessively drained. Because of their low water capacity crop yields are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Burkhardt soils are found on Segment 2B. These soils are nearly level to gently undulating soils that are somewhat droughty. Burkhardt soils developed on sandy and gravelly stream terraces. The upper layer is about 12 inches thick of dark sandy loam. These soils have low moisture holding capacity, but with adequate rain can be very productive. Burkhardt soils are irrigated on the Ronald and Elaine Flury Trust parcel on Segment 2B.

Segment 2F

Plainfield loamy fine sand has a low water capacity and crop yields are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Sparta soils have a low water capacity resulting in crop yields that are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Hubbard soils are nearly level to gently undulating, droughty soils. Hubbard soils are somewhat excessively drained. Their solum is 24-36 inches thick which over sand. These soils are limited by their moisture holding capacity.

Segment 2G

Fayette soils are deep, well-drained soils located on upland ridges and valley slopes. They are the most common soils found in Buffalo County. Slopes range from 3 to 20 percent on upland ridges and 4 to 35 percent in valley slopes. Fayette soils formed in deep, windblown silt, or loess. In some areas, Fayette soils have small amounts of sand in the surface layer and limestone fragments throughout the profile.

Meridian fine sandy loam soils are moderately deep, well-drained soils located on terraces of streams. The solum of these soils is 24-36 inches deep and is underlain by loose sand. These soils have moderate to low water holding capacity due to their moderate depth and the fact that they are underlain by sand.

Segment 2I

At the end of Segment 2I, about 2.6 miles into Trempealeau County, the Q1-Galesvilles Route turns to the east. The Q1 and Q1-Hwy 35 Routes continue to the south paralleling the existing Dairyland 161 kV transmission line. The primary soils along this segment are the following:

Sparta soils have a low water capacity resulting in crop yields that are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick. Sparta soils are irrigated on the Carlton and Wendell Klein parcel in the Trempealeau County.

Dickinson soils are nearly level, well-drained soils found on river terraces. The surface layer of these soils is dark brown fine sandy loam about 18 inches thick. The subsoil is dark- yellowish brown fine sandy loam in the upper part and dark- brown loamy fine sand in the lower part. The subsoil layer is about 14 inches thick. Dickenson soils have moderately rapid permeability and often benefit from irrigation.

Gotham soils are nearly level to gently undulating soils that are often excessively well drained. Gotham soils are found on stream terraces near uplands underlain by sandstone. The surface layer of this soil is 8 to 12 inches thick and it consists of dark grayish brown loamy fine sand. The subsoil is typically a dark yellowish brown that extends to a depth of 24 to 32 inches. Some of these soils are eroded. The plow layer of Gotham soils is dark grayish brown loamy fine sand about 9 inches thick. The subsoil layer is dark brown and brown sand about 27 inches thick.

Sparta soils have a low water capacity resulting in crop yields that are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Meridian fine sandy loam soils are moderately deep, well-drained soils located on terraces of streams. The solum of these soils is 24-36 inches deep and is underlain by loose sand. These soils have moderate to low water holding capacity due to their moderate depth and the fact that they are underlain by sand.

Carlton and Wendell Klein have two irrigated parcels that may be affected by the proposed project. The soils on these irrigated fields include Meridian fine sandy loam, Sparta loamy sand, and Dickenson soils.

Segments 3 & 4

Dickinson soils are nearly level, well-drained soils found on river terraces. The surface layer of these soils is dark brown fine sandy loam about 18 inches thick. The subsoil is dark- yellowish brown fine sandy loam in the upper part and dark- brown loamy fine sand in the lower part. The subsoil layer is

about 14 inches thick. Dickenson soils have moderately rapid permeability and often benefit from irrigation. The Neal and Susan Wilber parcels have irrigated fields where Dickenson soils are found.

Gotham soils are nearly level to gently undulating soils that are often excessively well drained. Gotham soils are found on stream terraces near uplands underlain by sandstone. The surface layer of this soil is 8 to 12 inches thick and it consists of dark grayish brown loamy fine sand. The subsoil is typically a dark yellowish brown that extends to a depth of 24 to 32 inches. Some of these soils are eroded. The plow layer of Gotham soils is dark grayish brown loamy fine sand about 9 inches thick. The subsoil layer is dark brown and brown sand about 27 inches thick. The Joseph Schuh parcel has an irrigation system where Gotham soils are located on Segment 3.

Sparta soils have a low water capacity resulting in crop yields that are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Segments 5A, 5B & 5C

Dakota soils are found on terraces along streams in La Crosse County. This soil is somewhat excessively drained. The surface layer is dark brown, friable fine sandy loam that is 8-14 inches thick. The subsoil is dark brown fine sandy loam or loam with a depth of 24- 36 inches.

Rasset soil is a well-drained sandy loam soil. The surface layer of this soil is 10 – 18 inches thick. It has parent material that consists of loamy alluvium over sandy and gravelly outwash. It is subject to wind erosion.

Pillot soils are nearly level to sloping, well-drained soils located on stream and river terraces. The surface layer is a very dark gray silt loam about 11 inches thick. The subsoil is about 23 inches thick and consists of a brown silty loam in the upper part, a dark yellowish-brown silty loam in the middle part, and a brown heavy loam in the lower part. The available water capacity of this soil is moderate and it has medium natural fertility.

Chelsea fine sand is excessively drained soil. It has limited organic matter content and limited available water capacity. It is subject to water and wind erosion. This soil has a surface of fine sand or loamy sand. The depth of the surface layer is up to 15 inches. This soil benefits from irrigation and is the primary soil on the two proposed sites for the Briggs Substations. One of the sites is an irrigated field.

Segments 6 and 12

Segments 6 and 12 of the Q1-Galesville Route cross some significant areas of farmland in the towns of Trempealeau and Caledonia in Trempealeau County. The primary soils on these segments are

Dickinson fine sandy loam and Gotham loamy fine sand. These soils comprise about 80% of all soils along Segments 6 and 12.

Dickinson soils are nearly level, well-drained soils found on river terraces. The surface layer of these soils is dark brown fine sandy loam about 18 inches thick. The subsoil is dark- yellowish brown fine sandy loam in the upper part and dark- brown loamy fine sand in the lower part. The subsoil layer is about 14 inches thick.

Dickenson soils have moderately rapid permeability and often benefit from irrigation. On Segment 6, Dickenson soils are irrigated on the Douglas A. Brenengen parcel. The Brian Brenengen parcel and James Senty parcel also have irrigated Dickenson soils on Segment 6. It is not clear whether the proposed transmission line would impact this center pivot irrigation systems. Kevin Evenson has irrigated Dickenson soils on a parcel on Segment 12 that may be affected by the transmission line.

Gotham soils are nearly level to gently undulating soils that are often excessively well drained. Gotham soils are found on stream terraces near uplands underlain by sandstone. The surface layer of this soil is 8 to 12 inches thick and it consists of dark grayish brown loamy fine sand. The subsoil is typically a dark yellowish brown that extends to a depth of 24 to 32 inches. Some of these soils are eroded. The plow layer of Gotham soils is dark grayish brown loamy fine sand about 9 inches thick. The subsoil layer is dark brown and brown sand about 27 inches thick.

The permeability of Gotham soils is rapid and the available water capacity is low. These soils have low natural fertility and are subject to wind erosion. On Segment 6, Sonsalla Farms has Gotham soils that are irrigated by a center pivot irrigation system.

Pamela Grover has irrigated soils on two fields that could be affected on Segment 12. At the junction of Segment 6 and 12, the Grover parcel also has irrigated Billett soils. On Segment 12, Gotham soils are irrigated. It is not clear whether the transmission line would affect these center pivot irrigation systems.

<u>Segment 8</u>

Gotham soils are nearly level to gently undulating soils that are often excessively well drained. Gotham soils are found on stream terraces near uplands underlain by sandstone. The surface layer of this soil is 8 to 12 inches thick and it consists of dark grayish brown loamy fine sand. The permeability of Gotham soils is rapid and the available water capacity is low. These soils have low natural fertility and are subject to wind erosion.

Pillot soils are nearly level to sloping, well-drained soils located on stream and river terraces. The surface layer is a very dark gray silt loam about 11 inches thick. The subsoil is about 23 inches thick and consists of a brown silty loam in the upper part, a dark yellowish-brown silty loam in the middle

part, and a brown heavy loam in the lower part. The available water capacity of this soil is moderate and it has medium natural fertility.

Dickinson soils are nearly level, well-drained soils found on river terraces. The surface layer of these soils is dark brown fine sandy loam about 18 inches thick. The subsoil is dark-yellowish brown fine sandy loam in the upper part and dark-brown loamy fine sand in the lower part. The subsoil layer is about 14 inches thick.

Finchford loamy sand is an excessively drained soil located on valley trains. The depth of the surface layer is 15 inches and it consists of loamy sand. The parent material is sandy and gravelly outwash. This soil has limited available water capacity and low organic matter content. It is subject to wind erosion.

Segment 9

Chelsea fine sand is excessively drained soil. It has limited organic matter content and limited available water capacity. It is subject to water and wind erosion. This soil has a surface layer of fine sand or loamy sand. The depth of the surface layer is up to 15 inches. This soil has limited available water capacity and low organic matter content. It is subject to wind erosion.

This soil benefits from irrigation and is the primary soil on the two proposed sites for the Briggs Substations. One of the sites is an irrigated field.

Segments 10B1, 10B2, 10C, 10C1, 10C2

Fayette silt loam and Downs silt loam comprise 60 percent of soils on these segments. Fayette soils are deep, well-drained soils located on upland ridges and valley slopes. They are the most common soils found in Buffalo County. Slopes range from 3 to 20 percent on upland ridges and 4 to 35 percent on valley slopes. Fayette soils formed in deep, windblown silt, or loess. In some areas, Fayette soils have small amounts of sand in the surface layer and limestone fragments throughout the profile.

Downs soils are nearly level to moderately steep, well drained soils found on valley benches. The surface layer is dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown, play silt loam about 2 inches thick. The permeability of Downs soils is moderate. It has high natural fertility and high available water capacity.

Segments 11A-11G1

Soils in the Eleva-Gale complex are found on sandstone ridges and on the sides of valleys in Trempealeau County. Eleva soils have convex slopes and Gale soils have concave slopes generally located near drainageways. The available water capacity is low in Eleva soils and medium in Gale soils. The hazard of erosion is severe on these soils.

The Ettrick series, clayey subsoil variant consists of nearly level, poorly drained soils generally located at the lower end of the Tamarack Valley in Trempealeau County. The surface layer of this series is black heavy silt loam and silty clay loam about 16 inches thick. The permeability of these soils is moderately slow. The natural fertility and available water capacity are high. A perched water table hinders cultivation during wet seasons.

Port Byron silt loam, 20 to 30 percent slopes, is found on concave areas on the sides of valleys near the upper end of large drainageways. In general, the plow layer is very dark brown silt loam and ranges from 0 to 9 inches thick. The erosion hazard of this soil is severe. This soil is suited to alfalfa and grasses for pasture.

La Farge silt loam, 20 to 30 percent slopes, eroded, is in irregularly shaped areas on the sides of ridges. The surface layer is very dark grayish brown. This soil has moderate permeability and available water capacity. It has medium natural fertility. The erosion hazard of this soil is severe. Itl is suited to alfalfa and grasses for pasture.

Segment 12

The primary soil on the short Segment 12 is Dickinson fine sandy loam. Dickinson soils are nearly level, well-drained soils found on river terraces. The surface layer of these soils is dark brown fine sandy loam about 18 inches thick. The subsoil is dark-yellowish brown fine sandy loam in the upper part and dark-brown loamy fine sand in the lower part. The subsoil layer is about 14 inches thick. Dickenson soils have moderately rapid permeability and often benefit from irrigation.

Segments 13B2, 13C, 13D, and 13E

Segments 13B2, 13C, 13D, and 13E on the Q1-Galesville Route are located in the town of Gale in Trempealeau County. Over 60% of the soils affected on farmland on these segments are Downs silt loam soils.

Downs soils are nearly level to moderately steep, well drained soils found on valley benches. The surface layer is dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown, clay silt loam about 2 inches thick. The permeability of Downs soils is moderate. It has high natural fertility and high available water capacity.

Segments 17 and 18

At Highway 53 in the town of Gale in Trempealeau County, the Q1-Galesville Route turns south and parallels Highway 53 in the town of Holland in La Crosse County. Segments 17 and 18 are included in this part of the route. The soils that would be affected on Segments 17 and 18 are primarily Chelsea

fine sand and Finchford loamy sand. These two soils comprise over 60% of the soils that are farmed on these segments.

Chelsea fine sand is excessively drained soil. It has limited organic matter content and limited available water capacity. It is subject to water and wind erosion. This soil has a surface layer of fine sand or loamy sand. The depth of the surface layer is up to 15 inches. This soil benefits from irrigation and is the primary soil on the two proposed sites for the Briggs Substations. One of the sites is a 40-acre irrigated field.

Finchford loamy sand is excessively drained and is subject to wind and water erosion. The surface layer of this soil is up to 15 inches of loamy sand. The subsurface layer consists of loamy sand, sand and coarse sand.

Segments 88A, 88B, 88C, 88D, 88E, 88F, 88G

Richwood soils consist of deep, well-drained, silty soils on high stream terraces. In Buffalo County, Richwood soils are mainly found in the valleys of the Little Waumandee and Waumandee Creeks. These soils are high in natural fertility. The surface layer of this soil is very dark gray silt loam that is about 12 inches thick. The subsoil is a dark brown silty clay loam that extends to a depth of 34-42 inches.

Sparta soils have a low water capacity resulting in crop yields that are often low, particularly during low rainfall periods. The surface layer of Sparta soils is typically very dark brown and is 12 – 18 inches thick. The subsoil layer is dark brown, slightly compact loamy fine sand about 24 inches thick.

Meridian fine sandy loam soils are moderately deep, well-drained soils located on terraces of streams. The solum of these soils is 24-36 inches deep and is underlain by loose sand. These soils have moderate to low water holding capacity due to their moderate depth and the fact that they are underlain by sand.

Fayette soils are deep, well-drained soils located on upland ridges and valley slopes. They are the most common soils found in Buffalo County. Slopes range from 3 to 20 percent on upland ridges and 4 to 35 percent in valley slopes. Fayette soils formed in deep, windblown silt, or loess. In some areas, Fayette soils have small amounts of sand in the surface layer and limestone fragments throughout the profile.

Lindstrom soils consist of deep, well-drained, silty soils on valley slopes. In general, these soils are well drained. Surface runoff is medium through rapid and their permeability is moderate. Because they are located on valley slopes, they receive runoff from adjacent uplands and are susceptible to erosion. The surface layer of this soil is up to 10 inches thick and is a dark brown silt loam. It is underlain by a dark yellowish-brown, smooth silt loam that extends to a depth of several feet.

Segments 1ET, 2ET, 3ET & 4ET

Downs soils are nearly level to moderately steep, well drained soils found on valley benches. The surface layer is dark grayish brown silt loam about 9 inches thick. The subsurface layer is brown, play silt loam about 2 inches thick. The permeability of Downs soils is moderate. It has high natural fertility and high available water capacity.

Fayette soils are deep, well-drained soils located on uplands. This soil has an 8-inch thick plow layer that is a dark grayish-brown silt loam. The permeability of this soil is moderate. They have high available water capacity and high natural fertility.

Fayette soils are moderately high in natural fertility and their capacity to supply moisture and their permeability is moderate. The soils are eroded easily, particularly by water and if the slopes are steep and long. Fayette soils are commonly used for farming because of their high natural fertility and moderate ability to supply moisture, but farmers must manage their lands carefully to reduce erosion.

SOIL EROSION

Many of the soils in the project area are subject to wind and water erosion due to their steep slopes and texture. Steeper slopes and longer slope length are subject to greater soil loss from erosion by water. Soil erosion by water also increases as the slope length increases due to the greater accumulation of runoff. Soils with higher levels of organic matter and improved soil structure have a greater resistance to erosion. Sand, sandy loam and loam textured soils tend to be less erodible than silt, very fine sand, and certain clay textured soils.

Soil erosion can affect crop yield through the loss of natural nutrients and applied fertilizers. Seeds and plants can be disturbed or completely removed from the eroded site. Organic matter, manure, and crop residue can be transported off the field through erosion. Pesticides can also be carried off the site with the eroded soil.

Erosion control practices must be carefully followed to minimize construction-related erosion impacts. The final route has been ordered and an Erosion Control Plan will be developed to meet the requirements outlined in NR 216 and NR 151. The plan will provide guidance on revegetation and site stabilization. Disturbed areas will be monitored weekly and after rain events as required by NR216.

The following table shows that the greatest acreage of highly erodible soils is located on the Arcadia and Arcadia-Ettrick Routes. The Arcadia Route would affect about 245 acres of erodible soils or 54% of the route. The Arcadia-Ettrick would affect 253 acres of highly erodible soils which also comprise about 54% of the soils on the route.

Table 5 - Acres of New and Existing Easements on Highly Erodible (H/E) Soils on Agricultural Land

	H/E(acres)	Total Ag (acres) on Route	% HE/Total Ag
Q-1 Ag			
Ag New	49.67		
Ag Exist	63.61		
Total	113.28	338.69	33.4%
Q-1/35			
Ag New	51.54		
Ag Exist	57.22		
Total	108.76	334.50	32.5%
Q-1/35 + 88A			
Ag New	88.24		
Ag Exist	82.68		
Total	170.92	402.13	42.5%
Q-1/35 + 88B			
Ag New	97.89		
Ag Exist	85.91		
Total	183.80	420.53	43.7%
Arcadia			
Ag New	119.06		
Ag Exist	125.56		
Total	244.62	455.34	53.7%
Arcadia-Ettrick			
Ag New	126.72		
Ag Exist	126.75		
Total	253.47	468.56	54.1%
Q1-Galesville			
Ag New	49.16		
Ag Exist	51.49		
Total	100.65	381.83	26.4%
Q1-Galesville-with 88A			
Ag New	87.25		
Ag Exist	70.98		
Total	158.23	449.46	35.2%
Q1-Galesville-with 88B			
Ag New	96.90		
Ag Exist	69.65		
Total	166.55	467.87	35.6%

AGRICULTURAL IMPACTS

OVERVIEW OF IMPACTS TO FARMLAND

Transmission line impacts to farmland can be categorized into restrictions on the use of the land, reductions in the area that can be farmed and potential reductions in the productivity of the affected farmland. Transmission line impacts can also be divided in to temporary and permanent impacts.

The restrictions on land uses in the area occupied by the easement and areas lost to agricultural production are permanent impacts. Reductions in the loss of productivity due to soil mixing, soil erosion, or compaction during construction could be permanent if mitigating construction practices are not followed.

The proposed transmission line will require new easements that contain restrictions on land use. Although most crops can be grown under transmission line, other activities such as constructing buildings or growing trees on the right-of-way would be prohibited. Part of the compensation provided is intended to compensate the landowner for the lost opportunities associated with these restrictions.

The area occupied by the transmission line structure and foundation obviously cannot be farmed. In addition, an area around the structure cannot be farmed because of the difficulty maneuvering large farm implements around these structures. Maneuvering around these structures also increases the risk of damage to farm implements and poles, which could slow field operations during the hectic planting and harvesting times.

Transmission line construction and maintenance can affect the productivity of the land. Farmland owners will be compensated for crop damages that occur during construction of the transmission line. Construction can also have residual impacts related to soil compaction, soil mixing, and soil erosion. These impacts can affect the long-term productivity of the farmland.

Land use impacts for each of the proposed routes are quantified by land use (cropland, wetland, woodland, etc.) and whether the land is encumbered by new or existing easements. The following discussion will describe the total easement land area affected (new and existing), the total farmland easement area affected (new and existing), and the total prime farmland easement area affected (new and existing).

Most of the farmland area encumbered by new easements can remain in agricultural production. Because the affected easement area and the area that can be used for crop production or pasture after construction are not necessarily the same, the total area that would be unfarmable due to the location of the transmission line poles is also estimated for each route.

PERMANENT IMPACTS

Land Use Impacts to Farmland Due to Location of Transmission Line Structures

The most direct measure of farmland loss due to the transmission line is the area that the transmission line structure would occupy that could consequently not be farmed. In general, poles would have drilled pier concrete foundations that may vary from 6 to 10 feet in diameter and 25 to 50 feet deep, depending on soil conditions. A 6-foot diameter foundation would occupy an area of about 28 square feet. A 10-foot diameter foundation would occupy about 80 square feet. The foundation and pole footprint would represent area lost to production on farmland that is in permanent pasture, assuming that pasture is planted up to the edge of the structure.

Table 6 - Estimated Acres Lost in Permanent Pasture due to Location of Poles

Route	# of Structures	Six-foot Diameter Structure (acres)	Ten-Foot Diameter Structure (acres)
Q1	138	0.089	0.253
Q1 Hwy 35	140	0.090	0.257
Q1 Hwy 35 w 88A	153	0.098	0.281
Q1 Hwy 35 w 88B	150	0.096	0.275
Arcadia	151	0.097	0.277
Arcadia Ettrick	149	0.096	0.274
Q1 Galesville	153	0.098	0.281
Q1 Galesville w 88A	166	0.107	0.305
Q1 Galesville w 88B	162	0.104	0.298

The impact of a transmission line can also be estimated by calculating the area lost around transmission line structures in cropland that is not farmable because of limitations to the maneuverability of large farm implements. This lost area depends on the type and size of the structure, its location in the field, the type of crop that is grown, the size of the machinery used to produce the crop, and the size of the safety buffer with which the farmer feels comfortable. In general, a transmission line structure will render about 220 to 500 square feet of area around the pole unfarmable.

There are project segments where existing transmission lines structures will be removed and double hung with new transmission line structures. In these areas, the number of poles in farmland may be

reduced due to the greater distance between poles. In any case, locating poles in agricultural areas that are not cultivated cropland is preferable.

A final metric is the extent to which a transmission line shares a corridor with an existing facility, such as another transmission line, pipeline, or highway. This measure assumes that following an existing infrastructure corridor such as an existing transmission line, highway, railroad, etc. has less overall impact than siting a transmission line on a new right-of-way.

Farmland Affected by Easement

Another way to estimate impacts is the total number of acres encumbered by easements. Easements provide utilities with certain rights and restrict activities of the underlying landowner. However, the majority of the area beneath the transmission line can be planted to most crops.

The farmland area encumbered by an easement and the area directly impacted by transmission line construction are not necessarily the same. The easement area would restrict certain land uses under the transmission lines. However, most crop-growing activities could continue on the easement area not occupied by a transmission line structure. Continued productive farming of the easement area not occupied by the pole structure can only take place if certain mitigation practices are followed during construction.

Permanent easements restrict certain activities on the easement area or right-of-way. Easements can be viewed as lost opportunities to the farmland owners. These lost opportunities could include restrictions on building construction, expansion or modification of irrigation systems, and planting of certain types of trees or other vegetation that mature to heights above those compatible with maintaining the transmission line. Compensation for easements should take this into consideration.

Where the new transmission line right-of-way parallels an existing road or power line right-of-way, the new transmission line right-of-way will usually overlay a portion of the existing right-of-way. This would reduce the amount of new right-of-way that must be acquired.

The following table summarizes the number of acres of farmland affected by easements on each route alternative.

	Table 7 - Farmland Affected by Existing and New Easements Under Each Route Alternative							
	Crop Land		Pasture		Specialty Ag		Total Ag Land	
Route	Existing ROW Area Shared (acres)	New ROW Area Required (acres)	Existing ROW Area Shared (acres)	New ROW Area Required (acres)	Existing ROW Shared Area (acres)	New ROW Area Required (acres)	Total Existing Ag Land Right-of-Way (acres)	Total New Ag Land Right-of-Way (acres)
Q1	161.50	172.84	2.27	2.09	0.00	0.00	163.77	174.92
Q1 Hwy 35	134.85	186.39	1.56	6.51	0.00	0.00	141.60	192.90
Q1 Hwy 35 w 88A	149.99	226.88	7.61	17.65	0.00	0.00	157.60	244.53
Q1 Hwy 35 w 88B	145.17	256.71	6.76	11.90	0.00	0.00	151.93	268.60
Arcadia	180.19	230.90	20.11	16.59	3.52	4.95	203.82	252.44
Arcadia Ettrick	194.71	233.62	21.01	17.30	0.49	1.42	203.82	252.34
Q1 Galesville	194.71	265.64	21.01	2.01	0.49	1.42	216.22	269.07
Q1 Galesville w 88A	110.08	306.13	3.11	13.15	0.49	1.42	113.68	320.70
Q1 Galesville w 88B	120.03	335.96	9.16	7.40	0.49	1.42	129.68	344.77

The Q1 Route requires the acquisition of new easements on the fewest acres of agricultural land. The Q1-35 Route requires the second fewest acres of new easements on agricultural land.

The Q1 Galesville-88A and Q1 Galesville-88B require the greatest number of acres of new easements on agricultural land.

The easement is a contract between the CapX2020 utilities and the individual landowner. The contract specifies restrictions on both the utilities' and the landowner's use of the land and specifies the rights of the utilities. It is binding upon the utilities, the landowner, and any future owners of the land until the contract is dissolved. It will identify specifically the kinds of structures that will be placed on a given landowner's property, and the number and location of each. In general, buildings and large trees cannot be located on an easement. An example of the CapX2020 utilities easement is included in the Appendix.

An easement acquired for transmission line right-of-way does not allow public use or access to the right-of-way. Both the landowner and the easement owner have property rights in the right-of-way. These rights should be clarified in the easement contract. Landowners should review their easement contracts carefully and should consult an attorney if they are unsure about what they are signing.

Area Lost due to Pole Placement

The area of cropland lost from production when transmission line poles are placed in fields will depend on whether the pole is out in the field, along the field edge, or in the corner of a field. The size of the tillage, planting and harvesting equipment, the safety buffer distance from the pole, and the crop being grown also will affect the amount of area taken out of production. The path taken to travel around a pole is not precisely known because of these variables. In general, a transmission line structure will render about 250 to 500 square feet of area around the pole unfarmable.

The single pole structure that will be used for this project provides much less loss of farmable area than would an H-Frame or a structure with guy wires. The CapX2020 utilities are not proposing to use any H-Frame structures for the proposed project.

One study found that "about 70 percent of the costs of towers to farmers was a result of the nonproductive area created by the presence of the tower, and the remaining 30 percent comprised time lost in working around towers, crop damage, and in some cases material waste through double coverage." (Gustafson, etal. 1979, 1-2). Another study similarly found that loss associated with the area around the towers that couldn't be farmed made up 70 percent of the total tower-induced farm costs. (Scott, 1981, 187) Comprehensive studies of the estimated costs from farming around transmission structures based on Wisconsin-specific farm operations are not available.

However, a number of such estimates have been made based on a model for typical Montana farming operations as part of an environmental impact assessment done for a transmission project there. Although this model was based on different crops from those in Wisconsin, the basic sequence of farm operations involved is likely to be similar to that found here. This sequence included: pesticide use, fertilizer application, planting, in-crop spraying, harvesting, and post-harvest harrowing. The model also included an estimate for labor time and equipment. It also adjusted for the presence of the structure in the field causing "overlap areas" where equipment passes through more than once. Based on 2007 prices, it estimated the annual cost of farming around a regular span mono-pole at the field edge in the range of $13 to $16 dollars per structure; a similar amount for H-frames parallel to the field edge; $40 for H-frames perpendicular to the field edge; $177 for H-frames in the field interior; and $150 for mono-poles in the field interior. (HydroSolutions Inc. and Fehringer Agricultural Consulting Inc., 2007) Elsewhere, somewhat different figures were reported for the same project simulations:

"In brief, the consultants say that the 2007 annual costs to farm around a small monopole, a large monopole and a H-pole in the middle of a field planted with spring wheat are $105.09, $107.98 and

$120.57, respectively. The costs to farm at the edge of a field for the three structures, with the H-pole built parallel to the edge, would be $13.81, $15.06 and $14.99, respectively." (Thornton, 2007)

Another study based in Ontario examined the potential yield loss for wheat, soybeans, grain corn and silage corn from working around transmission line poles in fields. Based on 1974-5 crop prices, annual economic losses from transmission poles in fields were on the order of $14 to $18 a year for twin poles in a field. (Scott, 1981, 192)

One study of transmission line impacts on agricultural operations found that:

"Average added costs per structure for dryland grain production were estimated to be in the order of $30 to $35 (Canadian) in 1978-79 which amounts to approximately $50 per structure in 1982 Canadian dollar terms. If one assumes an average of 2.5 towers per quarter section (160 acres), then the annual cost to a landowner in lost agricultural productivity is $125. This loss in perpetuity at a real discount rate of 5 percent represents a reduced market value of $2,500 per quarter section from altered current land use." (Thompson, and Phillips, 1983, 33)

Wisconsin Statutes, Chapter 187.017 (b) states: "In determining just compensation for the interest under s. 32.09, damages shall include losses caused by placement of the line and associated facilities near fences or natural barriers such that lands not taken are rendered less readily accessible to vehicles, agricultural implements and aircraft used in crop work, as well as damages resulting from ozone effects and other physical phenomena associated with such lines, including but not limited to interference with telephone, television and radio communication."

In order to estimate the loss in farmable area, DATCP used GIS data provided by the CapX2020 utilities to identify the likely location of transmission line structures. This information was used to determine whether the proposed pole locations were located in farmland. The location of the poles in farmland determined the affected soil and average corn yield for each pole was identified. This yield was multiplied by the area that could not be cultivated under the pole structure location and diameter scenarios described below.

The area lost to production was estimated for two size diameter poles. The CAPX 2020 utilities will determine the actual size of the foundation at each pole site. We expect that the structures in a straight (lateral) section of the line to have a 6-foot diameter. Formulas to calculate the area lost are approximations of the actual area. Several factors would influence the amount of loss. The size of the tillage, planting and harvesting equipment, the buffer distance from the pole with which the farmer is comfortable, and the crop being grown all will affect the amount of area taken out of production. The path taken to travel around a pole is not precisely known. For purposes of this analysis, a loss of 250 square feet for the 6-foot diameter transmission structure and 500 square feet for the 10-foot diameter structure is assumed, based on the variables mentioned above.

Based on these estimates, the amount of cropland that cannot be cultivated due to the location of the transmission line structure can be approximated for each route alternative. DATCP used GIS data provided by the CapX2020 utilities to identify the likely location of transmission line structures in cropland.

The area that could not be cultivated under the transmission line structure was estimated. The amounts for all poles for each route were calculated to determine the farmable area lost and the corn yield loss for each segment and route. An average corn yield of 161 bushels per acre was assumed. The following table summarizes these calculations.

Table 8 shows that the Q1 Route and the Q1-35 Route would create the smallest unfarmable area and would have the least impact on corn yields. These are the agriculturally preferred routes. The least preferred, the most damaging agriculturally, is the Q1 Galesville-88A Route or the Q1 Galesville-88B, which have about 17% more corn yield loss when compared to the Q1 Route or the Q1-35 Route.

Table 8 - Cropland Area Unfarmable & Field Corn Loss due to Structures in Fields

	Unfarmable Area Assuming 250' Area (acres)	Unfarmable Area Assuming 500' Area (acres)	Annual Field Corn Loss Assuming 250' Area (bu)	Annual Field Corn Loss Assuming 500' Area (bu)
Q1	0.79	1.58	127.5	255
Q1 Hwy 35	0.8	1.61	129.4	258.7
Q1 Hwy 35 w 88A	0.88	1.76	141.4	282.7
Q1 Hwy 35 w 88B	0.86	1.72	138.6	277.2
Arcadia	0.87	1.73	139.5	279.1
Arcadia Ettrick	0.86	1.71	137.7	275.4
Q1 Galesville	0.88	1.76	141.4	282.7
Q1 Galesville w 88A	0.95	1.91	153.4	306.8
Q1 Galesville w 88B	0.93	1.86	149.7	299.4

These lost yields can be used to estimate the annual value of lost production in terms of dollars and the present value of future losses. Table 9 shows annual value of lost production assuming a four percent discount rate and six dollar per bushel corn price.

Since the annual value and present value of future lost production is based on corn crop losses for each route, the ranking of the routes in terms of dollars lost is the same. The Q1 Route or the Q1-35

Route are agriculturally preferred because they would cause the smallest reduction in annual revenue and the smallest reduction in the present value of future annual revenues.

Table 9 - Annual and Present Value Loss of Revenue Based on Corn ($)

	Annual Value of Corn Loss Assuming 250' Area per Structure ($)	Annual Value of Corn Loss Assuming 500' Diameter Structure ($)	Present Value of Corn Loss Assuming 250' Area per Structure ($)	Present Value of Corn Loss Assuming 500' Diameter Structure ($)
Q1	$765	$1,530	$19,127	$38,254
Q1 Hwy 35	$776	$1,552	$19,404	$38,809
Q1 Hwy 35 w 88A	$848	$1,696	$21,206	$42,412
Q1 Hwy 35 w 88B	$832	$1,663	$20,790	$41,581
Arcadia	$837	$1,674	$20,929	$41,858
Arcadia Ettrick	$826	$1,652	$20,652	$41,303
Q1 Galesville	$848	$1,696	$21,206	$42,412
Q1 Galesville w 88A	$920	$1,841	$23,008	$46,016
Q1 Galesville w 88B	$898	$1,796	$22,454	$44,907

Loss of Agricultural Land to Substations for the Project

The greatest impact to a farm operation would be due to the land that would be acquired for the substation site.

The CAP2020 utilities identified two potential sites to construct a new substation near the intersection of U.S. Highway 53 and Briggs Road. Both sites are in the town of Onalaska just south of the village of Holmen. The west site is a relatively flat, irrigated farm field while the eastern site is a rolling, partially-wooded site occupied by a horse rider/rodeo club. The utilities prefer the western location. The PSC has selected the western site for the substation.

The Briggs Road Substation would be owned and operated by Northern States Power. The utilities would acquire a 40-acre parcel to allow for a 10-acre fenced in substation site as well as buffers to adjacent property and room for future substation facilities. The selection of the western site would

mean the loss of irrigated cropland and the selection of the eastern site would mean the loss of riding trails and woodland. The new Briggs Road Substation would be owned solely by Xcel Energy.

The western site is a 40-acre parcel owned by Dummer Family Transfer, LLC. The farm operation includes cash grain production, a grain elevator, custom combining, livestock production and a composting facility. Corn, soybeans and alfalfa are grown on their 650 of farmland.

The farm operation has about 550 steers and heifers. Some of the liquid manure from the Dummer Enterprises' farm operation and liquid manure from the adjacent Babcock Swine facility is applied to this field through it irrigations system. Removal of this site from the Dummer operation will limit the farmland eligible for irrigation and the application of manure. In addition, an irrigation system is a significant, long-term investment. It may several years of increased yields to recover the investment costs.

Irrigation Impacts

Depending on the location of transmission line construction, the impact on irrigation systems can be temporary or permanent. Transmission lines can impact irrigation systems temporarily during construction of the transmission line, but permanently if a new transmission tower becomes an obstacle, necessitating a permanent change to the irrigation system. The temporary impacts of construction in irrigated fields involve interfering with scheduled irrigations and preventing full water application coverage to the area requiring irrigation.

The existing Dairyland Q-1 transmission line currently crosses five fields with center pivot irrigation. The proposed project may affect irrigation systems on some of the routes depending on their location of the transmission line structures in relationship to the irrigation system. If it is determined that the project will impact central pivot irrigation system, CapX 2020 will compensate the owner for their loss.

According to the Bonneville Power Administration (BPA) located in the northwestern United States, "All types of irrigation systems, including center-pivot systems, can be operated safely near or on a power line right-of-way. However, irrigators should avoid situations where a solid stream of water can come in contact with a conductor, even if the possibility is remote." Also from BPA, "Caution should be used in storing, handling, and installing irrigation pipe, and in operating spray irrigation systems near power lines. Irrigation piping should be moved in a horizontal position under and near all power lines to keep it away from conductors overhead." Regarding center-pivot systems, BPA says, "Center-pivot circular irrigation systems installed near or under transmission lines can develop hazardous shock potentials during operation and maintenance. To eliminate these hazards: farmers should provide a good electrical ground for the pivot point; farmers should not touch the sprinkler pipe or its supporting structures when the system is operating under, or parallel to and near, a transmission line; and farmers should perform repairs/maintenance of the system with the sprinkler

pipe perpendicular to the transmission line." This information comes from BPA's *Living and Working Safely around High-Voltage Power Lines*.

Table 10 lists the parcels that have irrigation systems that could be affected by the proposed transmission line.

Table 10 - Irrigated Parcels

Segment	Number of Irrigated Parcels Near Transmission Line	Landowner Names
2B	2	Ronald R. & Elaine E. Flury
		Gaylord, Sr. & Gaylord, Jr. Lewis
2I	2	Carlton & Wendell Klein
3	2	Neal & Susab Wilber
		Schuh Farms
5C	2	Babcok Swine INC
		Dummer Family Enterprises LLC
6	4	Douglas A Brenengen
		Brian A Brenengen
		James Senty
		Sonsalli Farms, INC
12	2	Pamela Grover
		Kevin Evenson
13A	1	Steven Wright
13B1	1	Steven Wright
18H	1	Dummer Family Enterprises, LLC

Interference with Precision Farming

Some concerns have been expressed about proposed transmission lines interfering with the precision technology that is currently used or could be used in the future by farmers. Precision agriculture requires consistent contact with satellites in order to determine field location.

Farmers generally apply inputs, such as fertilizer, seed, and pesticides, uniformly based on the average needs of a field. However, the presence of significant variation in soil characteristics of a field means that the most economical application of inputs to such a field would need to be precisely calibrated to such variation. In some cases, the yield variation can be up to 100 percent within a field. Precision farming addresses the spatial and temporal variability in growth limiting factors. It manages fields by adopting a variable rate application of fertilizers, herbicides and pesticides in place of a uniform application across the whole field.

Such variable-rate application technology consists of three steps: collecting data through yield monitoring, grid soil sampling, or remote sensing; analyzing the data, and generating maps that reflect the variability within a field; and field use of GIS/GPS map-based systems to identify problems in a field. Two spatial requirements are necessary for the variable-rate application of inputs. One requirement is the knowledge of where the farm equipment is as it moves across a field. The other is information on selected variables important to the farmer as a function of location within the field. These two factors are often referred to as the "where" and "what" components.

Global Positioning Systems (GPS) are used to determine the "where" component to within a few meters accuracy within a field. The "what' factor involves the application of remote sensing or collecting information on a site-specific basis through grid-sampling. Precision-agriculture applications have been relatively limited till now because of the complexity and expense involved in such applications.

Currently, the most common application of precision farming is as a monitor to measure yield data during harvesting. Yield monitors allow farmers to measure crop yield, grain weight and harvested area. Some applications export this information to a personal computer for further analysis. The intended outcome is to enable farmers to compensate for natural and manmade types of variability that affect crop growth.

Xcel Energy reported doing a search to find cases of interference of transmission lines with GPS equipment as part of the environmental review process for another 345 kV transmission line project. They conclude:

"The utilities Xcel Energy contacted did not report any significant experiences or identify any written industry sources relating to interference between high voltage transmission lines and GPS units, satellite communication devices or cellular phones. Similarly, Company engineers could not identify any circumstances where persons living or working near a high voltage transmission line reported such interference with these communication devices. Rather, the Company's engineers noted that Company survey crews use GPS units. The crews routinely work along and under high voltage transmission lines, including 345 kV lines, and have not encountered interference." (State of Minnesota, 2005, Item 54)

Any damages resulting from transmission line interference with GPS-based or other farm equipment is compensable under Wis. Stats., s. 182.017 (7) (b).

Risk of Damage to Machinery

Farming around transmission line poles can be difficult, particularly for larger farm equipment. Farmers may attempt to reduce the area that cannot be cropped around the pole by planting as closely as `o the transmission line structure. This increases the likelihood of hitting the pole with farm implements. It is unlikely that the transmission line structure proposed for this project would be damaged. However, the farm implements may be damaged significantly. This impact would be especially troublesome if it occurred during crop planting or harvesting when time is especially crucial.

Restriction on Future Agricultural Land Use within Easement

As discussed previously, permanent easements restrict certain activities on the easement area or right-of-way. Easements can be viewed as lost opportunities to the farmland owners. Compensation for easements should take this into consideration. These lost opportunities could include restriction on building construction, expansion or modification of irrigation systems, and planting of certain types of trees or other vegetation that mature to heights above those compatible with maintaining the transmission line. It could also involve foregoing cultivation of deep-rooting crops over corridors where underground lines are buried.

In the "Landowners Bill of Rights," two of the rights that the CapX2020 utilities might ask landowners to waive are #2 and #6. They ask landowners to waive #2 so the utilities will have more flexibility in weed control (A weed killer called Garlan 4 is sometimes used for clearing rights-of-way). The CapX2020 utilities may ask landowners to waive #6 because access on farm lanes or other private roads may be less damaging than using the right-of-way for access. Landowners are not required to waive these rights. Refer to the Appendix for the complete text of the "Landowners' Bill of Rights."

Potential Reduction in Property Values

Numerous studies have shown there is often a small but real discount in residential property values due to the presence of transmission lines on a property. This discount appears in many peer reviewed studies comparing the market value of similar properties with and without transmission lines crossing them. There are also a number of peer reviewed studies which show no significant difference in sale price between properties with and without a transmission tower on them. A review summarized by the Wisconsin Public Service Commission found that the presence of a power line can reduce home values up to 14 percent, but that effects tend to decrease over time. (PSC, 2000, 214-215) Negative proximity effects on residential properties are not limited to properties actually crossed by a line. (Colwell, 1990, 127)

Studies have attempted to link electromagnetic radiation to health risks. Data from these studies have produced differing levels of evidence supporting or failing to support the validity of this linkage. The possibility of a connection between electromagnetic fields and health risks could affect the real estate market, irrespective of whether this connection is scientifically established. Since it is nearly impossible to prove a negative - for example that something does not cause cancer - it is likely that the EMF controversy will not soon be resolved.

A transmission line may also create a negative visual impact. This depends on the landowner's perception of the pole placement across their property, which would include each individual landowner's perception of what is visually acceptable or unacceptable.

One area of concern with transmission line projects has been the way that the market value of the property for resale could be affected, involving the right of the landowner to dispose of the property. Damages related to increased risk of economic loss associated with impairments to a property that exist or may occur are sometimes known as "stigma" damages. (Mitchell, 2000, 162-163) In many cases, landowners have sought to demonstrate that the fear of adverse health effects from exposure to transmission line electromagnetic (EM) fields on their land contributes to reduced re-sale value for their parcel.

Aesthetics

Aesthetics are often assumed to be a factor in reducing the value of properties encumbered by a transmission line right-of-way. Case law has upheld in many cases the admissibility of potential negative aesthetic effects of transmission lines on the value of farm property, but only where the line is actually located on the property in question. (For examples, see 97 American Law Reporter 3d, "Unsightliness of Powerline or Other Wire, Or Related Structure, As Element of Damages in Easement Condemnation Proceeding") In other cases, courts have held that "unsightliness" was inadmissible without a showing of direct physical disturbance to the subject property resulting in damage "in excess of that sustained by the general public." (Ibid., p.594)

In general, courts require that in order to be compensable, damages suffered by a subject property must be different in kind, not merely in degree, from those suffered by the general public or other properties in the neighborhood of the line. This distinction is commonly known and referred to as that between "special" and "general" damages.

The issue of how and the extent to which subjective aesthetic concerns may affect the value of property, including farmland, may vary greatly from case to case. However, in general, there has been an evolution toward increasing public concern or opposition to transmission lines related to their appearance. This concern is often focused on lines that go through wealthy or high-amenity urban parks or rural landscapes. It is considerably less common to see it applied to the flat, generic farmland typical in some parts of the country. However, in other parts of the country, like New England or certain parts of Wisconsin, farmland itself has significant scenic power and contributes to agricultural tourism and tourism generally, within certain regions. The variation in attractiveness of viewsheds along a linear corridor can be mapped, and such techniques have been increasingly accepted in court decisions on appraised value of wilderness or rural properties. (Devitt, 1988; Chenoweth, 1991)

"Whatever the nature of the landscape between the observer and the transmission line, the immediate surroundings of each tower will influence the potential visual effect magnitude of the structure." (Hadrian, Bishop and Mitcheltree, 1988, 268)

Despite utility concerns with the aesthetic impact of power lines and structures for the last 40 years, one industry survey concluded that there has been little reliable research on the subject. A 1990 report found that "the paucity and inconclusiveness of the research can be interpreted as an

indication that transmission line aesthetic evaluation is an area of professional practice that is in too early a stage of development to have generated either pressures for validation or a framework for evaluation." (Priestley and Evans, 1990 cited in Tikalsky and Willyard, 2007,31)

"The effect of aesthetic design on public perception of electrical transmission structures remains an elusive topic. …Despite more than 40 years of research, findings relating these two subjects are far from being established as definitive." (Tikalsky and Willyard, 2007, 31)

Complicating the ability to measure the impact of transmission lines on perceived landscape scenic beauty is the difficulty in separating people's aesthetic complaints about the lines from their growing concerns and fears about the potential biological effects of EM fields around the lines. One study observed that "vague public fears about health, safety, and other environmental aspects of the transmission system often get attached to the appearance issues." (Priestley, 1984 cited in Tikalsky and Willyard, 2007, 30)

Electromagnetic Fields (EMF)

Electric and magnetic fields (EMF) are produced by everything that carries or is operated by electricity. EMFs exist in the air around all electrical equipment and devices from toasters to power lines. An electric field is produced by voltage, the electrical force that causes current to flow in a conductor. Electric fields are reduced in strength (shielded) by trees and buildings. These fields are measured in units of kilovolts per meter (kV/m) or volts per meter (V/m) for weaker fields. Current, the movement of electrons in the conductor, produces a magnetic field. Magnetic fields pass through most objects including buildings. They are usually measured in units of milligauss (mG). Alternating electric fields and magnetic fields both cause induced currents. Additional information about EMF and their potential impacts on humans can be found in Appendix B of the PSC's Final Environmental Impact Statement for this project. (URL: http://psc.wi.gov, ERF# 158970)

The current consensus from most studies that have been done to assess transmission line effects in farm situations is that the electromagnetic fields generated by the transmission lines running through farms have no significant effects on crops:

- Osborn, C. Tim, et. al. (1982) "Overhead Electric Transmission Line and Support Structures: Cost and Yield Effects in the Production of Cotton and Soybeans." Journal of the American Society of Farm Managers and Rural Appraisers. Vol. 46, No. 2, October.
- Roy, W. R. and J. V. King. (1983) A Study of the Growth of Winter Wheat Near an Ultra-High Voltage Transmission Line. American Electric Power. North Liberty, Indiana.

or on livestock:

- Algers, Bo and Katarina Hennichs. (1985) "The Effect of Exposure to 400 kV Transmission Lines on the Fertility of Cows. A Retrospective Cohort Study." Preventive Veterinary Medicine. Vol. 3.
- Algers, Bo and Jan Hultgren. (1987) Effects of Long-Term Exposure to a 400 kV, 50-Hz Transmission Line on Estrous and Fertility in Cows." Preventive Veterinary Medicine. Vol. 5.
- Amstutz, Harold E. and David B. Miller (1980) "A Study of Cattle Near 765 kV Transmission Lines." International Congress on Diseases of Cattle. Vol. 1.
- Angell, R. F., et. al., (1990) "Effects of a High-Voltage Direct-Current Transmission Line on Beef Cattle Production." Bioelectromagnetics. Vol. 11.
- Ganskopp, D. C., et. al. (1989) Distribution and Behavior of Cattle Exposed to +500 kV DC Transmission Lines. Eastern Oregon Agricultural Research Center. Burns, Or.
- Ontario Hydro Environmental Resources Section. (1980) High Voltage Transmission Effects on Livestock. December.
- Mercer, Dwight. (1985) "Biological Effects of Electric Fields on Agricultural Animals." Veterinary and Human Toxicology. Vol. 27, No. 5. October.

Stray Voltage

Stray voltage is defined by the PSC as a natural phenomenon that can be found at low levels between two contact points in an animal confinement area where electricity is used. Electrical systems, including farm wiring systems and utility distribution systems, must be grounded to the earth according to the electrical safety code to ensure continuous safety and reliability.

Stray voltage often goes unnoticed by humans but can affect cows on dairy farms. Small stray voltage shocks are created when a cow makes contact between an energized point, such as a feeder, and the earth or concrete floor at a different voltage. Dairy cows can show changes in behavior or production if a level of stray voltage above a few volts is present, but these behavioral changes alone are not good indicators of the electrical situation. DATCP and the PSC Rural Electrical Power Service (REPS) program suggest that all farmers routinely (every year or two) have their electrical system tested for stray voltage and other electrical safety concerns.

According to the PSC docket 05-EI-106, the response level for stray voltage is 1.0 volt at cow contact from all sources. This level of stray voltage is considered to be below the level at which most cows would react. If an investigation determines that the utility is contributing 0.5 of a volt or more to the cow contact voltage, the utility will take immediate action to lower its contribution. Free investigative services are available to landowners who have livestock containment facilities. In addition, for the CapX2020 project, "the PSCW may require the utility to conduct pre-construction and post construction testing of potentially impacted farms and lines." (PSCW Draft EIS, November 2011, p. 72)

Distribution lines carry lower voltages (12.5 kV and lower) than transmission lines and they distribute power to neighborhoods and individual homes and businesses. Although it is not common, there is a

possibility that a transmission line paralleling a distribution line may induce a measurable steady voltage or neutral to earth voltage (NEV) on the distribution neutral. There are methods that the CapX 2020 utilities can use to address this issue where transmission lines parallel distribution lines. The relocation of distribution lines away from the proposed 345 kV transmission line is in part addressing this concern.

Crop Rotations

The most common rotation is 2 - 3 years of field corn, followed by soybeans, and then 3 years of alfalfa for livestock (beef and dairy) farms. There is a trend toward fewer livestock operations and more cash grain (corn and soybean) farms.

The construction activity across a field may cause farmers to alter the rotation. A farmer may plant an extra year of row crop and delay planting the field to alfalfa if construction will occur in the seeding year. Given the high cost of seeding the crop, it may pay for the operator to avoid the loss of a 25 – 40 foot strip of production across the field for 3 years, by delaying planting alfalfa for a year. One can reseed, but the effort may not be successful. But one result for a dairy operation may be a shortage of alfalfa forage (hay or silage), which results in: 1) a need to buy haylage or hay or; 2) a need for more corn silage; and 3) an adjustment in the programmed diet for the herd. There may be increased feed costs for buying forage or protein supplements, such as soybean oil meal.

The farmer may choose to keep a field in alfalfa an extra year, rather than move to the first year of field corn. The population of alfalfa plants in the field is reduced each year, with an increase in the percentage of grass. Without advance knowledge of the construction schedule, the farmer may not fertilize (top-dress) the forage with potassium (K2O) in the fall. The result is lower yield and poorer quality of the forage (alfalfa) than the previous year.

The farmers can make adjustments in their crop rotation, if they know the construction schedule in advance. They may wish to plant a row crop during the year of construction and the year following construction to have an additional opportunity for tillage to remove any residual effects of compaction caused by the construction equipment.

Safety Issues when Farming Near Transmission Lines

Direct Contact and Arcing

The most significant risk of injury from a transmission line is the danger of electrical contact.

Unlike the wiring in a home, the conductors of overhead transmission lines are not enclosed by an insulating material. Electrical contact between an object on the ground and an energized conductor can occur even if the two do not actually touch. In the case of high voltage lines, electricity will arc across an air gap if the object on the ground comes close enough to a conductor. The distance between an object and a transmission line needed for arcing varies with the voltage at which the line is operated. In general, the arcing distance for a 345 kV line is two to three feet and for a 115 kV line it is one to one and one half feet. However, it is recommended that objects on the ground not be raised more than 14 feet above the ground in the vicinity of any power line. The 14-foot limitation is a general rule of thumb. In some instances, it can be exceeded without any problems. Farmers should contact Xcel Energy or Dairyland Power if they need to exceed this recommendation to be sure that their situation is safe for anticipated farming activities. On the Electric Safety page of Xcel Energy's website, they recommend keeping people and equipment at least 10 feet away from any transmission line.

Transmission circuits are built to automatically de-energize upon contact with the ground or if phase conductors are severed. Therefore, the danger of electric shock from a downed transmission line is minimal.

Farmers must be careful where transmission lines sag due to high air temperatures. In areas where the soil shifts significantly with wind, the resulting dunes can elevate the earth under a line. If the safety limit needs to be exceeded or equipment close to the height limit is routinely used under a line, - such as bale wagons, bale elevators, grain augers, cranes, or large combines, - farmers should check with Excel Energy or Dairyland Power to confirm the necessary clearance requirements. This may include confirming that the earth-to-line distances have not changed since the line was constructed.

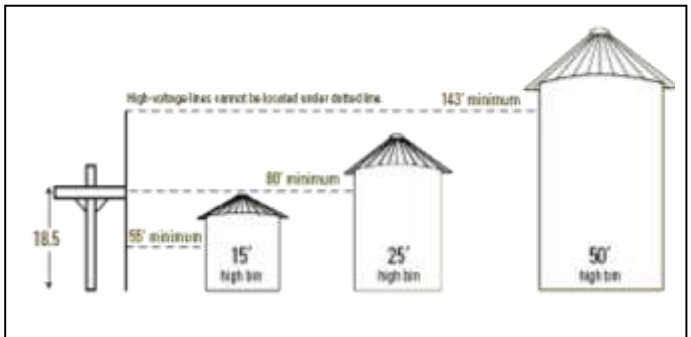
Injuries are more likely to occur with lower voltage power lines (12.5 kV to 115 kV) than with higher voltage lines because contact with the lower voltage lines is more likely. The electrical conductors for lower voltage lines are closer to the ground, smaller, and less noticeable. An injury from contact with a 12.5 kV line can be just as serious as that from a 500 kV line. Some general safety tips for farmers working near any power line include the following. Most of these are taken from Preparation and Awareness are Keys to a Safe Harvest found in the Farm Safety section of the Library of Articles at www.safeelectricity.org.

- Always lower portable augers or elevators to their lowest possible level (under 14 feet) before moving or transporting and be aware of your surroundings when raising them.
- When moving large equipment or high loads near a power line, always use a spotter, someone to help make certain that contact is not made with a power line.
- Be aware of increased height when loading and transporting larger modern tractors with higher antennas.
- Never attempt to raise or move a power line to help clear a path.

- Never raise ladders, poles, pipes, or rods near power lines. Remember that nonmetallic material such as lumber, tree limbs, and hay can conduct electricity depending on moisture and dirt contamination.

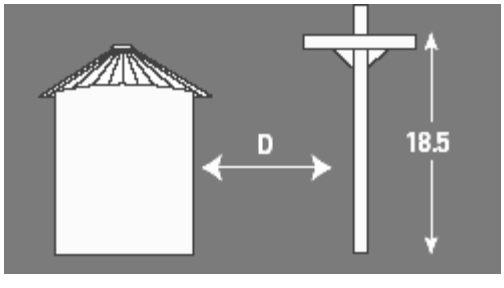
From the Ozark Border Electric Cooperative website:

"The overhead electric wires aren't the only electrical contact that can result in a serious incident. Pole guy wires are grounded to the neutral; but when one of the guy wires is broken, it can cause an electric current disruption. This can make those neutral wires anything but harmless. If you hit a guy wire and break it, call the utility to fix it. Don't do it yourself. When dealing with electrical poles and wires, always call the electric utility."



Source: http://www.alliantenergy.com/wcm/groups/wcm_internet/@int/documents/contentpage/014734.pdf

"It's also important for operators of farm equipment or vehicles to know what to do if the vehicle comes in contact with a power line. It's almost always best to stay in the cab and call for help. Warn others who may be nearby to stay away and wait until the electric utility arrives to make sure power to the line is cut off."



"If the power line is energized and you step outside, your body becomes the path and electrocution is the result. Even if a (distribution) power line has landed on the ground, there is still the potential for the area nearby to be energized. Stay inside the vehicle unless there's fire or imminent risk of fire. In that case, the proper action is to jump – not step – with both feet hitting the ground at the same time. Do not allow any part of your body to touch the equipment and the ground at the same time. Continue to shuffle or hop to safety, keeping both feet together as you leave the area. Once you get away from the equipment, never attempt to get back on or even touch the equipment. Many electrocutions occur when the operator dismounts and, realizing nothing has happened, tries to get back on the equipment."

Height of Grain Storage Structure	D= Minimum distance from line* to bin wall
15 feet	55 feet
20 feet	68 feet
25 feet	80 feet
30 feet	93 feet
35 feet	104 feet
40 feet	118 feet
50 feet	143 feet
60 feet	168 feet
70 feet	193 feet
80 feet	218 feet

The National Electric Safety Code requires that power lines be at least 18 feet above the highest point on any grain bin with which portable augers and other portable filling equipment is used. The

adjacent diagram illustrates the recommended distances that grain bins should be away from transmission lines. It was taken from Alliant Energy's Safety Notice: Grain Bin Clearance Regulations from its Overhead Power Lines web page.

Because transmission lines are not coated like electrical cords, contact with a line is dangerous. Farmers must be cautious when moving tall farm equipment like elevators and conveyors near transmission lines. Adequate clearance must be maintained between farm machinery and transmission lines. An 18-foot clearance should be maintained from the highest fill port of the grain bin and the transmission lines.

According to the Bonneville Power Administration (BPA) located in the northwestern United States, "All types of irrigation systems, including center-pivot systems, can be operated safely near or on a power line right-of-way. However, irrigators should avoid situations where a solid stream of water can come in contact with a conductor, even if the possibility is remote." Also from BPA, "Caution should be used in storing, handling, and installing irrigation pipe, and in operating spray irrigation systems near power lines. Irrigation piping should be moved in a horizontal position under and near all power lines to keep it away from conductors overhead." Regarding center-pivot systems, BPA says, "Center-pivot circular irrigation systems installed near or under transmission lines can develop hazardous shock potentials during operation and maintenance. To eliminate these hazards: farmers should provide a good electrical ground for the pivot point; farmers should not touch the sprinkler pipe or its supporting structures when the system is operating under, or parallel to and near, a transmission line; and farmers should perform repairs/maintenance of the system with the sprinkler pipe perpendicular to the transmission line." This information comes from BPA's Living and Working Safely around High-Voltage Power Lines

Although there has been no report of the accidental ignition of fuel caused by spark discharges induced from transmission line fields, it is recommended that vehicles be refueled at least fifty feet from the centerline of a transmission line corridor that is 345 kV or greater.

Farm Electrical Safety Resources

The following websites provide additional information about electrical safety on farms.

- Wisconsin Public Service Corporation's Brochures and Fact Sheets webpage http://www.wisconsinpublicservice.com/business/farm_brochures.aspx

- Safe Electricity, an Illinois project http://www.safeelectricity.org/

- Living and Working Safely around High-Voltage Power Lines, a publication of Bonneville Power Administration

http://www.transmission.bpa.gov/NewsEv/pdfs/LivingAndWorking.pdf

Static Discharge

Under certain conditions, a perceptible electrostatic voltage can be induced on such objects as large vehicles, permanent and temporary fences, metal buildings, shade cloth support structures used in ginseng gardens, or irrigation systems. This can happen when the object is near a high-voltage transmission line and is insulated from the ground. When a person or animal touches the object, a shock will be felt similar to what you may receive when you cross a carpet and then touch a doorknob. The static discharge is momentary, but can be painful. The magnitude of the static discharge depends on the voltage of the transmission line, distance from the conductors, size or length of the object, its orientation to the line, and the extent of grounding of the object to the earth.

This condition can be corrected by effectively grounding the object to the earth. Sometimes this is simply done by dragging a chain behind a tractor. Irrigation systems, metal buildings, and long wire fences may require additional assistance from the CapX2020 utilities to remove the nuisance static discharges if they are close to the right-of-way.

Induced Internal Currents

An internal electric voltage and current are induced in any conducting object such as a plant or an animal that is in an AC electric or magnetic field. These fields are also referred to as electromagnetic fields (EMF). Induced internal current is one of the primary mechanisms by which EMF from power lines could cause a biological response. Unlike a static discharge or stray voltage, the level of the induced internal current density does not usually reach a sufficient level to cause a perceivable shock.

Some of the many factors that influence the induced current densities are the strength of the electric field, the shape of the body in the field, the cross-sectional areas at any point between the line and the earth, the extent of grounding of the object to earth, and the nature of the internal structures of the object.

Corrosion on buried pipelines running parallel to a transmission line can occur if those pipelines are not properly grounded. This occurs where pipelines and transmission lines share a portion of their rights-of-way. Transmission lines can induce voltages on a nearby pipeline, which could lead to corrosion of the pipeline. This problem has been made worse by improvements in coatings that reduce the number of imperfections on the surface of a pipeline, which reduces the number of grounding opportunities. The problems of induced voltages and pipeline corrosion can be reduced by properly grounding the pipeline and providing adequate distance between the power line conductors and the pipeline.

The following are some safety considerations to remember when doing farm work around power lines.

- Check for overhead power lines before lifting or clearing debris from irrigation pipes.
- Never stack hay bales or other items under overhead power lines.
- Do not spray water on power lines or equipment. For irrigation systems, there may be a safety problem with arcing across the "air gap" because the end guns spray a stream of water much higher than the desired 15-foot maximum height under the transmission line. The problem can be handled by carefully orienting the "end guns" so they are not operating near the transmission line.
- Keep farm machinery away from power lines, poles and guy wires (the support cables for power poles). If you strike a guy wire or pole, call your power company immediately, you may have weakened the structure or created slack in the line.

Biosecurity

The CapX2020 utilities will use farm mitigation practices that focus on avoiding contact with livestock and manure. If avoidance is not possible, the utilities will work with the farmers to develop protocols specific to a landowner's farm operation. These protocols could include cleaning the equipment between parcels. (See CapX2020's "Agricultural Impact Mitigation Plan")

The farm disease mitigation measures that the CapX2020 utilities will use may include the removal of manure, organic material, and soil from tires where equipment crosses land containing livestock or certain high-value specialty crops that are especially susceptible to contamination, such as organic crops. This may be done by using cleaning stations.

The CapX2020 utilities have indicated that they will work with the agricultural producers along the approved route to follow any farm disease mitigation practices currently in place on the affected farms. The CapX2020 utilities will work to ensure that currently practiced farm disease mitigation standards will be adhered to during construction of the project. If an agricultural landowner has no biosecurity plan in place, the CapX2020 utilities will work with that landowner, at the landowner's request, to develop farm disease mitigation practices relevant to their agricultural operation. The utilities will hire farm disease mitigation specialists to assist in these activities.

The least expensive method to minimize the spread of agricultural diseases and pests would be to isolate the property within the proposed easement and remove it from agricultural production during the construction period. However, this may be problematic especially given that from start to completion, line construction may take several months. Compensation could be offered to the agricultural landowner for not producing a crop or spreading manure during this period. Other options include the use of cleaning stations.

Impacts on Trees

Affected forest land owners will maintain ownership of any trees that need to be cut as a result of the proposed project. The manner in which these trees are handled should be negotiated between the

CapX2020 utilities and the affected landowner before construction begins. Typically, any timber or saw logs are stacked on the edge of the right-of-way in upland locations for the landowner's disposition. Smaller diameter trees and limbs, often referred to as slash, are usually chipped and disposed of according to the landowner's wishes: spread on the right-of-way, piled on the edge of the right-of-way for the landowner's use, or disposed of according to other agreed-upon arrangements. Slash may also be disposed of by burning, but local permits may be required for this.

When right-of-way is cleared on forest land, the contractor may use a technique called feathering. This means that the right-of-way is not left with a straight, abrupt edge along the cleared area. Instead, trees are cut in a manner that leaves a staggered edge. This may reduce the potential for degrading the quality of the remaining forest by reducing the amount of sunlight and wind in the remaining forest. Increased sunlight and wind can cause changes in the microclimate along the cleared edge of a forest. Feathering may also soften the visual impacts of right-of-way clearing. Planting low-growing trees and shrubs along forested edges of cleared right-of-way can have positive effects similar to feathering.

If trees that are part of a windbreak are removed as a result of the proposed project, the adjacent soils could be eroded by wind. Factors that affect soil erosion include cloddiness, surface roughness, wind speed, soil moisture, and vegetative cover. According to the Indiana Soils Evaluation and Conservation Online Manual http://www.agry.pudue.edu/soils_judging/new_manual/ch6-wind.html , soil clods prevent wind erosion because they are large enough to resist the forces of the wind and because they shelter other erodible materials. Their firmness and stability vary with soil type and depend on other factors such as moisture, compaction, organic matter, and clay content. Sandy loams, loamy sands, and sands are most susceptible to wind erosion. Loams, silt loams, clay loams, and silty clay loams are the least susceptible to wind erosion. Ridges and depressions formed by tillage alter wind speed by absorbing and deflecting part of the wind energy. Such ridges are most effective in reducing soil erosion when they are perpendicular to the wind direction. Rough surfaces also trap moving particles. Higher wind speeds also increase erosion. Erosion decreases as soil moisture increases. Field size affects the distance wind blows without encountering a barrier. The rate of soil loss increases rapidly with distance downwind from the point in the field where the wind erosion process begins. Vegetative cover is the best way to control wind erosion.

Windbreaks can help to reduce wind erosion by providing a barrier on the windward side of a field. Depending on soil conditions and supporting practices, a single row of trees protects for a distance downwind of approximately 10 to 12 times (or more) the height of the windbreak.

In Trempealeau County, Dickenson soils have a moderate hazard of wind erosion and Gotham soils have a severe hazard of wind erosion. Both of these are found along Segment 8A. In La Crosse County, Plainfield soils have a severe hazard of wind erosion. They are found on Segment 8C. Other soils in La Crosse County that are susceptible to wind erosion are Chelsea soils (Segments 18A, 18D, and 18E) and Finchford soils (Segment 18 E).

The CapX2020 utilities have identified the segments where windbreaks are likely to be affected. On the Q1 Highway 35 Route these segments are 2B, 2E, 2F, 8A, and 8C. The Arcadia Route would affect a windbreak on Segment 18E. The Arcadia-Alma Option Route would not affect any windbreaks. The Q1 Galesville Route could affect windbreaks along Segments 2B, 2E, 2F, 6, 18B, 18D, and 18E.

Trees that provide shade in pastures can be a valuable asset to livestock farmers. Livestock begin to benefit from shade when the temperature rises above 75 degrees Fahrenheit. The negative effects of heat on livestock such as lower feed intake can be reduced where they have access to shade. Lower feed intake can lead to lower milk production in dairy animals and lower weight gain in meat animals, which would lead to lower revenue for the farmer. It could take many years for newly planted trees to grow large enough to replace mature trees that are lost as a result of transmission line construction.

Impacts to Farm Buildings

The CapX2020 utilities have not identified any farm buildings that will need to be removed or relocated because of the proposed project.

Farm buildings used to house animals were observed within 100 feet of the centerline of the routes. There are six buildings within 100 feet of the centerline of the Q1-Highway 35 Route, two buildings within 100 feet of the centerline of the Arcadia Route, and two buildings within 100 feet of the centerline of the Q1-Galesville Route. The Arcadia-Alma Option does not impact any buildings housing animals, but two buildings occur within 100 feet of the centerline for the Arcadia Route with or without the Arcadia-Alma Option.

Metal sheds or equipment storage buildings were observed within 100 feet of the centerline of each route. There is one metal shed within 100 feet of the Q1-Highway 35 centerline, three buildings within 100 feet of the centerline of the Arcadia Route, and two buildings within 100 feet of the centerline of the Q1-Galesville Route. The Arcadia-Alma Option does not impact any metal sheds or equipment storage buildings, leaving no buildings within 100 feet of the centerline for the Arcadia Route with or without the Arcadia-Alma Option.

There are two houses on the Highway 93/54 alignment that are less than 50 feet from the proposed project and would be within the project right-of-way. The CapX 2020 utilities have proposed an alignment that would have the powerline cross the highway to avoid these houses.

Negotiation Process for Establishing the Amount of Compensation

After the CapX2020 utilities receive approval for their application and the PSC issues the order to build the project, they will begin contacting landowners to inform them of the PSC order and to request surveying permission. The CapX2020 utilities will try to work with landowners to address their concerns. However, if landowners don't respond to the utilities' contact attempts, the utilities

will not know what concerns landowners might have. The CapX2020 utilities' offer of compensation should be based on the fair market value of the easement to be acquired and any damages to the remaining parcel. If easement negotiation is not possible, the utilities may seek condemnation of the needed easements.

If an easement is acquired through condemnation, the court assigns the legal obligations. Under a court-ordered settlement, the CapX2020 utilities may not be as capable of flexibly addressing individual landowner concerns The CapX2020 utilities may still be willing to work with the landowners in such cases. The "Landowner Bill of Rights" still applies on condemned land. But if condemnation is used, it doesn't result in an easement contract between the CapX2020 utilities and the landowner. It results in a court decision.

TEMPORARY CONSTRUCTION IMPACTS

Time Loss during Negotiations

It is important that the farm owner understand how his farmland may be impacted both during and after construction. In some cases, farmland owners choose to consult with an attorney prior to signing an easement. The time spent negotiating easements can be time-consuming and represents a cost to the farmland owner; it is time that cannot be spent on managing his farm operation. This is particularly significant if these negotiations occur during planting or harvesting times.

Delayed Compensation and Cash Flow Impact

If negotiations are prolonged and a settlement is not forthcoming, the farmer may not receive timely compensation for crops that are not planted or harvested due to construction activities through his farmland. In some cases, this could result in cash flow problems to the farm operation.

Soil Erosion during Construction

An erosion problem occurs if ruts or wheel tracks run up or down the slopes. This is why farmers are careful not to leave a dead-furrow when moldboard plowing in the fall. The spring snowmelt will erode the soil severely with channelized flow if a dead-furrow is present.

Rutting the soil with construction equipment in the transmission corridor will create a similar erosion problem. The silty soils of the project area are very susceptible to flowing water. The rutting also mixes topsoil with the subsoil. The impact depends on the depth of the ruts.

The obvious solution is to stay off the soil when it is wet, to avoid rutting. DATCP recommends that the CapX2020 utilities work to minimize rutting by not constructing through farmland when soil is saturated. If rutting occurs to depths greater than 6 inches, the environmental monitor should evaluate whether such rutting is causing excessive compaction or soil profile mixing. The other

possibility is to use some form of matting that prevents rutting by the equipment. During pre-construction planning, the utilities' staff should ask land owners about the extent of their existing and/or planned drainage tiles and systems. They should also document existing drainage problems that could affect the construction easement area.

Noise and Dust during Construction

Dust and noise due to transmission line construction can affect landowners and farm animals. If blasting is necessary to place the poles, dairy and beef cattle can stampede, breaking down fences and escaping the farm property. Fur animals and poultry are particularly sensitive to noise.

Cattle Fencing during Construction

The CapX2020 utilities should fence off the construction area to prevent cattle from wandering onto the right-of-way. If transmission line construction divides a field used for grazing, access between the divided parcels could be restricted. The CapX2020 utilities will need to work with the farmer to develop an access plan for the livestock or else compensate the landowner for the cost related to restrictions on grazing. If any cutting of fences is necessary during construction, the utilities will see that a temporary gate is installed. (Wis. Stats. §182.017 (7)(c)5.) Such gates may be left in place at the request of the landowner.

One of the concerns that the CapX2020 utilities staff should ask landowners about is the presence of animals on their farm operations, and the type of operation, i.e. feedlot, managed grazing, etc. Landowner schedules for manure application and storage in proximity to the right-of-way should be ascertained.

Farm Roads Needed to Access Construction Corridor

According to their application, the CapX2020 utilities are proposing to directly access the right-of-way from public roads, utility right-of-way, private roads and field roads (where access is granted).

According to the utilities' preliminary access plan, the Q1-Highway 35 Route would require 61 off-right-of-way construction access paths totaling 12.4 miles in length and 24.0 acres in area. These paths range in length from 30 to 7,800 feet. They would require the clearing of nearly three acres of forest and would include 16.5 acres of cropland and 3.5 acres of grassland. (Chapter 7 – Environmental Analysis: Q1-Highway 35 Route, p. 140)

The Q1-Galesville Route would require 55 off-right-of-way construction access paths totaling 12.8 miles in length and 24.8 acres in area. These paths range in length from 30 to 7,800 feet. They would require the clearing of 2.1 acres of forest and would include 16.3 acres of cropland and 2.8 acres of grassland. (Chapter 8 – Environmental Analysis: Q1-Galesville Route, p. 175)

The Highway 88 Connector Route Option A would require two off-right-of-way construction access paths totaling 0.7 miles in length and 1.3 acres in area. These paths range in length from 1,150 to 2,340 feet. They would require the clearing of 0.02 acre of forest and would include 1.1 acres of cropland.

The Highway 88 Connector Route Option B would require 19 off-right-of-way construction access paths totaling 2.7 miles in length and 11.3 acres in area. These paths range in length from 20 to 2,340 feet. They would require the clearing of 0.1 acre of forest and would include 3.8 acres of cropland and 0.3 acre of grassland. (Chapter 9 – Environmental Analysis: Q1-STH 88 Route Alternative, pg. 197)

The Arcadia Route would require 82 off-right-of-way construction access paths totaling 25.2 miles in length and 49.0 acres in area. These paths range in length from 140 to 9,100 feet. They would require the clearing of 5.5 acres of forest and would include 29.5 acres of cropland and 4.0 acres of grassland. (Chapter 10 – Environmental Analysis: Arcadia Route, p. 229)

The Ettrick Route Option would require 26 off-right-of-way construction access paths totaling 5.8 miles in length and 11.3 acres in area. These paths range in length from 70 to 7,140 feet. They would require the clearing of 4.2 acres of forest and would include 2.4 acres of cropland and 3.4 acres of grassland. (Chapter 11 Ettrick Connector Alternative – p. 246)

The access plan identifies where the right-of-way will be accessed by the contractor. However, the contractor may choose to ignore this plan and find alternate access if that access is less damaging to the environment or less costly and the affected landowner agrees. The contractor reports to the CapX2020 utilities where a deviation from the utilities' access plan was made. The CapX2020 utilities are responsible to the affected landowner for damage done outside of the access plan.

Access roads should be designed to allow proper drainage and minimize soil erosion. If desired by the landowner, temporary roads will be left in place after construction is completed. If access roads are removed, soil restoration practices should be applied to the road to mitigate compaction. Access roads are subject to the same impacts that can occur on the rest of the project right-of-way. These include soil compaction, soil mixing, the potential spread of unwanted plants and diseases, erosion, and the temporary loss of crops and other vegetation.

Lay down and Staging Areas

Table 11 - Location of the Laydown and Staging areas.					
Area #	**Legal Description**	**Municipality**	**County**	**Size (Acres)**	**Lease Option Status**
1	**Part of SW1/4-NE1/4, Sec 32, T21N-R12W**	**Town of Belvidere**	**Buffalo**	**20**	**Signed**
2	**Part of W1/2-NW1/4, Sec 11, T19N-R11W**	**Town of Gross**	**Buffalo**	**16**	**Signed**
3	**Part of NW1/4-NE1/4, Sec 16, T18N-R10W**	**Town of Trempealeau**	**Trempealeau**	**20**	**Signed**
4	**Part of NE1/4, Sec 23, T18N-R9W**	**Town of Trempealeau**	**Trempealeau**	**20**	**Signed**
5	**NE1/4-NW1/4, Sec 13, T17N-R8W**	**Town of Onalaska**	**La Crosse**	**17**	**Ongoing**

The following describes the land uses at the various laydown locations:

Staging Area 1 is a 40-acre parcel, 20 acres of which would be used for a staging site. The property has a 3-acre wetland in the northeast corner, some residential trees in the southern end and the rest is agriculture.

- Staging Area 2 is primarily agricultural.
- Staging Area 3 is about 75 percent forested with the remaining area residential.
- Staging Area 4 is entirely agricultural.
- Staging Area 5 is within the proposed Briggs Road Substation West property and is entirely agricultural.

The CapX2020 utilities have indicated that the selected sites are primarily agricultural. They plan to use about 20 acres at each site, and a 30-foot wide access path would be needed.

DATCP believes that same avoidance, mitigation, and restoration protocols recommended for the transmission line right-of-way should be followed on the laydown and staging areas on farmland. This would include avoidance or mitigation for soil compaction and soil mixing in these areas. Following project completion, the same backfilling and decompaction procedures required on the corridor right-of-way should also be applied to these storage areas.

Temporary Wire Pulling/Handling Areas

The CapX2020 utilities indicated that during construction temporary wire pulling/handling areas will need to be set up every 5,000 to 10,000 feet along the chosen route. (CapX2020 Application, p. 2-179) These areas would be about 100 by 200 feet. It is not stated whether such areas are able to be accommodated entirely within the planned construction right-of-way, or whether they would involve additional temporary easement areas. If additional temporary easement areas are necessary, the same topsoil removal and decompaction protocols should be applied as are used for the main construction right-of-way.

Impacts Associated with Surveying and Staking Transmission Line Right-of-Way

If surveying or construction crews leave wire surveying flags, equipment, or other debris behind after their work is completed, these items can pose a hazard to livestock. When livestock ingest such material, they can develop what is known as "hardware disease". Ingested wires or other objects can damage the animal's viscera and may lead to death.

Another hazard to livestock that can occur during right-of-way clearing or maintenance is the disturbance of black walnut trees. The roots of these trees produce a toxin known as juglone that causes an allergic reaction in horses and may also affect other livestock. Care should be taken when clearing any black walnut trees to make sure that all roots, wood, bark, leaves, hulls, and sawdust are removed from any area to which livestock may have access. Even the ash from trees that have been burned may still contain the toxin. Relatively small amounts of juglone are also found in Persian (English or Carpathian) walnut trees as well as butternut, pecan, and hickory trees.

Dewatering of Caisson Hole

The caisson hole will fill with water when the hole for the caisson is augured into somewhat poorly to poorly drained soils with either a perched or apparent water table. A 6-foot diameter hole, 10 feet deep will contain 283 cubic feet or 2,117 gallons of water. A 30-foot deep hole will contain 848 cubic feet or 6,342 gallons of water.

The usual procedure is to pump the water from the hole to a safe disposal area or to a tank truck for removal. The CapX2020 utilities have indicated that the location and amount of dewatering activities for the proposed project are unknown at this time.

The contractor may be able to place the concrete in the caisson hole using the "tremie" concrete placement process. This can greatly reduce the volume of water to be pumped. In this process, the concrete is pumped into the bottom of the hole which displaces the water until the concrete approaches the top of the hole or is above the water table. (Some concrete which has been diluted is skimmed off.) The reinforcement steel cage is then vibrated into the concrete and the structure finished. This process avoids the need to pump and dispose of very large quantities of water.

Proper dewatering of the caisson hole requires pre-construction identification by the CapX2020 contractors of low areas and hydric soils that are likely to collect water during construction, as well as suitable areas for the discharge of water accumulated within the caisson hole or other excavated areas. CapX2020 contractors should structure work to minimize accumulation of water within the excavated area and get the landowner's approval for all discharge locations and techniques used. Discharge locations must be well-vegetated areas that prevent the water from returning to the right-of-way, are as far from backfilling activities as possible, and avoid deposition of gravel or sediment onto fields, pastures, or watercourses.

If delivery of water onto cropland is unavoidable, crops cannot be inundated for more than 24 hours without severe damage to the crop. Discharge of water from non-organic farms or from hydrostatic testing is not allowed if that runoff would flow onto adjacent organic farm operations.

Silt or sediment extraction from the excavation site is minimized by preventing the intake from touching the bottom or sides of the trench, and by assuring that the intake is supported by a flotation device. Erosion control measures must be used to divert the flow of pumped water and prevent erosion. Dewatering should be monitored and stopped whenever necessary. When construction in hydric soils creates wet trenching and dewatering activities that cause damage that cannot be avoided, the CapX2020 utilities should reasonably compensate the landowner for such damages and restore the land and crops to pre-construction conditions.

POTENTIALLY TEMPORARY IMPACTS

Some impacts to agriculture can be "temporary" if effective construction protocols are implemented when constructing through farmland. The construction and maintenance of high-voltage transmission lines across or adjacent to cropland and pastures can affect the farming practices and operations in several ways.

Farmers have invested in their cropland to improve or maintain yields. Some of the invested costs are an annual expense, such as fertilizer and lime. Others involve a long-term investment in agricultural drainage systems, erosion control, and sprinkler irrigation. An assessment of the possible impacts and damages to cropland begins with knowledge of the soil and its characteristics.

Soil Compaction

Equipment used to construct transmission lines has the potential to compact soil and thereby reduce soil productivity on the farmland traversed during construction. Soil compaction reduces pore space between soil particles, restricting the movement of water and gases through the soil. This can affect the rooting depth of crops and the uptake of soil nutrients and water. In addition, soil compaction can decrease soil temperature, decomposition of organic matter, and a plant's ability to access

required nutrients found lower in the rooting zone. It can also increase the likelihood of water erosion on farm fields.

Studies by several universities have shown that yield reduction due to compaction can range from 10% to 40%.[8] Compaction is most evident when the crop is under additional stress. For example, this could include drought conditions or excessively wet conditions.

Several factors influence whether a soil becomes compacted. An important influence is soil moisture: the wetter the soil the more likely it is to be compacted from traffic. The potential for compaction also depends on the soil texture. Coarser textured soils, like sand or sandy loam, are less likely to become compacted than is clay or silty clay loams. Finally, the axle weight of the construction equipment affects compaction. The expected compaction depth increases as the axle load increases and as soil moisture content increases.

Compaction of the soil in the root zone of agricultural crops results in reduced yields. The depth at which the compaction occurs is very important. The combination of soil structure and the soil's internal drainage are major factors in determining whether compaction will occur and at what depth. The soil structure most resistant to compaction is granular or single grained. Subangular blocky structure resists compaction forces reasonably well at a soil moisture content of roughly 50 percent field moisture capacity. (Field moisture capacity is defined as the water content of soil after the excess water has drained away. It is the maximum amount of water stored in the soil for crop production.) The soil structure least able to resist compaction forces is platy structure. A platy structure has the soil particles arranged around a plane, generally horizontal. Platy structure appears laminated

Topsoil compaction and subsoil compaction can be viewed separately. When traffic loads are relatively lightweight, less than 10 tons per axle, the soil generally will not be compacted below the 8-10 inch range - the depth at which the topsoil layer is commonly found. Compaction at this depth normally can be decompacted with typical farm tillage equipment.

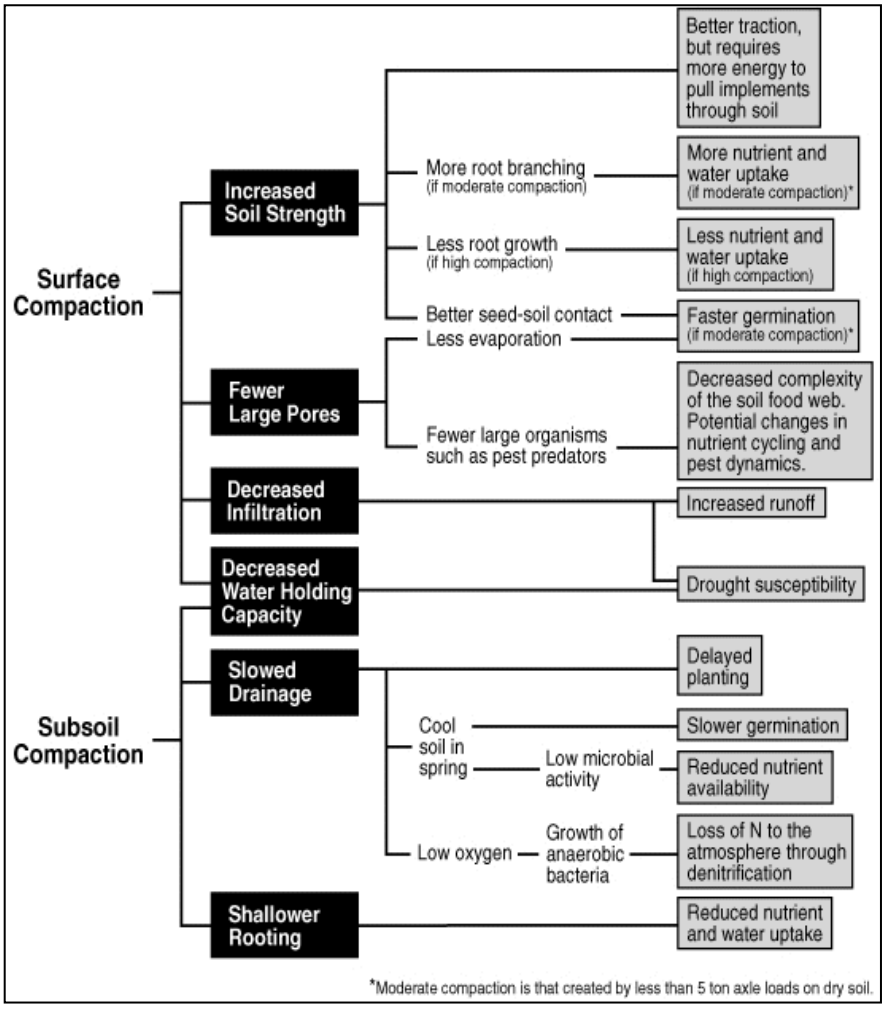
Some of the heavier construction equipment that will be used on the project can compact soil to depths of 20 inches or more, resulting in subsoil compaction that is very difficult to alleviate, especially with regular tillage equipment.

Subsoil compaction is related to weight-per-axle. Total axle load affects the depth of compaction, generally the subsoil layer, while contact pressure (psi) more commonly affects the topsoil layer.

[8] Effect of Compaction on Corn Yield, University of Wisconsin Publication A3367.

Subsoil compaction affects nutrient uptake, available water capacity, and can delay spring planting under wet conditions, consequently reducing crop yield. Indicators of soil compaction include abnormal root growth, excessive erosion, soil crusting, standing water, and uneven emergence of crops.

Impacts of Compaction Throughout the Soil Profile



Soil Drainage and Texture Definitions

The soil drainage classes used in the description of the soils reflect the combined effects of surface runoff, soil permeability, and internal soil drainage. The classes are:

- **Excessively well drained** – Water is removed from the soil very rapidly.
- **Well drained** – Water removed readily, but not rapidly.

- **Moderately well drained** – Water removed from the soil somewhat slowly so that the profile is wet for a small, but significant part of the time.
- **Somewhat poorly drained** – Water is removed from the soil slowly enough to keep it wet for significant periods. The soil has a slowly permeable layer in the profile, a high water table, seepage from up-hill, or a combination of the above.
- **Poorly drained** – Water is removed so slowly that the soil remains wet for a large part of the time. The water table is commonly at or near the surface during a large part of the year. The soil has a high water table, slowly permeable layers within the profile, up-hill seepage, or a combination of the above.
- **Very poorly drained** – Water is removed from the soil so slowly that the water table remains at or near the surface the greater part of the time. Soils of this drainage class usually occupy level or depressed sites, and are frequently ponded.

The water table is the upper limit of the waterlogged soil. Growing plants will remove soil water by transpiration; during the growing season this will lower the water table and reduce downhill seepage.

An apparent water table results from an impermeable or essentially impermeable layer, below the soil profile. A perched water table occurs because a slowly permeable soil layer within the soil profile causes part of the profile to be waterlogged.

The field description of soil structure established by the soil mapper/classifier provides (1) the grade (distinctness) of structure which is the degree of aggregation, (2) The class or size of the aggregate or ped, and (3) the type of structure.

The grade or distinctness of the structure is expressed as (1) Weak being equal to poorly formed or indistinct peds (aggregates), (2) Moderate being equal to well-formed or distinct peds, and (3) Strong equaling durable peds.

The class or size of aggregate or ped is expressed as (1) very fine or very thin, (2) fine or thin, (3) medium, (4) coarse or thick, and (5) very coarse or very thick. The reference to thin applies to platy or laminated structural shape.

The types of soil structure shapes are (1) Platy (laminated) where the soil particles are arranged around a plane, generally horizontal, (2) Prism like (prismatic or columnar) where the soil particles are arranged around a vertical axis, (3) Block like or polyhedral (angular or subangular) where the soil particles are arranged around a point and bounded by flat or rounded surfaces, and (4) Spheroidal or polyhedral represented by granular or crumb. Structure-less soils are either “single grain” or massive. A massive structure is a condition where the soil particles adhere without any regular cleavage, as in a hardpan.

“Soil consistence when moist” is the consistence when the soil moisture is midway between air dry and field moisture capacity. “Friable” describes a condition where the soil material crushes easily

under gentle to moderate pressure between the thumb and fore-finger. "Firm" represents the condition when the soil material crushes under moderate pressure between the thumb and fore-finger, but resistance is distinctly noticeable. Color is the easiest condition to observe. The color of the soil material is provided to help us recognize when the surface layer becomes the subsoil, and subsoil becomes substratum.

CONCLUSIONS AND RECOMMENDATIONS

The agriculturally preferred routes for the CapX2020 transmission line project are either the Q1 Route or the Q1-35 Route. These routes affect the fewest acres of farmland and have the least overall impact on agriculture. However based on a number of resource issues and other concerns, the PSC has selected the Q1-Galesville Route for construction.

The Applicants have provided an Agricultural Impact Mitigation Plan (AIMP) to minimize the impacts of the transmission line project on farmland and farm operations.

The DATCP further recommends the following as ways to mitigate the potential adverse impacts associated with the proposed project:

1. Construction on agricultural land should occur as much as possible when the ground is frozen. This will minimize soil compaction and reduce the risk of spreading diseases and pests between farms.
2. The Applicants should hire an agricultural specialist to conduct pre-construction interviews with farmers and farmland owners who will be directly affected by the acquisition of easements for this project. At a minimum, the interview should determine whether the affected farm operation has a biosecurity plan, the types of crops grown and livestock raised, and the location of any existing or planned drainage systems or other agricultural infrastructure.
3. Information from the pre-construction farm interviews should be incorporated into the bid packages and line lists used by the contractors and inspectors.
4. The Applicants should consult with affected farmland owners to determine the least damaging locations for transmission support structures within reasonable limits of engineering and environmental constraints. DATCP supports the Applicant's plans to consult with landowners regarding the location of poles. After construction of the line is complete, the Applicants should test the soil profile to determine whether the soils in the right-of-way have been compacted by construction or other equipment. This is commonly done by comparing the compaction levels of soils on the portion of the right-of-way that carried the traffic to comparable soils off the right-of-way. If soils are compacted, steps should be taken to correct this problem.
5. If ruts are created in the portion of the right-of-way that crosses farmland, the Applicants should make reasonable attempts to restore the affected soils as quickly as possible.

6. Landowners who will have easements acquired for the proposed project should be familiar with the "Landowners' Bill of Rights" which is found in Wis. Stat. §182.017 (7). The Applicants may ask landowners to waive some or all of the rights listed in this statute, but the landowners are not required to waive any of these rights.
7. The county conservationists in the three counties affected by the proposed project should be consulted to ensure that construction proceeds in a manner that minimizes drainage problems, crop damage, soil compaction, and soil erosion.
8. All farmland owners and operators should be given advance notice of acquisition and construction schedules so that farm activities can be adjusted accordingly. To the extent feasible, the timing of the right-of-way acquisitions and construction by the Applicants and their contractors should be coordinated with landowners to minimize crop damage and disruption of farm operations.
9. The Applicants should strip and segregate the topsoil over and around all excavation sites on the project to ensure that the uniquely valuable topsoil is not mixed with lower quality subsoil and underlying parent material.
10. The Applicants should make sure that all excavated soil below the topsoil layer displaced by the pole and foundation, and other spoil material, are removed from the site and not deposited over, or mixed with, the topsoil in the fields surrounding the excavation site.
11. Wherever the Applicants remove transmission structures, they should replace the newly created space where the poles were located with imported topsoil of a quality similar to that of the adjacent farm fields.
12. The Applicants should make sure that the project monitors are adequately trained, experienced and knowledgeable in agricultural issues and practices, and in measures to prevent and mitigate damage to agricultural land caused by transmission line projects.
13. The Applicants should implement training for all construction supervisors, inspectors and crews to ensure that they understand the Agricultural Impact Mitigation Plan and other steps needed to protect the integrity of agricultural lands during project construction and restoration.
14. The Applicants should undertake post-construction monitoring to ensure that no damage to agricultural fields along the project route has occurred.
15. The Applicants should ensure that their contractors and subcontractors incorporate all necessary site-specific easement conditions to protect agricultural resources, as well as all statutory requirements and PSC permit conditions regarding agricultural land protection into their construction line list, and into any bid documents for the project.
16. Agricultural monitors should be retained to oversee compliance with the AIMP. The Applicants have agreed to this recommendation.

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Appendix 1- Agricultural Impact Statements

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) is required to prepare an Agricultural Impact Statement (AIS) whenever more than five acres of land from at least one farm operation will be acquired for a public project if the agency acquiring the land has the authority to use eminent domain for the acquisition(s). The DATCP has the option to prepare an AIS for projects affecting five or fewer acres from each farm. An AIS would be prepared in such a case if the proposed project would have significant effects on a farm operation. The agency proposing the acquisition(s) is required to provide the DATCP with the details of the project and acquisition(s). After receiving the needed information, DATCP has 60 days to analyze the project's effects on farm operations, make recommendations about it and publish the AIS. DATCP will provide copies of the AIS to affected farmland owners, various state and local officials, local media and libraries, and any other individual or group who requests a copy. Thirty days after the date of publication, the proposing agency may begin negotiating with the landowner(s) for the property.

Section 32.035 of the Wisconsin Statutes: Agricultural impact statement.

(1) Definitions. In this section:
(a) "Department" means department of agriculture, trade and consumer protection.
(b) "Farm operation" means any activity conducted solely or primarily for the production of one or more agricultural commodities resulting from an agricultural use, as defined in s. 91.01 (1), for sale and home use, and customarily producing the commodities in sufficient quantity to be capable of contributing materially to the operator's support.
(2) EXCEPTION. This section shall not apply if an environmental impact statement under s. 1.11 is prepared for the proposed project and if the department submits the information required under this section as part of such statement or if the condemnation is for an easement for the purpose of constructing or operating an electric transmission line, except a high voltage transmission line as defined in s. 196.491(1)(f).
(3) PROCEDURE. The condemnor shall notify the department of any project involving the actual or potential exercise of the powers of eminent domain affecting a farm operation. If the condemnor is the department of natural resources, the notice required by this subsection shall be given at the time that permission of the senate and assembly committees on natural resources is sought under s. 23.09(2)(d) or 27.01(2)(a). To prepare an agricultural impact statement under this section, the department may require the condemnor to compile and submit information about an affected farm operation. The department shall charge the condemnor a fee approximating the actual costs of preparing the statement. The department may not publish the statement if the fee is not paid.

Appendix 2 -Wisconsin Statutes Section 182.017 "Landowners' Bill of Rights"

(1g) DEFINITIONS. In this section:

(a) "Commission" means the public service commission.

(b) "Company" means any of the following:

1. A domestic corporation organized to furnish telegraph or telecommunications service or transmit heat, power, or electric current to the public or for public purposes.

2. An independent system operator, as defined in s. 196.485 (1) (d).

3. An independent transmission owner, as defined in s. 196.485 (1) (dm).

4. A cooperative association organized under ch. 185 or 193 to furnish telegraph or telecommunications service.

5. A cooperative association organized under ch. 185 to transmit heat, power, or electric current to its members.

6. An interim cable operator, as defined in s. 66.0420 (2) (n).

7. A video service provider, as defined in s. 66.0420 (2) (zg).

(c) "Municipality" means a city, village, or town.

(cq) "Telecommunications service" means the offering for sale of the conveyance of voice, data, or other information, including the sale of service for collection, storage, forwarding, switching, and delivery incidental to such communication regardless of the technology or mode used to make such offering.

(d) "Video service network" has the meaning given in s. 66.0420 (2) (zb).

(1r) RIGHT-OF-WAY FOR. Any company may, subject to ss. 30.44 (3m), 30.45, 86.16, and 196.491 (3) (d) 3m. and to reasonable regulations made by any municipality through which its transmission lines or systems may pass, construct and maintain such lines or systems with all necessary appurtenances in, across or beneath any public highway or bridge or any stream or body of water, or upon any lands of any owner consenting thereto, and for such purpose may acquire lands or the necessary easements; and may connect and operate its lines or system with other lines or systems devoted to like business, within or without this state, and charge reasonable rates for the transmission and delivery of messages or the furnishing of heat, power, or electric light.

(2) NOT TO OBSTRUCT PUBLIC USE. But no such line or system or any appurtenance thereto shall at any time obstruct or incommode the public use of any highway, bridge, stream or body of water.

(3) ABANDONED LINES REMOVED. The commission after a public hearing as provided in s. 196.26, and subject to the right of review as provided in ch. 227, may declare any line to have been abandoned or discontinued, if the facts warrant such finding. Whenever such a finding shall have been made the company shall remove such line, and on failure for 3 months after such finding of abandonment or discontinuance, any person owning land over, through or upon which such line shall pass, may remove the same, or the supervisors of any town within which said lines may be situated, may remove the said lines from the limits of its highways, and such person or supervisors shall be entitled to recover from the company owning the lines the expense for labor involved in removing the property.

(4) LOCATION OF POLES. In case of dispute as to the location of poles, pipes or conduits, the commissioners appointed in condemnation proceedings under ch. 32 may determine the location. In no case, except where the owner consents, shall poles be set in front of or upon any residence

property, or in front of a building occupied for business purposes, unless the commissioners find that the same is necessary and the court may review the finding.

(5) TREE TRIMMING. Any company which shall in any manner destroy, trim or injure any shade or ornamental trees along any such lines or systems, or, in the course of tree trimming or removal, cause any damage to buildings, fences, crops, livestock or other property, except by the consent of the owner, or after the right so to do has been acquired, shall be liable to the person aggrieved in 3 times the actual damage sustained, besides costs.

(6) MUNICIPAL FRANCHISE REQUIRED. No lighting or heating corporation or lighting or heating cooperative association shall have any right hereunder in any municipality until it has obtained a franchise or written consent for the erection or installation of its lines from such municipality.

(7) HIGH-VOLTAGE TRANSMISSION LINES. Any easement for rights-of-way for high-voltage transmission lines as defined under s. 196.491 (1) (f) shall be subject to the conditions and limitations specified in this subsection.

(a) The conveyance under ch. 706 and, if applicable, the petition under s. 32.06 (7), shall describe the interest transferred by specifying, in addition to the length and width of the right-of-way, the number, type and maximum height of all structures to be erected thereon, the minimum height of the transmission lines above the landscape, and the number and maximum voltage of the lines to be constructed and operated thereon.

(b) In determining just compensation for the interest under s. 32.09, damages shall include losses caused by placement of the line and associated facilities near fences or natural barriers such that lands not taken are rendered less readily accessible to vehicles, agricultural implements and aircraft used in crop work, as well as damages resulting from ozone effects and other physical phenomena associated with such lines, including but not limited to interference with telephone, television and radio communication.

(c) In constructing and maintaining high-voltage transmission lines on the property covered by the easement the utility shall:

1. If excavation is necessary, ensure that the top soil is stripped, piled and replaced upon completion of the operation.

2. Restore to its original condition any slope, terrace, or waterway which is disturbed by the construction or maintenance.

3. Insofar as is practicable and when the landowner requests, schedule any construction work in an area used for agricultural production at times when the ground is frozen in order to prevent or reduce soil compaction.

4. Clear all debris and remove all stones and rocks resulting from construction activity upon completion of construction.

5. Satisfactorily repair to its original condition any fence damaged as a result of construction or maintenance operations. If cutting a fence is necessary, a temporary gate shall be installed. Any such gate shall be left in place at the landowner's request.

6. Repair any drainage tile line within the easement damaged by such construction or maintenance.

7. Pay for any crop damage caused by such construction or maintenance.

8. Supply and install any necessary grounding of a landowner's fences, machinery or buildings.

(d) The utility shall control weeds and brush around the transmission line facilities. No herbicidal chemicals may be used for weed and brush control without the express written consent of the landowner. If weed and brush control is undertaken by the landowner under an agreement with the utility, the landowner shall receive from the utility a reasonable amount for such services.

(e) The landowner shall be afforded a reasonable time prior to commencement of construction to harvest any trees located within the easement boundaries, and if the landowner fails to do so, the landowner shall nevertheless retain title to all trees cut by the utility.

(f) The landowner shall not be responsible for any injury to persons or property caused by the design, construction or upkeep of the high-voltage transmission lines or towers.

(g) The utility shall employ all reasonable measures to ensure that the landowner's television and radio reception is not adversely affected by the high-voltage transmission lines.

(h) The utility may not use any lands beyond the boundaries of the easement for any purpose, including ingress to and egress from the right-of-way, without the written consent of the landowner.

(i) The rights conferred under pars. (c) to (h) may be specifically waived by the landowner in an easement conveyance which contains such paragraphs verbatim.

(8) COMMISSION REVIEW.

(a) Upon complaint by a company that a regulation by a municipality under sub. (1r) is unreasonable, the commission shall set a hearing and, if the commission finds that the regulation is unreasonable, the regulation shall be void. If the commission determines that a municipal regulation that was in effect on January 1, 2007, and immediately prior to January 9, 2008, or that a community standard, as demonstrated through consistent practice and custom in the municipality, that was in effect on January 1, 2007, and immediately prior to January 9, 2008, is substantially the same as the municipal regulation complained of, there is a rebuttable presumption that the latter regulation is reasonable.

(am) A municipal regulation is unreasonable if it has the effect of creating a moratorium on the placement of company lines or systems under sub. (1r) or on the entrance into the municipality of a video service provider, as defined in s. 66.0420 (2) (zg), or is inconsistent with the purposes of s. 66.0420.

(b) A municipal regulation is unreasonable if it requires a company to pay more than the actual cost of functions undertaken by the municipality to manage company access to and use of municipal rights-of-way. These management functions include all of the following:

1. Registering companies, including the gathering and recording of information necessary to conduct business with a company.

2. Except as provided in provided in par. (c), issuing, processing, and verifying excavation or other company permit applications, including supplemental applications.

3. Inspecting company job sites and restoration projects.

4. Maintaining, supporting, protecting, or moving company equipment during work in municipal rights-of-way.

5. Undertaking restoration work inadequately performed by a company after providing notice and the opportunity to correct the work.

6. Revoking company permits.

7. Maintenance of databases.

8. Scheduling and coordinating highway, street, and right-of-way work relevant to a company permit.

(c) A municipal regulation is unreasonable if it requires a company to be responsible for fees under s. 182.0175 (1m) (bm) that may be assessed to a municipality as a member of the one-call system under s. 182.0175.

(d) It is reasonable for a municipal regulation to provide for the recovery of costs incurred under par. (b) 1., 2., 3., and 7. through a preexcavation permit fee.

(e) It is reasonable for a municipal regulation to provide for the recovery of costs incurred under par. (b) 4., 5., and 6. only from the company that is responsible for causing the municipality to incur the costs.

(9) TIME LIMIT FOR PERMITS. If a municipality establishes a permit process under sub. (1r), the municipality shall approve or deny a permit application no later than 60 days after receipt of the application, and, if the municipality fails to do so, the municipality shall be considered to have approved the application and granted the permit. If a municipality denies a permit application, the municipality shall provide the applicant a written explanation of the reasons for the denial at the time that the municipality denies the application.

Appendix 3 – Sample of CAPX 2020 Easement

Appendix 4 - Agricultural Impacts Mitigation Plan (AIMP)

CapX2020 345 kV Electric Transmission Projects in Wisconsin

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AGRICULTURAL IMPACT MITIGATION PLAN
CapX2020

Purpose

This Agricultural Impact Mitigation Plan ("AIMP" or 'the plan') was developed by Northern States Power Company, a Wisconsin corporation (Xcel Energy), Dairyland Power Cooperative (Dairyland), and WPPI Energy (WPPI) (collectively, the Applicants) propose to construct a new 345 kilovolt (kV) transmission line between Hampton, Minnesota; Rochester, Minnesota: and La Crosse, Wisconsin and two new 161 kilovolt (kV) transmission lines in the Rochester area.

The construction standards and policies in this plan apply only to construction activities occurring partially or wholly on privately owned Agricultural Land. The measures do not apply to construction activities occurring entirely on public rights-of-way, railroad rights-of-way, publicly owned land, or private land that is not Agricultural Land. The Applicants will, however, adhere to the same construction standards relating to the repair of agricultural tile (Item No. 3 in the AIMP) when Tiles are encountered on public highway rights-of-way, railroad rights-of-way, or publicly or privately owned land.

Appendix B of this AIMP applies only to Organic Agricultural Land as described in the National Organic Program Rules, 7 CFR Parts 205.100, 205.202, and 205.101.

Unless the Easement or other agreement, regardless of nature, between the Applicants and the Landowner or Tenant specifically provides to the contrary, the mitigative actions specified in the construction standards and policies set forth in this AIMP will be implemented in accordance with the General Provisions.

General Provisions

The mitigative actions are subject to change by Landowners or Tenants, provided such changes are negotiated with and acceptable to the Applicants.

Certain provisions of this AIMP require the Applicants to consult with the Landowner and Tenant of a property. The Applicants will engage in a good faith effort to secure the agreement of both Landowner and Tenant in such cases.

Unless otherwise specified, the Applicants will retain qualified contractors to execute mitigative actions. However, the Applicants may negotiate with Landowners or Tenants to carry out the mitigative actions that Landowners or Tenants wish to perform themselves. The Applicants will pay the current commercial rate for such work.

Mitigative actions employed by the Applicants pursuant to this AIMP, unless otherwise specified in this AIMP or in an Easement or other agreement negotiated with an individual Landowner or Tenant, will be implemented within 45 days following completion of Final Clean-up on an affected property, weather permitting, or unless otherwise delayed by mutual agreement between Landowner or Tenant and Utility. Temporary repairs will be made by the Applicants during construction as needed to minimize the risk of additional property damage or interference with the Landowner's or Tenant's access to or use of the property that may result from an extended time period to implement mitigative actions.

The Applicants will implement the mitigative actions contained in this AIMP to the extent that they do not conflict with the requirements of any applicable federal and/or state rules and regulations and other permits and approvals that are obtained by the Applicants for the project or they are not determined to be unenforceable by reason of other requirements of federal and state permits issued for the project. To the extent a mitigative action required by this agreement is determined to be unenforceable in the future due to requirements of other federal or state permits issued for the project, the Applicants will so inform the Landowner or Tenant and will work with them to develop a reasonable alternative mitigative action.

Prior to the construction of the transmission line, the Applicants will provide each Landowner and Tenant with a telephone number and address which can be used to contact the Applicants, both during and following the completion of construction, regarding the agricultural impact mitigation work which is performed on their property or other construction-related matter. If the contact information changes at any time before completion of Final Clean-up and/or after the completion of construction, the Applicants will provide the Landowner and Tenant with updated contact information. The Applicants will respond to Landowner and Tenant telephone calls and correspondence within a reasonable time.

The Applicants will use good faith efforts to obtain a written acknowledgement of completion from each Landowner and Tenant upon the completion of Final Clean-up on their respective property.

If any provision of this AIMP is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the AIMP will be interpreted as if it did not contain the unenforceable provision.

Mitigative Actions

The Applicants will reasonably restore or compensate Landowners and/or Tenants, as appropriate, for damages caused by the Applicants as a result of transmission line construction, and as outlined in the “Construction Damage Payments Plan.” The decision to restore land or compensate Landowners will be made by the Applicants after discussion with the Landowner or Tenant.

1. Pole Placement

During the design of the project, the Applicants' engineering, land rights and permitting staff will work together to address pole placement issues. Applicants' staff will work with Landowners on pole placement. When the preliminary design is complete, the land rights agents will review the staked pole locations with the Landowners

2. Soil and Rock Removal for Bored Holes

Any excess soil and rock will be removed from the site unless otherwise requested by the Landowner. This includes any soil or rocks that are displaced by the placement of the transmission structure.

3. Damaged and Adversely Affected Tile

The Applicants will contact affected Landowners or Tenants for their knowledge of Tile locations prior to the transmission line's installation. Applicants will make every attempt to probe for Tile if the Landowner does not know if Tile is located in the proposed pole location. Tile that is damaged, cut, or removed as a result of this probe will be immediately repaired. The repair will be reported to the Inspector.

If Tile is damaged by the transmission line installation, the Tile will be repaired in a manner that restores the Tile's operating condition at the point of repair. If Tiles on or adjacent to the transmission line's construction area are adversely affected by the construction of the transmission line, the Applicants will take such actions as are necessary to restore the functioning of the Tile, including the relocation, reconfiguration, and replacement of the existing Tile. The affected Landowner or Tenant may elect to negotiate a fair settlement with the Applicants for the Landowner or Tenant to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile. In the event the Landowner or Tenant chooses to undertake the responsibility for repair, relocation, reconfiguration, or replacement of the damaged Tile, the Applicants will not be responsible for correcting Tile repairs after completion of the transmission line (the Applicants are responsible for correcting Tile repairs after completion of the transmission line, provided the repairs were made by the Applicants or their agents or designees).

Where the damaged Tile is repaired by the Applicants, the following standards and policies will apply to the Title repair:

A. Tiles will be repaired with materials of the same or better quality as that which was damaged.
B. If water is flowing through a damaged Tile, temporary repairs will be promptly installed and maintained until such time that permanent repairs can be made.

C. Before completing permanent Tile repairs, Tiles will be examined within the work area to check for Tile that might have been damaged by construction equipment. If Tiles are found to be damaged, they will be repaired so they operate as well after construction as before construction began.

D. The Applicants will make efforts to complete permanent Tile repairs within a reasonable timeframe after Final Clean-up, taking into account weather and soil conditions.

E. Following completion of the Final Clean-up and damage settlement, the Applicants will be responsible for correcting and repairing Tile breaks, or other damages to Tile systems that are discovered on the Right-of-Way to the extent that such breaks are the result of transmission line construction. These damages are usually discovered after the first significant rain event. The Applicants will not be responsible for Tile repairs the Applicants have paid the Landowner or Tenant to perform.

4. Installation of Additional Tiles

The Applicants will be responsible for installing such additional Tile and other drainage measures as are necessary to properly drain wet areas caused by the construction of the transmission line.

5. Construction Debris

Construction-related debris and material which are not an integral part of the transmission line, and which have been placed there by the Applicants, will be removed from the Landowner's property at the Applicants' cost. Such material to be removed would include excess construction materials or litter generated by the construction crews.

6. Compaction, Rutting, Fertilization, Liming, and Soil Restoration

A. Compaction will be alleviated as needed on Cropland traversed by construction equipment. Cropland that has been compacted will be plowed using appropriate deep-tillage and draft equipment. Alleviation of compaction of the topsoil will be performed during suitable weather conditions, and must not be performed when weather conditions have caused the soil to become so wet that decompaction attempts would not be effective or would damage the future production capacity of the land as determined by the Agricultural Monitor.

B. Significant rutting in agricultural areas should be avoided to prevent excessive soil mixing, compaction, and additional erosion. If significant rutting is anticipated or begins to occur, mitigation measures must be employed such as

stopping work to allow the area to firm up/dry out, placing construction mats, or finding alternate access to avoid the area. Where rutting or compaction does occur, areas will be repaired and restored using appropriate equipment.

C. If there is a dispute between the Landowner or Tenant and the Applicants as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or rates of lime, fertilizer, and organic material application, the Agricultural Monitor's opinion will be considered by the Applicants.

7. Damaged Soil Conservation Practices

Soil conservation practices such as terraces and grassed waterways which are damaged by the transmission line's construction, will be restored to their pre-construction condition.

8. Weed Control

On land which is owned by Applicants for substation facilities, the Applicants will work with Landowners if requested on weed control activities outside of the substations with the intent to not allow the spread of weeds onto adjacent Agricultural Land. Any weed control spraying will be in accordance with State of Wisconsin regulations.

9. Irrigation Systems

A. If the transmission line and/or temporary work areas intersect an operational (or soon to be operational) spray irrigation system, the Applicants will establish with the Landowner or Tenant, an acceptable amount of time the irrigation system may be out of service.

B. If, as a result of the transmission line construction activities, an irrigation system interruption results in crop damages, either on the Right-of-Way or off the Right-of-Way, compensation of Landowners and/or Tenants, as appropriate, will be determined as described in section 11 of this AIMP.

C. If it is feasible and mutually acceptable to the Applicants and the Landowner or Tenant, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the transmission line is also being constructed. Applicants will work with the Landowner or Tenant to identify a preferable construction time.

10. Temporary Roads

The location of temporary roads to be used for construction purposes will be discussed with the Landowner or Tenant.

A. The temporary roads will be designed so as to not impede proper drainage and will be built to mitigate soil erosion on or near the temporary roads.

B. Upon abandonment, temporary roads may be left intact through mutual agreement of the Landowner or Tenant and the Applicants unless otherwise restricted by federal, state or local regulations.

C. If a temporary road is to be removed, the Agricultural Land upon which the temporary road is constructed will be returned to its previous use and restored to equivalent condition as existed prior to their construction.

11. Trees

If trees are to be removed from privately owned farmland, the Applicants should consult with the landowners to determine if the trees are of any commercial or other value to the landowner. If the trees have value to the landowner, the landowner the right has the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to commencement of land clearing. If the landowner decides that the trees have no value, the trees should be disposed of by burning, burial or complete removal in accordance with the landowner's wishes.

12. Construction in Wet Conditions

Construction in wet conditions through agricultural land should be avoided where possible. This can cause soil compaction, rutting and erosion. If construction must continue under wet conditions, matting should be used to minimize damage to the soil. The Agricultural Monitor will determine when conditions are too wet to work through farmland. In general, when ruts exceed 6 inches in depth, soil conditions are too wet for construction without the protection of matting.

13. Procedures for Determining Construction-Related Damages and Providing Compensation

A. The Applicants have developed and put into place a procedure for the processing of anticipated Landowners' or Tenants' claims for construction-related damages. This procedure is title "Construction Damages Payments" and is part of the "CAPX 2020 Right-of-Way Guidelines." The procedure will be intended to standardize and minimize Landowner and Tenant concerns in the recovery of damages, to provide a degree of certainty and predictability for Landowners, Tenants and the Applicants, and to foster good relationships among the Applicants, Landowners and their Tenants over the long term.

B. Negotiations between the Applicants and any affected Landowner or Tenant will be voluntary in nature In the event the Applicants and a Landowner or Tenant are unable to reach an agreement on the amount of damages, the Landowner or Tenant may seek recourse through mediation.

14. Advance Notice of Access to Private Property

The Applicants will endeavor to provide the Landowner and/or Tenant advanced notice before beginning construction on the property. Prior notice will consist of a personal contact, email, letter or a telephone contact, whereby the Landowner and the Tenant are informed of the Applicants' intent to access the land.

15. Role and Responsibilities of Agricultural Monitor

The Agricultural Monitor will be retained and funded by the Applicants, but will report directly to the DATCP. The primary function of the Agricultural Monitor will be to audit the Applicants' compliance with this AIMP. The Agricultural Monitor will not have the authority to direct construction activities and will not have authority to stop construction. The Agricultural Monitor will notify the Applicants' Inspector if he/she believes a compliance issue has been identified. The Agricultural Monitor will have full access to Agricultural Land crossed by the CapX2020 projects and will have the option of attending meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include, but are not limited to the following:

1. Participate in preconstruction training activities sponsored by the Applicants.
2. Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this AIMP.
3. Report instances of noncompliance to the Applicants Inspector and DATCP.
4. Prepare regular compliance reports and submit to DATCP, as requested by the DATCP.
5. Act as liaison between Landowners and Tenants and DATCP, if necessary.
6. Maintain a written log of communications from Landowners and/or Tenants regarding compliance with this AIMP. Report Landowner complaints to the Applicants Inspector and/or Right-of-Way representative.
7. In disputes between Applicants and a Landowner and/or Tenant over restoration, determine if agricultural restoration is reasonably adequate in consultation with the Applicants Inspector.

16. Qualifications and Selection of Agricultural Monitor

The Agricultural Monitor will have a bachelor's degree in agronomy, soil science or equivalent work experience. The Agricultural Monitor will have demonstrated practical experience with pipeline or electric transmission line construction and restoration on Agricultural Land. The agricultural monitor ability to communicate effectively orally and

in writing with landowners, tenants, agency staff, and construction personnel. Final selection of the Agricultural Monitor will be a joint decision between the DATCP and the Applicants.

17. Role of the Applicants Inspector

The Applicants Inspector will:

1. Be full-time member of the Applicants inspection team.
2. Be responsible for verifying the Applicants compliance with provisions of this AIMP during construction.
3. Work collaboratively with other Applicants Inspectors, Right-of-Way agents, and the Agricultural Monitor in achieving compliance with this AIMP.
4. Observe construction activities on Agricultural Land on a regular basis.
5. Have the authority to stop construction activities that are determined to be out of compliance with provisions of this AIMP.
6. Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed.
7. Provide construction personnel with training on provisions of this AIMP before construction begins.
8. Provide construction personnel with field training on specific topics as needed.

Appendix A: Definitions

Agricultural Land	Land that is actively managed for cropland, hayland, or pasture, and land in government set-aside programs.
Agricultural Monitor	Monitor retained and funded by the Applicants, reporting directly to the Wisconsin Department of Agriculture ("DATCP") and responsible for auditing the Applicants' compliance with provisions of this AIMP.
Cropland	Land actively managed for growing row crops, small grains, or hay.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by the Applicants by virtue of which it has the right to construct, operate and maintain the transmission line together with such other rights and obligations as may be set forth in such agreement.
Final Clean-up	Transmission line activity that occurs after the power line has been constructed. Final Clean-up activities include but are not limited to: removal of construction debris, de-compaction of soil as required, installation of permanent erosion control structures, final grading, and restoration of fences and required reseeding. Once Final Clean-up is finished, Landowners will be contacted to settle all damage issues and will be provided a form to sign confirming final settlement.
Landowner	Person(s) holding legal title to Agricultural Land on the transmission line route from whom the Applicants is seeking, or has obtained, a temporary or permanent Easement, or their representatives.
Non-Agricultural Land	Any land that is not "Agricultural Land" as defined above.
Right-of-Way	The Agricultural Land included in permanent and temporary Easements which the Applicants acquires for the purpose of constructing, operating and maintaining the transmission line.
Tenant	Any Person lawfully renting or sharing land for agricultural production which makes up the "Right-of-Way" as defined in this AIMP.
Tile	Artificial subsurface drainage system.
Topsoil	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter.
Applicants Inspector	Full-time on-site inspector retained by the Applicants to verify compliance with requirements of this AIMP during construction of the transmission line. The Inspector will have demonstrated experience with transmission line construction on Agricultural Land.

Mitigative Actions for Organic Agricultural Land

Introduction

The Applicants recognize that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features. This Appendix identifies mitigation measures that apply specifically to farms that are Organic Certified or farms that are in active transition to become Organic Certified, and is intended to address the unique management and certification requirements of these operations. All protections provided in the Agricultural Impact Mitigation Plan will also be provided to Organic Agricultural Land in addition to the provisions of this Appendix.

The provisions of this Appendix will apply to Organic Agricultural Land for which the Landowner or Tenant has provided to the Applicants a true, correct and current version of the Organic System Plan within 60 days after the signing of the Easement for such land.

Organic System Plan

The Applicants recognize the importance of the individualized Organic System Plan (OSP) to the Organic Certification process. The Applicants will work with the Landowner or Tenant, the Landowner or Tenant's Certifying Agent, and/or a mutually acceptable third-party Organic consultant to identify site-specific construction practices that will minimize the potential for Decertification as a result of construction activities. Possible practices may include, but are not limited to: equipment cleaning, planting a deep-rooted cover crop in lieu of mechanical decompaction, applications of composted manure or rock phosphate, preventing the introduction of disease vectors from tobacco use, restoration and replacement of beneficial bird and insect habitat, maintenance of organic buffer zones, use of organic seeds for any cover crop, or similar measures. The Applicants recognizes that Organic System Plans are proprietary in nature and will respect the need for confidentiality.

Prohibited Substances

The Applicants will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, fuel or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic and lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

Temporary Road Impacts

Topsoil and subsoil layers that are removed during construction on Organic Agricultural Land for temporary road impacts will be stored separately and replaced in the proper sequence after the transmission line is installed. Unless otherwise specified in the site-specific plan described above, the Applicants will not use this soil for other purposes, including creating access ramps at road crossings. No topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

Erosion Control

On Organic Agricultural Land, the Applicants will, to the extent feasible, implement erosion control methods consistent with the Landowner or Tenant's Organic System Plan. On land adjacent to Organic Agricultural Land, the Applicants' erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the Right-of-Way and be deposited on Organic Agricultural Land. Treated lumber, non-organic hay bales, non-approved metal fence posts, etc. will not be used in erosion control on Organic Agricultural Land.

Weed Control

On Organic Agricultural Land, the Applicants will, to the extent feasible, implement weed control methods consistent with the Landowner's or Tenant's Organic System Plan. Prohibited Substances will not be used in weed control on Organic Agricultural Land. In addition, the Applicants will not use Prohibited Substances in weed control on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

Monitoring

In addition to the responsibilities of the Agricultural Monitor described in the AIMP, the following will apply:

A. The Agricultural Monitor will monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document any activities that may result in Decertification.

B. Instances of non-compliance will be documented according to Independent Organic Inspectors Association protocol consistent with the Landowner's Organic System Plan, and will be made available to the DATCP, the Landowner, the Tenant, the Landowner's or Tenant's Certifying Agent, the Applicants Inspector and to the Applicants.

If the Agricultural Monitor is responsible for monitoring activities on Organic Agricultural Land, he/she will be trained, at the Applicants' expense, in organic inspection, by the Independent

Organic Inspectors Association, unless the Agricultural Monitor received such training during the previous three years.

Compensation for Construction Damages

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures. Unless the Landowner or Tenant of Organic Agricultural Land and Company agree otherwise, at the Applicants expense, a mutually agreed upon professional agronomist will make crop yield determinations and the USDA Fruit and Vegetable Grading Program will make crop quality determinations. If the crop yield and/or crop quality determination–indicates the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to the Applicants and the Landowner or Tenant. Field work for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Wisconsin. The Applicants will be responsible for the cost of sampling, testing and additional restoration activities, if needed. Landowners or Tenants may elect to settle damages with the Applicants in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

Compensation for Damages Due to Decertification

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification so long as a good faith effort is made by the Landowner or Tenant to regain Certification.

Definitions
Unless otherwise provided to the contrary in this Appendix, capitalized terms used in this Appendix shall have the meanings provided below and in the AIMP. In the event of a conflict between this Appendix and the AIMP with respect to definitions, the definition provided in this Appendix will prevail but only to the extent such conflicting terms are used in this Appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certifying Agent	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.
Decertified or Decertification	Loss of Organic Certification.
Organic Agricultural Land	Farms or portions thereof described in 7 CFR Parts 205.100, 205.202, and 205.101.
Organic Buffer Zone	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.

Organic Certification or Organic Certified	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.100 and 7 CFR Part 205.101.
Organic System Plan	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.2.
Prohibited Substance	As defined by the National Organic Program Standards, Federal Regulations 7 CFR Part 205.600 through 7 CFR 205.605 using the criteria provided in 7 USC 6517 and 7 USC 6518.

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