Illinois Chorus Frog Conservation Plan
for the Moraine Sands Wind Project
Mason County, Illinois

Prepared for:

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Confidential Business Information

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1.0 INTRODUCTION

Moraine Sands Wind Power LLC (Moraine Sands) is proposing to construct the Moraine Sands Wind Project (Project) in Mason County, Illinois (Figure 1), with groundbreaking scheduled to occur as early as September 2022, and construction and decompaction efforts currently scheduled to be completed by November 2023. Western Ecosystems Technology Inc. (WEST) developed this Conservation Plan to assess the potential for Illinois chorus frog (*Pseudacris illinoensis*; ICF) to occur in or near the Project, estimate the potential impacts to ICF from Project construction, and outline the avoidance and minimization measures developed for the Project.

ICF is listed by the Illinois Department of Natural Resources (IDNR) as a threatened species (IDNR 2015). Moraine Sands is applying for an Incidental Take Authorization (ITA) to address potential impacts to ICF from construction activities, and requests coverage from groundbreaking as early as in September 2022 through the end of decompaction work that is currently scheduled to conclude in November 2023.

2.0 AREA TO BE AFFECTED

The Project is in Mason County, Illinois, and falls within all or portions of the following townships (Figure 1):

- Mason City Township (T20N, Range 5W): Sections 30 and 31
- Salt Creek Township (T20N, Range 6W): Sections 2–30, and 36
- Pennsylvania Township (T21N, Range 6W): Sections 31–34
- Sherman Township (T21N, Range 7W): Sections 35 and 36
- Crane Creek Township (T20N, Range 7W): Sections 1, 2, 10, 12–16, and 21–24

The Project is in southeast Mason County, 1.0 miles ([mi] 1.6 kilometers [km]) southwest of Mason City. The Project area is 4.8 mi (7.7 km) from north to south and 9.2 mi (14.8 km) across east to west. The Project is bordered by Illinois Route 10 to the north, and Illinois Route 29 runs along the eastern portion of the Project. All Project facilities are located on land Moraine Sands either leases or owns. As described in Section 4.1.1, there are certain areas within public road rights-of-way (ROW) where temporary widening/improvements are proposed to allow safe delivery of Project components during construction.

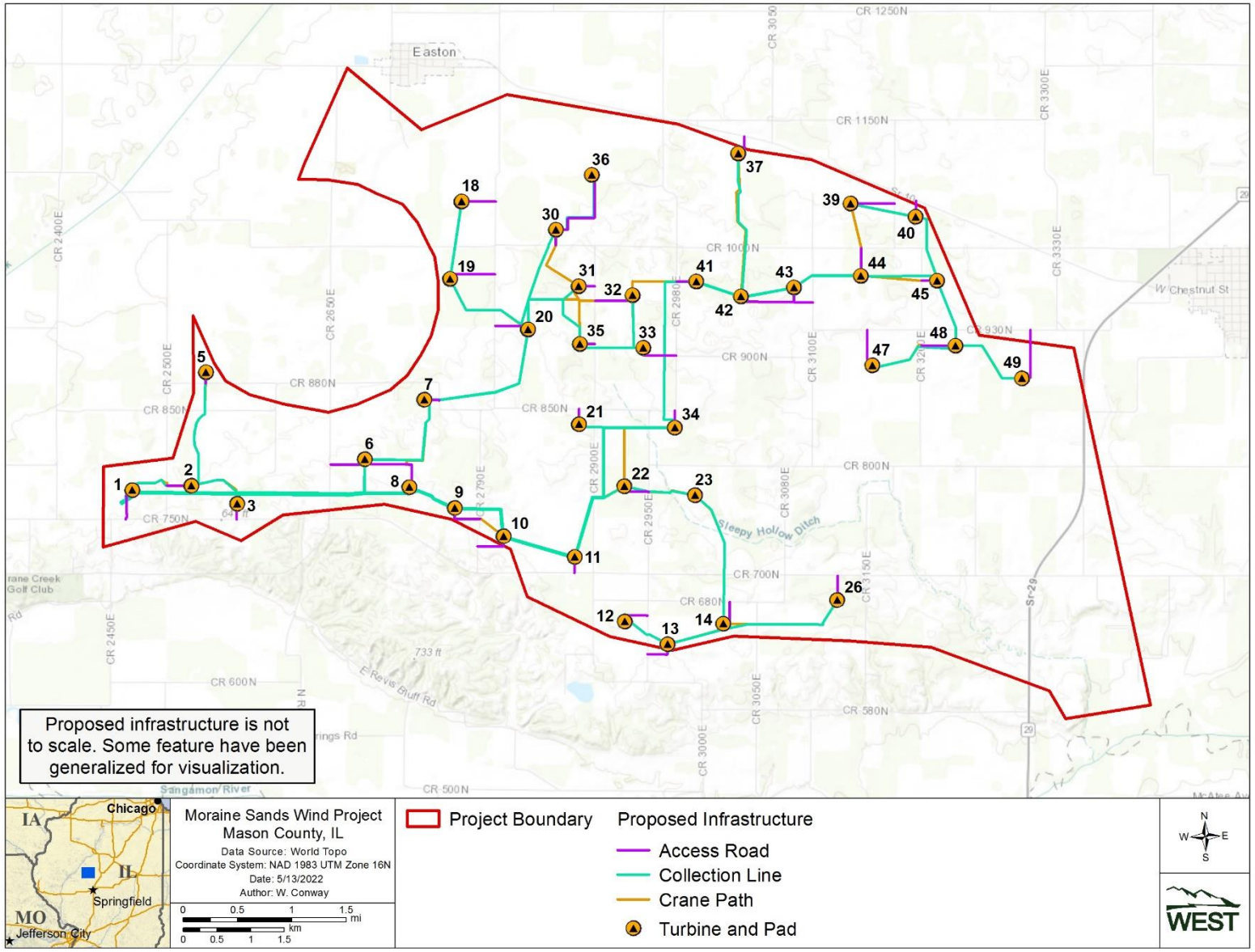

Figure 1. Location of the Moraine Sands Wind Project in Mason County, Illinois.

The Project falls within the Central Corn Belt Plains Ecoregion, which was historically characterized by flat to rolling plains with a mosaic of bluestem prairie and oak-hickory (*Quercus-Carya* spp.) forest (US Environmental Protection Agency 2012). The ecoregion is now dominated by corn (*Zea mays*), soybean (*Glycine max*), and livestock farming operations. Within the Project, corn and soybean production is the primary land use. Trees are sparsely distributed and typically restricted to small, linear clusters generally associated with homes and fencerows, with relatively few large woodlots within the Project. Soil types within the Project are predominantly sand or sandy loams. The US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps numerous riverine and palustrine wetlands throughout the Project (USFWS NWI 2020).

Moraine Sands is proposing construction of up to 49 wind turbines capable of generating up to 190 megawatts (MW) of energy annually. The proposed Project boundary encompasses approximately 19,120 acres (ac; 7,737 hectares [ha]) and will include associated ancillary facilities such as underground electrical collector and communication lines, access roads, substation, an operations and maintenance facility, meteorological towers, and aircraft detection lighting system towers. Turbine pads, excavation for collection lines, and access roads will account for 401.1 ac (162.3 ha) of temporary impacts and 24.1 ac (9.8 ha) of permanent impacts associated with the Project, with 88.5 ac (35.8 ha) of temporary impacts and 6.6 ac (2.7 ha) of permanent impacts in ICF upland habitat, as described further in Section 4.2. Locations of the meteorological towers and aircraft detection lighting system towers are not yet known, but Moraine Sands will endeavor to locate these towers outside of ICF upland habitat.

3.0 BIOLOGICAL DATA OF THE AFFECTED SPECIES

ICF is a small frog with a range restricted to sandy floodplain regions in western Illinois, southeast Missouri, and northeast Arkansas (Henning and Hinz 2016). ICF is a secretive, fossorial species that emerges from underground burrows only during the breeding season. Adults are small, up to 1.8 inches ([in; 4.6 centimeters [cm]) snout-vent-length, and stout, with toad-like bodies and robust forearms. Adults have a distinguishing dark, mask-like stripe from snout to shoulder and a V- or Y-shaped mark between the eyes (Henning and Hinz 2016).

3.1 Upland Life History

Between April to February, ICF live predominantly underground in sandy, loamy sand, or sandy loam loose soils conducive for burrowing (Henning and Hinz 2016). Burrowing habitat predominates in areas with no or relatively sparse vegetation near ephemeral breeding pools. In lab and field environments, adult burrows have ranged from less than 1.0 in (2.5 cm) up to 9.0 in (22.9 cm) deep (Brown et al. 1972).

While underground, ICF feed on invertebrates found in the soil. Prey species of ICF are likely most abundant close to the soil surface. Unlike other *Pseudacris* species, ICF are not freeze-tolerant and must burrow below the frost line to survive freezing temperatures in winter (Packard et al. 1998). ICF likely need to burrow between 5.0 in (12.7 cm) and 10.0 in (25.4 cm) below the surface to escape freezing (Brown et al. 1972).

3.2 Breeding

In Illinois, ICF are one of the earliest frog species to emerge and begin calling in the spring. ICF emerge from underground burrows between February and April to congregate at breeding ponds, often coinciding with heavy rainfall of 1.0 in or more (Brown and Rose 1988). ICF breed in fishless, shallow waterbodies with emergent or dead vegetation, and which may include ditches, flooded fields, and other emergent wetlands (Beltz 1991, 1993). Successful breeding pools support a hydroperiod long enough for tadpoles to reach metamorphosis, typically from February through June. Females attach egg clusters to the underside of submerged or floating vegetation (Tucker 1997). Egg masses are relatively small, with averages of 22 and 57 eggs per egg mass reported (Tucker 1997, McCallum and Trauth 2001). Tadpoles can be cannibalistic and have demonstrated survivorship rates of less than 5% in lab studies (McCallum and Trauth 2001). Froglets disperse from the pond in late May or early June and may disperse more than 0.5 mi (0.8 km) from their birth pond (Tucker 1995, 1998). ICF metamorphs are capable of breeding in their first year (Henning and Hinz 2016). Most ICF do not return to natal ponds to breed; instead, the frogs are more likely to disperse to other suitable ponds in the landscape (Tucker and Philipp 1995).

3.3 Population Status

As of 2015, there were 29 population records of the ICF in the Illinois Natural Heritage Database (IDNR 2018). Of these 29 records, 24 occur in the northern region of ICF's distribution, which encompasses Mason, Cass, Menard, Tazewell, Logan, Morgan, and Scott counties. The population size in the northern region has not been assessed to date, but it is known to have a low genetic diversity (Schneider 2011). The state conservation guidance for the species suggests the principal threat to the species is likely loss of breeding ponds due to changes in hydrology from agricultural drainage installations (Henning and Hinz 2016). Other major threats to ICF include road mortality and habitat degradation through woody encroachment (Beebee 2013, Henning and Hinz 2016).

There are 127 individual records of ICF breeding ponds in Mason County (Figure 2). The IDNR identified records of 16 ICF breeding ponds within the Project (T. Kieninger, IDNR, pers.comm., January 2019).

WEST biologists conducted surveys in the Project in March 2020 and determined that six previously documented breeding ponds no longer held water; one was along an intermittent stream and presumably could still support a breeding population. WEST assumed that hydrology at the other five ponds may have been altered through installation of drainage tiles, and may no longer hold standing water sufficient for breeding frogs (Rodriguez and Stulik 2020). Across two rounds of surveys, ICF were recorded at six ponds that had been previously documented as breeding ponds by the IDNR. ICF was also recorded incidentally at a pond that had not previously been documented as a breeding pond (Rodriguez and Stulik 2020).

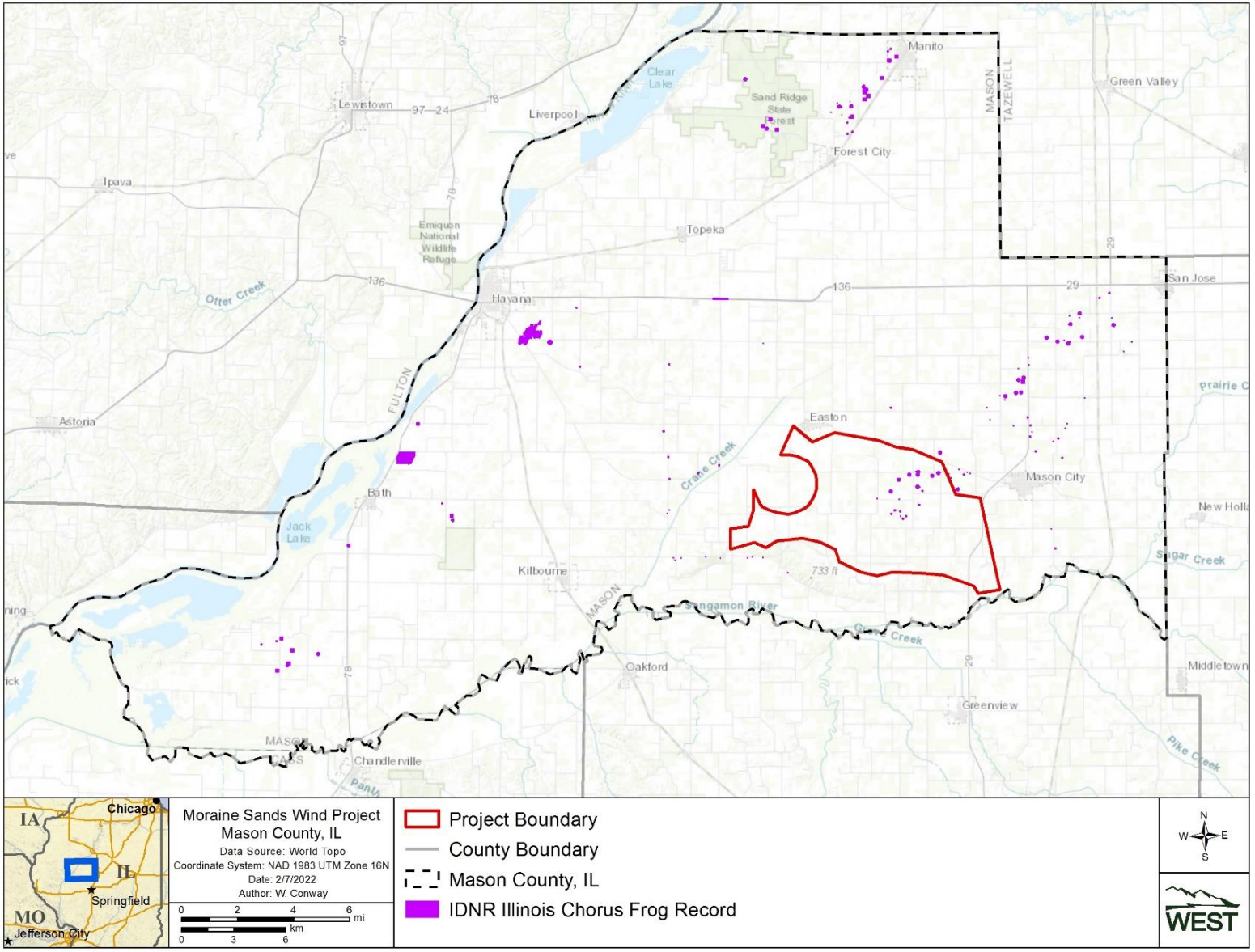

Figure 2. Illinois chorus frog distribution in Mason County, Illinois, and within the Moraine Sands Wind Project.

4.0 DESCRIPTION OF ACTIVITIES

4.1 Activities with Potential for Incidental Take

Due to the burrowing habits of the ICF and because the species has been confirmed to be present in ponds near proposed facilities, construction of the proposed Project is likely to result in incidental take of this species.

ICF may be most vulnerable to direct take between February to April, when adult frogs emerge from underground and congregate at breeding ponds. ICF may be at increased risk during this period due to their increased mobility and overland travel. Higher concentrations of ICF that occur at breeding ponds relative to upland habitat may also increase the population's susceptibility to negative impacts during this period if construction activities occur near occupied ponds between February and April. Work near active breeding ponds has the potential to change the pond's hydrology through siltation.

Ground disturbance associated with excavation, grading, and compaction of the soil also has the potential to adversely impact ICF. Specifically, installation of access roads, crane paths, collector system cables, turbine foundations, and crane pads have potential to result in direct take of ICF burrowed underground between April to February. Installation of turbine pads and access roads will permanently remove potential ICF upland habitat.

Construction activities are described in detail below (Sections 4.1.1–4.1.5; Figures 3 and 4).

4.1.1 Improvements to Existing Roads

Prior to installation of Project-related infrastructure, road widening and road improvements will occur within the existing ROWs along portions of county roads. Road widening/ improvement is currently planned to occur approximately between September and December 2022. Because county road ROWs consist of heavily impacted soils presumed to be unsuitable for burrowing frogs, Moraine Sands does not anticipate burrowing habitat would be affected by these activities. Additionally, because county roads are regularly traveled by vehicles, vehicles associated with road-widening activities during the daytime are not a new source (nor are anticipated to significantly increase the existing source) of potential direct take of ICF on the roads themselves. No road improvement construction is proposed to occur within 300 feet (ft; 91 meters [m]) of documented breeding ponds (e.g., no direct impacts to breeding ponds would occur; Figure 4).

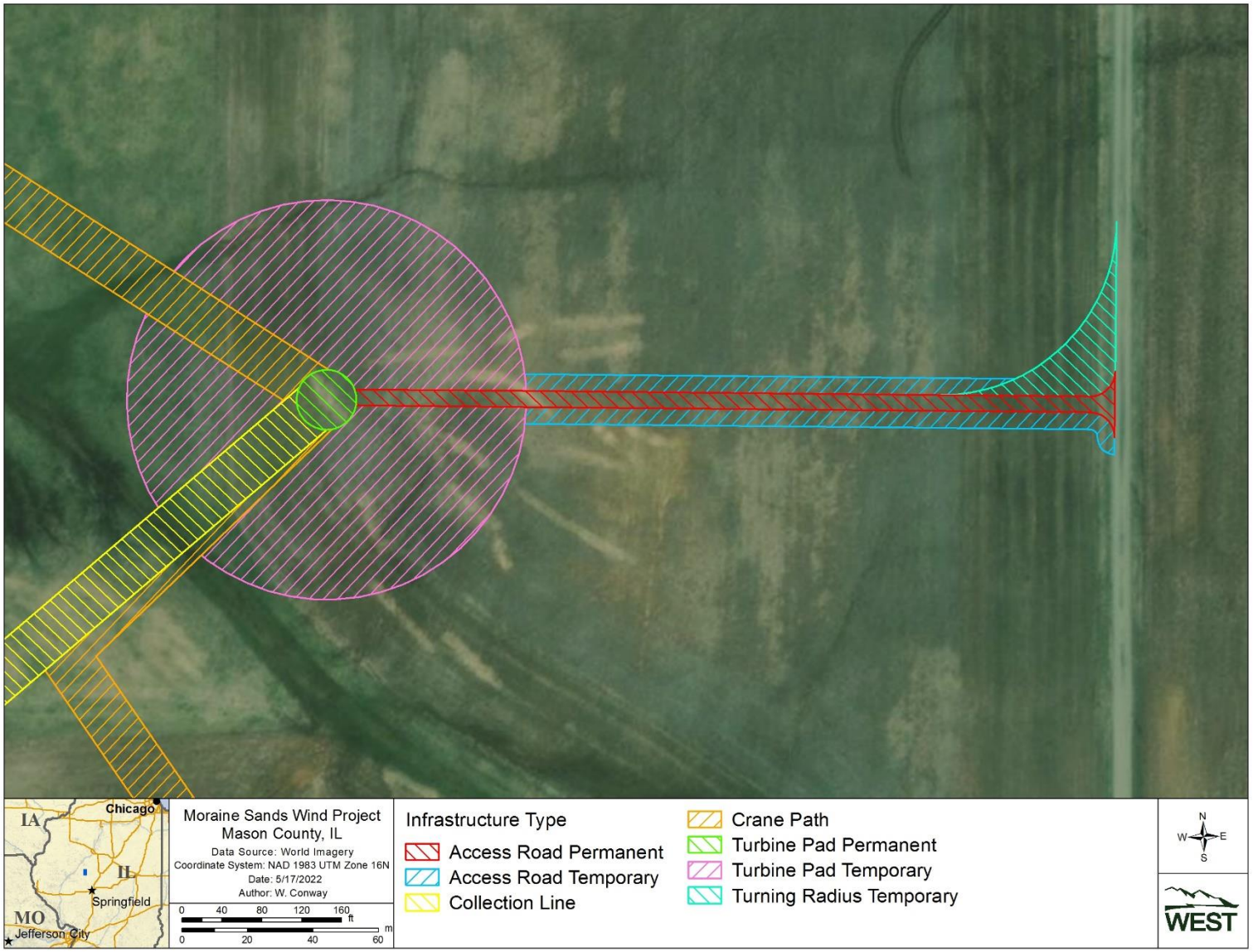

Figure 3. Illustration of proposed layout of temporary and permanent disturbance at example turbine at the Moraine Sands Wind Project, Mason County, Illinois.

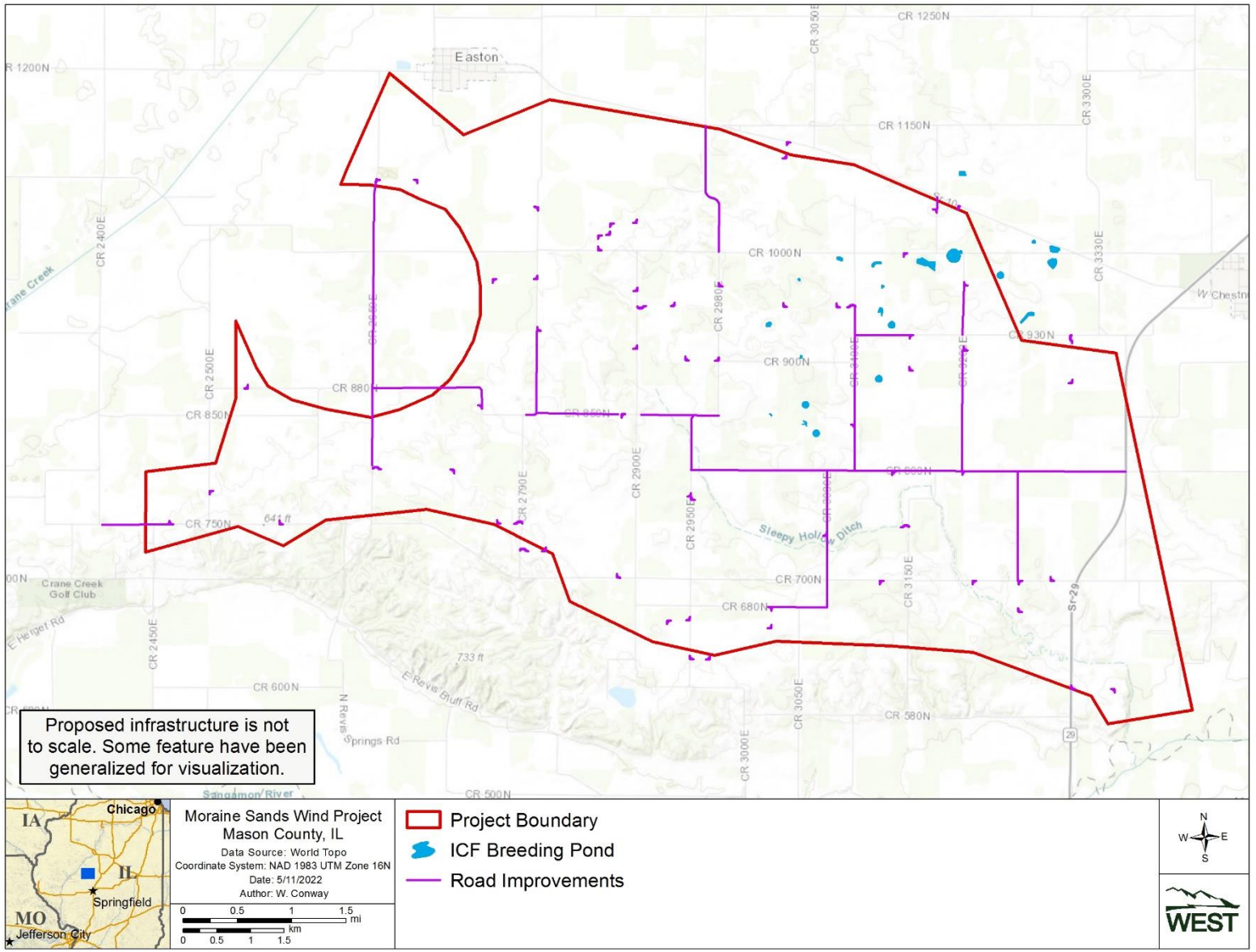

Figure 4. Proposed locations of road improvements at the Moraine Sands Wind Project, Mason County, Illinois.

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4.1.2 Turbine Access Roads

Access roads are expected be installed between October – December 2022, and May – July 2023. Permanent features of the turbine access roads will include a 16.0-ft (4.9-m) wide road covered in 4.0 in (10.1 cm) of aggregate surface of an approximately 8.0 in (20.3 cm) cement-stabilized base. Permanent access road construction typically begins with the removal of 4.0 in of topsoil using a motor grader. Following the removal of topsoil, subgrade soil will be tilled and mixed with cement and water via a soil stabilizer and water truck. The soil and cement mixture will be compacted with a sheep's foot roller and regraded with a motor grader. Approximately 4.0 in of aggregate material will be added to the road surface after the mixture has cured. This mixture will likely be dumped from a truck, spread with a bulldozer or backhoe, and compacted with a roller. A skid steer or backhoe will be used to shape any remaining topsoil in the areas immediately adjacent to the turbine access roads.

At each turbine, an additional temporary access area will be constructed to allow for wide-turning vehicles to bring turbine parts onto the permanent turbine road and pad area. The width of these wedge-shaped areas will vary depending on location, from 162–380 ft (49–116 m) at their widest. These portions of the road will be cleared of vegetation and will be covered in an aggregate surface during construction. Following construction, the aggregate will be removed and soil will be decompacted using tractor-pulled attachments to rip or plow backfilled surfaces to a depth of approximately 18 in (46 cm). Decompaction efforts will exceed known depths of ICF burrows and will allow agricultural practices to continue along crane paths and above collection lines in future years; for this reason, habitat impacts associated with temporary access roads are considered temporary. Temporary access areas will not undergo soil stabilization prior to use. Decompaction will likely begin in July 2023 and will continue through December 2023.

4.1.3 Turbine and Crane Pads

Turbine foundations will be excavated between October – December 2022, and May – July 2023. Crane pads will be installed in between May and July 2023. Permanent features of the turbine pads will include a pad 60.0 ft (18.3 m) in diameter (0.06 ac [0.02 ha]) and 4.0 in of cover by an aggregate. Temporary disturbance associated with turbine pads will extend out as much as 200 ft (61 m) in diameter, or 0.72 ac (0.29 ha). Turbine foundations are typically prepared by removing the existing topsoil layer and spreading the material adjacent to the site with motor graders, bulldozers, or pan scrapers. The foundation will be excavated with motorized excavators or similar equipment. Specific foundation designs and depths vary based on existing soil conditions, but excavation depths typically range between 12 and 24 ft (four and seven m). A typical volume for excavation is three-hundred cubic yards (229 cubic m) per turbine. The foundation footprint will likely be circular and 70 ft (21 m) in diameter. Turbine foundations will be constructed with small cranes assisting with the placement of steel rebar and concrete trucks delivering concrete materials for the foundation.

During construction, vegetation clearing, vehicle traffic, and aggregate is expected to extend out 200 ft in diameter. Crane pads will consist of a 55-ft (17-m) wide by 100-ft long area at the base

of each turbine pad, which will allow for cranes to park and assemble turbine components. Crane pads will fall within the bounds of the temporary disturbance of the turbine pads. Crane pads will be temporarily cleared of vegetation and covered in aggregate. Following construction, aggregate covering areas of temporary turbine pads and crane pads will be removed and soil will be decompacted using tractor-pulled attachments to rip or plow backfilled surfaces to a depth of approximately 18 in. The crane pad and temporary portions of the turbine pad will not undergo soil stabilization or excavation prior to use. Decompaction will begin in July 2023 and will continue through December 2023.

4.1.4 Collection Lines and Crane Paths

Moraine Sands expects to excavate and install collection lines between May – July 2023. Underground electric collection lines will be installed by laying cable in a trench cut by a mechanical trencher or similar equipment. During trench excavation, topsoil, defined as the "A" horizon, or the darkest color soil in the uppermost soil layers, will be excavated first. Topsoil will be stored near the excavation site in such a manner to avoid intermixing it with subsoil materials. During backfilling, stockpiled subsoil will be placed into the excavation site before replacing topsoil. Collection lines will be buried at a depth of 5.0 ft (1.5 m) below grade. Backfill will be added over top of the cable by a backhoe, skid steer, or similar equipment. Direct boring may be used in any areas where it is not possible to trench. This will involve excavation of bore pits by a backhoe or excavator, installation of conduit using a directional boring machine, and backfill of the boring pits using a backhoe or similar equipment.

Crane paths are expected to follow collection line routes to minimize soil compaction. Following backfill of collection lines and use of crane paths, crane path and collection line routes will be decompacted using tractor-pulled attachments to rip or plow backfilled surfaces to a depth of approximately 18 in. Decompaction efforts will exceed known depths of ICF burrows and will allow agricultural practices to continue along crane paths and above collection lines in future years; for this reason, habitat impacts associated with crane paths and collections lines are considered temporary. Decompaction will begin in July 2023 and will continue through the December 2023.

4.1.5 Vehicle Traffic

Construction associated with each turbine access road and turbine will vary based on each road's length, configuration, and the contractor's construction methods. A typical turbine access road is anticipated to generate approximately 500 combined loaded and unloaded delivery trips and 1,000 personal vehicle trips per turbine site. These trips will primarily occur from April through December 2023.

4.2 Estimate of Incidental Take

4.2.1 Take Estimate

4.2.1.1 Habitat Estimate

The IDNR considers potential upland habitat to be suitable soils within 0.6 mi (0.9 km) of documented breeding ponds. To determine the amount of potential upland habitat affected by the Project, WEST grouped known breeding ponds within the Project (i.e., previously documented

ponds not surveyed in 2020, previously documented ponds surveyed in 2020 and found to hold water, and one additional breeding pond record documented during 2020 surveys). Breeding pond records supplied by the IDNR were represented by circles ranging from 159–1,177 ft (48−359 m) wide, and did not necessarily accurately represent delineated pond boundaries. In some cases, the records represented flooded fields, which likely have variable boundaries from year to year due to variability in rainfall. In other cases, breeding ponds are located in discrete wetlands and ponds. Prior to calculating upland habitat, WEST digitized the boundaries of 12 wetlands using geospatial data gathered in the field and aerial imagery (Google Earth 2011, 2012, 2014, 2016, 2018, and 2019) to further refine the analysis. WEST then established a 0.6-mi (0.9-km) buffer around the breeding ponds and overlaid the proposed Project infrastructure to determine the number of acres of permanent and temporary impacts within varying distances from known breeding ponds (Figure 5).

Although ICF may disperse up to 0.9 km from breeding ponds, it is likely ICF dispersal into upland habitat occurs over a gradient, rather than an even distribution (i.e., density of ICF will be higher closer to each pond than the densities of ICF found at 0.9 km). Therefore, WEST determined the amount of temporary and permanent habitat impacts that would occur from zero to 750 ft (229 m) from breeding ponds, and from 750 ft–300 m, 300 m–600 m, and 600 m–900 m.

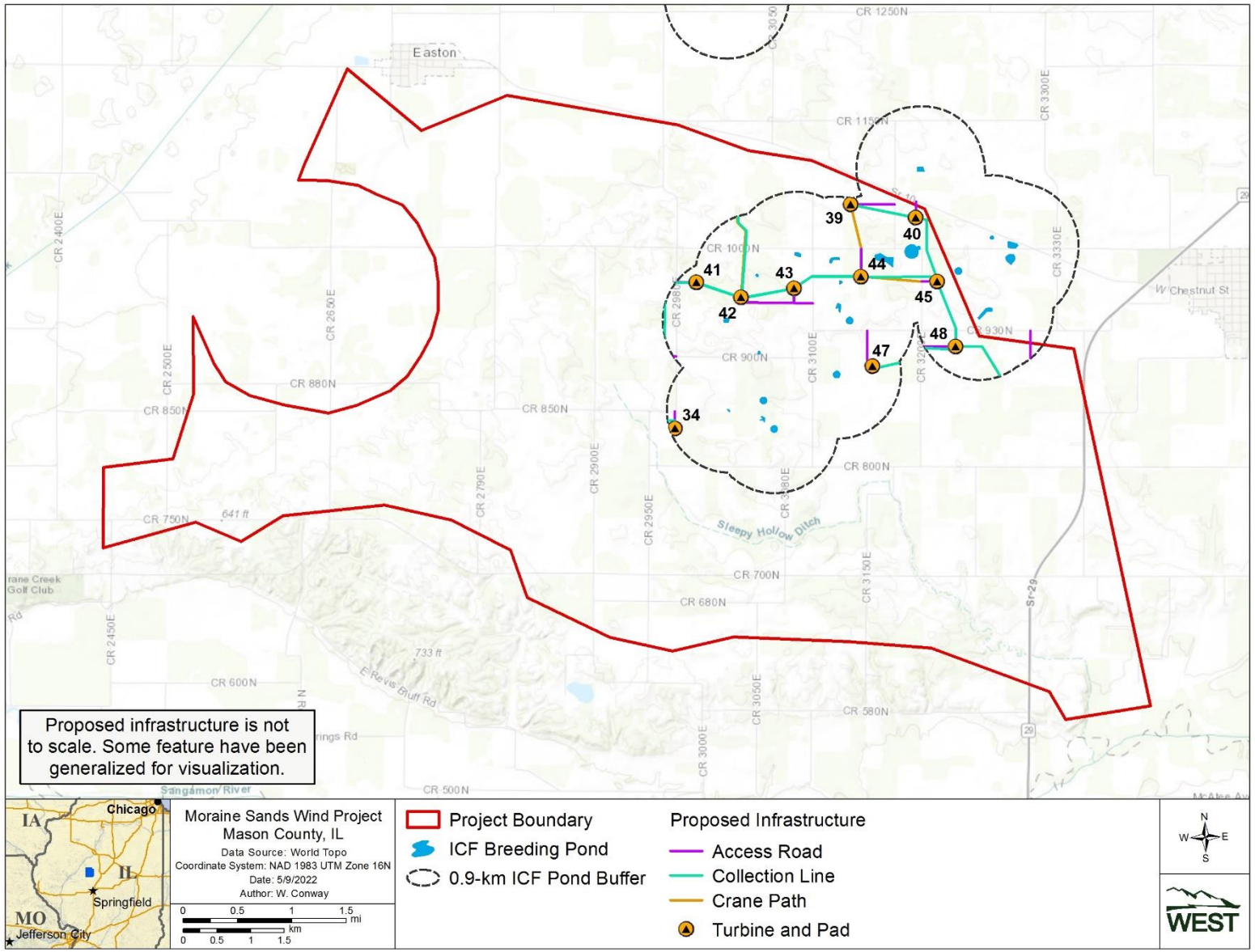

Figure 5. Temporary and permanent disturbance effects at the Moraine Sands Wind Project, Mason County, Illinois.

The width of disturbance associated with infrastructure will be as follows:

- Access roads
    - Temporary disturbance will be 50.0 ft (15.2 m) wide
    - Permanent disturbance will be 16.0 ft wide
- Collection lines and crane paths
    - Temporary disturbance will be 50 ft (15.2 m) wide
- Crane pads
    - Dimensions will be 55 ft wide and 100 ft long
- Turbine pads
    - Temporary disturbance will be 200 ft in radius
    - Permanent disturbance associated with pads and turbine foundations will be 30 ft in radius

The total acreage of each disturbance type within potential habitat is provided below in Table 1, and the total length of each disturbance type within potential habitat is provided below in Table 2.

Ninety-five ac (38 ha) of potential ICF upland habitat will be affected by construction of the Project. Of this disturbance area, 6.57 ac (2.66 ha) will be permanently affected, and the remaining 88.47 ac (35.80 ha) of temporary impacts will be restored to previous conditions after the completion of construction. Cultivated cropland and developed areas account for 92% of the total ICF upland habitat that will be affected.

Table 1. Acres of potential Illinois chorus frog upland habitat to be affected by permanent and temporary impacts at the Moraine Sands Wind Project in Mason County, Illinois.

Impact Type	Infrastructure	Acres within 0–750 ft	Acres within 750 ft–300 m	Acres within 300–600 m	Acres within 600–900 m	Total Acreage
Temporary	Turbine Pads[1]	0.00	2.84	11.67	6.29	20.80
	Access Roads	0.13	0.38	3.05	3.74	7.30
	Crane Paths	2.35	2.30	7.38	3.37	15.40
	Collection Lines	6.36	5.90	20.13	12.57	44.96
Temporary Total		**8.84**	**11.42**	**42.23**	**25.97**	**88.46**
Permanent	Turbine Foundations	0.00	0.09	0.36	0.19	0.64
	Access Roads	0.31	0.29	2.67	2.66	5.93
Permanent Total		**0.31**	**0.38**	**3.03**	**2.85**	**6.57**

ft = feet; m = meters.

[1]The temporary impacts associated with crane pads will fall within the temporary impacts of the turbine pads; therefore, the crane pad acreage is not displayed separately from the turbine pad.

Table 2. Length of potential Illinois chorus frog upland habitat to be affected by permanent and temporary impacts at the Moraine Sands Wind Project in Mason County, Illinois.

Infrastructure	Miles within 0–750 ft	Miles within 750 ft–300 m	Miles within 300–600 m	Miles within 600–900 m	Total Miles[1]
Access Roads	0.16	0.15	1.40	1.36	3.07
Collection Lines	1.31	1.21	4.03	2.77	9.32
Permanent Total[1]	**1.47**	**1.36**	**5.43**	**4.13**	**12.39**
Crane Paths	0.80	0.63	3.37	1.70	6.50
Temporary total[1]	**0.80**	**0.63**	**3.37**	**1.70**	**6.50**

[1] Lengths were calculated as total acreage/width; turbine pad and crane pad area is provided as a diameter in Table 1 and total length is not presented here.

Ft = feet; m = meters.

4.2.1.2 Direct Take

Although ICF will be distributed throughout the landscape in relatively low densities, ground-disturbing activities associated with Project construction are likely to result in direct take of ICF while ICF are in upland habitats. However, as discussed in Section 4.1, ICF may be at highest risk of impacts during the breeding season when ICF are above ground and dispersing through a variety of habitats to reach breeding ponds. Due to the uncertainty of take associated with excavation, Moraine Sands conservatively estimates construction activities associated with the Project may result in take of between zero to 50 ICF. Moraine Sands is committed to implementing the measures laid out in Section 5.1 to minimize impacts and the potential for direct take of ICF during both the breeding and non-breeding seasons.

5.0 MINIMIZATION AND MITIGATION

5.1 Minimization Measures

Minimizing the acreage of disturbance needed to construct the Project is anticipated to reduce the risk to ICF and its habitat. The Project boundary and limits of disturbance have been reduced as Project development continued.

Moraine Sands has sought to minimize potential impacts to breeding ponds through siting project infrastructure more than 750 ft away from documented breeding ponds, to the extent possible. All turbines are located more than 750 ft away from breeding ponds. The remaining infrastructure has been sited to minimize the extent of facilities within 750 ft of breeding ponds, but 0.16 mi of access roads and 1.31 mi of collection lines are within 750 ft of breeding ponds. Moraine Sands has committed to the following siting and avoidance measures during construction:

1. Widths assumed in impact calculations are presented as a conservative estimate of ground disturbance and will be reduced whenever possible.
2. When laying out access roads and underground collection lines, the most direct route will be used to limit ground disturbance, provided that there are not considerations that require a deviation, such as presence of a breeding pond or requests from Project participants.

3. To preserve soil structure, all excavation will be performed in a manner to preserve topsoil, defined as the "A" horizon, or the darkest color soil in the uppermost soil layers. Topsoil will be stored near the excavation site in such a manner to avoid intermixing it with subsoil materials. During backfilling, stockpiled subsoil will be placed into the excavation site before replacing topsoil.
4. Herbicides, pesticides, and fertilizer use associated with the Project will be restricted; no applications will occur within 48 hours of a rain event.
5. Between February 1 and June 30, construction will cease at sunset to avoid the time of day when ICF are most active and to decrease potential for hitting migrating ICF.
6. No road improvements will occur within 300 ft of known breeding ponds.
7. To the extent possible, no excavation work will occur within 900 m of breeding ponds between February 1 and April 30.
8. If excavation occurs between February 1 and April 30, all excavated trenches left unfilled overnight within 300 m of known breeding ponds will be covered to avoid trapping ICF or other wildlife. For all other trenches in ICF habitat, a board will be placed as a ramp. Each morning prior to resuming construction work a Biological Monitor shall inspect those trenches left open for the presence of ICF.
9. Between February 1 and April 30, the Biological Monitor will survey newly excavated turbine foundations within ICF habitat for the presence of ICF or other wildlife prior to construction work resuming in the area. The Biological Monitor will apply for a Herptile Permit through IDNR to allow them to handle any non-listed amphibian and reptile species that are observed in trenches, turbine foundations, or along silt fencing during construction monitoring.
10. Between February 1 and April 30, the Biological Monitor will perform weekly roadway mortality monitoring along established Project roads, if active construction or component delivery is occurring. The Biological Monitor will also perform weekly surveys of silt fencing within 300 m of known breeding ponds to check for ICF and to ensure the integrity of the silt fencing.
11. Only the Biological Monitor is authorized to handle ICF; all instances of ICF sightings, suspected or confirmed, shall be reported to the Biological Monitor for verification and collection. If an ICF is discovered at any time in the Project, construction shall cease immediately at that location, and the Biological Monitor shall be contacted. The Biological Monitor will give the all clear to resume construction activities once the ICF is out of the area.

12. Disturbed areas outside of agricultural fields will be reseeded, rather than installing sod, to avoid entombing burrowed ICF. The Project will use Illinois Department of Transportation Class 2 mix, consisting of 100 pounds (lb)/acre[1] of tall fescue (*Festuca arundinacea*), 50 lb/acre of perennial ryegrass (*Lolium perenne*), 40 lb/acre of creeping red fescue (*Festuca rubra*), and 10 lb/acre of redtop (*Agrostis gigantea*). The specific seed type is subject to change based on the request of the County Engineer or Township Roadway Supervisors.
13. Once a crane path is no longer in use, the area shall be decompacted using tractor-pulled attachments to rip or plow backfilled surfaces to a depth of approximately 18 in to restore loose soil conditions.
14. All Project personnel will attend a worker environmental awareness training led by a qualified biologist prior to engaging in construction work. The worker environmental awareness training will cover avoidance and minimization measures for the Project with regard to ICFs, as well as identifying characteristics of the species.

5.2 Management of the Affected Area

Impacts to ICF breeding habitat will be avoided and minimized during siting and construction. As described in Section 4.2.1.1, approximately 88 ac of temporary impacts and seven ac of permanent impacts are proposed for this Project. Moraine Sands will not impact breeding ponds during construction or operation of the Project and operation of the Project will not affect the ability of the ICF to use breeding ponds adjacent to the turbines and other components of the Project.

All areas of temporary disturbance will be decompacted using tractor-pulled attachments to rip or plow backfilled surfaces to a depth of approximately 18 in. Decompaction efforts will exceed known depths of ICF burrows and will allow agricultural practices, and likewise, ICF burrowing, to continue in future years. In non-agricultural areas, reseeding will help to establish plant species and help to restore areas to pre-construction conditions.

5.3 Mitigation

Moraine Sands will mitigate for potential take of ICF at the Project by funding the acquisition of off-site conservation lands (either by acquisition of the land itself, or of perpetual easements on the land). If land is acquired directly, acquired lands/easements will be entrusted to the IDNR or a local land conservation trust for long-term management.

[1] 1.0 pound = 0.5 kilogram; 1.0 acre = 0.4 hectare.

It is anticipated the greatest concentrations of ICFs will be in the upland habitat immediately surrounding ponds, with lower densities in the outer areas of ICF's presumed maximum dispersal distance. A study of western chorus frogs' (*Pseudacris triseriata triseriata*) upland movements found frogs stayed within an average of 246 ft (75 m) of breeding ponds during the non-breeding season. Maximum dispersal distance was 699 ft (213 m; Kramer 1973), and a review paper of amphibian migrations found core terrestrial habitat, or the amount of habitat used during migrations, ranged, on average, from 673–1,207 ft (205–368 m; Semlitsch and Bodie 2003) across 19 frog species. Given this review of average dispersal distances, Moraine Sands proposes the mitigation ratios outlined in Table 3.

Table 3. Proposed ratios and acreages for Illinois chorus frog mitigation at the Moraine Sands Wind Project in Mason County, Illinois.

Distance from Breeding Ponds	Acres of Permanent Impacts	Proposed Ratio	Proposed Mitigation Total
0–750 ft	0.31	5.5:1.0	1.71
750 ft–300 m	0.38	3.0:1.0	1.14
300–600 m	3.03	2.0:1.0	6.06
600–900 m	2.85	0.5:1.0	1.43
Total	**6.57**	--	**10.34**

ft= feet; m = meters.

IDNR's Realty Division valued the land in Mason County at $8,789 per acre. Therefore, Moraine Sands anticipates total mitigation costs for permanent impacts to be $90,878. The land protected through easements and acquisitions will help to ensure that known breeding and upland habitat for ICF is protected and managed in perpetuity to support long-term population recovery and stability for ICF. Moraine Sands will provide in-kind funds for land acquisition to an IDNR-approved recipient, The Conservation Fund, within 90 days of the execution of an ITA.

Furthermore, to account for temporary impacts associated with the Project, Moraine Sands proposes funding $50,000 towards research on the species, or for further land acquisition.

5.4 Monitoring

5.4.1 Construction Monitoring

Between February 1 and April 30, a Biological Monitor will be present during construction activities within 900 m of breeding ponds to inspect silt fencing and trenches as outlined in Section 5.1, and document compliance to mitigation measures. A Biological Monitor will respond to any sightings of ICF that occur on site, and will be on-call to respond to ICF sightings, questions, and concerns throughout the construction period.

5.4.2 Post-Construction Monitoring

Spring monitoring will be conducted post-construction. Post-construction monitoring will target ponds within 0.3 mi (0.5 km) of active construction (i.e., ponds where landowner permission is granted, and/or ponds within 100 ft of public roads). Monitoring will be performed to confirm if ICF occupy areas in use prior to construction. Control surveys will be performed at known ICF

breeding ponds outside of the Project for two consecutive years post-construction. If rainfall in the year following post-construction is substantially lower than average, Moraine Sands will confer with the IDNR about postponing surveys to a year with better conditions to evaluate ICF populations.

5.4.3 Reporting

Any observed fatalities of ICF will be reported to the IDNR within two business days of observation. Weekly updates will be provided to the IDNR during the breeding season, and will detail any live ICF observed at the Project. All ICF fatalities will be documented by photograph and a Project-specific data form. Annual reports will be supplied to the IDNR, as required by state-issued permits. A final construction monitoring report, detailing methods, photographic documentation of best management plans (BMPs) and avoidance and minimization measures, a summary of monitoring logs, and any observations of ICF (fatalities or live ICF), will be provided to the IDNR within 90 days of completion of construction and decompaction.

5.5 Adaptive Management

5.5.1 Adaptive Management Goals

The goals of the adaptive management plan are to enable the Project to respond to issues and unanticipated events identified by monitoring data collected over the term of the permit. Certain trigger events and subsequent changes to the avoidance, minimization, and mitigation plan have been defined as a part of the adaptive management plan, to guide the adaptive process.

5.5.2 Adaptive Management Plan

The events that would trigger changes to the avoidance, minimization, and mitigation plan presented herein would be documented impacts above the anticipated Project footprint of 88 ac of temporary impacts and seven acres of permanent impacts. In the event Project impacts exceed the anticipated acreage through errant or purposeful action, Moraine Sands will consult with the IDNR to determine any appropriate additional minimization or mitigation measures that should be enacted at the Project.

If, in any given area, more than two migrating ICF are discovered inside construction limits along the silt fence, Moraine Sands will consult with the IDNR regarding increasing monitoring checks on that portion of fencing or increasing silt fencing to avoid take in an area of relatively higher concentration of ICF.

This adaptive management plan will apply throughout the construction of the Project to provide effective avoidance, minimization, and mitigation measures for avoiding and reducing impacts to ICF.

5.6 Verification of Adequate Funding

Moraine Sands will fund and complete construction monitoring and post-construction monitoring at the Project between February 1 and April 30; Moraine Sands will also fund a combination of acquisition of conservation land and establishment of conservation easements for ICF to be held

in perpetuity. Funding assurance may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the Conservation Plan. Prior to both construction monitoring and post-construction monitoring, Moraine Sands will provide the IDNR with a letter certifying that a monitoring contract has been executed with a firm qualified to conduct monitoring in accordance with the approved monitoring plan. Moraine Sands will purchase the easement for mitigation lands or provide funding for acquisition of mitigation lands to the IDNR, or to a land trust selected in coordination with the IDNR, within 90 days of the execution of the ITA.

6.0 ALTERNATIVES CONSIDERED

6.1 No Action Alternative

The No Action alternative in this case would consist of the Project not being developed, constructed, or operated. However, Illinois's Long-Term Renewable Resources Procurement Plan sets a goal of obtaining 25% of Illinois's energy from renewable sources by 2025 in support of the Future Energy Jobs Act (Senate Bill 2814 [Illinois General Assembly 2016]). The Future Energy Jobs Act requires the energy utilities, Commonwealth Edison, and Ameren Illinois to expand energy efficiency to lower power bills. Currently, around 11% of the energy used in Illinois is created by renewable resources (US Energy Information Administration 2021). Moreover, Executive Order #6 from Governor J.B. Pritzker expresses a desire to put Illinois on a path to 100% renewables. The Project is needed to contribute to these goals, therefore, the No Action alternative is considered non-viable.

6.2 Construction Alternatives

6.2.1 Alternative 1

Construction Alternative 1 is to increase the breeding pond setback to further avoid potential impacts and the risk of migrating ICF encountering Project construction. This alternative would restrict the buildable acreage of the Project to a smaller area and would result in a decreased number of turbines and a lower acreage used for associated Project infrastructure. Due to the decreased Project size, this alternative would not allow the Project to meet its target of 190 MW, and would cause the Project to lose substantial profitability. The elimination of turbines could put the ability of the Project to satisfy this obligation at risk. For these reasons, this construction alternative is considered non-viable.

6.2.2 Alternative 2

Construction Alternative 2 is to install collection lines above ground, thereby decreasing the potential for excavation to impact ICF. However, this would result in increased maintenance and construction expenses for the Project, decrease land owner participation through interference with farm and irrigation equipment, and would increase potential for avian collisions at the Project, making this alternative non-viable.

7.0 IMPLEMENTING AGREEMENT

7.1 Obligations and Responsibilities

Moraine Sands will be responsible for implementing the Conservation Plan. Moraine Sands will promptly report any ICF carcasses to the IDNR. Obligations and responsibilities of Moraine Sands include:

- Implementing BMPs and biomonitors during the breeding season (February to April), within 900 m of ICF breeding ponds
- Reporting any ICF carcasses, or observations of more than two ICF along silt fencing, within two business days of discovery
- Providing a construction monitoring report to the IDNR with photographic documentation of BMPs, avoidance and minimization measures, monitoring logs, and ICF observations, if any, within 90 days of the completion of construction and decompaction
- Implementing post-construction breeding surveys for ICF

7.2 Relinquishment

Moraine Sands reserves the right to relinquish the ITA prior to expiration by providing 30 days advance written notice to the IDNR. Moraine Sands may surrender the ITA by returning it to the IDNR along with a written statement of its intent to surrender and cancel the ITA. The ITA shall be deemed void and canceled upon receipt of the permit by the IDNR.

7.3 Amendment or Modification

The Conservation Plan may be amended or modified with the written consent of both Moraine Sands and the IDNR.

7.4 Terms Do Not Run with the Land

The terms of the Conservation Plan and the ITA are not intended to run with the land, and will not bind the existing owners of covered lands or subsequent purchasers of the Project or covered lands unless such parties agree in writing to become bound by the Conservation Plan and ITA.

7.5 Compliance with Other Federal, State, and Local Regulations

Moraine Sands certifies all activities undertaken at the Project comply with applicable federal, state, and local regulations. No federal take authorization for ICF is required. The undersigned certify they have the legal authority to carry out the obligations and responsibilities set forth in this agreement and Conservation Plan.

Signature of Principal

Paul Rapp
COO

8.0 REFERENCES

Beebee, T. J. 2013. Effects of Road Mortality and Mitigation Measures on Amphibian Populations. Conservation Biology 27(4): 657-668. doi: 10.1111/cobi.12063.

Beltz, E. 1991. Illinois Chorus Frog, *Pseudacris streckeri illinoensis*, 1991 Survey of Cass, Menard, Morgan, and Scott Counties, Illinois. Report to the Illinois Department of Conservation, Division of Natural Heritage.

Beltz, E. 1993. Distribution and Status of the Illinois Chorus Frog, *Pseudacris streckeri illinoensis*, in Cass, Menard, Morgan, and Scott Counties of West-Central Illinois. Report to the Illinois Department of Conservation, Division of Natural Heritage. 17 pp. + appendices.

Brown, L. E., H. O. Jackson, and J. R. Brown. 1972. Burrowing Behavior of the Chorus Frog, *Pseudacris streckeri*. Herpetologica 28(4): 325-328.

Brown, L. E. and G. B. Rose. 1988. Distribution, Habitat, and Calling Season of the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*) Along the Lower Illinois River. Ilinois Natural History Survey Biological Notes 132.

Esri. 2022. World Imagery and Aerial Photos (World Topo). ArcGIS Resource Center. Environmental Systems Research Institute (Esri), producers of ArcGIS software, Redlands, California. Accessed February 2022. Available online: https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=10df2279f9684e4a9f6a7f08febac2a9

Google Earth. 2011, 2012, 2014, 2016, 2018, 2019. Google Earth Aerial Imagery. Available online: https://www.google.com/earth/

Henning, B. M. and L. C. Hinz. 2016. Conservation Guidance for Illinois Chorus Frog (*Pseudacris Illinoensis*), Inhs Technical Report 2016 (56). Prepared for Illinois Department of Natural Resources, State Wildlife Initiative Grants Program. Prepared by the Illinois Natural History Survey, Champaign, Illinois. December 30, 2016. 18 pp. Available online: https://www.ideals.illinois.edu/bitstream/handle/2142/95126/INHS2016_56.pdf?sequence=2

Illinois Department of Natural Resources (IDNR). 2015. Checklist of Illinois Endangered and Threatened Animals and Plants. Illinois Endangered Species Protection Board. Effective May 19, 2015. Available online: https://www.dnr.illinois.gov/ESPB/Documents/2015_ChecklistFINAL_for_webpage_051915.pdf

Illinois Department of Natural Resources (IDNR). 2018. Natural Heritage Biotics 5 Database. IDNR, Springfield, Illinois.

Illinois General Assembly. 2016. Future Energy Jobs Bill. Senate Bill SB2814. Enacted December 2016, Effective date of June 1, 2017. Available online: http://www.ilga.gov/legislation/BillStatus.asp?DocNum=2814&GAID=13&DocTypeID=SB&LegId=96125&SessionID=88&GA=99

Kramer, D. C. 1973. Movements of Western Chorus Frogs *Pseudacris triseriata triseriata* Tagged with Co60. Journal of Herpetology 7(3): 231-235. doi: 10.2307/1563008.

Mccallum, M. L. and S. E. Trauth. 2001. Are Tadpoles of the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*) Cannibalistic? Transactions of the Illinois State Academy of Science 94(3): 171-178.

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

Packard, G. C., J. K. Tucker, and L. D. Lohmiller. 1998. Distribution of Strecker's Chorus Frogs (*Pseudacris streckeri*) in Relation to Their Tolerance for Freezing. Journal of Herpetology 32(3): 437-440. doi: 10.2307/1565461.

M. Rodriguez and E. Stulik. 2020. Illinois Chorus Frog (*Pseudacris illinoensis*) Presence/Absence Surveys, Moraine Sands Wind Project, Mason County, Illinois. Prepared for Swift Current Energy, Boston, Massachusetts. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. April 30, 2020. 12 pp. + appendix.

Schneider, E. A. 2011. Population Genetics of the Illinois Chorus Frog (*Pseudacris illinoensis*). University of Illinois at Urbana-Champaign, Urbana, Illinois. Available online: https://www.ideals.illinois.edu/bitstream/handle/2142/29412/Schneider_Ellen.pdf?sequence=1&isAllowed=y

Semlitsch, R. D. and J. R. Bodie. 2003. Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles. Conservation Biology 17(5): 1219-1228. doi: 10.1046/j.1523-1739.2003.02177.

Tucker, J. K. 1995. Early Post-Transformational Growth in the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*). Journal of Herpetology 29(2): 314-316. doi: 10.2307/1564577.

Tucker, J. K. 1997. Fecundity in the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*) from Madison County, Illinois. Transactions of the Illinois Academy of Science 90(3 and 4): 167-170.

Tucker, J. K. 1998. Status of Illinois Chorus Frogs in Madison County, Illinois. Pp. 94-101. M. J. Lanoo, ed. *In*: Status and Conservation of Midwestern Amphibians. University of Iowa Press, Iowa City, Iowa.

Tucker, J. K. and D. P. Philipp. 1995. Population Status of the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 1994 Surveys. Report to the Illinois Department of Transportation.

US Energy Information Administration (EIA). 2021. Profile Analysis. Illinois: State Profile and Energy Estimates. EIA, Washington, D.C. Last updated June 17, 2021. Available online: https://www.eia.gov/state/analysis.php?sid=IL

US Environmental Protection Agency (USEPA). 2012. Level III and Level IV Ecoregions of Illinois. Ecoregions of the United States. USEPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEERL), Corvallis, Oregon. May 8, 2012. Accessed December 2021. Available online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-5#pane-11

US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). 2020. National Wetlands Inventory Data Mapper. USFWS NWI Fort Snelling, Minnesota. Updated October 1, 2020. Accessed January 2022. Available online: https://www.fws.gov/wetlands/Data/Mapper.html

Appendix A. Example Breeding Pond Habitat

Appendix A. Looking south – Documented breeding pond at the Moraine Sands Wind Project.