Enbridge Pipelines (North Dakota) LLC

Beaver Lodge Loop Project

TREE & SHRUB RESTORATION PLAN

North Dakota Public Service Commission
Case No. PU-10-613

Prepared by:

Merjent

February 2013

Enbridge Pipelines (North Dakota) LLC
Beaver Lodge Loop Project
Tree Shrub Restoration Plan

INTRODUCTION

On November 17, 2010 Enbridge Pipelines (North Dakota) LLC (Enbridge) filed an Application for Certificate of Corridor Compatibility and a Route Permit with the North Dakota Public Service Commission (Commission) to authorize construction of an approximately 56-mile crude oil pipeline and associated facility upgrades (Beaver Lodge Loop Project or BLLP) in Williams, Mountrail and Ward Counties, North Dakota. On May 18, 2011, the Commission issued its Findings of Fact, Conclusion of Law and Order (Order) regarding the case (Case No. PU-10-613).

For construction purposes, the project was divided into two segments: BLLP West (26 miles of pipe between Beaver Lodge and Stanley Station) and BLLP East (29 miles of pipe between Stanley Station and Berthold Station). Enbridge completed construction of BLLP East in 2011 and construction of BLLP West in 2012. Facility upgrades and construction activities at Beaver Lodge, Stanley, and Berthold Stations have occurred in 2011, 2012 and will be completed in 2013.

In accordance with the Tree and Shrub Mitigation Specifications identified in the Commission s Order (see Exhibit A), Enbridge is required to inventory and replace trees and shrubs that were removed during the Project. Cleared trees and shrubs are to be replaced on a two to one basis using the same or similar species. Invasive species will be replaced by a suitable native variety. Landowners were given the option to either have replacement trees and shrubs planted off right-of-way on their property or waiving that requirement and allowing replanting to take place at an alternate location. Following replanting, inspection of the replaced trees and shrubs will be conducted annually for three years to document the condition and survival rate. Enbridge will submit annual reports to the Commission following these inspections. Enbridge understands that if the survival rate is less than 75% after three years from the planting, the Commission may order additional plantings.

Enbridge is hereby submitting the results of its preconstruction tree and shrub inventories, information regarding landowner discussions, planting procedures, and a timeline for replanting. Enbridge requests that the Commission review this plan for adequacy and approval.

TREE AND SHRUB INVENTORY

Preconstruction inventories of the construction right-of-way were conducted by Carlson McCain, Inc. (Carlson McCain). BLLP East was inventoried in July 2011 and BLLP West was inventoried in June 2012 (reports included as Exhibit B). As required by the Commission s Tree and Shrub Mitigation Specifications, the right-of-way width was reduced to 50 feet in windbreaks, shelterbelts, and other wooded areas.

Inventory was taken of planted and naturally growing trees greater than 1 inch in diameter at breast height (DBH), as well as trees and shrubs, regardless of size, located in windbreaks, shelterbelts, other planted areas, and natural growth areas within the construction right-of-way. Colony-forming shrubs, such as silverberry and western snowberry, located in native growth areas were sampled using the Commission-approved Shrub Sampling Method. High-density woodland areas, located in native growth areas were delineated and sampled using the Commission-approved Tree Sampling Method. Natural growth areas were typically found near wetlands and in native landscapes on

hillsides. Planted tree rows and shelterbelts, containing both trees and shrubs, occurred in multiple locations along the proposed right-of-way. Four tree and shrub species were located within Stanley Station. Nine tree, eleven shrub, and five subshrub species were identified along the project corridor.

The tree inventories performed by Carlson McCain included a wider survey corridor than was used during construction. In addition, Enbridge reduced impacts within the construction corridor by restricting the construction right-of-way to 50 feet in wooded areas, and avoided other trees/shrubs located within the workspace, where feasible. As such, not all inventoried trees/shrubs were impacted. Actual trees and shrubs removed during construction were field-verified and recorded for mitigation purposes (refer to Table 3 in Exhibit C).

Additionally, a recent sapling planting on tract BB-82-43 was missed during the initial BLLP West tree/shrub inventory due to tall vegetation on the tract. Planting information was received from the Mountrail County Soil Conservation District (SCD) office to inventory the trees and shrubs planted on the tract (see Exhibit D). Actual trees and shrubs removed during construction were determined in consultation with the SCD and landowner. Results are presented in tabular form in Table 3 (Exhibit C).

RESULTS OF PRELIMINARY LANDOWNER DISCUSSIONS

The Commission s Order states that trees and shrubs are to be replaced at a 2:1 ratio. In accordance with Condition 13 of the Commission s Tree and Shrub Mitigation Specifications, Enbridge consulted with affected landowners to determine if they would like the replacement trees/shrubs off the right-of-way on the landowner s property. Several landowners provided a written waiver allowing replacement trees/shrubs to be planted at alternate locations.

During the initial phase of consultations, landowners were given the option to have all, a portion of, or no trees/shrubs replaced on their property, keeping in mind that all trees and shrubs were to be replaced at a 2:1 ratio. Waivers and contact records for these landowners have been included as Exhibit E.

REPLANTING PROCEDURES TO BE IMPLEMENTED

A total of 431 trees and 196 shrubs were removed during construction of the Project. As such Enbridge is responsible for planting 862 trees and 392 shrubs. The following table summarizes the total mitigation effort accounting for the landowner discussions described above. Specific tracts requiring mitigation are presented in Table 3 (Exhibit C).

Table 1 BLLP Tree Shrub Mitigation Overview						
Project Segment	Trees to Be Planted on Landowner s Property	Shrubs to be Planted on Landowner s Property	Trees to be Planted on Alt Location	Shrubs to be Planted on Alt Location	**Total Trees**	**Total Shrubs**
BLLP East	20	10	46	0	**66**	**10**
BLLP West	684	354	90	18	**774**	**372**
Stanley Station (owned by Enbridge)	0	0	24	10	**24**	**10**
Total	**544 (704)**	**364**	**160**	**28**	**864**	**392**

Includes 160 trees to be planted by a private Minnesota contractor (Wolcyn Tree Farms), per special arrangement with landowner (BB-82-20-3/BB-82-21-1).
Location and quantities of trees/shrubs to be planted on landowner s property included as Exhibit F.

The landowner on BLLP tracts BB-82-20-3, BB-82-21-1, BB-82-23-1 has worked out a separate planting arrangement. This landowner has requested to have the trees planted by a private Minnesota contractor (Wolcyn Tree Farms). As such, Enbridge is working directly with the landowner for this planting.

Enbridge has been in recent contact with the North Dakota Forest Service (NDFS), who has indicated an interest in partnering with Enbridge on the remaining tree mitigation effort for this and other active Enbridge projects requiring mitigation. In a January 15, 2013 conference call, NDFS State Forester Larry Kotchman provided details regarding the state s Trees for North Dakota program[1], and stated that NDFS has successfully partnered with other utility companies in North Dakota on similar projects requiring tree mitigation.

In addition to BLLP, Enbridge has several other ongoing projects in the state which require tree/shrub mitigation per Orders from the Commission. As a result of the Enbridge Project Case No. PU-10-612, PU-10-613, PU-11-232, and PU-11-606, the NDFS is proposing to plant 1,353 trees and shrubs to satisfy the mitigation requirements for these projects (See Table 2).

[1] North Dakota Code 4-21.2

Table 2 Bakken Program Mitigation Overview			
PSC Order	**Project Segment**	**Total Trees**	**Total Shrubs**
Case No. PU-10-612	Bakken Pipeline Project US	24	72
Case No. PU-10-613	**Beaver Lodge Loop Project (BLLP)**	**66**	**10**
	BLLP West	**774**	**372**
	BLLP - Stanley Station	**24**	**10**
Case No. PU-11-232	Berthold Station Expansion Project	26	0
Case No. PU-11-606	Little Muddy Station Connection Project	0	12
Total Mitigation Requirement		**914**	**476**
Total to be Mitigated by BLLP Landowner Directly		*160*	
Total to be Mitigated by the NDFS		*754*	*476*
Combined Total to be Mitigated by the NDFS		**1,230**	
Additional NDFS-Recommended Planting to Offset mortality		**123**	
Total to be Planted by NDFS		**1,353**	

Enbridge is planning to work in partnership with NDFS to complete the tree and shrub replantings and monitoring for its active projects shown in Table 2. The NDFS will coordinate with local Soil Conservation Districts (SCDs) to plant/replace trees and shrubs on impacted landowner's property, where requested. Trees and shrubs targeted for planting at alternative locations will also be administered through NDFS. A copy of the cover letter that summarizes the partnership is included as Exhibit G.

Willing landowners, with appropriate conservation tree plantings, will be encouraged to participate by working directly with SCD employees. Site-specific planting plans will be developed by a resource professional, based on soils, topography, land-form, and the landowner's goals using Natural Resources Conservation Service (NRCS) practice specifications.

Highlights of the partnership include:

- The initial emphasis of the program will be to complete tree/shrub planting on those private property owners crossed by the pipeline who requested that the trees and shrubs be replanted on their properties. The program's remaining tree/shrub planting opportunities will target the entire state of North Dakota. Public and private parties will be encouraged to participate.

- The *Trees for North Dakota Trust Fund*[2] will be used as a vehicle to orchestrate tree and shrub replantings on private property owners, as well as to make tree planting grants available to public and private landowners. Legislative oversight provides security and assurances that the funds are used for intended tree planting purposes. The program will include funds for site preparation, tree stock, tree planting services, and weed control. Funding for the program will be provided by Enbridge, based on a cost estimate to be

[2] established by North Dakota Code 4-21.2-02

provided by the NDFS.

- NDFS staff and/or local SCDs will conduct annual monitoring of the replanted trees/shrubs, and will prepare an annual report detailing the replanting effort and survival rates. Using this data, Enbridge will submit annual reports to the Commission per Tree and Shrub Mitigation Specification 15.

TIMELINE FOR REPLANTINGS

Mechanical planting will generally be utilized where a large number of plantings are required and hand planting will be employed where there are fewer plantings. Per discussions with NDFS staff, plantings generally occur between late April and June 1. It is anticipated that some areas will require site preparation prior the plantings. While some planting may occur in 2013, it is assumed that the majority of the plantings will occur in Spring 2014.

REPLACEMENT MONITORING

On Enbridge s behalf, NDFS and/or local SCDs will inspect tree and shrub replacements once a year for three years, on the anniversary of the plantings, and complete a report documenting the status and condition of plantings on or shortly before October 1 of each year. This report will be submitted to the Commission. Survival success rates will be determined by monitoring replacement plantings only and on a species-by-species basis. Enbridge understands the Commission may order additional plantings if survival rates are less than 75%. Based on discussions with NDFS, more trees/shrubs than required are typically planted to account for some anticipated mortality.

EXHIBIT A

North Dakota Public Service Commission's Tree and Shrub Mitigation Specifications

STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

Enbridge Pipelines (North Dakota) LLC **Case No. PU-10-612**
Bakken Pipeline Project US – Ward & Burke Counties
Siting Application

Enbridge Pipelines (North Dakota) LLC **Case No. PU-10-613**
Beaver Lodge Loop Project – Williams, Mountrail, &
Ward Counties
Siting Application

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (e.g., Caragana arborescens, Elaeagnus angustifolia, Rhamnus cathartica, Tamarix chinensis, T. parviflora, T. ramosissima, Ulmus pumila), shall be inventoried before cutting. The inventory shall record the location, number, and species of trees and shrubs.

2. In windbreaks, shelterbelts, and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, shall be inventoried for replacement.

3. In native growth areas, trees anticipated to be cleared that are 1-inch diameter at breast height (dbh) or greater shall be inventoried for replacement.

4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way shall be inventoried for replacement.

5. In native growth areas outside the permanent right-of-way, shrubs shall be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil shall be preserved and replaced after construction. Shrubs shall be allowed to regenerated naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared shall be inventoried for replacement.

6. In native growth areas, trees and shrubs may be inventoried by actual count or by sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission), and approved prior to the start of construction shall define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots shall be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs shall be selectively cleared, leaving mature trees and shrubs intact where practical.

8. The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the Commission.

9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced shall be noted on the inventory.

Replacement

10. Prior to replacement, documentation identifying the number and variety of trees removed as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings shall be filed with the Commission for approval.

11. Tree replacement shall be on a 2 to 1 basis with 2-year-old saplings. Shrub replacement shall be on a 2 to 1 basis with stem cuttings.

12. Trees and shrubs shall be replaced by the same species or similar species, except in the case of invasive species or noxious weeds, suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.

13. Landowners shall be given the option of having replacement trees or shrubs planted off the right-of-way on the landowner's property or waiving that requirement in writing and allowing those replacement trees or shrubs to be planted at alternative locations.

14. At the conclusion of the project, documentation identifying the actual number, variety, type, location, and date of the replacement plantings shall be filed with the Commission.

15. Tree and shrub replacements shall be inspected once a year for three years, on or about the anniversary of the plantings, and, on or shortly before October 1 of each year, a report shall be submitted to the Commission documenting the condition of replacement planting and any woodlands work completed. If after three years from the anniversary of the plantings the survival rate is less than 75%, the Commission may order additional planting(s).

EXHIBIT B

Tree and Shrub Inventory Reports (Carlson McCain)

Beaver Lodge Loop Project East (2011)

Carlson McCain

ENVIRONMENTAL • ENGINEERING • LAND SURVEYING

August 17, 2011

Ms. Angela Ronayne, PE
Merjent
615 First Avenue NE
Minneapolis, MN 55413

Re: **Beaver Lodge Loop Project and Stanley Station Tree Inventory Report**

Dear Ms. Ronayne,

Carlson McCain, Inc. is pleased to submit the "Tree Inventory Report of the Beaver Lodge Loop Project and Stanley Station" for your review. The field evaluation was conducted during July, 2011 by Greg Meyer, Chad Tucker, and John Snyder, Biologists of Carlson McCain, Inc.

Please call me at 701-255-1475 if you have any questions or need additional informational.

Sincerely,

Greg Meyer, MS
Ecologist

Tree Inventory Report

Beaver Lodge Loop Project
and
Stanley Station

Project #3421

Prepared for:

Merjent
615 First Avenue
Minneapolis, MN 55413

August 17, 2011

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ENVIRONMENTAL • ENGINEERING • LAND SURVEYING

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1.0 SCOPE OF WORK

Carlson McCain, Inc. (Carlson McCain) inventoried trees and shrubs along the proposed Beaver Lodge Loop Project (BLLP) and Stanley Station for Enbridge Pipelines (North Dakota) LLC (Enbridge). The proposed BLLP is oriented west to east, approximately 29 miles in length and connects Enbridge's Stanley and Berthold Stations. The proposed BLLP is located in Mountrail and Ward Counties, North Dakota.

Trees and shrubs were inventoried in accordance with the North Dakota Public Service Commission (Commission) Tree and Shrub Mitigation Specifications (Specifications) for the BLLP and Stanley Station. The inventory was conducted across an approximately 150-foot wide corridor. Carlson McCain biologists, Greg Meyer, John Snyder, and Chad Tucker, conducted the tree and shrub inventory during July 2010.

2.0 PROCEDURES

Carlson McCain utilized the Commission approved "Tree and Shrub Inventory Plan Enbridge Pipelines (North Dakota) LLC, Bakken Pipeline Expansion Project, Beaver Lodge Loop Project" (Inventory Plan) while conducting the tree and shrub inventory. Standard data forms were completed for each inventoried tree/shrub site. Each site was assigned a unique identification that consisted of the site's section, township, range, and identification number, i.e. 24156087-01. Data collected at each site included, observer, date, site id, woodland type, tree/shrub species, invasive species, tally, and total number. An example can be found in the Inventory Plan (Appendix B).

Trees and shrubs located in windbreaks, shelterbelts, other planted areas, and natural growth areas in the BLLP corridor and Stanley Station were counted by direct stem count. Planted and natural growing trees that were ≥1 inch diameter breast height (DBH) were inventoried for mitigation replacement.

Colony forming shrubs, located in native growth areas were delineated with a GPS unit or on aerial photography and sampled with the Commission approved Shrub Sampling Method. Silverberry, western snowberry, and sandbar willow are common colony-forming shrub growing along the BLLP. The Shrub Sampling Method is described in detail in the Inventory Plan (Appendix B).

3.0 RESULTS

Natural growth and planted trees and shrubs were inventoried at approximately 95 individual sites along the proposed BLLP and Stanley Station. Sixteen tree and shrub species were identified along the proposed BLLP (Table 1). Four tree and shrub species were identified within the Stanley Station. Trees and shrubs were found in numerous locations along the proposed BLLP. Naturally growing tree and shrub areas were found near wetland areas and in native landscapes on hillsides. Planted tree rows are also present along the proposed BLLP. Some of the tree rows contain planted shrubs.

Quaking aspen and cottonwood are the most common naturally growing tree species found along the BLLP. Prevalent native shrubs found along the BLLP include silverberry, western snowberry, and sandbar willow. Siberian elm, an invasive tree species, is the most common planted tree while Siberian peashrub, an invasive shrub species, is the most common planted shrub. Tree and Shrub Count Forms are included in Appendix C.

Table 1. Summary of Tree and Shrub Inventory

Species	Common Name	Growth Form	Reproduction	Invasive or Nonnative	Naturally Growing ≥1"	Planted ≥1"	Overall Total
Amelanchier alnifolia	Juneberry	tree/shrub	seed	No	52	0	52
Caragana arborescens	Peashrub (Siberian)	shrub	seed	Yes	0	1222	1222
Crateagus rotundifolia	Hawthorn (Round-Leaved)	tree/shrub	suckering	No	49	0	49
Crotoneaster integerrimus	European Crotoneaster	shrub	seed	Yes	0	2	2
Elaeagnus angustifolia	Russian Olive	tree	seed	Yes	11	1	12
Elaeagnus commutata	Silverberry	shrub	seed	No	23386	338	23724
Fraxinus pennsylvanica	Ash (Green)	tree	seed	No	0	67	67
Populus deltoides	Cottonwood	tree	seed/suckering	No	89	0	89
Populus tremuloides	Quaking Aspen	tree	seed/suckering	No	118	0	118
Prunus americana	Plum (American)	tree/shrub	seed/suckering	No	2	0	2
Prunus virginiana	Chokecherry	shrub	seed/suckering	No	110	130	235
Salix amygdaloides	Willow (Peachleaf)	tree	seed	No	73	0	73
Salix exigua	Willow (Sandbar)	tree/shrub	suckering	No	454	3	457
Shepherdia argentea	Buffaloberry	shrub	rhizomatous, colony forming	No	45	3	48
Symphoricarpos occidentalis	Western snowberry	shrub	rhizomatous, colony forming	No	10840	0	10840
Ulmus pumila	Elm (Siberian)	tree	seed	Yes	6	108	114
				Totals	35235	1874	37109

4.0 RECOMMENDATIONS

Carlson McCain makes the following recommendations regarding mitigation:

- **Invasive Species.** Invasive species should be replaced with non-invasive native tree/shrub of similar height and canopy suitable for the mitigation area.

- **Colony-forming Species.** Colony-forming and/or suckering species as described in Section 3 should be cut flush with the ground level where necessary to accommodate construction. These areas should then be allowed to regenerate naturally. Where complete removal is necessary, replacement should be made on a 1:4 basis with stem cuttings. A planting ratio of 1:2 is accurate in areas where moisture is not a limiting growth factor.

Enbridge will develop a tree/shrub mitigation plan for Commission's approval.

5.0 REFERENCES

Enbridge Pipelines (North Dakota) LLC. Tree and Shrub Inventory Plan. Enbridge Pipelines (North Dakota) LLC, Bakken Pipeline Project, Beaver Lodge Loop Project. Case No. PU-10-612 and PU-10-613. July 2011.

North Dakota Tree Handbook. North Dakota Tree Information Center. North Dakota State University. ND Forest Service. http://www.ag.ndsu.edu/trees/handbook/ndhand-1.htm Accessed September 2010.

North Dakota Public Service Commission. Exhibit C1 North Dakota Public Service Commission Findings of Fact, Conclusion of Law and Order. Tree and Shrub Mitigation Specifications. 3p.

APPENDIX A

Tree and Shrub Mitigation Specifications

Case No. PU-10-612 / PU-10-613

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (*e.g., Caragana arborescens, Elaeagnus angustifolia, Rhamnus cathartica, Tamarix chinensis, T. parviflora, T. ramosissima, Ulmus pumila*), shall be inventoried before cutting. The inventory shall record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, shall be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1-inch diameter at breast height ("dbh") or greater shall be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way shall be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs shall be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil shall be preserved and replaced after construction. Shrubs shall be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared shall be inventoried for replacement.
6. In native growth areas, trees and shrubs may be inventoried by actual count or by sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction shall define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots shall be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs shall be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the NDPSC.
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced shall be noted on the inventory.

Replacement

10. Prior to tree/shrub replacement, documentation identifying the number and variety of trees removed as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings shall be filed with the NSPSC for approval.
11. Tree replacement shall be on a 2 to 1 basis with 2-year-old saplings. Shrub replacement shall be on a 2 to 1 basis with stem cuttings.
12. Trees and shrubs shall be replaced by the same species or similar species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.
13. Landowners shall be given the option of having replacement trees/shrubs planted off the right-of-way on the landowner's property or waiving that requirement in writing and allowing those replacement trees/shrubs to be planted at alternative locations.
14. At the conclusion of the project, documentation identifying the actual number, variety, type, location, and date of the replacement plantings shall be filed with the NDPSC.
15. Tree/shrub replacements shall be inspected once a year for three years, on about the anniversary of the plantings, and, on or shortly before October 1 of each year, a report shall be submitted to the NDPSC documenting the condition of replacement planting and any woodlands work completed. If after three years from the anniversary of the plantings the survival rate is less than 75%, the NDPSC may order additional planting(s).

APPENDIX B

Tree and Shrub Inventory Plan

Tree and Shrub Inventory Plan

Enbridge Pipelines (North Dakota) LLC
Bakken Pipeline Project
Beaver Lodge Loop Project

Case No. PU-10-612
PU-10-613

Prepared for:

Enbridge Pipelines (North Dakota) LLC

July 2011

Introduction

Enbridge Pipelines (North Dakota) LLC proposes to construct, own, and operate the the Bakken Pipeline Project US – Ward & Burke Counties (case number PU-10-612) and the Beaver Lodge Loop Project – Williams, Mountrail, & Ward Counties (case number PU-10-613). Enbridge Pipelines (North Dakota) LLC will comply with the tree and shrub mitigation specifications as outlined by the North Dakota Public Service Commission (Commission) Findings of Fact, Conclusion of Law and Order. Enbridge Pipelines (North Dakota) LLC proposes to contract McCain and Associates for the tree and shrub inventory. The tree and shrub mitigation specifications are found in Appendix A of this Tree and Shrub Inventory Plan. Specifically, this Plan outlines the process for completing the tree and shrub inventory.

Inventory Methods

Enbridge Pipelines (North Dakota) LLC will inventory trees and shrubs, including those considered invasive species, to be cleared within the right-of-way (ROW) easement. Inventories will be documented on standard forms and will include the inventory location, species present, and number of trees and shrubs in the location. An example form is found in Appendix B.

Windbreaks, Shelterbelts, and Other Planted Areas

In windbreaks, shelterbelts, and other planted areas, trees and shrubs anticipated to be cleared regardless of size will be counted by direct stem count. Trees that are one-inch or greater diameter at breast height (DBH) will be inventoried for replacement.

In windbreaks, shelterbelts, and other planted areas, shrubs that form colonies (such as buffalo currant, chokecherry, dogwood, plum, pussy willow, sandbar willow, western snowberry, and Woods rose) and that are cut flush with the ground surface and not cleared, so as to leave the naturally occurring seed bank and root stock intact will not be direct stem counted. Instead, the area will be delineated on an aerial photo and indicated on construction drawings to not be cleared or have the ground disturbed. If ground disturbance occurs, Enbridge Pipelines (North Dakota) LLC will conduct a direct stem count of the disturbance area or estimate the number of stems cleared using a Commission approved sampling estimate method (see Shrub Sampling Method, Appendix C).

Native Growth Areas

In native growth areas, trees that are one-inch or greater diameter at breast height (DBH) will be inventoried for replacement.

In high-density woodland areas, a Commission approved sampling method may be used in place of individual counting (see Tree Sampling Method, Appendix D).

In native growth areas, shrubs that form colonies (such as buffalo currant, chokecherry, dogwood, plum, pussy willow, sandbar willow, western snowberry, and Woods rose) and that are cut flush with the ground surface and not cleared, so as to leave the naturally occurring seed bank and root stock intact will not be direct stem counted. Instead, the area will be delineated on an aerial photo and indicated on construction drawings to not be cleared or have the ground disturbed. If ground disturbance occurs, Enbridge Pipelines (North Dakota) LLC will conduct a direct stem count of the disturbance area or estimate the number of stems cleared using a Commission approved sampling estimate method (see Shrub Sampling Method, Appendix C).

Tree Sampling Method

Per the Commission's Tree and Shrub Inventory Specifications (Inventory Specification No. 6 in Appendix A), in high-density woodland areas, Enbridge Pipelines (North Dakota) LLC proposes the following sampling method for the tree inventory. The dimensions of the entire woodland stand within the ROW will be delineated to determine the area of the woodland. Tree and shrub counts will be made in representative sample site areas within the woodland. Transects will be developed and the circular sample sites placed along the transect. The number of sample sites within a woodland stand will be dependent on woodland size and uniformity. A smaller, more uniform woodland stand would require fewer sample sites than a larger, less uniform woodland stand.

The sample sites will be 0.10 acres (37.42-foot radius circles). A rope 37.42 feet in length will be attached to a central stake and rotated in a circle (Appendix D). Trees and shrubs within the circle will be counted. Tree and shrub density for the entire woodland area within the ROW will be calculated based on the average density from all of the sample locations within the woodland, weighted against the woodland size.

Shrub Sampling Method

Per the Commission's Tree and Shrub Inventory Specifications (Inventory Specification No. 6 in Appendix A), in high-density woodland areas, Enbridge Pipelines (North Dakota) LLC proposes the following sampling method for the shrub inventory. The dimensions of the entire woodland stand within the ROW will be delineated to determine the area of the woodland. Shrub counts will be made in representative sample site areas within the woodland. Transects will be developed and the circular sample sites placed along the transect. The number of sample sites within a woodland stand will be dependent on woodland size and uniformity. A smaller, more uniform woodland stand would require fewer sample sites than a larger, less uniform woodland stand.

The sample sites will be 0.01 acres (3.72-foot radius circles). A rope 3.72 feet in length will be attached to a central stake and rotated in a circle (Appendix C). Shrubs within the circle will be counted. Tree and shrub density for the entire woodland area within the ROW will be calculated based on the average density from all of the sample locations within the woodland, weighted against the woodland size.

Appendix A

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (*e.g., Caragana arborescens, Elaeagnus angustifolia, Rhamnus cathartica, Tamarix chinensis, T. parviflora, T. ramosissima, Ulmus pumila*), shall be inventoried before cutting. The inventory shall record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, shall be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1-inch diameter at breast height ("dbh") or greater shall be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way shall be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs shall be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil shall be preserved and replaced after construction. Shrubs shall be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared shall be inventoried for replacement.
6. In native growth areas, trees and shrubs may be inventoried by actual count or by sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction shall define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots shall be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs shall be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the NDPSC.
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced shall be noted on the inventory.

Replacement

10. Prior to tree/shrub replacement, documentation identifying the number and variety of trees removed as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings shall be filed with the NSPSC for approval.
11. Tree replacement shall be on a 2 to 1 basis with 2-year-old saplings. Shrub replacement shall be on a 2 to 1 basis with stem cuttings.
12. Trees and shrubs shall be replaced by the same species or similar species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.
13. Landowners shall be given the option of having replacement trees/shrubs planted off the right-of-way on the landowner's property or waiving that requirement in writing and allowing those replacement trees/shrubs to be planted at alternative locations.
14. At the conclusion of the project, documentation identifying the actual number, variety, type, location, and date of the replacement plantings shall be filed with the NDPSC.
15. Tree/shrub replacements shall be inspected once a year for three years, on about the anniversary of the plantings, and, on or shortly before October 1 of each year, a report shall be submitted to the NDPSC documenting the condition of replacement planting and any woodlands work completed. If after three years from the anniversary of the plantings the survival rate is less than 75%, the NDPSC may order additional planting(s).

Appendix B

Tree and Shrub Count Form

TREE COUNT: Enbridge Pipelines LLC			
Sampled by:		Date:	
Location / Site ID:			
Woodland Type (circle):		Native[1] Planted[2]	
SPECIES	Invasive Species?[3]	TALLY	TOTAL NUMBER

[1] Criteria for counting in native areas: trees DBH >1" and shrubs total count

[2] Criteria for counting in planted areas: total count

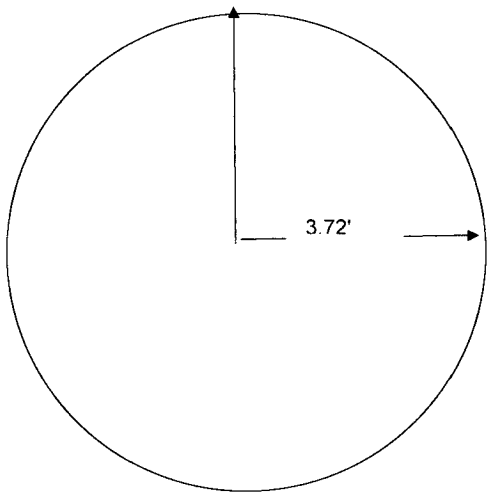
[3] invasive includes species such as caragana, Russian olive, buckthorn, Siberian elm

Appendix C

Shrub Sampling Method

Sample Plot

- Circular sample plots with a radius of 3.72 feet, or area equivalent to 0.01 acres created with a central stake and rope.
- The rope, 3.72 feet in length, anchored to the central stake and rotated in a circle



Shrub Counts

- Direct stem counts from each plot
- Tallied on work sheet by species

Woodland size

- GPS points taken in the field around boundary
- GIS used to calculate acreage

Calculations

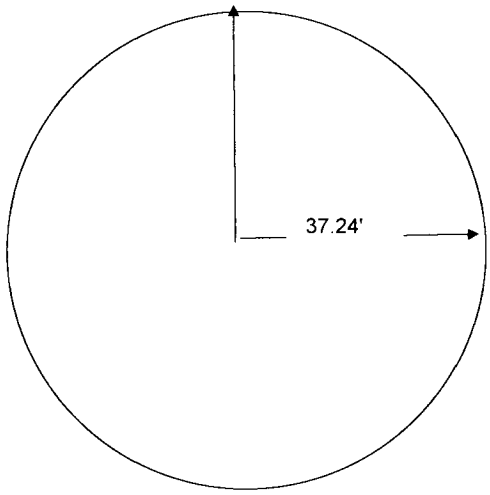
- Average determined from all plots sampled in a woodland area or area is equivalent to stems/0.001 acre
- Converted to a per acre basis (average times 100)
- Total number per woodland determined by multiplying average number per acre with woodland size

Appendix D

Tree Sampling Method

Sample Plot

- Circular sample plots with a radius of 37.24 feet, or area equivalent to 0.10 acres created with a central stake and rope.
- The rope, 37.24 feet in length, anchored to the central stake and rotated in a circle



Tree Counts

- Direct stem counts from each sample site
- Tallied on work sheet by species

Woodland size

- GPS points taken in the field around boundary
- GIS used to calculate acreage

Calculations

- Average determined from all plots sampled in a woodland area or area is equivalent to stems/0.10 acre
- Converted to a per acre basis (average times 10)
- Total number per woodland determined by multiplying average number per acre with woodland size

APPENDIX C

Tree and Shrub Count Forms

TREE COUNT: Enbridge Pipelines

Sampled by: GM / CT Date: 7/18/11

Location / Site ID: Stanley Station 27156091

Woodland Type (circle): Native[1] Planted[2]

SPECIES	Invasive Species?[3]	# (DBH 1-2")	# (DBH >2")	TOTAL NUMBER
box Elder	N		3	
Choke Cherry (Natural growth - 27156091-03)	N		5	
Si. Elm (Natural growth - 27156091-03)	Y		4	
Cottonwood (Natural growth - 27156091-03)	N		2	
Russian Olive - 27156091-04	Y		1	

27156091-03

27156091-04

[1] Criteria for counting in native areas: trees DBH >1" and shrubs total count

[2] Criteria for counting in planted areas: total count

[2] invasive includes species such as caragana, russian olive, buckthorn, siberian elm

APPENDIX D

Figures

Stations
Pipeline
Tract Boundary
Construction Right-of-Way
Tree Survey Results

1:1,200

0 100 200 Feet

N

Enbridge Pipelines (North Dakota) LLC

Beaver Lodge Loop Project

Project Location Map

Revised: 09/29/2011

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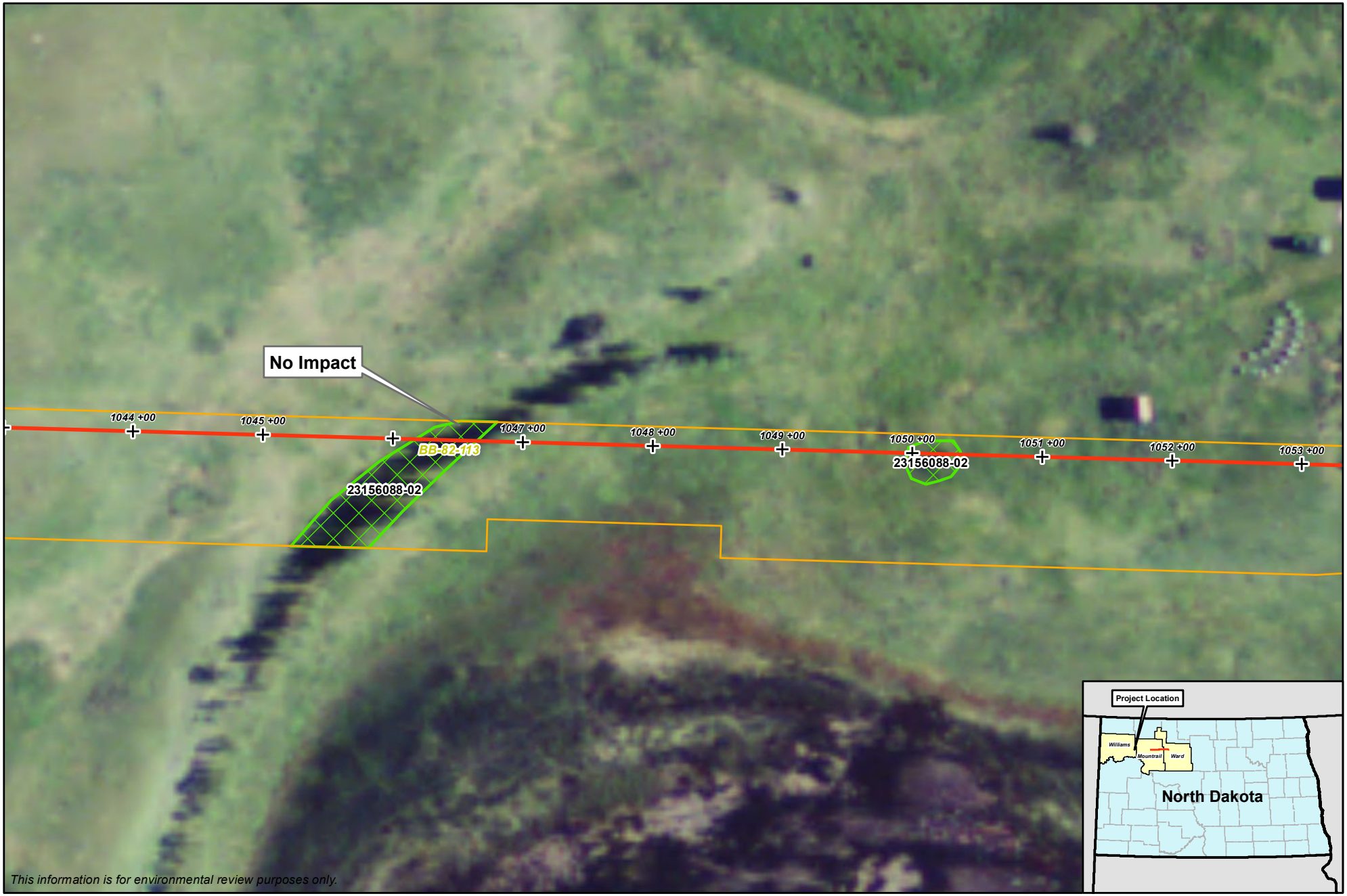

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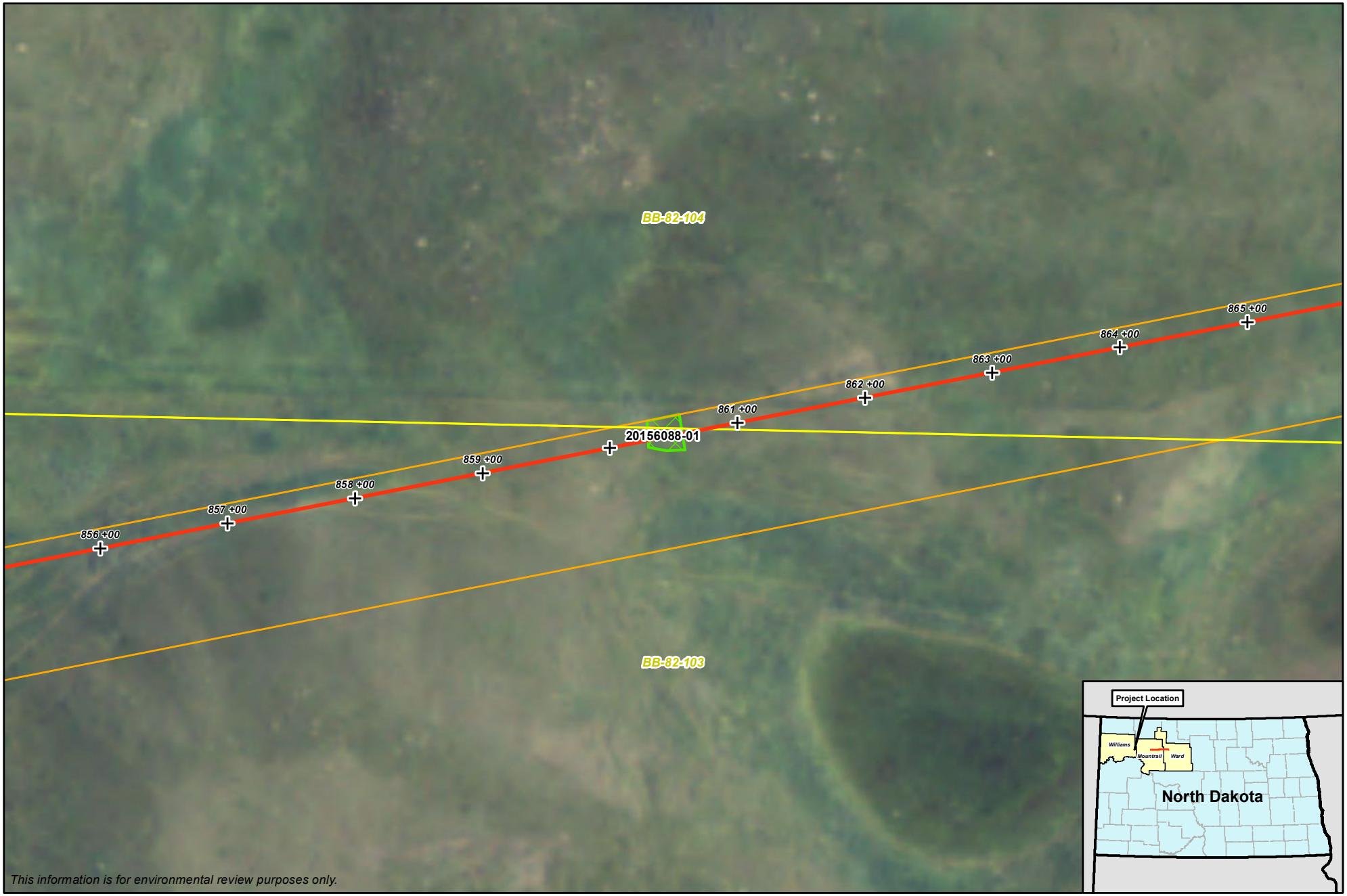

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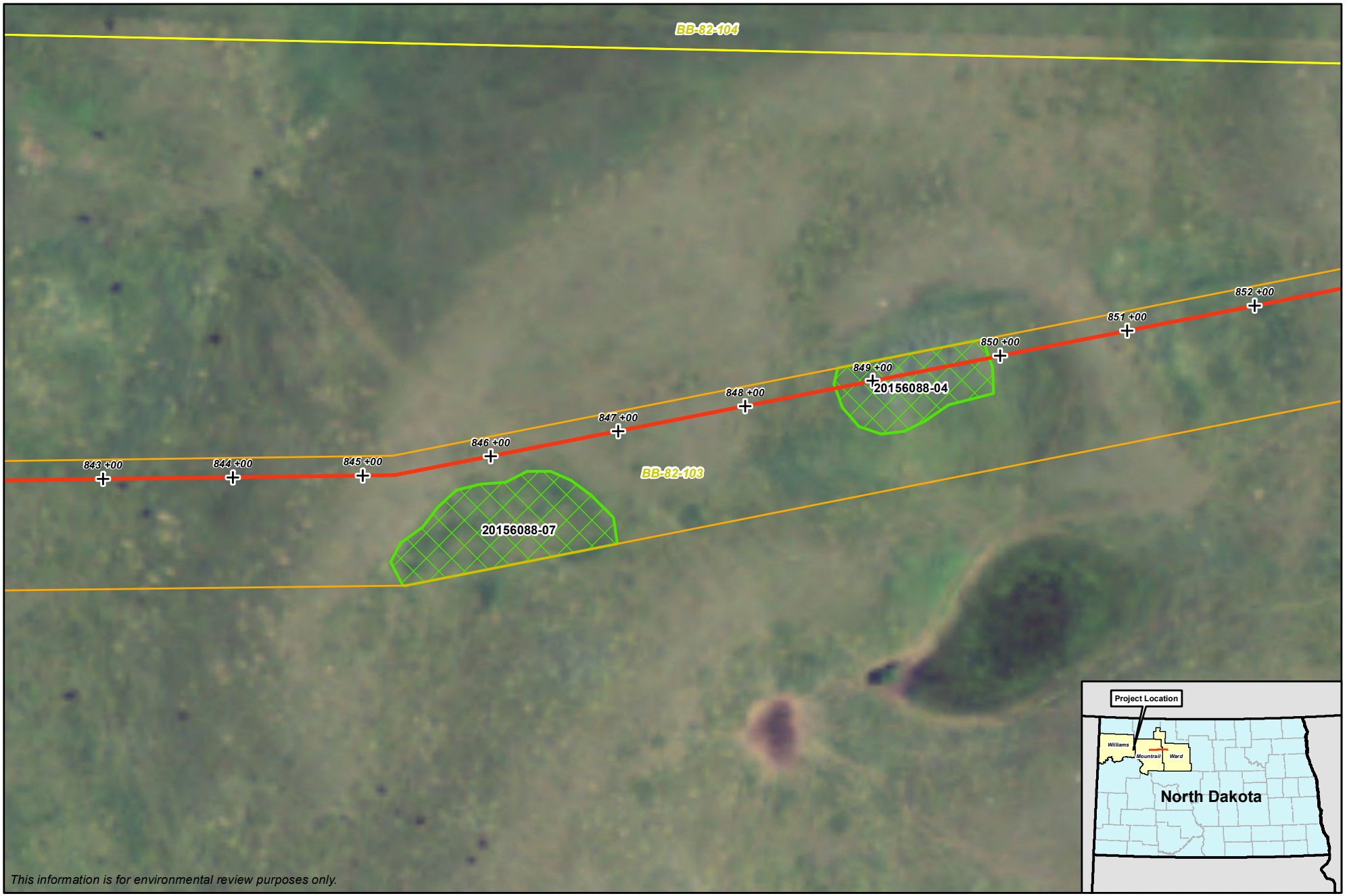

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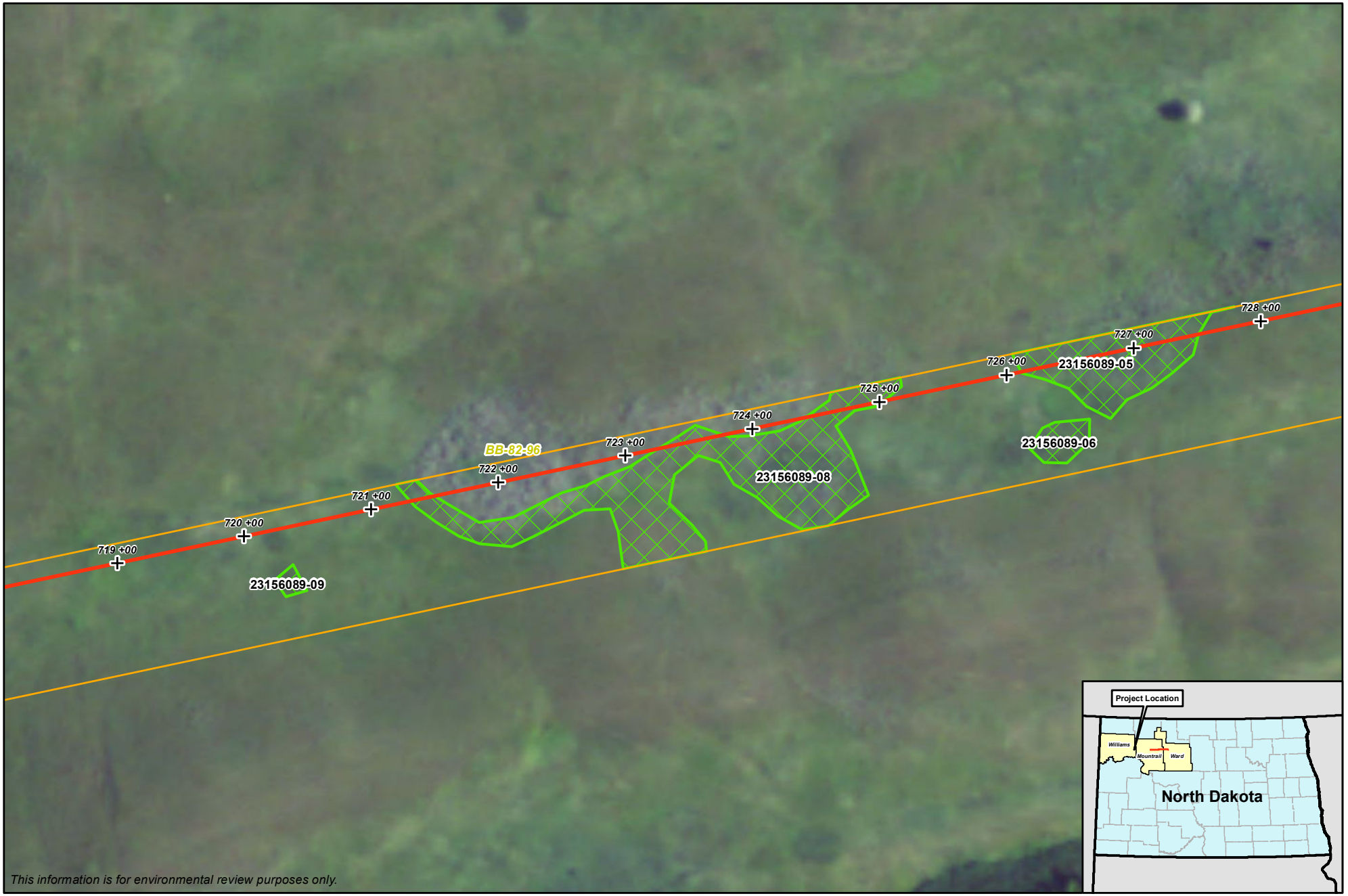

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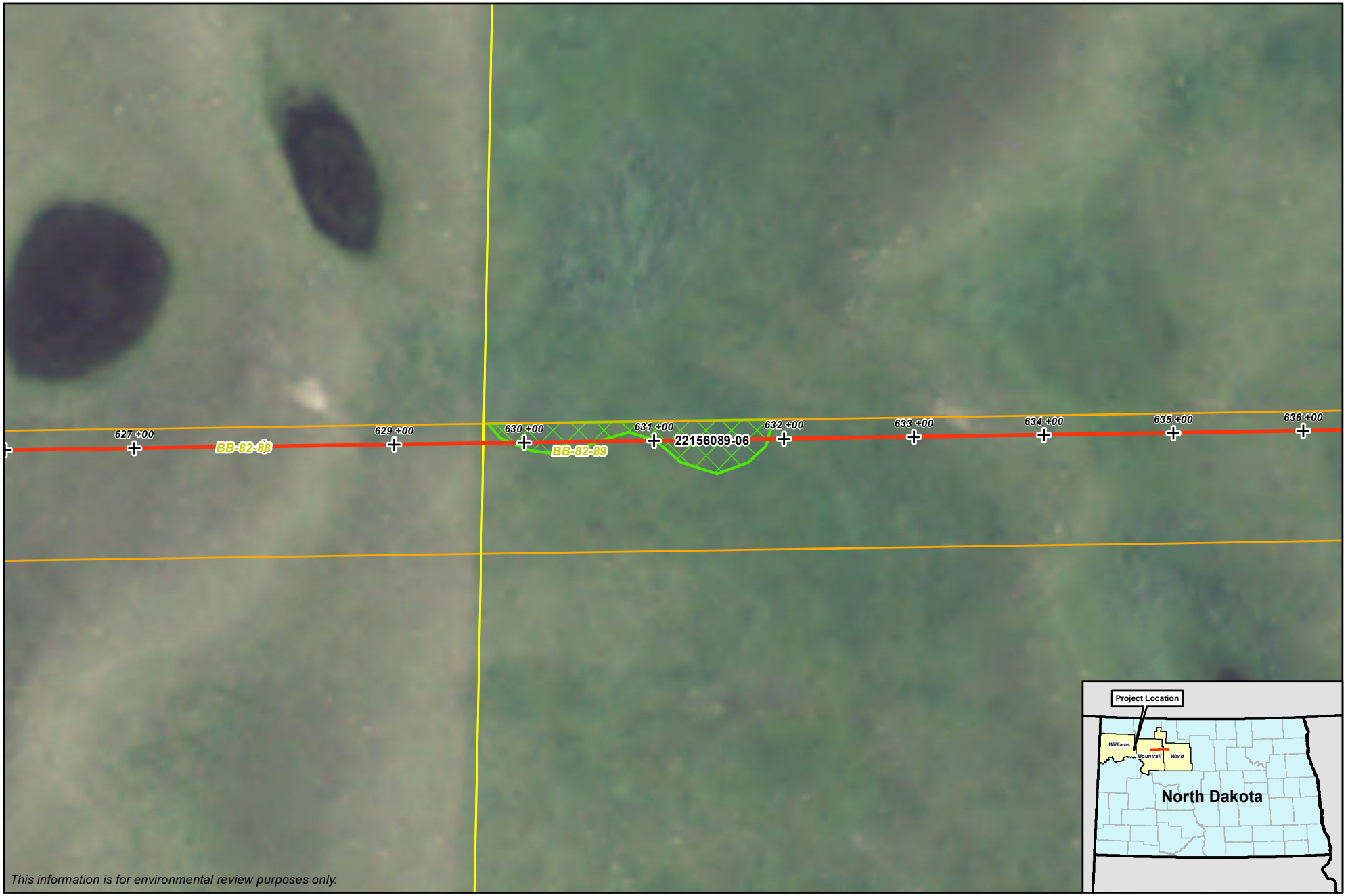

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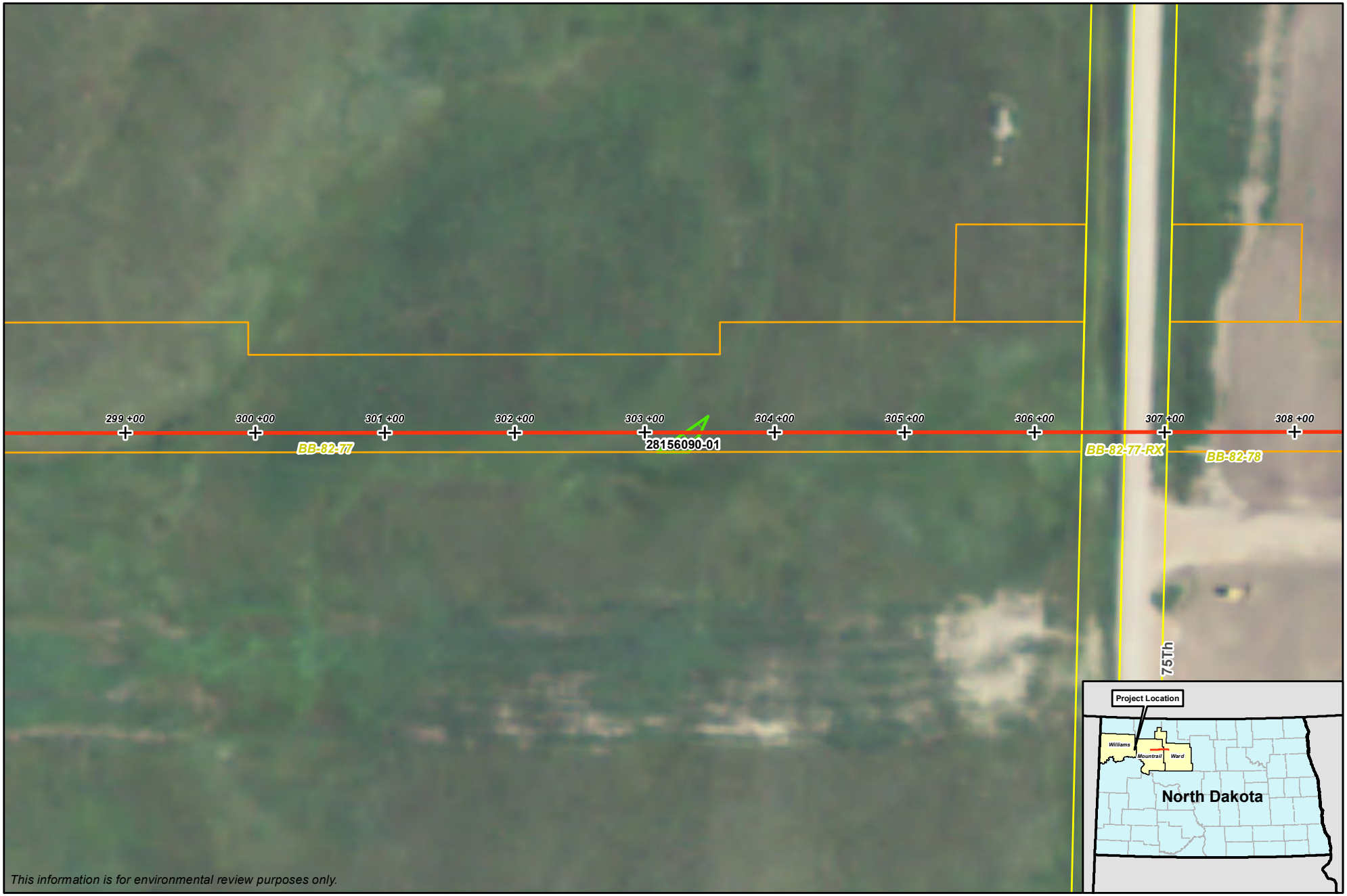

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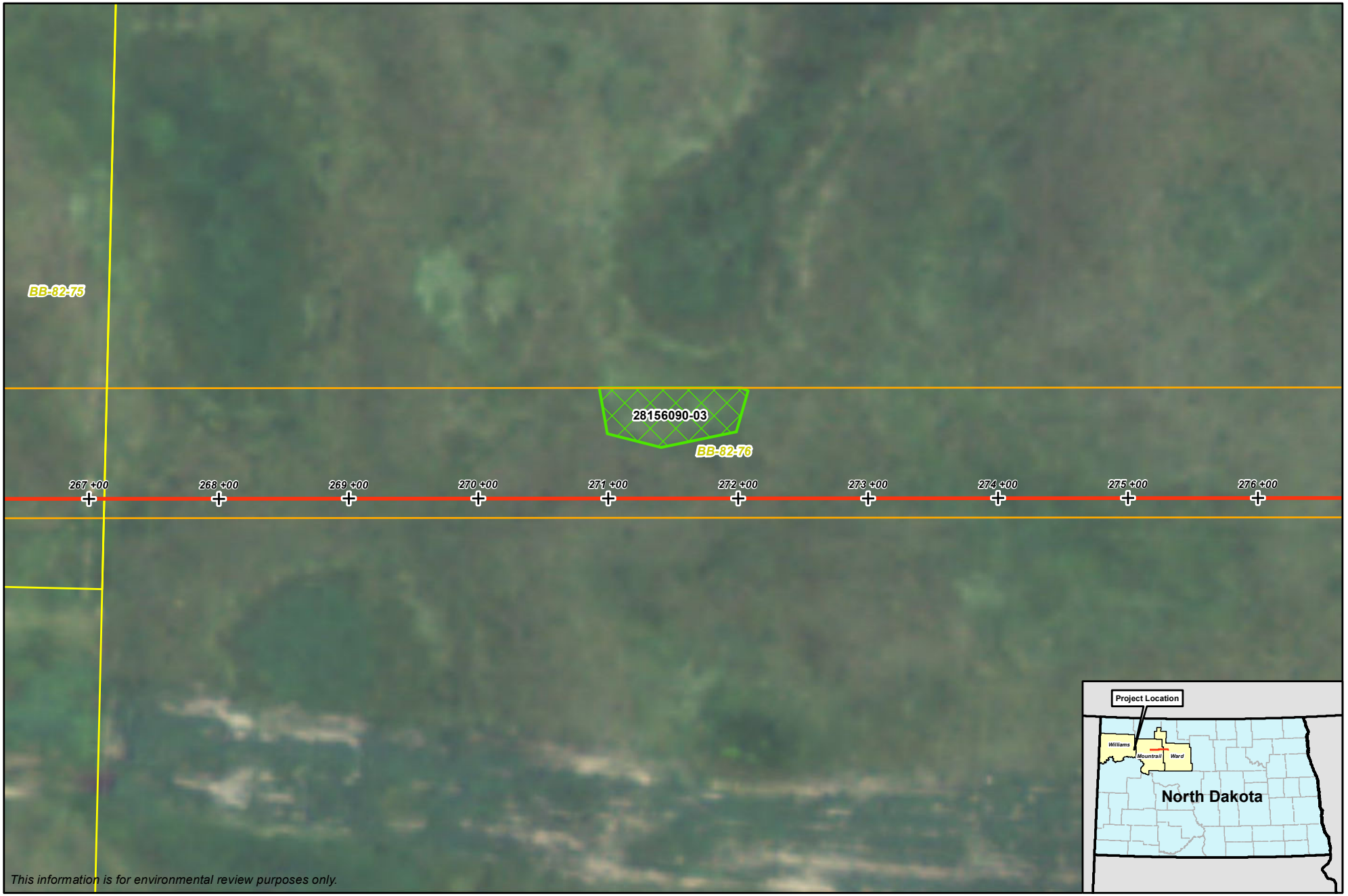

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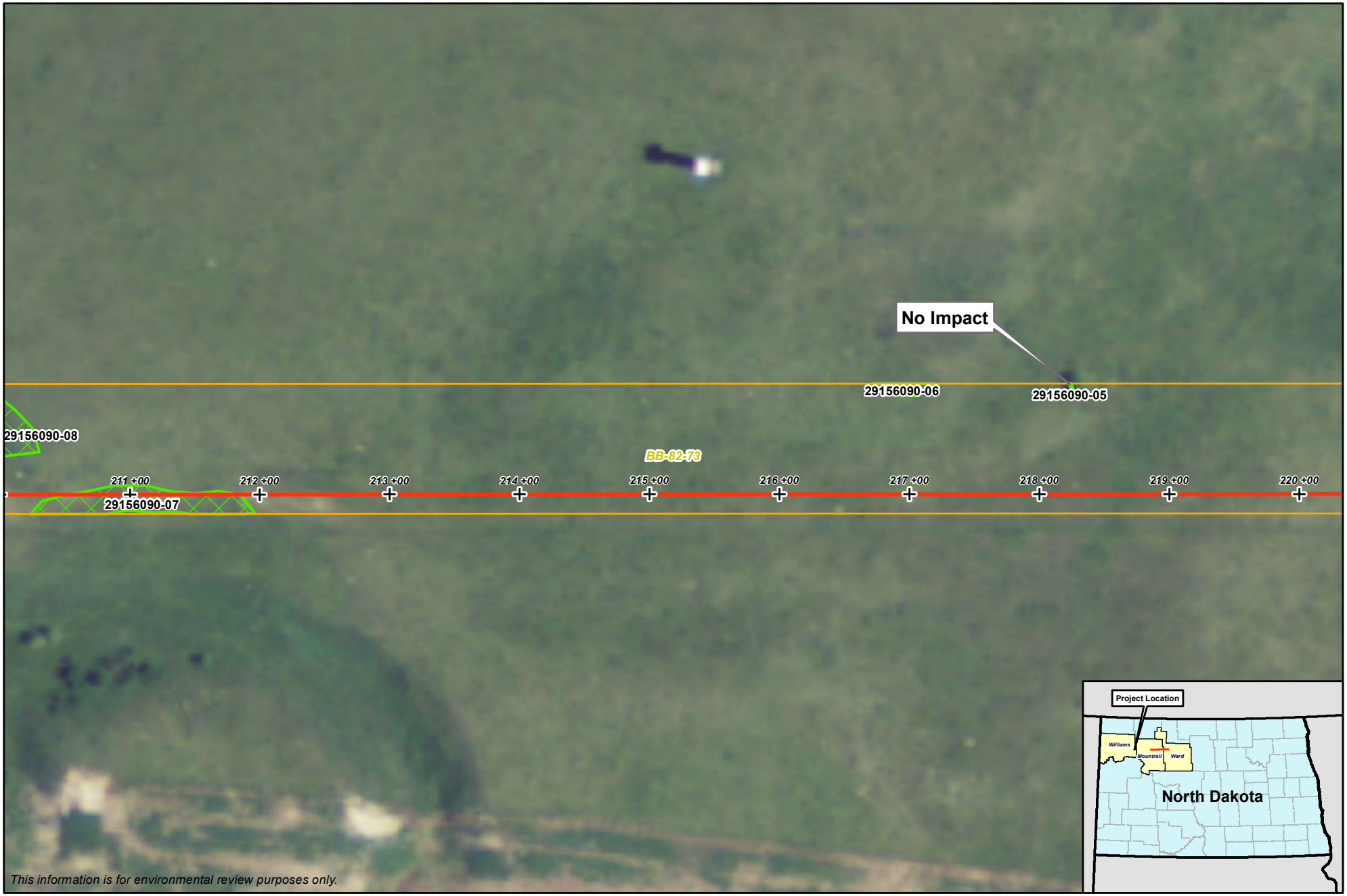

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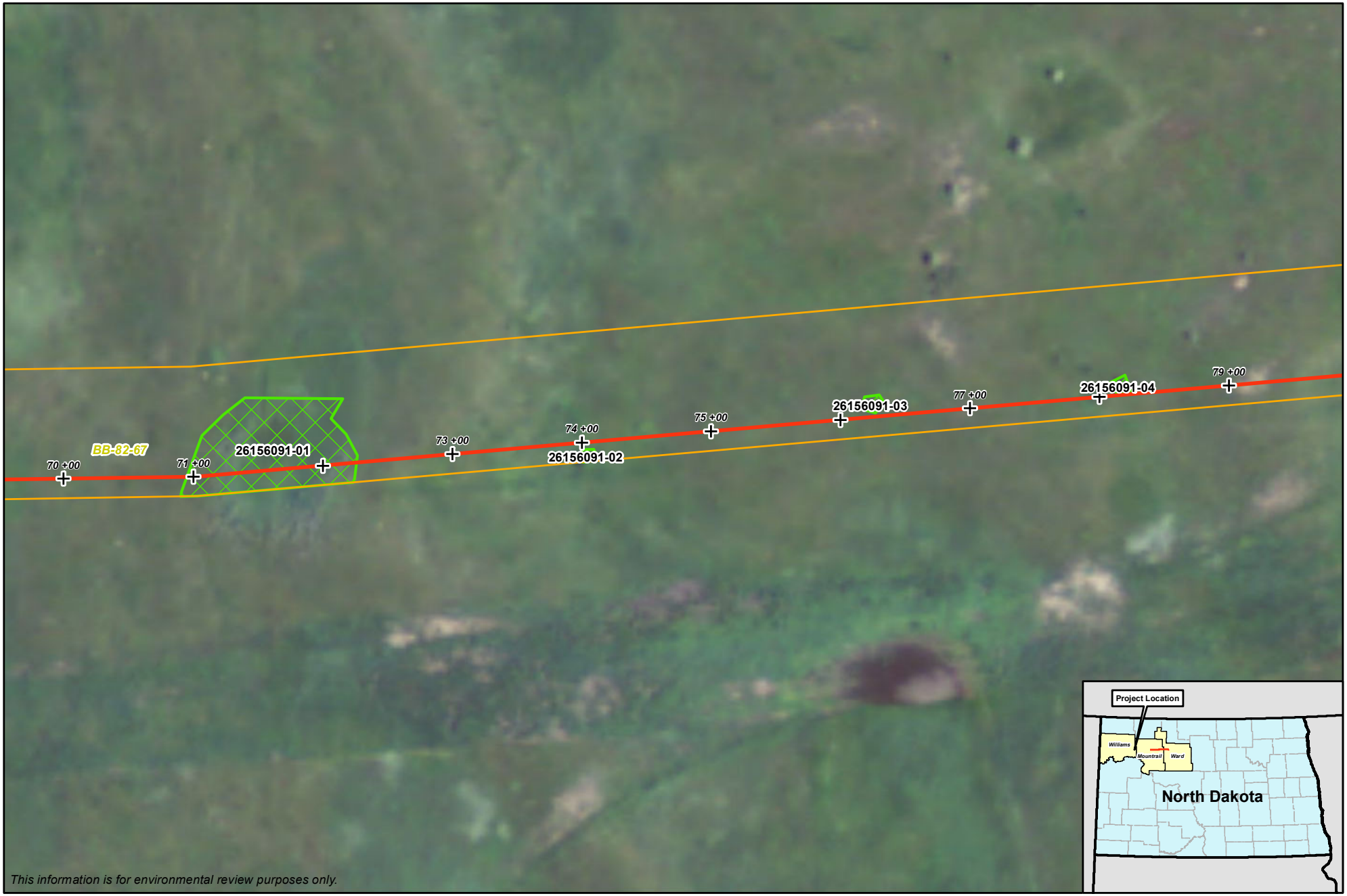

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Beaver Lodge Loop Project

Project Location Map

Revised: 09/29/2011

Beaver Lodge Loop Project □West (2012)

Carlson McCain

ENVIRONMENTAL • ENGINEERING • LAND SURVEYING

August 3, 2012

Angela Ronayne P.E.
Merjent
800 Washington Avenue, N., Suite 315
Minneapolis, MN 55401

Re: **Beaver Lodge Loop Project (West) Tree and Shrub Inventory Report**

Dear Ms. Ronayne,

Carlson McCain, Inc. is pleased to submit the "Beaver Lodge Loop Project (West) Tree and Shrub Inventory Report" for your review.

Please call me at 701-595-7004 if you have any questions or need additional informational.

Sincerely,

Greg Meyer, MS
Ecologist

Tree & Shrub Inventory Report

Beaver Lodge Loop Project (West)
Stanley Station – Beaver Lodge Station
Project #4075

Prepared for:

Ms. Angela Ronayne PE
Merjent
TractorWorks Building
800 Washington Avenue, N., Suite 315
Minneapolis, MN 55401

August 3, 2012

Carlson McCain

600 South 2nd Street, Suite 105
Bismarck, ND 58503
Tel 701-255-1475
Fax 701-255-1477
www.carlsonmccain.com

ENVIRONMENTAL • ENGINEERING • LAND SURVEYING

TABLE OF CONTENTS

1.0 SCOPE OF WORK

Carlson McCain, Inc. (Carlson McCain) inventoried trees and shrubs along the proposed Beaver Lodge Loop Project (BLLP West) for Enbridge Pipelines (North Dakota) LLC (Enbridge). The proposed project is oriented west to east, approximately 26 miles in length and connects Enbridge's Stanley and Beaver Lodge Stations. The proposed BLLP West is located in Mountrail and Williams Counties, North Dakota.

Trees and shrubs were inventoried in accordance with the North Dakota Public Service Commission (Commission) Tree and Shrub Mitigation Specifications (Specifications) for the BLLP West. The inventory was conducted across an approximately 100-foot wide construction corridor. Carlson McCain biologists, Heidi Eaves, Miranda Meehan, Matt Stasica and Chad Tucker, conducted the tree and shrub inventory during June 2012.

2.0 PROCEDURES

Carlson McCain utilized the Commission approved "Tree and Shrub Inventory Plan Enbridge Pipelines (North Dakota) LLC, Bakken Pipeline Expansion Project, Beaver Lodge Loop Project" (Inventory Plan) while conducting the tree and shrub inventory. Standard data forms were completed for each inventoried tree/shrub site. Each site was assigned a unique identification that consisted of the site's section, township, range, and identification number, i.e. 24156087-01. Data collected at each site included, observer, date, site id, woodland type, tree/shrub species, invasive species, tally, and total number. An example can be found in the Inventory Plan (Appendix B).

Trees and shrubs located in windbreaks, shelterbelts, other planted areas, and natural growth areas in the BLLP West corridor were counted by direct stem count. Planted and natural growing trees that were ≥1 inch diameter breast height (DBH) were inventoried for mitigation replacement. To enhance location accuracy, a point was taken using a Trimble Geo XT GPS to mark the location of each planted tree within the corridor. Points were also taken for trees and shrubs in natural growth areas where densities were not too extreme, such as in woodland draws in the White Earth River Valley.

Colony forming shrubs, located in native growth areas were delineated with a GPS unit and sampled with the Commission approved Shrub Sampling Method. Silverberry and western snowberry are common colony-forming shrubs growing along the BLLP West. The Shrub Sampling Method is described in detail in the Inventory Plan (Appendix B). The sampling method was used to determine tree density. The densities were then applied to the acreage of the shrub area to calculate the number of stems present. Individual GPS points were collected for shrubs in low density shrub areas to increase accuracy.

High-density woodland areas, located in native growth areas were delineated with a GPS unit and sampled with the Commission approved Tree Sampling Method. The Tree Sampling Method is described in detail in the Inventory Plan (Appendix B). The sampling method was used to determine tree density. The densities were then applied to the acreage of the woodland area to calculate the number of stems present.

3.0 RESULTS

Nine tree, eleven shrub, and five subshrub species were identified along the proposed BLLP West (Table 1). Trees and shrubs were found in numerous locations along the proposed BLLP West. Naturally growing tree and shrub areas were found near wetland areas and in native landscapes on hillsides. Planted tree rows and shelterbelts, containing trees and shrubs, are also present along the proposed BLLP West.

Green ash and cottonwood are the most common naturally growing tree species found along the BLLP West. Prevalent native shrubs found along the BLLP West include silverberry, western snowberry, and buffaloberry. Siberian elm, an invasive tree species, is the most common planted tree while Siberian peashrub, an invasive shrub species, is the most common planted shrub. Tree and Shrub Count Forms are included in Appendix C.

Table 1. Summary of Tree and Shrub Inventory

Species	Common Name	Growth Form	Reproduction	Colony-forming	Native / Invasive	Natural Growth	Planted	Overall Total
Acer negundo	Boxelder	Tree	Seed, Stump, Root Sprouts	NA	Native	4	0	4
Amelanchier alnifolia	Juneberry	Shrub	Seed	Yes	Native	43,355	0	43,355
Caragana arborescens	Siberian Peashrub	Shrub	Seed	No	Invasive	0	25	25
Cornus stolonifera	Redosier dogwood	Shrub	Seed, Bare Roots, Dying Branches	No	Native	3,489	0	3,489
Cotoneaster integerrimus	Cotoneaster	Shrub	Seed, Bare Roots	No	Invasive	0	5	5
Crataegus rotundifolia	Hawthorn	Shrub	Seed, Suckering	Yes	Native	5,244	0	5,244
Elaeagnus angustifolia	Russian olive	Tree	Seed, Bare Roots	NA	Invasive	4	0	4
Elaeagnus commutata	Silverberry	Shrub	Seed, Bare Root	Yes	Native	35,374	0	35,374
Fraxinus pennsylvanica	Ash (Green)	Tree	Seed, Bare Root	NA	Native	654	0	654
Juniperus horizontalis	Creeping Juniper	Subshrub	Bare Root, Cuttings, Colonization, Seed	Yes	Native	10	0	10
Pinus ponderosa	Ponderosa Pine	Tree	Bare Root, Seed	NA	Native	0	1	1
Poplus deltoides	Cottonwood	Tree	Seed, Suckering	NA	Native	60	0	60
Poplus tremuloides	Quaking Aspen	Tree	Seed, Suckering	NA	Native	42	0	42
Prunus americana	Plum (American)	Shrub	Seed, Suckering	Yes	Native	363	0	363
Prunus virginiana	Chokecherry	Shrub	Seed, Suckering	Yes	Native	45,943	0	45,943
Ribes odoratum	Golden Currant	Subshrub	Cuttings	Yes	Native	2,807	0	2,807
Rosa arkansana	Prairie Rose	Subshrub	Seed, Rhizomes	Yes	Native	34,369	0	34,369
Rosa woodsii	Woods' Rose	Subshrub	Seed, Rhizomes	Yes	Native	6	0	6
Rubus idaeus	American Red Raspberry	Subshrub	Seeds, Bare Roots, Cuttings	Yes	Native	2,384	0	2,384
Salix amygdaloides	Willow (Peachleaf)	Tree	Seed, Root Stocks, Cuttings	NA	Native	2	0	2
Salix exigua	Willow (Narrowleaf)	Shrub	Rhizomes, Bare Root, Seed, Cuttings	Yes	Native	11	0	11
Shepherdia argentea	Buffaloberry	Shrub	Rhizomes, Seeds	Yes	Native	9,414	0	9,414
Symphoricarpos occidentalis	Western Snowberry	Shrub	Rhizomes, Seeds	Yes	Native	181,106	0	181,106

Species	Common Name	Growth Form	Reproduction	Colony-forming	Native / Invasive	Natural Growth	Planted	Overall Total
Ulmus americana	Elm (American)	Tree	Seeds, Bare Roots, Cuttings	NA	Native	32	0	32
Ulmus pumila	Elm (Siberian)	Tree	Seed	NA	Invasive	0	25	25
					Totals	**364,673**	**56**	**364,729**

4.0 RECOMMENDATIONS

Carlson McCain makes the following recommendations regarding mitigation:

- **Invasive Species.** Invasive species should be replaced with non-invasive native tree/shrub of similar height and canopy suitable for the mitigation area.

- **Colony-forming Species.** Colony-forming and/or suckering species as described in Section 3 should be cut flush with the ground level where necessary to accommodate construction. These areas should then be allowed to regenerate naturally. Where complete removal is necessary, replacement should be made on a 1:4 basis with stem cuttings. A planting ratio of 1:2 is accurate in areas where moisture is not a limiting growth factor.

Enbridge will develop a tree/shrub mitigation plan for Commission's approval.

5.0 REFERENCES

Enbridge Pipelines (North Dakota) LLC. Tree and Shrub Inventory Plan. Enbridge Pipelines (North Dakota) LLC, Bakken Pipeline Project, Beaver Lodge Loop Project. Case No. PU-10-612 and PU-10-613. July 2011.

North Dakota Tree Handbook. North Dakota Tree Information Center. North Dakota State University. ND Forest Service. http://www.ag.ndsu.edu/trees/handbook/ndhand-1.htm Accessed June 2012.

North Dakota Public Service Commission. Exhibit C1 North Dakota Public Service Commission Findings of Fact, Conclusion of Law and Order. Tree and Shrub Mitigation Specifications. 3p.

APPENDIX A

Tree and Shrub Mitigation Specifications

Case No. PU-10-612 / PU-10-613

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (*e.g., Caragana arborescens, Elaeagnus angustifolia, Rhamnus cathartica, Tamarix chinensis, T. parviflora, T. ramosissima, Ulmus pumila*), shall be inventoried before cutting. The inventory shall record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, shall be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1-inch diameter at breast height ("dbh") or greater shall be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way shall be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs shall be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil shall be preserved and replaced after construction. Shrubs shall be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared shall be inventoried for replacement.
6. In native growth areas, trees and shrubs may be inventoried by actual count or by sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction shall define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots shall be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs shall be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the NDPSC.
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced shall be noted on the inventory.

Replacement

10. Prior to tree/shrub replacement, documentation identifying the number and variety of trees removed as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings shall be filed with the NSPSC for approval.
11. Tree replacement shall be on a 2 to 1 basis with 2-year-old saplings. Shrub replacement shall be on a 2 to 1 basis with stem cuttings.
12. Trees and shrubs shall be replaced by the same species or similar species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.
13. Landowners shall be given the option of having replacement trees/shrubs planted off the right-of-way on the landowner's property or waiving that requirement in writing and allowing those replacement trees/shrubs to be planted at alternative locations.
14. At the conclusion of the project, documentation identifying the actual number, variety, type, location, and date of the replacement plantings shall be filed with the NDPSC.
15. Tree/shrub replacements shall be inspected once a year for three years, on about the anniversary of the plantings, and, on or shortly before October 1 of each year, a report shall be submitted to the NDPSC documenting the condition of replacement planting and any woodlands work completed. If after three years from the anniversary of the plantings the survival rate is less than 75%, the NDPSC may order additional planting(s).