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Memo

To: Tina Bartunek Iberdrola Renewables 1125 NW Couch Street, Suite 700 Portland OR 97209	
From: Joyce Pickle	Project: Rugby Wind Project
Date: September 28, 2011	Job No: 170841

RE: Tree Replacement Memo for Rugby Wind Project, Pierce County, North Dakota – Second Year of Three Years of Monitoring

This memorandum documents the results of the second year of three years of monitoring the tree replacement at the Iberdrola Renewables (IRI) Rugby Wind Project, a 150 MW wind farm and associated 230 kV transmission line in Pierce County, North Dakota. HDR Engineering, Inc. (HDR) completed a tree survey of the project in the summer and fall of 2008 and spring of 2009. The tree survey was requested by the North Dakota Public Services Commission (PSC) to determine the number of trees required for replacement under the PSC Order #16, which states:

> Trees or other woody vegetation must be replaced with saplings that are two or more years old at a rate of two for every one removed. Landowners shall be given the option of having replacement trees or shrubs planted on the landowner's property or waiving that requirement in writing and allowing IRI to plant the replacement trees or shrubs elsewhere. IRI shall inspect tree replacements once a year for three years and send a report on or before October 1 of each year to the Commission documenting work completion and condition of woodlands planting. The Commission may order additional plantings if survival rates are less than 75%.

Land use at the Project site is primarily tilled agricultural land and pasture. Data collection points and the wooded area boundaries were mapped with a Trimble ProXH Global Positioning System (GPS), providing a permanent record of tree locations in the Project area. Final cleared tree numbers were provided by field staff after construction had been completed.

Tree removal was necessary at twelve locations within the Project area (Figure 1). Out of the twelve locations, nine of the sites were planted tree rows between tilled fields. The remaining three locations were naturally occurring aspen (*Populus tremuloides*) or green ash (*Fraxinus pennsylvanica*) woodlands. Tree removal was necessary to construct overhead transmission lines, underground collector lines and access roads for the Project. Overall, 289 trees were removed due to construction of the Project.

Iberdrola Rugby Wind Project
Tree Replacement Memorandum
September 28, 2011

Table 1 describes the landowner, location, and number of trees removed at each of the removal sites. The table also identifies the number of replacement trees planted for each landowner.

The replacement species recommendations are based on communications with Randy Myers, District Technician at the Pierce County NRCS office. Green ash and American elm (*Ulmus americana*) trees are not currently recommended for plantings in Pierce County, ND. Hackberry (*Celtis occidentalis*) or bur oak (*Quercus macrocarpa*) are recommended as alternatives. The affected landowners were also consulted and requested plantings of different species within their property. The species planted are shown in Table 1; photos of the replacement planting areas are included at the end of this memorandum.

As documented in HDR's November 30, 2010 report (summarizing the first year of the three year monitoring period), replacement trees were planted in six locations in 2010. By November 30, 2010, 563 replacement trees were planted, 559 of which were living at the time of the field surveys. On May 17, 2011 IRI operations and maintenance staff conducted a survey of the replacement trees planted in 2010, and determined that three additional trees had died over the winter, and several of the plantings were under water due to spring flooding. On September 1, 2011, 20 more trees were planted (these specific replacement trees matching landowner preferences were not available at the end of 2010 before ground freeze, so were planted in 2011). Photos of the trees planted in 2011 are shown at the end of this memorandum. The locations of the replacement trees are shown on Figure 2 and detailed on aerial maps shown at the end of this memorandum. On September 28, 2011, IRI operations and maintenance staff conducted a survey of the replacement trees and found that 35 trees had died since the May survey. Table 1 summarizes the number and status (live vs. dead) of all the replacement trees for the second year of monitoring. At a replacement ratio of 2:1, 93.6% replacement has been achieved at the Rugby Wind Project.

$$\frac{541 \text{ (live replacement trees)}}{578 \text{ (289 trees removed x 2)}} = 93.6\%.$$

Table1. Summary of Tree Removal Locations and Replacement Numbers as of September 28, 2011						
Landowner	Trees Removed				Trees Replaced	
	Location (Site on Figure 1)	Construction Activity	Number of Trees Removed		Location (Replacement Area on Figure 2)	Number and Type of Trees Replaced
Ferguson	S10 T157N R72W (Site 1)	Overhead Transmission	6 Green Ash	27 total	S10 T157N R72W (Area A)	56 Hackberry – 26 live, 30 dead
	S10 T157N R72W (Site 2)	Overhead Transmission	12 Green Ash			
	S10 T157N R72W (Site 3)	Overhead Transmission	9 Green Ash			
Gronvold	S15 T158N R72W (Site 4)	Overhead Transmission	26 Aspen	115 total	S15 T158N R72W (Area B)	236 Aspen – all live
	S15 T158N R72W (Site 5)	Overhead Transmission	89 Aspen			
Halvorson	S3 T157N R72W (Site 6)	Overhead Transmission	5 American Elm, 36 Green Ash	41 total	S2 T157N R72W (Area C)	82 Hackberry – all live
Koble	S6 T156N R72W (Site 7)	Overhead Transmission	4 American Elm, 42 Green Ash	46 total	S6 T156N R72W (Area D)	92 Hackberry – 90 live, 2 dead
Kraft	S12 T158N R73W (Site 8)	Underground Cabling	4 Green Ash	35 total	S13 T158N R73W (Area E)	71 Blue Spruce – 62 live, 9 dead
	S12 T158N R73W (Site 9)	Underground Cabling	10 Green Ash			
	S12 T158N R73W (Site 10)	Access Road	21 Green Ash			
Kukla	S18 T158N R72W (Site 11)	Overhead Transmission	10 Green Ash	25 total	S13 T158N R73W (Area F)	30 Lilacs – 29 live, 1 dead
	S18 T158N R73W (Site 12)	Access Road	5 Evergreens 5 Choke Cherry, 5 Willow		S18 T158N R72W (Area G)	15 Ponderosa Pine, 5 Willow – all live
Total	289 Trees Removed				541 Live Trees Replaced, 42 Dead Trees	

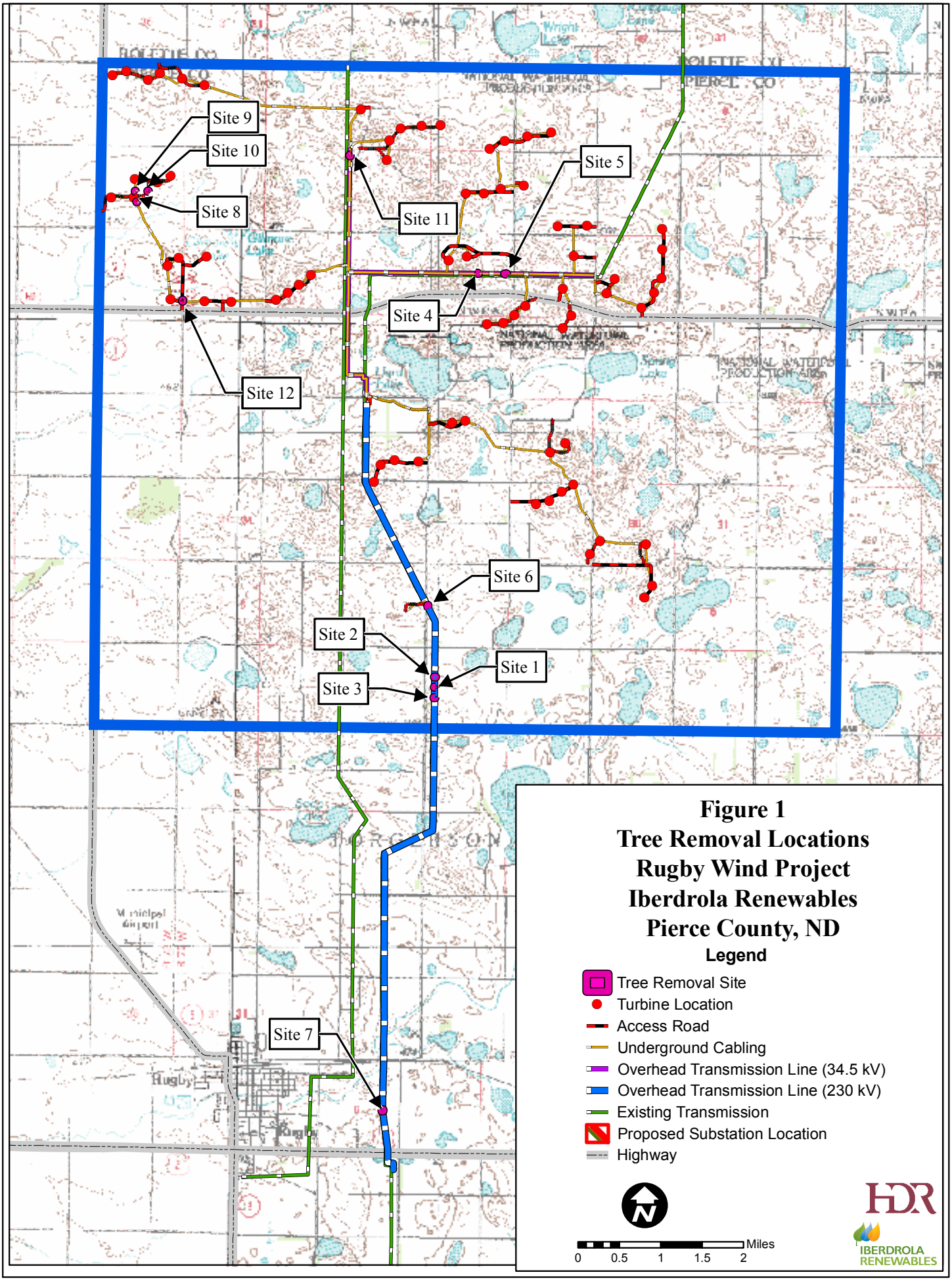

Figure 1
Tree Removal Locations
Rugby Wind Project
Iberdrola Renewables
Pierce County, ND

Legend

- Tree Removal Site
- Turbine Location
- Access Road
- Underground Cabling
- Overhead Transmission Line (34.5 kV)
- Overhead Transmission Line (230 kV)
- Existing Transmission
- Proposed Substation Location
- Highway

N

0 0.5 1 1.5 2 Miles

HDR

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Map Document: (\\mspe-gis-file\GISProj\9624\aprs\2008SiteVisits\Rugby_TreeSurveyFigure2.mxd)
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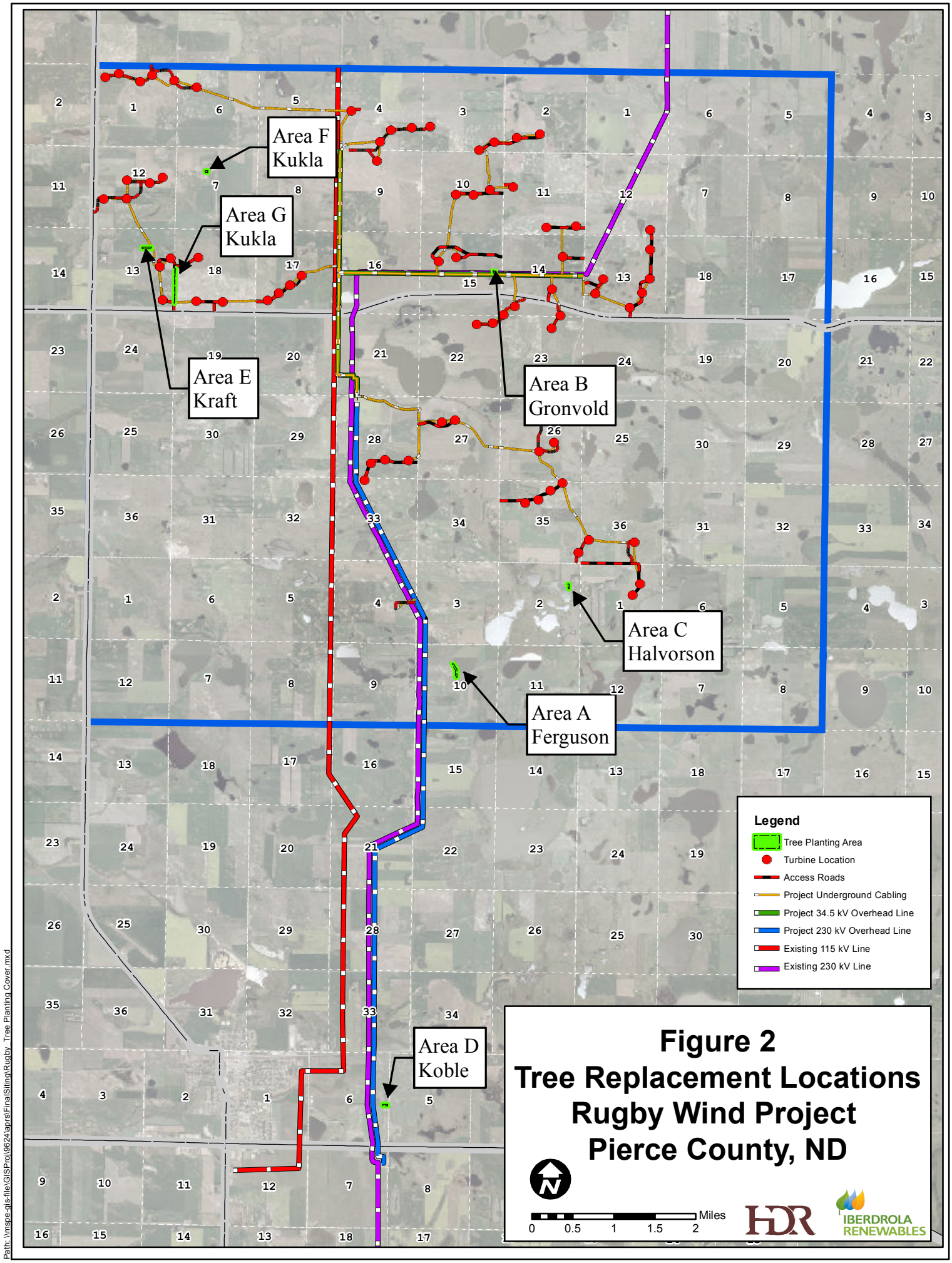

Figure 2
Tree Replacement Locations
Rugby Wind Project
Pierce County, ND

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Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

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9/29/2011

Feet

0 100

Ferguson Property Area: A

Tree Replacement Locations
Rugby Wind Farm

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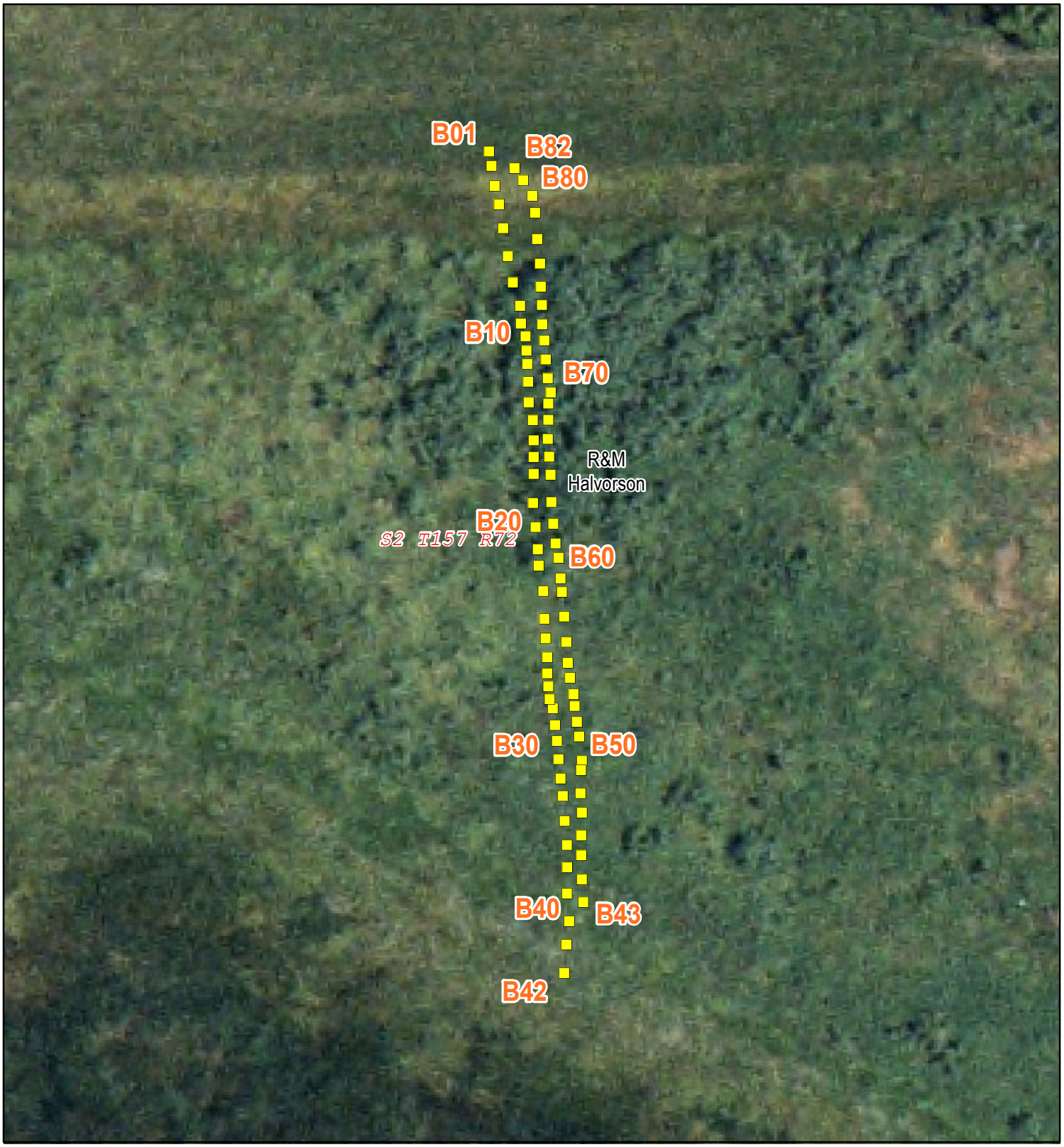

Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

HDR

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9/29/2011

0 100 Feet

Halvorson Property Area: B

Tree Replacement Locations
Rugby Wind Farm

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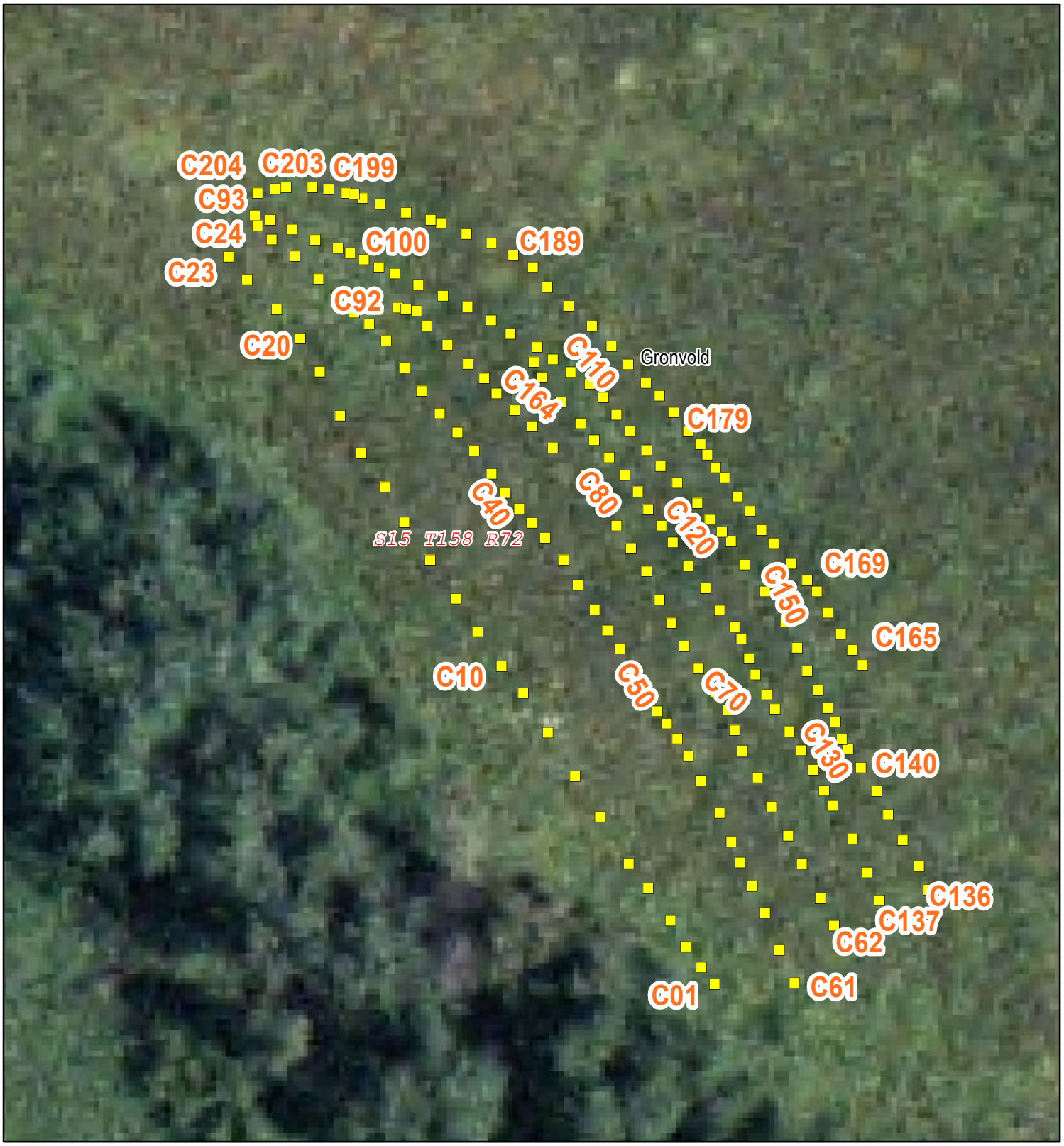

Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

HDR

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9/29/2011

0 Feet 100

Gronvold Property Area: C

Tree Replacement Locations
Rugby Wind Farm

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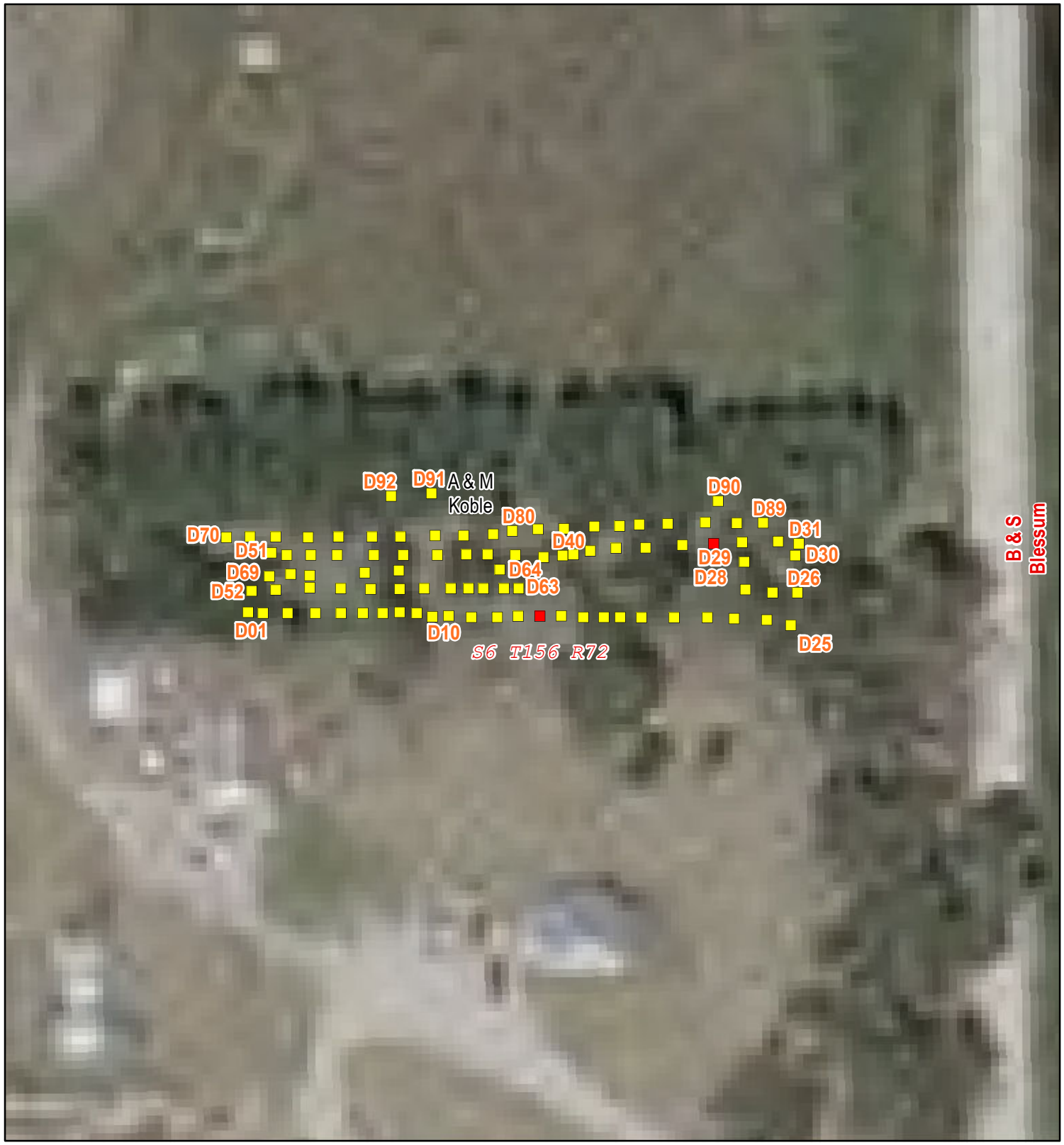

Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

9/29/2011

0 100 Feet

Koble Property Area: D

Tree Replacement Locations
Rugby Wind Farm

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Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

HDR

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9/29/2011

0 100 Feet

Kraft Property Area: E

Tree Replacement Locations
Rugby Wind Farm

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Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

HDR

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9/29/2011

0 Feet 100

Kukla Property Area: F

Tree Replacement Locations
Rugby Wind Farm

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Legend

Tree Location

Dead (Fall 2011)

Live Tree (Fall 2011)

9/29/2011

Feet

0 100

Kukla Property Area: G

Tree Replacement Locations
Rugby Wind Farm

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Photo 1: Ponderosa Pine on Kukla Property

Photo 2: Willows on Kukla Property