

***Bridger Four
Bears Pipeline
Phase 2
Construction
Inspection Report***

***Bridger Pipeline,
L.L.C.***

Prepared for:

**NORTH DAKOTA
PUBLIC SERVICE COMMISSION**
600 E. Boulevard Avenue
Bismarck, ND 58505-0480

PU-09-750

Prepared by:

WENCK ASSOCIATES, INC.
301 1st Street NE
Suite 202
Mandan, ND 58554
(701) 751-3370

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Executive Summary

The North Dakota Public Service Commission (PSC) retained Wenck Associates, Inc. (Wenck) to complete a two phase construction inspection Four Bears Pipeline (Project) in McKenzie, Dunn, and Billings Counties, ND owned and operated by Bridger Pipeline, LLC. (Bridger). The purpose of the construction inspection was to ensure the Project was constructed in compliance with the siting laws and rules and the applicable PSC Order for the Project. Wenck reviewed all Project documents to identify those which required site verification. Phase 1 of the construction inspection was submitted to the PSC on 15 September 2011. This report contains the results of the Phase 2 construction inspection.

The site was visually inspected on 9-10 May 2012 by Wenck, accompanied by a Bridger representative. The Project appeared to be constructed as planned with numerous efforts to minimize impacts. However, revegetation in areas disturbed by construction was an outstanding issue, and was lacking along much of the route. There were also several non-critical issues that may need to be resolved for the Project to be considered in full compliance. Wenck recommends that the PSC request the following from Bridger:

- 1) Reseeding/revegetating areas disturbed by construction activities, especially in areas susceptible to erosion;
- 2) Written documentation of several particular aspects of Project implementation identified during document review;
- 3) Fulfillment of the tree and shrub replacement plan and survival monitoring.

The PSC will need to decide whether these recommendations are necessary to fulfill Project obligations. Wenck expects most follow-up action taken by Bridger to address these particular issues can be corroborated in writing. However, it may be prudent for another site visit to confirm that final reclamation/revegetation of the site and tree and shrub replacement were completed as specified.

1.0 Background

1.1 INTRODUCTION

The Four Bears Pipeline (Project) was completed and operational on 26 August 2011. The 77 mile long, 12-inch diameter, crude oil pipeline is operated by Bridger Pipeline, LLC (Bridger). The Project is under the jurisdiction of the North Dakota Public Service Commission (PSC), which issued its Findings of Fact, Conclusions of Law, and Order on Case No. PU-09-750 on 22 September 2010, granting a Certificate of Corridor Compatibility No. 115 and Route Permit No. 125 for the Project.

1.1 PURPOSE AND SCOPE OF INSPECTION

The North Dakota Energy Conversion and Transmission Facility Act (North Dakota Century Code Chapter 49-22) authorizes the Public Service Commission to determine that the location, construction, and operation of jurisdictional energy conversion and transmission facilities will produce minimal adverse effects on the environment and welfare of citizens of North Dakota. Construction inspections ensure the Project is constructed in compliance with siting laws, rules, and the applicable Commission Findings of Fact, Conclusions of Law, and Order (Order).

The North Dakota PSC retained Wenck Associates, Inc. (Wenck) to complete a two phase construction inspection of the Project. Phase 1 was completed and submitted to the PSC on 15 September 2011. Phase 2 included a review of the Application for Corridor Compatibility and Route Permit, Order, and other applicable documents to determine Project-specific siting and construction requirements; a site visit and inspection of facilities; documentation of compliance; and a report summarizing findings. This report includes, but is not limited to, documentation of site visit observations, documentation of compliance deficiencies, and a summary of issues that should be addressed for the Project to be considered complete and in full compliance.

2.0 Document Review

2.1 METHODS

Wenck reviewed North Dakota siting laws and rules, the Application for Certificate of Corridor Compatibility and Route Permit (Application), and the Order for the Project to identify what Project-specific documentation was required for compliance. Wenck then reviewed Project documents in the PSC Online Case Search (ND PSC 2012) to identify those siting laws, rules, and Application and Order assertions that already had written verification, those that still required documentation, and those that required physical site verification.

2.2 FINDINGS

The following table includes a list of components of the Project that were asserted in the Application and Order that could be documented to verify compliance with siting laws, rules and the Order for the Project via either written documentation or physical site verification (**Table 1**). The source of each component or assertion is found in the first column. If Wenck found written verification in the online PSC files for a particular Project component, this is marked in the third column. If physical site verification was possible, this was marked in the fourth column and that particular component was verified during the site inspection (Section 3.0).

Several components of the Project were asserted in the Application or proposed construction but have no written documentation showing that they were indeed implemented or constructed as planned, and physical site verification is not applicable. *This includes all items listed in Table 1 that have shaded boxes in the third column*, indicating written verification is appropriate, but is lacking from current files. To show that the Project is in full compliance, the PSC should request written verification from Bridger for these items.

Table 1. Bridger 77 mile Crude Oil Pipeline Project Document Review Summary

Source of Project Component/Assertion	Description of Project Component/Assertion	Written Verification in PSC Files*	Site Verification
	<i>PRECONSTRUCTION</i>		
CROP** ¶1	Preconstruction conference	X	
CROP ¶2	Permits/Approvals from other agencies	X	
CROP ¶3	Intent to start construction	X	
CROP ¶19	Approved corridor changes within 3 months of Order	X	
Conc. of Law ¶7	Compliance with Chapter 49-22 of ND Century Code	X	
Fin. of Fact ¶11	Compliance with Chapter 69-06-08 of ND Admin. Code	X	
Fin. of Fact ¶9	CFT Part 195, Transport of Hazardous Liquids followed		
	<i>ENGINEERING/CONSTRUCTION/DESIGN & SOILS</i>		
CROP ¶3	Weekly construction reports	X	
CROP ¶4	Pipeline buried 48 inches or 72 inches in undeveloped section lines		X
Fin. of Fact ¶8	Construction corridor of 100 ft. maximum width		X
CROP ¶9	Graded road crossings bored		X
CROP ¶10	Roads restored to previous use		X
CROP ¶12	Topsoil segregated and replaced		X
CROP ¶13	Reclamation and clean-up continuous with construction		X
CROP ¶15	Reclamation and maintenance throughout life of facility		Ongoing
CROP ¶17	Mitigation of any TV or Radio interference	N/A	
CROP ¶20	As-built GIS files submitted within 3 months of completion	X	
NDDH Stipulations	Erosion control BMP's implemented successfully		X
Fin. of Fact ¶29	Compensation for landowners for crops impacted by construction		
Fin. of Fact ¶35	Cathodic protection system in place		X
Fin. of Fact ¶36	Environmental inspector used during project construction		
NDDH Consultation (8/13/10)	Minimize fugitive dust, degradation of waterways, storm water management, noise		X
	<i>NATURAL AND CULTURAL RESOURCES</i>		
CROP ¶14	Reclamation/reseeding according to NRCS or landowner		Ongoing/ Lacking
USFWS Consultation (8/24/2010)	Construct Sept. 1-April 1, stop construction if whooping crane is sighted within 1 mile, buffer of ½ mile for bald and golden eagle nests, erosion control around waterways, reseeding with native species		X
NDGF Consultation (8/13/2010)	Avoid woodlands and native prairie, buffer of ¼ mile around prairie falcon nests Mar. 15-June 1, erosion controls		X
CROP ¶16	Compliance with "Tree and Shrub Mitigation Specifications"	Ongoing	Ongoing
CROP ¶6	Reports of presence of threatened, endangered species or bald or golden eagles, if applicable		
CROP ¶8	Reports of cultural, archeological, historical resources found, if applicable		

*Note: Shaded boxes indicate documentation is lacking.

**CROP: Certification Relating to Order Provisions.

3.0 Site Inspection

3.1 METHODS

Luke Toso of Wenck visited the Project area on 9-10 May 2012. Tommy Massengale, Pipeline Inspector for the Project, accompanied Wenck staff during the site visit and assisted with navigation, pointed out problem areas, and answered any questions.

The site was visually inspected along portions of the pipeline route by accessing as many points as feasible where road access was available. Some features were accessed by walking within the pipeline right-of-way (ROW). The inspection began at Skunk Hill Junction on the morning of May 9th and continued to just south of the Little Missouri River. On May 10th, the inspection began on the north side of the Little Missouri River and finished at the terminus of the pipeline at Station 23 Terminal. Digital photographs (Canon Power Shot SD1300 IS, 12.1 megapixels) were taken showing typical Project infrastructure and documenting problem areas (**Appendix B**). Geographic coordinates were recorded at observation points or potential problem areas using a handheld Global Positioning System (GPS) (Garmin eTrex Legend H; <10m accuracy; WGS 84 datum) (**Appendix A I, II, III; Appendix C**).

3.2 OBSERVATIONS & FINDINGS

3.2.1 Engineering/Construction/Design & Soils

The following aspects pertaining to engineering, construction, or design of Project infrastructure were inspected at the site.

- *Pipeline Buried 48in in Rangeland, Cultivated Land, Bottom of Ditch for Road Crossings, and 72in in Undeveloped Section Lines.* Physical verification of pipeline depth was not feasible at the construction inspection. However, the

Bridger representative asserted that the pipeline was buried to 5ft along the entirety of the line, 6-8ft at river crossings, and greater than 8ft in areas that were bored (Tommy Massengale, pers. comm. 2012).

- *Construction Corridor of 100ft maximum width, Narrowed to 50ft in Areas Around Archeological Features and Through Wooded Areas.* Wenck observed that the construction corridor was within 100ft along the entire route. The corridor was narrowed to 50ft to avoid archeological features, wooded areas, and topographical features (**Appendix B, Photos 64, 65, 66, 67, 72, 74**). One particular area where the pipeline ran close to an archeological site was observed during the inspection (**Appendix B, Photo 50**). It appeared Bridger took proper precautions at this location, had a certified archeologist on site, and did not adversely affect this area.
- *Graded Road Crossings Bored.* The Project bored under all graded roads throughout the route (**Appendix B, Photos 16, 46**). Wenck observed that the pipeline route was marked at these locations and that no settling or erosion to the roads was evident.
- *Roads Restored to Previous Use.* The Application stated that several temporary access roads would be constructed for the Project. These roads were well maintained and in good condition at the time of the inspection (**Appendix B, Photos 6, 9, 24**). One access road was constructed for pipeline access, but built according to landowner stipulations for use after the pipeline was complete (**Appendix B, Photo 9**). Wenck confirmed that minimum maintenance roads, county roads, and highways within the Project area appeared to be in good condition and properly maintained (**Appendix B, Photos 16, 47**). In addition, Wenck observed that appropriate signage was in place at all road, fence, and section line intersections with the pipeline ROW (**Appendix B, Photos 1, 4, 5, 7, 8, 22, 23, 29, 30, 33, 43, 44, 63, 69, 73, and 77**).

- *Topsoil Segregated and Replaced Up To 12in.* Bridger stated that topsoil had been segregated from subsoil during construction (Tommy Massengale, pers. comm.). During the site inspection, it appeared that topsoil had been replaced because vegetation had recolonized some areas of the route, but a soil pit was not dug to confirm this. Further monitoring of revegetation may be necessary to confirm that soils have been restored to pre-construction conditions.
- *Reclamation and Clean-Up Continuous With Construction.* At the time of the inspection, reclamation and clean-up work appeared complete. The Bridger representative stated that most clean-up activities were completed during the construction process (Tommy Massengale, pers. comm. 2012). Wenck observed that all fences and gates had been repaired (**Appendix B, Photos 4-8, 12, 22, 33, 39, 47, 69**). Replaced fences and gates were in good condition and working properly. Restoration of roads was discussed above. Final recontouring and reseeded occurred after construction was completed. However, revegetation was ongoing and will be discussed further in section 3.2.2.
- *Reclamation and Maintenance Throughout Life of Facility.* The Bridger representative asserted that the pipeline ROW is inspected monthly by helicopter to identify problem areas and maintenance issues (Tommy Massengale, pers. comm. 2012).
- *Mitigation of TV and Radio Interference.* According to Bridger's representative, no TV or Radio interference occurred as a result of construction and operation of the Project (Tommy Massengale, pers. comm. 2012). This stipulation is not applicable for the Project at this time.
- *Erosion Control BMP's Implemented Successfully.* During construction of the Project, erosion and low soil cohesion caused many problems along the pipeline route. During the Phase 2 inspection, erosion control measures appeared to have been implemented successfully in all areas where erosion had been problematic, in specific areas by request of landowners, and in other potentially erosive areas

(**Appendix B, Photos 17, 31, 34, 35, 51, 53-59, 67**). Bridger has accommodated landowner's requests for additional erosion control, ameliorated problem areas identified by the PSC in 2010, and controlled erosion throughout the Project route.

- *Cathodic Protection System in Place.* Bridger asserted that cathodic testers were located at every mile throughout the route (Tommy Massengale, pers. comm. 2012). Wenck observed several of these testers; only one tester was photographed (**Appendix B, Photo 77**).
- *Environmental Inspector Used During Project Construction.* Based on notes from the preconstruction meeting (PSC Docket #52), an environmental inspector would be used during pipeline construction. Wenck confirmed this verbally with the Bridger representative (Tommy Massengale, pers. comm. 2012). However, the PSC may want to request written verification from Bridger.
- *NDDH (ND Department of Health) Requests: Minimize Fugitive Dust, Degradation of Waterways, Manage Storm Water and Noise.* Fugitive dust was not an issue because construction occurred during winter months; snowfall dampened and depressed any dust that would have been airborne as a result of construction. Wenck did not observe major erosion or sediment deposition problems to waterways due to Project construction. Noise appeared to have been minimized during construction of the Project. It appeared all above measures were followed.

3.2.2 Natural (Wildlife, Wetlands, Vegetation) and Cultural Resources

The following aspects pertaining to natural resources, including wildlife, wetlands, and vegetation, were inspected at the Project site.

- *Reclamation/Reseeding According to NRCS or Landowner.* At the time of the inspection, recontouring and reseeded had been completed but the degree of revegetation along the route varied considerably. In many areas, no vegetation

was evident and soil was bare (**Appendix B, Photos 2, 3, 4, 8, 10, 11, 14, 17, 18, 19, 20, 22, 33, 35, 37, 38, 39, 41, 45, 46, 48-61, 63-70, 77**). Other areas were partially reclaimed by vegetation (**Appendix B, Photos 15, 16, 25, 47, 62, 71, 72, 74**), or nearly completely revegetated (**Appendix B, Photos 7, 12, 26, 27, 31, 32, 43, 75, 76**). Even where landowners had planted over the pipeline, revegetation varied from being non-existent to nearly completely reclaiming the route (**Appendix B, Photos 1, 5, 22, 23, 28, 40, 73**). Revegetation is of paramount concern to prevent erosion, especially around waterways and steep slopes (**Appendix B, Photos 13, 14, 53, 54, 56, 58-60**). Wenck recommends that reseeded be done immediately in areas with a high potential for erosion, like on steep slopes near the Little Missouri. Bridger has the obligation per PSC stipulations to monitor revegetation and restoration by October 1st for 3 years following the completion of construction. In other areas, if reseeded is still unsuccessful after 3 years, additional topsoil may be necessary for vegetation to colonize the area. The degree or lack of revegetation along the pipeline route is the most outstanding issue observed during the inspection, one that the PSC should monitor or enforce before Bridger is considered in full compliance.

- *USFWS Requests: Construct Sept. 1st-April 1st; Stop Construction if Whooping Crane is Sighted Within Imile, ½mile Buffer for Bald and Golden Eagle Nests, Erosion Control Around Waterways, Reseeding with Native Species.* Limiting construction from September 1st-April 1st was due to the Project's proximity to piping plover habitat. Based on weekly construction reports, major construction activities, including grading, stripping, trenching, and backfilling were nearly completed by April 1st (~85%). In areas where major construction activities were not completed, it was not nearby piping plover habitat. No whooping cranes were sighted during construction and bald and golden eagle nests were not located within ½ mile of the Project. It appeared erosion had been controlled during construction because no erosion or sedimentation was noted near waterbodies. Some erosion control structures around waterways/wet areas were present at the time of the inspection (**Appendix B, 31, 34, 35, 55, 56, 67**). Reseeding had been

done with an approved state mix of native seeds on state lands and some rangeland. As discussed previously, revegetation by native species varied considerably along the route. It appeared these stipulations were met or will be met as revegetation continues.

- *NDGF Requests: Avoid Woodlands and Native Prairie, Buffer of 1/4mile around Prairie Falcon Nest March 15-June 1, Erosion Controls Around Waterways.* To the extent possible, woodlands and native prairie habitat was avoided throughout the route. There were impacts to these habitats when no practical alternative was available, but it appeared disturbance to these areas was minimized when possible. It appears the prairie falcon nest was not disturbed because of the timing of construction. Erosion controls have been discussed previously. It appears the above measures were followed, and where it was not feasible to do so, impacts were minimized.
- *Compliance with “Tree and Shrub Mitigation Specifications”.* Trees and shrubs are scheduled to be replaced over three growing seasons, with the first planting beginning sometime during early spring 2012. At the time of the inspection, plantings had yet to occur. Bridger is working with the ND Forest Service to coordinate plantings using the Trees For North Dakota Trust Fund. In order to meet 2:1 replacement, 97,278 trees and shrubs will need to be replaced. Annual reports of tree planting and survival are required by October 1st of each year. If after the third annual report the survival rate is less than 75%, the PSC may order additional plantings.

4.0 Issues to Resolve and Recommendations

4.1 FINAL RESTORATION AND RECLAMATION

Revegetation was an outstanding issue identified along the pipeline route. Many areas had bare soil with no vegetation colonizing the area. To prevent soil erosion and to fully reclaim the disturbed area, revegetation should be monitored until the right of way is completely reclaimed. Wenck recommends that reseeded areas be done immediately in areas with a high potential for erosion, like on steep slopes and near waterways. The PSC requires that revegetation and restoration be monitored for three years following completion of construction and submitted to the PSC by October 1st. Wenck recommends the PSC request continued progress reports from Bridger if revegetation is not complete within three years. If it is still not reclaimed within three years, topsoil may have to be hauled in for vegetation to colonize the disturbed area. It may be prudent to perform another site visit to verify that revegetation has indeed occurred along the route, and that native species are predominant.

4.2 WRITTEN VERIFICATION OF PROJECT IMPLEMENTATION

As noted in Section 2.0, several components of the Project were asserted in the plans or proposed during construction, but have not been documented by the PSC. Verification would be possible with written documentation that particular impacts have or have not occurred, or that the potential issue is not applicable to the Project. Wenck recommends that the PSC requests from Bridger the list of items which, according to our review of PSC files, have not been documented in writing. This would include all items listed in Table 1 which have shaded boxes in the third column (Section 2.0). The PSC may be able to verify some of these items/issues from other records it has available.

4.3 FULFILLMENT OF TREE & SHRUB REPLACEMENT AND SURVIVAL MONITORING

Replacement of trees and shrubs will occur over three growing seasons beginning spring 2012. To meet PSC stipulations of 2:1 replacement, 97,278 trees and shrubs will need to be replaced. Survival monitoring must be reported to the PSC for three years after planting is completed, with 75% survival. The PSC should monitor that replacement occurs as planned and survival is reported by October 1st for three years after plantings.

5.0 Conclusions

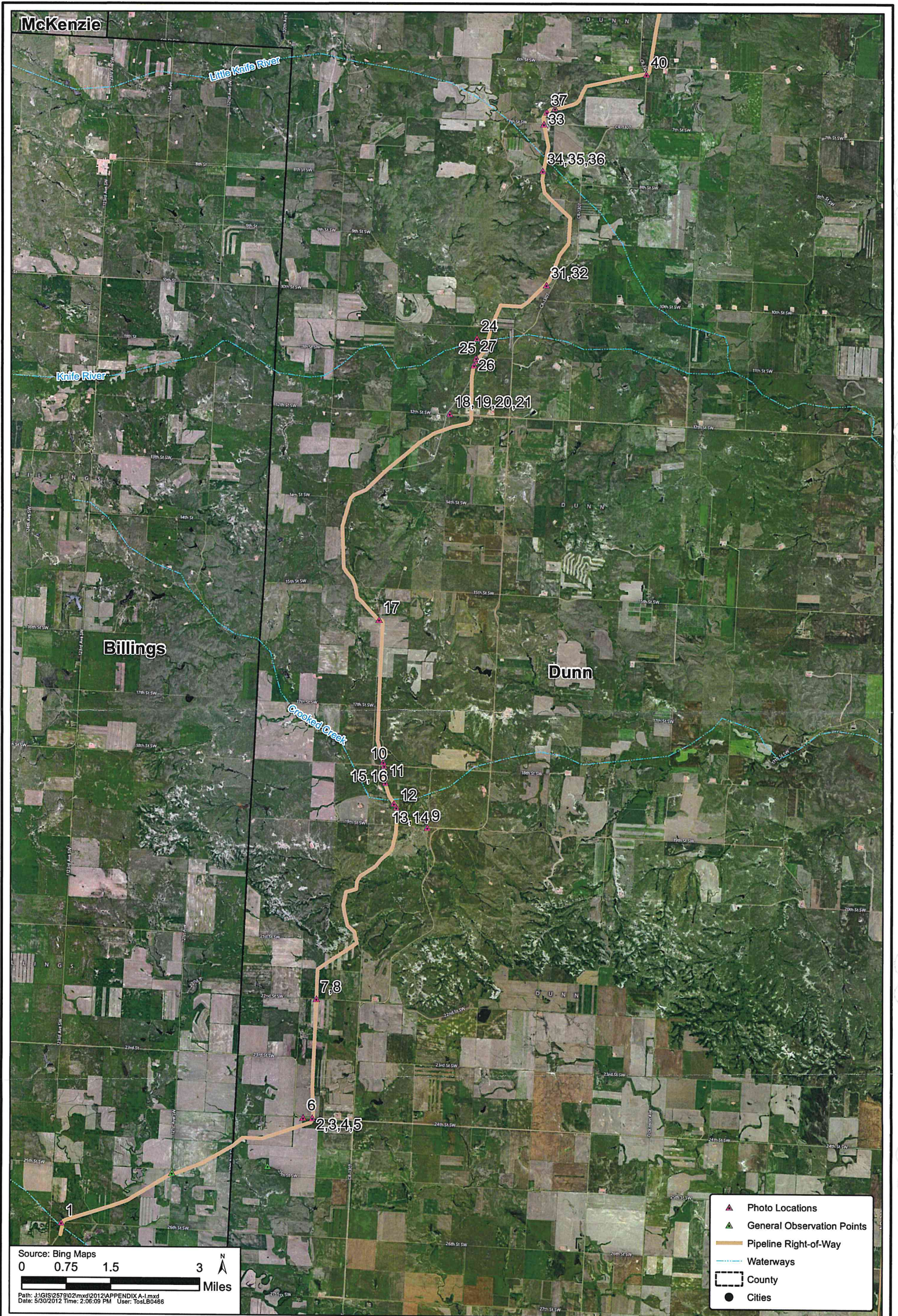
Overall, the Project appeared to be constructed as designed with minimal impacts to the surrounding natural and human environment. The Project site was in good condition with the degree of revegetation varying significantly. Wenck observed several issues that needed to be resolved before the Project can be considered in full compliance. This includes the degree or lack of revegetation along the route, provision of written documentation of particular aspects of the Project implementation, and documentation of tree and shrub replacement and survival. The PSC should review these issues and determine how Bridger should comply. It should be noted that the Bridger representative was easy to work with during the construction inspection process. He was fully transparent and answered any questions during and after the site visit.

6.0 References


Tommy Massengale. 2012. Bridger Pipeline Inspector. Personal Communication: discussion during site visit.

North Dakota Public Service Commission (ND PSC). 2012. Online Case Search. Available from: http://www.psc.nd.gov/database/company_list.php. Accessed 1 May 2012.

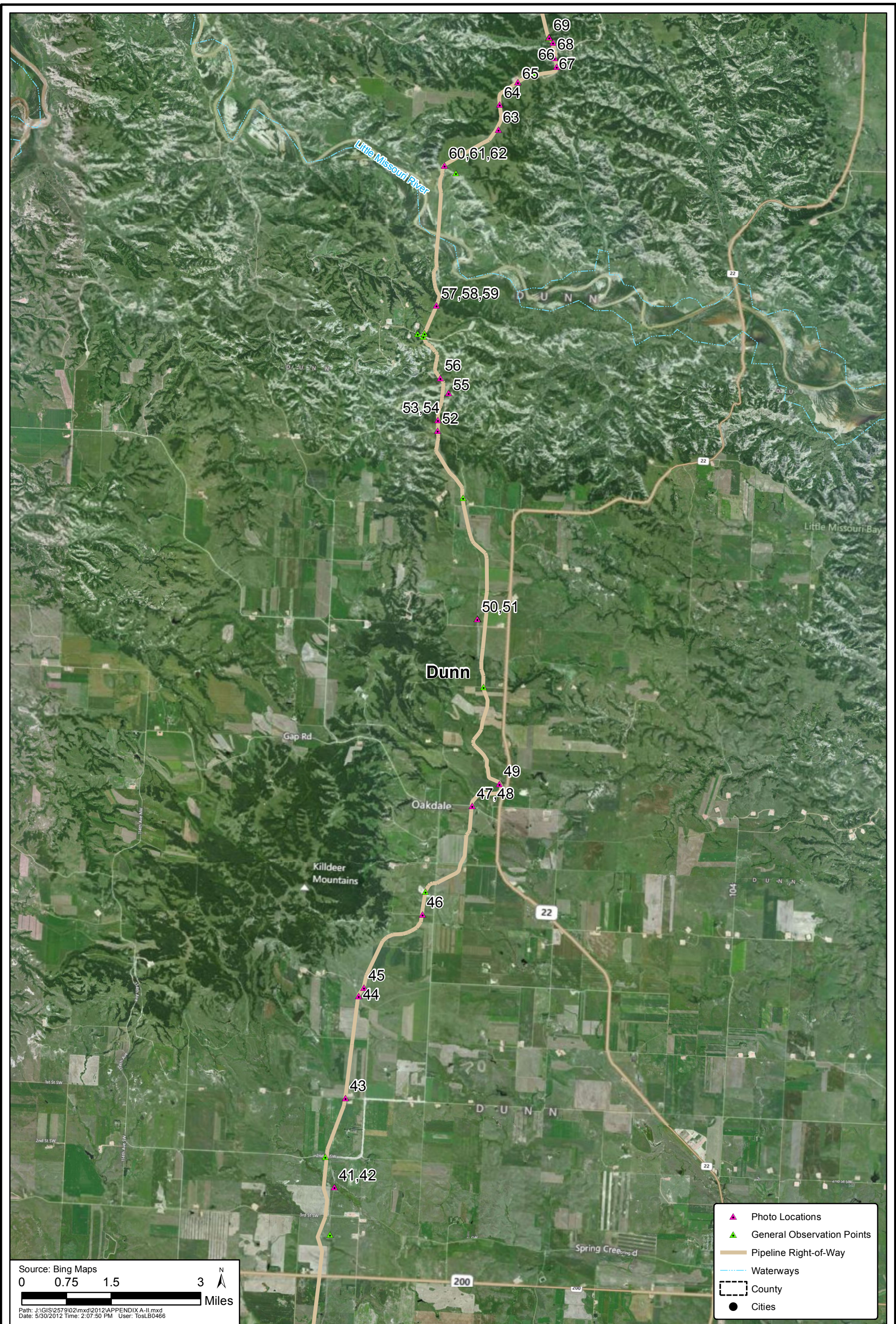
Appendix A



North Dakota Public Service Commission
 McKenzie, Dunn, and Billings Counties, ND


Wenck
 Engineers - Scientists
 Business Professionals
 www.wenck.com
 301 1st Street NE, Suite 202
 Mandan, ND 58554
 701-751-3370

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 APPENDIX A-I

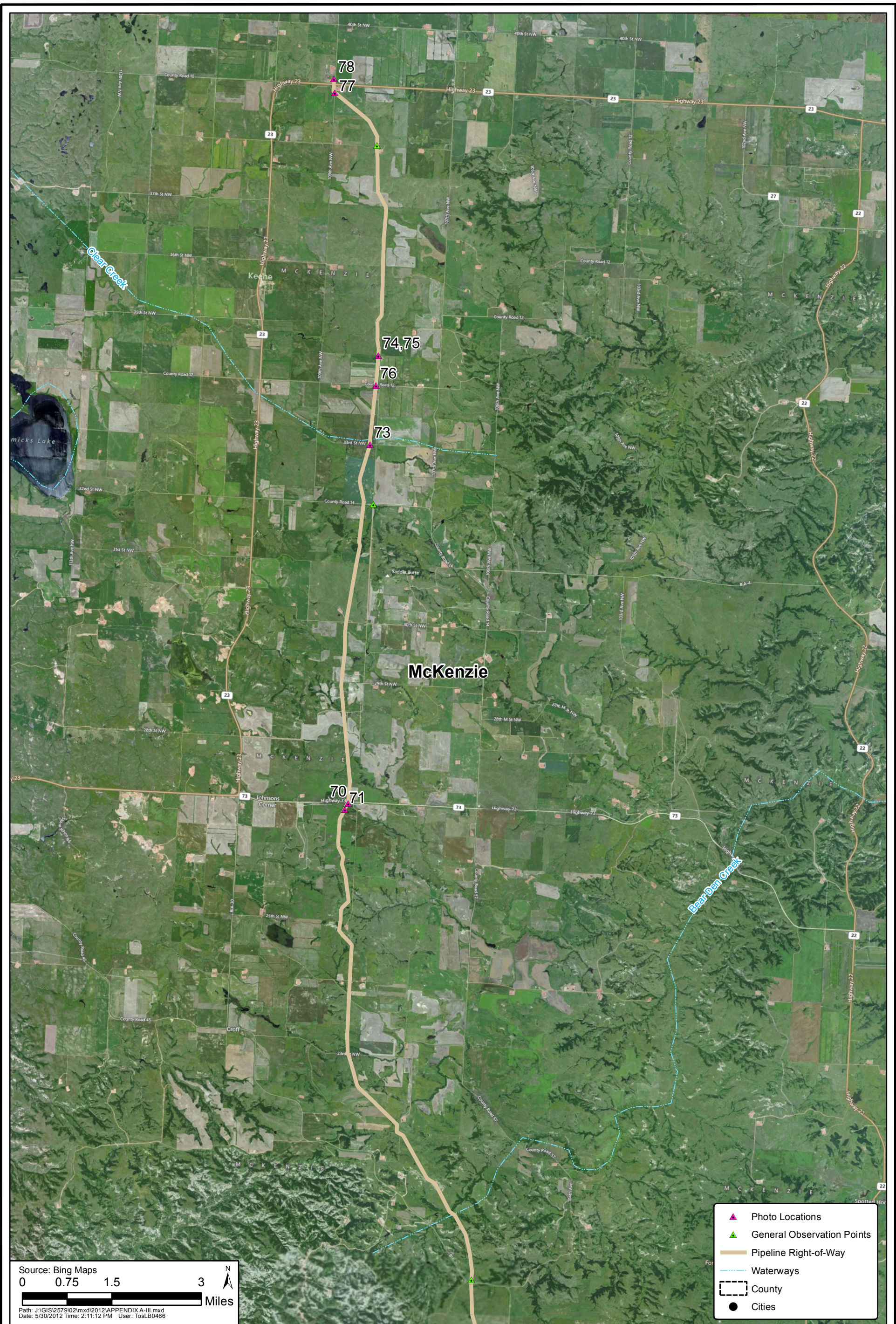


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 APPENDIX A-II



Source: Bing Maps
 0 0.75 1.5 3 Miles
 Path: J:\GIS\2579\02\mxd\2012\APPENDIX A-III.mxd
 Date: 5/30/2012 Time: 2:11:12 PM User: TosLB0466

- Photo Locations
- General Observation Points
- Pipeline Right-of-Way
- Waterways
- County
- Cities

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 Mandan, ND 58554
 701-751-3370

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 APPENDIX A-III

Appendix B



Photo 1. Direction: Northeast. Pipeline right-of-way through an agricultural field that had been planted over by landowner.



Photo 2. Direction: Southwest. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 3. Direction: North. Pipeline right-of-way. No erosion or sedimentation was noted to the water body.



Photo 4. Direction: South. Pipeline right-of-way. Note repaired fence and signage where the pipeline crosses the fenceline.



Photo 5. Direction: North. Pipeline right-of-way through an agricultural field. Field had been planted by landowner.



Photo 6. Direction: Southeast. An access road for Bridger's pipeline routed through the fenceline just below the dense grass in the upper right hand corner of the photo. Disturbance had been restored and almost completely reclaimed.



Photo 7. Direction: North. Pipeline right-of-way. Note repaired fence and posted signage.



Photo 8. Direction: South. Pipeline right-of-way. Note repaired fence, gate, and posted signage.



Photo 9. Direction: West. Photo shows a scoria access road constructed for Bridger’s pipeline. The road was well maintained and in good condition.



Photo 10. Direction: South. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 11. Direction: South. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 12. Direction: South. Pipeline right-of-way. Plants were beginning to reclaim the disturbance.



Photo 13. Direction: Southwest. Pipeline right-of-way. No erosion or sedimentation to the waterway was evident as a result of construction, but erosion controls were not in place at the time of the inspection. Steps to vegetate the slope should be done immediately to prevent erosion to the waterway



Photo 14. Direction: North. Photo shows Bridger's pipeline where it crosses Crooked Creek.



Photo 15. Direction: North. Pipeline right-of-way. Plants were beginning to reclaim some areas of disturbance.



Photo 16. Direction: South. Pipeline right-of-way. Roadway was bored and in good condition.



Photo 17. Direction: North. Pipeline right-of-way at the 15th St. valve setting. Note erosion control structures on the slope.



Photo 18. Direction: Southwest. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 19. Direction: South. Pipeline right-of-way just north of Photo 18. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 20. Direction: North. Pipeline right-of-way at the same location as Photo 19. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 21. Direction: Southeast. Pipeline right-of-way at the 12th St. valve setting. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 22. Direction: South. Pipeline right-of-way at the 10th St. valve setting. Agricultural field in the background had been planted by landowner.



Photo 23. Direction: North. Pipeline right-of-way. Plants were beginning to reclaim the disturbance in this area.



Photo 24. Direction: South. Access road for Bridger's pipeline where it crosses the Knife River. A culvert was used to preserve the waterway's natural flow patterns; no erosion or sedimentation was noted.



Photo 25. Direction: South. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim most areas.



Photo 26. Direction: North. Pipeline right-of-way. Plants were beginning to reclaim the disturbance in this area.



Photo 27. Direction: South. Pipeline right-of-way. Plants were beginning to reclaim the disturbance in this area.



Photo 28. Direction: South. Pipeline right-of-way. This area had recently been planted by the landowner.



Photo 29. Direction: North. North of where Bridger’s pipeline bored under the Knife River. No erosion or sedimentation to the waterbody was evident.



Photo 30. Direction: South. South of where Bridger’s pipeline bored under the Knife River. No erosion or sedimentation to the waterbody was evident.



Photo 31. Direction: Northwest. Pipeline right-of-way. Grass mats (indicated by arrow) had been placed for erosion control at the request of landowner. This area was nearly completely reclaimed by vegetation.



Photo 32. Direction: South. Pipeline right-of-way. This area was nearly completely reclaimed by vegetation.



Photo 33. Direction: South. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 34. Direction: Southeast. Pipeline right-of-way. Grass mats had been placed for erosion control at the request of landowner.



Photo 35. Direction: Southeast. Pipeline right-of-way. Grass mats had been placed for erosion control at the request of landowner.



Photo 36. Direction: Northeast. Pipeline right-of-way where it was bored under the Little Knife River. No erosion or sedimentation to the waterbody was evident.



Photo 37. Direction: Northeast. Pipeline right-of-way. A seep in the side of the hill caused erosion problems during construction, but restoration appeared to have ameliorated any permanent construction impacts.



Photo 38. Direction: Northeast. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 39. Direction: Southwest. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 40. Direction: Southeast. Pipeline right-of-way. It appeared the landowner had seeded the field at the time of the inspection.



Photo 41. Direction: South. Photo shows the right-of-way of Bridger’s pipeline north of a wetland crossing. There was some ponding of water along the right-of-way.



Photo 42. Direction: South. Photo shows an area where Bridger’s pipeline bored under a wetland. No erosion or sedimentation to the water body was evident. Some ponding was noted on the right-of-way.



Photo 43. Direction: North. Pipeline right-of-way. Vegetation appeared to have reclaimed some areas.



Photo 44. Direction: South. Photo shows the right-of-way of Bridger's pipeline in an area with rocky soils. Rocks had been picked prior to reseeding but it appeared some resurfaced.



Photo 45. Direction: North. Photo shows the right-of-way of Bridger’s pipeline in an area with rocky soils. Rocks had been picked prior to reseeding but it appeared some resurfaced.



Photo 46. Direction: South. Photo shows the right-of-way of Bridger’s pipeline. Roadway was bored and in good condition.



Photo 47. Direction: South. Pipeline right-of-way. Disturbance was beginning to be reclaimed by vegetation in some areas.



Photo 48. Direction: South. Pipeline right-of-way. This wet area had caused construction problems, but restoration appeared to have ameliorated any permanent impacts.



Photo 49. Direction: Northeast. Pipeline right-of-way. Disturbance appeared to have been limited to 50ft where the pipeline routed through this wooded area.



Photo 50. Direction: South. Pipeline right-of-way. Vegetated area in the right side of photo was a historic site that had been avoided.



Photo 51. Direction: Southwest. Photo shows erosion control water bar (indicated by arrows) in place at Bridger's 7th St. valve setting.



Photo 52. Direction: South. Pipeline right-of-way. Disturbance had been limited to 50ft where the pipeline routed through this wooded area.



Photo 53. Direction: South. Pipeline right-of-way. Drainage problems caused major erosion in this area last year. Restoration by hauling in soil and channeling water (Photo 54) through the area appeared to have controlled erosion.



Photo 54. Direction: North. Channel created to prevent erosion. Note some vegetation growing on the slope, which should further stabilize the area. However, this area should be monitored closely to make sure vegetation fully recolonizes the area.



Photo 55. Direction: West. Photo shows an area where erosion had been a problem. Erosion was controlled by diverting water through culverts and laying down grass mats. It appeared these methods have been successful.



Photo 56. Direction: South. Pipeline right-of-way. Note grass mats in place to prevent erosion (indicated by arrows).



Photo 57. Direction: South. Pipeline right-of-way. Restoration and reseeded had occurred, but vegetation had yet to reclaim the area.



Photo 58. Direction: Northwest. Low soil cohesion caused major erosion problems. Soil was hauled in and water bars were installed. The slope appeared to be stabilized.



Photo 59. Direction: West. Note water bar and soil recontouring on the slope.



Photo 60. Direction: South. Photo shows the right-of-way of Bridger's pipeline north of the Little Missouri. Recontouring and water bars controlled erosion, but vegetation had yet to reclaim the slope.



Photo 61. Direction: South. Photo shows where the right-of-way of Bridger’s pipeline bores under the Little Missouri River. No erosion or sedimentation was evident to the water body.



Photo 62. Direction: Northeast. Pipeline right-of-way. Vegetation had reclaimed some areas of the right-of-way.



Photo 63. Direction: East. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the disturbance.



Photo 64. Direction: South. Pipeline right-of-way. Disturbance to the woody area was minimal and the corridor limited to 50ft.



Photo 65. Direction: West. Photo shows the right-of-way of Bridger’s pipeline routing through a wooded area. The cut appeared to have been limited to 50ft.



Photo 66. Direction: North. South of where Bridger’s pipeline bores under a badland butte.



Photo 67. Direction: South. North of where Bridger’s pipeline bores under a badland butte. Note erosion control structures in place around wetland.



Photo 68. Direction: South. Pipeline right-of-way. Reseeding had occurred, but vegetation had yet to reclaim the area.



Photo 69. Direction: North. Pipeline right-of-way. Note buffalo fence that had been replaced.



Photo 70. Direction: South. Photo shows the right-of-way of Bridger's pipeline 73rd interconnect.



Photo 71. Direction: South. Pipeline right-of-way. Vegetation appeared to be reclaiming some areas here.



Photo 72. Direction: North. Photo shows the right-of-way of Bridger's pipeline where it bores under a tree row. Vegetation appeared to be reclaiming some areas here.



Photo 73. Direction: South. Pipeline right-of-way. Area had been replanted by landowner.



Photo 74. Direction: South. Photo shows a tree row that had been cut for Bridger's pipeline. It appeared that disturbance had been minimized.



Photo 75. Direction: North. This wet area had very minimal ponding within the right-of-way of Bridger's pipeline.



Photo 76. Direction: South. Pipeline right-of-way. Vegetation appeared to have reclaimed some of the area.



Photo 77. Direction: Southeast. Pipeline right-of-way. Note cathodic tester located in bottom left of photo.



Photo 78. Direction: West. Station 23, the end of Bridger's pipeline.

Appendix C

Appendix C. Field Observation Points (GPS Coordinates)

Photo or General Observation Point	Latitude	Longitude		Photo or General Observation Point	Latitude	Longitude
1	47.03843	-103.09248		GOP	47.51872	-102.85491
GOP	47.05208	-103.05404		GOP	47.51880	-102.85500
GOP	47.05510	-103.02007		GOP	47.54782	-102.86218
2,3,4,5	47.06744	-103.00511		52	47.56384	-102.87244
6	47.06745	-103.00837		53,54	47.56643	-102.87258
7,8	47.09652	-103.00588		55	47.57313	-102.86919
9	47.13978	-102.96959		56	47.57666	-102.87250
12	47.14434	-102.98106		GOP	47.58646	-102.87927
13,14	47.14528	-102.98193		GOP	47.58703	-102.88131
11	47.15019	-102.98536		GOP	47.58730	-102.87891
10	47.15431	-102.98614		57,58,59	47.59415	-102.87512
15,16	47.15525	-102.98648		GOP	47.62642	-102.87059
17	47.18997	-102.99073		60,61,62	47.62813	-102.87475
18,19,20,21	47.24127	-102.96922		63	47.63749	-102.85601
26	47.25342	-102.96146		64	47.64357	-102.85610
25	47.25467	-102.96030		65	47.64922	-102.84999
27	47.25517	-102.96088		GOP	47.65113	-102.84424
28,29,30	47.25774	-102.95729		66	47.65344	-102.83639
24	47.26006	-102.96085		67	47.65550	-102.83727
22,23	47.26287	-102.95590		68	47.65923	-102.83805
31,32	47.27401	-102.93699		GOP	47.66023	-102.83955
34,35,36	47.30195	-102.94046		GOP	47.66023	-102.83957
33	47.31338	-102.94089		GOP	47.66025	-102.83960
37	47.31628	-102.94004		GOP	47.66037	-102.83971
38,39	47.31731	-102.93731		69	47.66042	-102.83954
40	47.32686	-102.90512		GOP	47.66042	-102.83954
GOP	47.36779	-102.89658		GOP	47.66042	-102.83954
41,42	47.37930	-102.89579		GOP	47.68974	-102.84927
GOP	47.38659	-102.89970		71	47.80207	-102.90314
43	47.40109	-102.89344		70	47.80361	-102.90205
44	47.42599	-102.89057		GOP	47.87642	-102.89857
45	47.42804	-102.88886		73	47.89079	-102.90082
46	47.44646	-102.86932		76	47.90527	-102.89969
GOP	47.45210	-102.86865		74,75	47.91254	-102.89935
47,48	47.47340	-102.85343		GOP	47.96332	-102.90374
49	47.47909	-102.84408		77	47.97558	-102.91989
GOP	47.50234	-102.85143		78	47.97899	-102.92048
GOP	47.51871	-102.85491		GOP	48.05281	-103.97994
50,51	47.51872	-102.85491				
				Note: GPS Map Datum WGS 84		