CHAPTER
10

10. Environmental Analysis: Arcadia Route

10.1. ROUTE DESCRIPTION

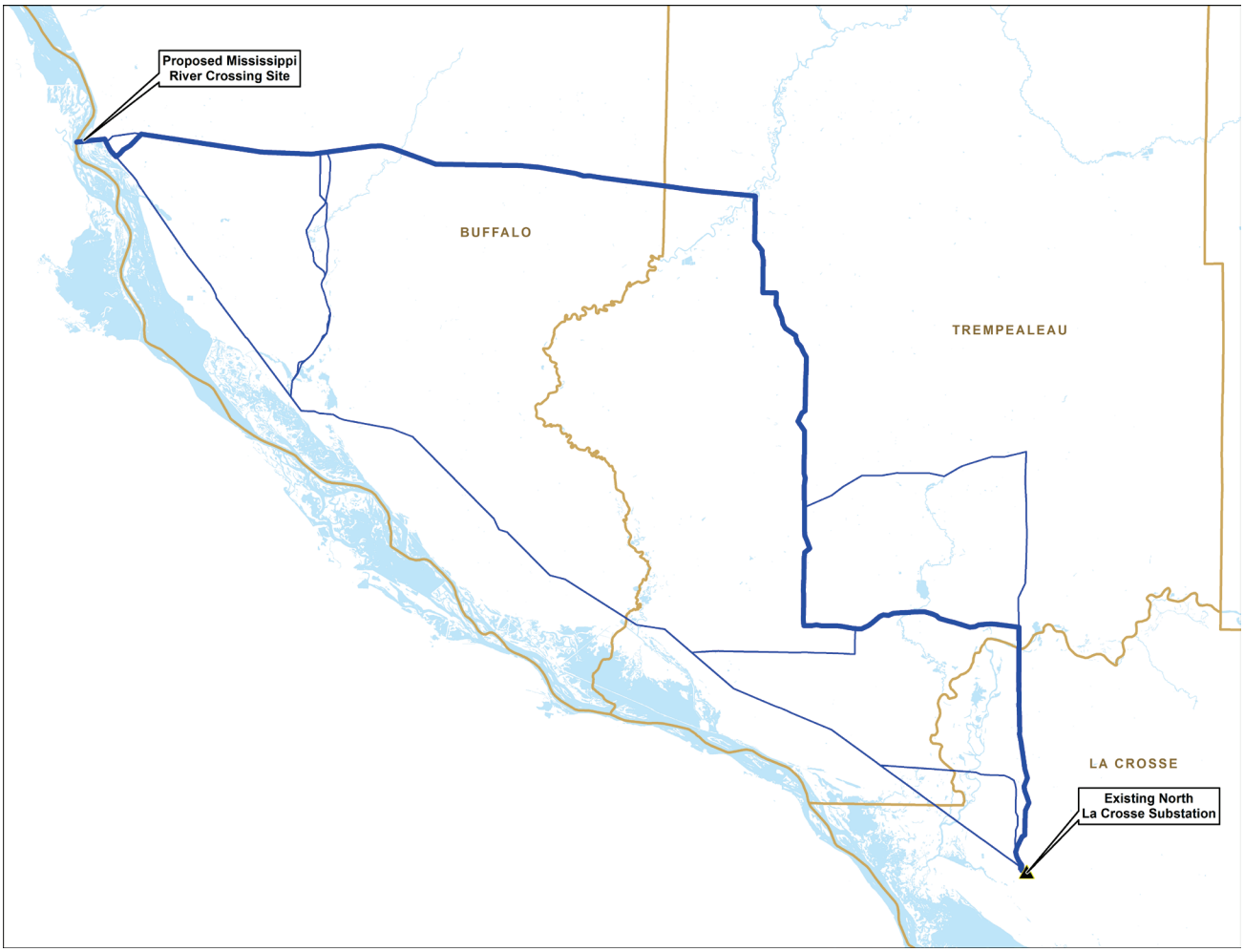
This chapter focuses on the Arcadia Route, beginning at the Mississippi River crossing at Alma in Buffalo County, crossing Trempealeau County, and ending at the proposed Briggs Road Substation site near the village of Holmen in La Crosse County. It consists of Segments 1, 2A1, 2A2, 10B1, 10C, 11A, 11B, 11C, 11D, 11E, 11F, 11G, 13A, 13B1, 13B2, 13C, 13D, 13E, 17A, 17B, 18A, 18B, 18C, 18D, 18E, 18F, 18G, and 18H, and can be tracked on the maps in Figures Vol. 2-1A, 2-1B, 2-1C, 2-1D, 2-1E, 2-1F, 2-1G, 2-1H, 2-1I, 2-1J, and 2-1K. A visualization of the entire route is shown in Figure 10.1-1.

This route is 54.8 miles long and its ROW shares 90.0 percent of its length and 48.4 percent of its area with existing corridors. The majority of these existing corridors contain electric transmission lines, either 161 or 69 kV. The new line would, in most cases, be constructed in a 150-foot-wide ROW on steel, self-supporting single poles on concrete foundations. Some poles in hilly, wooded areas may use guy wires to reduce pole diameters and weights, making construction easier.

Segment 1 is 0.9 miles long and crosses the Mississippi River at the DPC J.P. Madgett Power Plant at Alma. The new line would be triple-circuited with existing 161/69 kV lines, using steel multi-pole structures and expanding the existing 180-foot ROW to 280 feet. The segment also crosses railroad tracks, STH 35, and an existing 161 kV transmission corridor. On the Wisconsin side of the crossing, the route turns southeast to follow the ROW of the DPC 161 kV Q1 transmission line, paralleling STH 35 and the BNSF railroad tracks for 0.7 miles on Segments 2A1 and 2A2. An additional 27.5 feet of new ROW on private property would be needed in addition to the ROW shared with the existing line.

From this point on, except for the route segment connecting to the eastern terminus for the line, this route is different from the "Q1" routes. Segment 10B1 heads northeast, cross-country over the river bluffs, on an entirely new ROW, for 1.1 miles to connect the route to the existing Alma- transmission line corridor. Segment 10B1 also skirts a housing development on the uplands above Alma. A 150-foot ROW on private property would be cleared across the wooded slopes on this segment. Above Alma, the route continues eastward for 20.7 miles, cross-country, following the existing DPC Alma-Tremval 161 kV transmission line ROW on Segment 10C. The existing line would be double-circuited with the new 345 kV line on steel single poles, requiring a 70-foot expansion of the existing ROW.

Figure 10.1-1 Arcadia Route



An alternative approach to crossing the river bluffs is for the line to follow Segment 10B2 instead of 2A2 and 10B1. See the map in Figure Vol. 2-1A. This alternative approach is a shorter climb over the bluff and passes through less woodland. However, it bisects a new housing development on the ridge-top, where roads and infrastructure have been installed but not all home sites have been sold or developed.

About 0.3 miles east of STH 93, the route turns south, continuing in that direction, mostly cross-country, until it reaches STH 54. Segment 11A consists of 0.9 miles of entirely new ROW that links the new line to an existing DPC 69 kV line. Segment 11B shares the 69 kV transmission line corridor for 2.0 miles and would require expanding the ROW by 70 feet. To avoid some homes, Segment 11C leaves the existing 69 kV ROW for a distance of 0.8 miles. Segment 11D mostly shares ROW with Thompson Valley Road for 1.1 miles, following along the west side. An additional 84 feet of new ROW would be needed adjacent to the road. On Segments 11E, 11F, and 11G, the new line would be double-circuited with the DPC 69 kV line for about 10.6 miles. Where the new line would share the existing 69 kV line 80-foot ROW, the ROW would be expanded to 150 feet. For the 0.4 miles of Segment 11F, an entirely new ROW would be established to improve construction access and remove the 69 kV line from a steep hillside. Approximately 0.4 miles of Segment 11G, along Thompson Valley Road just north of Norway Valley Road, and another 0.4 miles along Grove Lane would share road ROW, requiring 84 more feet of new ROW on the east side of each road. A 0.6-mile section of this segment would be located on entirely new ROW, and the existing 69 kV line moved to the new ROW in order to remove it from a wooded ridge.

Once the route reaches STH 54/93, it leaves the existing 69 kV line ROW, turning east to follow the highway for 6.6 miles, passing through the southern part of Galesville along the same path to the Briggs Road substation sites as the Q1-Galesville Route. The route crosses the highway seven times to avoid homes. On Segments 13A, 13B1, 13B2, 13C, and 13D, the amount of new ROW that would be acquired varies from 0 to 110 feet, with the remainder of the 150-foot ROW overlapping highway ROW. Segment 13E continues east for 0.7 mile, cross-country, on entirely new ROW, until it meets the NSPW 161 kV Tremval-Mayfair line running north-south about 0.25 mile east of and parallel to USH 53/STH 93. For the remainder of the route, the new line would be combined with this line on double-circuit single poles.

Turning south, Segments 17A, 17B, and 18A follow the 161 kV line for 5.1 miles, until the route leaves the existing transmission line ROW in order to follow USH 53/STH 93. On Segments 17A and 18A, an additional 25 feet of ROW would be acquired on each side of the existing 100-foot ROW. Segment 17B also follows the east side of Aspeslet Road for approximately 0.4 miles. The existing 161 kV line would be relocated to the east side of that roadand double-circuited with the new line, requiring 80 feet of new ROW. Segment 18B is a 0.3-mile connector on new ROW between the existing transmission line ROW and the CTH HD corridor. The existing 161 kV line would be moved to this new corridor as well. After following CTH HD for 0.6 miles on segment 18C, the route leaves the corridor, proceeding south and west for 1.8 miles, mostly on new corridor, through Segments 18D, 18E, 18F, and 18G until it joins the USH 53/STH 35/STH 93 corridor. An 800-foot section of Segment 18F follows the west side of Briggs Road as it passes between Holmen High School and a residential area, requiring 106 feet of new ROW. The last segment, Segment 18H, follows the west side of USH 53/STH 35/STH 93 for 0.7 miles to the proposed Briggs Road Substation site. This final segment shares 70 feet of highway ROW and requires 80 feet of additional ROW.

10.2. GEOGRAPHY

10.2.1. Geology

Like the area of the Q1 Routes, the Arcadia project area is located in Wisconsin's Driftless Area, which was bypassed by the glaciers from the north. This unglaciated or "driftless" region was once covered by limestone deposits. Erosional forces have worn away and deeply dissected much of the original plain. Limestone is now found only as remnants capping the ridge tops and higher hills. In the bottoms and river lowlands, it has eroded away, leaving the older Cambrian sandstone with some dolomite and shale. Outcroppings of bedrock are common for the region, especially on the sheer bluff faces along the Mississippi River.

The landscape was modified by glacial meltwater streams and later non-glacial streams, as well as wind deposition and erosion processes. The melting of the massive ice fields produced torrential flows of meltwater in streams and rivers of this region. Valley trains of gravel and sand were deposited from the outwash. This was followed by a drop in the water level of the Mississippi River and its tributaries. Over time, tributary streams eroded into their flood plains and meandered inside the larger glacial outwash valleys. In a relatively short time period, a large portion of the flood plains of glacial times has been altered, leaving narrow, dissected terraces.

For thousands of years, sediment has continually been deposited on the floor of the project area floodplains. However, about 150 years ago, agricultural practices began to destroy the protective covering of sod and forest litter and accelerated erosion processes. In some drainageways this post-settlement alluvium is quite significant. The earlier, older topsoil in the stream valleys has been buried in many places,

and new soil development has begun on the surfaces of the alluvial soils covering the earlier, buried topsoils.

10.2.2. Topography

The Arcadia Route is in the Western Coulees and Ridges Ecological Landscape.[126] This region includes the southwestern and west-central portions of Wisconsin. It is characterized by highly eroded, thoroughly-dissected upland with high, narrow ridges and deep, steep-sided valleys. Constant geologic erosion occurs where slopes are steep and very steep. Some areas, such as those identified as stony and rocky land, have so much runoff that geologic erosion almost keeps pace with the weathering of bedrock and the initial stages of soil formation.

Bedrock is often at or close to the surface. The elevation of the limestone ridges is about 1,200 feet, or about 500 feet above the adjacent valleys. Most of the rolling sandstone uplands are about 250 feet above the adjacent valleys. Aside from the upland itself, the strongest topographic features of the region is the Mississippi River Valley and the numerous Mississippi River tributaries including the Trempealeau and Black Rivers.

The topography and its challenges vary among different parts of the proposed transmission route.

The Arcadia Route begins by crossing the Mississippi River floodplain (Segment 1). It then moves slightly up the hillside (approximately 770 feet AMSL) and turns south along the Mississippi River valley for a short distance (Segments 2A1 and 2A2). Segment 10B1 then turns northeast, up a steep river valley, climbing at a 10 percent gradient to an elevation of 1,260 feet AMSL. Alternative route Segment 10B2 is similar to Segment 10B1 but climbs a steeper bluff with a gradient of approximately 30 percent, before arriving at the uplands.

The 20.7 miles of Segment 10C repeatedly crosses river valleys and upland ridges, often varying more than 500 feet in elevation. Difficulty of construction can be inferred by the ease with which construction equipment can move between pole locations along the ROW. This more varied topography would result in approximately 10.5 miles of off-ROW access roads. Of the 99 proposed transmission structures on this segment, in approximately 65 instances, construction equipment would not be able to travel along the ROW between pole locations. For more information about the length and impacts associated with access roads for this route, see Section 10.5 in this chapter.

The route briefly crosses the lowlands and floodplains of the Trempealeau River valley at the eastern end of Segment 10C, Segment 11A, and half of Segment 11B to the south. For the next 13 miles, the route again travels through the varied topography of numerous river valleys and steep upland ridges (southern Segment 11B through most of Segment 11G). Elevations range from 800 to 1,220 feet AMSL. The dramatic up and down topography of the region would require numerous off-ROW access roads to reach the proposed transmission structure locations.

Once Segment 11G leaves the uplands, it crosses through the Tamarack Creek lowlands to STH 54. At first paralleling STH 54/STH 93 and later USH 53 (Segments 13A to 13D), the route continues eastward cross-country and then south within the relatively flat lowlands along the highways, Beaver Creek and the various prairies and wetlands east of the Black River (Segment 13E to Segment 18H).

[126] Ecological Landscapes of Wisconsin, WDNR website: http//dnr.wi.gov/landscapes.

10.2.3. Soils

The soil types and their distribution are greatly influenced by the bedrock of the region, its water regimes, and the area's vegetation and land use.

Wind-borne loess, water-borne alluvium, and colluvium at the bases of bluffs form the uppermost geologic deposits and, in addition to the bedrock, are the parent materials for many of the local soils. The sedimentary bedrock of sandstones and dolomitic limestone are overlain by soils of silt loams (loess) and sandy loams. 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. Aeolian silt deposits are present and range from 0.5 to 16 feet deep with decreasing depths from southwest to northeast.

The Arcadia Route starts by crossing the wet loamy and sandy alluvial soils characteristic of the Mississippi River bottom lands (Segment 1). It consists of highly variable, medium-textured materials transported by stream waters and waters that ran off the nearby terraces and uplands. Bedrock is between 50 and 100 feet of the land surface. The route then turns south for a short distance along the gently undulating soils of stream terraces and outwash plains (Segments 2A1 and 2A2).

Segment 10B1 and alternate Segment 10B2 swing across a steep gradient to the uplands over predominantly steep stony and rocky land, and the Fayette and Downs silty soils. Segment 10C varies between soil associations of the uplands and the loamy and silty soils of the lowlands. In Buffalo County, upland soils continue to be dominated by Fayette on the hill tops and steep stony and rocky land plus more developed Downs and Dubuque soil units on the hillsides. Valley sideslopes have thinner topsoil and can be more susceptible to erosion with slopes up to 25 percent. Depth to bedrock varies from 5.0 feet or less in the uplands and between 5.0 and 50 feet below the ground surface in the river valleys. In Trempealeau County (Segments 10C through part of 11G), the limestone that underlays the Dubuque soils and stony and rocky land is thin or completely eroded away and sandstone predominates. The dominant upland soil association is Seaton-Palsgrove-Dubuque-Fayette-LaFarge-Eleva-Norden. These soils consist of well-drained silty and loamy soils with a silt loam or sandy loam surface over non-calcareous silty loess or over loamy, sandy, or clayey residuum or colluvium. About 60 percent of this association is moderately steep or steeper. Peripheral to the limestone ridgetops are steep, stony, and rocky escarpments that drop sharply down to moderately steep valley slopes. The difference in elevation rom the ridgetops to the valley bottoms ranges from 300 to 400 feet.

The soil units in the valleys are varied and include the Bertrand-Richwood-Toddville-Meridian-Tell-Arenzville-Orion-Ettrick soil associations. These soils range from well-drained to poorly drained silty soils with a silt loam surface over non-calcareous sandy or silty alluvium or over sand outwash. The variety in drainage is illustrated by the amounts of wetland in juxtaposition to the land covered by crops or buildings and infrastructure.

Within the varied topography of Segments 10C and 11G, seven transmission structures would be constructed on soils identified by the soil survey as severely eroded (and erodible) with slopes ranging from 6 to 30 percent. Another 12 proposed transmission structures would be located on steep stony and rocky land which has shallow and fragile soils. With shallow soils to bedrock, there might be the need for blasting as well as augering to install the transmission foundations. Increased potential for environmental impacts would be anticipated from construction on steep wooded hillsides found along the edges of the uplands and areas identified as having erosion issues. Additionally, steep wooded hillsides may contain rare species that may be impacted by the proposed construction. See Section 10.2.

Once Segment 11G leaves the uplands, it continues eastward and then south within the relatively flat lowlands around the state highways and through river valleys, and various prairies and wetlands. The lowlands of this section (southern end of Segment 11G through 18H) consist of soils similar to the Mississippi River Valley soils found along Segment 1 and also the Bilson-Elavasil-Merit-Sparta-Gotham soil associations. The Bilson soil association is well-drained loamy and sandy soils with a sandy loam, silt loam, or loamy fine sand surface over non-calcareous sandy or loamy alluvium, hill slop alluvium or colluvium. Greater than 70 percent of the area has bedrock within 5 feet of the land surface with the exception of the river valleys where bedrock may be at a depth of 100 feet or more. Segments 18F through 18H are located in areas where the bedrock is located greater than 100 feet below ground.

10.2.4. Land cover in general

The land use of the Buffalo, Trempealeau, and La Crosse counties is almost entirely agricultural. The flat areas that are not too wet in the lowlands and not too steep in the uplands are farmed. Numerous creeks dissect the uplands and run through the hillsides toward the Mississippi River. These steep hillsides are forested with exposed outcroppings. The variable relief makes a significant portion of the land area non-developable. Roads wind in and around steep gradients, following river valleys to some degree. Straight line transmission routes, with the exception of those along the Mississippi River Valley, are not environmentally appropriate.

The woodlands on the lowlands are dominated by willow, soft maple, box elder, ash, elm, cottonwood, and river birch trees, and prairie vegetation. Extensive stands of bottom land hardwoods such as elm and cottonwood are found in the vicinity of the Black and Mississippi Rivers. Upland woods which in pre-settlement times were populated with oaks today are mostly broad-leaved deciduous forest with oak and maple as the predominant hardwood. Oaks continue to grow along the steep hillsides. In a few places on the steep bluffs along the Mississippi River, where access to water and fertility are low, red cedar makes up a large part of the stand.

Human populations have remained somewhat static over the past 30 years, except for the area in and around the city of La Crosse where populations have increased more than 20 percent since 2000. The village of Holmen continues to grow. In the rural areas, the population densities are relatively low. Small urban areas are located along major highways and on the flatter river valleys.

10.3. NATURAL RESOURCES AND IMPACTS

10.3.1. Woodlands

A general discussion of potential woodland impacts can be found in Chapter 5, Section 5.5.17. Particular woodlands along the Arcadia Route are discussed here where potential specific impacts are noted.

10.3.1.1. Existing environment

The route is punctuated by alternating bluff lands and stream valleys. Upland areas that formerly were populated with oak woods currently support forests with oak and maple as the predominant hardwood trees. Oaks, hickory, and basswood continue to grow along the steep hillsides. The woodlands of the lowland stream valleys are dominated by willow, soft maple, box elder, ash, elm, cottonwood, and river birch trees, and prairie vegetation.

10.3.1.2. Potential impact

The expected ROW for the new line would be about 150 feet wide, in many cases expanded from the existing 161 or 69 kV ROW. Xcel, as the lead utility for the project, has provided a visualization of the tree clearing that would be required for the ROW. It is shown in Figure 4.2-1 in Chapter 4.

Indirect impacts would likely result from increasing the width of the disturbed corridor. Edge effects such as changes in vegetation structure, light conditions, and moisture conditions would encroach further into the interior of the forest. The increase in edge-to-interior ratio would be a measure of forest fragmentation. Large corridors in a forest block generally provide conduits for the introduction of invasive plant and animal species and result in barriers to the movement of local wildlife, including increased exposure to predators.

Overall, there would be about 140 new acres of upland woods cleared along the Arcadia Route. This is more than there would be for any other route except the Arcadia-Ettrick combination (see Chapter 11).

Where the existing 161 kV line has a cleared ROW through woodlands, on Segments 10C or 11B, the new double-circuit line would require a wider ROW. On steeper, larger slopes, however, the applicants indicate that they would cut trees on the downslope only as far as necessary to avoid tree-transmission contact. Considering clearance requirements plus an additional number of feet for future growth, there would likely be trees on the valley floor that would never grow into the wire on some high spans. These trees would not need to be cut.

The forested area along Segment 10B1 heading upslope from the Mississippi River Valley, would require about 13.5 acres of new forest ROW clearing over a distance of about 1.0 mile. Alternative Segment 10B2 (termed by the utilities the Arcadia-Alma Option) would require about 5.65 acres of new ROW clearing over about the same distance, but Segment 10B2 has other issues related to residences and home development.

Segment 10C would require about 40 acres of new woodland clearing over about 21 miles of ROW. West of the town of Lincoln, the ROW on Segments 10C would require cutting off small portions of wooded blocks, resulting in less total woodland habitat and more edge habitat per acre of woods than previously. In the town of Lincoln, the route bisects a larger wooded area and the existing ROW would be widened. Another wooded block is bisected west of STH 88 in the town of Waumandee. This also would be widened, except possibly for the downslope portion that has remained wooded because of the existing line's high clearance.

East of STH 88, another wooded block is bisected by the existing ROW (which would be widened), except for the steeper slopes on each side of the ridge east of STH 88 and west of Wojchik Valley Road. Another ridge, further east in the town of Waumandee near CTH E, would require a widened ROW and also have to accommodate an angle structure at the crest of the ridge (with a possibly wider ROW at that point). Again, it may be possible to leave trees on the steeper slopes standing because of the high clearance. In the town of Glencoe, small woodland parcels would be made even smaller by widening the ROW, but another steep slope on the west side of the ridge west of Bremer Ridge Road could be left wooded because of the high clearance needed. Another previously bisected woodland east of Bremer Ridge Road would be made smaller by widening the existing ROW and creating new edges. Just east of the Trempealeau County line, there is a large woodland with a narrow portion where the existing ROW bisects it. New edges would be created on either side of the widened ROW.

On the portion of the route that heads south toward STH 54, there are smaller wooded areas where the existing ROW would be widened, possibly creating new edge habitat. Segments 11A, B, C, and D east of Arcadia would require about 10 acres of new woodland clearing over about 25 miles, depending on the steepness of some of the slopes. Segments 11E and 11F, skirting the ridges east of Thompson Valley Road, would require widening a ROW near the edge of a large woodland, removing about 7.94 acres of trees. Some southern slopes may be steep enough that the high clearance would allow some trees to remain.

Segment 11G follows the existing 69 kV utility corridor in the area, but substantial clearing would be necessary for access roads and ROW widening. Segment 11G also skims the edges of larger forested complexes, takes larger portions of smaller woodlands, and crosses many active crop lands. There may be steep slopes on some ridges where the clearance can allow trees to stand, but this is not known yet. Segment 11G would require new clearing of about 32 acres of ROW woodland, depending on slopes, over about ten miles of line.

There would be very little woodland impact along STH 93/54 and Segments 13A and 13B1. From there to the proposed substation sites, the route would be identical to the Q1-Galesville Route described in Chapter 8, and the potential woodland impacts would also be the same. Trees would need to be removed from the ROW along the route south and east of Galesville, usually from smaller patches or the edges of larger tracts. Along USH 53, Segments 17A and 17B could affect about 800 feet of mixed forest between the roadway and the proposed ROW. The new ROW would expand on the already-existing, cleared 161 kV ROW, but moving the proposed ROW closer to the roadway could reduce habitat and forest fragmentation. These segments are a mix of residential/commercial places, crop production areas, and smaller forested areas. Segment 18A would also follow the existing transmission corridor on the edge of the large forested complex. The proposed access routes for the line appear to cut though this large forested complex and not follow any existing open areas. Cutting through large forested complexes for access roads may create introduction of invasive species, more edge habitat, or the loss of managed timber lands. Except for Segment 18G, where about five acres of woodland could be removed, there would be very little woodland impact where the line would be routed through Holmen.

10.3.2. Endangered and threatened species and communities

The Arcadia Route has no segments in common with the Q1-Highway 35 Route except for the first, Segment 1, at the Mississippi River crossing and the last, Segment 18H, leading to the proposed substation site. The Arcadia Route shares the same segments as the Q1-Galesville Route east of the juncture of Segments 13B1 and 13B2 along STH 93/54, where the Q1-Galesville Route Segment 6 meets STH 93 west of Engen Road. This section focuses on potential endangered resource impacts that may be present on segments unique to the proposed Arcadia Route or that may be different in nature or magnitude relative to the other routes.

10.3.2.1. Natural communities

Approximately 42 percent or 422 acres of 1,007 total acres of the ROW area for this route is located in non-agricultural upland and wetland (*i.e.*, forested and non-forested wetland, upland forest, upland shrub, and prairie/grassland.)

The Arcadia Route crosses uplands in rural agricultural areas predominantly on private lands, which means that the NHI database may not be a reliable indicator of upland natural community types present along the route. NHI information has been supplemented by the applicants' field assessments. As expected because of the steeper topography and/or narrower riparian corridors, Table 10.3-1 identifies fewer floodplain

forest and/or shrub-carr NHI natural community occurrences along the proposed Arcadia Route relative to the Q1-Highway 35 Route. Aerial photo inspection and the applicants' field assessments tend to confirm this.

Table10.3-1 NHI natural community occurrences summarized for the Arcadia Route

NHI - Natural Community Type	Number of Occurrences
Alder Thicket	1
Cedar Glade	
Dry Prairie	1
Dry-Mesic Prairie	0
Emergent Marsh	5
Floodplain Forest	3
Lake-Oxbow	1
Lake - Shallow, Hard, Drainage	0
Moist Cliff	0
Oak Barrens	0
Sand Prairie	2
Shrub-Carr	2
Southern Dry-Mesic Forest	0
Southern Sedge Meadow	3
Southern Tamarack Swamp (Rich)	1
Stream - Fast, Hard, Cold	0

Source: WDNR - NHI Database

Table 10.3-2 provides the acreage of natural community impacts as acreages of land cover types. Upland forest, followed by wetland forest and wetland communities are the most impacted. Transmission lines built on existing or new ROW in forested natural communities result in permanent changes through forest loss and indirectly from fragmentation and edge effects. These changes in turn alter habitat conditions such as light, moisture, vegetation composition and structure, for the plant and animal species that live there.

Table 10.3-2 Summary of area affected in acres, by general habitat type

Habitat Type	Arcadia in ROW	Arcadia Out of ROW (Access)	Arcadia Total In/Out ROW
Forested Upland	262.5	5.5	268
Forested Wetland	45.9	0	45.9
Non-Forested Wetland	65	0.6	65.6
Grassland	34.9	1.8	36.7
Shrub Upland	4	0	4
Total In ROW	412.3	7.9	420.2

Source: Table 8 of Applicant's Confidential Rare Species Report, January 2011.
Note: Methods used to arrive at these numbers are different than those used to measure land cover in Appendix A, Table 2 of the CPCN Application. For that reason, direct comparisons between the two tables cannot be made.

More specifically, the NHI natural community occurrences are likely to under-represent the presence of high quality or diverse southern dry forest, southern dry-mesic forest, and mesic forest communities. Major tree species identified in the applicants' habitat assessment are aspen, basswood (*Tilia americana*), birch, black walnut (*Juglans nigra*), black cherry, cottonwood, elm, hickory (*Carya ovata*), red oak, northern pin oak (*Quercus ellipsoidalis*), and white oak (*Quercus alba*) in varied proportions. Open upland habitats include dry prairie and disturbed grassland. The most diverse upland prairie or grassland communities

described in the applicants' habitat assessment are found on existing ROW at the top of steep slopes mixed with forested habitat or toward the interior of the agricultural landscape.

10.3.2.2. Rare species

The Arcadia Route has approximately 58 special concern, threatened, and endangered species occurrences recorded within 2.0 miles of the proposed ROW. The occurrences are primarily fish, birds and terrestrial plants as summarized in Table 10.3-3. This number is less than the original Q1 Route and the Q1-Highway 35 Route, and probably a reflection of a more fragmented landscape where natural habitat remains within a matrix of agricultural development. However, the relative lack of public conservation lands, which limits access for species surveys, may also be a factor.

The Black-Buffalo-Trempealeau Basin contains 62 percent of the state's endangered, threatened or special concern species.

Table 10.3-3 Summary of NHI rare species occurrences along the Arcadia Route, by taxa

Taxa	Arcadia Special Concern	Arcadia Threatened	Arcadia Endangered
Bird	3	3	1
Butterfly	1		
Dragonfly/Mayfly	5		1
Fish	9	5	4
Mammal	1		
Mussel	1	1	0
Snake	2		1
Terrestrial Snail		1	
Turtle		1	
Terrestrial Plant	9	3	
Aquatic/ Wetland Plant	4	2	
Total	35	16	7

Special Concern = SC; Threatened = THR; Endangered = END

The following sections address rare species along the Arcadia Route by major taxa.

10.3.2.3. Fish, mussels, and aquatic invertebrates

Twenty-six of the recorded rare species occurrences for this proposed route are fish, mussels, or aquatic dragonflies and mayflies. One threatened and one special concern mussel species is recorded within the Black River (Segment 17A). Fish occurrences are associated with the Mississippi River (Segment 1), Black River, and Beaver Creek (Segment 13B2). One endangered mayfly and five special concern dragonfly or mayfly species are recorded in the Black River and also one special concern species in Beaver Creek. Similar to the Q1-Galesville Route, the floodplain zones for proposed waterway crossings are narrow and thus can be spanned by the proposed line. The methods to avoid or minimize impacts to aquatic species described for the Q1-Galesville Route in Chapter 8 would be applicable to this route as well.

10.3.2.4. Turtles and snakes

One occurrence of the wood turtle is recorded in the NHI search area for this route near the Black River crossing, which is along a segment coincident with the Q1-Galesville Route. Blanding's turtles may also be present in Beaver Creek; however, the occurrences were not recorded in the NHI search area. There is relatively less suitable habitat for both of these species and, therefore, if this route is approved, it might be easier to successfully implement avoidance and minimization measures.

The evaluation provided in Section 8.3.3.4 in Chapter 8 for the EMR and the timber rattlesnake along the Q1-Galesville Route would also apply to the Arcadia Route.

10.3.2.5. Terrestrial invertebrates

This proposed route has one occurrence of a special concern butterfly species recorded in the NHI search area. The conclusions and recommendations for this species along the proposed Q1-Galesville route are applicable to the species along this route as well.

Portions of Segments 10C and 11G (see Figures Vol. 2-1B through 2-1D and Figure Vol. 2-1G), in addition to Segment 18, may contain suitable habitat for the wing snaggletooth. The applicants' Rare Species Report indicates that some of these areas can be avoided. However, the conclusions in that report should be reevaluated against the final pole locations and access routes. If this route is approved, additional surveys or assessments by someone familiar with the species and its habitats would be needed (1) to determine whether the wing snaggletooth was present, and (2) if necessary, to delineate the extent of the occurrence relative to the proposed workspace, prior to construction. Overall, this proposed route contains more ROW area and pole locations in potentially suitable habitat than the Q1–Galesville Route or the Q1-Highway 35 Route and, therefore, the effort at delineating and avoiding impacts to this species may also be greater.

10.3.2.6. Birds

Three special concern, three threatened, and one endangered bird species are recorded within the NHI search area. During the applicants' bird survey, one state threatened species, the red-shouldered hawk, was identified near the Mississippi River crossing in Segment 1, the segment common to all proposed routes. Along Segment 11, which is unique to the proposed Arcadia Route (see Figures Vol.2-1D through Vol. 2-1G), eight special concern bird species were identified. The Arcadia Route crosses more upland habitat, and the birds identified during the applicants' survey along Segment 11 include species that prefer upland forest, shrub, and open habitats.

The evaluation of potential impacts to rare bird species provided for the Q1–Galesville along Segments 13 to 18 would also be applicable to the Arcadia Route, and similar potential impacts could be expected along Segments 10 and 11 of the Arcadia Route as well. However, for a route such as this, in predominantly upland habitat with significant agricultural land use, the nature of the impacts may be different. In upland agricultural landscapes, incremental losses of natural habitat and changes in vegetation structure are the primary sources of long-term impact because the habitat is already often infested by nonnative species. Many rare birds are more sensitive to vegetation structural changes than to species composition. In a fragmented habitat, it is very difficult to estimate how much incremental loss or change can occur before important characteristics like vegetation structure become unsuitable to rare birds.

10.3.2.7. Plants

Nine special concern and three threatened terrestrial plant species, and four special concern and two threatened aquatic plant species, are recorded in the NHI search area near the proposed Arcadia Route. Although no rare plant surveys were completed for this project, the applicants' habitat assessment found one special concern plant along a forested portion of Segment 2A near Alma. Two species, Hill's thistle and snowy campion, are in habitats intersected by Segment 2A. Additional rare plant occurrences, including the state threatened prairie milkweed (*Asclepias sullivantii*) are recorded on or near Segment 18G. Segments 10 and 11, unique to the Arcadia Route, have upland habitat that is potentially suitable for rare plant species. However, there are no NHI plant occurrences recorded along either segment. If this route were chosen, a more careful assessment of Segments 10, 13, 17, and 18 would need to be considered based on the applicants' rare species report that identified moderate to good quality habitats. Minimizing

impacts to moderate or high quality habitat could indirectly minimize impacts to rare plants as well as implementing measures like winter construction, matting, and workspace limitation.

10.3.2.8. Summary of endangered resources impacts for the Arcadia Route

The Arcadia Route has proportionally more upland than wetland habitat, more than the Q1-Highway 35 Route or the Q1-Galesville Route, but because it is the longest of the three utility-proposed routes, the absolute acreage of wetland in the ROW is greater. For those route segments unique to the Arcadia Route, no occurrences are recorded in the NHI search area. However, this lack of recorded occurrences may be an artifact of the route's predominance of private lands that have never been inventoried for rare species. The habitat assessment included in the applicants' Rare Species Report can be used as a guide to the location of suitable habitat for rare species. If this route is approved by the Commission, additional surveys or assessments will probably be needed in suitable habitat along Segments 10 and 11, depending on the species and final design and schedule of the project.

For those segments in common with the Q1-Galesville Route (Segments 13 through 18) the impact evaluation would be the same for the Arcadia Route. For Segment 1, the impact evaluation would be the same as for both the Q1-Highway 35 Route and the Q1-Galesville Route. If the Arcadia Route were approved by the Commission, consultation for incidental take would likely be needed for rare turtles, the wing snaggletooth snail, and rare bird species—similar to what would be needed for the Q1-Galesville Route. With the potential exception of Segment 1, waterway crossings that might support rare aquatic invertebrates, mussels and fish would be spanned, and there is less floodplain habitat.

Impacts to the wing snaggletooth snail might be greater along this route than along the Q1-Highway 35 and Q1-Galesville Routes. At a minimum, more areas of concern would need to be addressed through further assessment or sampling. This need would depend on the final location and extent of ground disturbing activities relative to suitable habitat.

10.3.3. Rivers and streams

This section describes the streams and basins where the proposed project route is located and smaller watersheds within the basins that could be affected by the project.

10.3.3.1. Basin information

The proposed route, like the other proposed routes for this project, would be located in the Black, Buffalo, and Trempealeau Basins. The BBT group is a group of distinct river basins that drain directly to the Mississippi. The three basins in the BBT group include several watersheds and many unique and rare aquatic habitats. The group is part of the Great Western Rivers area of Wisconsin. The ridge tops and valleys of the "Driftless Area" generally support forests and agriculture, respectively. The driftless terrain drains to the Mississippi's wide floodplains that can be viewed for miles from the region's steep bluff overlooks. Along the Arcadia Route, the BBT group includes the Little Buffalo River watershed, the Waumandee Creek watershed, the Middle and Lower Trempealeau River watersheds, the Beaver Creek and Lake Marinuka watershed, and the Lower Black River watershed. These are illustrated in Figure Vol. 2-4. Figure Vol. 2-4 also illustrates designated trout waters and their tributaries that could be affected by construction along the Arcadia Route. The floodplains associated with the major stream outflows are shown in Figure Vol. 2-5.

10.3.3.2. Hydrologic features

As with each proposed route for the project, the very western portion of the route in Wisconsin lies in the Lower Buffalo River Watershed. The watershed is dominated by forests and agriculture, but has problems with agricultural nonpoint source pollution affecting streams and groundwater in the watershed. Most streams in the Lower Buffalo River Watershed have stream habitat that has been severely degraded by agricultural nonpoint source pollution. All assessed streams have degraded fishery habitat, mainly due to stream bank destruction and in-stream sedimentation.

A large portion of Segment 10C crosses the Waumandee Creek watershed. This watershed is approximately 142,060 acres in size and consists of 508 miles of streams and rivers, 3,011 acres of lakes, and 8,254 acres of wetlands. The watershed is dominated by forests and agriculture. The Waumandee Creek watershed empties into the Mississippi River at the southern end of STH 88, about ten miles south of the Arcadia Route.

Segment 10C continues eastward into the Middle Trempealeau River Watershed, crossing the Trempealeau River northeast of Arcadia. The watershed is approximately 131,498 acres in size and consists of 490 miles of streams and rivers, 397 acres of lakes, and 5,115 acres of wetlands. It also is dominated by forest and agriculture and is ranked high for nonpoint source pollution affecting groundwater in the watershed.

The portion of the route heading southward along Segments 11A through 11G from Arcadia crosses the Lower Trempealeau River Watershed, which is approximately 113,345 acres in size and consists of 333 miles of streams and rivers, 4,667 acres of lakes, and 13,987 acres of wetlands. The watershed is dominated by forests and agriculture. It empties into the Mississippi River near the unincorporated village of Marshland, south of the Arcadia Route.

South of Galesville, the route crosses the southern part of the Beaver Creek and Lake Marinuka Watershed and the Lower Black River Watershed, passing south and downstream of Lake Marinuka and crossing the Black River upstream from the Van Loon Wildlife Area. The Beaver Creek Watershed drains approximately 160 square miles in Trempealeau and Jackson Counties and empties into the Lower Black River Watershed. The north and south forks of Beaver Creek originate in Jackson County and meet in Ettrick in Trempealeau County to form Beaver Creek. The creek is impounded in Galesville to form the 98-acre Lake Marinuka. Beaver Creek joins the Black River near the Van Loon State Wildlife Area. The Beaver Creek and Lake Marinuka Watershed has drainage characteristics typical of Wisconsin's unglaciated areas. The topography is dissected with high, narrow, irregular divides, steep bluffs, moderate slopes, and broad open valleys. Local relief results in stream gradients that vary from 70 to 150 feet per mile in the headwaters, 20 to 40 feet in the middle reaches of main channels, and less than 10 feet per mile in the lower main channel reaches. As the stream gradient decreases, stream flow velocities also decrease and deposition of sand and silt occurs. Movement and deposition of material in streams is a natural process; however, it may be accelerated by poor land management activities.

10.3.3.3. Potential waterway impacts specific to this route

There are 42 waterway crossings along this route, but few would require installation of a TCSB. Many of the waterways appear to be ditched and are located in agricultural areas that are actively grassed. Waterways associated with some of the larger stream complexes have heavier vegetative riparian areas and more natural flows, with oxbows and meandering channels. These streams are the ones most likely to be adversely affected by removal of stream bank vegetation and potential soil erosion and sedimentation.

On Segment 1, several open-water back sloughs are located near the Mississippi River and would require some type of bridging over the waterways to facilitate construction. Bridge placement over these

waterways might be difficult, if the bed and bank of the waterways cannot be easily identified and also because these areas are routinely inundated or flooded, even during winter months.

One of the waterways crossed by Segment 10C lies parallel to and within the ROW for approximately 800 feet. This could result in stream bank vegetation removal over this distance, which could increase sedimentation and thermal loading and lead to decreased water quality. This stream is an unnamed tributary to Waumandee Creek. Stream restoration efforts to reduce thermal loading could be hampered by the loss of a vegetative canopy at this location. Additionally, long-term maintenance of the line could require bridging or matting across many waterways if the proposed access roads are not available in the future.

Segments 11F and 11G also cross a waterway that runs within the ROW for some distance. This waterway is a tributary to Tamarack Creek, which is Class 3 trout water. See Figure Vol. 2-4. Stream restoration efforts to reduce thermal loading could be hampered by the loss of tree canopy at this location as a result of the transmission line. Additionally, long-term maintenance of the line could require bridges or matting along many portions of the route if the proposed access roads are not available in the future.

10.3.4. Wetlands

There are several wetlands along the Arcadia Route. Construction in wetlands could alter the wetland hydrology, vegetative character, and function. Minimizing impacts is necessary and might be achieved by restricting construction to winter or periods of low flow, implementing the requirements of Wis. Admin. Code ch. NR 40 for invasive species, or using matting or other low ground pressure equipment.

Acres of wetland within the proposed ROW of the Arcadia Route segments are tabulated in Table 10.3-4.

About 96 wetland acres are located within the proposed ROW. Of that acreage, about 22 percent are forested wetlands that would be cleared for new ROW. This forested wetland habitat would be permanently lost. The affected area would be converted to a shrub wetland or sedge meadow and might be opened to invasive species.

Table 10.3-4 Arcadia Route wetland summary by route segment*

Segment	Existing ROW Forested Wetland Shared (acres)	New ROW Forested Wetland Affected (acres)	Existing ROW Non-forested Wetlands Affected (acres)	New ROW Non-forested Wetland Affected (acres)
1	8.2	4.5	0	0
2A1	0	0	0	0
2A2	0	0	0	0
10B1	0	0	0	0
10C	4.0	3.8	13.3	11.0
11A	0	0.4	0	3.6
11B	2.3	2.1	0.1	0.1
11C	0	2.7	0	0
11D	0	0	0	8.8
11E	0	0	0	0
11F	0	0	0	0
11G	2.9	2.4	9.0	7.7
13A	0	0	0	0.2
13B1	0	0.2	0	0
13B2	0	3.0	0	2.7
13C	0	0.2	0	0
13D	0	2.0	0	0
13E	0	0	0	0
17A	0.4	0.2	0.2	0.1
17B	0	0	0	0
18A	0	0	0	0
18B	0	0	0	0
18C	0	0	0	0
18D	0	0	0	0
18E	0	0	0	0
18F	0	0	0	0
18G	0	0	0	0
18H	0	0	0	0
Total	17.7	21.1	22.6	34.3

*Does not include information from segment ROW within road ROW in open water, where the application shows no resource impacts.

Although not identified separately in the application, many of the wetlands along this route are actively farmed.

A discussion of wetlands by route segment follows.

On Segment 1 at Alma (see Figure Vol. 2-1A), several transmission structures would be placed in forested wetlands associated with the river. The proposed ROW at these locations bisects the existing wooded environment. The required ROW clearing would create open sedge meadow and habitat for more edge species. Forest wetland loss at these locations would be permanent and increase the likelihood of invasive species being introduced to the site.

Segment 10B1 heads north through large forested hillsides, crossing several small streams along the access route.[127] It joins Segment 10C, heading eastward along an existing utility corridor (see Figures Vol. 2-1A,

[127] The Segment 10B2 option does not have any new wetland impacts.

Vol. 2-1B, Vol. 2-1C, and Vol. 2-1D). Segment 10C intersects some smaller woodlots and crosses large areas of crop land and small wetland pockets. These small wetland areas are commonly associated with stream corridors. Several structures would be located in wetlands. These wetlands support prairie cord grass (*Spartina pectinata*), various sedges, angelica (*Angelica atropurpurea*), and other wetland forbs. Some of the wetlands and low areas with mucky substrate are pastured. At least one pole appears to be located in a wooded stream corridor wetland. If the applicants moved the pole a few meters to either side, the line could span the stream and avoid the associated wetland. The majority of stream corridors on this segment have associated riparian wetland complexes, many of them are wooded. Where Segment 10C reaches STH 93, it crosses the Trempealeau River and a very large forested floodplain complex including: a wet meadow dominated by reed canary grass (*Phalaris arundinacea*); a forested wetland with silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), and box elder (*Acer negundo*); and a marsh with forested wetlands that includes water plantain (*Alisma subcordatum*), arrowhead (*Sagittaria latifolia*), and cattail (*Typha latifolia*). Transmission poles would be located within this forested floodplain wetland complex.

Segments 11A, 11B, and 11C have a few wooded wetland areas that are associated with small streams. See Figures Vol. 2-1D and Vol. 2-1E. Most of this portion of the route is in active crop production. One transmission pole would be located in a forested wetland consisting of red oak (*Quercus rubra*), black walnut (*Juglans nigra*), cottonwood, and box elder.

Segment 11D (Figure Vol. 2-1E) appears to parallel and be partially located within a large mixed-wetland complex, including a medium-to-high-quality mix of sedges, box elder, cottonwood, black willow (*Salix nigra*), Joe Pye weed (*Eupatorium purpureum*), marsh marigold (*Caltha palustris*), and jewelweed (*Impatiens capensis*), and other wetland species. Four transmission poles would be located along this wetland complex.

Segment 11E (Figure Vol. 2-1E) follows an existing utility corridor through a large forest complex but would require no new wetland ROW.

Segments 11F and 11G have a stream located within the ROW. See Figures Vol. 2-1F, Vol. 2-1G, and Vol. 2-1H. Shifting the ROW a few meters might avoid impacts to the stream. These route segments cross small forested wetlands associated with riparian corridors. Five transmission poles would be located in wetlands. The wetlands include a large forested wetland complex, a wet meadow of various sedges and grasses, three wetlands dominated by reed canary grass, and some active pasture.

Segments 13B2, 13C, 13D, 13E, 17A, 17B, 18A, 18B, 18C, 18D, 18E, 18F, 18G, and 18H are all identical to the similarly-identified route segments for the Q1-Galesville Route, discussed in Section 8.3.4 in Chapter 8 of the EIS.

Along STH 54, Segments 13A and 13B1 are located in active crop land that is irrigated. Segment 13B2 continues to follow the highway corridor and crosses stream corridors that are wooded or in agricultural use, some suburban residential development, and some smaller wetland complexes mixed with developed and residential lands. See Figure Vol. 2-1H. The wetland is floodplain forest, dominated by silver maple, but the portion of the wetland along the proposed ROW is not heavily forested and appears to be mixed shrub and wet meadow adjacent to the highway corridor. Large portions of Segment 13 are in active crop production. At the junction of Segments 12 and 13B2, transmission poles would be located in a roadside wet meadow complex on the edge of an active agricultural area. Another pole would be located in a floodplain forest dominated by silver maple and box elder. It may be possible to locate this pole outside the wetland boundary. Four other poles would be located in similar environments at wetlands along Segment 13B2.

Segments 13C and 13D continue to follow the STH 54/93 corridor. See Figure Vol. 2-1I. This corridor splits a larger forest complex that includes a heavily forested wetland dominated by box elder, aspen (*Populus tremuloides*), red oak, and black cherry (*Prunus serotina*). Segment 13E which connects to the southernmost portion of the route crosses a wooded stream west of CTH AA.

Segments 17A, 17B, and 18A parallel STH 53 approximately 800 feet west of the roadway. See Figure Vol. 2-1I. There is a wooded wetland complex associated with the Black River crossed by the route. It includes a degraded wet meadow dominated by reed canary grass, but widening the ROW would also clear trees and change the area's vegetative and hydrologic character.

Segments 18B through 18H do not cross any waterways or wetlands of significance.

10.3.5. Archeological resources/historic properties

WHS's archeological sites database shows 11 known prehistoric archeological sites within or adjacent to the proposed ROW of the Arcadia Route that could be affected by construction activities.

Several prehistoric effigy mounds are located along this route. Four groups of mounds are located in the vicinity of Galesville along STH 54/93 and USH 53, on route segments that are also part of the proposed Q1-Galesville Route. WHS generally treats mounds as burials subject to the Wisconsin Burial Sites Preservation Law, Wis. Stat. § 157.70.

Other archeological resources along the route appear to be prehistoric campsites and work areas. Three along Segments 18A, B, and C are campsites, quarry sites, or lithic scatter (these would also be along the Q1-Galesville Route.) Segment 10C east of Arcadia has two prehistoric campsites listed. One of those is also a burial site. One prehistoric era campsite is located on each of Segments 11B and 11G, south of Arcadia.

To preserve the archeological integrity of these WHS-listed historic properties, the applicants have stated that they would locate transmission structures outside of their boundaries in order to span them. Some sites appear small enough to be spanned with appropriate line design.

However, it is likely that these sites would require additional field investigations. WHS and PSCW would require that the investigations be done by a qualified archeologist able to assess each site's location and boundaries and its current integrity.

10.4. COMMUNITY IMPACTS

10.4.1. Aesthetic and visual impacts

This discussion of visual impacts is based on visits to the project area and the following underlying assumptions:

- Different types of viewers may have different levels of visual sensitivity.
- The setting can influence the degree of visual impact.
- The viewing conditions can influence the degree of visual impact.

The Arcadia Route begins in the west by crossing the Mississippi River floodplain along a shared ROW with an existing transmission line corridor (Segment 1). Additional tree clearing would be required for the new transmission line. Segment 10B1 and Alternate Segment 10B2 both climb up the steep tree-covered

bluffs on new ROW. Tree clearing would be required and maintained for the full ROW width (150 feet) of these route segments plus any additional clearing required for construction and maintenance of the proposed line. This linear clearing of the forested bluffs would be visible from the Mississippi River Valley and those traveling along GRR (STH 35).

The route then crosses the upland ridges and valleys on Segments 10C through 11G. The visual environment along this portion of the route is characterized by irregular-shaped agricultural fields perched on the relatively flat hill tops which are thoroughly dissected by steep forested hillsides and numerous deep valleys. The valley associated with the Trempealeau River near the city of Arcadia broadens out briefly (primarily Segment 10C, 11A, and the northern portion of Segment 11B). Much of this route is cross-country, not following existing roads, property boundaries, or field edges. While the proposed line would be double-circuited with an existing transmission line and share its ROW, the overall ROW width would be almost doubled (an additional 35 feet on each side). Additionally, the region's repeated elevation changes most likely resulted in siting the existing line primarily within agricultural fields in an attempt to span the steep valleys and dense woodlands of the smaller waterways. Still, significant clearing of woodlands that surround most agricultural fields would be required for the new ROW and any improved or new access roads. The route crosses rural and undeveloped landscapes. Although the route skirts the edge of the city of Arcadia, there would be only a small number of homes located within 300 feet of the proposed line.

The Arcadia Route shares Segments 13A through 18H with the Q1-Galesville Route. These segments are characterized by flat lowlands and prairies, and the line would be located adjacent and near to roads and highways (STH 93, STH 54, and USH 53) in this area. While this portion of the route is more urban, the area is heavily interspersed with agricultural fields and woodlots both small and large. It skirts around the southern end of the city of Galesville and the edges of the village of Holmen. This mixed use area is experiencing outgrowth from the city of Onalaska, to the south. The population in the village of Holmen has increased almost 35 percent since 2000. Over 80 percent of this portion of the route shares a ROW with roads and an existing transmission line. While no residences are located within 50 feet of the centerline, 69 homes would be within 300 feet of the line, primarily along Segment 13B2. Over the 5.0 miles covered by Segments 13B2 through 13D, the route crosses the highway five times to avoid residential properties. Beyond the 300-foot distance, the line would be visible to even more residential developments. The line would also be seen by individuals at Castle Mound Country Club (golf course), Holmen High School, and drivers passing through the area on the highways. In some places, trees that screen residences from the highway or are part of landscaping would be cleared for the ROW. This would result in visual impacts for these properties.

Overall, visual or aesthetic impacts are difficult to measure and tend to be perceived as greater in natural or scenic settings. Choosing the most suitable type of mitigation for an aesthetic impact also depends on individual preferences and experience.

10.4.2. Agriculture

A significant portion of the Arcadia Route (44 percent) crosses land used for agricultural purposes. Of the 445.3 agricultural acres that would be within the proposed ROW, approximately 56 percent would be affected by new ROW. Most of this acreage is in cropland with some in pasture. The majority of the crops on this route are corn and soybeans, but wheat and alfalfa were observed along some segments. The proposed ROW crosses tree farms on Segments 18B (1.4 acres) and 18C (0.3 acres). The route also crosses an apple orchard owned by Fergusons Morningside Orchard in two locations along Segment 11G. This orchard currently has an easement for the existing transmission line but an additional 6.56 acres of ROW would be needed. The route crosses 68 parcels or 386 acres enrolled in the Farmland Preservation

Program. Within the ROW, there are approximately 188.8 acres of prime farmland soils, 137.7 acres of farmland of statewide importance, and 59.5 acres of prime farmland if drained and/or protected from flooding.

The portion of the route that crosses the steep-sided and hilltop terrain (Segments 10C through 11G) would impact agricultural lands to a greater extent than other portions. While the proposed line would be double-circuited with an existing transmission line, the route is almost entirely cross-country, rarely following existing roads, property boundaries, or field edges. Due to the repeated elevation changes, most proposed transmission structures and access roads would be constructed on the more accessible flat agricultural fields in an attempt to reduce construction impacts and costs.

This route has one known pivot irrigation system in a field on Segment 18H, in the town of Onalaska, that would need to be removed. Additional irrigation systems might exist along the route. Impacts to these systems could be minimized by working with agricultural landowners prior to the start of construction, providing appropriate compensation for damage or required modifications to the system, and post-construction restoration of agricultural lands to pre-construction conditions.

Limited aerial applications of herbicides, fungicides, and pesticides might occur along the route, though no specific information is known. The applicant should work with landowners whose aerial spraying would be affected by transmission line placement to minimize potential impacts.

Farms with livestock or farms that practice organic farming would require specific protection measures during construction to avoid the spread of farm pests and diseases or to protect organic certifications. Additional issues for organic farms might be caused by the removal of tree buffers for new ROW or the enlargement of existing ROWs. The removal of these buffers might threaten a crop's organic status by increasing the potential for herbicide drift from adjacent fields. The number of properties that would require some form of protective measures along this route is not yet known. Biosecurity and organic farm impacts can be minimized by the applicants working with agricultural landowners well in advance of construction, advance notice of construction activities, and follow-through with agreed-to protection measures. The applicants estimate $5,000 per mile for various agricultural protection measures.

At 19 locations, animal confinement facilities are located within 300 feet of the proposed route centerline. Two of these buildings are within 100 feet. There are also 27 non-residential agricultural buildings within 300 feet of the centerline, with no buildings located within 100 feet. Concerns associated with the location of confined animal buildings are stray voltage and the relationship of distribution lines to the proposed high-voltage lines. For a detailed discussion of this issue see Section 5.5.15 in Chapter 5.

Wis. Stat. § 182.017(7)(c) through (h) is a list of landowner rights, many of which address issues that are of particular import to agricultural landowners and their fields. These mitigation measures apply to landowners whose property is directly affected by the construction of a high-voltage transmission line and include the proper segregation of topsoils, post-construction restoration of the land, repair of damaged fences and drainage tile, scheduling construction as much as practicable when the ground is frozen or at the landowner's request, removal of construction debris and rocks, and payment for crop damage. A detailed discussion of landowners' statutory rights is included in Section 5.3 in Chapter 5.

The full width of the ROW could be cleared for construction of the proposed line, including properties currently planted with trees as part of plantations or orchards. Under Wisconsin statute (see Section 5.3) landowners must be compensated for any crop damage caused by construction or maintenance of a high-voltage transmission line. Additionally, the landowner must 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 still retains title to all trees cut by the utility. However, after construction is completed, the utility would most likely not approve re-vegetating the transmission easement with trees. The change of use for the ROW land under the easement could represent a financial loss to the landowner. The applicants should work with tree farm and orchard landowners to minimize construction impacts and determine allowable post-construction use of the land within the easement.

For Segments 10C through 11G that cross the steep, hilly inland terrain, there would be erosion concerns for agricultural soils during construction. Many of these land surfaces have slopes of 12 percent or greater. The area has experienced significant soil loss from crop fields in the past, and soil loss is currently a primary nonpoint source pollutant in the region. While farming practices and government programs have changed to limit erosion, construction of the transmission line could pose additional soil loss or nonpoint pollution concerns. Furthermore, fragile soils in this area may be more susceptible to rutting, compaction, and disturbance of the limited top soil present. More aggressive protective methods would be required to protect agricultural soils than in other portions of the route.

Refer to Chapter 5, Section 5.5.2, for a discussion of potential impacts associated with transmission line construction and operation in agricultural fields. The AIS prepared by WDATCP will contain discussions of potential impacts of the line on farmed fields. Its Executive Summary will be included in Appendix C of the EIS.

10.4.3. Airports and airstrips

No public-use airports would be impacted by any of the proposed routes. The nearest public airport is the City of La Crosse Municipal Airport. It provides scheduled commercial service and general aviation and freight services. The southernmost transmission structure for this proposed project route is approximately 4.4 miles from the nearest runway. All proposed transmission structures are outside of the height limitation zoning map for the airport and not subject to any height restrictions.

The Holland Air Park is a privately-owned airstrip, located more than 3,500 feet from Segment 18A as shown on the map in Figure Vol.2-1I. It is an asphalt-paved north-south oriented runway. Due to its distance and orientation, it is unlikely that the proposed transmission line would adversely affect the safe use of the airport.

10.4.4. Electric distribution line issues

Along the proposed routes, there are distribution lines owned by NSPW and by Riverland. Because of issues associated with stray voltage and its potential effect on confined animals (mostly dairy cows), all routes were analyzed for areas where distribution lines may be located too close to the proposed transmission lines. There is a general consensus that distribution lines located less than 150 feet from a transmission line and parallel to the transmission line for a continuous distance greater than 1,000 feet can cause impacts to farms with confined animals. The cause, impact, and mitigation of stray voltage or NEV are discussed in detail in Section 5.5.15 in Chapter 5.

For this project, distribution lines would be removed, relocated, or buried if they present a physical conflict to the proposed transmission line or if their proximity to the transmission line might result in NEV concerns. No distribution lines are proposed to be underbuilt on the new 345 kV structures.

The applicants have identified six locations along seven segments of the Arcadia Route where distribution lines would be relocated. A total of approximately 6.5 miles of overhead distribution lines would be replaced with approximately 5.3 miles of underground cables.

On Segment 11B near Arcadia (see the map in Figure Vol. 2-1E), about 1,200 feet of overhead three-phase distribution line owned by Riverland would be relocated underground in an adjacent location (by proposed structures 345-346). The distribution line now crosses farm fields and natural areas. The construction might impact some wetlands and a waterway.

On Segment 11E to the south (see Figure Vol. 2-1E), approximately 6,900 feet of overhead single-phase distribution line (proposed structures 364-368) owned by Riverland would be relocated, resulting in approximately 2,100 feet of underground distribution. The new distribution lines would be located along roads and on the edge of farm fields. Distribution line construction could impact wetlands located adjacent to the roads.

On Segment 11G, distribution lines in two locations would be relocated. One, along Thompson Valley Road (see the map in Figure Vol. 2-1F), would require the removal of 4,100 feet of overhead single-phase distribution line (proposed structures 369-374), owned by Riverland. This would be replaced with 2,100 feet of underground single-phase cable. The other, near Grover Lane (Figure Vol. 2-1H), would result in underground relocation of 2,200 feet of overhead Riverland single-phase distribution line near to its original location. At both locations along this segment, the land use is agricultural with no natural resource impacts anticipated.

On Segments 13A through 13B2 south and west of Galesville (Figure Vol. 2-1H), the existing distribution would be undergrounded adjacent to and paralleling STH 54. In total, approximately 3.5 miles of NSPW three-phase overhead distribution would be relocated. Starting at proposed structure 830, the transmission line would be located along the north side of the highway to Engen Road, where it would cross to the south side as far as West Mill Road and proposed structure 853. Land use along this route is primarily agricultural with some upland woods and residential developments. Construction of the line might cause impacts to some woodlands and small waterways. Construction within the STH 54 ROW would require permitted use from WisDOT.

Approximately 1,000 feet of single-phase overhead Riverland distribution line would be relocated from Segment 17 (near proposed structure 732) and buried underground along Aspeslet Road (Figure Vol. 2-1I). No significant environmental impacts are anticipated from this construction.

There might be construction impacts associated the removal of the existing structures and the installation of the new cables. Distribution conductors and insulators would be removed using a two-axel bucket truck or, where access is difficult, a lineperson would climb the poles and detach them. Existing distribution poles would be either pulled from the ground using vehicle mounted equipment where possible or cut off at the ground level by chainsaw. The new distribution line would be undergrounded using either a vibratory plow or directional boring techniques. Of the two techniques, directional boring produces the least impacts and can be used to avoid significant impacts to protected resources such as wetlands and waterways. Impacts can be further minimized by working with the affected landowner well in advance of construction and by compensating landowners for any damage to fields, infrastructure, or landscaping. Additional state and federal permits or approvals might be required prior to the start of construction.

The Commission may require the applicant to conduct pre-construction and post-construction testing of potentially impacted farms and lines.

10.4.5. Electric and magnetic fields

The majority of segments for this route would use existing transmission line corridors. The following information on EMF is provided to give readers an idea of the expected magnitude of the magnetic fields that would be produced by the proposed line under expected normal load conditions. This section also provides an estimate of the existing transmission line magnetic fields where existing transmission line ROW exists. In all cases, the magnetic fields provided are estimates only. Magnetic fields are proportional to the current flowing on a line at any given time. Because current flow is highly variable, only an estimate of the magnetic field can be provided. For more information on EMF refer to Appendix B.

The information is provided by route segment. To locate the segment, refer to the map in Figure Vol. 2-1 Index.

Segment 1
There is an existing 161/69 kV double-circuit transmission line along Segment . The proposed project would replace this line with a 161/345/161 kV triple-circuit transmission line on H-frame structures (see Appendix A, Figure 14).

There are no residences, schools, daycare centers, or hospitals within 300 feet of the proposed line.

The estimated magnetic field from the existing 161/69 kV line under normal load conditions is approximately 3.3 mG at 100 feet and decreases to 1.6 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.4 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 46 mG at 100 feet and would decrease to about 12 mG at 150 feet. At 300 feet, the expected magnetic field would be about 1.4 mG.

Segments 2A1 and 2A2
Along Segments 2A1 and 2A2, there is an existing 161 kV single-circuit transmission line. The proposed project would replace this line with a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figures 3, 5, 6).

There is one residence within 300 feet of the proposed line. That residence is between 151 and 300 feet of the proposed line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 161 kV line under normal load conditions is approximately 6 mG at 100 feet and decreases to 3 mG at 150 feet. At 300 feet, the magnetic field from the existing line falls to approximately 0.8 mG. The estimated magnetic field from the proposed line under expected normal 2015 load conditions would be about 6 mG at 100 feet and would decrease to 3 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.9 mG.

10.4.5.1. Segments 10B2 or 10B1 (mutually exclusive options)

Segment 10B2
This route segment would require Segment 2A1 to connect it to the Mississippi River crossing, but not Segment 2A2. Approximately 80 percent of this segment, from the river crossing east, would be built as a 345 kV transmission line on single-pole structures (see Appendix A, Figure 28). The remaining 20 percent would be built as a double-circuit 161/345 kV line, also on single-pole structures (see Appendix A, Figure 5).

There is one residence within 300 feet of the proposed line. That residence is located between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the single-circuit 345 kV line using anticipated 2015 loads would be about 6 mG at 100 feet. At 150 feet, the magnetic field falls to approximately 3 mG, and it is reduced to approximately 0.9 mG at 300 feet. For the double-circuit line using anticipated 2015 loads the magnetic field would be about 11 mG at 100 feet. At 150 feet, the magnetic field falls to approximately 6 mG and is reduced to approximately 1.8 mG at 300 feet.

Segment 10B1
This route segment would require both Segment 2A1 and Segment 2A2 to connect it to the Mississippi River crossing in the west. There are no existing transmission lines along Segment 10B1. The proposed project would construct a 345 kV single-circuit transmission line on single-pole structures along this segment (see Appendix A, Figures 21, 25).

No residences, schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 6.3 mG at 100 feet and would decrease to 3 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.9 mG.

Segment 10C
There is an existing 161 kV single-circuit transmission line along Segment 10C. The proposed project would replace this line with a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figures 1, 5).

There are nine residences within 300 feet of the proposed line. All nine residences are between 151 and 300 feet from the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 161 kV line under normal load conditions is approximately 6.3 mG at 100 feet and decreases to 3 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.8 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 11 mG at 100 feet and would decrease to 6 mG at 150 feet. At 300 feet, the expected magnetic field would be about 1.8 mG.

Segment 11A
There are no existing transmission lines along Segment 11A. The proposed project would construct a 345 kV single-circuit transmission line on single-pole structures along this segment (see Appendix A, Figures 1, 28).

There are two residences within 300 feet of the proposed line. One residence is between 101 and 150 feet, and one is between 151 and 300 feet from the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The magnetic field from the proposed line under expected 2015 load conditions would be about 6.3 mG at 100 feet and would decrease to 3 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.9 mG.

Segment 11B
There is an existing 69 kV single-circuit transmission line along Segment 11B. The proposed project would replace this line with a 69/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figures 1, 5).

There is one residence within 300 feet of the proposed line. That residence is between 151 and 30 feet from the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 69 kV line under normal load conditions is approximately 0.7 mG at 100 feet and decreases to 0.3 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.07 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 5.7 mG at 100 feet and would decrease to 2.6 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.6 mG.

Segments 11C and 11D

There are no existing transmission lines along Segment 11C or 11D. The proposed project would construct a 345 kV single-circuit transmission line on single-pole structures along these segments (see Appendix A, Figures 20, 21).

There are four residences within 300 feet of the proposed line along Segment 11D. One residence is between 51and 100 feet of the line. One is between 101 and 150 feet, and two are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 18 mG at 50 feet, 6 mG at 100 feet, and 3 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.9 mG.

Segments 11E, 11F, and 11G

There is an existing 69 kV single-circuit transmission line along Segments 11E-11G. The proposed project would replace this line with a 69/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figures 1, 4, 5).

There are nine residences within 300 feet of the proposed line, all located along Segment 11G. Two residencesare between 51 and 100 feet of the line. Twoare between 101 and 150 feet, and five are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 69 kV line under normal load conditions is approximately 1 mG at 100 feet and decreases to 0.5 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.1 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 16 mG at 50 feet, 6 mG at 100 feet, and 3 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.6 mG.

Segments 13A, 13B1, 13B2, 13C, 13D, and 13E

There are no existing transmission lines along any portion of Segment 13 (A-D). The proposed project would construct a 345 kV single-circuit transmission line on single-pole structures along these segments (see Appendix A, Figures 20, 21, 22).

There are 53 residences within 300 feet of the proposed line. Three residences are between 51 and 100 feet of the line. Nine are between 101 and 150 feet, and 41 are between 151 and 300 feet of the line. Most residences (37) are found along Segment 13B2. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 9 mG at 50 feet and would decrease to 4 mG at 100 feet. At 150 feet, the expected magnetic field would be about 2 mG and, at 300 feet, the magnetic field would decrease to about 0.7 mG.

Segment 17A

There is an existing 161 kV single-circuit transmission line along Segment 17A. The proposed project would replace this line with a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figure 2, 5).

There are seven residences within 300 feet of the proposed line. Three residences are between 51 and 100 feet of the line. One is between 101 and 150 feet, and three are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 161 kV line under normal load conditions is approximately 4.5 mG at 50 feet and decreases to about 1 mG at 100 feet. At 150 feet, the magnetic field falls to approximately 0.6 mG and, at 300 feet, the magnetic field is approximately 0.12 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 15 mG at 50 feet and would decrease to 6 mG at 100 feet. At 150 feet, the expected magnetic field would be about 3 mG, and it would drop to approximately 0.8 mG at 300 feet.

Segment 17B
There is an existing 161 kV single-circuit transmission line along Segment 17B. The proposed project would replace this line with a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figure 1).

There are seven residences within 300 feet of the proposed line. One residence is between 101 and 150 feet, and six are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 161 kV line under normal load conditions is approximately 1 mG at 100 feet and decreases to 0.6 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.2 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 4.7 mG at 100 feet and would decrease to 2 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.5 mG.

Segment 18A
There is an existing 161 kV single-circuit transmission line along Segment 18A. The proposed project would replace this line with a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figures 1, 5).

There are four residences within 300 feet of the proposed line. All four residences are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line.

The estimated magnetic field from the existing 161 kV line under normal load conditions is approximately 1 mG at 100 feet and decreases to 0.6 mG at 150 feet. At 300 feet, the magnetic field falls to approximately 0.2 mG. The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 4.7 mG at 100 feet and would decrease to 2 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.5 mG.

Segments 18B, 18C, 18D, 18E, 18F, 18G, and 18H
There are no existing transmission facilities along Segments 18B through 18H. An existing 161 kV transmission line located east of these segments would be moved and built with the proposed project as a 161/345 kV double-circuit transmission line on single-pole structures (see Appendix A, Figure 1, 6).

There are nine residences within 300 feet of the proposed line. All nine residences are between 151 and 300 feet of the line. No schools, daycare centers, or hospitals are within 300 feet of the proposed line. Segment 18F would be located along the western edge of a parcel owned by the Holmen School District for its high school facilities. The proposed line would not be within 300 feet of any existing school buildings. Construction of a proposed new middle school along Segment 18C on this parcel could, in the future, place a school building within 300 feet of the proposed line.

The estimated magnetic field from the proposed line under expected 2015 load conditions would be about 14 mG at 50 feet, 5 mG at 100 feet, and about 2 mG at 150 feet. At 300 feet, the expected magnetic field would be about 0.5 mG.

10.4.6. High-voltage impact fees

Wisconsin state statutes require compensation to be paid to municipalities that are burdened by the construction of high-voltage transmission lines, via a one-time environmental impact fee and an annual impact fee. Described in statutes and rules (Wis. Stat. §§ 16.969 and 196.491(3g), and Wis. Admin Code ch. ADM 46), the fees paid by the utility to the counties, cities, villages, and towns are based on the percentage of the length of the 345 kV line constructed through each of those political subdivisions. The Commission determines what constitutes the "cost of the high-voltage transmission line" and the percentage applied to the various political subdivisions. Initial payments begin with an invoice issued no more than 60 days after the start of construction, and the Commission transmits the required information to WDOA. The annual payments continue for the life of the transmission line. There are some restrictions on how the one-time environmental impact fee may be used but the annual fee may be used in any way the local government sees fit. A complete discussion of how these fees are calculated and disbursed can be found in Section 4.5.4.

Income to local governments on an annual basis can range from thousands to tens of thousands of dollars, which would be a positive impact to the community. Based on the applicants' calculations and assumptions, the projected payments made to the municipalities are illustrated in Table 10.4-1.

Table 10.4-1 High voltage impact fees expected to be paid to governmental units along the Proposed Arcadia Route

Government Unit	One-Time Environmental Impact Fee	Annual Impact Fee	Total Payment During First Year of Construction*
Buffalo County	$1,577,066	N/A	$1,577,066
City of Alma	$153,615	$18,434	$172,049
Town of Belvidere	$406,811	$48,817	$455,628
Town of Glencoe	$464,706	$55,765	$520,471
Town of Lincoln	$75,650	$9,078	$84,728
Town of Waumandee	$476,285	$57,154	$533,439
La Crosse County	$589,760	N/A	$589,760
Town of Holland	$578,180	$69,382	$647,562
Town of Onalaska	$11,579	$1,389	$12,968
Trempealeau County	$2,057,211	N/A	$2,057,211
City of Galesville	$20,842	$2,051	$23,343
Town of Arcadia	$950,254	$114,030	$1,064,284
Town of Gale	$456,214	$54,746	$510,960
Town of Trempealeau	$629,900	$75,588	$705,488

* After the first year, only the annual impact fee would be paid.

10.4.7. Public lands

The route crosses no federal- or state-owned land. It does cross a Trempealeau County wayside along USH 53 and a bike trail east of Arcadia. The route would require approximately 285 feet of easement from the wayside along Segment 13C. No poles would be placed within the wayside or on the bike trail.

Segment 18C crosses a property owned by the village of Holmen School District. Currently, the Prairie View Elementary School is located on the west side of the property. Plans include a middle school to be built in the year 2018 on the east side of the property. An easement of approximately 100 feet in width and 950 feet in length would be required from the school district for the proposed route. The centerline

of the transmission would be located approximately 900 feet from the Prairie View Elementary School but could be much closer to the new middle school, as currently envisioned. See also the discussion in Section 10.4.9. The location of the site can be found in Figure Vol. 2-1J.

Segment 18F is adjacent to the Holmen High School (see Figure Vol. 2-1K) which is a large property that includes several outdoor fields and a stadium. The school facilities would be paralleled for approximately 0.5 mile. The centerline of the route is approximately 560 feet from the main building located near the eastern edge of the property.

Issues for the school district may include health concerns, impacts to community property values from which school support is derived, and temporary construction-related impacts.

10.4.8. Highway concerns

The Arcadia Route would run along existing electric transmission ROWs and generally not along highways except at its eastern end. It would share highway ROW near Galesville along Segments 13A through 13E, with STH 54/93, and along Segments 13C, 13D, and 18H with USH 53 further east. It would also share ROW with STH 35 on Segments 2A1 and 2A2 just south of Alma. Between Alma and Galesville, while not running in highway ROW, the line would cross and could require construction activities for Segment 10C in the ROWs for STH 88 and STH 93. Before running along the western side of USH 53 in Holmen, it would have to cross USH 53 for Segment 18G.

Safety, efficiency, and aesthetics must be considered for drivers on these state and federal highways during transmission line construction, maintenance, or repair. The project would require WisDOT safety analyses and permits in order for construction to occur.

Wisconsin Stat. § 86.16 allows utilities to locate their facilities along and across highway ROW with the written consent of the highway jurisdiction. However, wherever the line would need to share ROW or cross a state or federal highway, a permit must be obtained from WisDOT to ensure that the work does not adversely affect the safety, efficiency, and aesthetics of the highway, interfere with the highway's present use or future expansion, or require access for future utility maintenance directly from the highway lanes or shoulder.

10.4.9. Land use compatibility

Most areas along the Arcadia route are rural in nature and are currently in agricultural or other undeveloped uses, such as forestry. These uses are expected to continue into the future. An electric transmission line is usually compatible with these surrounding land uses. Greater potential for conflict exists near the developed areas of cities and villages, where residential and commercial development, existing and planned, becomes more common.

In general, residential uses are considered to be more sensitive to impacts from electric transmission lines than are commercial or industrial land uses, primarily due to aesthetic effects. Sharing a corridor with existing infrastructure, such as an existing transmission line or multi-lane highway, can mitigate impacts by causing incremental impacts instead of the entirely new impacts associated with a brand new corridor. About 90 percent of the route uses existing corridors.

Segments on the western part of the route follow the ROW of the existing DPC Alma-Tremval 161 kV line through largely rural, sparsely-developed areas of Buffalo County, zoned for agricultural use.

In Trempealeau County, the route predominantly crosses farmland with scattered single-family homes. The county's comprehensive plan designates much of this land as agricultural districts, which also allow for the preservation of woodlands, wetlands, natural areas, and the rural atmosphere of the townships. The route also encounters transitional agriculture districts, agricultural areas the plan identifies as being potentially suitable for development.

As the route enters the town of Arcadia, it crosses lands near the city of Arcadia that the county plan designates as a transition area of predominantly agricultural use, but that has been identified for future development. Much of this transition area is identified as rural residential, which allows for low-density residential developments. Segment 10C of the route crosses 0.25 mile of transitional agriculture land just east of Rainey Valley Road. See Figure Vol. 2-1D. North of the city of Arcadia, the route lies on the border of two parcels designated industrial and commercial.

Near the city of Arcadia, while following the existing 69 kV transmission line ROW, the route crosses the northeast quadrant of the intersection of STH 93 and STH 95 which is identified in the Arcadia comprehensive plan as a potential future commercial and industrial use area. Proceeding south, the route skirts a Tax Incremental Finance District on the east side of the city of Arcadia south of STH 95. The city's plan designates this land for future light industrial and commercial development. South of this area the plan shows a future residential area crossed by the route.

A short distance southeast of Arcadia, the proposed route deviates from the existing 69 kV transmission line ROW, proceeding directly south where the existing line turns east. A sand mine has been proposed for the land east of the proposed route. The mine's possible expansion to land west of the route could potentially be affected by the presence of the line. See the map in Figure Vol. 2-1E.

About 1.3 miles north of STH 35/54/93, the route borders a rural subdivision. Where it turns east to follow the highway, the Trempealeau County comprehensive plan shows a small area of industrial and commercial uses south and west of the route. See the map in Figure Vol. 2-1H.

The route passes along the southern edge of Galesville as it follows STH 54/93. Several residential areas lie on both sides of the highway, as well as a few businesses. The city's comprehensive plan has identified "generalized economic development opportunity areas" for currently undeveloped land along the highway. A principal residential growth area is shown on the north side of the highway, just west of the city limits and adjacent to an existing residential development. South of the highway and west of CTH K a potential commercial area is identified; a potential industrial area is located north of the highway at CTH K. Further east, east of the highway's junction with USH 53, a potential commercial area is planned for both sides of the highway.

The Trempealeau County comprehensive plan has designated lands in the town of Gale surrounding the city of Galesville as transition areas, where agricultural use is now predominant and future development is anticipated. Along STH 54/93 south of the city, the plan recommends that properties located adjacent to the highway corridor be designated as residential, but commercial or light industrial uses would be considered if they did not jeopardize the residential character of the area.

Just north of the Black River, the route follows the existing 138 kV transmission line ROW passing a campground and a commercial parcel. USH 53/STH 93 could be expanded to a multilane highway between Galesville and Holmen at some point in the future. Because the proposed route is not adjacent to the highway ROW, it would not be affected by a future road expansion.

In the town of Holland, the route passes through a wooded area designated for large lot residential development in its comprehensive plan. This area lies on the east side of USH 53/STH 93, between the Black River and Sylvester Road. Along the north/south leg of Aspeslet Road, just north of Sylvester Road, the route runs along the east side of the road, increasing the distances between the line and existing residences on the west side of the road. South of Sylvester Road, the route crosses a golf course before continuing south on the western edge of a large forested area. The town's plan shows small lot residential development as the planned land use west of the route in what is currently agricultural land.

The village of Holmen created the "Seven Bridges" Tax Incremental District on the north end of the community, between Amsterdam Prairie Road and USH 53/STH 93, and extending north of Old Highway 93 about 0.75 mile. Holmen's vision for the District is "to create a distinctive signature entrance into the Village of Holmen as one approaches the community from the north and west. Land uses will consist of residential, multi-family, mixed uses, office, light industrial and green space." The area is currently a combination of agricultural and open space with some pockets of residential and small commercial businesses. The North Holmen Neighborhood Master Plan covering this area shows mixed commercial and light industrial use and multi-family housing west of the route and a conservancy area (King Bluff) to the east, north of Old Highway 93. A bicycle route would run in the transmission line ROW north of the conservancy area.

The edge of a soon-to-be-built nursing home development at the southeast corner of the District, east of the STH 35/USH 53 interchange, is crossed by Segment 18B as it moves from the existing transmission line ROW to the west side of STH 35. A medical clinic is planned for the southeast corner of the intersection of STH 35 and USH 53/STH 93. South of the clinic site and east of Prairie View Elementary School is the planned site for a new middle school. See Figure Vol. 2-1J for the location of the school site. (This portion of the project is the same as the analogous portion of the proposed Q1-Galesville Route in Chapter 8.) The route follows the west side of STH 35 past the future clinic and middle school, passing adjacent to the middle school's athletic fields. Residential uses are shown on both sides of STH 35 in the village's smart growth plan. Continuing south, the route leaves the highway to pass between Holmen High School and a residential area to the immediate west. The new ROW could constrain the layout of single-family lots planned for the west side of Briggs Road. Once across CTH MH, the route proceeds southwest to the west side of the USH 53/STH93 freeway, crossing the edge of a future residential area that lies southeast of the CTH MH interchange. Commercial use is designated for the southwest corner of the interchange. For the remainder of the distance to the substation sites, the Holmen plan shows mixed uses on the west side of the freeway and higher density residential on the east side. The land on the east side of the freeway is already partly developed for multi-family housing. The Briggs Road Substation would be built in an area whose future planned use is transitional residential or mixed use.

As part of its proposal for this route, as with the Q1-Galesville Route, NSPW would move the existing 161 kV transmission line running through Holmen from its current ROW to double-circuit it with the new 345 kV transmission line on the new ROW. The new 345 kV line shares the ROW of this existing line north of STH 35. The existing line currently continues south-southeast from the base of King Bluff until it meets STH 35, where it turns directly south. The line parallels property boundaries as it crosses land owned by the Diocese of La Crosse. A nursing home expansion, church, and school are planned for the land east of the line. Before reaching CTH MH, the line passes a nursing home and a senior housing site. As the line proceeds south, it passes between residential and commercial/industrial development between CTH MH and Empire Street. Between Empire Street and the USH 53 freeway, the line lies in the backyards of numerous homes along Pioneer Drive. Most of these homes are within 100 feet of the transmission line's centerline—some are within 50 feet. The area east of the line is undeveloped land designated for residential development in the Holmen Smart Growth Plan. Removing the 161 kV line

from this ROW would greatly reduce the number of homes, existing and future, that would lie very close to it.

10.4.10. Residences

Nine homes lie within 100 feet of the proposed centerline, with another 15 homes between 100 and 150 feet from the centerline. The largest concentration of homes encountered along the route is a group of homes located south of River Bank Road, on Midway Court. This group also includes the home nearest the centerline of this route. Table 10.4-1 shows numbers of residences within increasing distances from the proposed transmission centerline.

East of Alma, there is a new upscale residential development called Alma Hills on the top of the bluff overlooking Alma and the Mississippi River. The applicants' Segment 10B2 passes through this development as part of the Arcadia Route or an STH 88 Connector for one of the Q1 Routes (see Chapter 9). Some land parcels along this segment have scenic easement covenants attached to their deeds. The entire residential development would be avoided by utilization of Segment 10B1 as part of the Arcadia Route or any STH 88 Connector Alternative to one of the Q1 Routes. Segment 10B1 does not pass within 300 feet of any homes or prospective homes.

On the west side of Galesville, on Segment 13B2, construction has begun on three eight-unit apartment buildings since the submittal of the project application. One of these buildings would be within 50 feet of the transmission line centerline, another within 100 feet, and the third within 150 feet. These apartment residences are not reflected in Table 10.4-2.

Table 10.4-2 Residences within 300 feet of the Arcadia Route

SEGMENT	0' – 25'	26' -50'	51' – 100'	101' – 150'	151' – 300'
	From Route Centerline				
2A2					1
10C					9
11A				1	1
11B					1
11D			1	1	2
11G			2	2	5
13A				3	2
13B1			1		1
13B2				5	32
13C					1
13D			2	1	3
13E					2
17A			3	1	3
17B				1	6
18A					4
18C					1
18F					4
Total	0	0	9	15	78

The applicants have proposed an alternative centerline alignment south of Galesville that would reduce the number of crossings of USH 53/STH 54/93. However, using this alignment would probably require the removal (and probably the purchase by the applicants) of one or more homes and a motel because of their proximity to the line.

As part of the proposal for this route, an existing 161 kV transmission line running through Holmen would be moved from its current ROW to double-circuit it with the new 345 kV transmission line on the new ROW. Between Empire Street and the USH 53 freeway, the line crosses the backyards of numerous homes along Pioneer Drive. Most of these homes are within 100 feet of the transmission line's centerline. Some are within 50 feet. A new transmission line on the Arcadia Route or the Q1-Galesville route would reduce by approximately 26 the number of homes near the existing transmission line in this area.

10.5. STAGING AND ACCESS

10.5.1. Staging areas

Construction staging areas would be required during the entire construction period for the storage of construction materials, transmission line poles, cables, equipment, vehicles, and related materials. The applicants identified potential staging areas on the basis of their location, access, security, and suitability for the efficient and safe warehousing of supplies. Environmental and landowner impacts were also considered. Identified sites were evaluated for potential impacts to wetlands, streams, natural features, threatened and endangered resources, and cultural or archaeological resources. Sites were also evaluated as to vegetation clearance, excavation, and grading requirements. Sites that need minimal site preparation were preferred.

For example, sites that are paved or have been previously graded and cleared of vegetation (parking lots, old gravel pits, and farm fields) are considered ideal locations for staging areas.

Staging areas outside the transmission line ROW would be obtained from private landowners through leases that would last until the end of construction. If it became necessary to secure additional staging areas near the route to temporarily store transmission line construction materials, a similar selection process as that used for the original site selection would be followed, including an environmental review.

In general, 20 acres would be used at each site, and an access path at least 30 feet wide would be required. The applicants state that staging areas would not be located within wetlands. If a selected site was located near or upslope from a wetland or waterway, appropriate erosion control measures would be implemented to prevent impacts. In addition, access points for and the haul routes to and from these work sites would be selected, located, and designed to minimize disturbance to soils and sensitive natural resources to the greatest degree practicable as well as to minimize off-site tracking of soil. Each contractor would be required by the applicants to have a Spill Prevention Control and Countermeasure Plan in place that would cover both the contractor's construction equipment and construction activities.

The proposed staging area sites are primarily agricultural. Soil compaction would be expected on croplands, although measures could be taken to alleviate this compaction once construction is completed. Any nearby homes could experience noise, dust, and visual impacts. Screening vegetation might mitigate these impacts in some cases. Roads between the staging areas and worksites would be impacted by construction traffic.

The proposed off-ROW sites nearest this route are described below.

- Staging Area 6 is a13-acre cropland parcel located along Segment 17A, near its junction with Segment 13E. The site lies about 0.5 mile north of the Black River, between CTH AA and Segment 17A, in the town of Gale. Several homes lie north and south of the site, along CTH AA. Trees south of the site provide some screening for homes in that direction.

- Staging Area 7 is a 20-acre parcel located on the east side of Ziegeweid Valley Road, just north of STH 95, about three miles west of Arcadia, in the town of Glencoe. The farmland on the site appears to be either fallow or grazed. An area in the northwest corner contains approximately one acre of wetland soils. Wooded wetlands along two streams border the site on two of its three sides.
- Staging Area 8 is a 16-acre parcel located on the west side of STH 93, about 2.5 miles south of the city of Arcadia, in the town of Arcadia. The site is located in a gravel quarry surrounded by wooded land.
- Staging Area 9 is a 20-acre parcel located where Segment 10C crosses CTH N, southeast of Alma, in the town of Belvidere. The site is almost entirely cropland, except for a small area of forest and shrub land surrounding an intermittent stream. Open cropland surrounds the parcel.

10.5.2. Access paths

Construction access paths, for the most part, would follow existing paths identified for the maintenance of existing lines along the proposed route. These paths are generally able to support large equipment, but some tree clearing may be necessary to provide a 16-foot-wide path where they have grown in or to allow for larger equipment. Existing paths have been developed over decades of use and coordination with landowners in order to minimize impacts to existing land uses and to avoid areas where large equipment cannot travel. Path widening, grading, or reinforcement may be necessary to accommodate ground conditions at the time of construction or the use of special equipment. BMPs would be used to prevent soil erosion from the paths where the ground would be disturbed.

The applicants state that, once construction is completed, the access paths would be restored to the landowner's satisfaction where the ground had been disturbed. Restoration would include grading to remove ruts and the establishment of ground cover to stabilize the soil. These activities would be regulated and monitored under a WDNR stormwater permit for construction activities.

The paths would also be used for future maintenance of the line. No specific ongoing maintenance measures for the paths are planned, but when access was needed, necessary improvements would be made at that time.

Clearing or trimming of oak trees during the growing season could possibly spread oak wilt to surrounding forests. Construction outside of the growing season or the immediate treatment of oak stumps or wounds could prevent this.

When access paths cross cropland, it is usually at the edges of fields. Impacts from rutting and soil mixing could be reduced if construction access using these paths takes place when the ground is frozen and avoided when soils are wet.

Access paths tend to be longer and more numerous in route areas dissected by ridges and valleys. Steep slopes can prevent direct access along the ROW path to pole locations. Off-ROW paths can also help reduce wetland and stream crossings by construction and maintenance equipment.

According to the applicants' preliminary access plan, the Arcadia Route would require 82 off-ROW 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. These paths would require the clearing of 5.5 acres of forest and would include 29.5 acres of cropland and 4.0 acres of grassland.