

September 29, 2017

North Dakota Public Service Commission  
Patrick Fahn  
600 E. Boulevard, Dept 408  
Bismarck, ND 58505-0480

**RE: Tree and Shrub Planting Survival – Second Year Annual Report Vantage West Spur Lateral Pipeline  
Case No. PU-15-142**

Dear Mr. Fahn,

In accordance with the North Dakota Public Service Commission (NDPSC) Tree and Shrub Mitigation Specifications, KC Harvey Environmental, LLC is submitting documentation of the reclamation planting survival monitoring for the second year after reclamation for the Vantage West Spur Lateral Pipeline Case Number PU-15-142.

The Tree and Shrub Reclamation Plan provided the following information as requested by the NDPSC Mitigation Specifications:

- The number and variety of trees and shrubs removed
- Reclamation plan for replacing these species at a 2:1 ratio
- The variety, location, and date of replacement plantings

A letter to the NDPSC dated May 9, 2016 and titled Tree and Shrub Reclamation Plan for Vantage West Spur Lateral Pipeline Case No. PU-15-142 documented the tree and shrubs planted as part of the original reclamation efforts. In May 2017, an additional 392 trees and shrubs were planted to address the 2016 losses. Tree and shrub stock was obtained from the Divide County Conservation District.

The first year's tree and shrub survival monitoring occurred in September 2016. The second year's monitoring occurred in September 2017. This year's results are documented in the attached annual report.

Please contact us if you require any additional information.

Sincerely,



David P. Cameron, P.E.

Principal Engineer

KC Harvey Environmental, LLC

58 PU-15-142 Filed 10/02/2017 Pages: 6  
2017 Tree and Shrub Reclamation Monitoring Report  
KC Harvey Environmental, LLC  
David Cameron, P.E.

cc: Pembina- Irfana Qureshi via email (IQureshi@pembina.com)

**ANNUAL MONITORING REPORT OF  
TREE AND SHRUB RECLAMATION  
PLANTING SURVIVAL**

Prepared for:

State of North Dakota Public Service Commission

Vantage West Spur Lateral Pipeline

Case No: PU-15-142

September 29, 2017

**KC HARVEY**  
ENVIRONMENTAL, LLC

**PEMBINA**



## **Introduction**

This document is a report of the second annual Vantage West Spur Lateral Pipeline monitoring for tree and shrub reclamation planting survival. Vantage Pipeline US LP (Pembina Pipeline Corp.) replanted trees and shrubs removed during construction using the methods outlined in the State of North Dakota Public Service Commission (NDPSC) approved Tree and Shrub Reclamation Plan submitted June 2015. The 47.8 mile pipeline alignment extends from a natural gas processing plant near Williston, North Dakota to an existing pipeline system near Stady, North Dakota within Divide and Williams Counties. The construction right-of-way (ROW) is 100 feet wide, which is made up of 30 feet of permanent right-of-way (PROW) and 70 feet of temporary work space. The PROW will be maintained for the lifetime of the pipeline. Vantage/Pembina Pipeline agrees to comply with all stipulations in the NDPSC's Tree and Shrub Mitigation Specifications, including completing annual inspections for three years following reclamation.

## **Tree and Shrub Reclamation Plantings**

An inventory of planted tree and shrub species was documented in a letter to the NDPSC dated May 9, 2016 titled Tree and Shrub Reclamation Plan for Vantage West Spur Pipeline Case No. PU-15-142. Trees and shrubs were planted as part of the pipeline reclamation in May 2016 (Table 1). Vantage worked with landowners along the pipeline ROW to identify desired species and locations for plantings (Table 1). The 1097 replacement tree and shrubs were planted outside of the Vantage West Spur ROW, as requested by the landowners (Figure 1). Most plantings were added to home sites, shelterbelts, and windbreaks. Two planting sites were near wetlands for wildlife habitat improvement. Trees and shrubs planted were one and two-year-old saplings and were purchased from Divide County Conservation District. In addition, some shrub species (snowberry, rose, silverberry) are expected to naturally regenerate from root where the species were present pre-pipeline construction. Trees and shrubs disturbed by the pipeline construction were replaced at a rate of 2:1. The goal is for  $\geq 75\%$  survival (420 plants) three years after planting.

## **Tree and Shrub Reclamation Planting Survival Monitoring**

A total of 280 trees and shrubs were removed during pipeline construction (Table 1). There were 705 individual plants of seven species planted on the Vantage West Spur Pipeline in 2016 as part of the original reclamation effort. Species included chokecherry, caragana, ponderosa pine, Colorado blue spruce, Russian olive, poplar and cottonwood. In spring 2017, 392 additional trees and shrubs were planted to address the 2016 losses. Species planted in 2017 included chokecherry, ponderosa pine, Colorado blue spruce, Russian olive, poplar and cottonwood.

Tree and shrub reclamation plantings were monitored for survival on September 25 and 26, 2017 by counting the number of live stems per species. Table 1 documents the number of surviving and regenerating reclamation plantings. September 2017 monitoring found 163 surviving from the 2016 planted species and 177 surviving from the 2017 planted species, for a total of 340 surviving plants. Regeneration data collected in 2016 showed 246 regenerated plants, resulting in a grand total of 586 reclamation plantings (Table 1). This total of 586 plants exceeds the 75% goal of 420 plants and equals approximately 105% of the 2:1 replacement ratio (560 plants).

It is expected that additional shrubs will regenerate on the reclaimed ROW in the next two years, adding to the overall total. A survey of regenerated plants will be completed during 2018 to verify and document

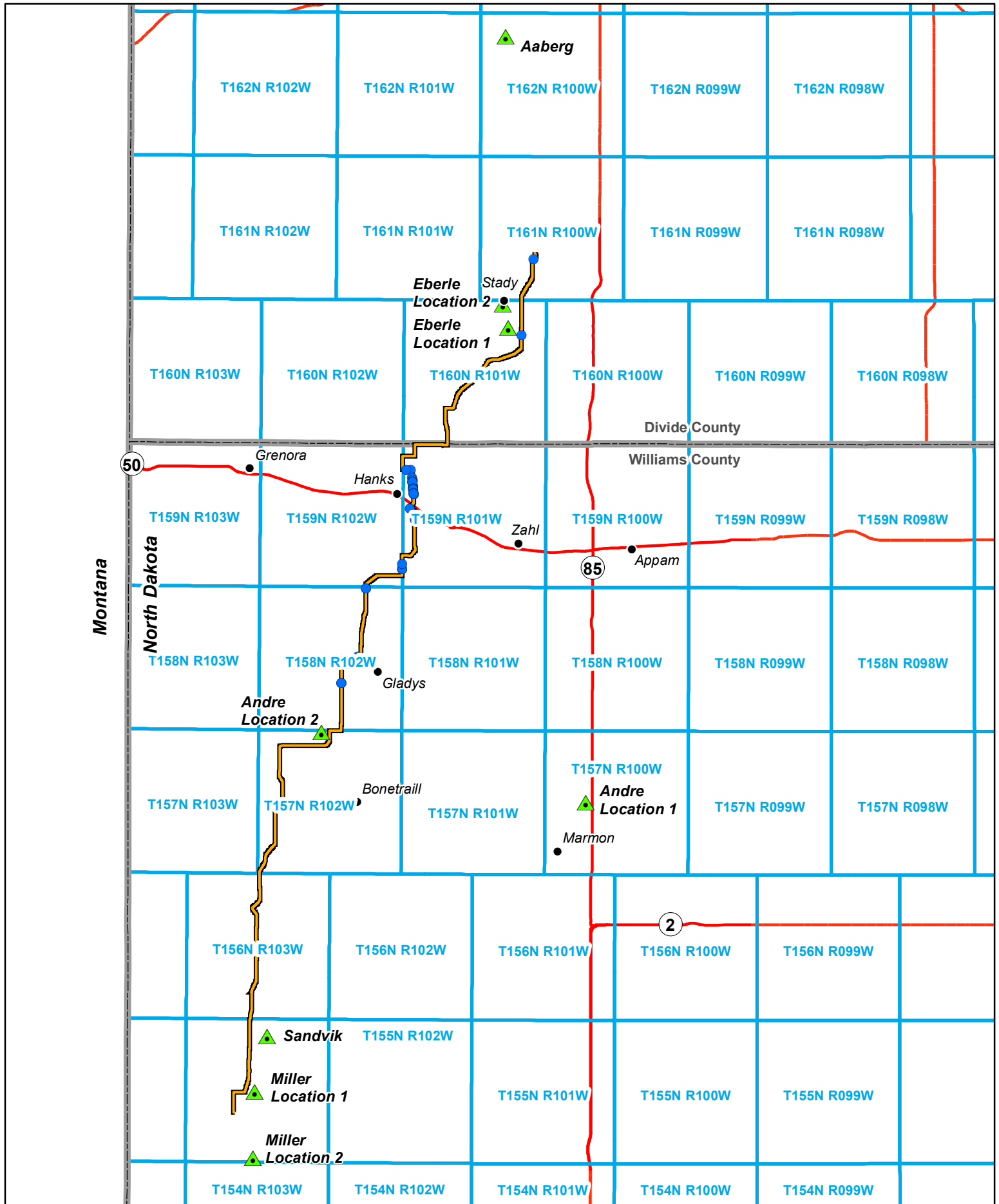
regeneration. Vantage worked with landowners to plant requested species at desired planting locations at home sites, shelterbelts, and windbreaks. Unfortunately, many of the landowners did not water the plantings that were provided and the survival rate was low due to the severe drought condition experienced during 2017. Where landowners did water trees, the survival was high (see Russian olive in Table 1).

**Table 1. Tree and shrub species present on the Vantage West Spur Lateral Pipeline ROW.**

Species	Number Inventoried Each Location	Actual Number Removed	2016 Planted	2017 Planted	Regeneration	Monitored Inventory of 2016 Planting	Monitored Inventory of 2017 Planting
Cottonwood	11	2	n/a	n/a	9	n/a	n/a
Chokecherry	10	2	n/a	n/a	8	n/a	n/a
Caragana	31	16	n/a	n/a	15	n/a	n/a
Green Ash	30	8	n/a	n/a	22	n/a	n/a
Chokecherry	1	1	n/a	n/a	0	n/a	n/a
Western Snowberry	2	2	n/a	n/a	2	n/a	n/a
Prairie Rose	2	2	n/a	n/a	10	n/a	n/a
Horizontal Juniper	2	2	n/a	n/a	0	n/a	n/a
Western Snowberry	9	9	n/a	n/a	20	n/a	n/a
Horizontal Juniper	4	4	n/a	n/a	0	n/a	n/a
Western Snowberry	4	4	n/a	n/a	15	n/a	n/a
Silverberry	22	22	n/a	n/a	25	n/a	n/a
Western Snowberry	4	0	n/a	n/a	n/a	n/a	n/a
Sage	80	0	n/a	n/a	n/a	n/a	n/a
Western Snowberry	80	80	n/a	n/a	40	n/a	n/a
Horizontal Juniper	25	25	n/a	n/a	0	n/a	n/a
Western Snowberry	24	24	n/a	n/a	20	n/a	n/a
Western Snowberry	1	1	n/a	n/a	0	n/a	n/a
Western Snowberry	1	1	n/a	n/a	10	n/a	n/a
Western Snowberry	1	1	n/a	n/a	10	n/a	n/a
Silver Buffaloberry	1		n/a	n/a	n/a	n/a	n/a
Chokecherry	2	2	n/a	n/a	0	n/a	n/a
Horizontal Juniper	2	2	n/a	n/a	0	n/a	n/a
Silverberry	8	0	n/a	n/a	n/a	n/a	n/a
Horizontal Juniper	4	0	n/a	n/a	n/a	n/a	n/a
Western Snowberry	40	40	n/a	n/a	20	n/a	n/a
Sage	14	14	n/a	n/a	0	n/a	n/a
Prairie Rose	16	16	n/a	n/a	20	n/a	n/a
Colorado Blue Spruce	n/a	n/a	40	38	n/a	0	20

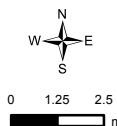
Vantage Pipeline Case No. PU-15-142  
Tree and Shrub Annual Survival Monitoring Report

<b>Species</b>	<b>Number Inventoried Each Location</b>	<b>Actual Number Removed</b>	<b>2016 Planted</b>	<b>2017 Planted</b>	<b>Regeneration</b>	<b>Monitored Inventory of 2016 Planting</b>	<b>Monitored Inventory of 2017 Planting</b>
Colorado Blue Spruce	n/a	n/a	160	132	n/a	0	45
Chokecherry, Caragana	n/a	n/a	100	62	n/a	59	45
Colorado Blue Spruce, Ponderosa Pine	n/a	n/a	100	80	n/a	3	45
Poplar	n/a	n/a	10	10	n/a	0	1
Russian Olive	n/a	n/a	50	0	n/a	36	0
Russian Olive	n/a	n/a	50	0	n/a	37	0
Cottonwood, Ponderosa Pine	n/a	n/a	195	70	n/a	28	21
<b>TOTALS</b>	<b>431</b>	<b>280</b>	<b>705</b>	<b>392</b>	<b>246</b>	<b>163</b>	<b>177</b>

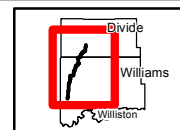


**KC HARVEY**

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- Asbuilt Route
- Highway
- Planting Location
- Plant Regeneration
- Township



**Vantage Pipeline US LP**

Vantage West Spur Pipeline:  
Tree & Shrub Planting Locations  
Plant Regeneration Locations

Date: 9/26/2016 Version: 2016-2