

APPENDIX F

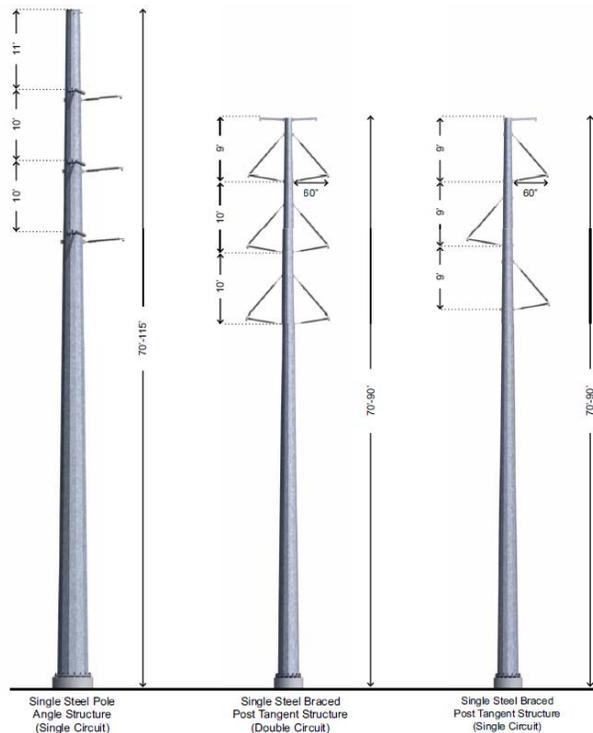
AVIAN COLLISION RISK ASSESSMENT

EDM International, Inc.
Tri-State Generation and Transmission
Bromley to Prairie Center 115kV Transmission Line Project
Avian Collision Risk Assessment
 June 7, 2012 - Updated January 9, 2014

Introduction

Tri-State Generation and Transmission (Tri-State) requested EDM International, Inc. (EDM) conduct an avian collision risk assessment for all segments of the proposed Bromley to Prairie Center 115kV Transmission Line Project (Project) located in the city of Brighton and in unincorporated Adams County. This Project would complete the third and final phase of the United Power System Improvement Project initiated by Tri-State and United Power in 2002, consisting of constructing a new 115kV transmission line to connect the Bromley Substation and the Prairie Center Substation in Adams, Colorado.

Tri-State is proposing to build a 115kV transmission line with vertical steel structures. The anticipated structure configurations are shown below and would typically be 70 to 90 feet tall, depending on the span distances. Taller structures may be required to obtain required clearance and distance over Interstate 76 (I-76) and the Burlington Northern Santa Fe Railroad. The right-of-way (ROW) required would be 75 feet (37.5 feet on either side of the centerline). The proposed transmission line would include an overhead static wire (OHS). Although the preferred route is located east of I-76, a number of alternative routes were examined from the Prairie Center Substation north to the Bromley Substation.



The Project would not pose an electrocution risk to birds, because the phase-to-phase and phase-to-ground clearances for transmission lines exceed those suggested to protect birds. Power lines can pose a collision risk to birds; however, a number of site-specific variables define this risk and not all power lines comprise an equal collision risk. Avian collision risk is determined by assessing habitat, land-use, topography, weather, and line configuration factors along with seasonal use by both resident and migratory bird species (APLIC 1994, Bevanger and Brøseth 2004, Mojica et al. 2009, Rollan et al. 2010). At-risk bird species to overhead line collisions include large, heavy-bodied birds such as herons, cranes, swans, and pelicans because of their large wingspans, heavy body mass, and resultant lack of agility. Historically, raptors have been considered to be at relatively low risk of collision with power lines. However, reports of raptor collision mortality from power lines suggest that collisions involving raptors may occur more widely than previously recognized (Mojica et al. 2009).

Methods

An EDM biologist conducted an initial field-based environmental review in May 2007 to identify potential impacts to species listed under the Migratory Bird Treaty Act (MBTA) from the proposed construction and operation of the proposed Project (EDM 2007). In May 2012 an EDM wetlands scientist delineated wetland features for the revised project. EDM converted GIS files of the alternative routes and the EDM field-delineated wetland features to Google Earth KMZ format using the ArcGIS “Layer to KML” geoprocessing tool. EDM overlaid the alternative routes and wetland features with Google Earth aerial imagery. EDM then conducted an updated avian collision assessment along the proposed UPIII alternative routes, based on the following factors:

- Areas of interest identified during the 2007 site reconnaissance.
- Proximity to Barr Lake and potential flight patterns.
- Wetland feature locations relative to route segments.
- Habitat and land use.
- Historical raptor and waterbird nesting.
- Line configuration and height.

Results

The proximity of power lines to locations where birds are landing and taking will affect avian collision risk (Stehn and Wassenich 2005), particularly during inclement weather and low-light conditions (APLIC 1994). Birds moving around the Barr Lake area may fly at lower altitudes, increasing the collision risk if a power line bisects daily movement corridors.

In general, the risk of bird collisions is greater on routes proposed on the east side of I-76, as compared to the west side of I-76. The routes east of I-76 are closer to Barr Lake and nesting birds, particularly at the southern end of the project area. The ROW alignment for the segments north of the Prairie Center substation parallel to the railroad track are buffered somewhat by a vegetative screen and some residential housing. At the north end of the lake, the bird movement is primarily to the northeast (parallel to the proposed line), reducing the chance of bird collisions. The risk of bird collisions along the east side of I-76 (i.e., the Preferred Route) would be a low to moderate collision risk with the OPGW during project operation, depending on the location of the route to native bird use areas.

The west side of I-76 is being rapidly developed, so the presence of a power line in this area would present less of a collision risk to migratory birds. However, this alignment bisects bird use

areas in two primary locations. First, a wetland located at the intersection of Buckley Road and I-76 supports emergent vegetation, and breeding Canada geese and yellow-headed blackbirds were documented during the 2007 field review (EDM 2007). Secondly, this route occurs between two large use areas for both waterfowl and bald eagles, which include Canada goose production areas and bald eagle winter forage areas. Similar to the Preferred Route alignment, the risk of bird collisions along the west side of I-76 also would be a low to moderate collision risk, depending on the location of the route to native bird use areas.

Based on habitat relative to line location and other area factors, it is suggested Tri-State mark the OHS along approximately 4 miles of the Preferred Route along the east side of I-76 from the Prairie Center Substation north to the Bromley Lane interchange (Segments A, K, L, and M; see Map 1). Marking the OHS with an appropriate marking device developed specifically for birds (e.g., Swan Flight Diverter) would increase the line profile and reduce potential collision risks. EDM recommends marking the OHS, since the upper static wire is smaller in diameter, can be more difficult for birds to see and avoid, and poses the greatest risk for avian collision. Other transmission OHS lines in the Barr Lake area have been strategically marked with SFDs on previously constructed United Power System Improvement Projects, and no collisions have been detected.

Additionally, marking the OHS is suggested for segments of alternative routes crossing and to the west of I-76, if the line is constructed in these areas (segments of alternative routes B, G, H, and N; see Map 1). In the northern section of the segments L and M, marking of the OHS should be executed in coordination with any required Federal Aviation Administration marking due to the presence of the helipad located at the Platte Valley Medical Center west of the proposed routes at the northwestern end of Barr Lake.

In summary, the overall avian collision risk was assessed for both of the routes located east and west of I-76 for the proposed Bromley-Prairie Center 115kV Transmission Line Project. Both routes would present a low to moderate avian collision risk, based on the location of the route to native bird use areas. However, the route east of I-76 would be incrementally higher in risk, based on its closer location to Barr Lake. Marking the OHS is recommended along approximately 4 miles of segments A, K, L, and M or along portions of segments B, G, H, and N, depending on the final ROW alignment. The device used for marking the single OHS would be the prerogative of Tri-State, but device spacing should follow that outlined in APLIC (2012).

Literature Cited

AVIAN POWER LINE INTERACTION COMMITTEE (APLIC). 2012. Reducing avian collisions with power lines: the state of the art in 2012. Edison Electric Institute. Washington D.C.

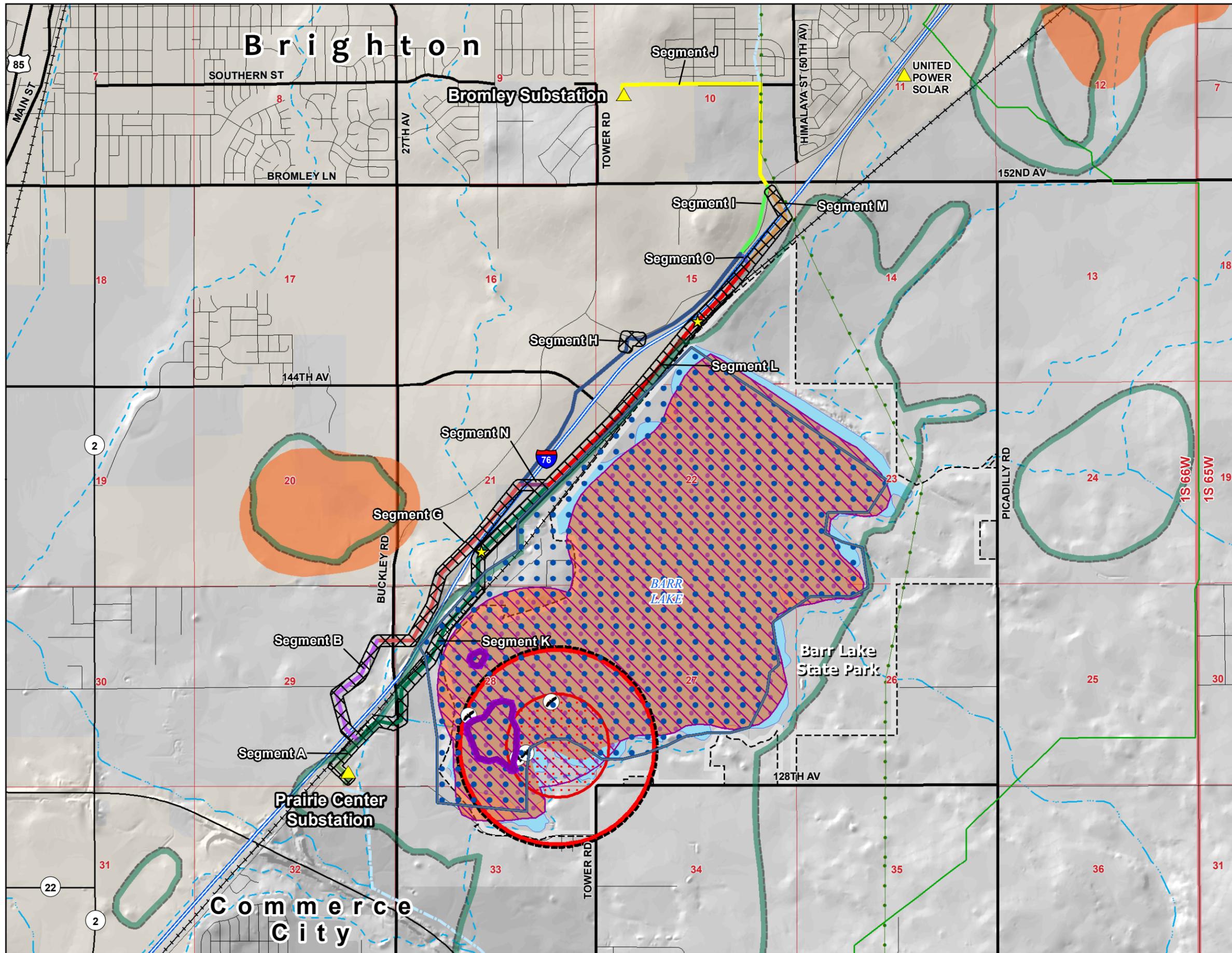
BEVANGER, K. AND H. BRØSETH. 2004. Impact of power lines on bird mortality in a subalpine area. *Animal Biodiversity and Conservation* 27: 67–77.

EDM INTERNATIONAL, INC. 2007. UNITED POWER SYSTEM IMPROVEMENT PROJECT, PHASE III, ENVIRONMENTAL REVIEW. 7PP.

MOJICA, E.K., B.D. WATTS, J.T. PAUL, S.T. VOSS, AND J. POTTIE. 2009. Factors contributing to Bald Eagle electrocutions and line collisions on Aberdeen Proving Ground, Maryland. *Journal of Raptor Research* 43:57-61.

ROLLAN, A., J. REAL, R. BOSCH, A. TINTO, AND A. HERNANDEZ-MATIAS. 2010. Modeling the risk of collision with power lines in Bonelli's Eagle (*Hieraaetus fasciatus*) and its conservation implications. *Bird Conservation International* 20:279-294.

STEHN, T.V. AND T. WASSENICH. 2005. Draft Whooping Crane collisions with power lines: an issue paper. December 22, 2005.



Bromley-Prairie Center 115kV Transmission Line Project

Avian Collision Risk Assessment Proposed OHS Marking Map 1

0 1,250 2,500 5,000
Feet

1:30,000
1 inch = 2,500 feet

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground

Original Route Segments

- A
- B
- G
- H
- I
- J
- K
- L
- M
- N
- O

Collision Assessment Areas to be Marked

- Collision Assessment Areas to be Marked
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

- City of Brighton
- Commerce City
- Barr Lake State Park

Wildlife

- Heron and Cormorant Rookery
- Canada Goose Brood Concentration
- Canada Goose Production Area
- Bald Eagle Historic Nest Sites (prior to 2003)
- Bald Eagle Active Nest (2003-2013) (0.5-mile buffer)
- Bald Eagle Winter Roost
- Bald Eagle Summer Forage
- Bald Eagle Winter Concentration
- Bald Eagle Winter Forage and Winter Range

Source: CPW 2012, EDM 2012b, G. Craig 2013, Barr Lake State Park 2013a, 2013b

TRI-STATE
Generation and Transmission
Association, Inc.
A Touchstone Energy Cooperative

This page left intentionally blank.