

**BEFORE THE STATE OF NORTH DAKOTA  
PUBLIC SERVICE COMMISSION**

**BOWMAN WIND, LLC  
BOWMAN WIND PROJECT – BOWMAN COUNTY  
SITING APPLICATION**

**CASE NO. PU-21-121**

**PRE-FILED TESTIMONY OF BRIE ANDERSON  
ON BEHALF OF BOWMAN WIND, LLC**

August 4, 2021

1 **I. INTRODUCTION AND QUALIFICATIONS**

2

3 **Q. Please state your name, employer, and business address.**

4 A. My name is Brie Anderson. I am employed at Merjent, Inc., 800 Washington Avenue  
5 North, Suite 315, Minneapolis, Minnesota.

6

7 **Q. Briefly describe your background and qualifications.**

8 A. I have a Bachelor of Science degree in ecology and field biology with a wildlife  
9 emphasis and a Master of Science degree in Geographic Information Systems for  
10 Natural Resources. I have 13 years of experience permitting various infrastructure  
11 projects at the federal, state, and local levels. A copy of my resume is attached as  
12 **BW Exhibit 21-A.**

13

14 **Q. What is Merjent’s role with respect to the Bowman Wind Project (“Project”)?**

15 A. Merjent is providing environmental permitting support for the Project.

16

17 **Q. What is your familiarity with the Bowman Wind Project (“Project”)?**

18 A. I have been working on the Bowman Wind Farm since October 2019. I managed  
19 preparation of the Certificate of Site Compatibility Application (“Application) for the  
20 Project, including drafting the environmental chapters; reviewed environmental  
21 desktop and survey data for the Project; assisted with agency consultation;  
22 managed other consultants, including sound and shadow flicker consultants; and  
23 assisted with layout development to avoid/minimize impacts to environmental  
24 resources and ensure compliance with applicable setbacks and other siting  
25 requirements.

26

27 **Q. What proposed hearing exhibits are you sponsoring in your testimony?**

28 A. I am sponsoring the following proposed hearing exhibits:

- 29 • **BW Exhibit 1:** Certificate of Site Compatibility Application (Sections 6.2, 6.5, 6.6,  
30 6.7, 6.8, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16, 6.17, 8.0, 9.0; Appendices C, D,  
31 E, F, G, H, I; Figures)

- 32 • BW Exhibit 2: Summary of Project Adjustments
- 33 • BW Exhibit 3: Updated Figures 1-12 in support of the Bowman Wind Project
- 34 Certificate of Site Compatibility Application
- 35 • BW Exhibit 4: Comparison Figure (comparing preliminary Project layout with
- 36 current Project layout)
- 37 • BW Exhibit 5: Updated Project Receptor Chart
- 38 • BW Exhibit 7: Noxious Weed Management and Control Plan
- 39 • BW Exhibit 8: Updated Sound Modeling Report
- 40 • BW Exhibit 9: Updated Shadow Flicker Report
- 41 • BW Exhibit 10: U.S. Department of the Interior, Bureau of Land Management
- 42 Letter, dated June 8, 2021
- 43 • BW Exhibit 11: North Dakota Geological Survey Letter, dated May 12, 2021
- 44 • BW Exhibit 12: U.S. Department of Commerce, National Telecommunications
- 45 and Information Administration Review Response, dated April 5, 2021
- 46 • BW Exhibit 13: Bowman Wind Response to 22 June 2021 Request for
- 47 Information
- 48 • BW Exhibit 14: Updated Application Table 7.0-1 Potential Permits and Approvals
- 49 • BW Exhibit 21-A: Anderson Resume

50

51 **Q. What is the purpose of your Direct Testimony?**

52 A. The purpose of my testimony is to identify the reports provided in support of the

53 Application, discuss the results of the sound and shadow flicker analyses conducted

54 for the Project, discuss the Project’s compliance with the North Dakota Public

55 Service Commission’s (“PSC”) siting criteria and the Siting Act (NDCC Ch. 49-22),

56 and to provide an update on the status of permits/approvals and agency

57 consultation.

58

59 **II. UPDATES TO THE APPLICATION**

60

61 **Q. Is proposed BW Exhibit 1 Bowman Wind’s Application for Certificate of Site**  
62 **Compatibility for the Bowman Wind Project (“Application”), which was filed**  
63 **with the PSC on March 30, 2021?**

64 A. Yes.

65

66 **Q. Have there been any updates to the Application?**

67 A. Yes. As described in the Summary of Project Adjustments (proposed **BW Exhibit 2**)  
68 and discussed in the Direct Testimony of Scott Jansen, since filing the Application,  
69 Bowman Wind has continued to coordinate with landowners on development of the  
70 Project, incorporate additional information, and further refine the Project boundary  
71 and layout. As a result, Bowman Wind has made minor adjustments to the Project  
72 boundary and Project layout, which are depicted in the Layout Comparison Figure  
73 (proposed **BW Exhibit 4**) and updated Application Figures 1-12 (proposed **BW**  
74 **Exhibit 3**).

75

76 **Q. Did these Project changes affect resource impact estimates?**

77 A. Overall, impact estimates for the current layout are similar to those for the  
78 preliminary layout. Notable changes include removal of a potential laydown yard  
79 that decreased temporary impacts by 15 acres and the addition of a potential turbine  
80 location, which increased temporary impacts by 5.4 acres and permanent impacts by  
81 1.8 acres. However, since impact calculations are based on all 86 proposed turbine  
82 locations, and only up to 74 turbines will be constructed, the actual temporary and  
83 permanent impacts will be less and remain unchanged between the preliminary and  
84 current layouts. The total acreage change between the preliminary layout and the  
85 current layout is a decrease of one half of one percent (see Table 1 in Summary of  
86 Project Adjustments (proposed **BW Exhibit 2**)).

87

88 **III. ENVIRONMENTAL AND SITE ANALYSIS REPORTS**

89

90 **Q. What environmental and site analysis reports were filed with the Application**  
91 **for the Project?**

92 A. The following environmental and site analysis reports were filed with the Application  
93 (proposed **BW Exhibit 1**):

- 94 • Appendix C: Telecommunications Studies;
- 95 • Appendix E: Sound Analysis Report;
- 96 • Appendix F: Shadow Flicker Analysis Report;
- 97 • Appendix G: Class I, Class II, and Class III Report for the Bowman Wind Project  
98 and Unanticipated Discoveries Plan [**CONFIDENTIAL**]; and
- 99 • Appendix I: Bird and Bat Conservation Strategy (“BBCS”), which discusses the  
100 following Tier 1, 2, and 3 surveys including:
  - 101 ○ Avian Use Surveys
  - 102 ○ Raptor Nest Surveys and Follow-up Monitoring
  - 103 ○ Prairie Grouse Lek Monitoring Surveys
  - 104 ○ Northern Long-eared Bat Habitat Assessment
  - 105 ○ Bat Acoustic Monitoring Surveys
  - 106 ○ Grassland Assessment
  - 107 ○ Back-tailed Prairie Dog Colony Mapping

108

109 **Q. Since the Application was filed, have any additional or updated reports been**  
110 **completed?**

111 A. Yes. Since the Application was filed, Bowman Wind completed or updated and filed  
112 the following:

- 113 • Wetland Delineation Report (titled Jurisdictional Determination Report), filed on  
114 June 25, 2021 (proposed **BW Exhibit 16**);
- 115 • Updated Sound Analysis Report, filed on July 23, 2021 (proposed **BW Exhibit**  
116 **8**);
- 117 • Updated Shadow Flicker Analysis Report, filed on July 23, 2021 (proposed **BW**  
118 **Exhibit 9**);

- 119 • An Updated BBCS, filed on July 23, 2021 (proposed **BW Exhibit 18**);
- 120 • Grassland Assessment, filed on July 23, 2021 (proposed **BW Exhibit 17**); and
- 121 • Updated Cultural Resources Report, dated July 2021 [**CONFIDENTIAL**]
- 122 (proposed **BW Exhibit 15**).

123

124 **Q. In addition to the formal studies you have identified, were any other key site**  
125 **analyses conducted?**

126 A. Yes. As discussed in the Application, Bowman Wind used desktop and site-specific  
127 data to identify and analyze potential impacts to a variety of resources in addition to  
128 those covered by the formal reports, including: land use; human health and safety;  
129 recreational resources; land-based economies; soils; vegetation; and rare and  
130 unique natural resources. See proposed **BW Exhibit 1**, Sections 6.0 and 8.0.

131

132 **Q. Were any changes to land use within the Project Area identified after the**  
133 **Application was filed?**

134 A. Yes. As indicated in the Summary of Project Adjustments filed on July 23, 2021,  
135 updated information was received regarding North Dakota Game and Fish  
136 Department (“NDGFD”) Private Lands Open to Sportsmen (“PLOTS”) parcels. See  
137 Summary of Project Adjustments (proposed **BW Exhibit 2**). The current PLOTS  
138 acreage is less than previously identified, as are the proposed temporary impacts to  
139 PLOTS parcels. Additionally, after the Application was filed, Bowman Wind learned  
140 that the BLM Grazing Allotment leases within the Project Area expired on February  
141 28, 2021. As a result, there are no BLM Grazing Allotment leases within the Project  
142 Area. These land use changes are reflected in the updated Figure 7 filed on July 23,  
143 2021 (proposed **BW Exhibit 3**).

144

145 **IV. SOUND ANALYSIS REPORT**

146

147 **Q. What sound may be generated by modern utility-scale wind turbines, such as**  
148 **those that will be used by the Project.**

149 A. The sound commonly associated with a wind turbine is described as a rhythmic  
150 “whoosh” caused by aerodynamic processes. This sound is generated by wind  
151 turbines due to turbulence at the blade tips, from mechanical systems in the hub or  
152 nacelle (which radiates throughout the structure), and from transformers at the base  
153 of the turbine mast. Sound increases with wind speed until maximum blade  
154 rotational speed is reached, which usually occurs when wind speeds reach 8-10  
155 meters per second at the turbine hub.

156

157 **Q. Are you aware of any federal or state sound level regulations for wind energy**  
158 **conversion facilities located in North Dakota?**

159 A. There is no federal sound level regulation for wind turbines. The PSC requires that  
160 sound produced by wind turbines not exceed 45 A-weighted decibels (“dBA”) within  
161 100 feet of an inhabited residence or a community building, unless a waiver is  
162 obtained from the owner of the inhabited residence or the community building.

163

164 **Q. Does Bowman County have a sound requirement for wind energy conversion**  
165 **facilities?**

166 A. Yes. The Bowman County Zoning Ordinance contains the following sound  
167 requirement:

168 [S]ound levels of wind turbines within one-hundred (100) feet of  
169 any non-participating residence will not exceed 45 dBA  $L_{eq}$ .  
170 Construction noise or reasonable and necessary maintenance  
171 activities are allowed to exceed the sound limit except between  
172 the hours of 10 PM to 6 AM local time. This sound standard  
173 does not apply to participating dwellings.

174

175 **Q. Was a sound modeling analysis conducted for the Project?**

176 A. Yes. On behalf of Bowman Wind, Merjent retained RSG, an experienced and highly  
177 qualified sound modeling consulting firm, to conduct a sound modeling analysis to  
178 determine if the Project would comply with the applicable County and PSC  
179 requirements. RSG conducted a sound modeling analysis for the preliminary Project

180 layout, and the associated report was submitted with the Application (see Sound  
181 Modeling Report, Appendix E). RSG also conducted updated sound modeling for  
182 the current Project layout, and that report was filed with the PSC on July 23, 2021  
183 (see updated Sound Modeling Report, proposed **BW Exhibit 8**). The methodology  
184 used and the modeling results are detailed in each report.

185

186 **Q. What turbine model was used for the sound modeling analysis?**

187 A. The sound modeling analysis was conducted using GE 2.82 MW turbines with 127-  
188 meter rotor diameters, approximately 89-meter hub heights, and fitted with low-noise  
189 trailing edges (“LNTE”). Although only up to 74 turbine locations would be  
190 constructed, all 86 potential turbine locations were modeled. Additionally, as an  
191 industry best practice, Bowman Wind included the Project substation (transformer)  
192 and battery storage facility in the sound modeling.

193

194 **Q. What receptors were included and how were they identified?**

195 A. The receptors in the sound modeling analysis included residences and community  
196 buildings, as those are the receptors identified in the applicable sound regulations.  
197 As discussed in the direct testimony of Scott Jansen, receptors were identified by  
198 Bowman Wind via a combination of publicly available aerial imagery, driving the site  
199 and collecting global positioning system (“GPS”) locations, getting feedback from  
200 members of the community, and using specific planimetric aerial imagery taken in  
201 2020 of the Project Area. Merjent also conducted a review of receptor data as a  
202 quality check. As a result, 140 residences and seven community buildings (one  
203 church and six schools) were identified and included in the analysis as receptors.

204

205 **Q. Please summarize the results of the sound modeling analysis.**

206 A. Based on the sound modeling analysis conducted, one residence was modeled at  
207 47 dBA within 100 feet of the residence (referred to as receptor R-148). The owners  
208 of that residence are in the process of signing a participation agreement with  
209 Bowman Wind that waives the sound requirement. In the event that agreement  
210 were not executed, Bowman Wind would not construct Turbine T41 and, if that

211 turbine is not constructed, the sound level at receptor R-148 is modeled at 44 dBA.  
212 For all other residences and community buildings, the modeled sound level within  
213 100 feet of the receptor is below 45 dBA. As a result, with or without a waiver for  
214 receptor R-148, the Project will comply with the County's and the PSC's sound  
215 requirements.

216  
217 **Q. If a different turbine model were ultimately selected for the Project, would**  
218 **Bowman Wind conduct an updated sound modeling analysis?**

219 A. Yes, if a different turbine model were selected for the Project, Bowman Wind would  
220 have an updated sound modeling analysis conducted to ensure continued  
221 compliance with the County's and PSC's sound level requirements.

222  
223 **V. SHADOW FLICKER REPORT**

224  
225 **Q. What is shadow flicker?**

226 A. Like any tall structure, wind turbines cast a shadow when the sun is visible. When  
227 the wind turbine blades rotate and pass in front of the sun, a flickering or flashing  
228 effect may occur when the shadows of the rotating blades cause alternating changes  
229 in light intensity at a given stationary location, a receptor, such as the window of a  
230 home. This recurring change in light intensity is known as shadow flicker.

231  
232 Shadow flicker occurs only under very specific conditions. For example, shadow  
233 flicker can only occur when the sun is shining and the turbine is in operation (i.e.,  
234 when the turbine blades are rotating). Moreover, shadow flicker is generally most  
235 notable when a turbine is facing a receptor, as this results in the widest-possible  
236 shadow being cast.

237  
238 Shadow flicker intensity and frequency at a given receptor are determined by a  
239 number of interacting factors, such as sun position, wind direction, turbine locations,  
240 receptor locations, terrain, and time of day. The intensity of shadow flicker varies  
241 significantly with distance, and as separation between a turbine and receptor

242 increases, shadow flicker intensity will generally diminish as shadows diffuse and  
243 become imperceptible.

244

245 **Q. Are you aware of any federal, state, or local shadow flicker regulations for the**  
246 **Project?**

247 A. Shadow flicker is not currently regulated in applicable state or federal law. Bowman  
248 County has a limit of 30 hours of shadow flicker per year for non-participating  
249 occupied residences unless a variance is granted.

250

251 Although the PSC does not have a shadow flicker requirement specified in statute or  
252 rule, the PSC typically expects applicants to limit shadow flicker at occupied  
253 residences to 30 hours per year or less, unless the owner of the residence grants a  
254 waiver.

255

256 **Q. Was a shadow flicker assessment conducted for the Project?**

257 A. Yes. On behalf of Bowman Wind, Merjent retained ReGenerate Consulting  
258 (“ReGenerate”), an experienced and highly qualified shadow flicker modeling  
259 consulting firm, to conduct a shadow flicker assessment to determine if the Project  
260 would comply with the applicable County requirement. ReGenerate conducted a  
261 shadow flicker assessment for the preliminary Project layout, and the associated  
262 report was submitted with the Application (see Shadow Flicker Assessment Report,  
263 Appendix F). Regenerate conducted an updated shadow flicker assessment for the  
264 current Project layout, and the report was filed with the PSC on July 23, 2021 (see  
265 updated Shadow Flicker Assessment Report, proposed **BW Exhibit 9**). The  
266 methodology used and the assessment results are detailed in each report.

267

268 **Q. What turbine model and locations were used for the shadow flicker**  
269 **assessment?**

270 A. The shadow flicker assessment was conducted using the GE 2.82 MW turbines with  
271 127-meter rotor diameters, approximately 89-meter hub heights, and fitted with

272 LNTE. Although only up to 74 turbine locations would be constructed, all 86  
273 potential turbine locations (including 12 alternates) were modeled.

274

275 **Q. What receptors were included in the assessment?**

276 A. The receptors in the shadow flicker assessment included the same 140 residences  
277 (both participating and non-participating) identified for the sound analysis.

278

279 **Q. Please summarize the results of the shadow flicker assessment.**

280 A. Based on the shadow flicker assessment conducted, all residences are expected to  
281 experience below 30 hours per year of shadow flicker. The maximum modeled  
282 shadow flicker (hours per year) is 14.0 for participating residences and 13.9 for non-  
283 participating residences. Additionally, 116 of the 119 nonparticipating residences  
284 have zero hours of modeled shadow flicker. Accordingly, all receptors are below the  
285 maximum limit set forth in the County's ordinance.

286

287 **Q. If a different turbine model were ultimately selected for the Project, would  
288 Bowman Wind conduct an updated shadow flicker assessment?**

289 A. Yes, if a different turbine model were selected for the Project, Bowman Wind would  
290 have an updated shadow flicker assessment conducted to ensure compliance with  
291 the County's shadow flicker requirement.

292

293 **Q. Do existing wind farms impact in the sound and shadow flicker modeling  
294 analyses for the Project?**

295 A. No. Neighboring projects that are currently operational were identified based upon  
296 the U.S. Wind Turbine Database maintained by the U.S. Geological Survey  
297 ("USGS"). The nearest wind project, Cedar Hills, is over five miles away. As a  
298 result, the Cedar Hills Project does not impact the receptors analyzed for the Project,  
299 and does not affect the sound and shadow flicker modeling results for the Project.

300

301 **VI. MICROWAVE BEAM PATH STUDY**

302

303 **Q. Was a microwave beam path study conducted for the Project Area?**

304 A. Yes. Bowman Wind conducted a study identifying microwave beam paths and  
305 towers in the Project Area, and a copy of the study is included in Appendix C to the  
306 Application (proposed **BW Exhibit 1**).

307

308 **Q. Do Project facilities avoid all microwave beam paths?**

309 A. Yes. There is one microwave beam path in the northern portion of the Project Area  
310 that extends northeast to another microwave tower several miles northeast of the  
311 Project Area. See updated Figure 9, proposed **BW Exhibit 3**. Bowman Wind sited  
312 the Project’s turbines to avoid the identified microwave beam path.

313

314 **VII. AGENCY COORDINATION**

315

316 **Q. Prior to filing its Project Application, did Bowman Wind send consultation**  
317 **letters to all agencies and entities identified in Section 69-06-01-05 of the North**  
318 **Dakota Administrative Code?**

319 A. Yes. Bowman Wind sent Project notification letters to 34 federal, state, and local  
320 agencies, including the agencies and entities identified in NDAC Section 69-06-01-  
321 05. The list of recipients and copies of the correspondence sent and received are  
322 provided in Appendix D of the Application (proposed **BW Exhibit 1**).

323

324 **Q. What agencies/entities has Bowman Wind received correspondence from or**  
325 **consulted with?**

326 A. Bowman Wind received comments from or otherwise consulted with the following  
327 agencies/entities:

- 328 • U.S. Department of Defense (“DOD”) and Ellsworth Air Force Base
- 329 (“Ellsworth AFB”)
- 330 • U.S. Department of Commers, NTIA
- 331 • U.S. Army Corps of Engineers (“USACE”)

- 332 • U.S. Fish and Wildlife Service (“USFWS”)
- 333 • NDGFD
- 334 • North Dakota Parks & Recreation (“NDPR”)
- 335 • North Dakota State Water Commission (“NDSWC”)
- 336 • State Historical Society of North Dakota (“SHSND”)
- 337 • Bowman County Airport Authority
- 338 • Bowman County

339

340 Additionally, after the Application was filed, the PSC received comments directly  
341 from the U.S. Department of the Interior, Bureau of Land Management (“BLM”), the  
342 NDGFD, and the North Dakota Geological Survey (“NDGS”). Additional discussion  
343 of Bowman Wind’s coordination with the DOD and Ellsworth AFB is provided in the  
344 Direct Testimony of Scott Jansen. Also, a detailed discussion of Bowman Wind’s  
345 coordination with the USFWS and the NDGFD is provided in the Direct Testimony of  
346 Ryan Henning.

347

348 **Q. Please provide an update regarding the results of the coordination with NTIA.**

349 A. On behalf of Bowman Wind, Evans Engineering coordinated with the NTIA to identify  
350 potential interference with federal telecommunications. The NTIA’s review was  
351 underway at the time the Application was filed. In a letter dated April 5, 2021, the  
352 NTIA responded that no reviewing agencies had identified concerns regarding  
353 turbine placement within the identified build area, which includes the Project Area.  
354 See proposed **BW Exhibit 12** (NTIA Review Response, dated April 5, 2021).

355

356 **Q. Does the Project comply with the recommended avoidance distances in the**  
357 **Telecommunication Studies conducted for the Project (proposed BW Exhibit**  
358 **1, Appendix C)?**

359 A. Yes. Project turbines will not be sited within 150 meters of land mobile fixed-base  
360 stations in order to avoid any possible impact to the communications services  
361 provided by these stations. Currently, the closest turbine to a communication tower

362 is 1,239 feet (378 meters). As such, impacts to communication systems are not  
363 anticipated.

364

365 **VIII. PERMITS AND APPROVALS**

366

367 **Q. Are other permits besides the Certificate of Site Compatibility required for this**  
368 **Project?**

369 A. Yes. Potential permits and approvals for the Project were identified in Table 7.0-1 of  
370 the Application, and an updated version of that table is provided as proposed **BW**  
371 **Exhibit 14.**

372

373 **Q. Please discuss the permit and approval updates provided in proposed BW**  
374 **Exhibit 14.**

375 A. The table provided as proposed **BW Exhibit 14** was updated to show that the  
376 current Project layout was submitted to the FAA for review in July 2021.  
377 Additionally, the table was updated to indicate that the Project submitted its permit  
378 and variance applications to Bowman County on June 25, 2021.

379

380 **Q. Has Bowman Wind committed to obtaining all necessary federal, state, county,**  
381 **and township permits?**

382 A. Yes.

383

384 **IX. COMPLIANCE WITH PSC SITING RULES**

385

386 **Q. Are you familiar with the exclusion areas, avoidance areas, selection criteria**  
387 **and policy criteria identified in Section 69-06-08-01 of the North Dakota**  
388 **Administrative Code?**

389 A. Yes.

390

391 **Q. Please discuss whether there are any general exclusion areas located within**  
392 **the Project Area.**

393 A. There are no categories of general exclusion areas within the Project Area.

394

395 **Q. Please discuss whether any of the exclusion areas specific to wind energy**  
396 **conversion facilities are located within the Project Area.**

397 A. Five exclusion areas specific to wind energy conversion facilities are present within  
398 the Project Area:

- 399 • Areas less than 1.1 times the height of the turbine from the nearest edge of an  
400 interstate or state roadway right of way;
- 401 • Areas less than 1.1 times the height of the turbine + 75 feet from the centerline of  
402 any county or maintained township roadway;
- 403 • Areas less than 1.1 times the height of the turbine from the nearest edge of any  
404 railroad right-of-way;
- 405 • Areas less than 1.1 times the turbine height from the nearest edge of a 115 kV or  
406 higher transmission line right-of-way; and
- 407 • Areas less than 1.1 times the turbine height from the property line of a non-  
408 participating landowner and 3 times the height of the turbine from an inhabited  
409 rural residence of a non-participating landowner, unless a variance is granted.

410

411 Although present within the Project Area, the turbines have been sited to avoid these  
412 areas. For six of the proposed turbine locations, the turbine model is currently  
413 limited to the GE-127 2.82 MW turbine to ensure compliance with all wind energy  
414 specific exclusion areas. For all other proposed turbine locations, compliance is  
415 based on a turbine model up to 105 meters (345 feet) in hub height, with an up to  
416 158 meter (519 feet) rotor diameter, and with a total tip height of 184 meters (604  
417 feet).

418

419 **Q. Are there any general avoidance areas present within the Project Area?**

420 A. Yes. The following general avoidance areas are present within the Project Area:

- 421 • Historical resources which are not designated as exclusion areas: Cultural  
422 resource sites have been avoided with the proposed Project layout.

- 423 • Areas within known floodplains as defined by the geographical boundaries of the  
 424 hundred-year flood: There are 95 acres of 100-year floodplain in the Project Area  
 425 associated with Spring Creek and an unnamed tributary of Spring Creek in the  
 426 northern portion and Cold Turkey Creek in the central southeast portion of the  
 427 Project Area. No Project facilities (turbines, access roads, Project substation,  
 428 O&M facility, or battery storage facility) are within this floodplain area.
- 429 • Woodlands and wetlands: Wetlands are present but all permanent wetland  
 430 impacts will be avoided to the extent practicable. Temporary impacts may occur  
 431 due to the installation of collection lines. Trees are sparsely located throughout  
 432 the Project and the Project has been designed to minimize tree removal to the  
 433 extent possible and would be limited to locations where crossing tree rows make  
 434 impacts unavoidable. If impacts to trees occur, Bowman Wind will comply with  
 435 the PSC’s tree and shrub mitigation specifications.

436

437 **Q. Will the Project comply with the wind energy conversion facility-specific**  
 438 **sound avoidance area requirement?**

439 A. Yes. As discussed earlier in my testimony, Bowman Wind has completed a sound  
 440 assessment for the GE-127 2.82 MW at all 86 proposed turbine locations, which also  
 441 included anticipated sound output for the substation (transformer) and battery  
 442 storage. Sound levels do not exceed 44 dBA within 100 feet of non-participating  
 443 residences or community buildings. One pending participation residence was  
 444 modeled at 47 dBA within 100 feet of the residence. However, Bowman Wind is in  
 445 the process of entering into a participation agreement and securing a waiver from  
 446 the owners of that residence. If Bowman Wind does not obtain the necessary waiver  
 447 of the sound avoidance requirement, Bowman Wind would not construct proposed  
 448 Turbine T41. If Turbine T41 is not constructed, the sound level at the pending  
 449 participation residence is modeled at 44 dBA.

450

451 **Q. Will any significant adverse effects resulting from the location, construction,**  
 452 **and operation of the Project as they relate to the Selection Criteria set forth in**

453        **the PSC's rules be at an acceptable minimum or managed and maintained at**  
454        **an acceptable minimum?**

455    A. Yes.

456

457    **Q. Were the policy criteria set forth in the PSC's siting rules considered and**  
458        **utilized to the extent possible by Bowman Wind when designing the proposed**  
459        **Project?**

460    A. Yes.

461

462    **Q. Were the factors set forth in NDCC § 49-22-09 considered by Bowman Wind**  
463        **when designing the proposed Project?**

464    A. Yes.

465

466    **X. CONCLUSION**

467

468    **Q. Based on the analysis conducted by Bowman Wind, as set forth in the**  
469        **proposed hearing exhibits, will construction of the proposed Project produce**  
470        **minimal adverse human and environmental effects?**

471    A. Yes.

472

473    **Q. Does this conclude your Testimony?**

474    A. Yes.

475