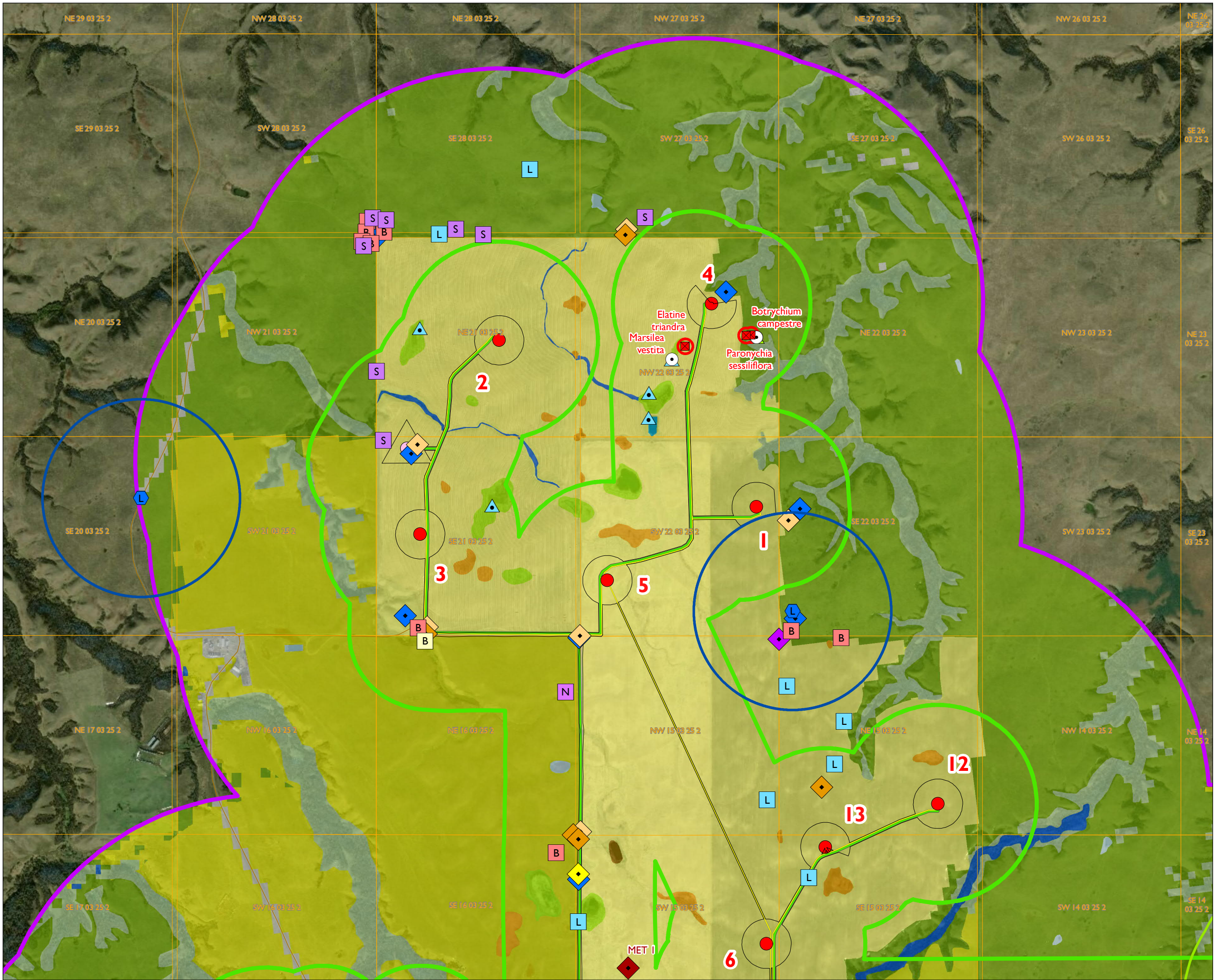


Appendix G

Biophysical Map Set



OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



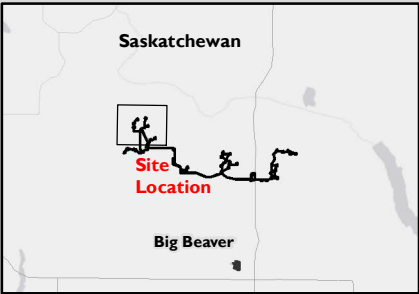
FIGURE G - I
BIOPHYSICAL MAPSET
(PAGE I OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- ◆ Substation

Spatial Boundaries

- Project Development Area
- Vegetation and Wetlands Local Assessment Area
- Wildlife and Wildlife Habitat Local Assessment Area
- Quarter Sections
- Minor Roads
- Major Roads



1:15,000

0 200 400 800 Meters



MAP DRAWING INFORMATION:

DATA PROVIDED BY CANVEC, ESRI, GEOSASK, STANTEC & DILLON CONSULTING

MAP CREATED BY PH
MAP CHECKED BY CD

MAP PROJECTION: NAD 1983 UTM Zone 13N ROTATION: -0.25°



PROJECT: 191825
STATUS: FINAL
DATE: 2021-01-28

Species of Management Concern Observations

- Rare Plant
- Noxious Weed
- Ferruginous Hawk Nest
- Sharp-tailed Grouse Lek
- Sharp-tailed Grouse Lek (Potential)
- American Badger
- Baird's Sparrow
- Barn Swallow
- Bobolink
- Chestnut-collared Longspur
- Common Nighthawk
- Ferruginous Hawk
- Lark Bunting
- Long-billed Curlew
- Northern Leopard Frog
- Osprey
- Red-necked Phalarope
- Short-eared Owl
- Sprague's Pipit

Species of Management Concern Setbacks

- Rare Plant Setback (30 m)
- Ferruginous Hawk Nest Setback (1000 m, year round)
- Northern Leopard Frog Breeding Pond Setback (500 m, year round)
- Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

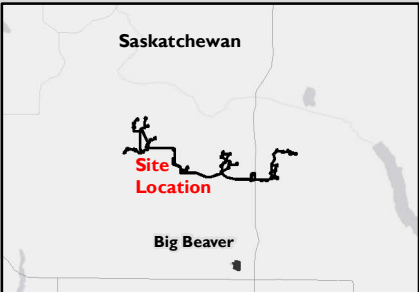
- Vegetation Community Survey Site
- Wetland Survey Site
- Amphibian Survey Site
- Bat Monitoring Station
- Bird Movement Survey Site
- Breeding Bird Survey Site
- Burrowing Owl Survey Site
- Common Nighthawk/Short-eared Owl Survey Site
- Sharp-tailed Grouse Lek Survey Site
- Yellow Rail Survey Site

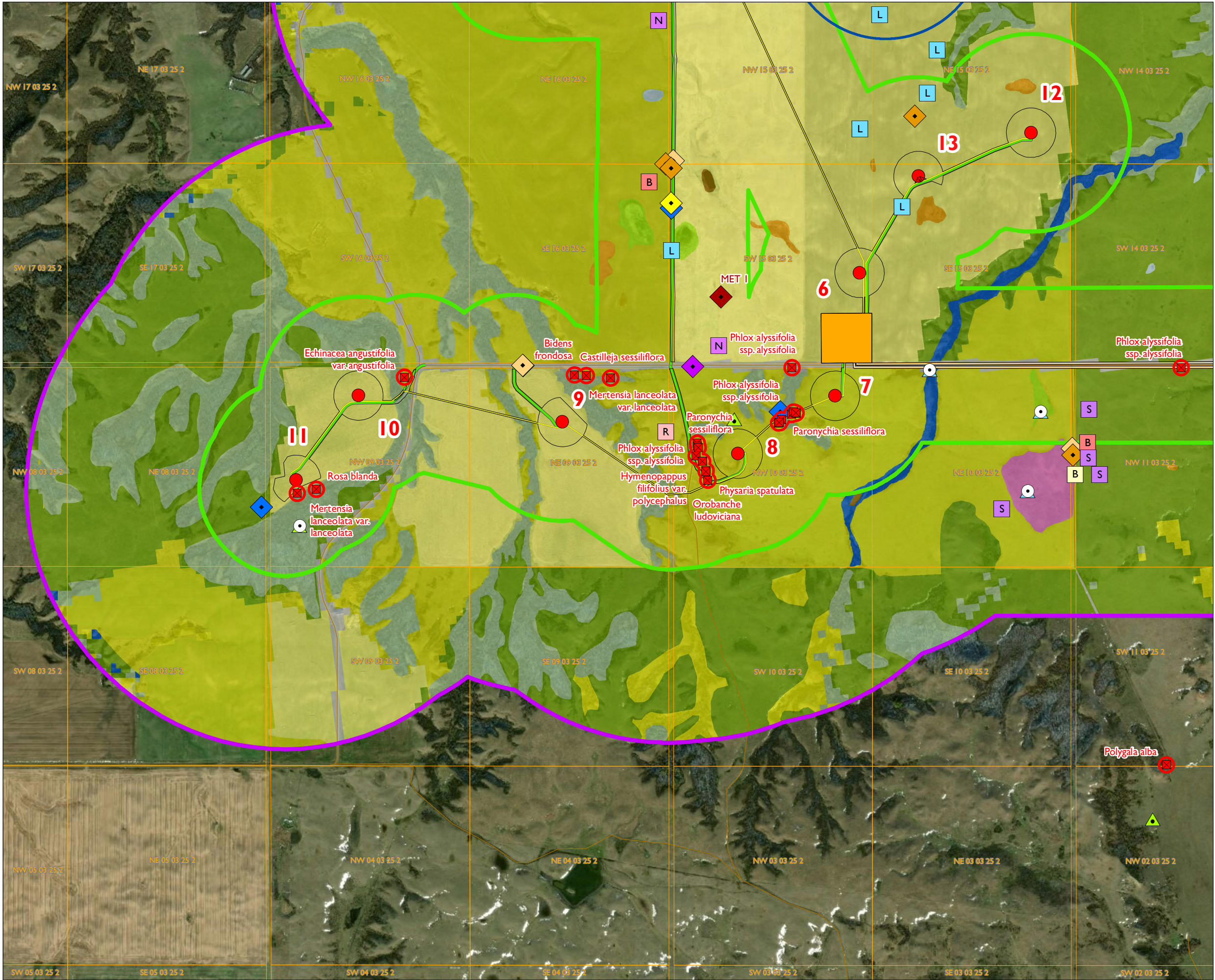
Land Cover

- Class 1 - Ephermal Wetland
- Class 2 - Temporary Wetland
- Class 3 - Seasonal Wetland
- Class 4 - Semi-Permanent Wetland
- Class 5 - Permanent Wetland
- Drainage
- Dugout
- Agricultural
- Broadleaf
- Exposed Land / Barren
- Native Grassland
- Pasture / Forages
- Shrubland
- Urban / Developed
- Water



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BIOPHYSICAL MAPSET





OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



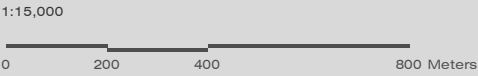
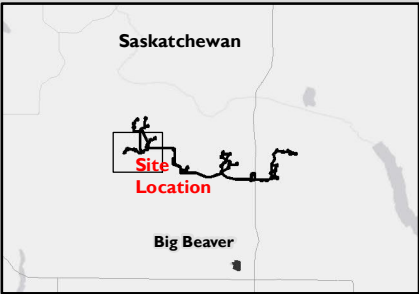
FIGURE G - 2
BIOPHYSICAL MAPSET
(PAGE 2 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

- Project Development Area
- Vegetation and Wetlands Local Assessment Area
- Wildlife and Wildlife Habitat Local Assessment Area
- Quarter Sections
- Minor Roads
- Major Roads



MAP DRAWING INFORMATION:
DATA PROVIDED BY CANVEC, ESRI, GEOSASK, STANTEC & DILLON CONSULTING
MAP CREATED BY PH
MAP CHECKED BY CD
MAP PROJECTION: NAD 1983 UTM Zone 13N ROTATION: -0.25°



PROJECT: 191825
STATUS: FINAL
DATE: 2021-01-28

Species of Management Concern Observations

- Rare Plant
- Noxious Weed
- Ferruginous Hawk Nest
- Sharp-tailed Grouse Lek
- Sharp-tailed Grouse Lek (Potential)
- American Badger
- Baird's Sparrow
- Barn Swallow
- Bobolink
- Chestnut-collared Longspur
- Common Nighthawk
- Ferruginous Hawk
- Lark Bunting
- Long-billed Curlew
- Northern Leopard Frog
- Osprey
- Red-necked Phalarope
- Short-eared Owl
- Sprague's Pipit

Species of Management Concern Setbacks

- Rare Plant Setback (30 m)
- Ferruginous Hawk Nest Setback (1000 m, year round)
- Northern Leopard Frog Breeding Pond Setback (500 m, year round)
- Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

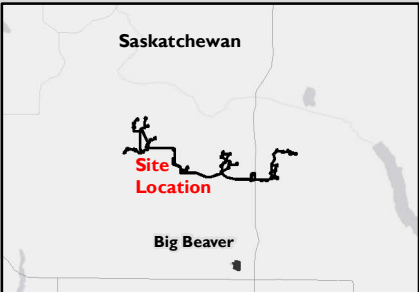
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- Bat Monitoring Station
- Bird Movement Survey Site
- Breeding Bird Survey Site
- Burrowing Owl Survey Site
- Common Nighthawk/Short-eared Owl Survey Site
- Sharp-tailed Grouse Lek Survey Site
- Yellow Rail Survey Site

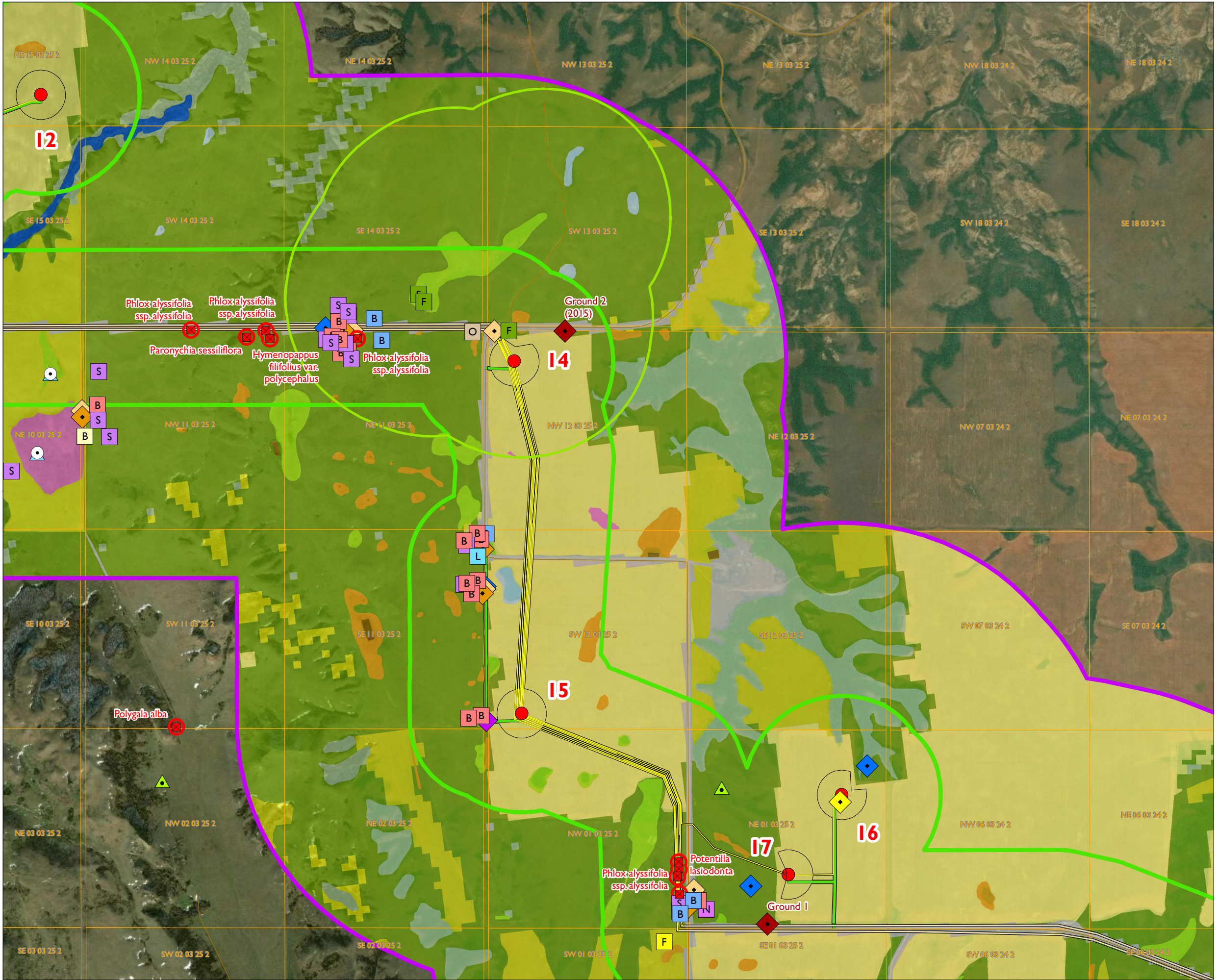
Land Cover

- Class 1 - Ephermal Wetland
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- Class 3 - Seasonal Wetland
- Class 4 - Semi-Permanent Wetland
- Class 5 - Permanent Wetland
- Drainage
- Dugout
- Agricultural
- Broadleaf
- Exposed Land / Barren
- Native Grassland
- Pasture / Forages
- Shrubland
- Urban / Developed
- Water



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BIOPHYSICAL MAPSET





OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



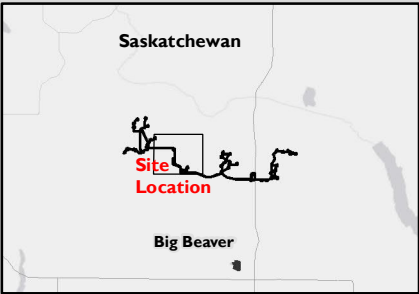
FIGURE G - 3
BIOPHYSICAL MAPSET
(PAGE 3 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

- Project Development Area
- Vegetation and Wetlands Local Assessment Area
- Wildlife and Wildlife Habitat Local Assessment Area
- Quarter Sections
- Minor Roads
- Major Roads



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MAP CREATED BY PH
MAP CHECKED BY CD
MAP PROJECTION: NAD 1983 UTM Zone 13N ROTATION: -0.25°



PROJECT: 191825
STATUS: FINAL
DATE: 2021-01-28

Species of Management Concern Observations

- ☒ Rare Plant
- ⦿ Noxious Weed
- 🦅 Ferruginous Hawk Nest
- 🦋 Sharp-tailed Grouse Lek
- 🦋 Sharp-tailed Grouse Lek (Potential)
- 🦉 American Badger
- 🦋 Baird's Sparrow
- 🦋 Barn Swallow
- 🦋 Bobolink
- 🦋 Chestnut-collared Longspur
- 🦋 Common Nighthawk
- 🦋 Ferruginous Hawk
- 🦋 Lark Bunting
- 🦋 Long-billed Curlew
- 🦋 Northern Leopard Frog
- 🦋 Osprey
- 🦋 Red-necked Phalarope
- 🦋 Short-eared Owl
- 🦋 Sprague's Pipit

Species of Management Concern Setbacks

- 🦋 Rare Plant Setback (30 m)
- 🦋 Ferruginous Hawk Nest Setback (1000 m, year round)
- 🦋 Northern Leopard Frog Breeding Pond Setback (500 m, year round)
- 🦋 Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

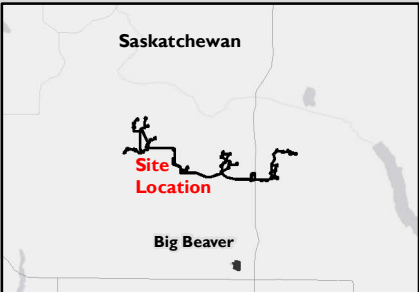
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- 🦋 Wetland Survey Site
- 🦋 Amphibian Survey Site
- 🦋 Bat Monitoring Station
- 🦋 Bird Movement Survey Site
- 🦋 Breeding Bird Survey Site
- 🦋 Burrowing Owl Survey Site
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- 🦋 Sharp-tailed Grouse Lek Survey Site
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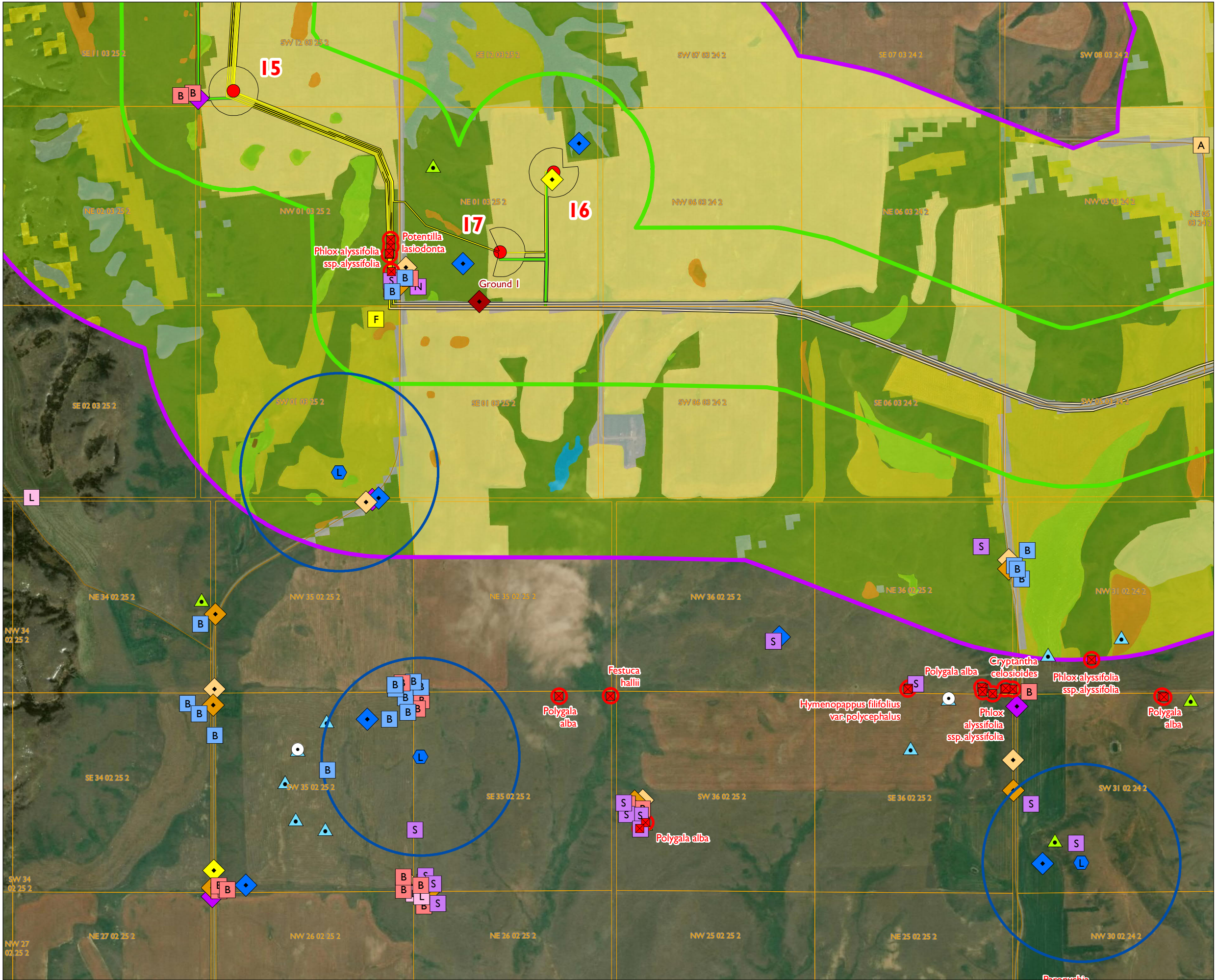
Land Cover

- 🦋 Class 1 - Ephemeral Wetland
- 🦋 Class 2 - Temporary Wetland
- 🦋 Class 3 - Seasonal Wetland
- 🦋 Class 4 - Semi-Permanent Wetland
- 🦋 Class 5 - Permanent Wetland
- 🦋 Drainage
- 🦋 Dugout
- 🦋 Agricultural
- 🦋 Broadleaf
- 🦋 Exposed Land / Barren
- 🦋 Native Grassland
- 🦋 Pasture / Forages
- 🦋 Shrubland
- 🦋 Urban / Developed
- 🦋 Water



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BIOPHYSICAL MAPSET





OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



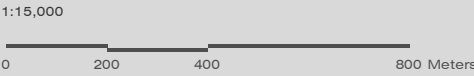
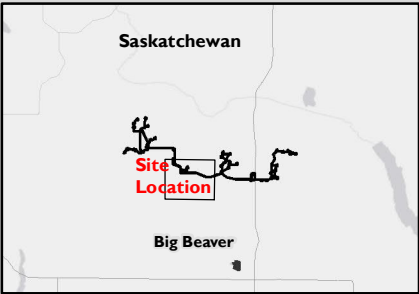
FIGURE G - 4
BIOPHYSICAL MAPSET
(PAGE 4 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

- Project Development Area
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PROJECT: 191825
STATUS: FINAL
DATE: 2021-01-28

Species of Management Concern Observations

- ☒ Rare Plant
- ⦿ Noxious Weed
- 🦅 Ferruginous Hawk Nest
- 🦋 Sharp-tailed Grouse Lek
- 🦋 Sharp-tailed Grouse Lek (Potential)
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- 🐦 Baird's Sparrow
- 🐦 Barn Swallow
- 🐦 Bobolink
- 🦉 Chestnut-collared Longspur
- 🦉 Common Nighthawk
- 🦅 Ferruginous Hawk
- 🐦 Lark Bunting
- 🦋 Long-billed Curlew
- 🐸 Northern Leopard Frog
- 🦉 Osprey
- 🦉 Red-necked Phalarope
- 🦉 Short-eared Owl
- 🐦 Sprague's Pipit

Species of Management Concern Setbacks

- 🦋 Rare Plant Setback (30 m)
- 🦅 Ferruginous Hawk Nest Setback (1000 m, year round)
- 🐸 Northern Leopard Frog Breeding Pond Setback (500 m, year round)
- 🦋 Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

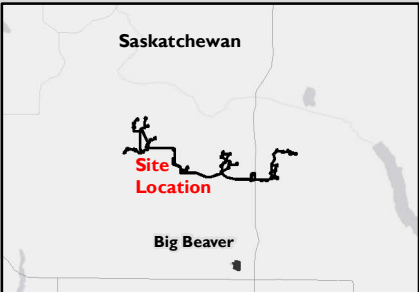
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- 🦋 Wetland Survey Site
- 🦋 Amphibian Survey Site
- 🦉 Bat Monitoring Station
- 🦋 Bird Movement Survey Site
- 🦋 Breeding Bird Survey Site
- 🦋 Burrowing Owl Survey Site
- 🦋 Common Nighthawk/Short-eared Owl Survey Site
- 🦋 Sharp-tailed Grouse Lek Survey Site
- 🦋 Yellow Rail Survey Site

Land Cover

- 🦋 Class 1 - Ephermal Wetland
- 🦋 Class 2 - Temporary Wetland
- 🦋 Class 3 - Seasonal Wetland
- 🦋 Class 4 - Semi-Permanent Wetland
- 🦋 Class 5 - Permanent Wetland
- 🦋 Drainage
- 🦋 Dugout
- 🦋 Agricultural
- 🦋 Broadleaf
- 🦋 Exposed Land / Barren
- 🦋 Native Grassland
- 🦋 Pasture / Forages
- 🦋 Shrubland
- 🦋 Urban / Developed
- 🦋 Water



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BIOPHYSICAL MAPSET



Species of Management Concern Observations

- ☒ Rare Plant
- ⦿ Noxious Weed
- 🦅 Ferruginous Hawk Nest
- 🦋 Sharp-tailed Grouse Lek
- 🦋 Sharp-tailed Grouse Lek (Potential)
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- 🐦 Baird's Sparrow
- 🐦 Barn Swallow
- 🐦 Bobolink
- 🦉 Chestnut-collared Longspur
- 🦉 Common Nighthawk
- 🦅 Ferruginous Hawk
- 🐦 Lark Bunting
- 🦋 Long-billed Curlew
- 🐸 Northern Leopard Frog
- 🦉 Osprey
- 🦅 Red-necked Phalarope
- 🦉 Short-eared Owl
- 🐦 Sprague's Pipit

Species of Management Concern Setbacks

- 🦋 Rare Plant Setback (30 m)
- 🦅 Ferruginous Hawk Nest Setback (1000 m, year round)
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- 🦋 Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

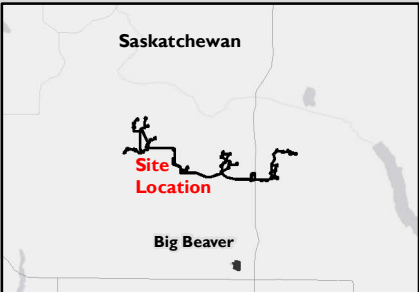
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- 🦋 Sharp-tailed Grouse Lek Survey Site
- 🦋 Yellow Rail Survey Site

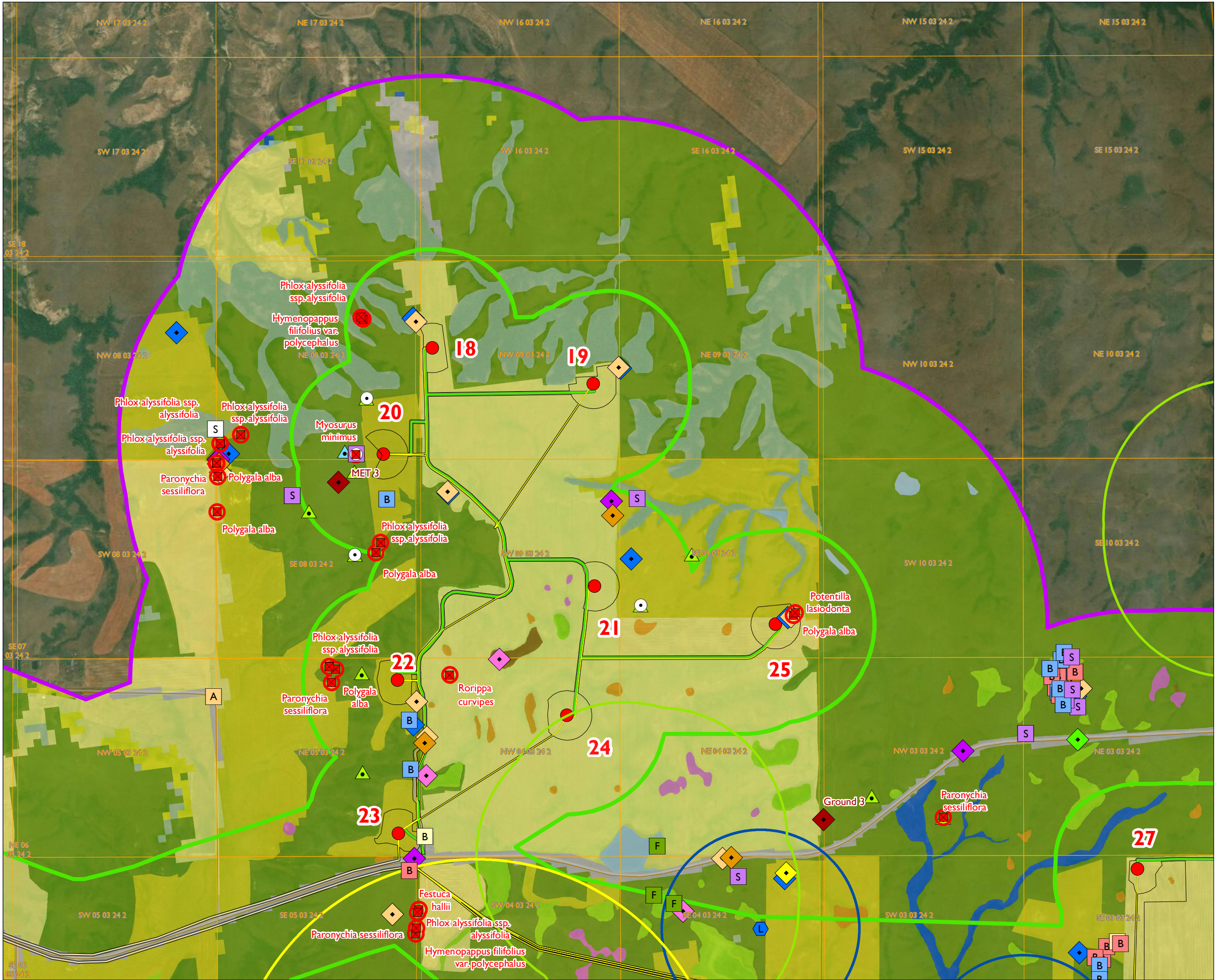
Land Cover

- 🦋 Class 1 - Ephermal Wetland
- 🦋 Class 2 - Temporary Wetland
- 🦋 Class 3 - Seasonal Wetland
- 🦋 Class 4 - Semi-Permanent Wetland
- 🦋 Class 5 - Permanent Wetland
- 🦋 Drainage
- 🦋 Dugout
- 🦋 Agricultural
- 🦋 Broadleaf
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- 🦋 Native Grassland
- 🦋 Pasture / Forages
- 🦋 Shrubland
- 🦋 Urban / Developed
- 🦋 Water



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BIOPHYSICAL MAPSET





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OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



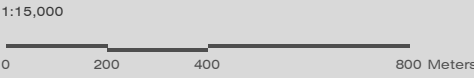
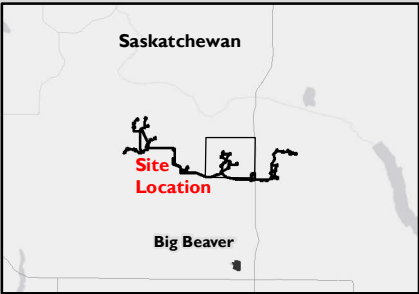
FIGURE G - 6
BIOPHYSICAL MAPSET
(PAGE 6 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

- Project Development Area
- Vegetation and Wetlands Local Assessment Area
- Wildlife and Wildlife Habitat Local Assessment Area
- Quarter Sections
- Minor Roads
- Major Roads



MAP DRAWING INFORMATION:
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MAP CREATED BY PH
MAP CHECKED BY CD
MAP PROJECTION: NAD 1983 UTM Zone 13N ROTATION: -0.25°



PROJECT: 191825
STATUS: FINAL
DATE: 2021-01-28

Species of Management Concern Observations

- ☒ Rare Plant
- ⦿ Noxious Weed
- 🦅 Ferruginous Hawk Nest
- 🦋 Sharp-tailed Grouse Lek
- 🦋 Sharp-tailed Grouse Lek (Potential)
- 🦉 American Badger
- 🐦 Baird's Sparrow
- 🐦 Barn Swallow
- 🐦 Bobolink
- 🦉 Chestnut-collared Longspur
- 🦉 Common Nighthawk
- 🦅 Ferruginous Hawk
- 🐦 Lark Bunting
- 🦋 Long-billed Curlew
- 🐸 Northern Leopard Frog
- 🦉 Osprey
- 🦅 Red-necked Phalarope
- 🦉 Short-eared Owl
- 🐦 Sprague's Pipit

Species of Management Concern Setbacks

- ☐ Rare Plant Setback (30 m)
- ☐ Ferruginous Hawk Nest Setback (1000 m, year round)
- ☐ Northern Leopard Frog Breeding Pond Setback (500 m, year round)
- ☐ Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

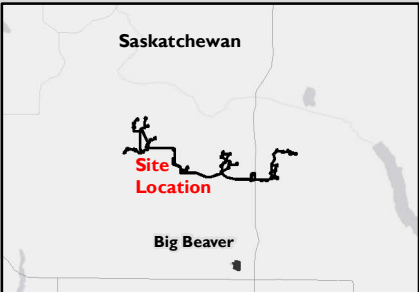
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- 🦋 Bat Monitoring Station
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- 🦋 Sharp-tailed Grouse Lek Survey Site
- 🦋 Yellow Rail Survey Site

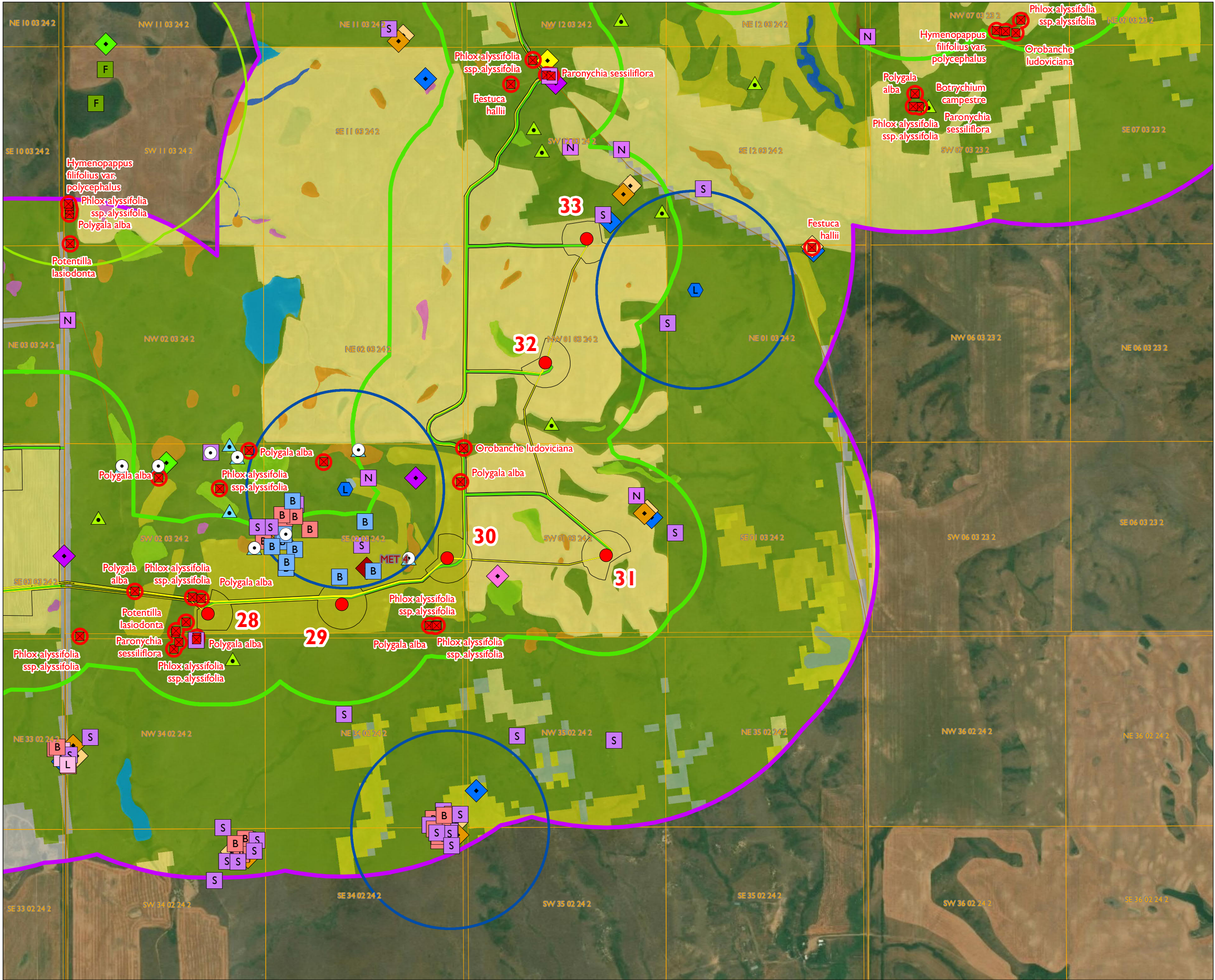
Land Cover

- 🦋 Class 1 - Ephermal Wetland
- 🦋 Class 2 - Temporary Wetland
- 🦋 Class 3 - Seasonal Wetland
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- 🦋 Pasture / Forages
- 🦋 Shrubland
- 🦋 Urban / Developed
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BIOPHYSICAL MAPSET





OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



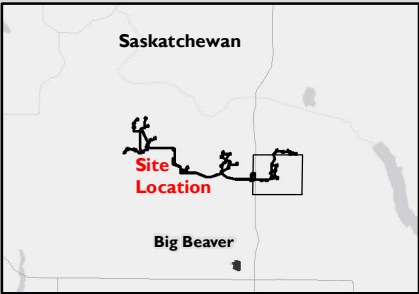
FIGURE G - 7
BIOPHYSICAL MAPSET
(PAGE 7 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

- Project Development Area
- Vegetation and Wetlands Local Assessment Area
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MAP CHECKED BY CD
MAP PROJECTION: NAD 1983 UTM Zone 13N ROTATION: -0.25°



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Species of Management Concern Observations

- ☒ Rare Plant
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- 🦋 Sharp-tailed Grouse Lek (Potential)
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- 🐦 Baird's Sparrow
- 🐦 Barn Swallow
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- 🦅 Ferruginous Hawk
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- 🦋 Long-billed Curlew
- 🐸 Northern Leopard Frog
- 🦉 Osprey
- 🐦 Red-necked Phalarope
- 🦉 Short-eared Owl
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Species of Management Concern Setbacks

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- ☐ Ferruginous Hawk Nest Setback (1000 m, year round)
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Biophysical Surveys

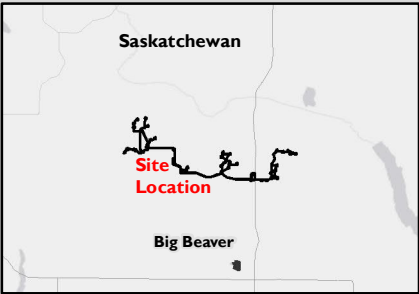
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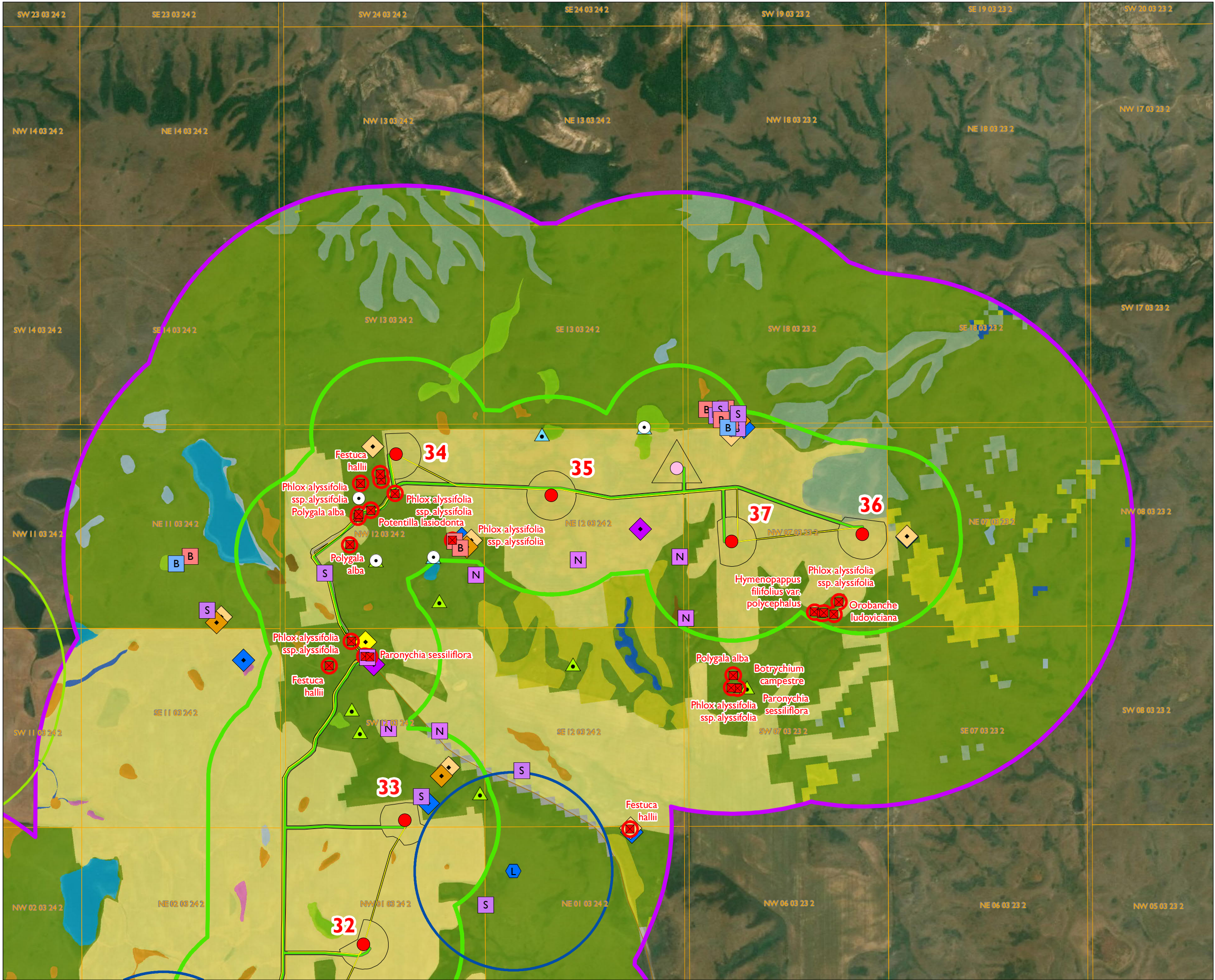
Land Cover

- 🌊 Class 1 - Ephermal Wetland
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- 🌾 Agricultural
- 🌿 Broadleaf
- 🌾 Exposed Land / Barren
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- 🌾 Pasture / Forages
- 🌿 Shrubland
- 🏠 Urban / Developed
- 🌊 Water



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BIOPHYSICAL MAPSET





OUTLAW TRAIL WIND LP
OUTLAW TRAIL WIND ENERGY PROJECT



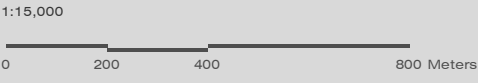
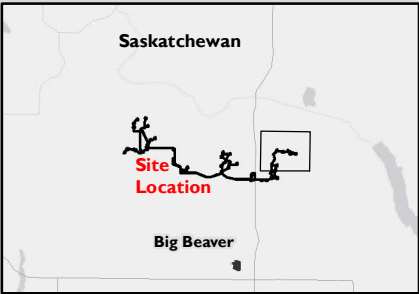
FIGURE G - 8
BIOPHYSICAL MAPSET
(PAGE 8 OF 8)

Proposed Project Layout

- Wind Turbine Generator
- Meteorological Towers
- Collector Line - Underground Feeder
- Collector Line - Overhead
- New Access Road
- Substation

Spatial Boundaries

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- 🦋 Sharp-tailed Grouse Lek Setback (400 m, March 15 to May 15)

Biophysical Surveys

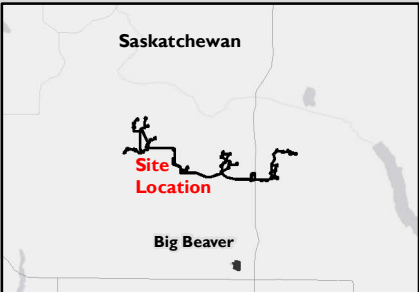
- 🦋 Vegetation Community Survey Site
- 🦋 Wetland Survey Site
- 🦋 Amphibian Survey Site
- 🦉 Bat Monitoring Station
- 🦋 Bird Movement Survey Site
- 🦋 Breeding Bird Survey Site
- 🦋 Burrowing Owl Survey Site
- 🦋 Common Nighthawk/Short-eared Owl Survey Site
- 🦋 Sharp-tailed Grouse Lek Survey Site
- 🦋 Yellow Rail Survey Site

Land Cover

- 🦋 Class 1 - Ephermal Wetland
- 🦋 Class 2 - Temporary Wetland
- 🦋 Class 3 - Seasonal Wetland
- 🦋 Class 4 - Semi-Permanent Wetland
- 🦋 Class 5 - Permanent Wetland
- 🦋 Drainage
- 🦋 Dugout
- 🦋 Agricultural
- 🦋 Broadleaf
- 🦋 Exposed Land / Barren
- 🦋 Native Grassland
- 🦋 Pasture / Forages
- 🦋 Shrubland
- 🦋 Urban / Developed
- 🦋 Water



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BIOPHYSICAL MAPSET



Appendix H

Vegetation and Wetlands Supplementary Information

Table H.1: Comprehensive List of Observed Vascular Plant Species

Scientific Name	Common Name	Status		
		G-Rank	N-Rank	S-Rank
<i>Achillea millefolium</i>	common yarrow	G5	NNR	S5
<i>Agropyron cristatum</i> ssp. <i>pectinatum</i>	crested wheatgrass	G5TNR	NNA	SNA
<i>Agrostis scabra</i> var. <i>scabra</i>	hair grass	G5T5	NNR	S4
<i>Alisma triviale</i>	broad-leaved water plantain	G5	N5	S4
<i>Alopecurus aequalis</i> var. <i>aequalis</i>	short-awn meadow-foxtail	G5T5	N5	S4
<i>Alopecurus pratensis</i>	meadow foxtail	GNR	NNA	SNA
<i>Androsace septentrionalis</i>	pygmyflower	G5	N5	S5
<i>Anemone patens</i> var. <i>multifida</i>	prairie crocus	G5T5	N5	S5
<i>Antennaria microphylla</i>	small-leaved pussy-toes	G5	N5	S5
<i>Antennaria neglecta</i>	broad-leaved pussytoes	G5	N5	S4
<i>Antennaria</i> sp.	pussytoes species			
<i>Apocynum androsaemifolium</i>	spreading dogbane	G5	N5	S4
<i>Aralia nudicaulis</i>	wild sarsaparilla	G5	N5	S4
<i>Arctium minus</i>	common burdock	GNR	NNA	SNA
<i>Artemisia campestris</i> ssp. <i>caudata</i>	plains sagewort	G5T5	N5	S4
<i>Artemisia dracunculus</i>	tarragon	G5	N5	S4
<i>Artemisia frigida</i>	pasture sage	G5	N5	S5
<i>Artemisia ludoviciana</i> ssp. <i>ludoviciana</i>	prairie sage	G5T5	N5	S5
<i>Artemisia</i> sp.	sage species			
<i>Astragalus gilviflorus</i> var. <i>gilviflorus</i>	cushion milk-vetch	G5T5	N5	S5
<i>Astragalus lotiflorus</i>	low milk-vetch	G5	N4N5	S4
<i>Astragalus pectinatus</i>	narrow-leaved milk-vetch	G5	N5	S4
<i>Astragalus</i> spp.	milk-vetch species			
<i>Avenula hookeri</i>	Hooker's oat grass	G5	N5	S5
<i>Beckmannia syzigachne</i>	slough grass	G5	N5	S4
<i>Bidens frondosa</i>	tall Beggar's-tick	G5	N5	S3
<i>Boechera</i> sp.	rockcress species			
<i>Bouteloua gracilis</i>	blue grama	G5	N5	S5
<i>Bromus inermis</i>	smooth brome	G5	NNA	SNA
<i>Calamagrostis montanensis</i>	plains reed grass	G5	N5	S5
<i>Calamovilfa longifolia</i> var. <i>longifolia</i>	long-leaved reed grass	G5T5	N5	S5
<i>Campanula rotundifolia</i>	harbell	G5	N5	S5
<i>Carex atherodes</i>	awned sedge	G5	N5	S4
<i>Carex duriuscula</i>	needle-leaved sedge	G5	N5	S5
<i>Carex filifolia</i>	thread-leaved sedge	G5	N5	S5
<i>Carex inops</i> ssp. <i>heliophila</i>	sun sedge	G5T5	N5	S5
<i>Carex pellita</i>	woolly sedge	G5	N5	S4
<i>Carex</i> sp.	carex species			

Scientific Name	Common Name	Status		
		G-Rank	N-Rank	S-Rank
<i>Carex sprengelii</i>	Sprengel's sedge	G5	N5	S5
<i>Castilleja sessiliflora</i>	downy paintbrush	G5	N3N4	S3
<i>Cerastium arvense</i> ssp. <i>strictum</i>	field mouse-ear chickweed	G5T5	N5	S5
<i>Chenopodium album</i> var. <i>album</i>	Lamb's quarter's	G5TNR	NNA	SNA
<i>Chenopodium rubrum</i> var. <i>rubrum</i>	red goosefoot	G5	N5	S4
<i>Cirsium arvense</i>	Canada thistle	G5	NNA	SNA
<i>Cirsium flodmanii</i>	Flodman's thistle	G5	N5	S4
<i>Coeloglossum viride</i>	long-bracted green bog orchid	G5	N5	S4
<i>Comandra umbellata</i> ssp. <i>pallida</i>	bastard toadflax	G5T5	N5	S5
<i>Crataegus chrysocarpa</i>	northern hawthorn	G5	N5	S4
<i>Cryptantha celosioides</i>	clustered oreocarya	G5	N4N5	S2
<i>Dalea purpurea</i> var. <i>purpurea</i>	purple prairie-clover	G5T5	N5	S4
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	G5	N5	S4
<i>Drymocallis arguta</i>	white cinquefoil	G5	N5	S4
<i>Echinacea angustifolia</i> var. <i>angustifolia</i>	narrow-leaved purple conflower	G4T4	NNR	S3
<i>Echinochloa muricata</i> var. <i>microstachya</i>	rough barnyard grass	G5T5	N5	S4
<i>Elaeagnus commutata</i>	sliverberry	G5	N5	S4
<i>Elatine triandra</i>	longstem water-wort	G5	NNA	S2
<i>Eleocharis acicularis</i>	needle spike-rush	G5	N5	S4
<i>Eleocharis palustris</i>	creeping spike-rush	G5	N5	S4
<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	northern wheatgrass	G5T5	N5	S5
<i>Elymus repens</i>	creeping wild rye	GNR	NNA	SNA
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	slender wheatgrass	G5T5	N5	S5
<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	slender wheatgrass	G5T5	N5	S5
<i>Erigeron caespitosus</i>	tufted fleabane	G5	N5	S4
<i>Erigeron glabellus</i> var. <i>glabellus</i>	streamside fleabane	G5T5	N5	S5
<i>Erigeron radicans</i>	dwarf fleabane	G3G4	N3N4	S3
<i>Erigeron</i> sp.	fleabane species			
<i>Eriogonum flavum</i> var. <i>flavum</i>	yellow umbrella plant	G5T5	NNR	S4
<i>Erysimum asperum</i>	western wallflower	G5	N4N5	S4
<i>Erysimum</i> sp.	wallflower species			
<i>Festuca hallii</i>	plains rough fescue	G5	N5	S3
<i>Festuca saximontana</i> var. <i>saximontana</i>	Rocky Mountain fescue	G5T5	N5	S5
<i>Fraxinus pennsylvanica</i>	green ash	G5	N5	S4
<i>Gaillardia aristata</i>	great-flowered gaillardia	G5	N5	S4
<i>Galium boreale</i>	northern bedstraw	G5	N5	S5
<i>Geum macrophyllum</i> var. <i>perincisum</i>	large-leaved avens	G5T5	N5	S4
<i>Geum triflorum</i> var. <i>triflorum</i>	three-flowered avens	G5T5	N5	S5
<i>Glyceria striata</i> var. <i>striata</i>	fowl-manna grass	G5T5	N5	S4

Scientific Name	Common Name	Status		
		G-Rank	N-Rank	S-Rank
<i>Gnaphalium palustre</i>	western marsh cudweed	G5	N5	S5
<i>Grindelia hirsutula</i>	hairy gumweed	G5	N5	S5
<i>Grindelia squarrosa</i>	gumweed	G5	N5	S5
<i>Gutierrezia sarothrae</i>	broomweed	G5	N5	S4
<i>Helianthus pauciflorus</i> ssp. <i>subrhomboideus</i>	rhombic-leaved sunflower	G5T5	N4N5	S4
<i>Helianthus</i> spp.	sunflower			
<i>Heracleum maximum</i>	cow parsnip	G5	N5	S4
<i>Hesperostipa comata</i> ssp. <i>comata</i>	needle-and-thread grass	G5T5	N5	S5
<i>Hesperostipa curisetia</i>	porcupine grass	G5	N5	S5
<i>Hesperostipa</i> sp.	needlegrass species			
<i>Hesperostipa spartea</i>	porcupine grass	G5	N4N5	S4
<i>Heterotheca villosa</i> var. <i>villosa</i>	hairy false golden-aster	G5T5	N5	S5
<i>Heuchera richardsonii</i>	alumroot	G5	N5	S4
<i>Hordeum jubatum</i> ssp. <i>jubatum</i>	fox-tail barley	G5T5	N5	S5
<i>Hymenopappus filifolius</i> var. <i>polycephalus</i>	tufted hymenopappus	G5T4T5	N3	S3
<i>Juncus balticus</i>	Baltic rush	G5	N5	S4
<i>Juniperus horizontalis</i>	creeping juniper	G5	N5	S5
<i>Koeleria macrantha</i>	June grass	G5	N5	S5
<i>Krascheninnikovia lanata</i>	winter-fat	G5	N5	S4
<i>Lactuca serriola</i>	prickly lettuce	GNR	NNA	SNA
<i>Lathyrus ochroleucus</i>	cream-coloured vetchling	G5	N5	S4
<i>Liatris punctata</i> var. <i>punctata</i>	dotted blazing star	G5T5	N5	S5
<i>Limosella aquatica</i>	mudwort	G5	N5	S4
<i>Linum lewisii</i> var. <i>lewisii</i>	flax	G5T5	N5	S4
<i>Lygodesmia juncea</i>	skeleton-weed	G5	N5	S5
<i>Lysimachia ciliata</i>	fringed loosestrife	G5	N5	S4
<i>Maianthemum stellatum</i>	starflower false Solomon's-seal	G5	N5	S4
<i>Marsilea vestita</i>	pepperwort	G5	N3	S3
<i>Medicago sativa</i> ssp. <i>sativa</i>	alfalfa	GNRTNR	NNA	SNA
<i>Melilotus officinalis</i>	yellow sweet-clover	GNR	NNA	SNA
<i>Melilotus</i> sp.	sweet-clover species			
<i>Mentha canadensis</i>	wild mint	G5	N5	S4
<i>Mertensia lanceolata</i> var. <i>lanceolata</i>	prairie bluebells	G5T5	NNR	S3
<i>Moehringia lateriflora</i>	blunt-leaved sandwort	G5	N5	S4
<i>Monarda fistulosa</i> var. <i>menthifolia</i>	wild bergamot	G5T5	NNR	S4
<i>Muhlenbergia cuspidata</i>	prairie muhly	G5	N4N5	S4
<i>Muhlenbergia richardsonis</i>	mat muhly	G5	N5	S4
<i>Myosurus minimus</i>	least mousetail	G5	N3N4	S3
<i>Nassella viridula</i>	green needlegrass	G5	N5	S5

Scientific Name	Common Name	Status		
		G-Rank	N-Rank	S-Rank
<i>Orobanche fasciculata</i>	clustered broom-rape	G4G5	N5	S4
<i>Orobanche ludoviciana</i>	Louisiana vroom-rape	G5	N3N4	S3
<i>Oxalis stricta</i>	yellow wood sorrel	G5	N5	S4
<i>Oxytropis campestris</i> var. <i>spicata</i>	northern yellow point-vetch	G5T5	N5	S4
<i>Oxytropis</i> spp.	locoweed species			
<i>Packera cana</i>	silvery groundsel	G5	N5	S4
<i>Paronychia sessiliflora</i>	low whitlowwort	G5	N3N4	S3
<i>Pascopyrum smithii</i>	western wheatgrass	G5	N5	S5
<i>Pedimelum argophyllum</i>	silvery scurf pea	G5	N5	S5
<i>Pedimelum esculentum</i>	Indian breadroot	G5	N4	S4
<i>Penstemon albidus</i>	white beardtongue	G5	N4	S4
<i>Persicaria amphibia</i> var. <i>emersa</i>	water smartweed	G5T5	N5	S4
<i>Phalaris arundinacea</i>	reed canary grass	G5	N5	S4
<i>Phlox alyssifolia</i> ssp. <i>alyssifolia</i>	blue wild phlox	G5TNR	NNR	S3
<i>Phlox hoodii</i> ssp. <i>hoodii</i>	moss phlox	G5T5	N5	S5
<i>Physaria spatulata</i>	spatulate bladderpod	G5TNR	NNR	S3
<i>Physaria</i> spp.	bladderpod species			
<i>Poa interior</i>	inland blue grass	G5T5	N5	S4
<i>Poa pratensis</i>	Kentucky blue grass	G5	N5	SNA
<i>Poa secunda</i> ssp. <i>secunda</i>	canby blue grass	G5T5	N5	S5
<i>Polygala alba</i>	white milkwort	G5	N3	S3
<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	balsam poplar	G5T5	N5	S5
<i>Populus tremuloides</i>	trembling aspen	G5	N5	S5
<i>Potentilla</i>	cinquefoil species			
<i>Potentilla concinna</i> var. <i>concinna</i>	early cinquefoil	G5T5?	NNR	S2
<i>Potentilla lasiodonta</i>	sandhills cinquefoil	G3	N3	S2
<i>Potentilla pensylvanica</i>	prairie cinquefoil	G5	N5	S4
<i>Prunus virginiana</i> var. <i>virginiana</i>	chokecherry	G5T5	N5	S5
<i>Ranunculus cymbalaria</i>	seaside buttercup	G5	N5	S4
<i>Ranunculus macounii</i>	Macoun's buttercup	G5	N5	S4
<i>Ratibida columnifera</i>	prairie cone-flower	G5	N4N5	S4
<i>Ribes oxyacanthoides</i> ssp. <i>oxyacanthoides</i>	bristly gooseberry	G5T5	N5	S4
<i>Rorippa curvipes</i>	curved yellow-cress	G5	NNR	S3
<i>Rosa acicularis</i> ssp. <i>sayi</i>	prickly rose	G5T5	N5	S5
<i>Rosa arkansana</i>	low prairie rose	G5	N5	S5
<i>Rosa blanda</i>	smooth wild rose	G5	N5	S1
<i>Rosa woodsii</i> var. <i>woodsii</i>	Wood's rose	G5T5	N5	S5
<i>Rubus idaeus</i> ssp. <i>strigosus</i>	American red raspberry	G5T5	N5	S5
<i>Rumex crispus</i>	curled dock	GNR	NNA	SNA

Scientific Name	Common Name	Status		
		G-Rank	N-Rank	S-Rank
<i>Sagittaria cuneata</i>	arum-leaved arrowhead	G5	N5	S4
<i>Salsola kali</i>	Russian-thistle	GNR	NNA	SNA
<i>Sanicula marilandica</i>	black snakeroot	G5	N5	S4
<i>Schizachyrium scoparium</i> var. <i>scoparium</i>	little bluestem	G5T5	N5	S4
<i>Schoenoplectus acutus</i> var. <i>acutus</i>	hard-stemmed bulrush	G5T5	N5	S4
<i>Selaginella densa</i> var. <i>densa</i>	dense spike-moss	G5T5	N5	S4
<i>Setaria viridis</i> var. <i>viridis</i>	green foxtail	GNRTNR	NNA	SNA
<i>Solidago gigantea</i>	late goldenrod	G5	N5	S4
<i>Solidago missouriensis</i>	low goldenrod	G5	N5	S5
<i>Sonchus arvensis</i> ssp. <i>arvensis</i>	field sow-thistle	GNRTNR	NNA	SNA
<i>Sonchus asper</i> ssp. <i>asper</i>	spiny-leaved annual sow-thistle	GNRTNR	NNA	SNA
<i>Sphaeralcea coccinea</i> ssp. <i>coccinea</i>	scarlet mallow	G5T5	N5	S5
<i>Stachys pilosa</i> var. <i>pilosa</i>	hairy hedge-nettle	G5T5	N5	S4
<i>Symphoricarpos albus</i> var. <i>albus</i>	snowberry	G5T5	N5	S4
<i>Symphoricarpos occidentalis</i>	western snowberry	G5	N5	S5
<i>Symphyotrichum ericoides</i> var. <i>pansum</i>	tufted white prairie aster	G5T5	N5	S5
<i>Symphyotrichum laeve</i> var. <i>geyeri</i>	Geyer's aster	G5T5	N5	S5
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	common dandelion	G5T5	NNA	SNA
<i>Thalictrum venulosum</i>	veiny meadow-rue	G5	N5	S4
<i>Thermopsis rhombifolia</i>	golden-bean	G5	N5	S5
<i>Thlaspi arvense</i>	stinkweed	GNR	NNA	SNA
<i>Toxicodendron rydbergii</i>	poison ivy	G5	N5	S4
<i>Tragopogon dubius</i>	yellow goat's-beard	GNR	NNA	SNA
<i>Typha angustifolia</i>	narrow-leaved cattail	G5	N5	SNA
<i>Typha latifolia</i>	common cattail	G5	N5	S4
<i>Ulmus pumila</i>	Siberian elm	GNR	NNA	SNA
<i>Utricularia vulgaris</i>	common bladderwort	G5	N5	S4
<i>Veronica peregrina</i> ssp. <i>xalapensis</i>	hairy speedwell	G5T5	N5	S4
<i>Vicia americana</i> ssp. <i>americana</i>	American purple vetch	G5T5	N5	S5
<i>Viola adunca</i> var. <i>adunca</i>	early blue violet	G5T5	N5	S5
<i>Viola canadensis</i> var. <i>rugulosa</i>	western Canada violet	G5T5	N5	S4
<i>Viola</i> spp.	violet species			
<i>Xanthisma spinulosum</i> var. <i>spinulosum</i>	spiny goldenaster	G5T4	N4N5	S4
<i>Zizia aptera</i>	heart-leaved alexanders	G5	N5	S4

Appendix I

Wildlife and Wildlife Habitat Supplementary Information



BLUEARTH RENEWABLES INC.

Appendix I

Supplementary Information - Wildlife

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References

Table I.1: Federal and Provincial Species Ranking Definitions

Category	Definition
SK CDC ¹	
S1	Critically Imperiled/ Extremely Rare - At very high risk of extinction or extirpation due to extreme rarity, very steep declines, high threat level, or other factors.
S2	Imperiled/Very Rare - At high risk of extinction or extirpation due to a very restricted range, very few populations, steep declines, threats or other factors.
S3	Vulnerable/Rare to Uncommon - At moderate risk of extinction or extirpation due to a restricted range, relatively few populations, recent and widespread declines, threats, or other factors.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure/Common - Demonstrably secure under present conditions; widespread and abundant; low threat level.
Range Rank	Such as S3S4, is used when the taxon straddles the criteria for more than one rank (i.e. S3 and S4).
Modifiers for SK CDC Ranks ¹	
A	Accidental or causal in the province, including species recorded infrequently that are far outside their range.
B	For a migratory species, applies to the breeding population in the province.
N	For a migratory species, applies to the non-breeding population in the province.
M	For a migratory species, rank applies to the transient (migrant) population.
H	Historical occurrence of the taxon, without recent verification (e.g. 20-40 years or older).
U	Status is uncertain in Saskatchewan because of limited or conflicting information (unrankable).
X	Believed to be extinct or extirpated from the province.
NA	Rank is not yet assigned or species has not yet been assessed (not ranked).
NR	Conservation status is not applicable to the species (e.g. it may have been determined to have been introduced in Saskatchewan).
?	A "?" following a rank means that there is some uncertainty associated with it. For example, a rank of S3? means that it is believed to be most likely an S3, but there is a significant chance that it could be an S2 or S4.
SK Wildlife Act ²	
Extirpated	A native wild species that no longer exists in the wild in Saskatchewan, but exists in the wild outside of Saskatchewan.
Endangered	A native wild species that is threatened with imminent extirpation or extinction.
Threatened	A native wild species that is likely to become endangered if the factors leading to its endangerment are not reversed.
Vulnerable	A native wild species that is of special concern because of low or declining numbers due to human activities or natural events but that is not endangered or threatened.

Category	Definition
SARA³	
Extinct	A wildlife species that no longer exists.
Extirpated	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
Endangered	A wildlife species that is facing imminent extirpation or extinction.
Threatened	A wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
COSEWIC⁴	
Extinct	A species that no longer exists.
Extirpated	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered	A species facing imminent extirpation or extinction.
Threatened	A species likely to become endangered if limiting factors are not reversed.
Special Concern	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Data Deficient	A species for which there is insufficient scientific information to support status designation.
Not At Risk	A species that has been evaluated and found to be not at risk.

Notes:

¹ SK CDC 2020b

² Government of Saskatchewan 1998

³ Government of Canada 2002

⁴ COSEWIC 2019

Table I.2: Wildlife SOMC with Potential to Occur in the Wildlife RAA

Common Name	Latin Name	SARA ¹	COSEWIC ¹	ENV ²	SK CDC ³	SK Activity Restriction Feature and Setback ⁴
Invertebrates						
Dusky dune moth	Copablepharon longipenne	Endangered	Endangered		S1	
Gypsy cuckoo bumble bee	Bombus bohemicus	Endangered	Endangered		S1	
Monarch	Danaus plexippus	Special concern	Endangered		S2B	
Nine-spotted lady beetle	Coccinella novemnotata		Endangered		S4	
Pale yellow dune moth	Copablepharon grandis	Special concern	Special concern		S2	
Rhesus skipper	Polites rhesus				S2	
Verna's flower moth	Schinia verna	Threatened	Threatened		S1	
Western bumble bee	Bombus occidentalis		Special concern		S4	
Yellow-banded bumble bee	Bombus terricola	Special concern	Special concern		S5	
Herptiles						
Bullsnake	Pituophis catenifer sayi		Special concern		S4	
Canadian toad	Anaxyrus hemiophrys		Not at risk		S4	Breeding and overwintering habitat (90 m)
Eastern yellow-bellied racer	Coluber constrictor flaviventris	Threatened	Threatened		S2	Hibernacula (200 m)
Great plains toad	Anaxyrus cognatus	Special concern	Special concern		S3	Breeding and overwintering habitat (500 m)
Northern leopard frog	Lithobates pipiens	Special concern	Special concern		S3	Breeding and overwintering habitat (500 m)

Common Name	Latin Name	SARA ¹	COSEWIC ¹	ENV ²	SK CDC ³	SK Activity Restriction Feature and Setback ⁴
Plains hog-nosed snake	Heterodon nasicus		Special concern		S3	Hibernacula (200 m)
Plains spadefoot	Spea bombifrons		Not at risk		S3	Breeding and overwintering habitat (90 m)
Smooth greensnake	Opheodrys vernalis				S4	Hibernacula (200 m)
Western tiger salamander	Ambystoma mavortium	Special concern	Special concern		S4	
Upland Game Bird						
Sharp-tailed grouse	Tympanuchus phasianellus				S5	Lek (400 m)
Raptors						
Bald eagle	Haliaeetus leucocephalus		Not at risk		S5B,S5N,S4M	Nest site (1000 m)
Burrowing owl	Athene cunicularia	Endangered	Endangered	Endangered	S2B,S2M	Breeding bird (500 m)
Cooper's hawk	Accipiter cooperii		Not at risk		S4B,S2N,S2M	Nest site (400 m)
Ferruginous hawk	Buteo regalis	Threatened	Threatened		S3B	Nest site (1000 m)
Golden eagle	Aquila chrysaetos		Not at risk		S3B,S3N,S4M	Nest site (1000 m)
Osprey	Pandion haliaetus				S2B,S2M	Nest site (1000 m)
Peregrine falcon	Falco peregrinus anatum	Special concern	Not at risk		S1B,SNRM	Nest site (1000 m)
Short-eared owl	Asio flammeus	Special concern	Special concern		S3B,S2N,S3M	Breeding bird (500 m)
Migratory Birds						
American bittern	Botaurus lentiginosus				S5B	Breeding bird (350 m)
American white pelican	Pelecanus erythrorhynchos		Not at risk		S5B,S5M	Nesting colony (1000 m)
Baird's sparrow	Ammodramus bairdii	Special concern	Special concern		S4B	
Bank swallow	Riparia riparia	Threatened	Threatened		S4B,S5M	

Common Name	Latin Name	SARA ¹	COSEWIC ¹	ENV ²	SK CDC ³	SK Activity Restriction Feature and Setback ⁴
Barn swallow	<i>Hirundo rustica</i>	Threatened	Threatened		S5B,S5M	
Black-crowned night-heron	<i>Nycticorax nycticorax</i>				S4B	Nesting colony (1000 m)
Black tern	<i>Chlidonias niger</i>		Not at risk		S5B,S5M	Nesting colony (400 m)
Boblink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened		S4B,S4M	
Buff-breasted sandpiper	<i>Calidris subruficollis</i>	Special concern	Special concern		S4M	
Cattle egret	<i>Bubulcus ibis</i>				SNA	Nesting colony (1000 m)
Chestnut-collared longspur	<i>Calcarius ornatus</i>	Threatened	Endangered		S3B	Breeding bird (200 m)
Common nighthawk	<i>Chordeiles minor</i>	Threatened	Special concern		S4B,S4M	Breeding bird (200 m)
Common tern	<i>Sterna hirundo</i>				S5B,S5M	Nesting colony (400 m)
Double-crested cormorant	<i>Phalacrocorax auritus</i>		Not at risk		S5B,S5M	Nesting colony (1000 m)
Eared grebe	<i>Podiceps nigricollis</i>				S5B,S5M	Breeding bird or breeding colony (200 m)
Forster's tern	<i>Sterna forsteri</i>		Data deficient		S4B,S4M	Nesting colony (400 m)
Franklin's gull	<i>Leucophaeus pipixcan</i>				S4B,S4M	Nesting colony (400 m)
Great blue heron	<i>Ardea herodias</i>	Special concern	Special concern		S5B	Nesting colony (1000 m)
Great egret	<i>Ardea alba</i>				SNA	Nesting colony (1000 m)
Herring gull	<i>Larus argentatus</i>				S4B,S5M	Nesting colony (400 m)
Horned grebe	<i>Podiceps auritus</i>	Special concern	Special concern		S5B,S5M	Breeding bird or breeding colony (200 m)
Lark bunting	<i>Calamospiza melanocorys</i>	Threatened	Threatened		S2B,S2M	

Common Name	Latin Name	SARA ¹	COSEWIC ¹	ENV ²	SK CDC ³	SK Activity Restriction Feature and Setback ⁴
Loggerhead shrike	<i>Lanius ludovicianus excubitorides</i>	Threatened	Threatened		S2B,S2M	Breeding bird (400 m)
Long-billed curlew	<i>Numenius americanus</i>	Special concern	Special concern		S3B,S4M	Breeding bird (200 m)
McCown's longspur	<i>Rhynchophanes mccownii</i>	Threatened	Threatened		S3B	Breeding bird (200 m)
Piping plover	<i>Charadrius melodus circumcinctus</i>	Endangered	Endangered	Endangered	S3B	High-water mark (600 m)
Red knot	<i>Calidris canutus rufa</i>	Endangered	Endangered		S2M	Staging area (1000 m)
Red-necked phalarope	<i>Phalaropus lobatus</i>	Special concern	Special concern		S4B,S3M	
Rusty blackbird	<i>Euphagus carolinus</i>	Special concern	Special concern		S3B,SUN,S3M	Breeding bird (300 m)
Snowy egret	<i>Egretta thula</i>				SNA	Nesting colony (1000 m)
Snowy plover	<i>Charadrius nivosus nivosus</i>				SHB	High-water mark (600 m)
Sprague's pipit	<i>Anthus spragueii</i>	Threatened	Threatened		S3B,S3M	Breeding bird (250 m)
Western Grebe	<i>Aechmophorus occidentalis</i>	Special concern	Special concern		S3B,S3M	Breeding bird or breeding colony (200 m)
Whooping crane	<i>Grus americana</i>	Endangered	Endangered	Endangered	SXB,S1M	Staging area (1000 m)
Yellow rail	<i>Coturnicops noveboracensis</i>	Special concern	Special concern		S3B,S3M	Breeding bird (350 m)
Mammals						
American badger	<i>Taxidea taxus taxus</i>	Special concern	Special concern		S3	
Big brown bat	<i>Eptesicus fuscus</i>				S5	Roost/foraging site (500 m)
Eastern red bat	<i>Lasiurus borealis</i>				S4B	Roost/foraging site (500 m)
Hoary bat	<i>Lasiurus cinereus</i>				S5B	Roost/foraging site (500 m)
Little brown myotis	<i>Myotis lucifugus</i>	Endangered	Endangered		S4B,S4N	Roost/foraging site (500 m)

Common Name	Latin Name	SARA ¹	COSEWIC ¹	ENV ²	SK CDC ³	SK Activity Restriction Feature and Setback ⁴
Long-eared myotis	<i>Myotis evotis</i>	Endangered	Endangered		S2B,S2N	Roost/foraging site (500 m)
Northern myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered		S3	Roost/foraging site (500 m)
Silver-haired bat	<i>Lasionycteris noctivagans</i>				S5B	Roost/foraging site (500 m)
Western small-footed myotis	<i>Myotis ciliolabrum</i>				S2	Roost/foraging site (500 m)

Notes:

1 Government of Canada 2020

2 Government of Saskatchewan 1999

3 SK CDC 2020a

4 ENV 2017

Table I.3: Habitat Associations for Wildlife SOMC with Potential to Occur in the Wildlife RAA

Common Name	Latin Name	Native Grassland	Tame Pasture	Hayland	Cultivated	Shrubland	Developed	Exposed/ barren	Water	Wetland
Invertebrates¹										
Dusky dune moth	Copablepharon longipenne							X		
Gypsy cuckoo bumble bee	Bombus bohemicus	X	X			X	X			
Monarch	Danaus plexippus	X	X							
Nine-spotted lady beetle	Coccinella novemnotata	X	X	X	X	X	X			
Pale yellow dune moth	Copablepharon grandis							X		
Rhesus skipper	Polites rhesus	X								
Verna's flower moth	Schinia verna	X								
Western bumble bee	Bombus occidentalis	X	X	X	X	X	X			
Yellow-banded bumble bee	Bombus terricola	X	X	X	X	X	X			
Herptiles²										
Bullsnake	Pituophis catenifer sayi	X	X							
Canadian toad	Anaxyrus hemiophrys	X	X						X	X
Eastern yellow-bellied racer	Coluber constrictor flaviventris	X	X			X				
Great plains toad	Anaxyrus cognatus	X	X						X	X
Northern leopard frog	Lithobates pipiens	X	X						X	X
Plains hog-nosed snake	Heterodon nasicus	X	X			X				
Plains spadefoot	Spea bombifrons	X	X						X	X
Smooth greensnake	Opheodrys vernalis	X	X							
Western tiger salamander	Ambystoma mavortium	X	X						X	X
Upland Game Bird³										
Sharp-tailed grouse	Tympanuchus phasianellus	X	X			X				

Common Name	Latin Name	Native Grassland	Tame Pasture	Hayland	Cultivated	Shrubland	Developed	Exposed/ barren	Water	Wetland
Raptors ³										
Bald eagle	<i>Haliaeetus leucocephalus</i>								X	
Burrowing owl	<i>Athene cunicularia</i>	X	X							
Cooper's hawk	<i>Accipiter cooperii</i>					X	X			
Ferruginous hawk	<i>Buteo regalis</i>	X	X			X				
Golden eagle	<i>Aquila chrysaetos</i>	X	X			X		X		
Osprey	<i>Pandion haliaetus</i>								X	
Peregrine falcon	<i>Falco peregrinus anatum</i>	X	X			X		X		
Short-eared owl	<i>Asio flammeus</i>	X	X							X
Migratory Birds ³										
American bittern	<i>Botaurus lentiginosus</i>								X	X
American white pelican	<i>Pelecanus erythrorhynchos</i>								X	X
Baird's sparrow	<i>Ammodramus bairdii</i>	X	X							
Bank swallow	<i>Riparia riparia</i>							X	X	X
Barn swallow	<i>Hirundo rustica</i>	X	X				X		X	X
Black-crowned night-heron	<i>Nycticorax nycticorax</i>								X	X
Black tern	<i>Chlidonias niger</i>								X	X
Bobolink	<i>Dolichonyx oryzivorus</i>	X	X	X						
Buff-breasted sandpiper	<i>Calidris subruficollis</i>								X	X
Cattle egret	<i>Bubulcus ibis</i>								X	X
Chestnut-collared longspur	<i>Calcarius ornatus</i>	X								
Common nighthawk	<i>Chordeiles minor</i>	X	X			X	X	X		
Common tern	<i>Sterna hirundo</i>								X	X
Double-crested cormorant	<i>Phalacrocorax auritus</i>								X	X

Common Name	Latin Name	Native Grassland	Tame Pasture	Hayland	Cultivated	Shrubland	Developed	Exposed/ barren	Water	Wetland
Eared grebe	Podiceps nigricollis								X	X
Forster's tern	Sterna forsteri								X	X
Franklin's gull	Leucophaeus pipixcan								X	X
Great blue heron	Ardea herodias								X	X
Great egret	Ardea alba								X	X
Herring gull	Larus argentatus						X		X	X
Horned grebe	Podiceps auritus								X	X
Lark bunting	Calamospiza melanocorys	X	X							
Loggerhead shrike	Lanius ludovicianus excubitorides	X	X			X				
Long-billed curlew	Numenius americanus	X								
McCown's longspur	Rhynchophanes mccownii	X	X							
Piping plover	Charadrius melodus circumcinctus	X							X	X
Red knot	Calidris canutus rufa								X	X
Red-necked phalarope	Phalaropus lobatus								X	X
Rusty blackbird	Euphagus carolinus								X	X
Snowy egret	Egretta thula								X	X
Snowy plover	Charadrius nivosus nivosus							X	X	X
Sprague's pipit	Anthus spragueii	X	X							
Western Grebe	Aechmophorus occidentalis								X	X
Whooping crane	Grus americana				X				X	X
Yellow rail	Coturnicops noveboracensis								X	X

Common Name	Latin Name	Native Grassland	Tame Pasture	Hayland	Cultivated	Shrubland	Developed	Exposed/ barren	Water	Wetland
Mammals ⁴										
American badger	Taxidea taxus taxus	X	X	X						
Big brown bat	Eptesicus fuscus		X	X	X		X			
Eastern red bat	Lasiurus borealis									
Hoary bat	Lasiurus cinereus						X			
Little brown myotis	Myotis lucifugus						X		X	X
Long-eared myotis	Myotis evotis						X			
Northern myotis	Myotis septentrionalis									
Silver-haired bat	Lasionycteris noctivagans								X	X
Western small-footed myotis	Myotis ciliolabrum	X	X							X
Totals		35	31	6	5	13	12	7	35	35

Notes:

¹ Government of Canada 2002

² Stebbins 2003

³ Cornell Lab of Ornithology and the American Ornithologist's Union 2020

⁴ Reid 2006

Table I.4: All Wildlife Species Observed During the 2015, 2016, 2017 and 2019 Field Studies

Common Name	Latin Name	SARA ^{1,2}	COSEWIC ^{1,2}	SK CDC ^{1,3}
Herptiles				
Boreal chorus frog	<i>Pseudacris maculata</i>		Not at risk	S5
Northern leopard frog	<i>Lithobates pipiens</i>	Special concern	Special concern	S3
Smooth greensnake	<i>Opheodrys vernalis</i>			S4
Wood Frog	<i>Lithobates sylvaticus</i>			S5
Birds				
American crow	<i>Corvus brachyrhynchos</i>			S5B,S4N,S5M
American goldfinch	<i>Spinus tristis</i>			S5B
American kestrel	<i>Falco sparverius</i>			S5B,S1N,S5M
American robin	<i>Turdus migratorius</i>			S5B,SUN,S5M
American wigeon	<i>Mareca americana</i>			S5B,S2N,S5M
Baird's sparrow	<i>Ammodramus bairdii</i>	Special concern	Special concern	S4B
Barn swallow	<i>Hirundo rustica</i>	Threatened	Threatened	S5B,S5M
Black-and-white warbler	<i>Mniotilta varia</i>			S5B,S5M
Black-billed magpie	<i>Pica hudsonia</i>			S5
Blue-winged teal	<i>Spatula discors</i>			S5B,S5M
Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened	S4B,S4M
Brewer's blackbird	<i>Euphagus cyanocephalus</i>			S4B,SUN,S4M
Brown-headed cowbird	<i>Molothrus ater</i>			S5B,SUN,S5M
Brown thrasher	<i>Toxostoma rufum</i>			S5B,S5M
California gull	<i>Larus californicus</i>			S4B,S4M
Canada goose	<i>Branta canadensis</i>			S5B,S2N,S5M
Chestnut-collared longspur	<i>Calcarius ornatus</i>	Threatened	Endangered	S3B
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>			S5B,S5M
Clay-coloured sparrow	<i>Spizella pallida</i>			S5B,S5M
Common grackle	<i>Quiscalus quiscula</i>			S5B
Common nighthawk	<i>Chordeiles minor</i>	Threatened	Special concern	S4B,S4M
Common raven	<i>Corvus corax</i>			S5
Common yellowthroat	<i>Geothlypis trichas</i>			S5B,S5M
Cooper's hawk	<i>Accipiter cooperii</i>		Not at risk	S4B,S2N,S2M

Common Name	Latin Name	SARA ^{1,2}	COSEWIC ^{1,2}	SK CDC ^{1,3}
Double-crested cormorant	Phalacrocorax auritus		Not at risk	S5B,S5M
Eastern kingbird	Tyrannus tyrannus			S5B,S5M
European starling	Sturnus vulgaris			SNA
Ferruginous hawk	Buteo regalis	Threatened	Threatened	S3B
Franklin's gull	Leucophaeus pipixcan			S4B,S4M
Gadwall	Mareca strepera			S5B,S2N,S5M
Golden eagle	Aquila chrysaetos		Not at risk	S3B,S3N,S4M
Grasshopper sparrow	Ammodramus savannarum			S4B
Gray catbird	Dumetella carolinensis			S5B,S5M
Great blue heron	Ardea herodias			S5B
Great horned owl	Bubo virginianus			S4
Green-winged teal	Anas crecca			S5B,S2N,S5M
Horned lark	Eremophila alpestris			S4B,S3N,SUM
House wren	Troglodytes aedon			S5B,S5M
Killdeer	Charadrius vociferus			S5B,S5M
Lark bunting	Calamospiza melanocorys	Threatened	Threatened	S2B,S2M
Least flycatcher	Empidonax minimus			S5B,S5M
Le Conte's sparrow	Ammodramus leconteii			S5B,S5M
Lesser scaup	Aythya affinis			S5B,S3N,S5B
Long-billed curlew	Numenius americanus	Special concern	Special concern	S3B,S4M
Mallard	Anas platyrhynchos			S5B,S5M
Marbled godwit	Limosa fedoa			S4B,S4M
Merlin	Falco columbarius		Not at risk	S5B,S5N,S5M
Mountain bluebird	Sialia currucoides			S4B,S4M
Mourning dove	Zenaida macroura			S5B,S5M
Northern flicker	Colaptes auratus			S5B,SUN,S5M
Northern harrier	Circus hudsonius		Not at risk	S4B,S4M
Northern pintail	Anas acuta			S5B,S4N,S5M
Northern shoveler	Spatula clypeata			S5B,S5M
Osprey	Pandion haliaetus			S2B,S2M
Ovenbird	Seiurus aurocapilla			S5B,S5M
Prairie falcon	Falco mexicanus		Not at risk	S3B,S3N,S3M
Red-necked phalarope	Phalaropus lobatus	Special concern	Special concern	S4B,S3M

Common Name	Latin Name	SARA ^{1,2}	COSEWIC ^{1,2}	SK CDC ^{1,3}
Red-tailed hawk	<i>Buteo jamaicensis</i>		Not at risk	S5B,S1N,S5M
Red-winged blackbird	<i>Agelaius phoeniceus</i>			S5B,SUN,S5M
Ring-billed gull	<i>Larus delawarensis</i>			S5B,S5M
Ring-necked pheasant	<i>Phasianus colchicus</i>			SNA
Rock pigeon	<i>Columba livia</i>			SNA
Savannah sparrow	<i>Passerculus sandwichensis</i>			S5B,S5M
Sharp-shinned hawk	<i>Accipiter striatus</i>		Not at risk	S4B,S2N,S4M
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>			S5
Short-eared owl	<i>Asio flammeus</i>	Special concern	Special concern	S3B,S2N,S3M
Song sparrow	<i>Melospiza melodia</i>			S5B,S5M
Spotted towhee	<i>Pipilo maculatus</i>			S3B,S5M
Sora	<i>Porzana carolina</i>			S5B,S5M
Sprague's pipit	<i>Anthus spragueii</i>	Threatened	Threatened	S3B,S3M
Swainson's hawk	<i>Buteo swainsoni</i>			S4B,S4M
Tree swallow	<i>Tachycineta bicolor</i>			S5B,S5M
Tundra swan	<i>Cygnus columbianus</i>			S5M
Turkey vulture	<i>Cathartes aura</i>			S3B,S3M
Upland sandpiper	<i>Bartramia longicauda</i>			S5B,S5M
Vesper sparrow	<i>Poocetes gramineus</i>			S5B,S5M
Warbling vireo	<i>Vireo gilvus</i>			S5B,S5M
Western kingbird	<i>Tyrannus verticalis</i>			S5B,S5M
Western meadowlark	<i>Sturnella neglecta</i>			S4B,S4M
Western wood-pewee	<i>Contopus sordidulus</i>			S4B,S4M
Willet	<i>Catoptrophorus semipalmatus</i>			S4B,S4M
Wilson's phalarope	<i>Phalaropus tricolor</i>			S5B,S5M
Wilson's snipe	<i>Gallinago delicata</i>			S5B,S5M
Yellow-breasted chat	<i>Icteria virens</i>		Not at risk	S3B,S3M
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>			S5B,S5M
Yellow-rumped warbler	<i>Setophaga coronata</i>			S5B,S5M
Yellow warbler	<i>Setophaga petechia</i>			S5B,S5M

Common Name	Latin Name	SARA ^{1,2}	COSEWIC ^{1,2}	SK CDC ^{1,3}
Mammals				
American badger	<i>Taxidea taxus taxus</i>	Special concern	Special concern	S3
Big brown bat	<i>Eptesicus fuscus</i>			S5
Bobcat	<i>Lynx rufus</i>			S3
Coyote	<i>Canis latrans</i>			S5
Eastern red bat	<i>Lasiurus borealis</i>			S4B
Elk	<i>Cervus canadensis</i>			S4
Hoary bat	<i>Lasiurus cinereus</i>			S5B
Little brown myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	S4B,S4N
Long-eared myotis	<i>Myotis evotis</i>			S2B,S2N
Moose	<i>Alces americanus</i>			S5
Mule deer	<i>Odocoileus hemionus</i>			S4
Silver-haired bat	<i>Lasionycteris noctivagans</i>			S5B
Western small-footed myotis	<i>Myotis ciliolabrum</i>			S2
White-tailed deer	<i>Odocoileus virginianus</i>			S4

Notes:

¹ See Table I.1 for provincial and federal ranking definitions.

² Government of Canada 2020

³ SK CDC 2020

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I.5 Bat Activity Survey Technical Report

**OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
PRE-CONSTRUCTION BAT MONITORING
REPORT**



Prepared for:

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Project Number: 113253956

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Executive Summary

BluEarth Renewables Inc. (BluEarth) is proposing to develop a wind energy project (the Project) in the rural municipalities of Hart Butte (RM. No. 11) and Happy Valley (RM. No. 10), Saskatchewan. The Project is located approximately 20 km east of the village of Coronach, in south-central Saskatchewan, and approximately 14 km north of the US/Canada border. The Project is proposed to be up to 200 MW with a maximum of 50 wind turbine generators (WTGs). BluEarth is applying for 60 WTG locations, including 10 alternative locations. Bat mortality risk is one important regulatory concern for wind projects and a passive bat detection program was, therefore, recommended in the pre-feasibility assessment of the Project area (Stantec 2015). Passive bat detection was conducted during the fall monitoring period (July 14 to September 30) in 2015, and spring (May 1 to June 7) and fall (July 28 to September 14) in 2016 using 11 detectors. Eight detectors were placed at four meteorological (MET) Towers (four low elevation and four high elevation detectors) in the Project area, and one detector at each of three additional ground stations during each monitoring period.

The purpose of the monitoring was to estimate bat activity in the Project area during the monitoring periods as has been previously requested by Saskatchewan Ministry of Environment (MOE) for other wind energy project bat assessments. Results were also put in context of the Alberta Environment and Parks (AEP) recommended fall migration period of August 1 to September 10 for regulatory considerations (ESRD 2013) as the MOE currently does not have wind energy guidelines specific to assessing bats for wind energy projects, and therefore those established by AEP were used as a reference.

Overall, bat activity varied by species at each monitoring station. Over the Alberta AEP recommended monitoring period (August 1 – September 10), 2.0 migratory bat passes per detector night were recorded at High detectors in 2015 and 2.4 migratory bat passes per detector night were recorded at High detectors in 2016. *Myotis* species and the big brown/silver-haired bat grouping were the most common species/species grouping of bats observed during all three monitoring periods (fall 2015, spring 2016 and fall 2016). The main contributing factors to observed bat activity levels in the Project area appear to be topography and habitat.

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Abbreviations

ABAT	Alberta Bat Action Team
ACA	Alberta Conservation Association
BluEarth	BluEarth Renewables Inc.
CF	Compact Flash
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
ESRD	Alberta Environment and Sustainable Resource Development (Currently Alberta Environment and Parks)
LLD	Legal Land Description
km	Kilometres
km/h	Kilometres per hour
m	Metres
ms	Millisecond
m/s	Metres per second
MET	Meteorological
MNRF	Ontario Ministry of Natural Resources and Forestry
PVC	Polyvinyl chloride
MOE	Saskatchewan Ministry of Environment
SARA	<i>Species at Risk Act</i>
SK	Saskatchewan
SRD	Alberta Sustainable Resource Development (Currently Alberta Environment and Parks)
Stantec	Stantec Consulting Ltd.
UTM	Universal Transverse Mercator

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Introduction

1.0 INTRODUCTION

BluEarth Renewables Inc. (BluEarth) is proposing to develop a wind energy project (the Project) in the rural municipalities of Hart Butte (RM. No. 11) and Happy Valley (RM. No. 10), Saskatchewan. The Project is located approximately 20 km east of the village of Coronach, in south-central Saskatchewan, and approximately 14 km north of the US/Canada border (Figure 2-1). The Project is proposed to be up to 200 MW with a maximum of 50 wind turbine generators (WTGs). BluEarth is applying for 60 WTG locations, including 10 alternative locations. The Big Muddy Valley borders the Project area to the north. The proposed Project area is located on private and leased crown land consisting of native and cultivated lands.

In 2015, Stantec Consulting Ltd. (Stantec) conducted a pre-feasibility assessment identifying bat mortality as a potential Project effect. As a result, Stantec recommended acoustic bat activity surveys be conducted as part of a comprehensive pre-feasibility evaluation (Stantec 2015). Two rounds of fall and one round of spring acoustic monitoring survey were therefore conducted from 2015 to 2016. This report summarizes the results of the 2015 and 2016 bat acoustic surveys and will contribute to the assessment of potential mortality risk in the Project area.

1.1 BACKGROUND

In recent years, bat collision fatality rates at wind energy facilities, particularly for migratory tree-roosting bats, have become an increasing concern (Arnett et al. 2008, Arnett and Baerwald 2013, BSC et al. 2017, Zimmerling and Francis 2016). Fatalities occur when bats are struck by rotating turbine blades and to a lesser extent by barotrauma due to a sudden drop in air pressure around the moving blade (Baerwald et al. 2008, Cryan and Barclay 2009). Recent studies have determined barotrauma to be of less importance (approximately 10% of fatalities) than originally thought for causes of fatality (Grodsky et al. 2011, Rollins et al. 2012). Whole project and individual turbine siting in relation to bat activity levels is likely an important factor influencing potential bat fatality rates (Baerwald and Barclay 2011).

Current research shows that most bat fatalities at wind power developments occur during fall migration. In most studies, fatalities of migratory species are higher than resident species, particularly in the prairie biome (Arnett et al. 2008, Arnett and Baerwald 2013, BSC et al. 2017). Few wind facilities exist in SK, and mortality monitoring reports are not available in the public domain. However, experience regarding bat and wind turbine interactions at existing wind power facilities in Alberta appear to be similar to those identified across North America, and may be representative of SK interactions. In Alberta, during the fall migration (July 15 to September 30) bat fatalities consist mainly of hoary and silver-haired bats (Baerwald et al. 2008, Lausen et al. 2010). Estimated corrected fatality rates of bats in Alberta have been determined for a variety of wind facilities averaging 7.31 ± 1.32 bats/turbine/year (BSC et al. 2017). Potential factors increasing the susceptibility of bats to collisions with turbines during migration include: abundance of individuals in flight, higher flight altitudes than resident bats, lower use of

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echolocation during migration, foraging differences between migrants and residents, and attractiveness of turbines to bats as potential resources for feeding, social, and mating opportunities (Cryan and Barclay 2009).

Geography may also play a role in bat activity levels, and therefore with collision fatality risk. Migration routes may be associated with the availability of suitable roosting sites (i.e., trees) and landmarks (e.g., river valleys), resulting in higher bat activity levels and fatality risk in those areas (Lausen et al. 2010). Activity levels of resident bats (*Myotis* species) are correlated with suitable roosting sites and prey availability; though they tend to feed at lower altitudes and are much less susceptible to collision strikes than migratory bat species.

1.2 REGULATORY CONTEXT

Bats are protected under the *Wildlife Act* of Saskatchewan, and under the *Species at Risk Act* for those species listed as endangered in Canada. As no Saskatchewan guidelines pertaining to bats exist, Alberta guidelines were used as context to the potential magnitude of effects. MOE regularly directs proponents to AEP guidance and survey protocols where none have been published in Saskatchewan, and previous experience with the MOE pertaining to assessment of effects to bats from wind developments in Saskatchewan confirms their reliance on the AEP guidance.

The *Bat Mitigation Framework for Wind Power Development* (ESRD 2013) establishes guidelines for interpreting pre-construction acoustic bat monitoring data for potential mitigation. This guidance document indicates potential fatality rates and acceptable activity levels based on bat passes per elevated (> 30 m height) detector night during the period identified in Lausen et al. (2010) for use in evaluating sites and applying mitigation. The thresholds of bat activity identified in ESRD (2013) are:

- Less than 1 migratory bat pass per detector night as potentially acceptable.
- 1 to 2 migratory bat passes per detector night as potentially requiring mitigation such as alternative siting locations and reduced turbine height or rotor length.
- Greater than 2 migratory bat passes per detector as likely requiring mitigation such as alternative turbine locations and changing cut-in speeds to reduce bat fatality.

However, the correlation used to derive these threshold guidelines was relatively weak ($r^2 = 0.31$, $P = 0.023$) and based on only five data points (Baerwald and Barclay 2009); moreover, other studies have not been able to reproduce a statistically significant relationship with greater datasets. This suggests that pre-construction survey data should be interpreted carefully.

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2.0 METHODS

To design the bat activity studies for the Project, methods provided in Lausen et al. (2010) were followed. This document provides methods for acoustic bat surveys for consistent sampling, including a fall survey period from August 1 to mid-September, survey timing, and detector placement based on project scale and landscape.

The fall monitoring periods for the Project began earlier and extended later than the Alberta Guideline Period (August 1 to September 10) recommended in the *Bat Mitigation Framework for Wind Power Development* (ESRD 2013). The longer fall monitoring periods were completed based on direction from the SK Ministry of Environment (MOE) for a previous bat activity monitoring program (MOE, Riley Schmidt, MOE, 2014, pers. comm).

Seasonality is also known to be a factor in bat activity, with higher levels of bat activity found in the fall. The 2017 final Wildlife Directive for Alberta Wind Energy Projects requires one year of spring and fall bat surveys. In addition, MOE has previously requested spring bat activity data for wind developments. Therefore, acoustic surveys during the spring monitoring period (May) were conducted to determine if seasonality is a major contributing factor in the Project area.

2.1 EQUIPMENT

A total of 11 AnaBat SD1 CF Bat Detectors (Titley Electronics) were installed at seven stations within the Project area. All detectors were powered by two HAZE or PowerKing (12 Volt 18 Ah) sealed lead acid batteries connected in parallel. To prevent exposure to the elements, the detectors were housed in an 8x8x4 cm PVC junction box enclosure, with an accompanying microphone pointing out of the junction box enclosure through a PVC elbow. To increase data collection quantity, division ratios were set to 8. Sensitivity was adjusted to the highest level, which did not produce ambient static during set up (below the squelch zone). Data were recorded and stored on compact flash (CF) cards. Detectors were programmed to record sound from 1900 hours to 0700 hours each night.

The bat call data was downloaded from the CF cards using CFC read storage ZCAIM interface (version 4.4u). The data collected were transcribed using the latest available software (AnalogW Version 4.2g).

2.2 MONITORING STATIONS

Two detectors were installed on each of the Project's four Meteorological Towers (MET) Towers; one at a low elevation (Low detector) (2 m) and one at a high elevation (High detector) (45-49 m) as listed in Table 2-1 and shown on Figure 2-1. High detectors were installed with a pulley system developed by Stantec; heights were verified using a range finder. The power cable connecting High detectors to the battery source was secured to rope using zip ties and

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attached at the tower's base near the weather-proof battery container. High detectors were installed to provide information on bat activity within the likely turbine rotor-swept altitude, as ground (i.e., Low) detectors only reliably collect data on bats travelling from ground level up to approximately 30 m height (Titley Scientific 2015).

Ground level detectors (Ground 1, 2, and 3) were installed at three additional ground stations (Figure 2-1, Table 2-1 Site Information and Photos of the Outlaw Trail Bat Monitoring Stations) to better understand the spatial distribution of bat activity of the Project area and to further inform turbine siting. To maintain consistency in data collection and allow data comparison, the three ground detectors were installed using the same parameters (i.e., height, orientation and detector settings) as the four MET Low detectors. The ground stations were sited between MET Towers to provide even coverage of the Project area in locations similar to where turbines might be constructed (Figure 2-1). In 2016, Detector Ground 2 was relocated to provide a better coverage following changes in to the Project target lands; all other detector locations did not change during the three rounds of surveys.

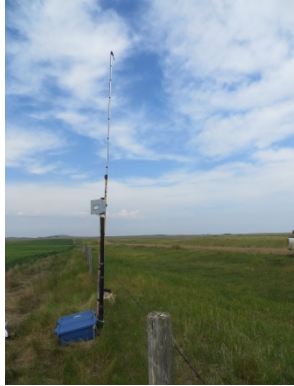


Based on data from the Moose Jaw airport, prevailing winds in the region originate from the northwest (Aviador 2016). In the spring, bats are expected to migrate from the south, and in the fall, the north, but taking into account the prevailing wind direction, and for consistency, all detectors were oriented to the southeast in the spring and northeast in the fall. Orienting the microphones perpendicular to the prevailing wind direction, and assumed bat migration direction, provides a balance that increases potential bat detections while reducing interfering noise caused by prevailing winds.

Table 2-1 Site Information and Photos of the Outlaw Trail Bat Monitoring Stations

Monitoring Station	Location (LLD, UTM)	Site / Setup Description	Land Cover	Photo
Ground 1	NE-1-3-25-W2M; NAD 83, 13U, 482435, 5447608	Attached to a fence line with temporary PVC pipe at a height of approximately 2 m. Located north of road.	Native prairie to northwest. Cultivation to east and south. Treed coulee 700 m to north and extends 2 km north into badlands. Farmstead and treed wetland 700 m to southeast.	Photo orientation: facing west 

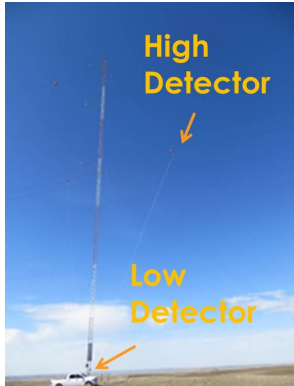
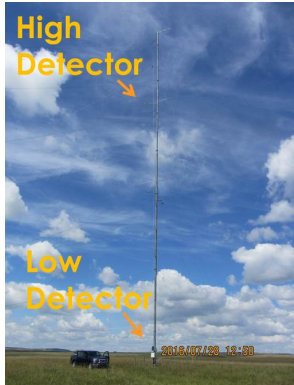
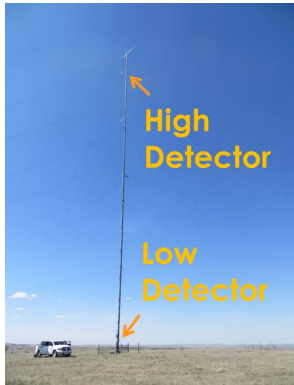
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Monitoring Station	Location (LLD, UTM)	Site / Setup Description	Land Cover	Photo
Ground 2 (2015)	NW-30-02-24-W2M; NAD 83, 13U, 481625, 5450009	Attached to a fence line with temporary PVC pipe at a height of approximately 2 m. Located on south side of road.	Cultivated grain to south and native prairie to north. Treed coulees approximately 300 m to southeast, extensive coulees and badlands beginning 800 m to east. Wetland 400 m to northwest.	Photo Orientation: facing west 
Ground 2 (2016)	NE22-2-25-W2MNAD 83, 13U, 480534, 5443504	Attached to a fence line with temporary PVC pipe at a height of approximately 2 m. Located 50 m south of road.	Surrounded by cultivation, a small patch of trees approximately 1 km to southwest.	Photo Orientation: facing north 
Ground 3	NW-3-3-24-W2M; NAD 83, 13U, 487828, 5447719	Attached to a fence line with temporary PVC pipe at a height of approximately 2 m. Located 50 m south of road.	Native prairie to east, cultivated flax to west and south. A few small patches of shrubs approximately 500 m to north. Wetlands approximately 250 m to northwest and 600 m to southwest.	Photo Orientation: facing north 

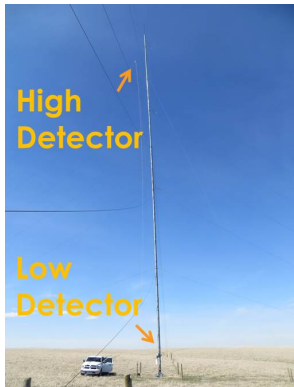
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Monitoring Station	Location (LLD, UTM)	Site / Setup Description	Land Cover	Photo
MET 1 (Met 1 High and Met 1 Low) MET Tower 3012	SW-15-03-25-W2M; NAD 83, 13U, 478248, 5450315	2 detectors were attached to the MET Tower: approximately 2 m and 45 m above ground	Located within cultivated field. Wetlands approximately 200 m to northwest. Treed coulees approximately 700 m to southwest. Patches of trees 350 m to southeast.	Photo Orientation: facing north 
MET 2 (Met 2 High and MET 2 Low) MET Tower 3010	NW-30-02-24-W2M; NAD 83, 13U, 485163, 5444624	2 detectors were attached to the MET Tower: approximately 2 m and 47 m above ground	Located within cultivated field. Slopes with native prairie approximately 200 m to east. Shrub shelter belt 400 m to north and treed shelterbelt 800 m to south.	Photo Orientation: facing east 
MET 3 (Met 3 High and Met 3 Low) MET Tower 3008	SE-8-3-24-W2M; NAD 83, 13U, 485869, 5449091	2 detectors were attached to the MET Tower: approximately 2 m and 49 m above ground	Located within native prairie, treed coulee 200 m to north, extends to badlands 900 m to north. Shrubby coulee approximately 400 m to south, cultivated field to the east.	Photo Orientation: facing west 

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Monitoring Station	Location (LLD, UTM)	Site / Setup Description	Land Cover	Photo
MET 4 (Met 4 High and Met 4 Low) MET Tower 3011	SW-2-3-24-W2M; NAD 83, 13U, 490688, 5447060	2 detectors were attached to the MET Tower: approximately 2 m and 49 m above ground	Located within hay / tame pasture field. Native prairie approximately 200 m to north and south. Wetlands 500 m to northwest.	Photo Orientation: facing west 

2.2.1 Equipment Status Visits and Monitoring Issues

Electronic monitoring equipment can experience malfunctions and other technical issues. While maintenance visits were executed every two weeks to verify equipment function and replace batteries, malfunctions and partial data loss may occur during the interval between maintenance visits. These malfunctions are typically attributed to the following events:

- Lightning strikes: MET towers are susceptible to lightning strikes and detectors mounted to MET towers also become subject to frequent lightning strikes. These events usually result in a system shutdown of the detectors and possibly to data loss in the memory cards. This is the most common source of technical issues with acoustic bat detectors.
- Battery failure: battery maintenance and predictions of charge capacity of batteries used to power the detectors helps to prevent battery failure. However, moisture, extreme temperatures and other environmental conditions may cause premature battery fatigue. If batteries fall below a minimum charge capacity, detectors may fail to record for a period of time.
- Detector failure: technical issues with detectors, such as moisture or short-circuiting, may cause detector units to fail.
- Memory card capacity: while maximum capacity memory cards are used in the detectors, ambient noise may sometimes cause sound recording and fill memory cards, thus limiting the period when data may be collected.

The following summarizes the equipment data visits and any technical issues encountered during the three monitoring periods.

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Fall 2015

Five stations (seven detectors) began collecting data on July 14, 2015 at 1900 hours (Ground 1, 2, and 3, MET 1 High, MET 1 Low, MET 2 High, and MET 2 Low), and the remainder on July 15, 2015 at 1900 hours (MET 3 High, MET 3 Low, MET 4 High, MET 4 Low). Equipment status checks were performed on July 30, August 12, September 1, and September 16, 2015. During these visits the CF cards and HAZE batteries were exchanged for empty cards and charged batteries. Data were retrieved from the cards and stored for interpretation at a future date. All detectors were removed on October 1, 2015.

Detectors Ground 2, Ground 3, MET 1 Low, MET 3 Low, MET 4 Low and MET 4 High were in operation for the entire monitoring period and complete datasets were collected. Five detectors malfunctioned during the fall 2015 monitoring period, accounting for approximately 8% of the total dataset. Malfunctions are summarized below and in Appendix A:

- Ground 1 did not collect data for 15 nights from September 1 to 15 due to card malfunctions
- MET 2 Low did not collect data for 14 nights from September 2 to 15 due to card malfunctions
- MET 1 High did not collect data for 23 nights from July 27 to 30, Aug 5 to 11, August 31, or September 4 to 14. due to unknown causes
- MET 2 High did not collect data for 14 nights from July 28 to 30 and August 13 to 23 due to unknown causes (possibly lightning)
- MET 3 High did not collect data for three nights from July 27 to 29 due to unknown causes (possibly lightning)

It is unknown as to why some of these detectors malfunctioned, but is likely due to lightning strikes. Some data malfunctions occurred during peak activity periods, particularly for MET 1 High and MET 2 High. However, the overall bat activity is calculated as bat passes per detector night, based on the number of operational nights during the monitoring period, and would not be biased by these malfunctions. Though this resulted in reduced sample size, with 11 stations, ample data were collected for the Project area despite the malfunctions.

Spring 2016

Three stations (four detectors) began collecting data on April 29, 2016 at 1900 hours (Ground 1, Ground 2, MET 1 High, and MET 1 Low), and the remainder on April 30, 2016 at 1900 hours (Ground 3, MET 2 High, MET 2 Low, MET 3 High, MET 3 Low, MET 4 High, and MET 4 Low). Equipment status checks were performed on May 15. During this visit the CF cards and HAZE batteries were exchanged for empty cards and charged batteries. Data was retrieved from the cards and stored for interpretation at a future date. Detectors MET 4 High and MET 4 Low were

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removed on June 6. Ground 1, Ground 2, Ground 3, MET 2 Low and MET 2 High were removed on June 7, and MET 1 High, MET 1 Low, MET 3 High and MET 3 Low were removed on June 9.

Detectors Ground 1, Ground 2, Ground 3, MET 1 Low, MET 1 High, Met 2 High, MET 3 Low, MET 3 High, and Met 4 High were in operation for the entire monitoring period and complete datasets were collected. Two detectors malfunctioned during the spring 2016 monitoring period, accounting for approximately 6% of the total dataset. Malfunctions are summarized below and in Appendix A:

- MET 2 Low did not collect data for 13 nights from May 3 to 15, due to water leakage damaging the HAZE batteries
- MET 3 Low did not collect data for 6 nights from May 10 to 15 due to water leakage damaging the HAZE batteries

Though these two malfunctions resulted in reduced sample size at two locations, with 11 stations ample data were collected for the Project area despite the malfunctions.

Fall 2016

All seven stations (eleven detectors) began collecting data on July 28, 2016 at 1900 hours. Equipment status checks were performed on August 18 and August 31. During these visits the CF cards and HAZE batteries were exchanged for empty cards and charged batteries. Data was retrieved from the cards and stored for interpretation at a future date. All detectors were removed on September 13, 2016.

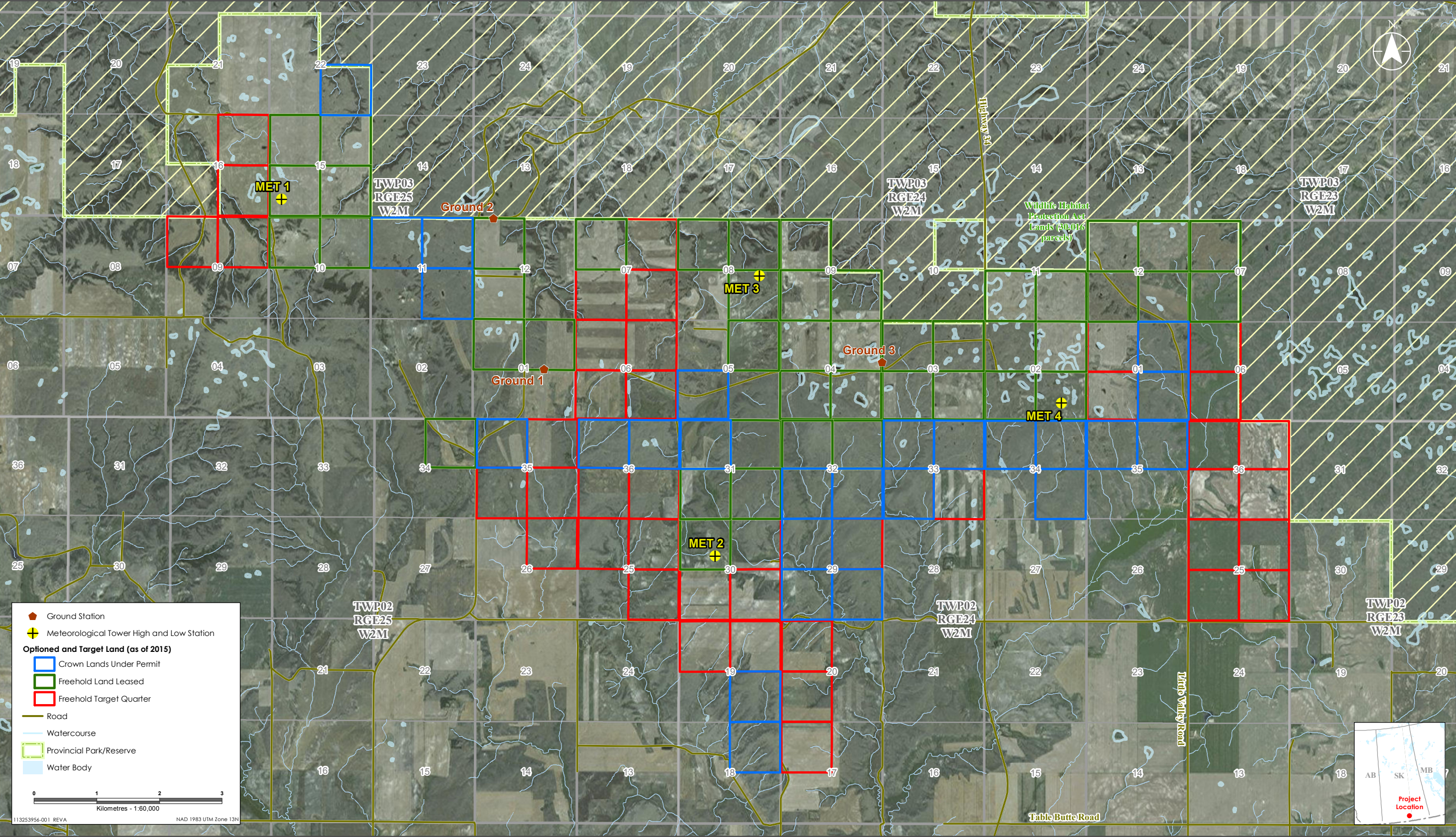
Detectors Ground 1, Ground 2, Ground 3, MET 1 Low, MET 2 Low, and Met 3 Low were in operation for the entire monitoring period and complete datasets were collected. Five detectors malfunctioned during the fall 2015 monitoring period, accounting for approximately 16% of the total dataset. Malfunctions are summarized below and in Appendix A:

- MET 1 High did not collect data for 23 nights from August 7 to 17, August 23 to 30 and September 10 to 13 due to lightning strikes.
- MET 2 High did not collect data for 19 nights from August 7 to 17 and August 23 to 30 due to lightning strikes.
- MET 3 High did not collect data for 14 nights from August 8 to 17 and September 10 to 13 due to lightning strikes.
- MET 4 Low did not collect data for 8 nights from August 8 to 17 due to card malfunctions.
- MET 4 High did not collect data for 20 nights, from August 7 to 17 and September 5 to 13 due to power failure, possibly due to lightning strikes.

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Some data malfunctions occurred during peak activity periods, particularly for the four high detectors. However, activity is relatively constant during the peak migration period, so using the average of the data from that period, regardless of the gaps due to malfunctions, will be representative of the activity levels.



2.3 ANALYSIS

2.3.1 Bat Echolocation Analysis

The unit of measure selected for analysis is a bat call sequence, which is expressed as a bat pass and can be used as a relative measure of bat activity. Bat passes per detector night is used as the relative measure of bat activity and is the primary measurement for reporting activity rates. A limitation to using bat passes as a metric is that it is unknown if multiple passes are attributed to one or several active bats in the area (i.e., one individual making multiple passes near the detector). However, standard practice is to use ≥ 2 seconds between call sequences to define a bat pass (Loeb et al. 2015). Echolocation analysis to determine the number of bat passes and identify passes to species was conducted using AnlookW (version 4.1 t). Data were compiled using Microsoft Excel and outputs modeled using R (version 3.2.2). Site-specific data for sunrise and sunset were generated using Anasun (version 1.0a). Bat calls and passes were visually distinguished using reference data from:

- Acoustics Workshop: Analysis of AnaBat files (Cori Lausen 2008, pers. comm.)
- Acoustics Techniques Course: Reference Bat Calls (Cori Lausen 2011, pers. comm.)
- Published literature
- Stantec bat call identification key

While automatic bat identification algorithms (e.g. Kaleidoscope Pro) exist and, in some cases, provide a more precise identification than manual identification, previous experience has indicated that these types of software do not completely analyze an entire dataset, and have a tendency to not recognize low quality calls and duplicate bat passes. Manual identification using AnlookW was therefore used to ensure a complete analysis of the dataset.

Where possible bats were identified to species, or grouping based on several parameters: frequency (minimum), duration, slope, and shape. Considerable regional variation can occur with the calls of a species based on habitat and other bat species in the area (Cori Lausen, 2008, pers. comm.); therefore, parameters from western Canada records were relied upon more heavily.

Though detector setup methods such as microphone orientation and sensitivity reduce extraneous noise collected (see Section 2.1), large quantities of unwanted noise data can be collected by the detectors. Due to similarities between species echolocation parameters and/or degraded call quality from extraneous noise, some bats cannot be conclusively identified to species and were therefore grouped together. Due to the potential for call similarities, there is some uncertainty in differentiating calls of big brown and silver-haired bats, eastern red and little brown myotis, and bat species in the *Myotis* genus. In most cases, these groupings were not identified to species conclusively.

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Considering the bat species in Saskatchewan (see Section 3.1) and the inability to identify all bat passes to species due to call quality and overlapping call parameters between species, the following five groupings were used for species classification in this study when individual species classification was not possible:

- **Low frequency bat:** includes big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*)
- **High frequency bat:** includes eastern red bat (*Lasiurus borealis*), long-eared bat (*Myotis evotis*), little brown myotis (*Myotis lucifugus*) and western small-footed bat (*Myotis ciliolabrum*)
- **Big brown bat or silver-haired bat**
- **Eastern red bat or little brown myotis**
- **Myotis species:** includes long-eared bat, little brown myotis, and western small-footed bat

Based on comparisons of echolocation results and fatality search results at a number of wind development projects in southern Alberta by Baerwald et al. (2008) and Baerwald and Barclay (2009), bat passes identified into the big brown/silver-haired grouping are likely to be mainly silver-haired bats. Likewise, the low frequency bat grouping is expected to be predominantly silver-haired and hoary bats.

The majority of bat fatalities at wind energy development sites in North America involve migratory species (Arnett and Baerwald 2013, Zimmerling and Francis 2016); therefore, migratory bats were considered as an additional grouping for this assessment. Three bat species known to occur within the Project area are considered migratory: hoary, eastern red and silver-haired bats. As such, the migratory bat grouping includes the three migratory bat species and all individuals within the low frequency bat, big brown/silver-haired bat, and eastern red/little brown myotis groupings. Grouping migratory bats in this manner provides the most conservative estimate of the maximum potential migratory bat activity within the Project area.

3.0 RESULTS AND DISCUSSION

3.1 BAT SPECIES IN THE PROJECT AREA

Eight species of bat are known to occur in Saskatchewan, seven of which have the potential to occur within the Project area (Table 3-1). The distribution data for Saskatchewan's bats indicate that the northern myotis, a non-migratory species of bat, is not expected to occur in the Project area (Caceres and Barclay 2000, BCI 2012). All seven of the possible bat species may potentially breed within the Project area as suitable terrain and vegetation is present.

All seven bat species potentially occurring in the Project area were identified by call, and therefore confirmed as occurring in the Project area. Species identified using manual identification are: eastern red bat, hoary bat, silver-haired bat, little brown myotis, long-eared myotis, western small footed myotis. Big brown bat was confirmed during the fall 2015 analysis.

Little brown myotis are the most abundant and widespread bat species in North America (COSEWIC 2013) and likely make up the majority of the Myotis species grouping observations. While little brown myotis are currently abundant in Saskatchewan, the species is listed as Endangered under the SARA (ECCC 2016) due to white-nose syndrome, which is currently decimating populations in eastern North American.

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Table 3-1 Bat Species With Potential to Occur in the Project Area

Common Name	Scientific Name	*SRank ¹	Wildlife Act ²	COSEWIC Status ³	SARA Status ⁴	Expected to Breed in the Project area	Migratory Bat
Big brown bat	<i>Eptesicus fuscus</i>	S5	N/A	N/A	N/A	Yes (roosts in buildings, tree cavities, rock crevices)	No
Silver-haired bat	<i>Lasionycteris noctivagans</i>	S5B	N/A	N/A	N/A	Yes (roosts in foliage)	Yes
Eastern red bat	<i>Lasiurus borealis</i>	S4B	N/A	N/A	N/A	Yes (roosts in foliage)	Yes
Hoary bat	<i>Lasiurus cinereus</i>	S5B	N/A	N/A	N/A	Yes (roosts in tree cavities)	Yes
Western small-footed bat	<i>Myotis ciliolabrum</i>	S2S3	N/A	N/A	N/A	Yes (roosts in rock crevices; associated with badlands along river valleys)	No
Little brown myotis	<i>Myotis lucifugus</i>	S4	N/A	Endangered	Endangered (Schedule 1)	Yes (roosts in buildings, tree cavities, rock crevices)	No
Long-eared bat	<i>Myotis evotis</i>	S2	N/A	N/A	N/A	Yes (roosts in buildings, tree cavities, rock crevices)	No
<p>SOURCES: ¹ NatureServe (2012), ²MOE (2016), ³ COSEWIC (2016), ⁴ ECCC (2016) S Rank Identifies subnational conservation rank (for Saskatchewan): S1: critically imperiled, S2: imperiled, S3: vulnerable, S4: Apparently Secure; S5: Secure; 2 ranks (S2S3) indicates a possible range of status; B refers to the Saskatchewan breeding population only.</p>							

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3.2 BAT ACTIVITY LEVELS

Although this study uses Alberta's guidelines (AEP 2016), which states that pre-construction migratory bat activity is positively correlated to post-construction mortality rates, the American Wind Wildlife Institute reports that the ability to predict collision risk for birds and bats from activity recorded by radar and acoustic detectors, respectively, remains elusive (AWWI 2015). To date studies have not been able to develop a quantitative model enabling reasonably accurate prediction of collision risk from pre-construction acoustic surveys (e.g., Hein et al. 2013).

3.2.1 Monitoring Summary

Fall 2015

During the 2015 fall monitoring period, migratory bat activity rates for all detectors during the full monitoring period (July 14 – September 30) ranged from 0.8 to 5.2 migratory bat passes per detector night, with an average of 2.4 migratory bat passes per detector night. During this same monitoring period, total bat activity rates for all bats in the Project area from all detectors combined ranged from 0.8 to 12.7 bat passes per detector night, with an average of 6.1 bat passes per detector night (Table 2-1).

During the Alberta Guideline period the migratory bat activity rate was recorded as 2.0 passes per detector night at elevated detectors, while non-migratory bats was only 0.3 (Table 2-1). Generally, non-migratory bat species showed higher activity at low detectors compared to migratory bat species, which is consistent with known foraging behavior of these species.

Although there was higher total bat activity recorded at the low detectors, the higher proportion of migratory bat activity at the high detectors (Figure 3-1) in the potential rotor-swept area supports observations that most bat fatalities at wind projects are migratory bats, as non-migratory bats are more active at lower altitude (Arnett et al. 2008), as observed for this Project.

Overall, Ground 2 recorded the highest levels of both total and migratory bat activity in the Project area (Figure 3-1), with 18.0 total bat and 6.6 migratory bat passes per detector night during the Alberta Guideline Period (August 1 – September 10) and 12.7 total bat and 5.2 migratory bat passes per detector night during the full monitoring period. This was likely due to the proximity to the adjacent forested coulees (Figure 2-1). In comparison, MET 2 High had the lowest levels of both total and migratory bat activity, both being 1.2 passes per detector night (total and migratory) for the Alberta Guideline period, and 0.8 passes per detector night (total and migratory) for the full monitoring period (Figure 3-1). Migratory bat activity peaked on several nights between July 28 and August 28, 2015, for all detectors combined. The highest level of activity was observed on the night of August 21 with 13.3 migratory bat passes per detector night (Figure 3-1, Appendix B). Total bat activity was also highest on the night of August 21 with 19.7 bat passes per detector night (Figure 3-1, Appendix B).

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Table 3-2 Summary of Bat Activity at Each Monitoring Station During the Fall 2015 Monitoring Period

	Ground 1	Ground 2 ¹	Ground 3	MET 1 Low	MET 1 High	MET 2 Low	MET 2 High	MET 3 Low	MET 3 High	MET 4 Low	MET 4 High	Total
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	11
Detector Height Above Ground (m)	2	2	2	2	45	2	47	2	49	2	49	N/A
Number of Nights of Operation	64	79	79	79	56	65	67	78	75	78	78	798
Alberta Guideline Period Nights of Operation Aug 1 to Sep 10	31	41	41	41	26	32	31	41	41	41	41	407
Number of Detector Hours	768	948	948	672	948	804	780	900	936	936	936	9,576
Number of Raw Data Files	8,566	5,026	1,615	3,225	5,566	55,745	3,114	32,541	16,613	17,690	2,112	151,813
Number of Recorded Total Bat Passes	585	1,003	646	486	137	321	56	571	222	686	116	4,829
Number of Recorded Migratory Bat Passes	235	413	185	120	115	154	55	199	203	194	81	1,954
Alberta Guideline Period Number of Recorded Total Bat Passes (Aug 1 to Sep 10)	384	736	511	358	82	248	38	313	170	526	96	3,462
Alberta Guideline Period Number of Recorded Migratory Bat Passes (Aug 1 to Sep 10)	184	270	123	66	81	122	37	156	97	143	67	1,346
Alberta Guideline Period Migratory Bat Passes Per Detector Night (Aug 1 to Sep 10)	5.9	6.6	3.0	1.6	3.1	3.8	1.2	3.8	2.4	3.5	1.6	3.3 2.0 ²
Alberta Guideline Period Total Bat Passes Per Detector Night (Aug 1 to Sep 10)	12.4	18.0	12.5	8.7	3.2	7.8	1.2	7.6	4.1	12.8	2.3	8.5
Migratory Bat Passes Per Detector Night	3.7	5.2	2.3	1.5	2.1	2.4	0.8	2.6	2.7	2.5	1.0	2.4 1.6 ²
Total Bat Passes Per Detector Night	9.1	12.7	8.2	6.2	2.4	4.9	0.8	7.3	3.0	8.8	1.5	6.1
NOTES:												
1- Detector Ground 2 was relocated during the 2016 surveys (Figure 2-1)												
2- Average based on high detectors												

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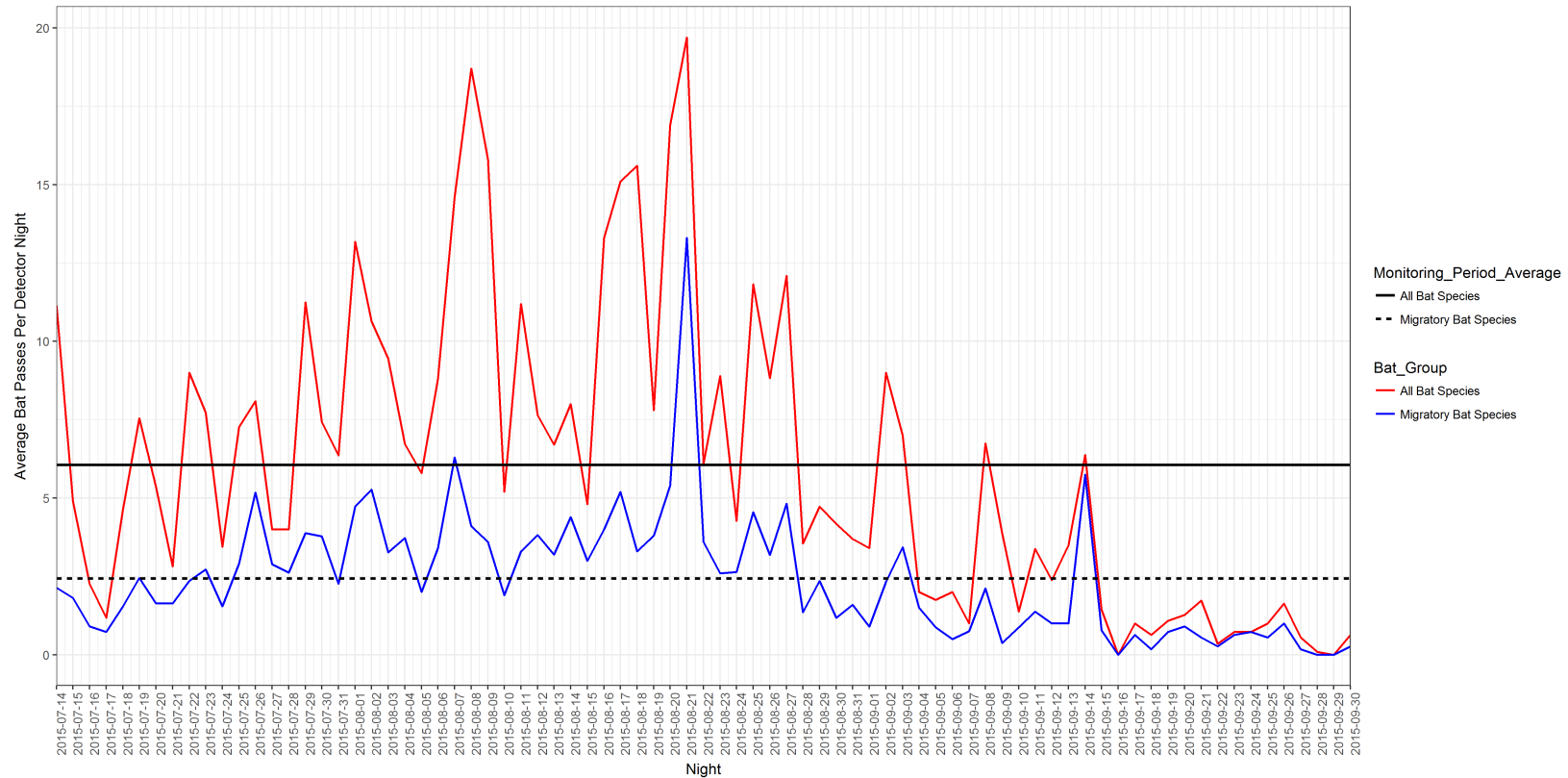


Figure 3-1 Bat Passes per Detector Night (Migratory and Total) During the 2015 Fall Monitoring Period

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Spring 2016

During the 2016 spring monitoring period, migratory bat activity rates for all detectors ranged from 0.1 to 0.7 migratory bat passes per detector night, with an average of 0.3 migratory bat passes per detector night. Total bat activity in the spring ranged from 0.1 to 6.5 bat passes per detector night, with an average of 1.4 bat passes per detector night (Table 3-3). Generally, non-migratory bat species showed higher activity at low detectors (1.8 passes per detector night) compared to elevated detectors where a rate of 0.01 passes per detector night was recorded.

Overall, MET 3 Low recorded the highest levels of both total and migratory bat activity in the Project area (Figure 3-2), with 6.5 total bat and 0.7 migratory bat passes per detector night observed during the 2016 Spring monitoring period. This is possibly due to its proximity to treed coulees.

Migratory bat activity peaked on several nights over the spring monitoring period with the highest level of activity observed on the night of June 4 with 1.2 migratory bat passes per detector night (Figure 3-2, Appendix A). Total bat activity was also highest on the night of June 4 with 4.5 bat passes per detector night (Figure 3-2, Appendix A).

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Table 3-3 Summary of Bat Activity at Each Monitoring Station During the Spring 2016 Monitoring Period

	Ground 1	Ground 2 ¹	Ground 3	MET 1 Low	MET 1 High	MET 2 Low	MET 2 High	MET 3 Low	MET 3 High	MET 4 Low	MET 4 High	Total
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	11
Detector Height Above Ground (m)	2	2	2	2	45	2	47	2	49	2	49	N/A
Number of Nights of Operation	39	39	38	40	40	25	38	33	39	37	37	405
Number of Detector Hours	468	468	456	480	480	300	456	396	468	444	444	4,860
Number of Raw Data Files	771	2525	3887	6780	4608	3442	2635	1968	6504	12320	5798	51,238
Number of Recorded Total Bat Passes	34	9	91	73	10	8	3	213	13	109	4	567
Number of Recorded Migratory Bat Passes	17	7	11	16	8	5	3	24	13	9	4	117
Migratory Bat Passes Per Detector Night	0.4	0.2	0.3	0.4	0.2	0.2	0.1	0.7	0.3	0.2	0.1	0.3 0.2 ²
Total Bat Passes Per Detector Night	0.9	0.2	2.4	1.8	0.2	0.3	0.1	6.5	0.3	2.9	0.1	1.4
NOTES: 1- Detector Ground 2 was relocated during the 2016 surveys (Figure 2-1) 2- Average based on high detectors												

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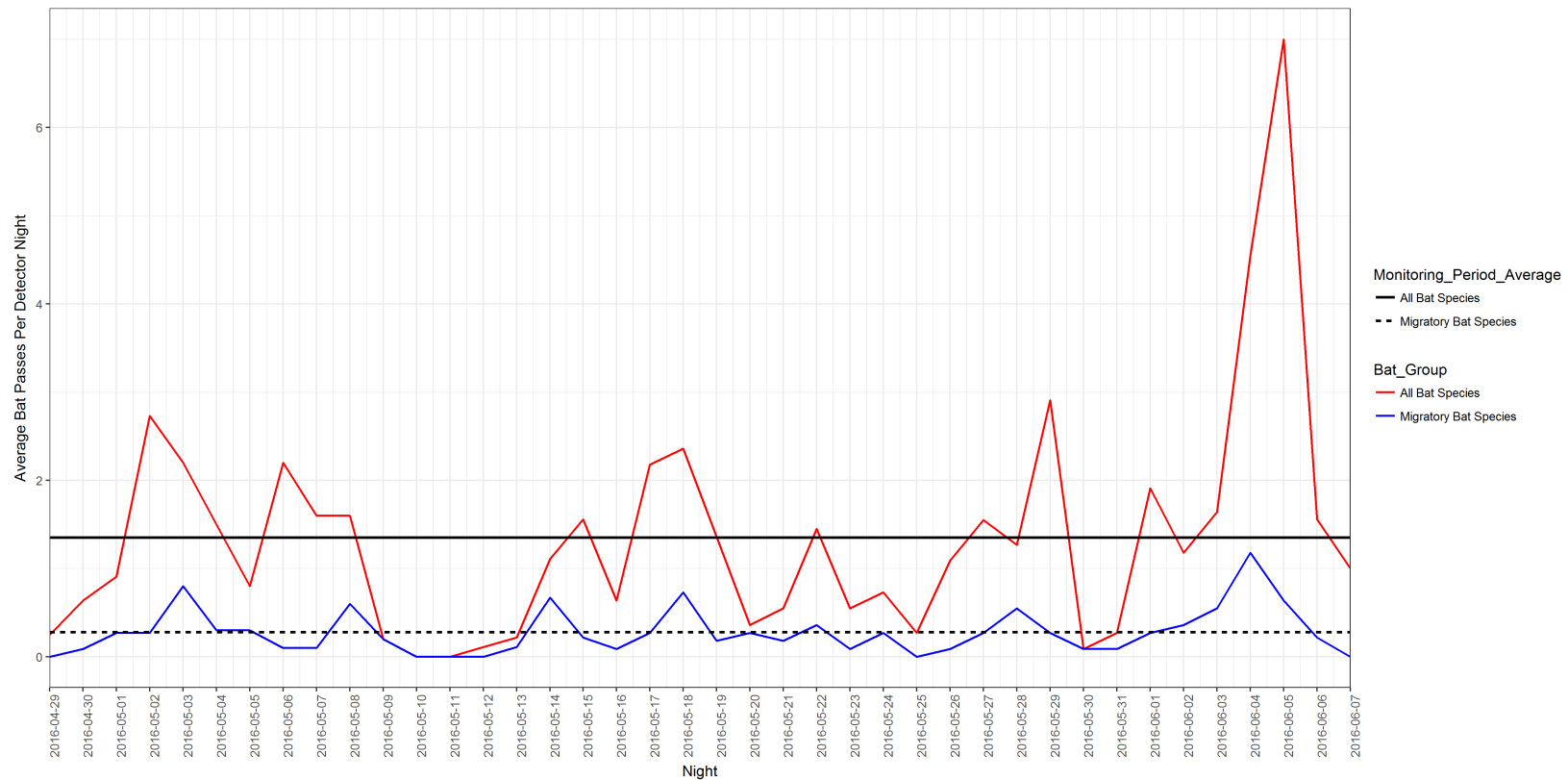


Figure 3-2 Bat Passes per Detector Night (Migratory and Total) During the 2016 Spring Monitoring Period

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Fall 2016

During the 2016 fall monitoring period, migratory bat activity rates for all detectors during the full monitoring period (July 28 – September 1) ranged from 1.1 to 3.8 migratory bat passes per detector night, with an average of 3.0 migratory bat passes per detector night. Total bat activity rates for fall 2016 ranged from 1.1 to 18.9 bat passes per detector night, with an average of 7.5 bat passes per detector night (Table 3-4).

During the Alberta Guideline period the migratory bat activity rate was recorded as 2.4 passes per detector night at elevated detectors, while non-migratory bats had rates of 0.5 passes per detector night (Table 3-4, Figure 3-3). Generally, non-migratory bat species had activity rates 18x higher at low detectors compared to elevated detectors, which is consistent with known foraging behavior of these species.

Although there was higher total bat activity recorded at the low detectors, there was a higher proportion of migratory bat activity at the high detectors (Figure 3-3) in the potential rotor-swept area, which supports observations that most bat fatalities at wind projects are migratory bats, as non-migratory bats are more active at lower altitude (Arnett et al. 2008).

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Table 3-4 Summary of Bat Activity at Each Monitoring Station During the Fall 2016 Monitoring Period

	Ground 1	Ground 2 ¹	Ground 3	MET 1 Low	MET 1 High	MET 2 Low	MET 2 High	MET 3 Low	MET 3 High	MET 4 Low	MET 4 High	Total
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	11
Detector Height Above Ground (m)	2	2	2	2	45	2	47	2	49	2	49	N/A
Number of Nights of Operation	48	48	48	48	25	48	29	48	34	40	28	444
Alberta Guideline Period Nights of Operation Aug 1 to Sep 10	43	43	43	43	22	43	24	43	31	35	25	395
Number of Detector Hours	576	576	576	576	300	576	348	576	408	480	336	5,328
Number of Raw Data Files	5,939	7,534	3,652	79,248	5,332	5,491	3,947	7,404	8,176	83,027	321	210,071
Number of Recorded Total Bat Passes	376	156	360	905	94	223	33	568	148	409	64	3,336
Number of Recorded Migratory Bat Passes	174	103	129	156	66	129	31	241	128	116	51	1,324
Alberta Guideline Period Number of Recorded Total Bat Passes (Aug 1 to Sep 10)	312	138	229	817	78	205	28	489	128	341	58	2,823
Alberta Guideline Period Number of Recorded Migratory Bat Passes (Aug 1 to Sep 10)	151	89	102	138	57	120	26	211	113	98	46	1,151
Alberta Guideline Period Migratory Bat Passes Per Detector Night (Aug 1 to Sep 10)	3.5	2.1	2.4	3.2	2.6	2.8	1.1	4.9	3.6	2.8	1.8	2.9 2.4 ²
Alberta Guideline Period Total Bat Passes Per Detector Night (Aug 1 to Sep 10)	7.3	3.2	5.3	19	3.5	4.8	1.2	11.4	4.1	9.7	2.3	7.1
Migratory Bat Passes Per Detector Night	3.6	2.1	2.7	3.2	2.6	2.7	1.1	5	3.8	2.9	1.8	3.0 2.4 ²
Total Bat Passes Per Detector Night	7.8	3.2	7.5	18.9	3.8	4.6	1.1	11.8	4.4	10.2	2.3	7.5
NOTES: 1- Detector Ground 2 was relocated during the 2016 surveys (Figure 2-1) 2- 2-Average based on high detectors												

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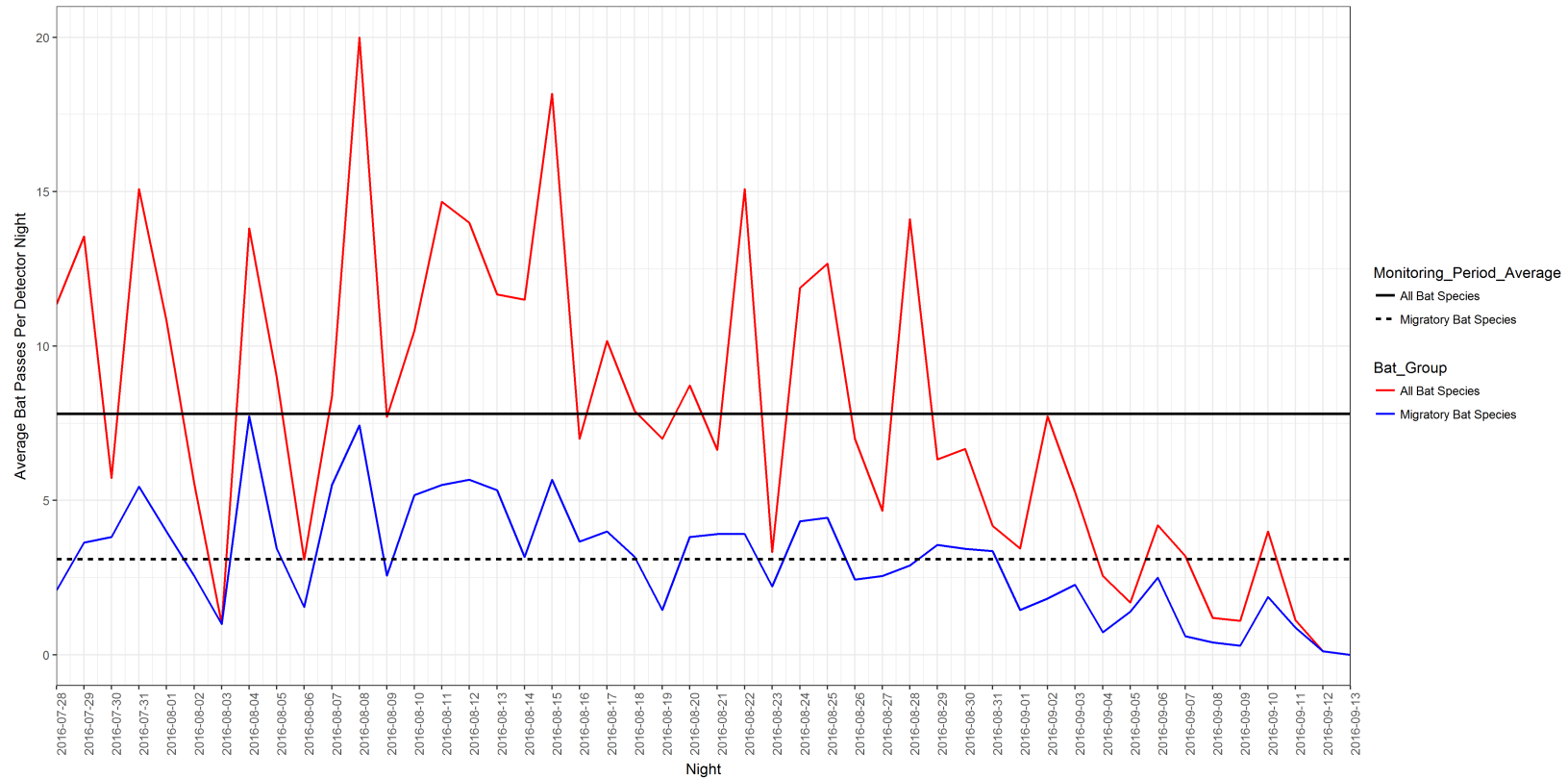


Figure 3-3 Bat Passes per Detector Night (Migratory and Total) During the 2016 Fall Monitoring Period

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3.2.2 Nightly Bat Activity Levels

Fall 2015

The highest levels of bat activity were recorded between 0300 and 0359 hours, with a total of 644 bat passes recorded, though bat activity was relatively even over the evenings between 2100 and 0459 hours (Figure 3-4). Both migratory and non-migratory activity was also relatively consistent between 2100 and 0459 hours (Figure 3-4).

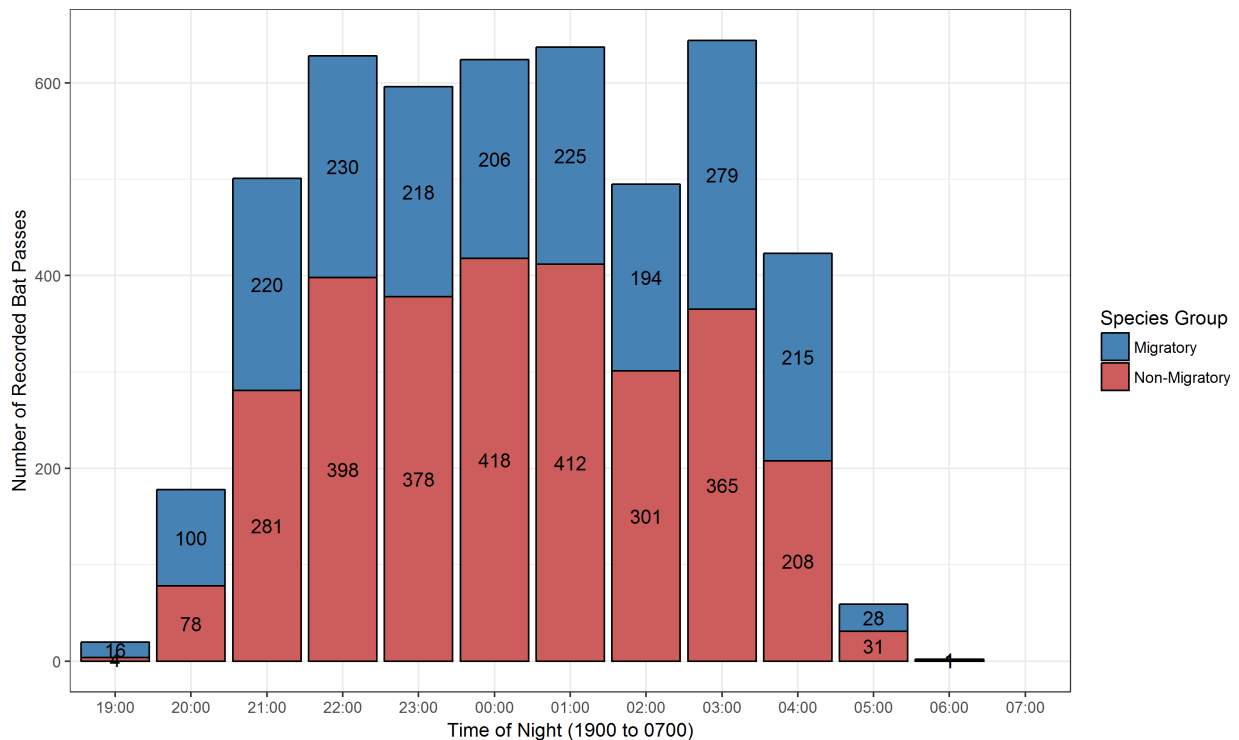


Figure 3-4 Distribution of Hourly Bat Activity for Migratory and Non-migratory Bats During the Fall 2015 Monitoring Period

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Spring 2016

The highest levels of bat activity were recorded between 2200 and 2259 hours, with a total of 126 bat passes recorded. Most activity occurred between 2100 and 0359 hours (Figure 3-5).

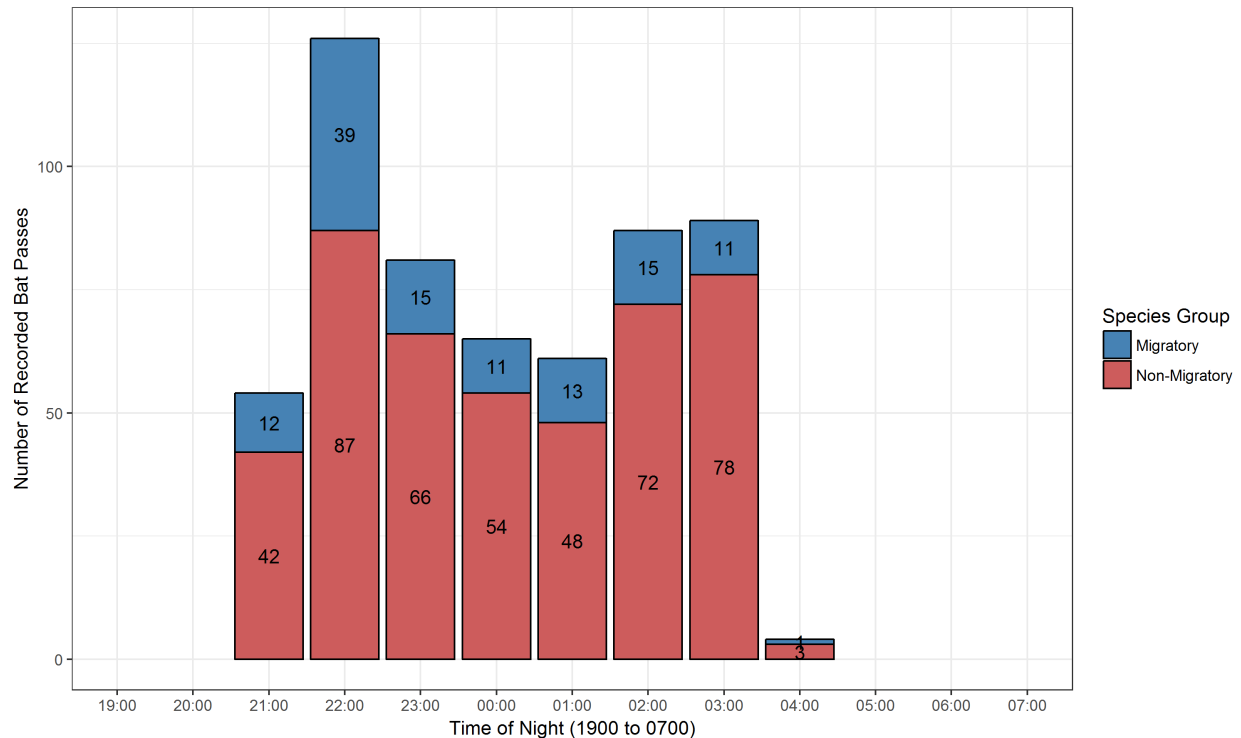


Figure 3-5 Distribution of Hourly Bat Activity for Migratory and Non-migratory Bats During the Spring 2016 Monitoring Period

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Fall 2016

The highest levels of bat activity were recorded between 2200 and 2259 hours, with a total of 455 bat passes recorded, though bat activity was relatively even over the nights between 2100 and 0459 hours (Figure 3-6). Both migratory and non-migratory activity was also relatively consistent between 2100 and 0459 hours (Figure 3-6).

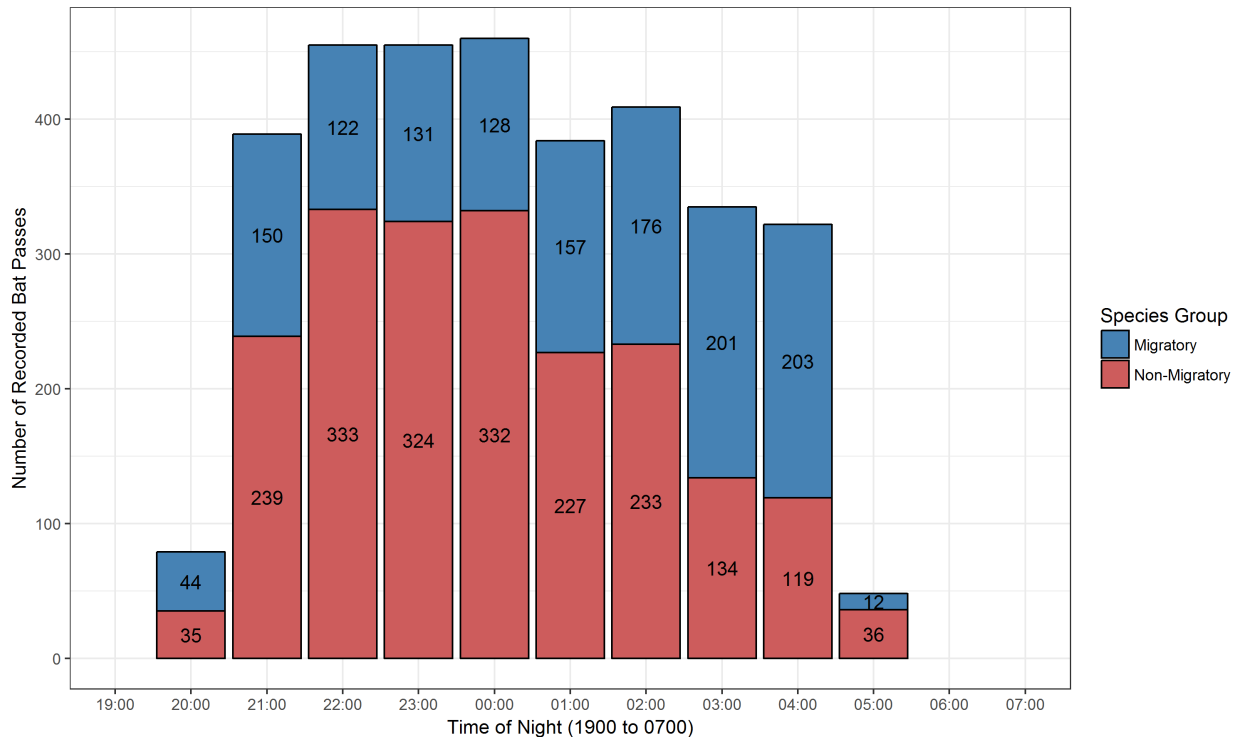


Figure 3-6 Distribution of Hourly Bat Activity for Migratory and Non-migratory Bats During the Fall 2016 Monitoring Period

3.2.3 Annual Fall Bat Activity

Between the 2015 and 2016 fall monitoring period, bat activity was relatively similar. During the Alberta Guideline Period, the average migratory bat activity at the high detectors was 2.0 passes per detector night in 2015 and 2.4 passes per detector night in 2016. The differences in activity rates between the two years of fall monitoring likely represents potential year-to-year variation in activity rates.

The three migratory species recorded in the Project area, eastern red bat, hoary bat, and silver-haired bat displayed similar patterns of activity between the two years of fall monitoring (Appendix B). Eastern red bat peak activity occurred on August 1 in 2015 and July 30 in 2016. Hoary bat activity peaked on August 6 in 2015 and August 4 in 2016. Bats identified as silver-

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haired bats were infrequently recorded over the fall monitoring periods, as this species is difficult to differentiate from the big brown bat. The big brown / silver-haired bat species grouping is likely mostly made up of silver-haired bats (Baerwald et al. 2008, Baerwald and Barclay 2009) and was the mostly commonly reported migratory species / grouping during both years of fall monitoring. Big brown / silver-haired bat activity was highest on August 21 in 2015 and August 31 in 2016, but also peaked on August 22. Consistent annual pattern of fall activity reflects those of migratory species that are spending the summer north of the Project area and only passing through on migration, as their activity is regulated more by seasonality and less by weather conditions.

3.3 ENVIRONMENTAL FACTORS

3.3.1 Sunrise and Sunset

Between the first (July 14) and last (September 30) night of monitoring in fall 2015, sunset and sunrise times varied by 4 hours and 8 minutes with a maximum darkness period of 12 hours and 16 minutes. Between the first and last night of monitoring in spring 2016, sunset and sunrise times varied by 1 hour and 34 minutes, with a maximum darkness period of 9 hours and 27 minutes. Between the first (July 28) and last (September 13) night of monitoring in fall 2016, sunset and sunrise times varied by 2 hours and 34 minutes with a maximum darkness period of 11 hours and 17 minutes. Because of this variation, it is not possible to accurately display nightly data in relation to both sunset and sunrise simultaneously. As such, nightly activity for the Project area is most effectively displayed in reference to the beginning of darkness (i.e., sunset), and the sunrise period accounts for the entire variation in the number of hours of darkness between the start and end of the monitoring period. No bat passes were recorded prior to sunset and activity rates increased considerably one hour after sunset (Figure 3-7, Figure 3-8, and Figure 3-9). Nightly activity varied by detector and by monitoring period (Figure 3-7, Figure 3-8, and Figure 3-9).

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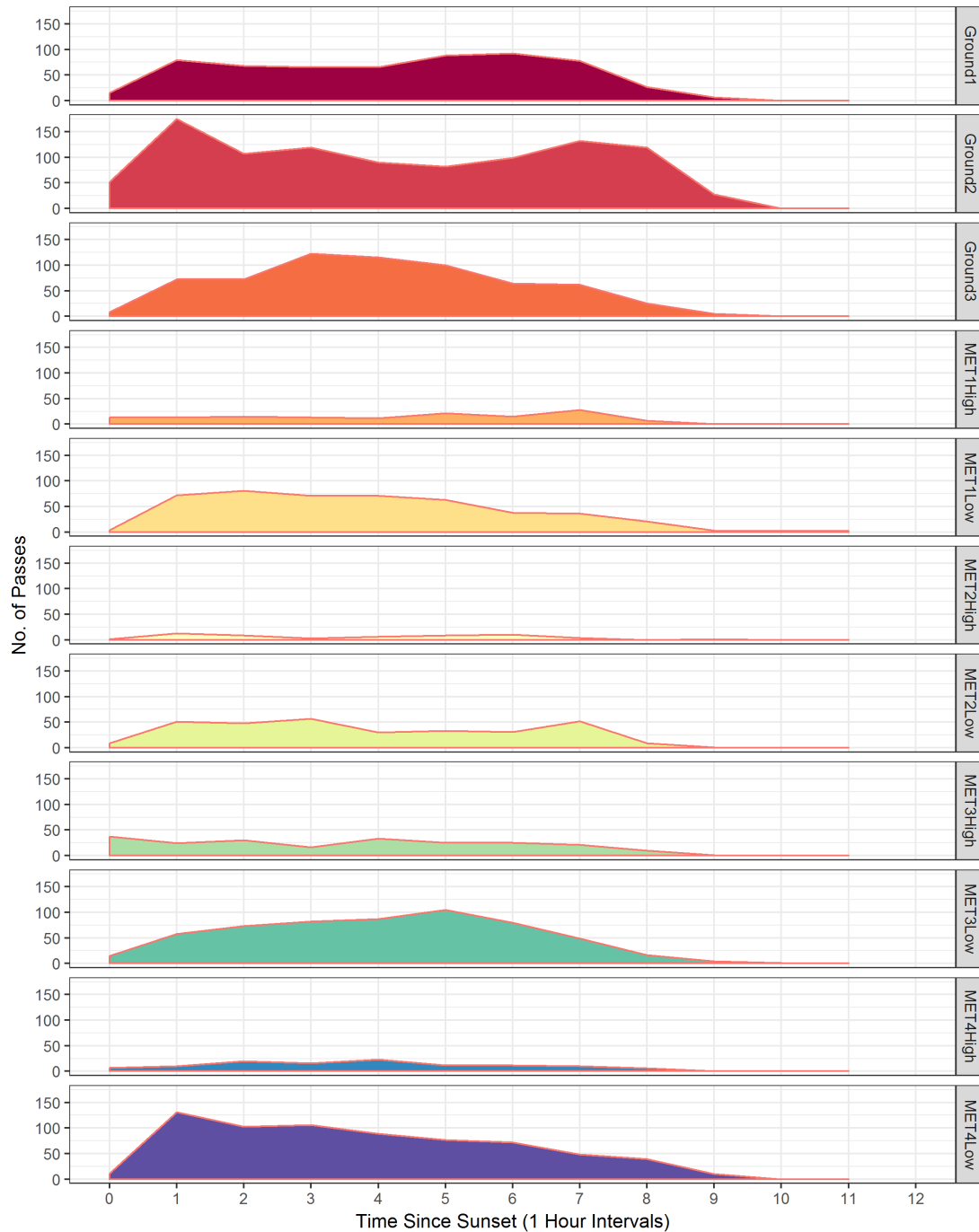


Figure 3-7 Distribution of Nightly Bat Activity by Detector During the Fall 2015 Monitoring Period

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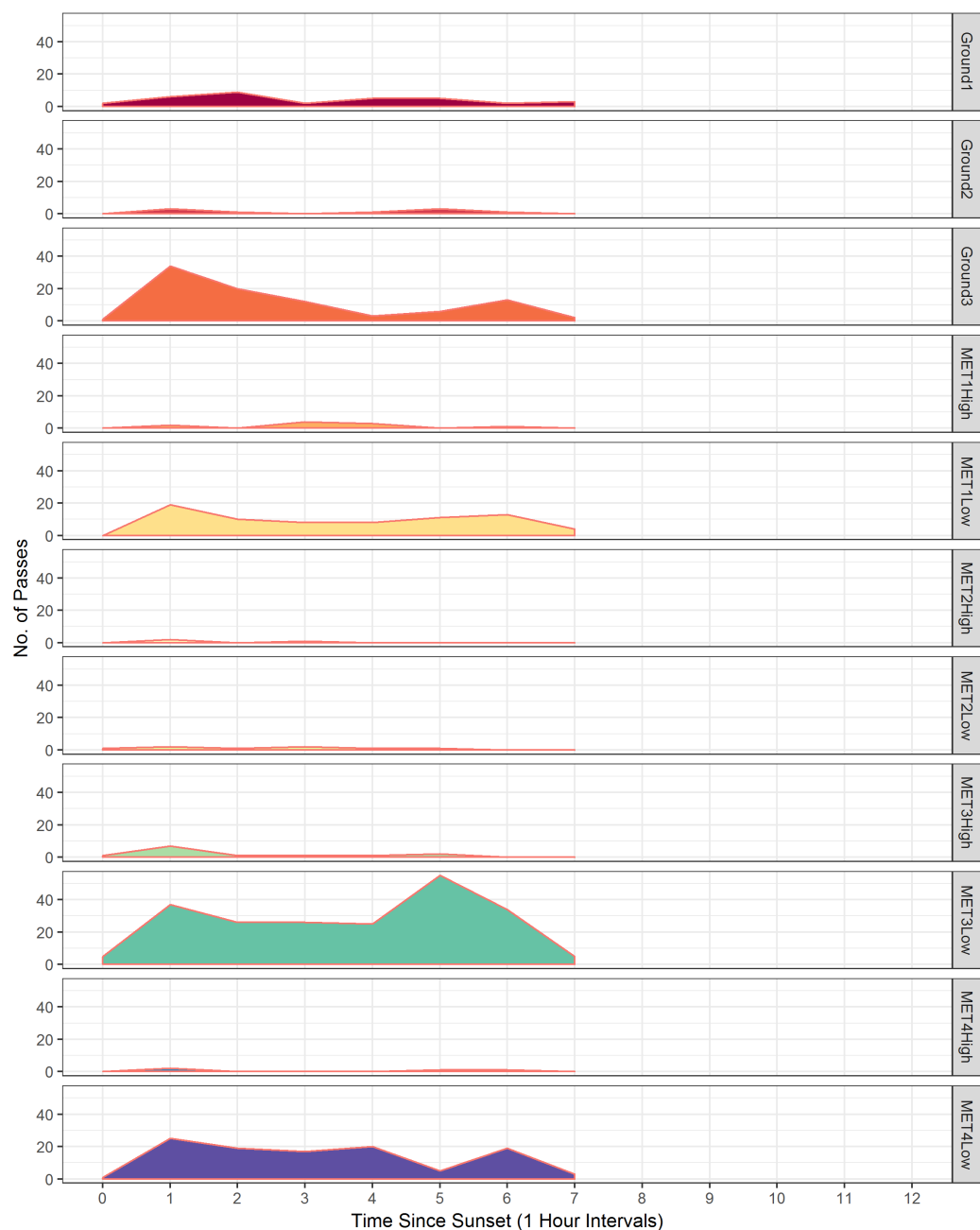


Figure 3-8 Distribution of Nightly Bat Activity by Detector During the Spring 2016 Monitoring Period

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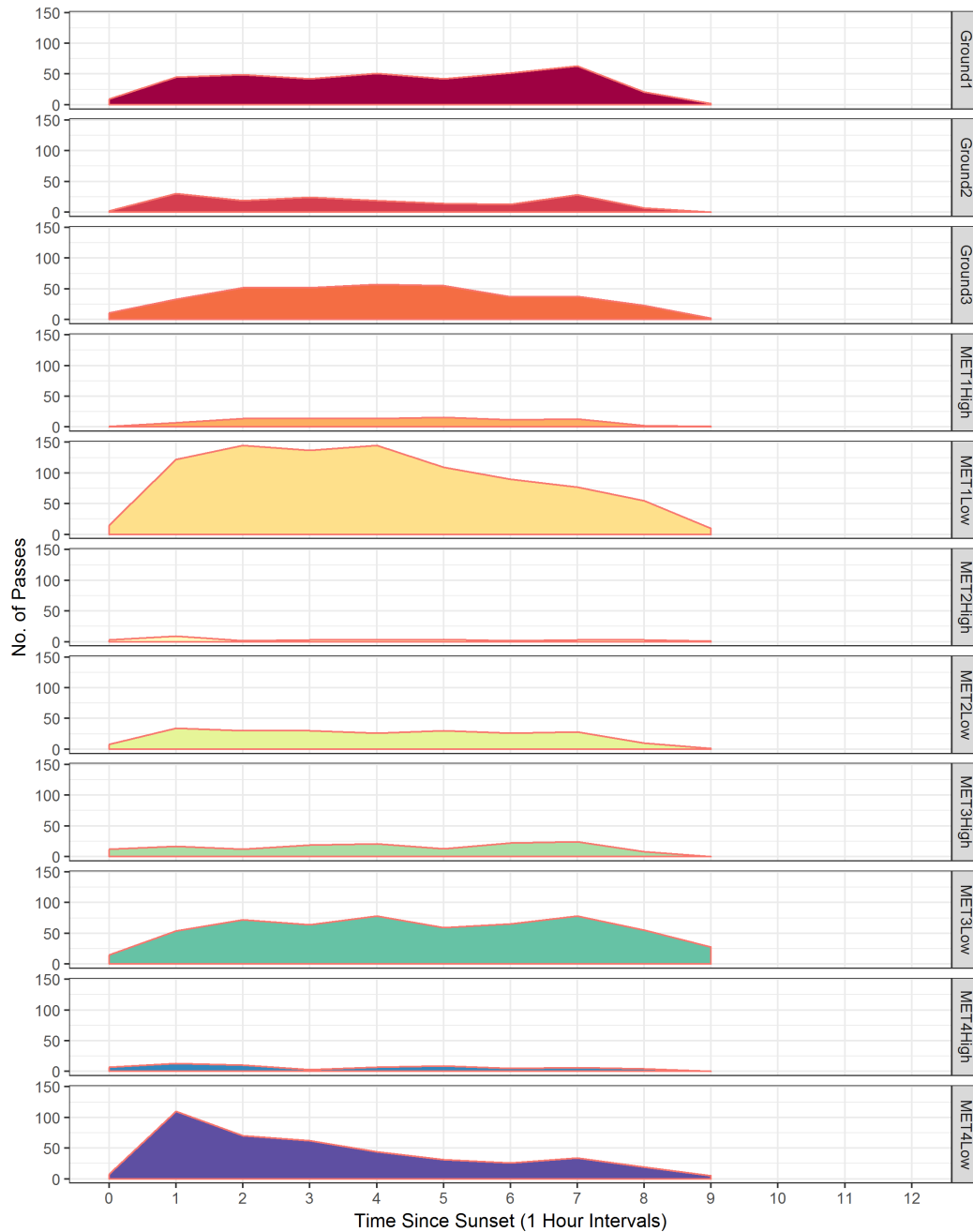


Figure 3-9 Distribution of Nightly Bat Activity by Detector During the Fall 2016 Monitoring Period

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3.4 BAT ACTIVITY BY SPECIES OR SPECIES GROUPING

The number of passes for each bat species and bat grouping recorded during the monitoring period is provided in Appendix B. The most common species or species grouping in the Project area during all three monitoring periods was *Myotis* species, followed by the big brown/silver-haired grouping (Figures 3-10, 3-11 and 3-12). In general, *Myotis* species activity was more variable throughout the three monitoring periods, with no consistent pattern.

The most common migratory species or species grouping was the big brown/silver-haired bat species grouping. During the spring monitoring period, bat observations were relatively sparse with the highest periods of activity recorded during the nights of June 3, 4 and 5, with relatively consistent activity occurring from early May to Early June.

During the fall monitoring period in 2015, big brown/silver-haired bat began increasing from the beginning of the monitoring period on July 14, peaking on August 21, and decreasing to very little activity by mid-September. During the fall monitoring period in 2016, big brown/silver-haired bat activity peaked on July 29 and 30, and was relatively low until mid-August, peaking on August 31, and decreasing until the end of the monitoring period (September 12) (Appendix B).

Other migratory bat species and species groupings, including silver-haired bat, eastern red bat, hoary bat and low frequency bats displayed similar patterns of activity to the big brown / silver-haired bat species grouping during both the spring and fall monitoring periods.

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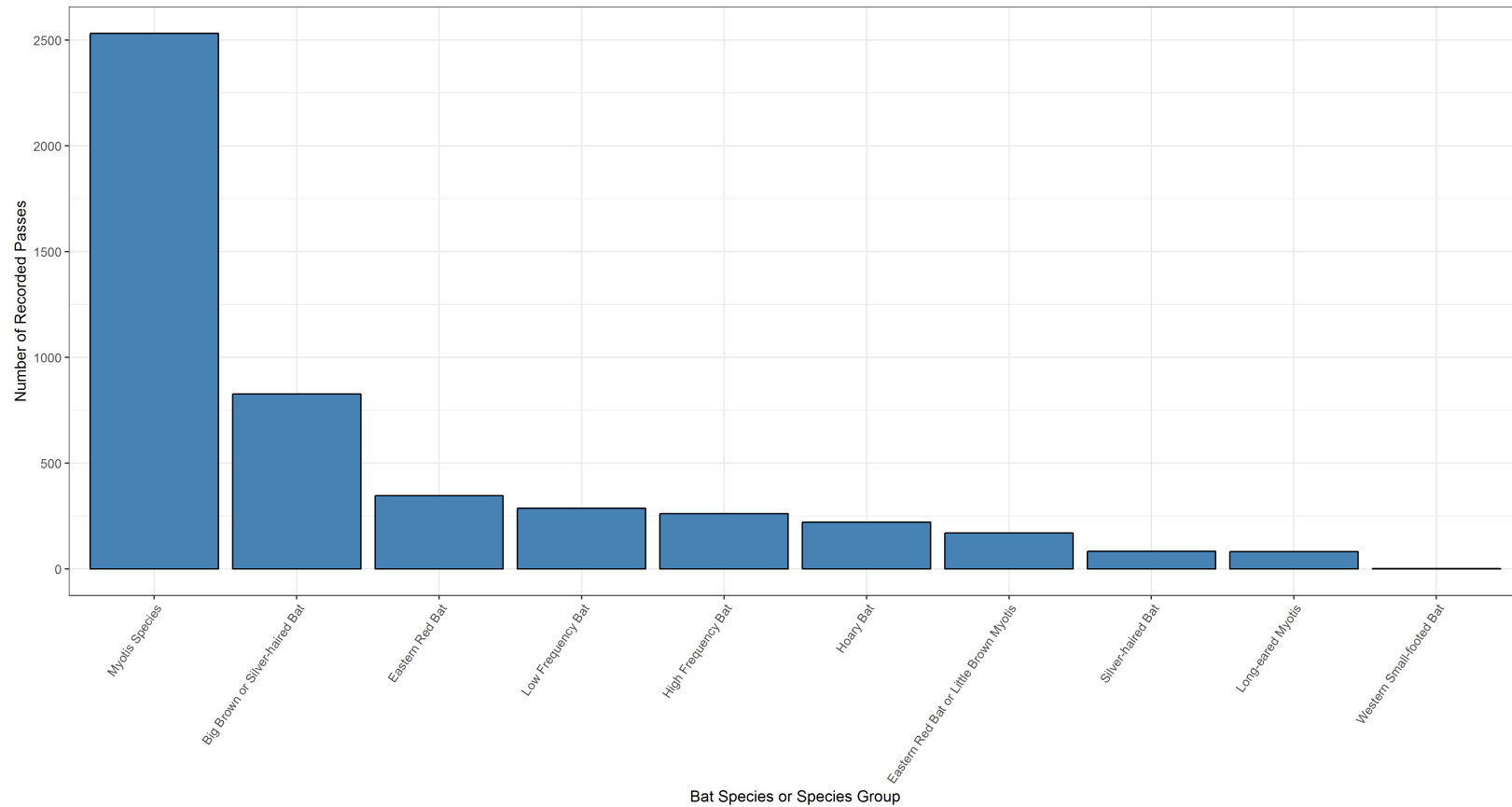


Figure 3-10 Total Bat Passes per Species or Species Grouping During the Fall 2015 Monitoring Period

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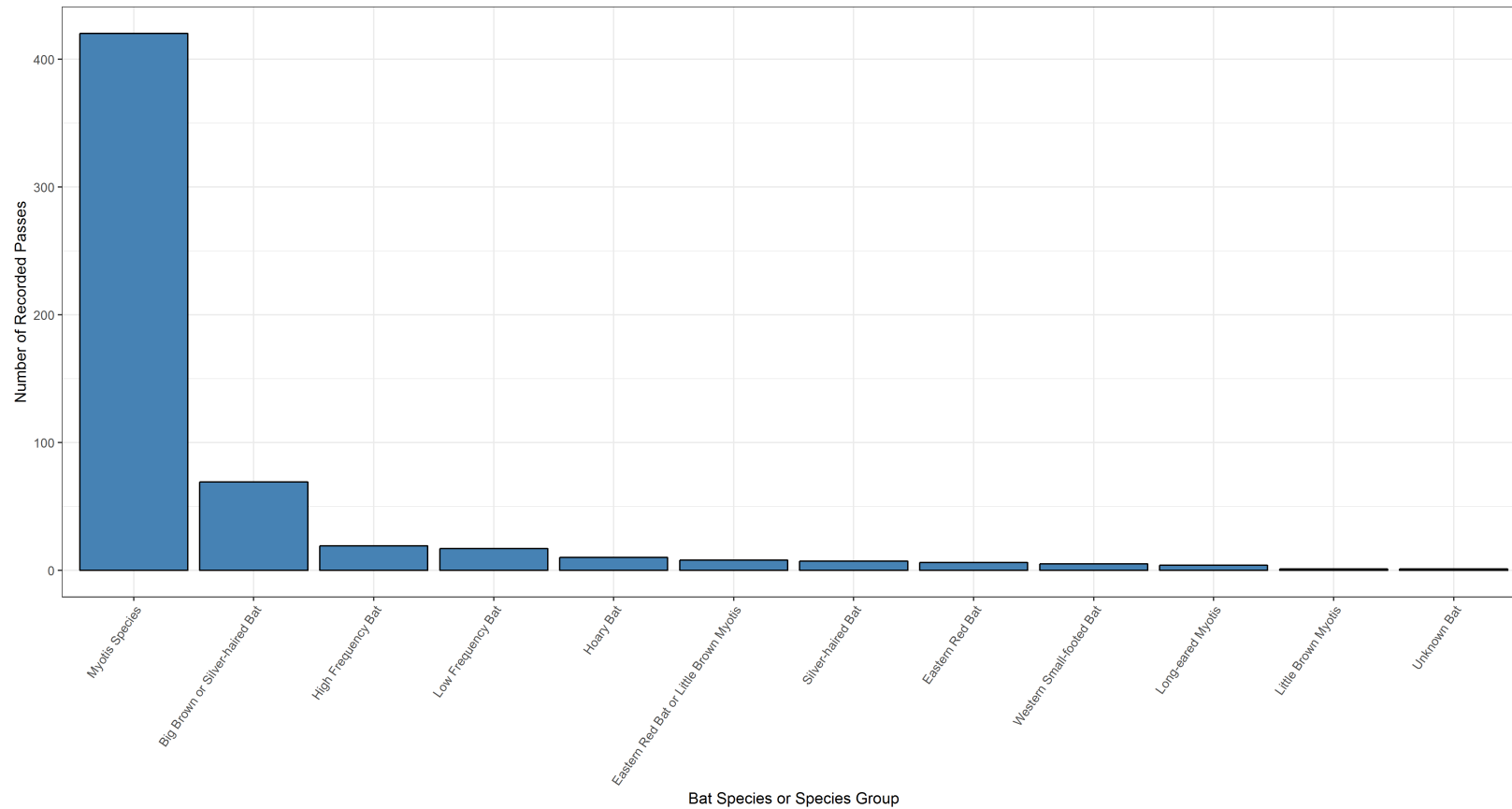


Figure 3-11 Total Bat Passes per Species or Species Grouping During the Spring 2016 Monitoring Period

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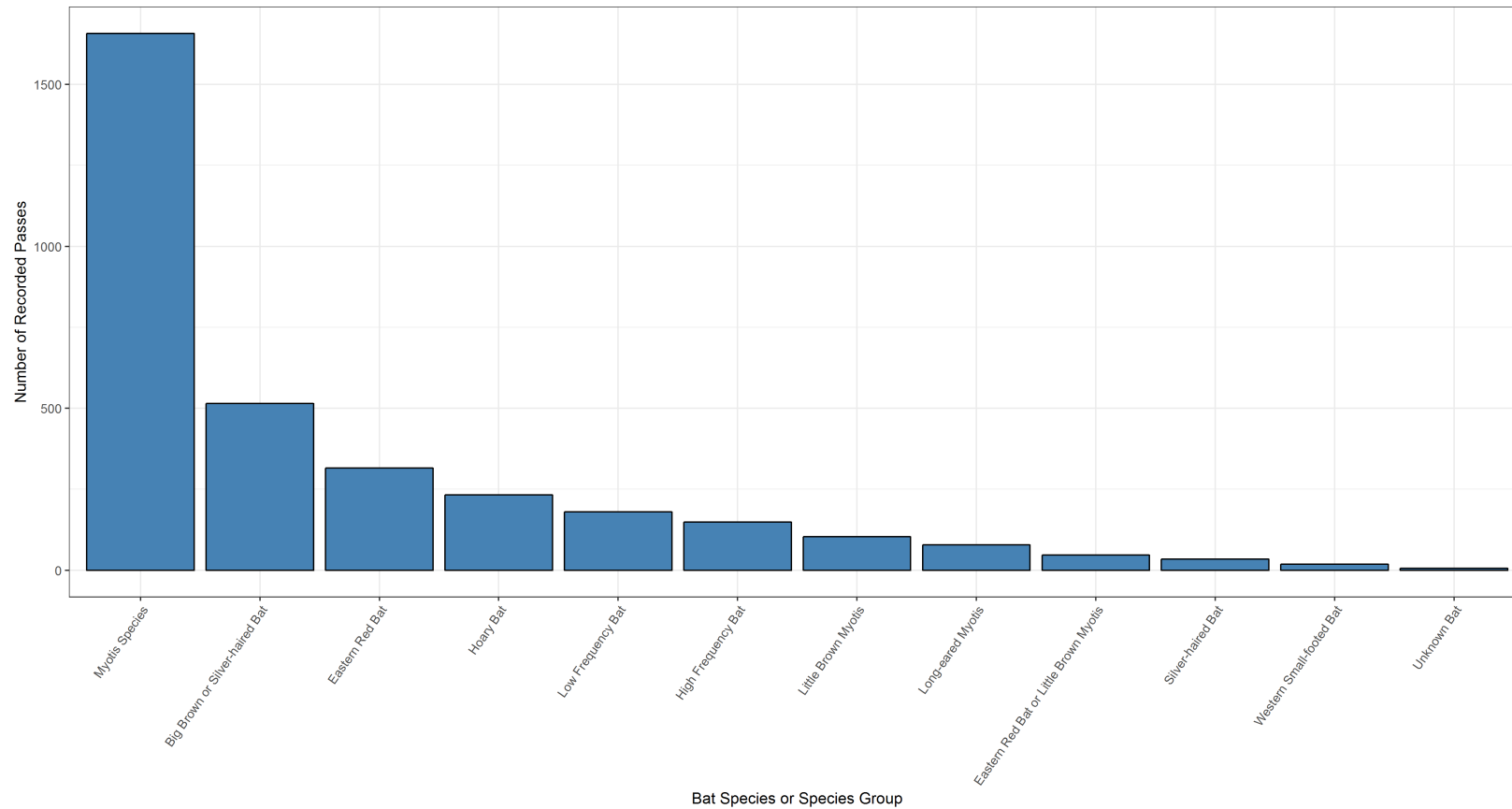


Figure 3-12 Total Bat Passes per Species or Species Grouping During the Fall 2016 Monitoring Period

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Summary

4.0 SUMMARY

The average activity rate for migratory bats at high detectors during the Alberta Guideline period (August 1 to September 10) was 2.0 migratory bat passes per detector night in 2015 and 2.4 migratory bat passes per detector night in 2016. Based on the AEP guidance related to bat activity and wind developments (ESRD 2013), greater than two migratory bat passes per detector night during this period indicates that there is a potentially high risk of bat fatalities for an area. Although this study is using Alberta's guidelines (ESRD 2013), which states that pre-construction bat activity is correlated to post-construction mortality rates, the ability to predict collision risk for birds and bats from activity recorded by radar and acoustic detectors, respectively, remains elusive as the correlations between activity rates and fatality rates are not strong (AWWI 2015). To date studies have not been able to develop a quantitative model enabling reasonably accurate prediction of collision risk from these surveys (e.g., Hein et al. 2013). Key findings of the passive acoustic bat surveys include:

- 6.1 total and 2.4 migratory bat passes per detector night were recorded over the fall 2015 monitoring period (July 14 to September 30) for all detectors.
- 1.4 total and 0.3 migratory bat passes per detector night were recorded over the spring 2016 monitoring period (April 29 to June 6) for all detectors.
- 7.5 total and 3.0 migratory bat passes per detector night were recorded over the fall 2016 monitoring period (July 28 to September 13) for all detectors.
- During the Alberta Guideline monitoring period (August 1st to September 10th) activity rates for total bats and migratory bats were 8.5 and 2.4 in 2015 and 7.1 and 2.9 in 2016, respectively.
- A potential migratory corridor was identified following the Big Muddy Valley to the north of the Project Area; turbines are not sited within the Big Muddy Valley
- The most common species grouping of bats was the big/brown silver-haired bat species grouping.
- At the MET High detectors, the most recorded activity was that of migratory bat species.

Bat activity rates varied considerably between the spring and fall monitoring periods. There were approximately 5 times as many total bat passes per detector observed during the fall monitoring periods as during the spring monitoring period, and 8 to 11 times as many migratory bat passes per detector night. This is consistent with results of previous studies where the highest rates of bat mortality at wind projects in North America were consistently found during August and September (Arnett et al. 2008).

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While non-migratory bats made up most recorded bat passes during all three monitoring periods, migratory bats consisted of 85, 93, and 81% of all high detector passes during the fall 2015, spring 2016 and fall 2016 monitoring periods respectively. The higher proportion of migratory bat activity at the high detector in the potential rotor-swept area for the Project supports observations that most bat fatalities at wind projects are migratory bats (94.4% in Alberta, 71.2 to 74% in Canada), as non-migratory bats are more active at lower altitude (BSC et al 2017, Zimmerling and Francis 2016). The potential for fatality of non-migratory bats is expected to be low as *Myotis* species tend to travel and forage below the rotor swept area (Arnett et al. 2008). Based on these results, the fatality risk for little brown myotis, which is listed on Schedule 1 (endangered) of the SARA, is predicted to be low.

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Closure

5.0 CLOSURE

This report was prepared on behalf of BluEarth. The report may not be relied upon by any other person or entity without the express written consent of Stantec and BluEarth.

Any use which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgment of Stantec based on the data obtained from the work and on the site conditions encountered at the time the work was performed at the specific sampling, testing, and/or observation locations.

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

**Appendix A BAT PASSES RECORDED IN THE OUTLAW TRAIL
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 1 Total Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (All Bats)
14-Jul-15	33	19	17	5	3	1	0	N/A	N/A	N/A	N/A	78	7	11.1
15-Jul-15	17	11	3	0	3	2	0	10	3	5	0	54	11	4.9
16-Jul-15	1	5	3	0	0	0	0	13	2	1	0	25	11	2.3
17-Jul-15	1	3	1	0	0	2	0	5	1	0	0	13	11	1.2
18-Jul-15	9	4	6	1	1	3	0	12	1	14	0	51	11	4.6
19-Jul-15	14	12	9	6	0	3	0	19	3	16	1	83	11	7.5
20-Jul-15	13	13	2	2	1	3	0	15	0	10	0	59	11	5.4
21-Jul-15	5	9	5	1	0	0	1	6	1	3	0	31	11	2.8
22-Jul-15	9	18	15	6	2	9	1	24	1	14	0	99	11	9
23-Jul-15	13	5	8	8	4	5	1	23	2	16	0	85	11	7.7
24-Jul-15	8	8	3	1	1	3	1	1	2	9	1	38	11	3.5
25-Jul-15	7	9	13	3	3	7	1	22	4	11	0	80	11	7.3
26-Jul-15	8	15	2	11	6	7	4	15	6	9	6	89	11	8.1
27-Jul-15	4	4	7	2	---	6	0	10	---	1	2	36	9	4
28-Jul-15	6	4	1	0	---	4	---	8	---	8	1	32	8	4
29-Jul-15	16	36	4	1	---	4	---	24	---	3	2	90	8	11.3
30-Jul-15	9	18	6	2	---	4	---	16	6	3	3	67	9	7.4
31-Jul-15	16	10	10	3	3	4	1	11	4	7	1	70	11	6.4
1-Aug-15	31	21	12	7	7	6	1	40	3	16	1	145	11	13.2

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Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (All Bats)
2-Aug-15	19	4	11	12	1	5	5	40	8	10	2	117	11	10.6
3-Aug-15	12	30	22	1	3	8	1	11	2	12	2	104	11	9.5
4-Aug-15	9	50	2	1	0	3	2	1	0	5	1	74	11	6.7
5-Aug-15	7	7	21	2	---	7	1	0	4	6	3	58	10	5.8
6-Aug-15	14	7	21	4	---	2	1	16	3	20	0	88	10	8.8
7-Aug-15	20	15	15	7	---	4	4	24	8	43	6	146	10	14.6
8-Aug-15	19	26	66	11	---	7	2	36	11	9	0	187	10	18.7
9-Aug-15	10	13	88	7	---	6	3	13	6	9	3	158	10	15.8
10-Aug-15	5	11	6	0	---	5	6	8	0	9	2	52	10	5.2
11-Aug-15	17	11	32	6	---	9	4	8	0	22	3	112	10	11.2
12-Aug-15	11	10	3	11	7	10	0	13	5	14	0	84	11	7.6
13-Aug-15	11	11	5	1	4	7	---	5	5	16	2	67	10	6.7
14-Aug-15	23	19	6	4	6	5	---	7	4	3	3	80	10	8
15-Aug-15	7	9	0	4	1	8	---	3	7	5	4	48	10	4.8
16-Aug-15	9	27	12	17	6	12	---	11	4	31	4	133	10	13.3
17-Aug-15	18	23	23	19	4	9	---	11	11	24	9	151	10	15.1
18-Aug-15	14	29	22	24	6	7	---	12	3	36	3	156	10	15.6
19-Aug-15	10	15	7	7	8	5	---	6	7	11	2	78	10	7.8
20-Aug-15	15	89	16	9	1	10	---	2	8	15	4	169	10	16.9
21-Aug-15	18	33	10	18	18	36	---	2	18	26	18	197	10	19.7
22-Aug-15	17	8	5	4	2	6	---	6	1	12	0	61	10	6.1

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Table A- 1 Total Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (All Bats)
23-Aug-15	8	33	12	8	1	1	0	5	8	10	3	89	11	8.1
24-Aug-15	5	2	6	2	3	9	0	2	4	12	2	47	11	4.3
25-Aug-15	13	47	12	13	5	11	0	4	2	21	2	130	11	11.8
26-Aug-15	4	42	10	5	2	6	0	2	10	16	0	97	11	8.8
27-Aug-15	14	23	28	15	10	14	0	5	0	20	4	133	11	12.1
28-Aug-15	5	6	6	2	2	7	0	3	1	7	0	39	11	3.5
29-Aug-15	6	20	2	2	1	7	0	0	3	8	3	52	11	4.7
30-Aug-15	11	8	1	4	0	10	0	3	3	6	0	46	11	4.2
31-Aug-15	2	12	2	3	---	6	0	0	4	8	0	37	10	3.7
1-Sep-15	---	9	2	5	2	0	2	4	0	10	0	56	10	5.6
2-Sep-15	---	22	2	25	3	---	2	1	2	23	1	81	9	9
3-Sep-15	---	13	3	32	2	---	0	2	3	5	3	63	9	7
4-Sep-15	---	6	2	3	---	---	0	0	5	0	0	16	8	2
5-Sep-15	---	4	1	5	---	---	1	0	1	2	0	14	8	1.8
6-Sep-15	---	2	3	2	---	---	0	0	0	6	3	16	8	2
7-Sep-15	---	1	1	0	---	---	0	1	0	4	1	8	8	1
8-Sep-15	---	15	7	14	---	---	1	3	4	10	0	54	8	6.8
9-Sep-15	---	1	5	16	---	---	0	3	1	3	2	31	8	3.9
10-Sep-15	---	2	1	4	---	---	2	0	1	1	0	11	8	1.4
11-Sep-15	---	13	2	5	---	---	3	2	1	1	0	27	8	3.4
12-Sep-15	---	6	3	1	---	---	1	2	1	5	0	19	8	2.4

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Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (All Bats)
13-Sep-15	---	13	2	6	---	---	0	2	0	5	0	28	8	3.5
14-Sep-15	---	6	5	27	---	---	3	0	3	6	1	51	8	6.4
15-Sep-15	---	1	0	5	0	---	0	0	0	7	0	13	9	1.4
16-Sep-15	0	0	0	0	0	0	0	0	0	0	0	0	11	0
17-Sep-15	2	0	0	3	0	1	0	1	2	2	0	11	11	1
18-Sep-15	3	0	1	1	0	0	0	2	0	0	0	7	11	0.6
19-Sep-15	2	2	0	2	1	0	0	3	1	1	0	12	11	1.1
20-Sep-15	0	2	4	1	0	1	1	3	1	1	0	14	11	1.3
21-Sep-15	3	3	1	7	0	1	0	1	2	1	0	19	11	1.7
22-Sep-15	0	0	0	2	0	2	0	0	0	0	0	4	11	0.4
23-Sep-15	1	3	1	0	0	0	0	1	0	0	2	8	11	0.7
24-Sep-15	0	3	0	1	1	0	0	1	2	0	0	8	11	0.7
25-Sep-15	0	4	0	4	0	0	0	2	0	1	0	11	11	1
26-Sep-15	1	4	1	7	1	1	0	0	3	0	0	18	11	1.6
27-Sep-15	0	3	0	1	0	0	0	2	0	0	0	6	11	0.5
28-Sep-15	0	0	0	1	0	0	0	0	0	0	0	1	11	0.1
29-Sep-15	0	0	0	0	0	0	0	0	0	0	0	0	11	0
30-Sep-15	0	1	0	2	2	0	0	2	0	0	0	7	11	0.6
Total	585	1,003	646	464	137	321	56	571	222	686	116	4,807	N/A	6.0
Total # of Nights Per Detector	64	79	79	79	56	65	67	78	75	78	78	N/A	798	N/A

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Table A- 1 Total Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (All Bats)
# of Total Bat Passes Per Detector Night	9.1	12.7	8.2	5.9	2.5	4.94	0.8	7.3	3.0	8.8	1.5	6.0	N/A	N/A
--- indicates night of detector malfunction														
N/A indicates night is outside of survey period or field is not applicable														

Table A- 2 Migratory Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
14-Jul-15	2	5	5	0	3	0	0	N/A	N/A	N/A	N/A	15	7	2.1
15-Jul-15	2	7	3	0	3	0	0	2	3	0	0	20	11	1.8
16-Jul-15	0	3	2	0	0	0	0	3	2	0	0	10	11	0.9
17-Jul-15	1	2	1	0	0	0	0	3	1	0	0	8	11	0.7
18-Jul-15	1	3	3	1	1	0	0	3	1	4	0	17	11	1.5
19-Jul-15	2	6	5	1	0	1	0	8	2	2	0	27	11	2.5
20-Jul-15	0	6	0	0	0	2	0	9	0	1	0	18	11	1.6
21-Jul-15	0	8	2	0	0	0	1	5	1	1	0	18	11	1.6
22-Jul-15	4	8	3	0	1	1	1	7	1	0	0	26	11	2.4

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 2 Migratory Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
23-Jul-15	1	4	3	0	4	4	1	9	2	2	0	30	11	2.7
24-Jul-15	4	3	0	0	0	1	1	1	2	4	1	17	11	1.5
25-Jul-15	5	4	5	0	3	2	1	4	3	5	0	32	11	2.9
26-Jul-15	5	12	1	1	6	4	4	9	6	6	3	57	11	5.2
27-Jul-15	3	3	4	0	---	5	0	9	---	0	2	26	9	2.9
28-Jul-15	4	1	1	0	---	3	---	6	---	6	0	21	8	2.6
29-Jul-15	3	17	3	0	---	2	---	4	---	1	1	31	8	3.9
30-Jul-15	3	12	3	0	---	3	---	3	5	2	3	34	9	3.8
31-Jul-15	5	2	4	0	2	0	1	5	3	2	1	25	11	2.3
1-Aug-15	13	5	7	1	4	5	1	7	2	7	0	52	11	4.7
2-Aug-15	12	3	8	1	1	4	5	12	8	2	2	58	11	5.3
3-Aug-15	4	14	3	1	2	2	1	2	2	4	1	36	11	3.3
4-Aug-15	6	26	1	1	0	0	2	0	0	4	1	41	11	3.7
5-Aug-15	3	4	3	1	---	2	1	0	3	1	2	20	10	2
6-Aug-15	7	2	3	0	---	1	1	8	3	9	0	34	10	3.4
7-Aug-15	11	6	5	0	---	1	4	14	8	12	2	63	10	6.3
8-Aug-15	2	8	6	1	---	3	2	9	10	0	0	41	10	4.1
9-Aug-15	2	5	5	2	---	4	3	5	6	1	3	36	10	3.6
10-Aug-15	2	3	3	0	---	1	5	3	0	0	2	19	10	1.9

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 2 Migratory Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
11-Aug-15	8	7	2	0	---	4	4	2	0	3	3	33	10	3.3
12-Aug-15	7	5	0	1	7	3	0	7	5	7	0	42	11	3.8
13-Aug-15	5	5	3	0	4	2	---	2	4	5	2	32	10	3.2
14-Aug-15	16	8	4	1	6	0	---	1	4	1	3	44	10	4.4
15-Aug-15	4	2	0	2	1	5	---	3	7	3	3	30	10	3
16-Aug-15	2	6	3	1	6	4	---	5	3	6	4	40	10	4
17-Aug-15	4	9	5	2	4	6	---	1	11	6	4	52	10	5.2
18-Aug-15	6	5	8	4	3	1	---	1	2	3	0	33	10	3.3
19-Aug-15	2	12	2	0	8	3	---	1	7	1	2	38	10	3.8
20-Aug-15	5	22	3	1	1	7	---	0	8	3	4	54	10	5.4
21-Aug-15	17	11	8	4	17	31	---	1	17	15	12	133	10	13.3
22-Aug-15	13	1	5	0	1	5	---	4	1	6	0	36	10	3.6
23-Aug-15	0	9	3	1	1	0	0	1	6	3	2	26	11	2.4
24-Aug-15	4	2	3	1	3	7	0	0	3	4	2	29	11	2.6
25-Aug-15	6	19	6	1	2	4	0	2	1	7	2	50	11	4.5
26-Aug-15	3	12	6	0	2	3	0	0	8	1	0	35	11	3.2
27-Aug-15	7	7	6	2	10	7	0	2	0	10	2	53	11	4.8
28-Aug-15	1	2	3	1	2	3	0	0	1	2	0	15	11	1.4
29-Aug-15	4	7	1	2	1	2	0	0	3	4	2	26	11	2.4

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 2 Migratory Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
30-Aug-15	6	3	0	0	0	1	0	0	3	0	0	13	11	1.2
31-Aug-15	2	6	1	1	---	1	0	0	4	1	0	16	10	1.6
1-Sep-15	---	3	0	0	1	0	2	1	0	2	0	9	10	0.9
2-Sep-15	---	6	1	5	1	---	2	0	2	3	1	21	9	2.3
3-Sep-15	---	8	2	9	1	---	0	2	3	3	3	31	9	3.4
4-Sep-15	---	5	1	1	---	---	0	0	5	0	0	12	8	1.5
5-Sep-15	---	2	1	1	---	---	1	0	1	1	0	7	8	0.9
6-Sep-15	---	1	0	1	---	---	0	0	0	0	2	4	8	0.5
7-Sep-15	---	1	0	0	---	---	0	1	0	3	1	6	8	0.8
8-Sep-15	---	7	0	6	---	---	1	0	3	0	0	17	8	2.1
9-Sep-15	---	0	1	1	---	---	0	0	1	0	0	3	8	0.4
10-Sep-15	---	1	1	2	---	---	2	0	1	0	0	7	8	0.9
11-Sep-15	---	3	2	0	---	---	3	2	1	0	0	11	8	1.4
12-Sep-15	---	3	1	0	---	---	1	1	1	1	0	8	8	1
13-Sep-15	---	6	0	1	---	---	0	1	0	0	0	8	8	1
14-Sep-15	---	5	5	23	---	---	3	0	3	6	1	46	8	5.8
15-Sep-15	---	0	0	1	0	---	0	0	0	6	0	7	9	0.8
16-Sep-15	0	0	0	0	0	0	0	0	0	0	0	0	11	0
17-Sep-15	2	0	0	1	0	1	0	0	2	1	0	7	11	0.6

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 2 Migratory Bat Passes Recorded in the Project Area During the Fall 2015 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
18-Sep-15	0	0	1	0	0	0	0	1	0	0	0	2	11	0.2
19-Sep-15	2	2	0	0	1	0	0	1	1	1	0	8	11	0.7
20-Sep-15	0	2	3	1	0	0	1	2	1	0	0	10	11	0.9
21-Sep-15	1	3	0	0	0	1	0	0	1	0	0	6	11	0.5
22-Sep-15	0	0	0	1	0	2	0	0	0	0	0	3	11	0.3
23-Sep-15	1	2	1	0	0	0	0	1	0	0	2	7	11	0.6
24-Sep-15	0	3	0	1	1	0	0	1	2	0	0	8	11	0.7
25-Sep-15	0	3	0	2	0	0	0	1	0	0	0	6	11	0.5
26-Sep-15	0	3	1	4	0	0	0	0	3	0	0	11	11	1
27-Sep-15	0	1	0	0	0	0	0	1	0	0	0	2	11	0.2
28-Sep-15	0	0	0	0	0	0	0	0	0	0	0	0	11	0
29-Sep-15	0	0	0	0	0	0	0	0	0	0	0	0	11	0
30-Sep-15	0	1	0	1	1	0	0	0	0	0	0	3	11	0.3
Total	235	413	185	98	115	154	55	199	203	194	81	1,932	N/A	2.4
Total # of Nights Per Detector	64	79	79	79	56	65	67	78	75	78	78	N/A	798	N/A
# of Migratory Bat Passes Per Detector Night	3.7	5.2	2.3	1.2	2.1	2.4	0.8	2.6	2.7	2.5	1.0	2.4	N/A	N/A
--- indicates night of detector malfunction N/A indicates night is outside of survey period or field is not applicable														

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 3 Total Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
29-Apr-16	0	0	N/A	1	0	N/A	N/A	N/A	N/A	N/A	N/A	1	4	0.3
30-Apr-16	0	0	3	1	1	0	0	2	0	0	0	7	11	0.6
1-May-16	0	0	2	1	0	0	0	5	1	1	0	10	11	0.9
2-May-16	1	0	6	2	2	0	0	11	0	8	0	30	11	2.7
3-May-16	2	0	4	2	0	---	0	4	0	9	1	22	10	2.2
4-May-16	3	0	2	1	0	---	0	3	2	4	0	15	10	1.5
5-May-16	1	0	1	4	0	---	0	2	0	0	0	8	10	0.8
6-May-16	0	0	2	8	0	---	0	7	0	5	0	22	10	2.2
7-May-16	1	1	4	3	0	---	0	6	0	1	0	16	10	1.6
8-May-16	0	1	1	3	0	---	0	6	0	5	0	16	10	1.6
9-May-16	0	0	0	0	0	---	0	2	0	0	0	2	10	0.2
10-May-16	0	0	0	0	0	---	0	0	0	---	0	0	9	0.0
11-May-16	0	0	0	0	0	---	0	0	0	---	0	0	9	0.0
12-May-16	0	1	0	0	0	---	0	0	0	---	0	1	9	0.1
13-May-16	0	0	0	2	0	---	0	0	0	---	0	2	9	0.2
14-May-16	0	0	3	1	0	---	0	0	1	3	2	10	9	1.1
15-May-16	0	0	5	2	0	---	0	0	1	6	0	14	9	1.6
16-May-16	0	0	0	0	1	0	0	2	1	3	0	7	11	0.6
17-May-16	1	0	9	3	0	0	0	9	0	2	0	24	11	2.2
18-May-16	2	0	3	3	1	1	0	10	2	3	1	26	11	2.4
19-May-16	1	1	0	1	0	0	0	7	0	5	0	15	11	1.4
20-May-16	1	1	0	0	0	0	0	1	1	0	0	4	11	0.4
21-May-16	2	0	1	0	0	0	0	3	0	0	0	6	11	0.6

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 3 Total Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
22-May-16	1	0	1	1	1	0	1	6	0	5	0	16	11	1.5
23-May-16	0	1	1	0	0	0	0	2	0	2	0	6	11	0.6
24-May-16	1	2	0	0	0	0	0	5	0	0	0	8	11	0.7
25-May-16	0	0	0	0	0	0	0	1	0	2	0	3	11	0.3
26-May-16	1	0	0	3	0	0	0	6	0	2	0	12	11	1.1
27-May-16	1	0	2	1	1	1	0	3	0	8	0	17	11	1.6
28-May-16	0	0	1	3	0	1	1	4	2	2	0	14	11	1.3
29-May-16	3	0	7	6	0	1	0	8	0	7	0	32	11	2.9
30-May-16	0	0	0	0	1	0	0	0	0	0	0	1	11	0.1
31-May-16	0	0	0	0	0	1	0	1	0	1	0	3	11	0.3
1-Jun-16	3	0	8	1	1	1	0	2	0	5	0	21	11	1.9
2-Jun-16	1	0	3	0	0	0	1	5	0	3	0	13	11	1.2
3-Jun-16	0	1	5	5	0	0	0	4	0	3	0	18	11	1.6
4-Jun-16	5	0	9	5	0	0	0	22	2	7	0	50	11	4.6
5-Jun-16	1	0	6	5	1	2	0	55	0	7	0	77	11	7.0
6-Jun-16	2	0	2	4	0	0	0	6	0	N/A	N/A	14	9	1.6
7-Jun-16	N/A	N/A	N/A	1	0	N/A	N/A	3	0	N/A	N/A	4	4	1.0
Total	34	9	91	73	10	8	3	213	13	109	4	567	N/A	N/A
Total # of Nights Per Detector	39	39	38	40	40	25	38	33	39	37	37	N/A	405	N/A
# of Total Bat Passes Per Detector Night	0.9	0.2	2.4	1.8	0.2	0.3	0.1	6.5	0.3	2.9	0.1	1.3	N/A	N/A
--- indicates night of detector malfunction														

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 3 Total Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
N/A indicates night is outside of survey period or field is not applicable														

Table A- 4 Migratory Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
29-Apr-16	0	0	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A	0	4	0.0
30-Apr-16	0	0	0	0	1	0	0	0	0	0	0	1	11	0.1
1-May-16	0	0	2	0	0	0	0	0	1	0	0	3	11	0.3
2-May-16	0	0	1	0	1	0	0	0	0	1	0	3	11	0.3
3-May-16	2	0	3	1	0	---	0	0	0	1	1	8	10	0.8
4-May-16	1	0	0	0	0	---	0	0	2	0	0	3	10	0.3
5-May-16	0	0	0	1	0	---	0	2	0	0	0	3	10	0.3
6-May-16	0	0	0	0	0	---	0	1	0	0	0	1	10	0.1
7-May-16	0	1	0	0	0	---	0	0	0	0	0	1	10	0.1
8-May-16	0	1	0	1	0	---	0	3	0	1	0	6	10	0.6
9-May-16	0	0	0	0	0	---	0	2	0	0	0	2	10	0.2
10-May-16	0	0	0	0	0	---	0	0	0	---	0	0	9	0.0

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 4 Migratory Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
11-May-16	0	0	0	0	0	---	0	0	0	---	0	0	9	0.0
12-May-16	0	0	0	0	0	---	0	0	0	---	0	0	9	0.0
13-May-16	0	0	0	1	0	---	0	0	0	---	0	1	9	0.1
14-May-16	0	0	1	0	0	---	0	0	1	2	2	6	9	0.7
15-May-16	0	0	0	1	0	---	0	0	1	0	0	2	9	0.2
16-May-16	0	0	0	0	0	0	0	0	1	0	0	1	11	0.1
17-May-16	1	0	0	2	0	0	0	0	0	0	0	3	11	0.3
18-May-16	2	0	0	0	1	0	0	2	2	0	1	8	11	0.7
19-May-16	1	0	0	0	0	0	0	0	0	1	0	2	11	0.2
20-May-16	0	1	0	0	0	0	0	1	1	0	0	3	11	0.3
21-May-16	1	0	0	0	0	0	0	1	0	0	0	2	11	0.2
22-May-16	1	0	0	0	1	0	1	1	0	0	0	4	11	0.4
23-May-16	0	1	0	0	0	0	0	0	0	0	0	1	11	0.1
24-May-16	0	2	0	0	0	0	0	1	0	0	0	3	11	0.3
25-May-16	0	0	0	0	0	0	0	0	0	0	0	0	11	0.0
26-May-16	0	0	0	0	0	0	0	1	0	0	0	1	11	0.1
27-May-16	1	0	0	0	1	1	0	0	0	0	0	3	11	0.3
28-May-16	0	0	0	1	0	1	1	1	2	0	0	6	11	0.6

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 4 Migratory Bat Passes Recorded in the Project Area During the Spring 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
29-May-16	1	0	0	1	0	1	0	0	0	0	0	3	11	0.3
30-May-16	0	0	0	0	1	0	0	0	0	0	0	1	11	0.1
31-May-16	0	0	0	0	0	1	0	0	0	0	0	1	11	0.1
1-Jun-16	1	0	1	0	1	0	0	0	0	0	0	3	11	0.3
2-Jun-16	0	0	0	0	0	0	1	3	0	0	0	4	11	0.4
3-Jun-16	0	1	1	2	0	0	0	1	0	1	0	6	11	0.6
4-Jun-16	4	0	1	3	0	0	0	3	2	0	0	13	11	1.2
5-Jun-16	0	0	1	1	1	1	0	1	0	2	0	7	11	0.6
6-Jun-16	1	0	0	1	0	0	0	0	0	0	0	2	9	0.2
7-Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0
Total	17	7	11	16	8	5	3	24	13	9	4	117	N/A	N/A
Total # of Nights Per Detector	39	39	38	40	40	25	38	33	39	37	37	N/A	405	N/A
# of Migratory Bat Passes Per Detector Night	0.4	0.2	0.3	0.4	0.2	0.2	0.1	0.7	0.3	0.2	0.1	0.3	N/A	N/A

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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 5 Total Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
28-Jul-16	11	1	50	10	2	2	1	20	5	23	0	125	11	11.4
29-Jul-16	15	5	52	27	5	5	1	23	3	9	4	149	11	13.6
30-Jul-16	8	4	17	10	2	2	2	7	4	5	2	63	11	5.7
31-Jul-16	28	7	12	37	7	8	0	28	8	31	0	166	11	15.1
1-Aug-16	15	4	14	34	5	4	1	16	2	23	1	119	11	10.8
2-Aug-16	4	4	4	15	2	4	2	8	3	13	2	61	11	5.6
3-Aug-16	1	0	0	2	3	0	0	4	1	0	0	11	11	1.0
4-Aug-16	13	4	14	13	7	11	3	24	33	30	0	152	11	13.8
5-Aug-16	9	6	2	23	8	7	3	15	7	19	0	99	11	9.0
6-Aug-16	5	5	2	7	0	1	0	7	3	4	0	34	11	3.1
7-Aug-16	8	1	7	14	---	11	---	17	7	2	---	67	8	8.4
8-Aug-16	14	11	12	45	---	17	---	25	---	16	---	140	7	20.0
9-Aug-16	4	4	4	19	---	6	---	9	---	8	---	54	7	7.7
10-Aug-16	11	2	11	17	---	5	---	17	---	---	---	63	6	10.5
11-Aug-16	13	4	9	30	---	8	---	24	---	---	---	88	6	14.7
12-Aug-16	18	5	7	30	---	5	---	19	---	---	---	84	6	14.0
13-Aug-16	7	10	13	21	---	4	---	15	---	---	---	70	6	11.7
14-Aug-16	6	6	6	27	---	7	---	17	---	---	---	69	6	11.5
15-Aug-16	9	7	11	55	---	16	---	11	---	---	---	109	6	18.2
16-Aug-16	8	7	4	3	---	9	---	11	---	---	---	42	6	7.0
17-Aug-16	8	3	3	27	---	4	---	16	---	---	---	61	6	10.2

**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 5 Total Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
18-Aug-16	11	4	4	39	2	2	3	10	4	6	2	87	11	7.9
19-Aug-16	8	1	8	23	6	2	0	16	1	10	2	77	11	7.0
20-Aug-16	7	6	5	19	3	7	2	18	3	21	5	96	11	8.7
21-Aug-16	12	7	8	10	5	12	1	10	0	5	3	73	11	6.6
22-Aug-16	14	3	6	63	7	3	2	15	5	39	9	166	11	15.1
23-Aug-16	5	0	2	8	---	1	---	4	4	6	0	30	9	3.3
24-Aug-16	20	2	6	28	---	1	---	28	5	15	2	107	9	11.9
25-Aug-16	8	3	18	27	---	3	---	35	3	9	8	114	9	12.7
26-Aug-16	1	3	5	10	---	3	---	22	0	17	2	63	9	7.0
27-Aug-16	5	0	6	1	---	3	---	5	7	9	6	42	9	4.7
28-Aug-16	24	4	2	51	---	1	---	13	1	30	1	127	9	14.1
29-Aug-16	6	3	2	15	---	10	---	3	7	8	3	57	9	6.3
30-Aug-16	3	4	6	13	---	12	---	8	5	8	1	60	9	6.7
31-Aug-16	3	1	2	7	7	3	2	4	8	3	6	46	11	4.2
1-Sep-16	4	0	7	11	3	4	2	1	0	3	3	38	11	3.5
2-Sep-16	10	1	3	46	2	3	1	11	1	7	0	85	11	7.7
3-Sep-16	4	2	3	20	1	4	3	6	8	7	0	58	11	5.3
4-Sep-16	2	0	1	12	1	1	0	3	3	3	2	28	11	2.6
5-Sep-16	2	2	0	2	5	1	2	1	1	1	---	17	10	1.7
6-Sep-16	6	3	2	5	2	7	1	7	4	5	---	42	10	4.2
7-Sep-16	2	1	2	9	6	0	0	1	2	9	---	32	10	3.2

**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 5 Total Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
8-Sep-16	0	0	1	7	3	0	0	1	0	0	---	12	10	1.2
9-Sep-16	1	2	1	2	0	0	0	5	0	0	---	11	10	1.1
10-Sep-16	1	3	6	7	---	3	0	7	---	5	---	32	8	4.0
11-Sep-16	2	1	0	3	---	1	1	1	---	0	---	9	8	1.1
12-Sep-16	0	0	0	1	---	0	0	0	---	0	---	1	8	0.1
13-Sep-16	0	0	0	0	---	0	0	0	---	0	---	0	8	0.0
Total	376	156	360	905	94	223	33	568	148	409	64	3,336	N/A	N/A
Total # of Nights Per Detector	48	48	48	48	25	48	29	48	34	40	28	N/A	444	N/A
# of Total Bat Passes Per Detector Night	7.8	3.2	7.5	18.9	3.8	4.6	1.1	11.8	4.4	10.2	2.3	7.5	N/A	N/A
--- indicates night of detector malfunction N/A indicates night is outside of survey period or field is not applicable														

**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 6 Migratory Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
28-Jul-16	0	1	2	4	2	1	1	7	4	1	0	23	11	2.1
29-Jul-16	5	2	5	5	3	2	1	9	2	2	4	40	11	3.6
30-Jul-16	6	4	12	4	1	2	2	4	4	2	1	42	11	3.8
31-Jul-16	10	6	8	3	3	3	0	9	5	13	0	60	11	5.5
1-Aug-16	5	3	5	2	2	3	1	7	2	13	1	44	11	4.0
2-Aug-16	2	2	2	9	1	3	2	2	3	0	2	28	11	2.6
3-Aug-16	1	0	0	2	3	0	0	4	1	0	0	11	11	1.0
4-Aug-16	5	4	4	3	5	8	3	18	33	2	0	85	11	7.7
5-Aug-16	1	4	0	4	8	2	3	8	7	1	0	38	11	3.5
6-Aug-16	2	5	0	2	0	1	0	2	3	2	0	17	11	1.6
7-Aug-16	4	0	5	9	---	9	---	10	6	1	---	44	8	5.5
8-Aug-16	11	6	2	9	---	10	---	10	---	4	---	52	7	7.4
9-Aug-16	2	3	4	1	---	3	---	5	---	0	---	18	7	2.6
10-Aug-16	3	1	4	7	---	3	---	13	---	---	---	31	6	5.2
11-Aug-16	7	1	6	6	---	3	---	10	---	---	---	33	6	5.5
12-Aug-16	8	4	5	6	---	3	---	8	---	---	---	34	6	5.7
13-Aug-16	4	8	4	5	---	3	---	8	---	---	---	32	6	5.3
14-Aug-16	3	3	3	1	---	2	---	7	---	---	---	19	6	3.2

**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 6 Migratory Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
15-Aug-16	3	4	5	7	---	12	---	3	---	---	---	34	6	5.7
16-Aug-16	4	5	2	1	---	6	---	4	---	---	---	22	6	3.7
17-Aug-16	6	1	1	3	---	3	---	10	---	---	---	24	6	4.0
18-Aug-16	7	3	3	5	2	0	3	4	4	4	0	35	11	3.2
19-Aug-16	3	0	1	1	5	0	0	2	0	2	2	16	11	1.5
20-Aug-16	1	2	2	3	2	4	2	9	3	9	5	42	11	3.8
21-Aug-16	9	4	5	1	5	10	1	3	0	2	3	43	11	3.9
22-Aug-16	6	2	3	5	2	1	1	6	3	11	3	43	11	3.9
23-Aug-16	4	0	1	0	---	1	---	4	4	6	0	20	9	2.2
24-Aug-16	8	1	5	0	---	1	---	14	5	3	2	39	9	4.3
25-Aug-16	4	2	8	8	---	2	---	5	3	1	7	40	9	4.4
26-Aug-16	0	3	1	2	---	2	---	10	0	2	2	22	9	2.4
27-Aug-16	3	0	3	0	---	3	---	1	5	2	6	23	9	2.6
28-Aug-16	12	2	0	3	---	0	---	1	1	7	0	26	9	2.9
29-Aug-16	3	2	1	4	---	6	---	3	6	4	3	32	9	3.6
30-Aug-16	2	2	1	4	---	5	---	6	5	5	1	31	9	3.4
31-Aug-16	3	1	2	2	7	1	2	2	8	3	6	37	11	3.4
1-Sep-16	3	0	3	3	3	1	1	0	0	0	2	16	11	1.5

OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix A Bat Passes Recorded in the Outlaw trail Project Study Area

Table A- 6 Migratory Bat Passes Recorded in the Project Area During the Fall 2016 Monitoring Period

Night	Ground 1	Ground 2	Ground 3	Met 1 Low	Met 1 High	Met 2 Low	Met 2 High	Met 3 Low	Met 3 High	Met 4 Low	Met 4 High	Total Bat Passes Per Night	Number of Detector Nights	Bat Passes Per Detector Night (Migratory Bats)
2-Sep-16	3	0	2	5	0	1	1	3	1	4	0	20	11	1.8
3-Sep-16	2	1	1	5	1	1	3	3	6	2	0	25	11	2.3
4-Sep-16	1	0	1	2	1	1	0	1	0	0	1	8	11	0.7
5-Sep-16	2	2	0	2	5	0	2	0	1	0	---	14	10	1.4
6-Sep-16	1	3	2	5	2	4	1	1	3	3	---	25	10	2.5
7-Sep-16	1	1	0	0	1	0	0	0	0	3	---	6	10	0.6
8-Sep-16	0	0	1	0	2	0	0	1	0	0	---	4	10	0.4
9-Sep-16	1	1	0	0	0	0	0	1	0	0	---	3	10	0.3
10-Sep-16	1	3	4	1	---	2	0	2	---	2	---	15	8	1.9
11-Sep-16	2	1	0	1	---	1	1	1	---	0	---	7	8	0.9
12-Sep-16	0	0	0	1	---	0	0	0	---	0	---	1	8	0.1
13-Sep-16	0	0	0	0	---	0	0	0	---	0	---	0	8	0.0
Total	174	103	129	156	66	129	31	241	128	116	51	1,324	N/A	N/A
Total # of Nights Per Detector	48	48	48	48	25	48	29	48	34	40	28	N/A	444	N/A
# of Migratory Bat Passes Per Detector Night	3.6	2.1	2.7	3.2	2.6	2.7	1.1	5	3.8	2.9	1.8	3.5	N/A	N/A
--- indicates night of detector malfunction N/A indicates night is outside of survey period or field is not applicable														

**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

**Appendix B BAT PASSES BY SPECIES OR SPECIES
GROUPING RECORDED IN THE OUTLAW
TRAIL PROJECT AREA**

OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
PRE-CONSTRUCTION BAT MONITORING REPORT

Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

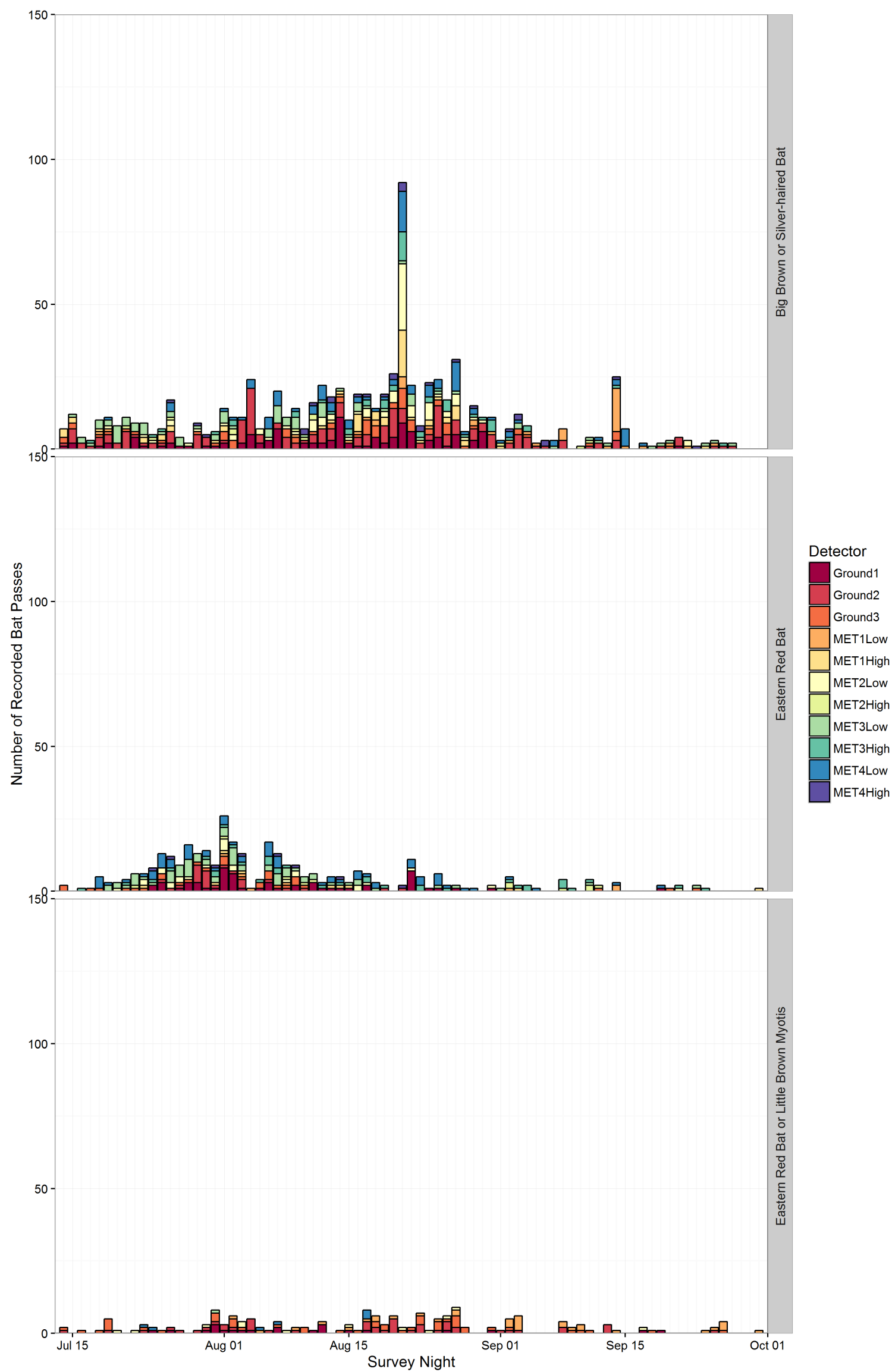


Figure B- 1 Bat Passes per Species by Detector During the 2015 Fall Monitoring Period

OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

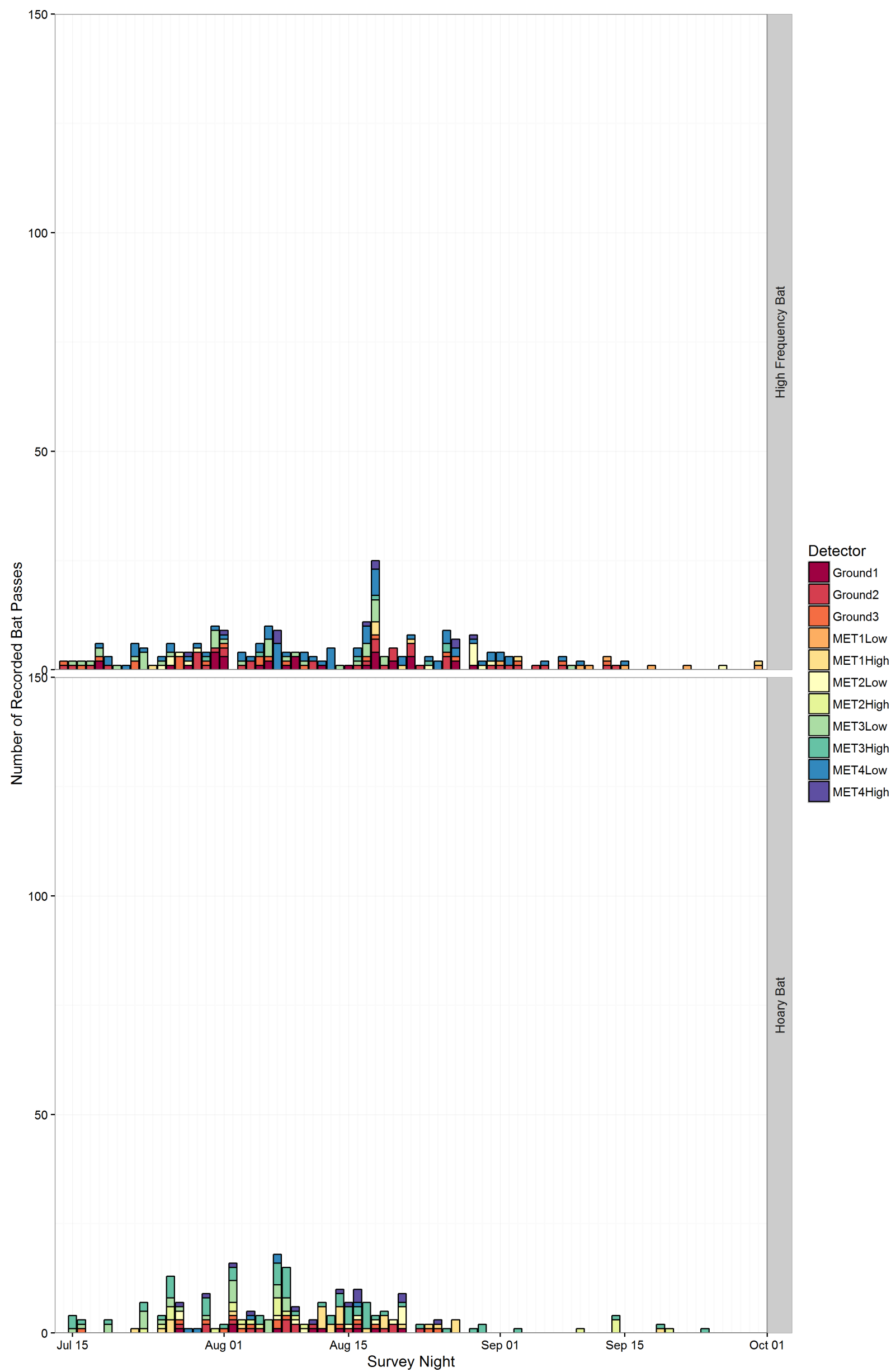


Figure B-1 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

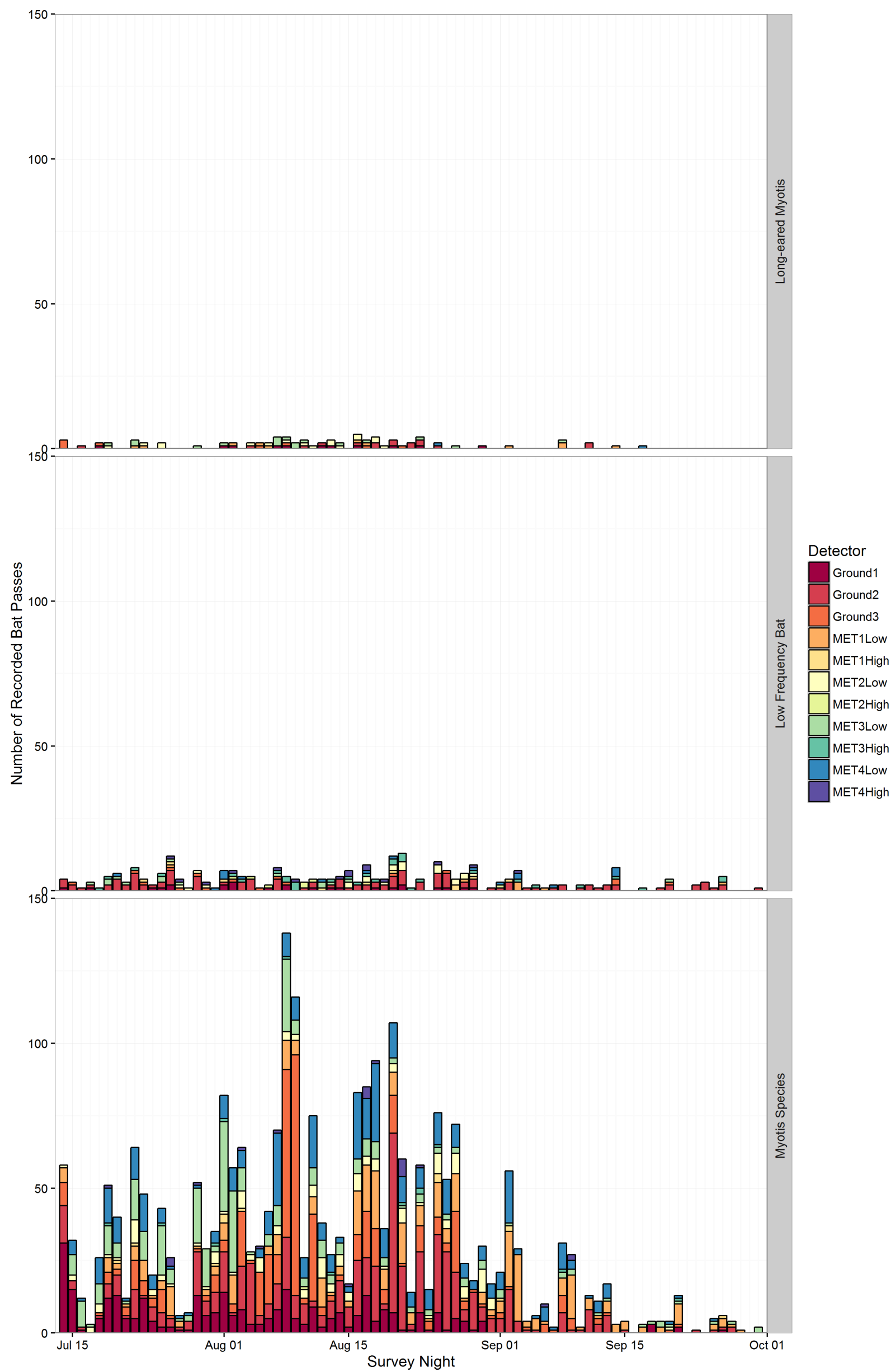


Figure B-1 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

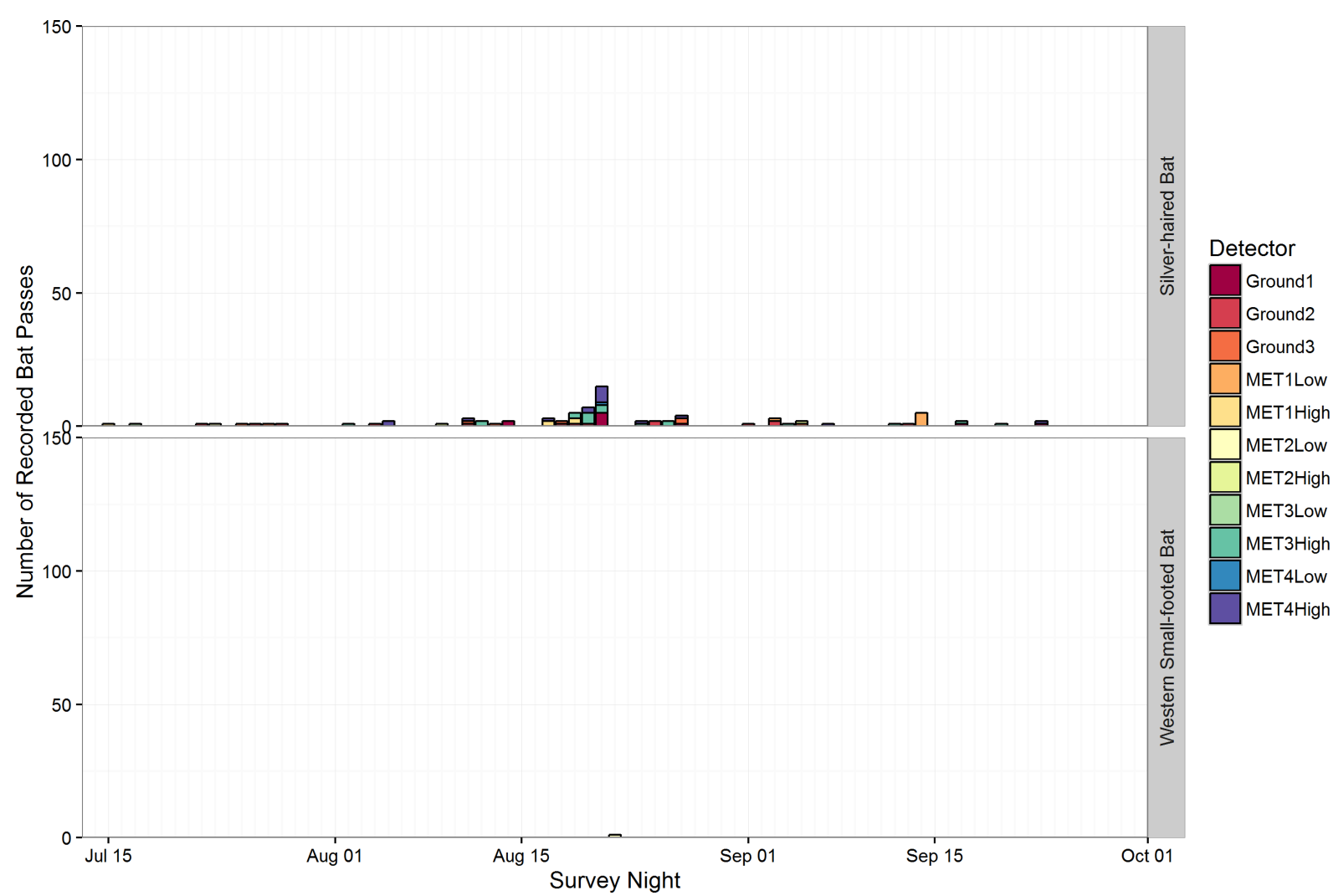


Figure B-1 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

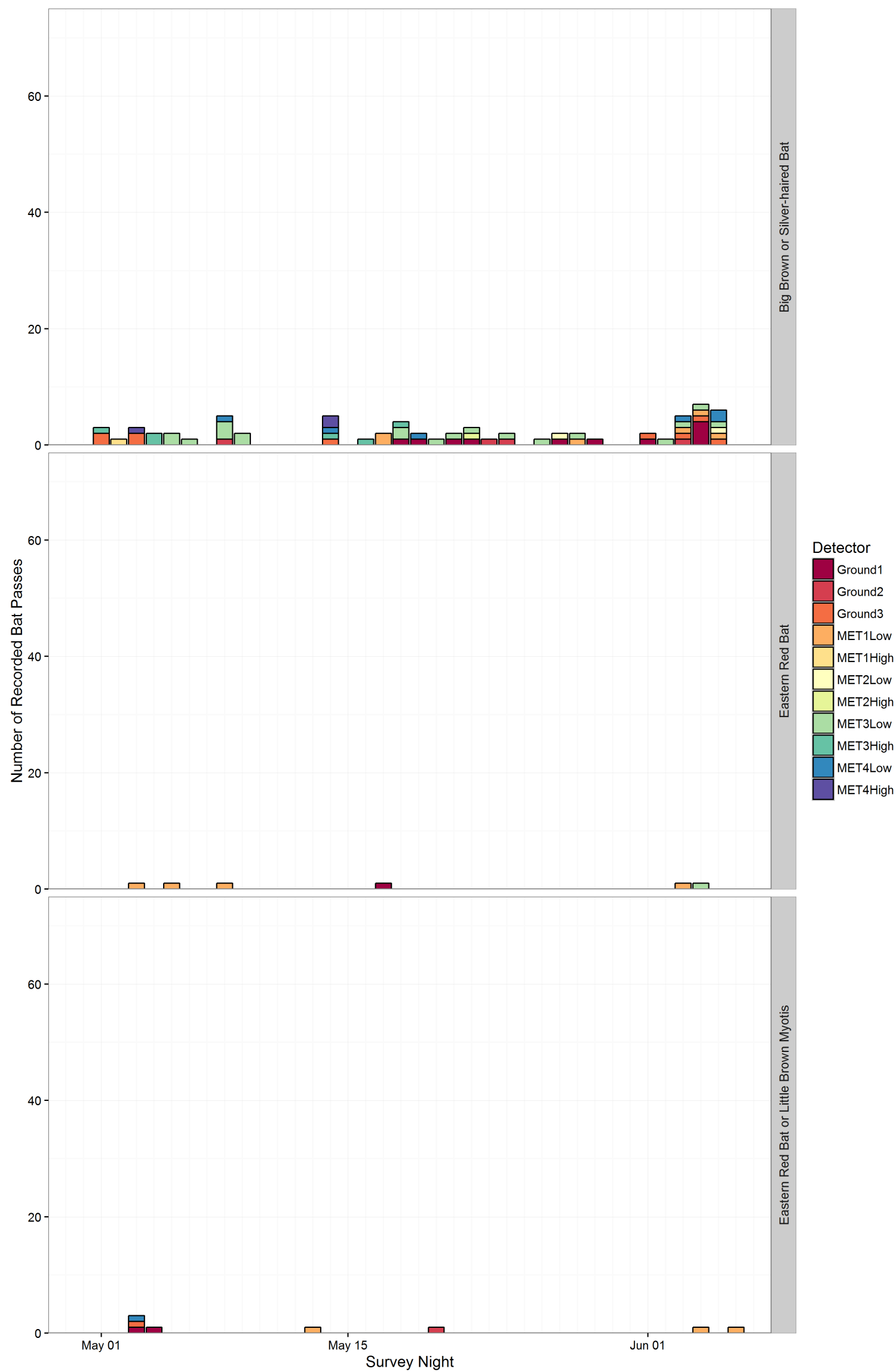


Figure B- 2 Bat Passes per Species by Detector During the 2016 Spring Monitoring Period

OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

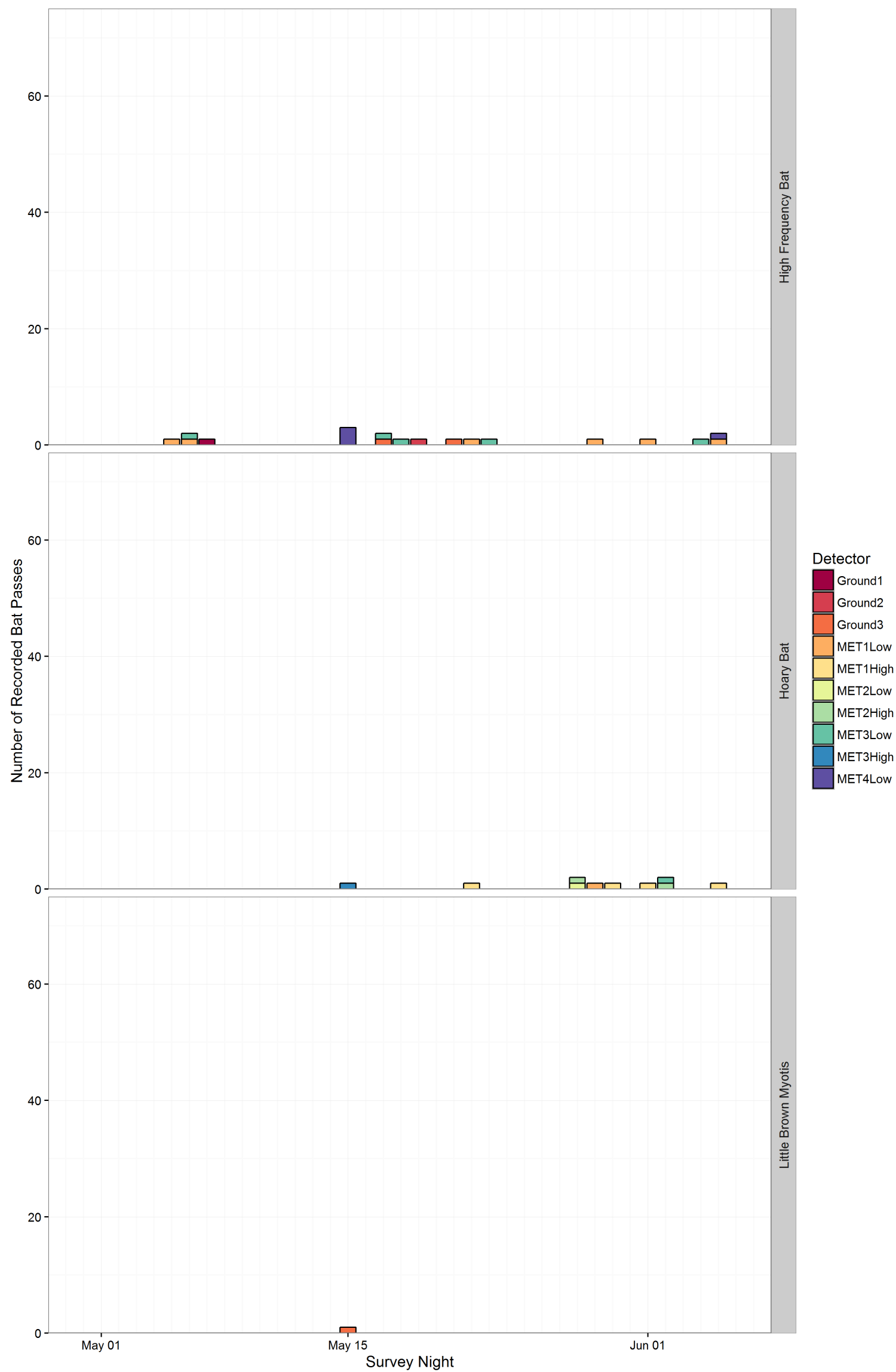


Figure B-2 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
PRE-CONSTRUCTION BAT MONITORING REPORT

Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

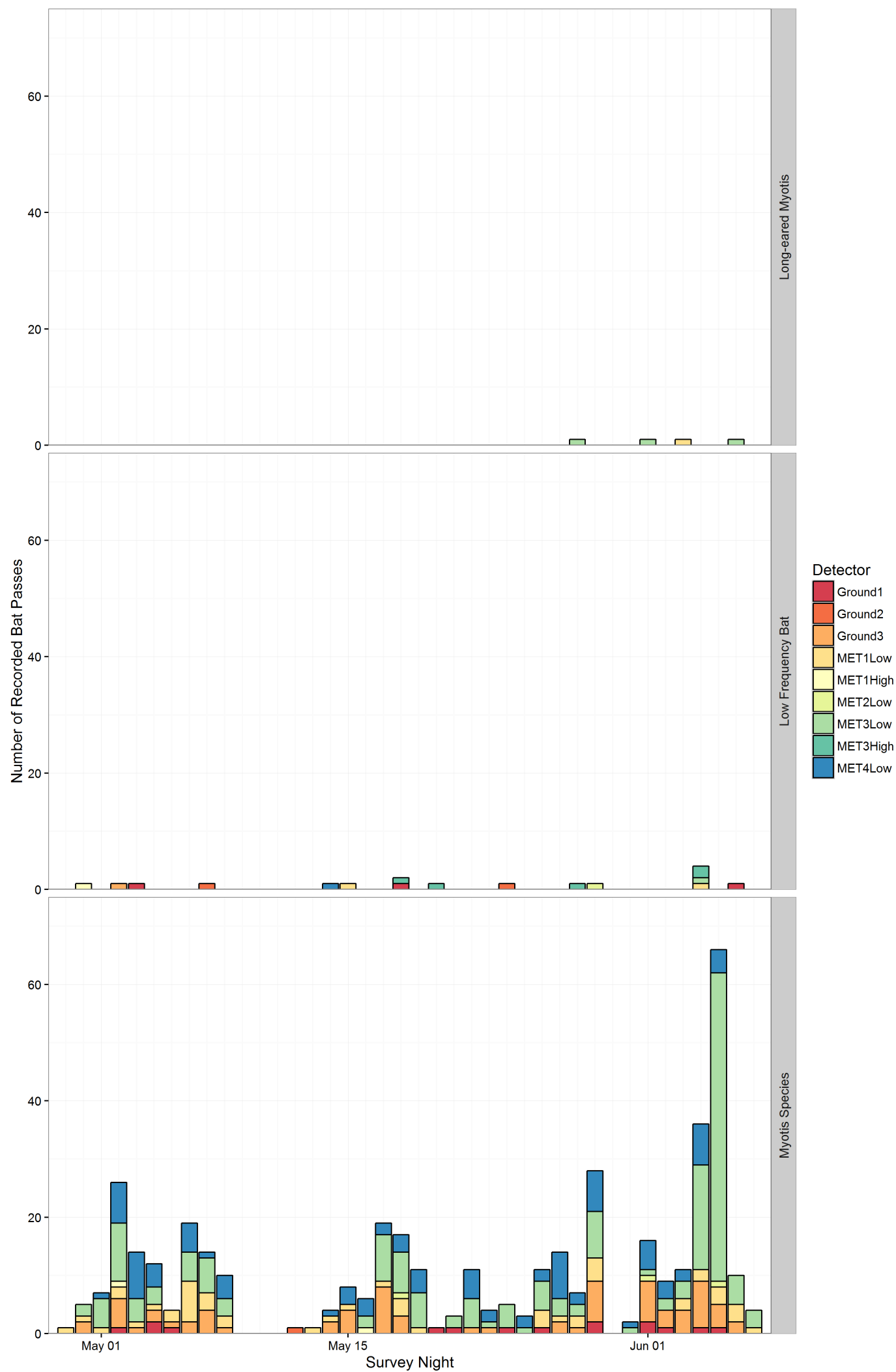


Figure B-2 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
PRE-CONSTRUCTION BAT MONITORING REPORT

Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

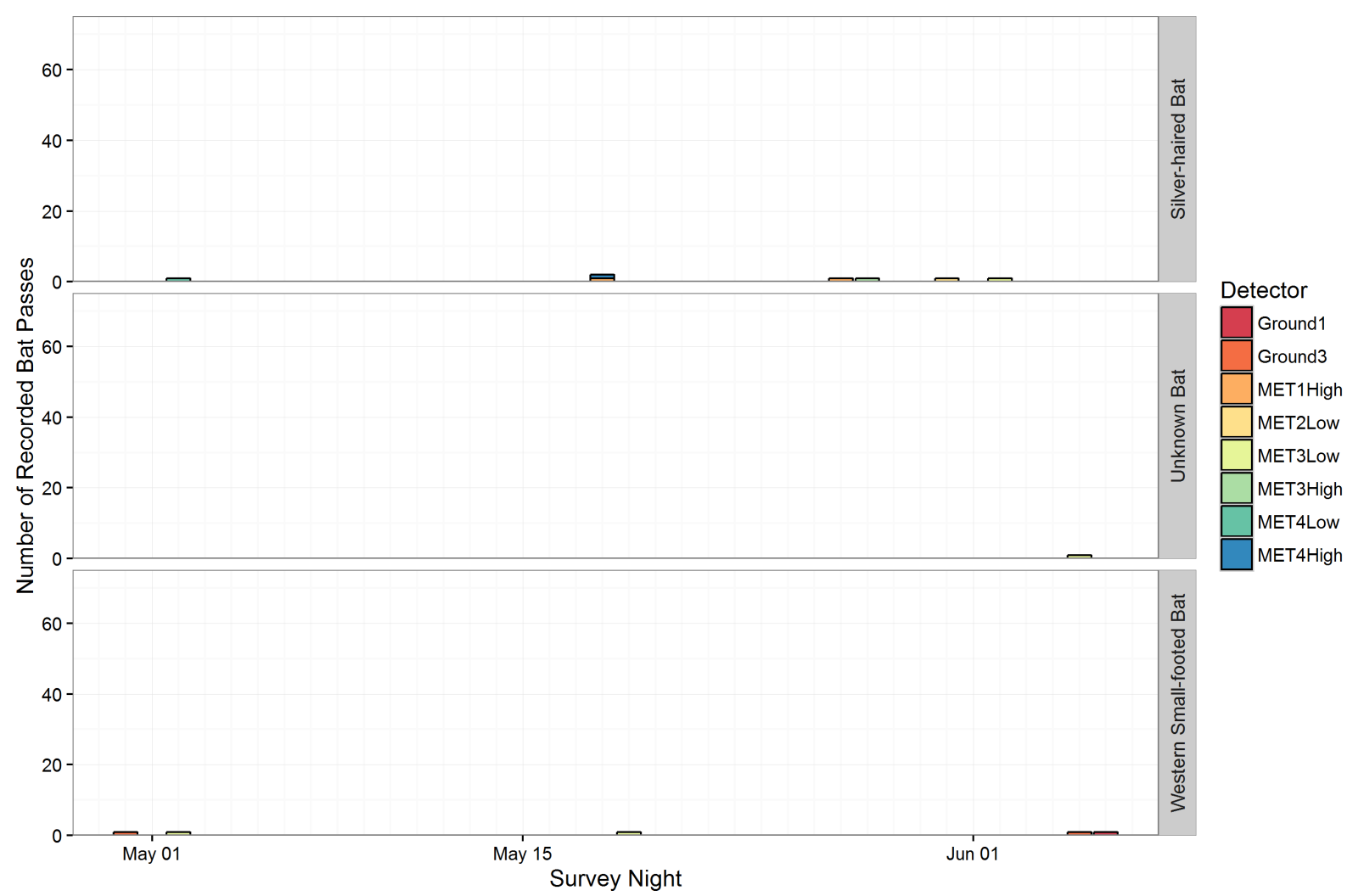


Figure B-2 (Continued)

Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area



OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

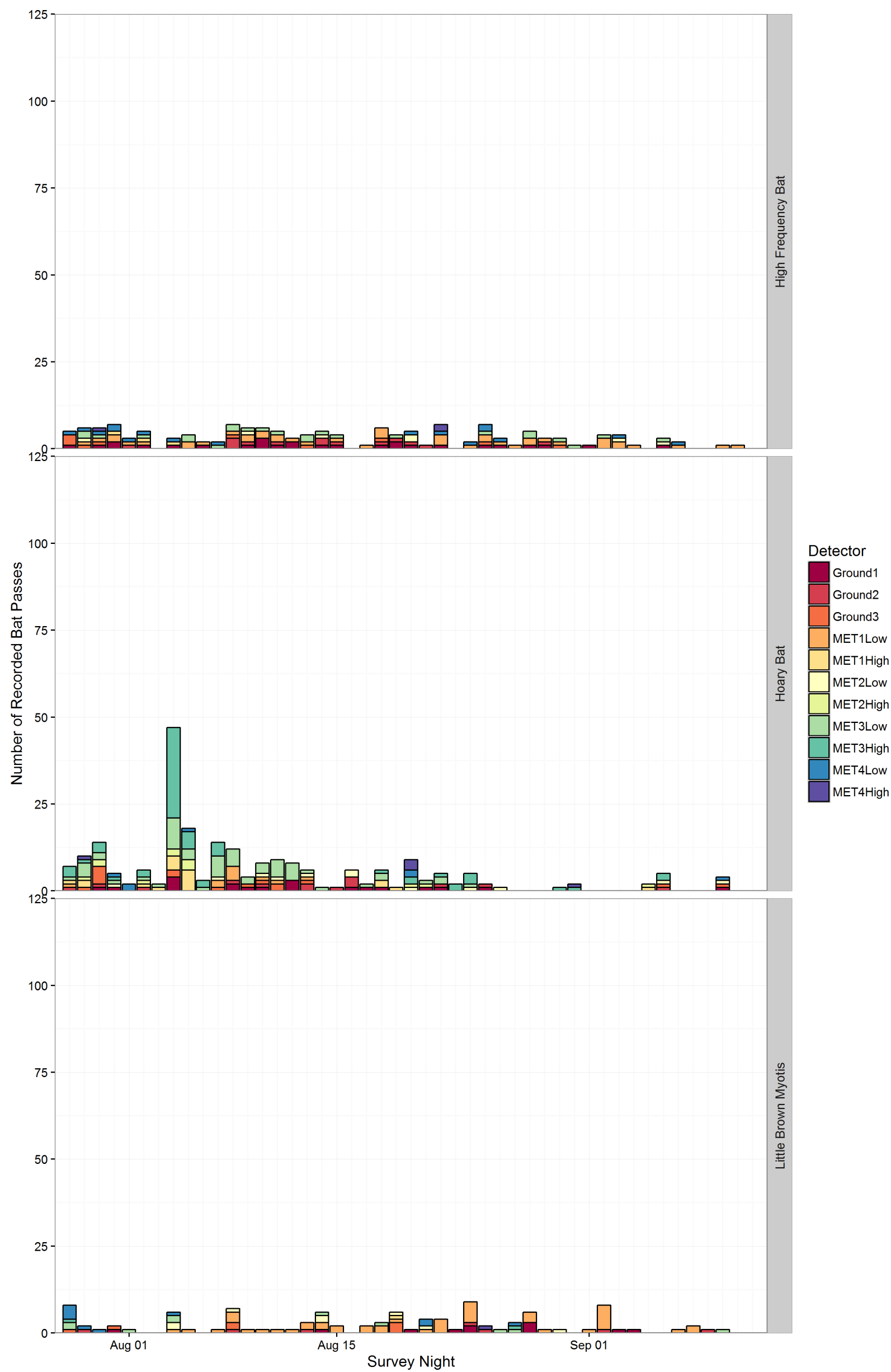


Figure B-3 (Continued)

OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
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Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area

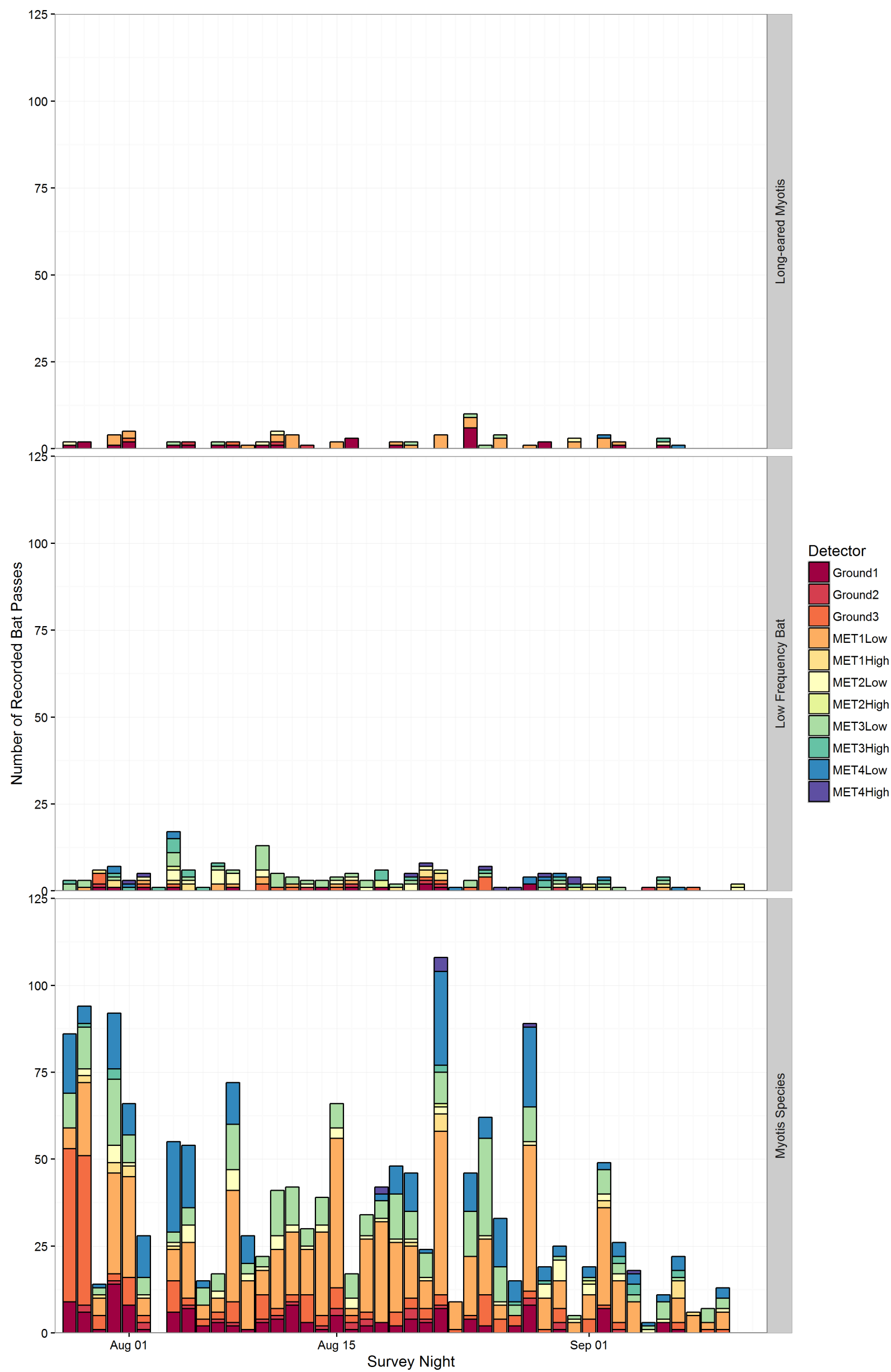
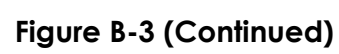


Figure B-3 (Continued)

Appendix B Bat Passes by Species or Species Grouping Recorded in the Outlaw Trail Project Area



**OUTLAW TRAIL WIND ENERGY PROJECT
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Appendix C Photos

Appendix C PHOTOS

**OUTLAW TRAIL WIND ENERGY PROJECT
2015-2016
PRE-CONSTRUCTION BAT MONITORING REPORT**

Appendix C Photos



Photo C- 1 Gentle Coulees with Native Prairie and Patches of Trees Looking South from MET 3 Station



Photo C- 2 Gentle Coulees with Native Prairie and Deciduous Forest Looking North from the top of the Big Muddy Valley at MET 3 Station.

Appendix J

Heritage Resources

J.1 Heritage Conservation Branch Referral Letter

HCB File No. 18-324



Government
— of —
Saskatchewan

Ministry of Parks Culture and Sport

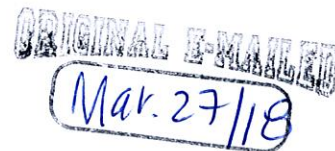
Heritage Conservation Branch
2nd Floor, 3211 Albert Street
Regina, Canada S4S 5W6

Phone: 306-787-5774
Tom.richards@gov.sk.ca

Our file: 18-324

March 27, 2018

Ms. Lauren Stead
Stantec Consulting Ltd.
Agent for: **BluEarth Renewables Inc.**
100 – 75 24th Street E
SASKATOON SK S7K 0K3
Email: lauren.stead@stantec.com



Dear Ms. Stead:

**RE: BluEarth Renewables Inc. – Outlaw Trail Wind Energy Project:
See Table 1 for 87 Locations;
HERITAGE RESOURCE REVIEW**

Thank you for referring this project for heritage resource review.

In determining the need for, and scope of, Heritage Resource Impact Assessment (HRIA) pursuant to s.63 of *The Heritage Property Act*, the following factors were considered: the presence of previously recorded heritage sites, the area's overall heritage resource potential, the extent of previous land disturbance, and the scope of new proposed land development.

The proposed project is located on both cultivated land and undisturbed hummocky native prairie near seasonal water sources and drainage coulees south of the Big Muddy Valley and Castle Butte. The latter is a terrain type considered to have moderate to high potential for containing archaeological sites. Eight archaeological sites (DhNh-1, 2, 15, 16, 44, 54, 55 and 56) and one palaeontological site (72H03-0003) are in direct conflict with the development, and there are a number of sites recorded nearby including Sites of a Special Nature (SSN). As heritage resources may be adversely affected by this wind farm development, an HRIA study is required for those areas specified in Table 1.

Although one palaeontological site (72H03-0003) is within the development area, a palaeontological HRIA is not required at this time provided the site area and surrounding exposures are avoided. The palaeontological site is located in NW-2-3-25-W2M and was found within the Ravenscrag Formation exposures present here. The site consists of one almost complete crocodile-like *Champsosaurus* skeleton. If the exposures cannot be avoided, the palaeontologists from the Royal Saskatchewan Museum (RSM) must be contacted to assess the potential disturbance area. There are also a number of other exposure areas within the rest of the development area. If fortuitous discovery of fossils occurs (either in the planning or construction phase), then the palaeontologists at the RSM must also be contacted for assessment.

The HRIA, including systematic surface survey and sub-surface test exploration, is a proponent responsibility. The study will first establish the presence of heritage sites within the project area and where suitable site avoidance measures (including right-of-way relocation) may be implemented. If heritage sites are located in unavoidable conflict with development, the study must also establish the content, structure and significance of those sites, and, on that basis, recommend both the need for and scope of any further study (including archaeological salvage excavation or other conservation action).

The HRIA must be carried out by qualified personnel under an approved investigation permit issued through this office. Normally, two days are required to process a heritage contractor's permit application.

If you have any questions regarding these heritage regulatory requirements, please contact Kim Cloutier at the above address or by calling 787-2848. Thank you again for referring this proposed development and for your cooperation in protecting the province's cultural heritage.

Sincerely,



Dr. Thomas Richards
Senior Archaeologist

cc: Kim Cloutier, Archaeologist, Heritage Conservation Branch, Ministry of Parks, Culture and Sport

Table 1: HRIA Requirements for 87 Heritage Sensitive Quarter Sections

Quarter Section	HCB Requirement(s)	HCB Comments
SW-36-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation adjacent to coulee drainages.
NW-36-02-25-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to seasonal water sources and coulee drainages.
NW-03-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation and road infrastructure adjacent to coulee drainages and seasonal water

		sources.
SW-04-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation and road infrastructure adjacent to seasonal water sources.
NE-27-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation and an existing yard site.
SE-15-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact a small portion of native prairie along the edge of a coulee drainage and areas disturbed by cultivation.
NE-34-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, road infrastructure and an existing yard site.
NE-32-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and possibly areas disturbed by cultivation, adjacent to seasonal water sources and drainages.
SW-09-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, adjacent to coulee drainages.
SW-01-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, adjacent to seasonal water sources.
SE-11-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, adjacent to seasonal water sources.
NE-05-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation.
NE-11-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and possibly areas disturbed by cultivation, adjacent to seasonal water sources.
SE-08-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, adjacent to coulee drainages.
NW-35-02-24-W2M	HRIA Required for	No sites in conflict. Development may impact

	native prairie portions only	hummocky native prairie and areas disturbed by cultivation, adjacent to coulee drainages.
SE-02-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation, adjacent to seasonal water sources and coulee drainages.
SE-04-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and areas disturbed by cultivation and road infrastructure, adjacent to seasonal water sources.
NW-34-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages.
SW-35-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to seasonal water sources and areas disturbed by cultivation.
SW-02-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to seasonal water sources and areas disturbed by cultivation and road infrastructure.
NE-10-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and coulee drainages, and areas disturbed by cultivation.
NW-12-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to seasonal water sources, and areas disturbed by cultivation and road infrastructure.
SE-12-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and coulee drainages, and areas disturbed by cultivation and road infrastructure.
SW-03-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie and coulee drainages, and areas disturbed by cultivation.
NW-31-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to seasonal water sources, and areas disturbed by cultivation.
NW-34-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by road infrastructure.

NE-31-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas possibly disturbed by cultivation.
NW-09-03-25-W2M	HRIA Required for native prairie portions	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure.
NE-03-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to seasonal water sources, and areas disturbed by cultivation and road infrastructure.
NW-09-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
SW-29-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure.
NE-35-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NW-22-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NE-33-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to seasonal water sources, and areas disturbed by gravel activities in SE corner.
SE-29-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
SW-01-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to seasonal water sources and coulee drainages, and areas disturbed by cultivation.
SW-33-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
SW-12-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to seasonal water sources, and areas disturbed by cultivation, road infrastructure and gravel activities.
NW-01-03-24-W2M	HRIA Required for	No sites in conflict. Development may impact

	native prairie portions only	native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
SE-22-03-25-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
SE-19-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
NW-29-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
NW-33-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
NE-12-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
SE-03-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NW-04-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie along the western boundary of the quarter section adjacent to seasonal water sources, and areas disturbed by cultivation, road infrastructure, and an existing yard site.
NW-07-03-23-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
SE-21-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a coulee drainages, and areas disturbed by cultivation and road infrastructure.
SW-32-02-24-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to coulee drainages.
SE-11-03-25-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to seasonal water sources.
NW-32-02-24-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to coulee drainages.
NW-30-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation, road infrastructure and a yard site.

NE-09-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NE-02-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to seasonal water sources, and areas disturbed by cultivation.
SE-31-02-24-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to coulee drainages.
NW-08-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
SW-22-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a coulee drainage in the NE corner, and areas disturbed by cultivation.
SW-07-03-23-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a coulee drainage, and areas disturbed by cultivation.
NE-04-03-24-W2M	No further concerns	No sites in conflict. Development will impact areas disturbed by cultivation and road infrastructure with minimal amounts of native prairie adjacent to seasonal water sources.
NE-18-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
NE-01-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NE-34-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to coulee drainages.
NW-10-03-25-W2M	HRIA Required for native prairie portions and assessment of DhNh-2	DhNh-2 (artifact/feature combo) in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure.
NW-35-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to water sources, and areas disturbed by cultivation and road infrastructure.
SE-36-02-25-W2M	HRIA Required for native prairie	No sites in conflict. Development may impact native prairie adjacent to coulee drainages, and

	portions only	areas disturbed by cultivation.
NE-36-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure.
NE-01-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure.
NE-08-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NW-02-03-25-W2M	HRIA Required for native prairie portions only and avoidance of exposures around site 72H03-0003 recommended	One palaeontology site (72H03-0003) in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation. Avoid exposures of Ravenscrag Formation. If avoidance of exposures is not feasible, a palaeontology HRIA may be required.
SE-35-02-25-W2M	HRIA Required	No sites in conflict. Development will impact hummocky native prairie adjacent to coulee drainages.
NE-15-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a coulee drainage, and areas disturbed by cultivation.
SE-09-03-24-W2M	HRIA Required for native prairie portions and assessments of DhNh-1, 15, and 16	DhNh-1 (artifact/feature combo), DhNh-15 (single feature), and DhNh-16 (recurrent feature) in conflict. Development may impact hummocky native prairie adjacent to coulee drainages, and areas disturbed by cultivation.
NW-26-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a drainage, and areas disturbed by cultivation.
SE-05-03-24-W2M	HRIA Required if potential impact to DhNh-55	DhNh-54 (artifact find), DhNh-55 (single feature) and DhNh-56 (artifact find) are in conflict, but DhNh-54 and 56 have no further work recommended. Development may impact native prairie adjacent to coulee drainages, and areas disturbed by cultivation and road infrastructure. This entire quarter section was previously surveyed (permit 17-197).
NW-15-03-25-W2M	HRIA Required for	DhNh-44 (recurrent feature) in conflict.

	assessment of DhNh-44	Development will impact areas disturbed by cultivation.
NE-21-03-25-W2M	No further concerns	No sites in conflict. Development will impact areas disturbed by cultivation with only a small amount of native prairie within the drainage coulee.
NW-01-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to water sources, and areas disturbed by cultivation.
NW-12-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to drainage coulees, and areas disturbed by cultivation.
NE-22-02-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie and areas disturbed by cultivation.
SW-31-02-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to seasonal water sources, and areas disturbed by cultivation.
SE-34-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to drainage coulees.
SE-01-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to drainage coulees, and areas disturbed by cultivation and road infrastructure.
SE-32-02-24-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to drainage coulees.
NW-11-03-25-W2M	HRIA Required	No sites in conflict. Development will impact native prairie adjacent to seasonal water sources and a drainage coulee.
SW-02-03-25-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to a drainage coulee, and areas disturbed by cultivation and road infrastructure.
SW-11-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact areas disturbed by cultivation with only a small portion of native prairie in the SW corner.
NW-07-03-24-W2M	HRIA Required for native prairie portions only	No sites in conflict. Development may impact native prairie adjacent to drainage coulees, and areas disturbed by cultivation.

J.2 Heritage Conservation Branch Referral Letter

HCB File No. 20-247

March 11, 2020

Our file: 20-247

Mike Markowski
Atlheritage Services Ltd.
Agent for: **BluEarth Renewables Inc.**
150 – 203 Packham Avenue
SASKATOON SK S7N 4K5
Email: mike.markowski@atlheritage.ca

ORIGINAL EMAILED

Mar. 12/20

Dear Mike Markowski:

**RE: BluEarth Renewables – Outlaw Trail Wind Energy Project Revision:
Townships 2 and 3, Ranges 23, 24 and 25, W2M;
HERITAGE RESOURCE REVIEW**

Thank you for referring this development for heritage resource review. The original project had an HRIA requirement (issued March 27, 2018, file 18-324) based on a broad project footprint. The project footprint has now been defined and was submitted again for review on February 13, 2020.

In determining the need for, and scope of, Heritage Resource Impact Assessment (HRIA) pursuant to s.63 of *The Heritage Property Act*, the following factors were considered: the presence of previously recorded heritage sites, the area's overall heritage resource potential, the extent of previous land disturbance, and the scope of new proposed land development.

One known archaeological site (DhNh-56) is in direct conflict with the development. DhNh-56 is an artifact find site. The development will impact both cultivated land and undisturbed hummocky native prairie near seasonal water sources and drainage coulees south of the Big Muddy Valley. The latter is a terrain type considered to have moderate to high potential for containing intact archaeological sites. Accordingly, as this wind energy project may damage or disturb archaeological sites, an HRIA is required for the 18 quarter sections listed in Table 1. The HRIA must occur in snow-free and frost-free conditions.

The HRIA, including systematic surface survey and sub-surface test exploration, is a proponent responsibility. The study will first establish the presence of previously recorded heritage sites as well as any new site discoveries within the project area that were disturbed during development. If heritage sites are located, the study must also establish the content, structure and significance of those sites, and, on that basis, recommend both the need for and scope of any further study (including archaeological salvage excavation or other conservation action).

The HRIA must be carried out by qualified personnel under an approved investigation permit issued through this office. A minimum of two business days are required to process a heritage contractor's permit application.

Mike Markowski
Page 2
March 11, 2020

If you have any questions regarding these heritage regulatory requirements, please contact Kim Cloutier at the above address or by calling 787-2848. Thank you again for referring this proposed development and for your cooperation in protecting the province's cultural heritage.

Sincerely,



Dr. Thomas Richards
Senior Archaeologist

cc: Kim Cloutier, Archaeologist, Heritage Conservation Branch, Ministry of Parks, Culture and Sport

Table 1: Quarter Sections Requiring an HRIA

Quarter Section	HCB Requirement(s)	HCB Comments
NE-9-3-25-W2M	HRIA for native prairie only	No sites. Collector line impacts native prairie along northern boundary.
NW-10-3-25-W2M	HRIA for native prairie only	No sites. Collector line impacts native prairie along northern boundary.
NW-11-3-25-W2M	HRIA Required	No sites. Collector lines impact native prairie.
NE-11-3-25-W2M	HRIA Required	No sites. Collector lines impact native prairie.
NW-1-3-25-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie.
NW-35-2-25-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie along eastern boundary.
SE-35-2-25-W2M	HRIA Required	No sites. Collector lines impact native prairie.
NW-31-2-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie.
SE-5-3-24-W2M	HRIA Required	DhNh-56 in conflict. Collector lines impact native prairie.
SW-4-3-24-W2M	HRIA Required	No sites. Collector lines impact native prairie.
SE-4-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie.
SW-3-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie along the southern boundary.
SW-2-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie along southern boundary.
SE-2-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie along southern boundary.

SW-1-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie in SW and NW corner.
NW-1-3-24-W2M	HRIA for native prairie only	No sites. Collector lines impact native prairie in SW corner.
SW-12-3-24-W2M	HRIA for native prairie only	No sites. Collector lines and road impacts native prairie adjacent to existing trails and roads.
NW-12-3-24-W2M	HRIA for native prairie only	No sites. Collector lines and road impacts native prairie adjacent to existing trails.

J.3 Heritage Resource Impact Assessment Report



**OUTLAW TRAIL WIND LIMITED PARTNERSHIP
c/o BluEarth Renewables Inc.**

**Outlaw Trail Wind Project
Heritage Resources Impact Assessment**

Permit No. 20-114
HCB File No.: 20-247

Atlheritage File No. AH20014-2

Atlheritage Services Corp.
150 – 203 Packham Avenue
Saskatoon, SK
S7N 4K5
o. (306) 242-2822

EXECUTIVE SUMMARY

The Outlaw Trail Wind Limited Partnership (Outlaw Trail LP) is proposing to develop a wind power project known as the Outlaw Trail Wind Project in south-central Saskatchewan on the south side of the Big Muddy Valley (Figure 1). A Heritage Resources Impact Assessment (HRIA) was completed for the Outlaw Trail Wind Project under Archaeological Resources Investigation Permit No. 20-018. Following the HRIA, The Outlaw Trail Wind Project was revised to include underground collector lines, which resulted in several new right-of-way's (ROW) that were not part of the original Heritage Resource Review and HRIA. Atlheritage Services Corp. (Atlheritage) submitted the revised plans, heritage concerns (i.e. areas of native prairie) to the Heritage Conservation Branch (HCB) and Archaeological Resource Investigation Permit No. 20-114 was issued.

Atlheritage completed the new HRIA requirements under Archaeological Resource Investigation Permit No. 20-114 on September 30, 2020. No new archaeological sites were discovered in conflict. In addition, archaeological sites DhNh-57 and DhNh-58 that were discovered during the original HRIA (Permit No. 20-018) are no longer in conflict with the Outlaw Trail Wind Project.

Based on the results of the HRIA, it is recommended that Outlaw Trail LP be provided with regulatory approval as per Section 63 of *The Heritage Property Act* for the Outlaw Trail Wind Project (HCB File No. 20-247). The following HRIA Permit Report fulfills the permit requirements for Permit No. 20-114.



PROJECT CREDITS

Project ManagerMike Markowski, M.A.
Permit HolderMike Markowski, M.A.
Field AssistantPaul Thomson, B.A., M.A. Candidate
Report AuthorMike Markowski, M.A.
Senior ReviewBrad Schiele, M.A.

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APPENDICES

Appendix A: Shovel Probes



1.0 INTRODUCTION

The Heritage Conservation Branch (HCB) reviewed the Outlaw Trail Wind Project for heritage concerns (HCB File No. 20-247). The HCB identified several areas where Project components (i.e. collector lines and access roads) will impact areas of native prairie near seasonal water sources and drainage coulees south of the Big Muddy Valley – terrain considered to have moderate to high potential to discover intact archaeological sites. Atlheritage Services Corp. (Atlheritage) completed the Heritage Resources Impact Assessment (HRIA) requirements under Archaeological Resource Investigation Permit No. 20-018. Archaeological sites DhNh-57 and DhNh-58 were discovered in conflict with collector line right-of-way's (ROW).

Following the HRIA, The Outlaw Trail Wind Project was revised to include underground collector lines, which resulted in several new right-of-way's (ROW) through areas of native prairie that were not assessed during the original HRIA. Atlheritage submitted the revised plans and heritage concerns (i.e. areas of native prairie) to the HCB. The HCB agreed with Atlheritage's recommendations and issued Archaeological Resource Investigation Permit No. 20-114.

Atlheritage completed the new HRIA requirements under Archaeological Resource Investigation Permit No. 20-114 on September 30, 2020. No new archaeological sites were discovered in conflict. In addition, archaeological sites DhNh-57 and DhNh-58 that were discovered during the original HRIA (Permit No. 20-018) are no longer in conflict with the Outlaw Trail Wind Project.

This report documents the results of the HRIA. The HCB's Heritage Resource Review and HRIA requirements are addressed in Section 2.0, a description of the Project and local environment is discussed in Section 3.0. A general discussion regarding the methodology used to complete the HRIA requirements are reviewed in Section 4.0. The results of the HRIA are included in Section 5.0. A summary of the HRIA and recommendations are found in Section 6.0



and closure to the HRIA is in Section 7.0. All references cited in this report are presented in Section 9.0. Excavated shovel probe locations are documented in Appendix A. At this time, there are no formal survey plans available since all data (i.e. collector lines, turbine locations, access road) were provided using .shp files. For the Project layout/footprint, please refer to Figures 1, 2A and 2B.

2.0 HERITAGE RESOURCE REVIEW

The Heritage Property Act (Part III and IV, s.59, s.63, s.66) outlines the key provisions for protecting heritage resources in Saskatchewan. The legislation states that heritage resources include Precontact Period and Historic Period archaeological sites, built heritage sites and structures of historical and/or architectural interest and palaeontological sites. Heritage Resources are regarded as a public resource; however, all heritage resources (e.g. artifacts) are the property of the Provincial Crown and are protected under *The Heritage Property Act* (s.66). Any person or corporation who contravenes any provision of *The Heritage Property Act* is guilty of an offence and liable on summary conviction of a fine, imprisonment, or both.

The HCB's (Government of Saskatchewan – Parks, Culture and Sport), Archaeological Resource Management Section focuses on land and resource development review, HRIAs, permitting, managing the Saskatchewan Archaeological Site Inventory, and geographic place naming. To streamline the Heritage Resource Review process, the HCB has developed screening criteria for identifying archaeologically sensitive lands in Saskatchewan.

For any proposed land use or development project, the HCB relies on two primary factors to determine if the land use or development project will trigger an HRIA as per s.63 of *The Heritage Property Act*:

- The presence of previously recorded archaeological sites.
- The heritage resource potential (or sensitivity) of the development area.

Important secondary factors include:

- The nature and extent of previous land disturbance (including cultivation).
- The nature and scope of new land alteration.

This information is taken into consideration with additional screening criteria developed specifically for southern Saskatchewan (grasslands, southern parklands); and, northern Saskatchewan (northern parklands, boreal forest).

2.1 Outlaw Trail Wind Project

The original Project footprint for the proposed Outlaw Trail Wind Project was reviewed HCB for heritage concerns under HCB File No. 18-324; however, a HRIA was never completed since the Project footprint was not defined. In 2020, Atlheritage submitted a subsequent Heritage Resource Review with defined turbine locations, collector lines and access roads to determine HRIA requirements. The HCB noted that the Project will impact both cultivated land and areas of native prairie near seasonal water sources and drainage coulees south of the Big Muddy Valley (HCB File No. 20-247). Based on the heritage concerns identified, the HCB required a HRIA for all areas of native prairie that will be impacted by Project infrastructure (HCB File No. 20-247) (Atlheritage 2020).

Following the completion of the HRIA requirements under Permit No. 20-018 (Atlheritage 2020), the Outlaw Trail Wind Project was further revised (Figures 1; 2A and 2B). Specifically, collector line ROWs were revised (from overhead to underground), which impacted routing. Atlheritage reviewed the revised Project footprint and identified areas with heritage concerns (i.e. areas of native prairie) and discussed their recommendations with the HCB. A HRIA was recommended for collector line ROWs that will impact areas of native prairie in the quarter-sections included in Table 1 (Figures 1; 2A and 2B). All collector lines adjacent to existing gravel roads will be installed in the ditches, which have been impacted by RM road construction.

Table 1: Heritage Concerns Identified in the Revised Outlaw Trail Wind Project

<i>Quarter-section</i>	<i>HRIA Recommendations</i>
NE 9-3-25 W2M	Collector line ROW in areas of native prairie (~270 m of ROW).
NW 10-3-25 W2M	Collector line ROW in areas of native prairie; hills (~400 m)
NE 1-3-25 W2M	Collector line ROW in areas of native prairie; hills (~385 m)
SE 8-3-24 W2M	Collector line ROW in areas of native prairie; hills (~485 m)
SW and SE 4-3-24 W2M	Collector line ROW in areas of native prairie (~1,200 m)
SW 3-3-24 W2M	Collector line ROW in areas of native prairie; creek (~540 m)
SW 2-3-24 W2M	Collector line ROW in areas of native prairie; creek (~530 m)

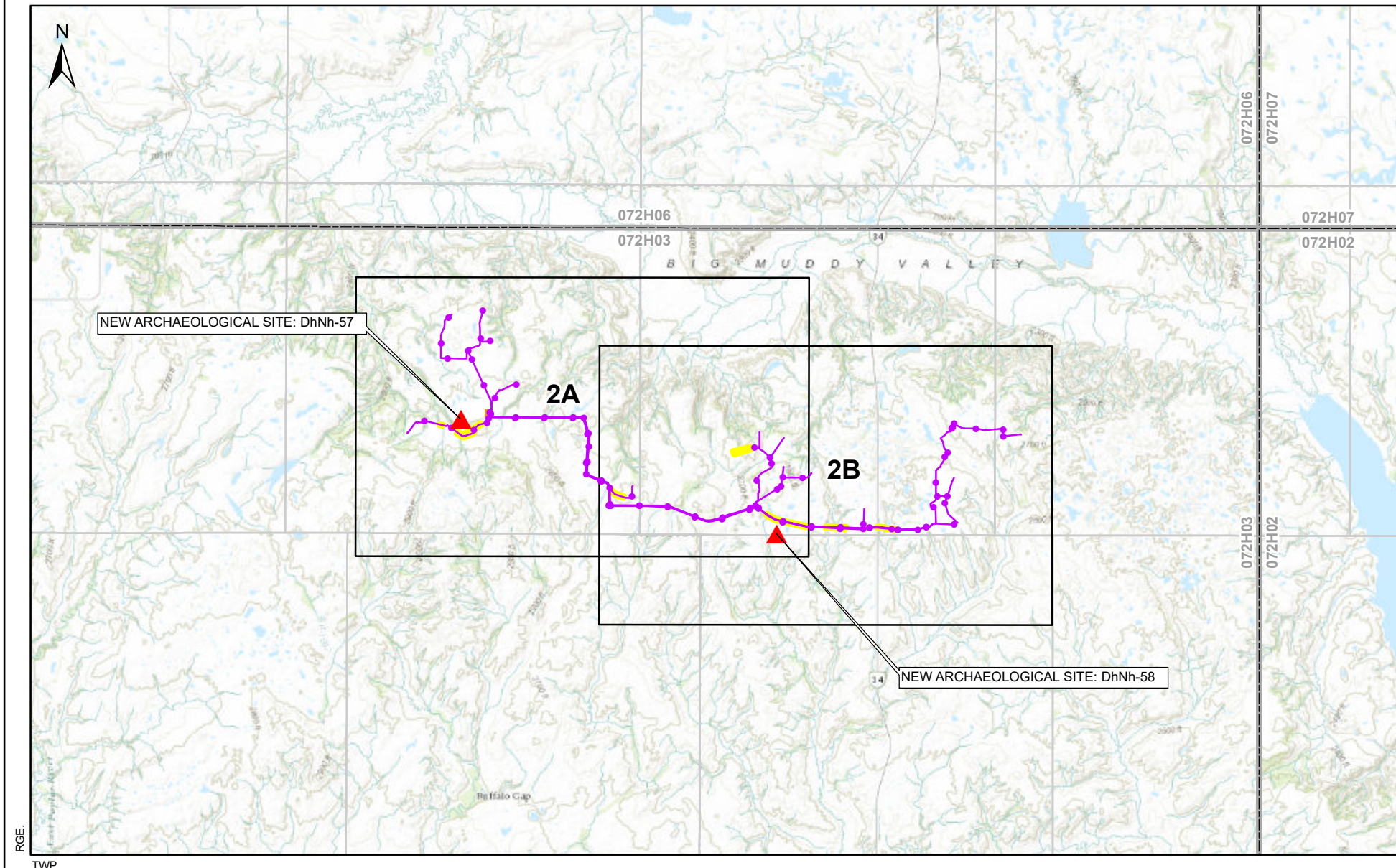
3.0 PROJECT DESCRIPTION AND LOCAL ENVIRONMENT

The Outlaw Trail Wind Project is located in the Mixed Grasslands Ecoregion in south-central Saskatchewan (Acton et al. 1998) (Figure 1). The Project area is located approximately 10 km north of Big Beaver, SK and immediately south of the Big Muddy Valley (Figure 1).

3.1 Outlaw Trail Wind Project

The Outlaw Trail Wind Project covers an approximate 10 km (north/south) by 20 km (east/west) area (Figures 1; 2A and 2B). The Project currently consists of 55 proposed turbine locations (Figures 1; 2A and 2B). Access roads will be required to access the turbines and power will be distributed through a series of underground collector lines (Figures 1, 2A and 2B).

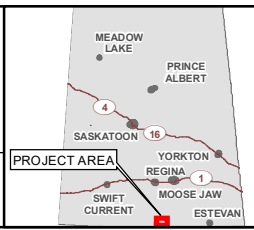
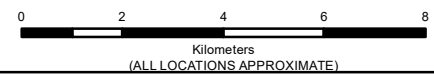
The Project will impact a combination of previously disturbed terrain (e.g. cultivated fields, ditches) and areas of native prairie. Areas of native prairie are primarily found on rolling terrain characterized by poor soil development and glacial till (surface cobbles and small boulders). Areas of native prairie primarily consists of short native grasses and are often near seasonal water sources and watercourses. Aspen, willow, and wild rose are commonly found in low-lying areas adjacent to water sources. The Big Muddy Valley is located approximately 2 km north of the northern extent of the Project area, which also includes the well-known landscape marker known as Castle Butte (Figures 1, 2A and 2B).



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SCALE: 1:150,000



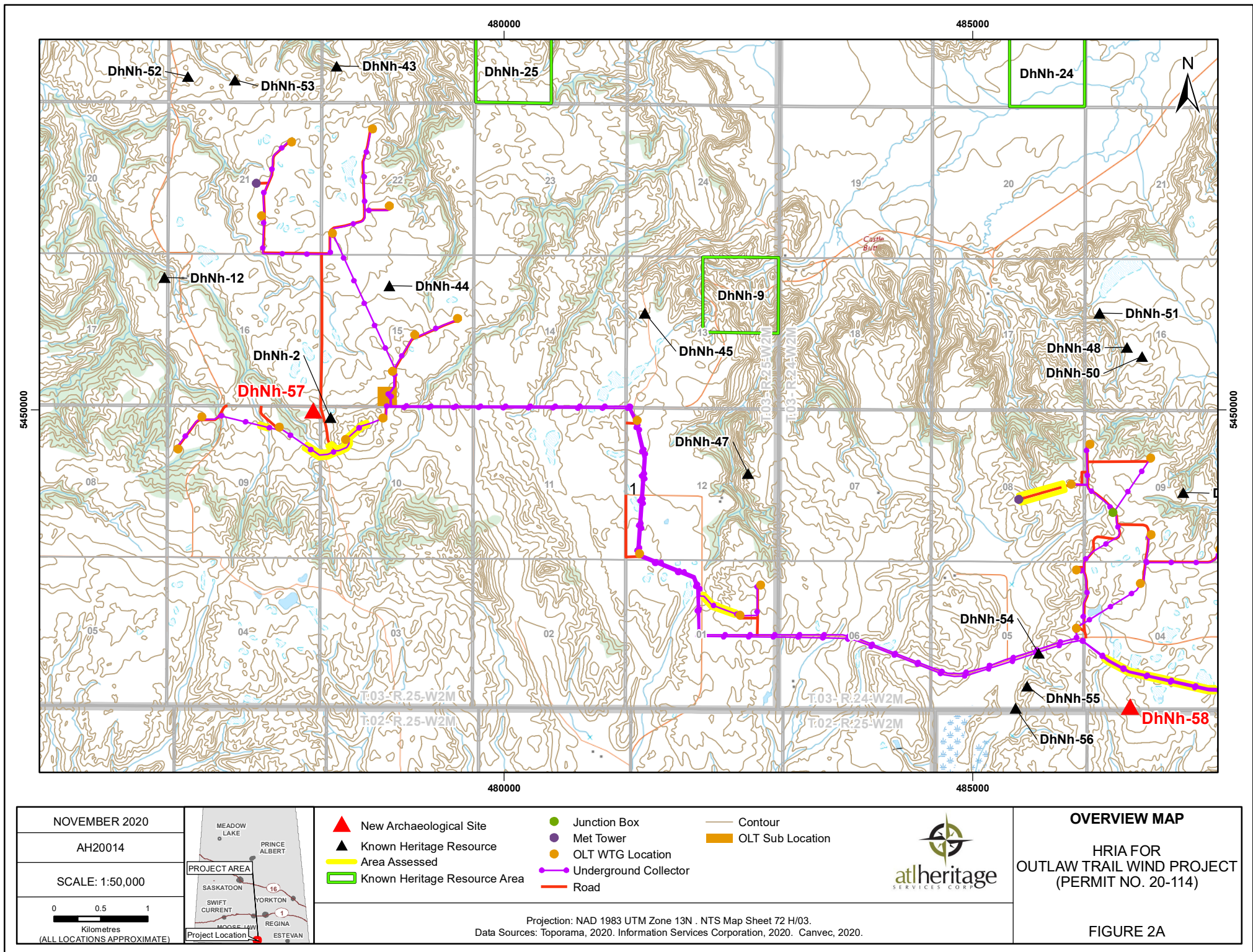
- ▲ New Archaeological Site
- Underground Collector
- Overview Figure Index
- Area Assessed

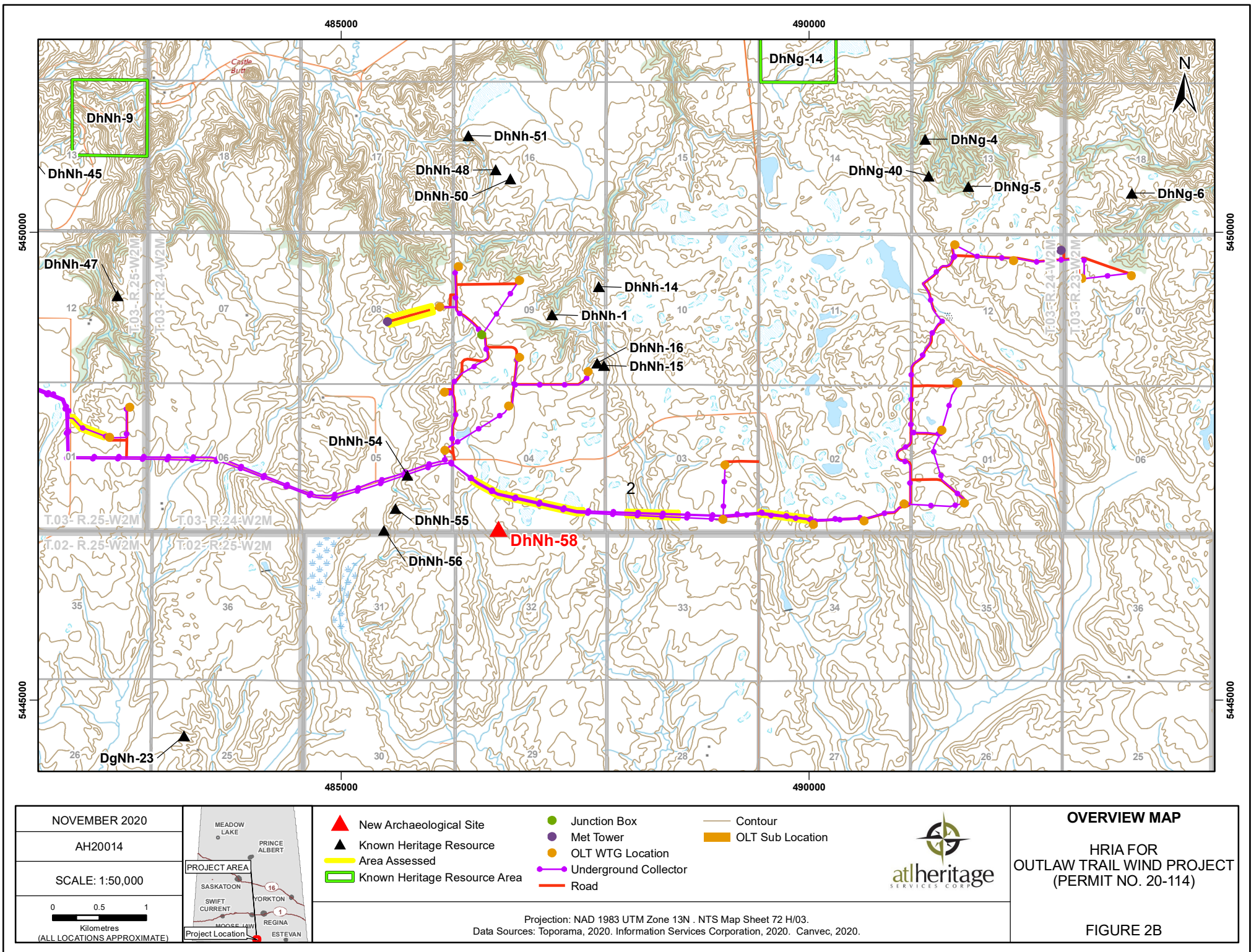
Projection: NAD 1983 UTM Zone 13N . Data Sources: Information Services Corporation, 2020, Geobase 2020. Image Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

REGIONAL OVERVIEW

HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)

FIGURE 1





4.0 METHODOLOGY

Effective methodology is essential for completing an HRIA. An understanding of the general archaeology and previous archaeological research (including information on known archaeological sites) provides the archaeologist with important background information. This information may increase archaeological site discovery, interpretation of archaeological sites and the overall effectiveness of the field assessment. In addition, standard field assessment methodology and good judgement allows the archaeologist to adequately assess the project area during the field assessment.

4.1 Previous Archaeological Research

The HCB's Saskatchewan Archaeological Site Inventory was reviewed for information regarding the types of archaeological sites recorded in the project area. Typically, Saskatchewan Archaeological Resource Record (SARR) and SARR Update forms are requested for all previously recorded archaeological sites within a 1 km radius of the project area. In addition, previously completed permit reports are available on request. These reports often contain important information that is not typically included in the SARR or SARR Update forms.

Known heritage resources were reviewed within a 1 km radius of the Outlaw Trail Wind Project (NTS Map Sheet: 72 H/03). A total of 17 known heritage resources (archaeological sites) have been recorded in this area and are included in Table 2 and illustrated on Figures 2A and 2B. Archaeological site types include: Single Features (n=6), Recurrent Features (n=6), Artifact/Feature Combinations (n=2), Artifact Finds (n=2) and a Multiple Feature (n=1) (Table 2). All of the known archaeological sites within 1 km of the Project area date to the Precontact Period. The majority of these sites lack any diagnostic artifacts (e.g. projectile points, pottery) to indicate temporal age and cultural affiliation; however, a diagnostic artifact from archaeological site DhNh-1 provides evidence that this site was occupied during the Late Precontact Period. In

southern Saskatchewan, the Late Precontact Period ranges from approximately 2,000 years before present (BP) to 170 years BP (Peck 2011; Walker 1999; Dyck 1983) (Figure 2B).

Archaeological site DhNh-57 consists of the remains of a European Homestead from the Historic Period that likely dates to c. 1918 (Figures 1 and 2A) (Atlheritage 2020).

Table 2: Known Heritage Resources within a 1 km radius of the Outlaw Trail Wind Project

<i>Borden No.</i>	<i>Site Type</i>	<i>Period</i>	<i>Permit No.</i>
DhNg-5	Recurrent Feature	Precontact	90-028:00
DhNg-6	Recurrent Feature	Precontact	90-028:00
DhNg-40	Single Feature	Precontact	97-000:00
DhNh-1	Artifact/Feature Combination	Late Precontact	60-000:00
DhNh-2	Artifact/Feature Combination	Precontact	62-000:00
DhNh-12	Single Feature	Precontact	87-000:00
DhNh-14	Single Feature	Precontact	89-015:00
DhNh-15	Single Feature	Precontact	89-015:00
DhNh-16	Recurrent Feature	Precontact	89-015:00
DhNh-44	Recurrent Feature	Precontact	97-000:00
DhNh-45	Recurrent Feature	Precontact	97-000:00
DhNh-47	Single Feature	Precontact	97-000:00
DhNh-54	Artifact Find	Precontact	17-197:00
DhNh-55	Single Feature	Precontact	17-197:00
DhNh-56	Artifact Find	Precontact	17-197:00
DhNh-57	Multiple Feature	Historic (European)	20-018:00
DhNh-58	Recurrent Feature	Precontact	20-018:00

Archaeological sites DhNh-57 and DhNh-58 were discovered during the original HRIA for the Outlaw Trail Wind Project (Atlheritage 2020). These sites were discovered in conflict with collector line ROWs and required further mitigation (i.e. avoidance). The remains of a European Homestead dating to c. 1918 was discovered at DhNh-57 and 3 stone circles were recorded at DhNh-58.

The revised footprint of the Outlaw Trail Wind Project will no longer impact DhNh-57, DhNh-58 and DhNh-56 (Figures 1; 2A and 2B). Archaeological site DhNh-56 was discovered during a HRIA in 2017 and was determined to have low interpretive and scientific value (Atlheritage 2020). Therefore, there are no further heritage concerns (i.e. mitigation requirements) with the current footprint of the Outlaw Trail Wind Project.

4.2 Field Assessment

The purpose of the field assessment is to determine if heritage resources are in conflict with the proposed Project. Field assessment methodology generally consists of a combination of pedestrian reconnaissance and the excavation of subsurface shovel probes (Saskatchewan Ministry of Tourism, Parks, Culture and Sport 2008; Burke and Smith 2004; Ruppel 1966). Pedestrian reconnaissance allows the archaeologist to identify surface features (e.g. stone circles, stone cairns, cellar depressions), artifacts exposed on the surface, inspect subsurface exposures (e.g. tree throws, trails, cut-banks) and to identify areas considered to have high heritage potential.

Surface visibility can vary from excellent (e.g. short native grasses, cultivated field) to poor (e.g. tall grasses, organic deposits observed in treed environments) depending on topography, location and time of year (e.g. winter conditions – snow covered). Despite the level of surface visibility, artifacts and features may be buried due to erosional factors (e.g. wind and water) and soil deposition throughout the last 10,500 years (Schiffer et al. 1978). For this reason, it is almost always necessary to compliment pedestrian reconnaissance with the excavation of

shovel probes within the project area. This is especially vital in areas with poor surface visibility, such as those covered by thick vegetation (e.g. trees, shrubs, tall grasses) or in areas in proximity to known archaeological sites (Chartkoff 1978; Lovis 1976).

Shovel probes typically measure 40 cm by 40 cm and are excavated until subsoil or glacial till is encountered which can range in depth from 5 cm depth below surface (DBS) to 60 cm DBS. In areas where greater deposition has occurred (e.g. sand dune terrain, valleys), heavy equipment may be necessary to determine if deeply buried archaeological sites are present. In general, the likelihood of discovering a small site and buried artifacts is improved when the frequency of shovel probes is increased (McManamon 1984; Meyer 1983).

If an archaeological site is discovered, the location, size, boundaries, function, and significance of the site are determined through the excavation of shovel tests and pedestrian reconnaissance (Burke and Smith 2004; Fladmark 1978). Atlheritage bases the archaeological site's geographical location (UTM coordinates NAD 83) off a central location (if multiple features and/or artifacts are discovered) using a feature (e.g. stone circle, stone cairn) or the location where the artifact was discovered. An archaeological site's UTM coordinates are recorded using a hand-held Global Positioning Satellite (GPS) unit. Instead of shovel probes, which are used for site discovery, shovel tests measuring 50 cm by 50 cm are systematically excavated to determine the extent of the site. All excavated soils are screened through a quarter-inch (6 mm) wire mesh, increasing the recovery rate of artifacts.

If artifacts are discovered on the surface during an HRIA and are not identified as a tool (e.g. lithic debitage), they are recorded and left in-situ. All artifacts discovered in-situ (e.g. in a shovel probe or shovel test) are collected. Surface and/or buried features that are discovered in conflict during the HRIA are typically tested, photographed, and mapped in detail. If the archaeological site (including cultural materials and/or features) is considered significant, or if the site is located immediately adjacent to the project area, the site or features nearest to the

project area may be staked and flagged using surveyor lathe and hazard identification flagging tape for avoidance.

Artifacts collected during the HRIA will be further analyzed by Atlheritage. All collected artifacts will be catalogued and prepared according to the Royal Saskatchewan Museum's (RSM) requirements and are required to be submitted to the RSM by December 31, 2020. An artifact catalogue and photographs of all significant artifacts (e.g. stone tools, maker's marks) will be documented and discussed in the report.

5.0 FIELDWORK RESULTS

Atlheritage completed the HRIA requirements for Outlaw Trail Wind LP's Outlaw Trail Wind Project under Archaeological Resource Investigation Permit No. 20-114. Atlheritage completed the field assessment on September 30, 2020. The results of the HRIA are discussed below.

5.1 Outlaw Trail Wind Project

The Outlaw Trail Wind Project was assessed using a combination of pedestrian reconnaissance and the excavation of shovel probes (Figures 2A and 2B; Figures 3A to 3G); Appendix A). Pedestrian reconnaissance transects were completed within all of collector line ROWs that required a HRIA (3.8 km assessed). Based on the HRIA requirements and the archaeological potential of the Project, pedestrian reconnaissance transects were completed in a 25 m wide ROW for all collector line ROWs. While the actual ROWs will be much smaller than the assessed 25 m wide ROWs – the additional areas that were assessed allowed for any archaeological sites adjacent to the collector lines and access road ROWs to be identified and recorded in the event additional workspace or the actual ROWs need to be slightly moved.

A total of 47 shovel probes were excavated within the assessed collector line ROWs that will impact areas of native prairie (Figures 2A and 2B; Figures 3A to 3G); Appendix A). Shovel probes were generally excavated in 70 m to 100 m intervals in areas of native prairie in order to provide an adequate sampling of the area to determine if any buried features or artifacts are in conflict. In addition, shovel probes were also excavated in areas determined to have high archaeological potential including, hill tops and small saddle-type landforms – a common place where Precontact Period activity areas (e.g. processing areas, stone tool making) are often discovered.

All shovel probes were excavated until subsoils were encountered to a maximum depth of 60 cm depth below surface (DBS). All excavated back-dirt was broken up using a shovel and trowel, when required, to closely inspect for artifacts. All back-dirt was then trowelled through for artifacts while backfilling the excavated shovel probe. No buried artifacts, features or paleosols were discovered during the HRIA.

The results of the HRIA are summarized per quarter-section in the Table below (Table 3) (Figures 2A and 2B). Table 3 includes a brief summary of the HRIA results / quarter-section and includes fieldwork observations, fieldwork results and references to Photos and Figures.

Table 3: Summary of the Outlaw Trail HRIA Fieldwork Results (Permit No. 20-114)

<i>Quarter-section</i>	<i>Fieldwork Observations</i>	<i>Fieldwork Results</i>	<i>Photo / Figure Reference</i>
NE 9-3-25 W2M	Areas of native prairie along shallow coulees.	270 m of collector line ROW assessed	Photo 1
	General Stratigraphy: 0 cm to 1 cm sod 1 cm to 3 cm brown loam/clay; 3 cm to 20 cm grey/tan clay with gravel.	5 shovel probes excavated. Access Road follows existing bladed trail with shallow ditches (disturbed area).	Figures 2A, 3A and 3B
NW 10-3-25 W2M	Area of native prairie limited to hill tops/irregular ridge features.	400 m of collector line ROW and small portion of access road ROW assessed.	Photo 2
	General Stratigraphy: 0 cm to 1 cm sod 1 cm to 5 cm gravel.	9 shovel probes excavated.	Figures 2A and 3B
NE 1-3-25 W2M	Area of native prairie along shallow draw. Majority of native prairie is located on sloped (west slope) terrain.	385 m of collector line ROW assessed	Photo 3
	General Stratigraphy: 0 cm to 1.5 cm sod 1.5 cm to 3 cm brown loam/clay; 3 cm to 10 cm gravel and cobbles.	6 shovel probes excavated.	Figures 2A, 2B and 3C

SE 8-3-24 W2M	Rolling native prairie.	485 m of collector line ROW assessed	Photo 4
	General Stratigraphy: 0 cm to 1.5 cm sod 1.5 cm to 3 cm dark brown clay; 3 cm to 20 cm grey clay and gravel. Rolling native prairie.	6 shovel probes excavated.	Figures 2A, 2B and 3D
SW and SE 4-3-24 W2M	General Stratigraphy: 0 cm to 0.5 cm sod; 0.5 cm to 2 cm dark brown sand/loam; 2 cm to 10 cm dark brown sand/clay and gravel; 10 cm to 22 cm brown clay; 22 cm to 30 cm grey clay.	1,200 m of collector line ROW assessed 10 shovel probes excavated.	Photo 5 Figures 2A, 2B and 3E
	Area of native prairie intersected by 2 north/south trending coulees. Rolling terrain.		
SW 3-3-24 W2M	General Stratigraphy: 0 cm to 1 sod; 1 cm to 4 cm dark brown loam/clay; 4 cm to 18 cm brown clay and gravel; 18 cm to 25 cm grey clay and gravel.	540 m of collector line ROW assessed. 8 shovel probes excavated	Photo 6 Figures 2B and 3F
	Area of native prairie located east of Highway No. 34 to west edge of coulee. Cultivated/modified pasture in coulee bottom and east side of coulee.		
SW 2-3-24 W2M	General Stratigraphy: 0 cm to 1.5 cm sod; 1.5 cm to 3 cm dark brown loam/clay; 3 cm to 10 cm gravel and cobbles.	530 m of collector line ROW assessed. 3 shovel probes excavated	Photo 7 Figures 2B and 3G

No archaeological sites (artifacts, surface features) were discovered in conflict with the Outlaw Trail Wind Project. Based on the results of the HRIA, there are no recommendations for further archaeological work with the current footprint of the Outlaw Trail Wind LP's Outlaw Trail Wind Power Project.



Photo 1: View southeast from shovel probe B01 in NE 9-3-25 W2M.



Photo 2: View northeast from shovel probe A07 in NW 10-3-25 W2M.



Photo 3: View northwest from shovel probe A10 in NE 1-3-25 W2M.



Photo 4: View southwest in SE 8-3-34 W2M. Archaeologist excavating shovel probe B06.



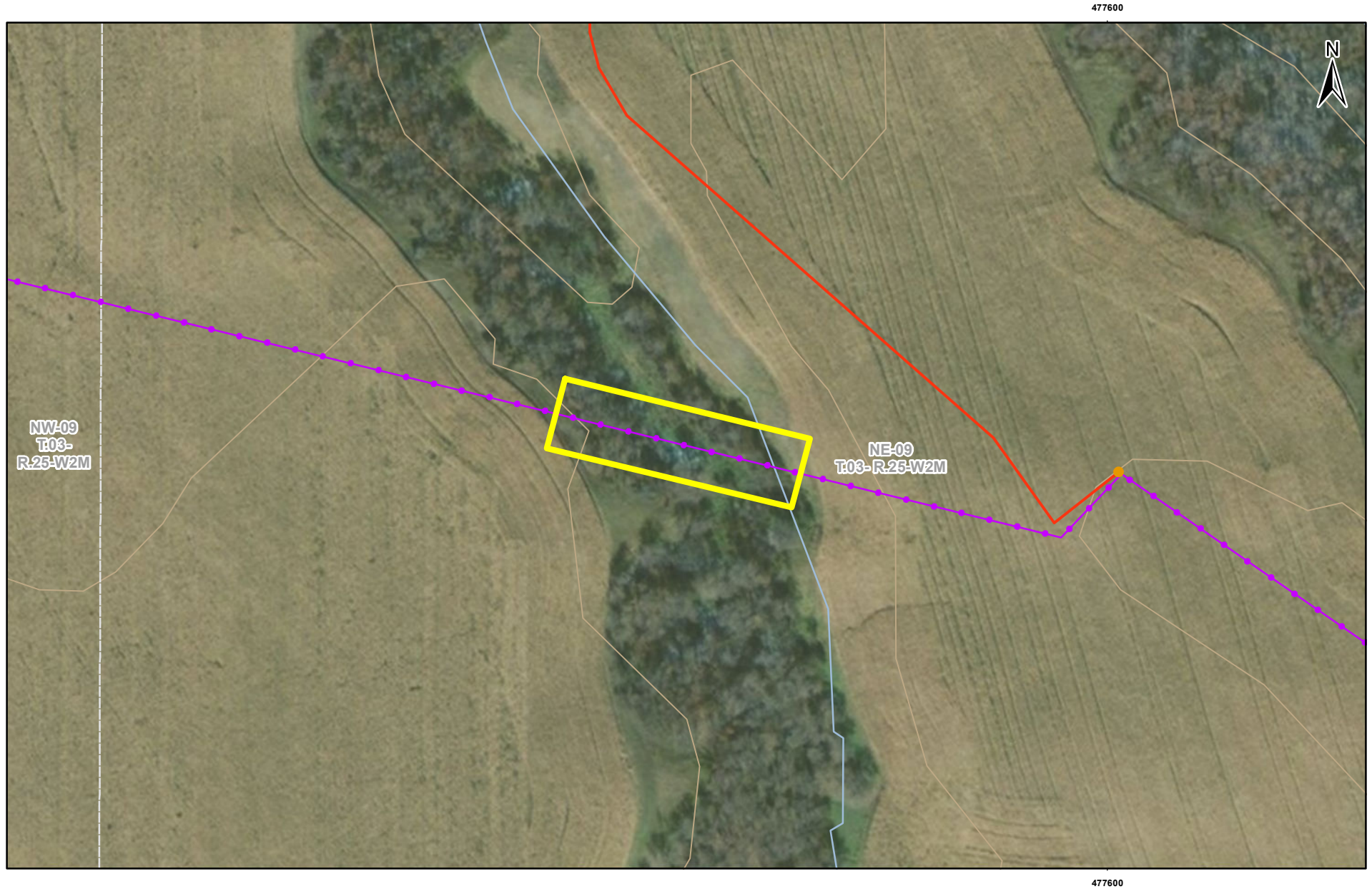
Photo 5: View southeast in SW 4-3-24 W2M. Archaeologist near shovel probe B07.



Photo 6: View east from shovel probe A15 in SW 3-3-24 W2M.



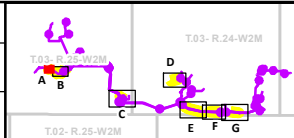
Photo 7: View east from shovel probe A23 in SW 2-3-24 W2M. Note: cultivated field in coulee bottom and on east side of coulee.



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SCALE: 1:2,000



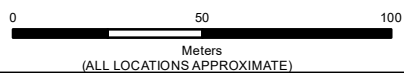
- Shovel Probe (Negative)
- ▲ Archaeological Site Recorded during HRIA (Permit No. 20-018)
- ▲ Known Heritage Resource
- ▭ Known Heritage Resource Area
- ▭ Area Assessed

- Junction Box
- Met Tower
- OLT WTG Location
- Underground Collector
- Road
- 1:50,000 Contour Line



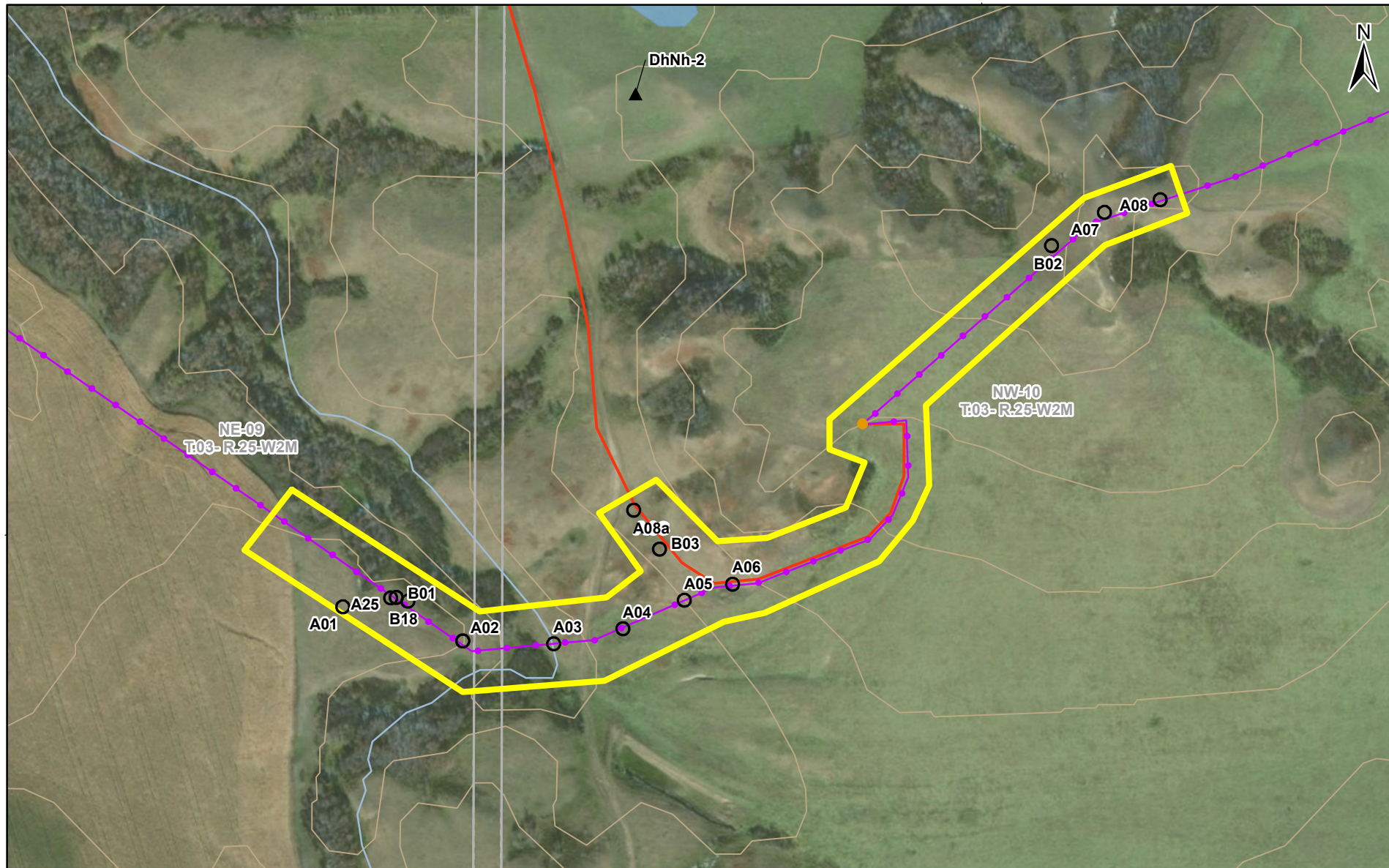
DETAILED MAP

HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)



Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03.
Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.

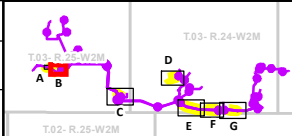
FIGURE 3A



NOVEMBER 2020

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SCALE: 1:4,000



○ Shovel Probe (Negative)

▲ Archaeological Site Recorded during HRIA (Permit No. 20-018)

▲ Known Heritage Resource

Known Heritage Resource Area

Area Assessed

● Junction Box

● Met Tower

● OLT WTG Location

Underground Collector

Road

1:50,000 Contour Line



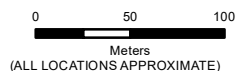
DETAILED MAP

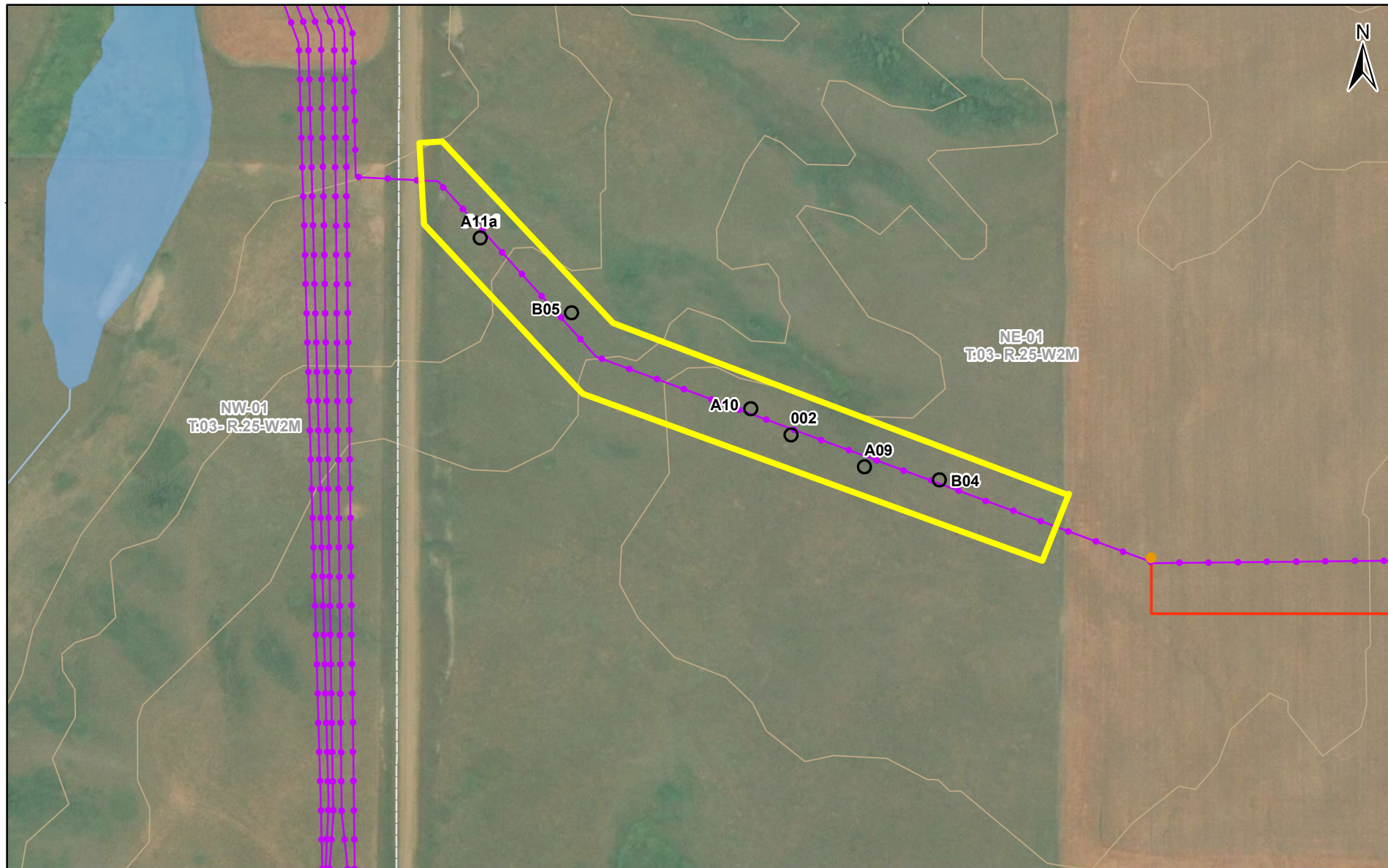
HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)

FIGURE 3B

Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03.

Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.

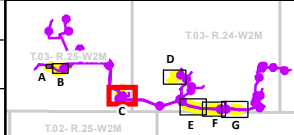




NOVEMBER 2020

AH20014

SCALE: 1:3,000



- Shovel Probe (Negative)
- ▲ Archaeological Site Recorded during HRIA (Permit No. 20-018)
- ▲ Known Heritage Resource
- Known Heritage Resource Area
- Area Assessed

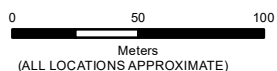
- Junction Box
- Met Tower
- OLT WTG Location
- Underground Collector
- Road
- 1:50,000 Contour Line



DETAILED MAP

HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)

FIGURE 3C



Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03.
Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.

485600

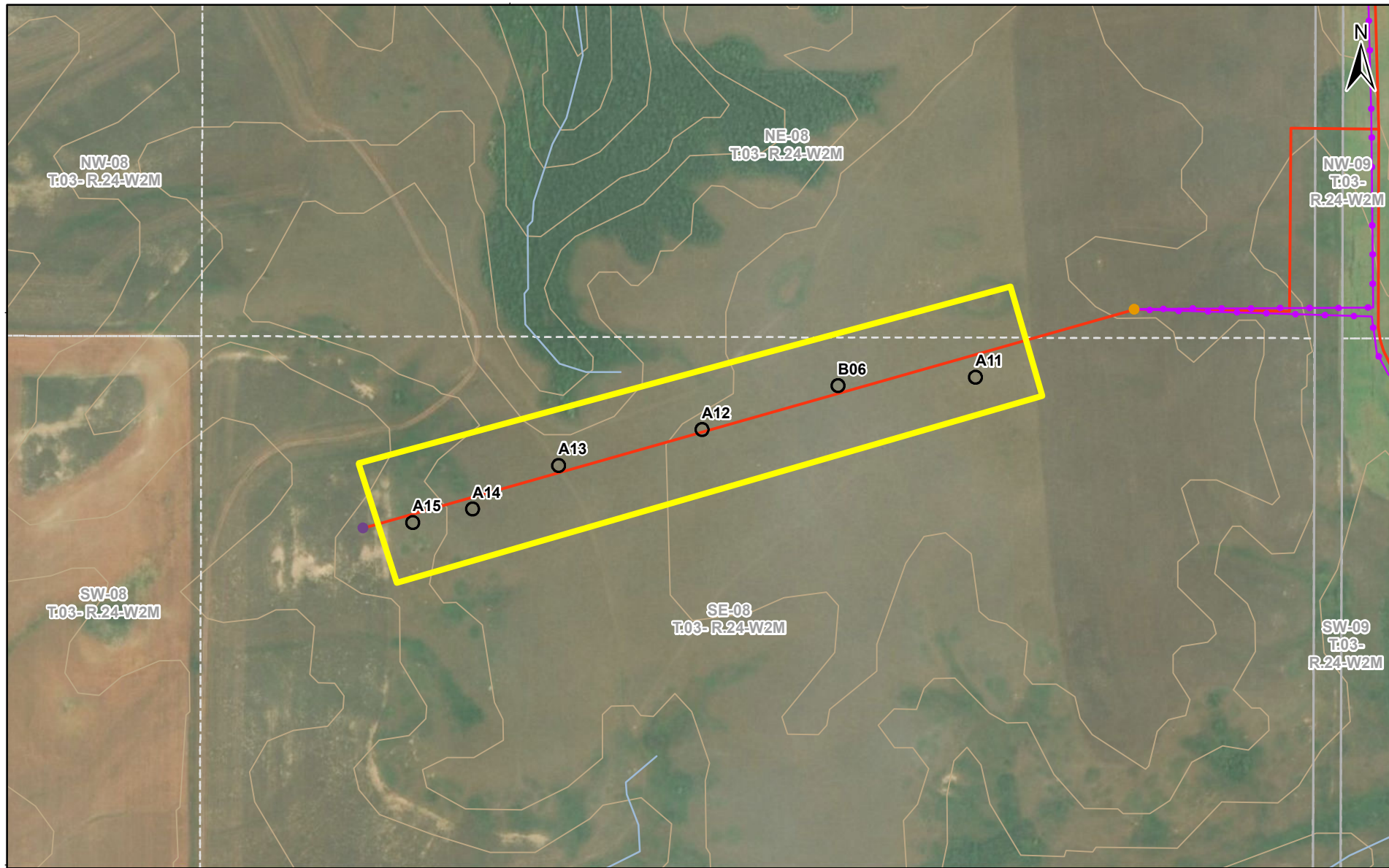
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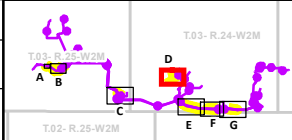
5448800



NOVEMBER 2020

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SCALE: 1:4,000



○ Shovel Probe (Negative)

▲ Archaeological Site Recorded during HRIA (Permit No. 20-018)

▲ Known Heritage Resource

Known Heritage Resource Area

Area Assessed

● Junction Box

● Met Tower

● OLT WTG Location

Underground Collector

Road

1:50,000 Contour Line

**DETAILED MAP**

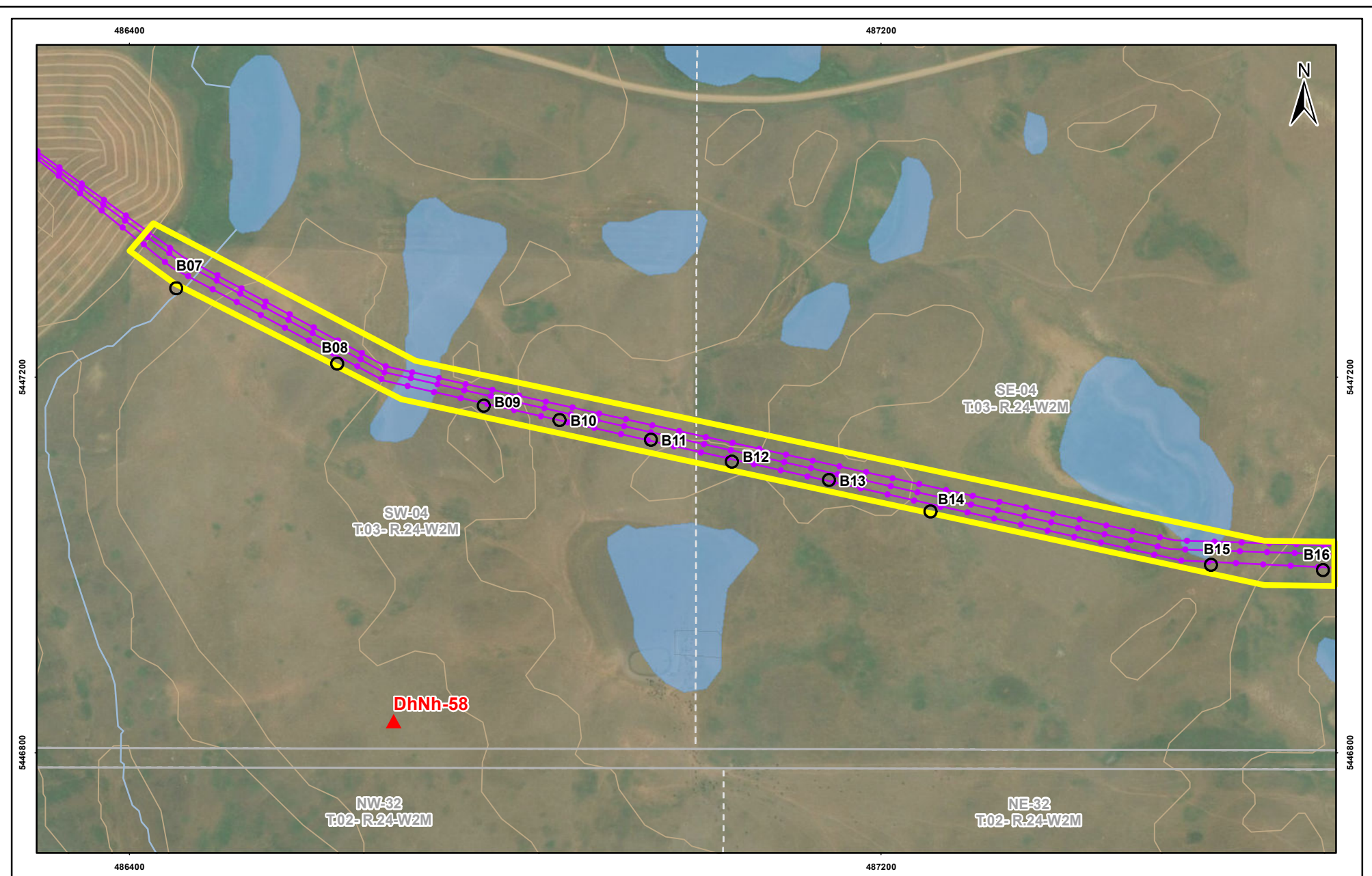
HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)

FIGURE 3D

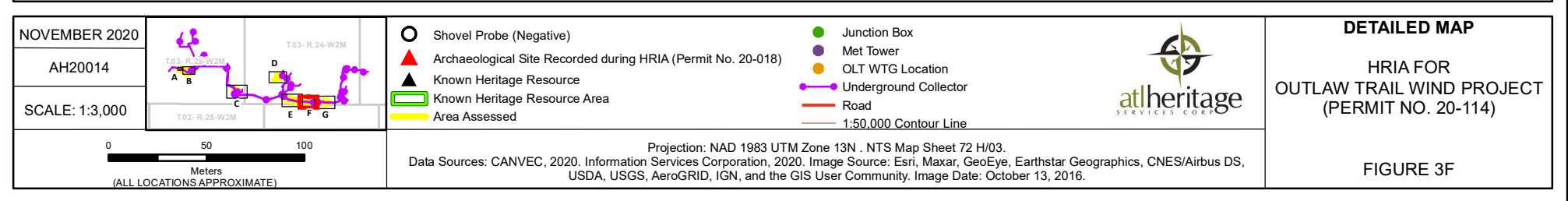
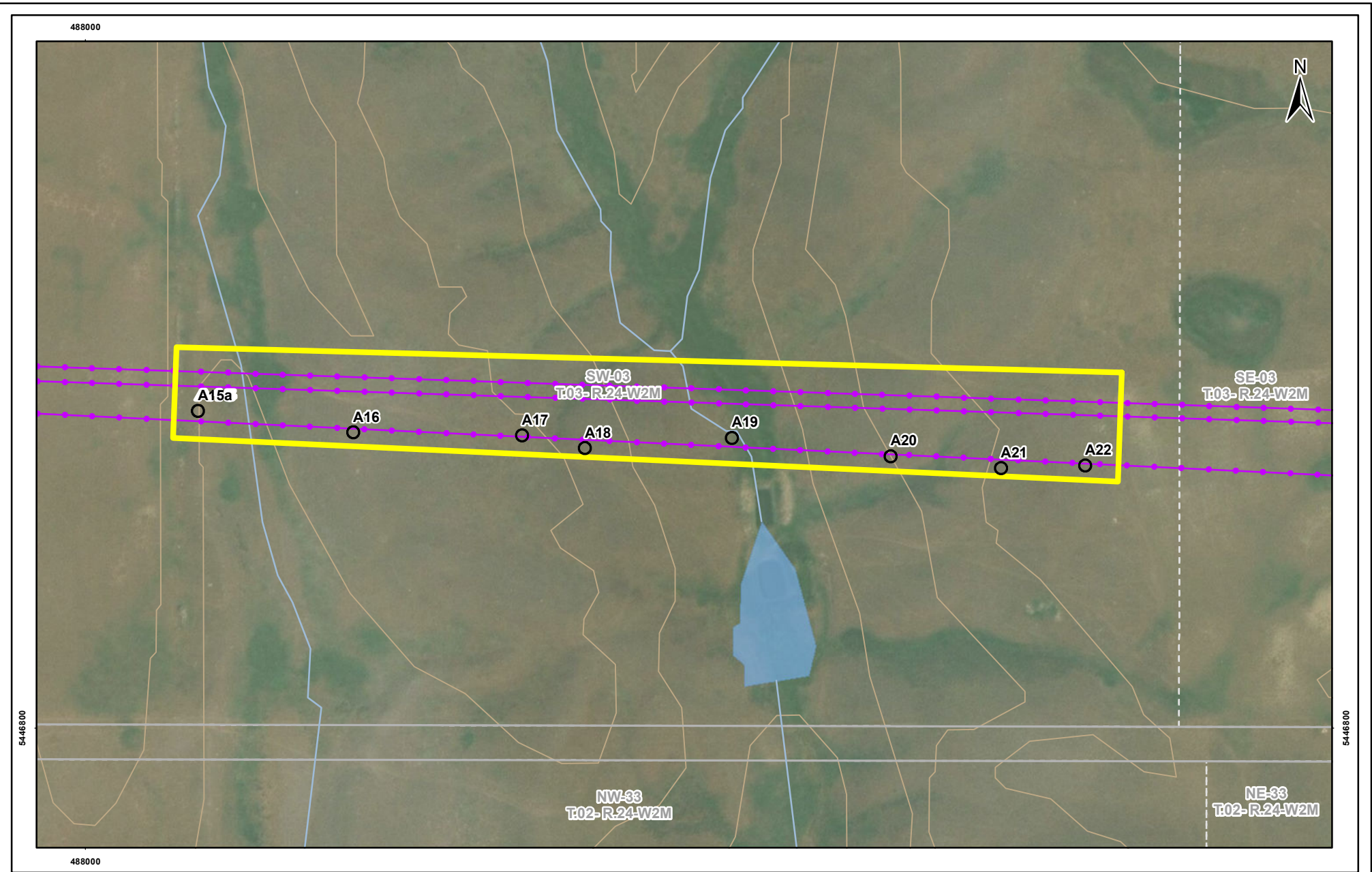
Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03.

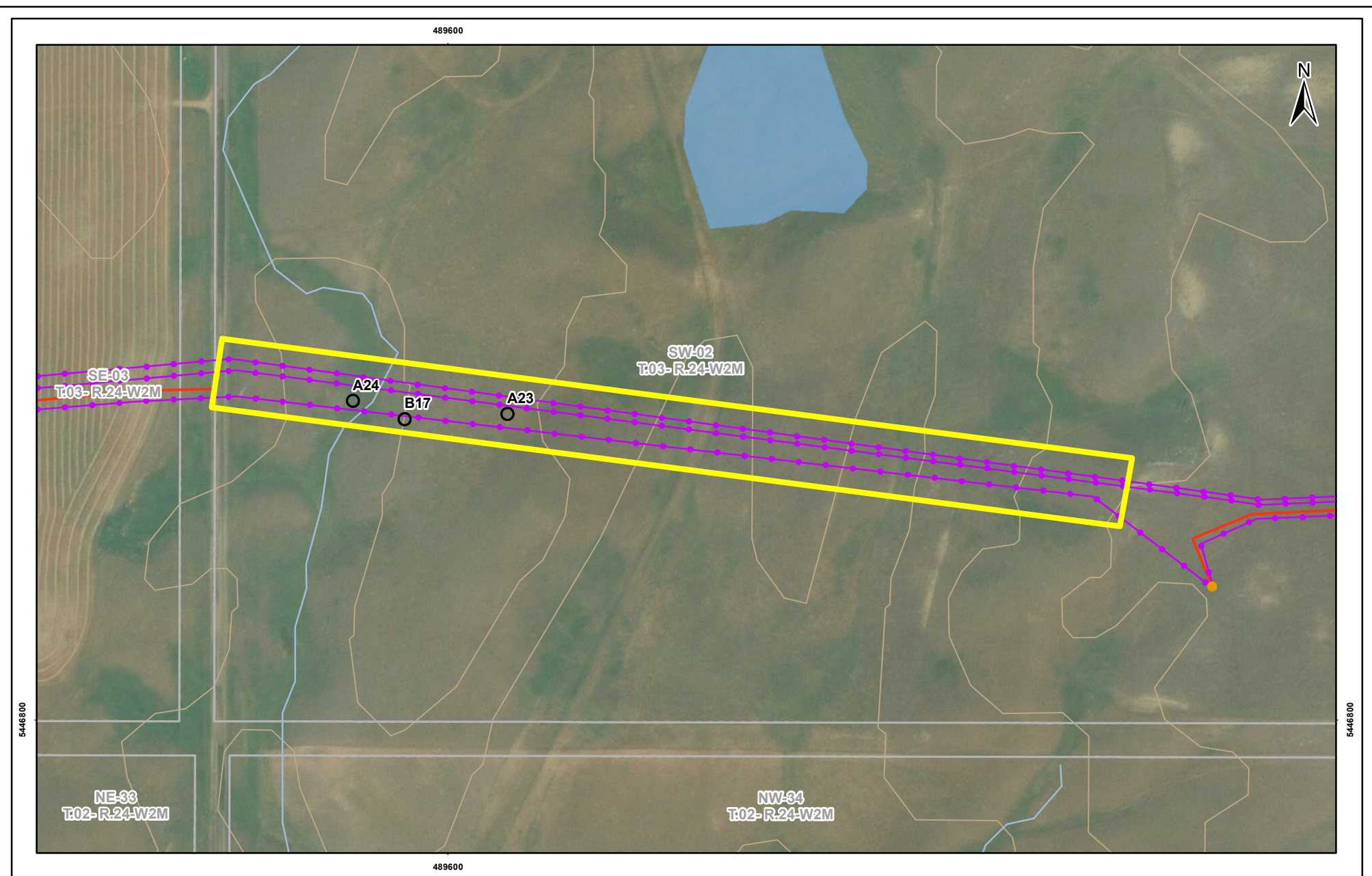
Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.

0 50 100
Meters
(ALL LOCATIONS APPROXIMATE)



NOVEMBER 2020 AH20014 SCALE: 1:5,500				<ul style="list-style-type: none"> ○ Shovel Probe (Negative) ▲ Archaeological Site Recorded during HRIA (Permit No. 20-018) ▲ Known Heritage Resource ▭ Known Heritage Resource Area ▭ Area Assessed ● Junction Box ● Met Tower ● OLT WTG Location — Underground Collector — Road — 1:50,000 Contour Line 				DETAILED MAP HRIA FOR OUTLAW TRAIL WIND PROJECT (PERMIT NO. 20-114)	
0 50 100 Meters (ALL LOCATIONS APPROXIMATE)		Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03. Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.						FIGURE 3E	





NOVEMBER 2020

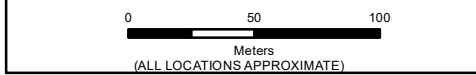
AH20014

SCALE: 1:3,000

- Shovel Probe (Negative)
- ▲ Archaeological Site Recorded during HRIA (Permit No. 20-018)
- ▲ Known Heritage Resource
- ▭ Known Heritage Resource Area
- ▭ Area Assessed
- Junction Box
- Met Tower
- OLT WTG Location
- Underground Collector
- Road
- 1:50,000 Contour Line

DETAILED MAP

HRIA FOR
OUTLAW TRAIL WIND PROJECT
(PERMIT NO. 20-114)



Projection: NAD 1983 UTM Zone 13N . NTS Map Sheet 72 H/03.
Data Sources: CANVEC, 2020. Information Services Corporation, 2020. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Image Date: October 13, 2016.

FIGURE 3G

6.0 SUMMARY AND RECOMMENDATIONS

A HRIA was completed for Outlaw Trail Wind LP's proposed Outlaw Trail Wind Project under Archaeological Resource Investigation Permit No. 20-114 (HCB File No. 20-247) (Figures 1; 2A to 2B; Figures 3A to 3G). The HRIA was completed on September 30, 2020.

The HRIA was completed using a combination of pedestrian reconnaissance, inspection of surface and subsurface exposures and the excavation of 47 shovel probes (Figures 3A to 3G; Appendix A). In total, 3.8 km of ROW was assessed (Figures 2A and 2B; Figures 3A to 3G). No archaeological sites are in conflict with the current footprint of the Outlaw Trail Wind Project (Figures 2A and 2B).

In addition, the revised footprint of the Outlaw Trail Wind Project will no longer impact DhNh-57, DhNh-58 and DhNh-56 (Figures 1; 2A and 2B). Archaeological site DhNh-56 was discovered during a HRIA in 2017 and was determined to have low interpretive and scientific value (Atlheritage 2020). Therefore, there are no further heritage concerns (i.e. mitigation requirements) with the current footprint of the Outlaw Trail Wind Project.

It is recommended that Outlaw Trail Wind LP be provided with regulatory approval as per Section 63 of *The Heritage Property Act* for concluding the heritage requirements for their proposed Outlaw Trail Wind Project. This report fulfills the permitting requirements for the HRIA (Permit No. 20-114). If heritage resources are discovered during construction activities, or if the Project footprint changes, immediately notify Atlheritage (306.242.2822) and/or the HCB (306.787.2817). If human remains are discovered, please contact the local RCMP detachment and the HCB.

7.0 CLOSURE

The results of the pre-impact HRIA are discussed in this report. Following the HCB's approval and receipt of the Permit Report, the HCB will issue a Heritage Clearance Letter for this Project. On behalf of Atlheritage, thank-you for adhering to *The Heritage Property Act* and your role in protecting and preserving Saskatchewan's heritage.

If you have any questions regarding this HRIA, please contact Atlheritage.

Respectfully submitted,



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Co-founder, Principal Archaeologist
Heritage Division Manager

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APPENDIX A: Shovel Probes



Appendix A

Shovel Probe UTM Locations			
Shovel Probe	Zone (NAD 83)	Easting	Northing
Outlaw Trail Wind Project			
002	13U	482326	5447874
A01	13U	477938	5449548
A02	13U	478025	5449523
A03	13U	478091	5449522
A04	13U	478141	5449532
A05	13U	478185	5449553
A06	13U	478220	5449565
A07	13U	478489	5449833
A08	13U	478529	5449843
A08a	13U	478149	5449618
A09	13U	482365	5447857
A10	13U	482304	5447888
A11	13U	482157	5447981
A11a	13U	485937	5449153
A12	13U	485739	5449115
A13	13U	485635	5449089
A14	13U	485573	5449058
A15	13U	488066	5446985
A15a	13U	485530	5449048
A16	13U	488156	5446972
A17	13U	488254	5446971
A18	13U	488291	5446963
A19	13U	488377	5446969
A20	13U	488469	5446958
A21	13U	488533	5446951
A22	13U	488582	5446953
A23	13U	489635	5446978
A24	13U	489545	5446985
A25	13U	477973	5449555
B01	13U	477977	5449555
B02	13U	478451	5449809
B03	13U	478167	5449590
B04	13U	482406	5447850
B05	13U	482206	5447941
B06	13U	485838	5449147
B07	13U	486450	5447244
B08	13U	486621	5447215
B09	13U	486777	5447170
B10	13U	486858	5447154
B11	13U	486955	5447133
B12	13U	487042	5447110
B13	13U	487145	5447090
B14	13U	487253	5447057

Appendix A

Shovel Probe UTM Locations			
Shovel Probe	Zone (NAD 83)	Easting	Northing
B15	13U	487551	5447000
B16	13U	487671	5446995
B17	13U	489575	5446975
B18	13U	477985	5449552

J.4 Heritage Conservation Branch Clearance Letter

November 30, 2020

Our file: 20-247

Mike Markowski
Atlheritage Services Ltd.
Agent For: **Outlaw Trail Wind Limited Partnership (c/o BluEarth Renewables Inc.)**
150 – 203 Packham Avenue
SASKATOON SK S7N 4K5
Email: mike.markowski@atlheritage.ca

Dear Mike Markowski:

**RE: Outlaw Trail Wind Limited Partnership – Proposed Outlaw Trail Wind Energy
Project Revisions:
Townships 2 and 3, Ranges 23, 24 and 25, W2M;
Heritage Resource Impact Assessment Results (Permit #20-114)**

Please be advised we received (November 26, 2020) a final report from Atlheritage Services Ltd., on the heritage resource impact assessment (HRIA) of this project completed under Investigation Permit #20-114. An HRIA for the original footprint of the Outlaw Trail Wind Energy Project was conducted under Permit #20-018. Revisions to the placement of the collector lines resulted in additional HRIA requirements, conducted under Permit #20-114. This letter replaces the previous heritage clearance letter for this project issued on July 3, 2020 (based on the results of Permit #20-018).

No new or previously recorded heritage sites were observed in the course of the heritage assessment, despite the moderate to high potential of the area. In addition, the revised footprint of the Outlaw Trail Wind Project will no longer impact DhNh-56 (artifact find site), DhNh-57 (multiple feature site), and DhNh-58 (recurrent feature site) and the previous requirements to avoid these sites is no longer applicable. As all HRIA regulatory requirements have now been satisfactorily completed, this office has no concerns with this development proceeding as planned.

On behalf of the Heritage Conservation Branch, thank you for your continuing assistance and support in preserving Saskatchewan's archaeological heritage.

Sincerely,



Dr. Thomas Richards
Senior Archaeologist

Appendix K

Employment and Economy

K.1 Value-Added Community Benefits Plan



Outlaw Trail Wind LP

Outlaw Trail Wind Energy Project
Value-Added Community Benefits Plan

November 2020

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1.0 Introduction

Outlaw Trail Wind LP (OTW LP), a partnership between BluEarth Renewables Inc. (BluEarth) and NuWind Energy Corp., has been developing the Outlaw Trail Wind Energy Project (the Project) for more than five years. The Project is located approximately 20 kilometres east of the Village of Coronach, in south-central Saskatchewan. To support a proposal submission to Saskatchewan Power Corporation (SaskPower) in response to its Request for Proposals issued for the development and operation of a Wind Energy Facility (Inquiry Number: RVS/155(2)), OTW LP has prepared this Value-Added Community Benefits Plan for the Project to fulfill the Section 10.7 and Form 10 requirements.

BluEarth is a Canadian company that values supporting local communities corporately and where its projects are located. BluEarth is continually evaluating the needs of the community to determine how best to service those needs. Partnerships with local organizations, use of local labour and suppliers, and community investments through initiatives like scholarships are some of the opportunities that BluEarth actively seeks to support the communities where projects are located. BluEarth also recognizes that community benefits extend beyond the human environment and seeks to enhance the sustainability of the natural landscape and its ecological value to the community.

NuWind Energy Corp. is a wholly-owned subsidiary of FHQ Developments, the investment and economic development corporation for the File Hill's Qu'Appelle Tribal Council and is owned by 11 Nations. FHQ Development's mission is to enable long-term economic independence and prosperity of its citizens.

For additional information on the consultation and engagement initiatives that have been ongoing for the past five years and planned for the future with Project Area residents, Indigenous communities, and local municipalities, please see the Community Engagement Plan provided to fulfill the requirements of Form 9 of the RFP.

1.1 Local Context

The Project is located in the Rural Municipalities of Hart Butte (RM No. 11) and Happy Valley (RM No. 10), 20 km east of the Town of Coronach, and is located on Treaty 4 First Nations territory. The primary economic drivers of this community and surrounding areas are the Westmoreland Mining Holdings LLC's Poplar River Coal Mine, SaskPower's Poplar River Power Station, and commercial agriculture. With the mine and power station scheduled to close by 2030, the Town of Coronach and neighbouring communities are predicted to lose approximately 300 jobs.

1.2 Regional Context

The Town of Coronach and area communities have been evaluating future economic opportunities and initiatives to remain viable. To evaluate potential economic transition options, the Town of Coronach

engaged MDB Insight to produce an Economic Transition Plan and Socio-economic Impact Study for the Town in anticipation of the closure of the mine and power station. As a result of these initiatives, the South Saskatchewan Regional Economic Partnership (SSREP; formerly the Deep South Economic Partnership) was formed by a group of nine communities including the Town of Coronach, the Rural Municipality of Happy Valley and the Rural Municipality of Hart Butte. The SSREP has created a 2020-2022 Workplan outlining strategic objectives and short-term action items. The five main strategic pillars consist of 1) Workforce transition, retention and attraction; 2) Resource development; 3) Tourism development; 4) Business retention, expansion and attraction; and 5) Organizational capacity.

2.0 Indigenous Benefits

BluEarth recognizes that the Project is located within Treaty 4 lands and acknowledges the diverse Indigenous communities that inhabit these lands. BluEarth has partnered with NuWind Energy Corp. to develop, own and operate the Project. NuWind Energy Corp. is a wholly-owned subsidiary of FHQ Developments (FHQ). FHQ is the investment and economic development corporation for the File Hill's Qu'Appelle Tribal Council and is owned by 11 Nations including Nekaneet, Piapot, Muscowpetung, Pasqua, Wood Mountain, Standing Buffalo, Carry the Kettle, Star Blanket, Peepeekisis Little Black Bear and Okanese. The Nations ownership represents over 16,000 citizens throughout southern Saskatchewan within the Treaty 4 territory.

FHQ Developments' vision is focused on growing the financial independence of their Nations in a way that is sustainable and focused on the long term. Building wealth and financial independence does not just include looking at the bottom line of investments and businesses but focusing on other areas that help to build wealth in their communities such as building of capacity and reinvesting profits back into new businesses. It is through these principles of growing the Nations that FHQ Developments is able to ensure the wealth they are generating continues to revolve multiple times before it leaves local economies in which FHQ does business.

Through its partnership in the Outlaw Trail Wind Energy Project, FHQ / NuWind / the eleven Nations and their members will benefit through the following:

1. Ownership: 49% equity ownership in the Project.

- This ownership structure will see wealth created and redistributed over the life of the Project
- This will give greater opportunity to procure contracts of which FHQ Developments companies have the capacity to deliver, allowing for additional wealth to be generated through those companies that will benefit the 11 Nations
- FHQ Tribal Council Nations will take pride in being the first Indigenous equity owner in a major renewable energy project in Saskatchewan

Outlaw Trail Wind LP

Outlaw Trail Wind Energy Project – Value-Added Community Benefits Plan

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2. Capacity Development & Labour: Creating Indigenous capacity in renewables.

- Tokata HR Solutions will provide access to a large database of Indigenous professionals from throughout Saskatchewan to ensure there is greater impact on Indigenous labour and capacity development
- FHQ Developments companies will support the Project through contracts that will increase its capacity for future renewable energy projects in Saskatchewan
- FHQ Developments companies will also seek opportunities to leverage small and medium sized Indigenous enterprises to subcontract in situations where it is possible to do so, including businesses owned by Wood Mountain Lakota Nation

3. Reinvestment: Ensuring the wealth that is generated in Saskatchewan stays in Saskatchewan.

- FHQ Developments believes in reinvestment, including in new businesses or back into the communities it serves
- FHQ Developments major focus for community reinvestment is on youth engagement to ensure Indigenous youth are given opportunity to develop and become a part of the future workforce in Saskatchewan. This investment focuses on youth programming in entrepreneurship, STEM, Arts, Culture, Sports, and Language.
- FHQ Developments has created an economic impact tool that will demonstrate the overall economic impact in the Saskatchewan economy through their participation and ownership in the Project

3.0 Community Benefits

OTW LP recognizes the value of the proposed Outlaw Trail Wind Energy Project to the economic transition of the coal-affected Town of Coronach and surroundings communities. OTW LP attended one of the consultation sessions held in Coronach in November 2019 to determine how the Project could contribute to the transition and support other community initiatives. As such, OTW LP is confident that the initiatives detailed in this plan will result in true and meaningful benefits to the local and regional community.

The Project will contribute to achieving the Town of Coronach and the SSREP's strategic objectives outlined in its 2020-2022 Workplan. Initial discussions have been held with the Community Development Officer for the Town of Coronach and the Managing Director of the SSREP. Once the Project is awarded a Power Purchase Agreement, the initiatives outlined below will be implemented:

- 1) **Workforce Transition, Retention and Attraction:** *SSREP is developing a workforce transition/development plan with SaskPower and Westmoreland Coal Company.*
 - Workforce transition – the Project will require approximately 120 full-time workers during the 18-month construction period and during operations, six full-time technicians

and one site supervisor with similar skills applicable to thermal energy generation such as electricians and millwrights. Further details are provided in Section 4.1 and 4.2.

- Skills training – the BluEarth Renewables Scholarship Program offers scholarship opportunities, mentorship and work experience with wind technicians. BluEarth also offer talks in schools from our operators and head office staff to learn about renewable energy and paths to a career in this field. A Project-specific scholarship will be created for Coronach School graduating students interested in pursuing a career in renewable energy, or local tradespeople looking to make the switch from coal to renewable energy. Further detail is provided in Section 7.0.

2) **Resource Development:** *SSREP plans to work with SaskPower to identify all respondents to the Solar and Wind power generation RFQ and RFP process to develop a shortlist of proponents who may be interested in developing facilities in the region.*

- OTW LP has met with the Managing Director of the SSREP, the local RMs and the Economic Transition Coordinator for the Town of Coronach to discuss the direct and indirect benefits of this Project to the community.
- Coronach is interested in bringing more solar power to the community and OTW LP will support efforts with knowledge sharing and in-kind contributions to develop a community based renewable energy project, such as a micro-solar facility or roof-top solar installations. The local group, EDY Cooperative, is looking into installing roof-top solar panels on a historic building in town and rooftop solar has also been proposed for the large Sportsplex in Coronach.

3) **Tourism Development:** *SSREP will investigate opportunities associated with the completion of Regional Festivals and Event Strategy to attract and host destination events.*

- OTW LP has met with a local tourism operator (Big Muddy Tours) to discuss including the Project, should it be successful, in its tour offerings.
- The significant western heritage of the Project area as a tourist attraction is under used. The Big Muddy Valley just northeast of the Project was known as Station No. 1 on an Outlaw Trail that ran all the way to Mexico. Having a wind project named after this famous trail will generate interest in this local history. OTW LP will sponsor a roadside turnout information sign to educate tourists about the historic significance of the area and its role in the famous Outlaw Trail.
- OTW LP will erect information boards adjacent to the Project to educate tourists and the general public about wind energy and its benefits.
- In its partner communities, BluEarth sponsors local events such as the Hand Hills Rodeo, the Beaverton Agricultural Fair, local holiday parades, and more. OTW LP would support

local festivals and participate in local fair events to educate the local population and tourists about renewable energy.

- 4) **Business Retention, Expansion and Attraction:** *SSREP wants to secure broadband internet infrastructure upgrade to increase the region's accessibility for resident and business attraction.*
 - OTW LP is proposing to support expansion of telecommunications in the area by working with a local telecommunications company to share infrastructure being built for the Project. Further details are provided in Section 6.0.
 - The Project will create indirect benefits through the use of local businesses such as supplies, services, restaurants and motels. Refer to Section 4.3 for details.
- 5) **Organizational Capacity:** *SSREP is working to improve local (water, sewer) and regional (digital) infrastructure including public wifi.*
 - OTW LP will work with local service providers to explore shared use of infrastructure being built for the Project, such as new electrical and communications systems. Further details are provided in Section 6.0.

4.0 Local Employment Opportunities

4.1 Construction

OTW LP will work with its general contractor to maximize the use of local contractors on the Project. Prior to construction, OTW LP will have a contractor and employment open house in the community for the general contractor to meet suitable local companies and workers for sub-contracting and employment opportunities that are available to the Project. OTW LP anticipates that the Project will result in approximately 175,000 person hours during the 18-month construction period. Jobs will range from labourers, to skilled tradespeople to engineering, management, environment and health and safety.

4.2 Operations

OTW LP's preference is to hire locally for the operations staff if a suitable candidate(s) is available. Operations staff are expected to reside within the local Project area, within an hour drive. During operation, OTW LP estimates that the Project will provide approximately seven full-time employees in technician and supervisory positions. Local skilled tradespeople from other industries, such as thermal power generation, may be ideal candidates to fill these positions. OTW LP will be looking specifically for millwrights and electricians, and experience working with high voltage is also important.

4.3 Indirect Employment and Community Support

The Project will represent a major generation site that will require scheduled and unscheduled maintenance on a regular basis. Local service providers will be given the opportunity to supply goods and services for this work. Likewise, from time to time specialised workers will be required as part of maintenance activities. These workers will require hotel rooms, food and entertainment, bringing revenue into the local hospitality sector. Specifically, OTW LP will engage local residents and companies to provide snow clearing, vegetation management, site security, and housekeeping services.

5.0 Municipal Revenue Benefits

Through the development of the Project, the two Rural Municipalities that overlap the Project will gain significant economic benefits through business taxes. It is estimated that the Project would result in an increase of 26% in municipal taxes for the Rural Municipality of Hart Butte and an increase of 268% for the Rural Municipality of Happy Valley, based on 2019 values. The Project will contribute over \$1.4 Million annually in municipal and education property taxes. This source of new, sustained revenue for the municipalities over the next twenty-five years will dramatically increase the Municipalities available budgets.

6.0 Community Improvements

BluEarth contributes to local community initiatives and invests into the local communities where its employees live, work and operate. Its community investment program is targeted to provide financial support for local initiatives that align with its giving priorities of:

- Environment
- Community Building
- Education

These community improvement initiatives align well with the strategic objectives and associated action items identified by the Town of Coronach and in the SSREP workplan. Specifically, the need for more secure and reliable telecommunications connections was identified in two SSREP strategic objectives. As the Project will require the installation of communication and meteorological towers as a component of the remote monitoring infrastructure, sharing of this infrastructure with a local telecommunications provider is possible. This would result in improved telecommunications to local residents and communities, and support the SSREP in achieving the strategic objectives of their workplan. Improved cellular reception will improve neighborhood safety, work efficiency and overall access to affordable technology.

BluEarth employees also volunteer their time, energy and resources to causes and programs that strengthen the communities where we live and work. Some examples of volunteering include building garden boxes for the Lennox & Addington Stewardship Council's pollinator program in Ontario, participating in the annual shoreline cleanup in North Vancouver with our BC operations team, participation by our Bow Lake wind operators in the Batchewana First Nation parade, and coordinating STARS training with the local Chauvin Volunteer Fire Department and our Bull Creek wind operations team. These are just a few examples of ways that BluEarth employees contribute to the local communities where they work and provide ideas of how OTW LP can be involved in local community initiatives should the Project be successful in this Request for Proposals.

Specific to the Project community, OTW LP has donated to local organizations for several years including the Nature Conservancy of Canada Big Muddy Property for trail improvements and native vegetation conservation. OTW LP has and will continue to donate funds and employee time to support local food drives and food banks as these are important resources for vulnerable populations in the Project area.

7.0 Scholarship Programs

BluEarth has established a corporate scholarship program that is designed to support, educate and inspire the next generation of leaders and professionals who have the power to change the future. BluEarth has three scholarship categories available to inspiring students, with preference given to applicants that originate from within its project areas:

- **Indigenous Peoples** – BluEarth is committed to building mutually-beneficial relationships with Canada's Indigenous communities. As part of this commitment, BluEarth awards scholarships to Indigenous students to help develop their skills and knowledge in the renewable energy sector.
- **Community Leaders** - Building strong communities relies on many people. This scholarship is awarded to students who demonstrate a commitment to giving back to their community and making the world a better place for their generation and generations to come.
- **Renewable Energy Trades** – BluEarth is committed to helping grow the renewable energy sector and supporting the skilled workers who will lead the way. This scholarship is awarded to students enrolled in a renewable energy trades program.

BluEarth's scholarship program is open to residents of Canada or the United States but a key component of the selection process is to consider applicants who are in proximity to the locations where employees live, work and operate. In addition to BluEarth's corporate scholarship program and to ensure at least one resident of the local Project area benefits, OTW LP will create a new scholarship to support either:

- Local residents transitioning from employment at the coal mine and power station to a career in renewable energy, or

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- Graduating students of Coronach and area schools who are poised to work in renewable energy and who want to stay in the local area.

8.0 Landscape Sustainability Benefits

BluEarth and OTW LP recognize that community benefits extend beyond the human environment and also represent enhancing the sustainability of the natural landscape and its ecological value to the community. Sustainability efforts are a key focus at BluEarth and one way that it contributes to these efforts at project sites are through habitat enhancement initiatives. In recognition of its commitment towards sustainability, BluEarth was named one of Canada's Greenest Employers in 2020.

At BluEarth's operating renewable energy facilities, it has been able to incorporate pollinator friendly re-vegetation and reclamation following construction, install bee and bat houses within the projects, plant trees to help provide habitat as well as install wetland connectivity crossings for species in the area. Below in Figure 1 are highlights from BluEarth's sustainability initiatives in 2019, which demonstrate some of the community benefits it was able to provide in the communities where employees live and operate projects. Specific to the Project area, BluEarth has identified the following possible landscape sustainability initiatives that team members will participate in should the Project be successful:

- Trail maintenance and native species planting within the Big Muddy Property managed by the Nature Conservancy of Canada
- Tree planting and invasive species management in Poplar River Community Park in Coronach

9.0 Other Benefits

9.1 Provincial Opportunities

OTW LP is aware that the Province of Saskatchewan has invested \$10 Million to support the transition of communities away from coal to cleaner sources of energy. According to recent news articles, the Town of Coronach will benefit from \$2 million of this funding spaced evenly over three years, beginning in 2020. Further details of the intended investment of these funds is unclear, but OTW LP will explore options to create synergies with local recipients of these funds to maximize the overall community benefits of this Project.

9.2 Federal Opportunities

On October 1, 2020, the Prime Minister announced \$10 billion in new major infrastructure initiatives to create jobs, economic growth and help build a low-carbon future. The Canada Infrastructure Bank's (CIB) Growth Plan is expected to create approximately 60,000 jobs across the country. The Growth Plan will invest in five major initiatives, of which one of them is \$2.5 billion for clean power to support renewable

generation, storage and transmission of clean electricity between regions, provinces, and territories. This federal funding is specifically targeted to support clean energy projects to reduce greenhouse gas emissions and help Canada in its 2030 and 2050 emission reductions targets. The CIB has stated that partnerships with public authorities are central to new project opportunities¹. Outlaw Trail Wind LP believes there is an opportunity for the CIB to finance transmission infrastructure upgrades in Southern Saskatchewan and specifically from the Poplar River thermal power station to support the rapid integration of renewable energy projects in the area. The CIB's Growth Plan will be implemented over the next 24-36 months, which aligns well with SaskPower's required network upgrades to support the current, and future, requests for proposals for wind generation and solar generation facilities.

9.3 SaskPower Value-Add

The Project area hosts a community that is currently supported by local employment and tax revenues from SaskPower's Poplar River thermal generating station that was established in 1981. SaskPower has made significant investments over many years in the electrical generation infrastructure at Poplar River, including the three major 230kV transmission lines that carry electricity from the power plant to other areas of the Province. As the Poplar River power plant is scheduled to close by 2030, this community will be heavily impacted economically. In addition to the economic impact to the community, SaskPower will have significant stranded assets in the form of the generating station and multiple 230kV transmission lines. By awarding the Project a Power Purchase Agreement, SaskPower has an opportunity to use existing infrastructure and to create an economic advantage for itself and the community. If the existing 230kV lines are maintained and network upgrades are made, the transmission infrastructure will encourage and benefit future development of renewable energy projects and ensure the most cost-effective electricity is generated for ratepayers in Saskatchewan.

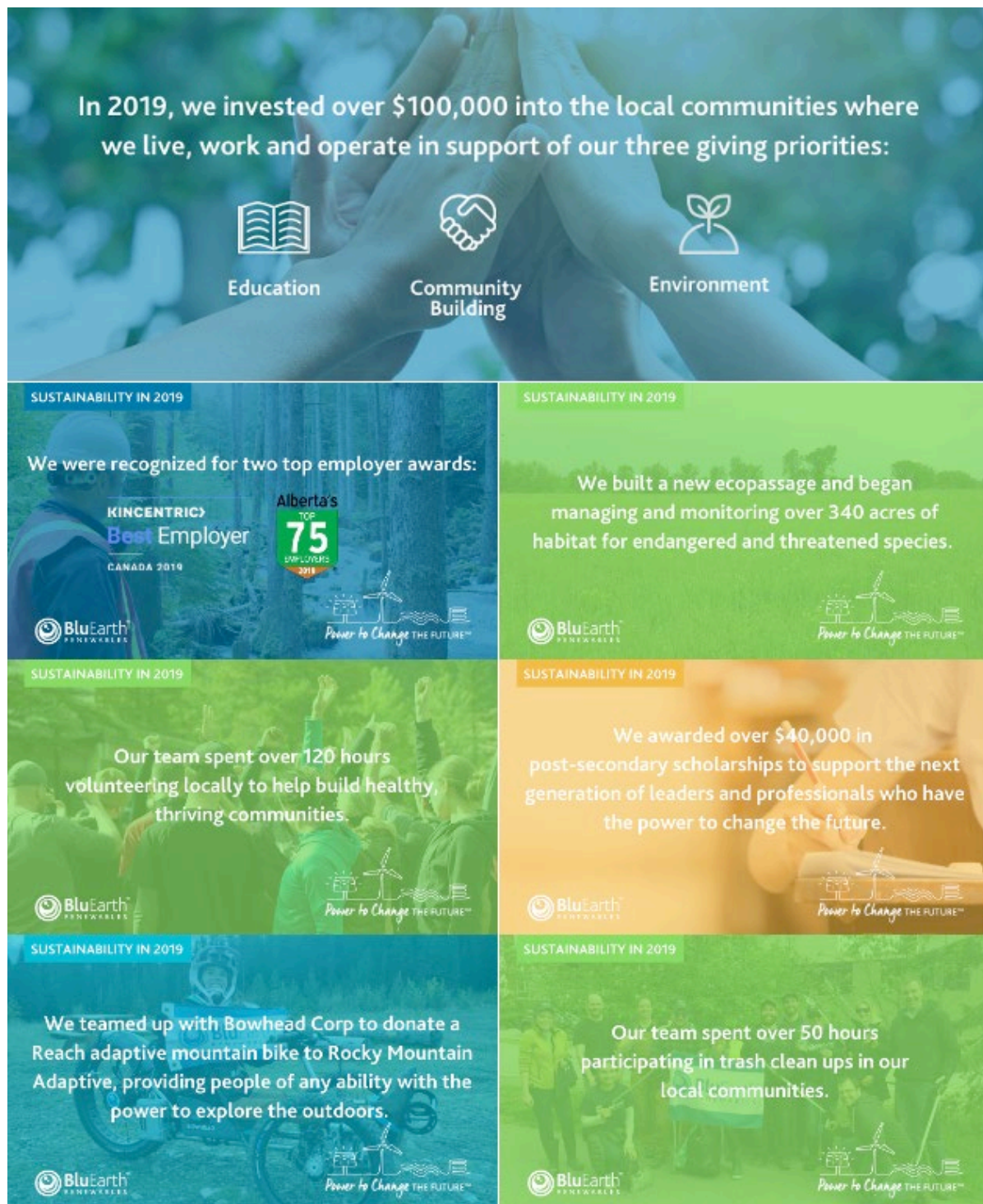
10.0 Summary

Through direct employment, taxes and creation of opportunities for local businesses, in addition to contributions to local initiatives and scholarship programs, OTW LP will provide significant value-added benefits to the Project community. The Outlaw Trail Wind Energy Project will bring substantial benefits to a community that will be materially impacted by the closure of the existing thermal station and associated coal mine. A summary of value-added community benefits is provided below. Although BluEarth has already been contributing to local initiatives, it looks forward to substantially increasing its involvement over the coming years should the Project be successful in this Request for Proposals.

¹ <https://cib-bic.ca/wp-content/uploads/2020/10/Summary-of-the-CIB-Growth-Plan.pdf>

Initiative	Benefit to Community
Wireless Communications Improvements	OTW LP will facilitate the installation of wireless communications on the Project's meteorological towers to improve local reception.
Scholarship Program	OTW LP will provide education funding to local residents looking to transition into the renewable sector or students interested in careers in renewable energy.
Resource Development	OTW LP will support efforts to develop community based renewable resource projects, such as roof-top solar installations, through knowledge sharing and in-kind contributions.
Tourism Development	OTW LP will sponsor a roadside turnout information sign to educate tourists about the historic significance of the area and role in the famous Outlaw Trail, as well as erect information boards to educate tourists and the general public about wind energy.
Coronach and Area Food Banks	OTW LP will donate funds and employee time to support local food drives and food banks as these are important resources for vulnerable populations in the Project area.
Landscape Improvements	OTW LP will support, through financial or employee time, trail maintenance and native species planting within the Big Muddy Property managed by the Nature Conservancy of Canada and tree planting and invasive species management in Poplar River Community Park in Coronach.

Figure 1: BluEarth Renewables' 2019 sustainability highlights



K.2 Community Engagement Plan



Outlaw Trail Wind LP

Outlaw Trail Wind Energy Project
Community Engagement Plan

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1.0 Introduction

Outlaw Trail Wind LP (OTW LP), a partnership between BluEarth Renewables Inc. and NuWind Energy Corp. (a subsidiary of FHQ Developments), is developing the Outlaw Trail Wind Energy Project (the Project), located approximately 20 kilometres east of the Village of Coronach, in south-central Saskatchewan. To support OTW LP's proposal submission to Saskatchewan Power Corporation (SaskPower) in response to its Request for Proposals issued for the development and operation of a Wind Energy Facility (Inquiry Number: RVS/155(2)), this Community Engagement Plan has been prepared for the Project to fulfill the Section 10.6 and Form 9 requirements.

OTW LP is committed to the engagement and communication with stakeholders, government and regulatory agencies and Indigenous communities throughout all phases of the Project. OTW LP started engagement for the Project in 2015 and will continue to engage until the decommissioning of the Project. Engagement is a way to share information and seek feedback through comments and interest. Public engagement provides the opportunity for locals, stakeholders and other interested parties to review the Project throughout the planning and development stages of the Project. Engagement is intended to be an interactive process that allows the Project to be developed in a way that meets the developer's needs, while respecting various stakeholders' cultures and values by considering concerns and additional benefits to stakeholders. This is accomplished through education, providing information about the Project, and where applicable, modifying the Project design based on responses and concerns raised during the engagement process.

OTW LP has been engaging with the broad Project community for the past five years and will continue to provide multiple opportunities through various venues and methods for stakeholders, government, regulatory agencies and Indigenous communities to participate in the engagement process. Additionally, OTW LP will continue to provide information, feedback, solutions and updates made to the Project that consider comments and concerns from the engagement process.

1.1 Purpose and Goals

OTW LP developed objectives and an approach for the engagement process that included the identification of those individuals or groups that may have an interest or could be affected by the Project. The purpose of the engagement process is to allow these individuals or groups to obtain information, voice their input, and review the Project throughout the planning and development phase.

The goals of the engagement process include:

- Present information on wind energy projects, including construction, operation and maintenance and decommissioning activities;
- Present potential effects of wind projects on human and natural environments;

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- Present the specific Project design including location, field study results, schedule and regulatory process and requirements;
- Receive feedback from stakeholders and discuss concerns about the Project;
- Obtain local knowledge on the Project area, as well as additional ideas, concerns and information that could assist in the planning of the Project;
- Inform participants as to how their input and concerns will be considered in the planning of the Project;
- Discuss any modifications made to the Project design throughout the planning process; and,
- Inform participants how additional comments and concerns can be relayed to us and how further information can be obtained throughout the planning and development process.

To achieve these goals, engagement activities to date have been completed through public open house events, direct stakeholder engagement (e.g. meetings with the Saskatchewan Ministry of Environment) and information distribution (e.g. project website and mail-out newsletters). Future planned activities include additional open houses, the development of a community liaison committee, and ongoing identification of stakeholders, consultation and engagement with interested parties.

1.2 Identification of Interested Parties

1.2.1 Stakeholders

Stakeholders were identified as local and regional individuals and organizations that may have an interest in the Project. These stakeholders are believed to be those most directly relevant to the Project and who would be best to involve in influencing decisions about the Project for the greatest benefit of the community. The following initial stakeholder groups were identified:

- Residents and landowners situated within the Project area;
- Landowners located within 2 km of the Project area;
- Rural Municipalities (RM) overlapping the Project area;
- Rural economic partnerships in Southern Saskatchewan;
- Villages, towns and hamlets located within 2 km of the Project area;
- Provincial regulatory agencies;
- Non-government organizations active in the Province of Saskatchewan.

The community engagement process allowed for the identification of additional interested stakeholders. For example, during the engagement process it was identified that an organization called Big Muddy Tours offered guided tours in the area and were interested in learning more about the Project, so they were added to the contact list at that time. The stakeholder list is continually updated throughout the planning and development process, therefore future activities will include continued identification of interested parties and outreach to them.

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Non-government organizations (NGOs) identified as stakeholders included:

- Nature Saskatchewan;
- Saskatchewan Environmental Society;
- Ducks Unlimited Canada;
- Nature Conservancy of Canada- Saskatchewan Region;
- Canadian Parks and Wilderness Society – Saskatchewan Chapter;
- Public Pastures Public Interest; and
- Nature Conservancy of Canada

The list of NGOs identified as stakeholders will be reviewed and updated prior to each outreach campaign to ensure that all stakeholders have an opportunity for input.

1.2.2 Indigenous Communities

OTW LP recognizes that the Project is located within Treaty 4 lands and acknowledges the diverse Indigenous communities that inhabit these lands. For the initial consultation process in 2017, Indigenous communities were identified based on geographic proximity to the Project and potential interest in the Project. These Indigenous communities were identified as Wood Mountain Lakota Nation and Willow Bunch Metis Local 139. Additional Indigenous communities may be identified throughout the engagement process and therefore the list is continually updated throughout the planning and development process. The File Hill's Qu'Appelle Tribal Council was also identified as representing multiple Nations including Wood Mountain Lakota Nation across the Treaty #4 territory in southern Saskatchewan.

2.0 Engagement Activity Plan

Since 2015, OTW LP has been consulting and engaging with the broader Project community through active and passive approaches. Active activities include in person meetings, open houses and newsletters, while passive approaches include keeping the project website up-to-date and providing contact information should stakeholders have any questions. OTW LP continues to use a range of engagement methods and tools throughout the planning and development process to make information accessible and provide participation opportunities and feedback for stakeholders, government agencies and Indigenous communities. The consultation and engagement activities completed to date and those planned future activities are detailed in the table and subsections below.

Engagement Activity	Project Stage		
	Development	Construction	Operation
Active	<ul style="list-style-type: none"> - In person meetings - Open houses - Indigenous engagement - Meetings with RMs - Meetings with SK MOE - Meetings with NGOs - Newsletters and handouts 	<ul style="list-style-type: none"> - Community Liaison Committee - In person meetings - Indigenous engagement - Meetings with RMs - Newsletters 	<ul style="list-style-type: none"> - Community Liaison Committee - In person meetings - Indigenous engagement - Meetings with RMs - Newsletters
Passive	<ul style="list-style-type: none"> - Website updates - Email address and phone number 	<ul style="list-style-type: none"> - Website updates - Email address and phone number 	<ul style="list-style-type: none"> - Website updates - Email address and phone number
Other	Tracking and Documentation		

2.1 In-Person Meetings

OTW LP completed phone calls and/or in-person visits to landowners, municipal leaders and government ministries and organizations throughout the Project planning and development phase. The objective of this communication was to provide information and allow OTW LP to obtain specific comments and questions from stakeholder groups. The outcome of these in-person meetings was to help gauge the level of interest of the municipalities, to provide Project development updates and to determine which individuals within the region desired to participate in the Project and to sign optioned lease agreements.

Regular in-person meetings with landowners and other parties are planned to continue through the remaining development phase, and throughout the operating life of the Project. These in-person meetings will be opportunities for local residents and local government to engage with OTW LP and influence Project decisions.

2.2 Open Houses

Open houses are held throughout the Project planning and development phases. Open houses allow for sharing of Project information to any interested member of the public, government and regulatory agencies, Indigenous communities and non-government organizations. Open houses allow for the public to learn about the Project and Project specific planning and development activities. Here, individuals are given the opportunity to ask questions and express concerns related to the Project. Comment forms are used to obtain feedback from stakeholders. Attendance is tracked through sign-in sheets at each open

house. Open houses are attended by members of the Project team and local environmental consultants, who are available to answer questions, address concerns and discuss the Project.

Three open houses were held in Big Beaver, SK in June 2016, June 2017 and December 2019. Open houses were communicated through advertisements taken out two weeks prior to the event in local newspapers, including the Assiniboia Times, South Central Star and Coronach Triangle. Invitations were mailed out directly to landowners within 2 km of the Project area.

Once the Project is deemed to be moving forward, a schedule for planned open houses and other meetings will be created to ensure timely distribution of information to the public and other stakeholders. This will include a stakeholder meeting following award of a Power Purchase Agreement (PPA) (summer 2021) and prior to the start of the Project construction phase (spring 2022). Additionally, an open house will be planned for local companies, contractors and individuals who are interested in working on the Project construction phase. The Project's prime contractor will participate directly in community events and hold a job fair and local vendor open house prior to construction.

2.3 Meetings with Rural Municipalities and Economic Partnerships

OTW LP has consulted with the Rural Municipalities of Hart Butte and Happy Valley throughout the planning and development process. Updates on Project planning and development were communicated to both RMs through presentations at RM Council meetings in Hart Butte in March 2016, December 2016, December 2017 and February 2019 and in Happy Valley in March 2016, December 2017 and February 2019. In November 2019, OTW LP attended in person meetings at both RMs to provide a project update and obtain signatures required in Form 8 – Community Engagement Checklist of RFQ RVS/155(1). Most recently in July 2020, OTW LP met with RM Councils to discuss the RFP, provide a project update and request written confirmation that the Project is eligible for a disposition for any road allowance under the jurisdiction and control of the RM. At this time, OTW LP obtained feedback and discussed items of interest with the municipalities, such as updated property tax estimates and use of overhead collector lines in the RM road allowance to minimize impacts to native grasslands. The RM's have since provided the written disposition for use of road allowances. OTW LP maintains regular communication with the administrator of both RMs. This engagement plan was shared with both RMs for their review and comment, and RM feedback was incorporated into the final version.

Meetings with the RMs through both attendance at their regularly scheduled council meetings, and creation of special meetings will continue through the life of the Project. A representative of the RMs will be a member of the Community Liaison Committee (see Section 2.7). Going forward, OTW LP plans to meet regularly with the RM Councils and Administrators for consultation and Project update purposes. During the construction period the RMs will be provided with regular updates on progress by the construction team, while once in operation, regular updates will be provided by our Operations Site Supervisor.

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OTW LP has had preliminary discussions with the Managing Director of the South Saskatchewan Regional Economic Partnership (SSREP), previously the Deep South Economic Partnership. This partnership was formed as a result of the coal transition and to mitigate economic effects through better positioning member communities to attract new businesses and investment. Member communities include the Towns of Coronach, Willow Bunch, Bengough and Rockglen as well as the RMs of Willow Bunch, Bengough, Happy Valley, Poplar Valley and Hart Butte. The SSREP has five main strategic pillars consisting of organization capacity; workforce transition, retention and attraction; tourism development; resource development and; business retention, expansion and attraction. Further details on how the Project will support the advancement of these five strategic pillars are provided in the Outlaw Trail Wind Energy Project Value-Added Community Benefit Plan submitted under Form 10. OTW LP will continue to engage with the SSREP in 2021 through meetings and emails to ensure they are kept apprised of Project advancement and able to provide feedback.

With the local Westmoreland Mine and SaskPower Poplar River thermal power station facing closure by 2030, the Town of Coronach recently hired an Economic Transition Coordinator to support the development and coordination of various transition initiatives. OTW LP has attended public meetings and had initial discussions with the Coordinator to introduce the Project and benefits for the Town of Coronach. OTW LP is in an excellent position to offset some of the economic impacts of this impending coal plant shutdown through an increase to the tax base, increased use of local suppliers and services, and through short- and long-term employment for Coronach and wider area residents in this coal affected community. Discussions and planning will continue in 2021 to keep the Town apprised of Project developments and share opportunities for input and collaboration on future initiatives.

2.4 Meetings with SK Ministry of Environment

OTW LP has engaged and communicated with SK Ministry of Environment (MOE) through emails, phone calls and meetings where project updates were presented. Six engagement meetings were held between OTW LP and MOE to discuss the Project. These meetings were held on the following dates:

- June 27th, 2016
- March 30th, 2017
- January 18th, 2018
- December 17th, 2018
- April 25th, 2019
- December 11th, 2019

SK MOE will continue to be kept updated on the permit application and development progress of the Project through email and phone calls. Additional consultation meetings with SK MOE will be completed on an as-needed basis throughout the development process. These future meetings may be considered around major project milestones (e.g., completion of the Adaptive Management Plan monitoring

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components or finalization of a Construction Environmental Management Plan) related to environmental programs.

2.5 Indigenous Engagement

OTW LP continues to engage with the Wood Mountain First Nation and the Willow Bunch Metis Local 139. Information packages including Project description, Project layout and studies completed were mailed out to these Indigenous communities in 2017. Follow up phone discussions were held with the Willow Bunch Metis Local 139 in December 2017. This phone conversation included a discussion about Project location, including siting of the operations and maintenance building and the benefits to the local economy. Additionally, these Indigenous communities received invites to all open houses.

OTW LP plans to engage with other member Nations of the File Hills Qu'Appelle Tribal Council. These consultations will be completed throughout the regulatory phase of project development, through construction, and continue through the life of the Project.

FHQ Developments is the development corporation for the File Hill's Qu'Appelle Tribal Council which operates and invests in multiple companies throughout Saskatchewan. BluEarth has built a strong relationship with FHQ Developments through a common desire to partner on renewable energy-based economic opportunities, beginning when BluEarth provided studies for future solar opportunities on reserve for all 11 Nations. This relationship then turned to focusing on project specific opportunities throughout Saskatchewan for both solar and wind projects. It was in this relationship building and partnership that the opportunity to work on the Outlaw Trail Wind Energy Project came to be.

FHQ Developments is focused on growing its economic impact in Saskatchewan through contributing to the long-term economic independence and prosperity of their Limited Partners and citizens by developing profitable business ventures, economic development opportunities, and advancing employment and livelihood for their Nations and citizens in a manner that is consistent with the Nehiyew (Cree), Dakota, Nakota, Lakota, and Anishinaabe (Saulteaux) Nations teachings. This forward thinking mission allows FHQ Developments the opportunity to focus on the long term sustainability of its businesses.

The relationship that has been built between FHQ Developments through Nuwind Energy and BluEarth is focused on growing the participation and equity of an Indigenous business into a major renewable energy project. This project and the equity that is to be gained through FHQ Developments will create one of the largest Indigenous equity ownerships in renewable energy in Saskatchewan. This coupled with FHQ Developments' focus on creating economic impact in Saskatchewan will see a major overall economic impact to the Saskatchewan economy and a major gain of Indigenous capacity within the industry.

FHQ Developments is ensuring that there is major capacity development through every step of the way from being an equity owner to construction of the project and the maintenance of the assets over 25 years. FHQ companies can deliver on multiple scopes of work, supply Indigenous talent from front line to

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management, and ensure there is significant reinvestment in the community it operates in, providing a long term, sustainable source of income and opportunity for the member Nations.

2.6 Non-Government Organizations

OTW LP has met with NGOs active in the Province of Saskatchewan. Meetings were a combination of in-person meetings and email correspondence. The initial consultation meetings focused on environmental NGOs to incorporate potential environmental concerns into the planning process. Consulted parties and dates of consultation are listed as follows:

- Saskatchewan Environmental Society – January 28th, 2020
- Nature Saskatchewan – January 29th, 2020
- Public Pastures Public Interest – January 29th, 2020
- Ducks Unlimited Canada (via email correspondence) – January 2 to 20, 2020

Future consultation with non-government organizations will include both environmental NGOs and construction related NGOs in the province and will include the following groups:

- Nature Conservancy of Canada: to discuss potential collaboration with NCC about offsetting options for the Project.
- Saskatchewan Parks and Wilderness Society – SK Chapter: to raise awareness of the Project with this group.
- Saskatchewan Construction Association: to engage with members of this organization and explore opportunities for additional local involvement in the Project.

Consultation with these groups may be held through in-person meetings, current circumstances allowing, or through email correspondence, video conference or telephone conference. Engagement completed to date and future consultation with NGOs will provide them an opportunity to make recommendations on how to improve the Project and participate in its success.

2.7 Community Liaison Committee

Prior to construction initiation, and as part of the community engagement program, OTW LP will develop a Community Liaison Committee (CLC). This CLC will be comprised of community leaders, community members and Project representatives from the development, construction and operations teams and will be a key venue for the community to engage and discuss Project issues.

The CLC will aim to achieve the following objectives:

- To provide a forum for meaningful and open dialogue between local residents, landowners, interested parties and OTW LP on matters related to the Project construction, operation and maintenance, and decommissioning;
- For OTW LP to provide project updates on the Project construction, operation and maintenance, and decommissioning plans/activities including any ongoing studies, mitigation or monitoring activities;
- To facilitate two-way communication and help OTW LP gain a better understanding of any Project-related issues and concerns from local residents, landowners, and interested parties and to receive suggestions that can help make OTW LP a better community partner;
- For OTW LP to review, discuss and respond to comments and questions raised at the previous CLC meeting(s), emailed, or otherwise received by the CLC from members of the community;
- For CLC members to have a venue to offer constructive feedback and reasonable suggestions on local items of interest related to the Project; and
- For OTW LP to assess items brought forward or discussed at CLC meetings and incorporate them, where reasonably appropriate and at OTW LP's discretion, into the construction, operation and maintenance, and decommissioning plans/processes.

The Committee will be formed immediately upon final approval/permitting of the Project and execution of the PPA with SaskPower. Meetings of the CLC will commence prior to construction and will be held at least quarterly during construction and into early operations. This CLC will be a key avenue through which the community and stakeholders will be able to raise concerns, and also influence Project decisions.

2.8 Project Website and E-Mail Address

The Project webpage is available at:

<https://blueearthrenewables.com/projects/outlaw-trail-wind-project/>

The Project webpage makes information accessible to all interested parties. The webpage features a Project summary, preliminary layout figures, information on the open houses, Project contact information and links to additional information. Details on the open houses include dates and content presented at the open houses including poster boards, frequently asked questions and visual simulations. Additionally, there is a designated Project-specific email address (projects@blueearth.ca) and phone number (1-844-214-2578) to receive comments, feedback and answer questions related to the Project.

The Project website is continually updated with the most current Project information available and will be updated throughout the life of the Project.

2.9 Information Materials and Sources

Information handouts summarizing Project details were made available at the open houses and on the Project webpage. In addition, information packages were mailed to landowners within 2 km of the Project area in May 2017 and July 2020. These information packages included an overview of the Project and an anticipated Project schedule. This information continues to be available to interested parties on the Project website. As the Project is advanced, further information packages will be available at future open house sessions and will be distributed by mail as necessary to ensure that residents, landowners and community members have the most current Project information. Through late-stage development and construction, newsletters will be mailed to local residents and stakeholders on a quarterly basis.

2.10 Tracking and Documentation

The engagement process includes the continuous tracking of interested parties and stakeholders. Contact information was collected and documented in a database that will continue to be updated throughout the life of the Project. This documentation process is a component of the Issues and Grievance Management process, which is further described in Section 4.0.

3.0 Project Impacts and Interest

With the extensive consultation and engagement program to date, OTW LP has received a high level of interest in the Project and prepared a comprehensive list of questions and concerns raised by various stakeholder groups. These questions were answered either directly at the time they were posed, or through follow-up correspondence with additional information. Concerns raised were discussed, and additional information on the topic was provided to the individual stakeholders interested in receiving more details. Answers to many of these common questions and concerns are provided on the Project website for public viewing.

Issues, questions and comments, as well as those individuals or parties interested in the Project, will continue to be recorded and addressed appropriately as an ongoing component of the Project development. This process also forms part of the Issues and Grievance Management process, described in Section 4.0.

3.1 Landowners

Through in-person consultation and open houses, the following impacts and interests have been raised by landowners in the Project area:

- Interest in job opportunities and land lease compensation;
- Concerns about impacts to the acoustic environment through turbine noise;

- Concerns about impacts to their agriculture activities;
- Questions about health effects of wind energy projects;
- Questions about impacts to the visual landscape of a wind project in the local area;
- Questions about soil and groundwater impacts during construction;
- Questions about the specific locations of Project components;
- Questions about potential impacts to local wildlife, such as birds and bats.

3.2 Indigenous Communities

Representatives of the Indigenous communities near the Project and File Hill's Qu'Appelle Tribal Council have expressed the following questions and concerns:

- Questions about how the Project will specifically benefit Indigenous communities in the area;
- Questions about Indigenous employment and sub-contracting opportunities;
- Concerns about archaeological impacts of the Project;
- Concerns about potential impacts to wildlife and hunting.

3.3 Rural Municipalities and Town of Coronach

Through in-person meetings and presentation at Council meetings, the following impacts and interests have been raised by the RMs and Coronach representatives:

- Interest in broad community benefits, specifically municipal tax benefits to the RMs;
- Construction timelines and employment numbers;
- Long-term job opportunities and indirect employment;
- Interest in the Project as a component of the transition to renewable energy;
- Questions about government subsidies for wind energy projects.

3.4 SK Ministry of Environment and NGOs

During in-person meetings with the SK MOE and environmental NGOs, the following questions and concerns were raised about the Project:

- Questions about soil and groundwater impacts during construction;
- Questions about the specific locations of Project components, why components are sited where they are;
- Questions about potential impacts to local wildlife, specifically bird activity levels in the Big Muddy Valley;
- Questions about potential impacts to native prairie and project-specific mitigation plan;
- Questions about archaeological studies and known heritage sites in the Project area;

- Sustainability practices and turbine recycling.

4.0 Issues and Grievance Management

OTW LP uses a specialized engagement tracking software to track community and stakeholder correspondence, issues and concerns throughout the project lifecycle (Borealis). This allows the company to ensure that all discussions, commitments and concerns are tracked and clearly identified. Identified issues and concerns are documented within the software with specific follow-ups/actions assigned to ensure that the issue and grievance addressed in a timely manner. To date, issues, concerns, comments and questions have been logged and will continue to be logged to document further considerations and actions to be taken.

OTW LP takes issues and grievances from the public seriously and works to address the concern in a timely manner. The company's experience on a wide variety of renewable energy projects across Canada has demonstrated our ability to follow-up and remedy local stakeholder concerns and employ adaptive management where necessary. Should SaskPower be interested, OTW LP can provide examples of where specific stakeholder concerns have been successfully addressed and/or mitigated.

Extensive up-front consultation in the site design stage is a key component to ensuring post-construction issues and grievances against the project are minimized. To the extent possible, the Project is designed to mitigate and minimize the known concerns that were highlighted in the community consultation process and feedback will continue to be incorporated through the detailed design, construction and operation. In the event that post-construction or operational concerns arise that were not previously identified, OTW LP is committed to working with the stakeholder to remedy or mitigate the issue.