WENCK File #B2579-0032
December 2016

Caliber Bear Den Pipeline Project
Topsoil Inspection Report
PU-16-420




Prepared for:

North Dakota Public Service Commission

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APPENDICES

1.0 Executive Summary

The North Dakota Public Service Commission (PSC) retained Wenck Associates, Inc. (Wenck) to complete topsoil inspections during construction of the Caliber Bear Den Interconnect Pipeline (Project) in McKenzie County, North Dakota (ND), constructed by Caliber Bear Den Interconnect, LLC. (Caliber). The purpose of the inspections was to ensure the project was constructed in compliance with the siting laws and rules and the applicable PSC Orders for the Project, which includes a requirement that topsoil must be segregated from subsoil during installation of the pipeline.

Construction for the Project began 8 November 2016. Wenck reviewed Project documents to become familiar with the Project and PSC Orders for the Project. Wenck visually inspected the Project area on 8 November and 5 December to observe topsoil and subsoil removal and segregation done by the contractors. Overall soil removal and storage processes appeared to be done properly and the work was satisfactory. There were noteworthy observations, which included bore locations where topsoil and subsoil piles were too close together and subsoil was on top of a topsoil pile near a bell hole location.

2.0 Background and Scope

2.1 INTRODUCTION

Caliber Bear Den Interconnect, L.L.C. (Caliber) is a subsidiary of Caliber Midstream Partners, L.P. The Caliber Bear Den Interconnect Pipeline Project (Project) originates at a truck off-load facility connected to the Enable Midstream's Devore terminal, extends to the northwest, and terminates at the Dakota Access Pipeline (DAPL) Watford City terminal located in McKenzie County, North Dakota (**Appendix A, Figure 1**). The Project is a 12.75-inch diameter crude oil pipeline with a total length of approximately 5.3 miles. 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 in Case No. PU-16-420 on 2 November 2016, granting a Certificate of Corridor Compatibility No. 195 and Route Permit No. 206 for the Project.

2.2 REGULATORY PURPOSE AND SCOPE OF WORK

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 the welfare of citizens of North Dakota. Construction inspections ensure that such projects are constructed in compliance with the siting laws (North Dakota Century Code Chapter 49-22) and rules (North Dakota Administrative Code Article 69-06) and the applicable Commission Orders.

The North Dakota PSC retained Wenck Associates, Inc. (Wenck) to complete a construction inspection, and specifically a topsoil inspection, of the Project. The inspection process included a review of the Application for Corridor Compatibility and Route Permit, Order, and other applicable documents. PSC Order #12 for the Project states: "Company understands and agrees that all topsoil, up to 12 inches, or topsoil to the depth of cultivation, whichever is greater, over and along trench areas where cuts will be made, must be carefully stripped and segregated from the subsoil. Any area on which excavated subsoil will be placed must also be stripped of topsoil. The stripped topsoil must not be stockpiled in natural drainages, and must be protected from water erosion. Care must be taken to protect topsoil from unnecessary compaction by heavy machinery. Unless otherwise approved by the Commission, topsoil must be removed before topsoil freezes in the late fall/ early winter to the point that frost inhibits proper soil segregation. After backfilling with subsoil is completed, any excess subsoil must be placed over the excavation area, blending the grade into existing topography. Topsoil must be replaced over areas from which it was stripped only after the subsoil is replaced."

Wenck's scope of work was to perform and document on-site inspections during the topsoil removal phase of the Project to verify that topsoil was properly removed and kept segregated from subsoil until replacement occurred. The number of on-site inspections was to be based on Wenck's determination that equipment operators demonstrated proficiency concerning topsoil and subsoil removal and segregation in compliance with the Commission's Order. This report includes, but is not limited to, documentation of site visit observations and a summary of findings and issues that should be addressed for the Project to be considered complete and in full compliance.

2.3 BACKGROUND

During pipeline installation and excavation work in general, it is very important to separate topsoil and subsoil. Topsoil has biological, physical, and chemical properties that are critical to recovery of a site. Topsoil, also known as the A horizon, should be stripped to the correct depth according to natural variations in the depth of this top layer of soil. Distinguishing the horizon boundaries can be difficult as they vary in distinctiveness and topography. Most boundaries are zones of transition rather than sharp lines of division. Boundary distinctiveness is the vertical distance over which one horizon transitions into another which can be abrupt, clear, gradual, or diffuse. The boundary topography is the cross-sectional shape of the contact between the horizons which can be smooth, wavy, irregular or broken (Soil Survey, 1993).

Mixing subsoil in with the topsoil is usually detrimental to the reclamation and re-vegetation of a site. Subsoil material has lower organic matter content than topsoil, making it typically lighter in color. It may also have a different texture than the topsoil (Sedivec et al., 2014). The most visible impact of pipeline constructions on agricultural land is the mixing of organic and nutrient rich topsoil with less fertile, mineral subsoil, which can bring up toxic elements such as sodium that restrict plant growth (Folga, 2007).

3.0 Findings of Site Inspection

3.1 METHODS

Samantha Swanberg, Wenck Environmental Scientist, visited the Project site on 8 November 2016, and 5 December 2016. A Representative from Caliber/PSSI, Inspector, Roy Hamilton, accompanied Wenck staff during the topsoil inspection site visits.

The site was inspected visually by driving to access points and walking or driving within the Project right-of-way (ROW). The surveys began at the south end of the pipeline. Contractors/equipment operators were observed during the topsoil removal phase of the project to check that topsoil has been properly removed, piled, and kept segregated from subsoil. Digital photographs (Canon Power Shot SD1300 IS, 12 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 GPSMAP 60CSx; <10m accuracy; NAD83 datum).

3.2 ON-SITE INSPECTION OBSERVATIONS AND FINDINGS

Construction for the Project began 8 November 2016. At the time of inspection, work had started. Equipment operators mowed the grass in the ROW. Then, they started stripping topsoil with a dozer. They started by scraping a small area or a line in the ground with the edge of the dozer, or the grader would go through near the edges of the right of way (ROW), to identify the ROW edge where topsoil should be stripped and where the topsoil pile should be placed (stakes were in these areas)(**Appendix B, Photos 1, 2, 4, 5**); or there would be a spotter for the dozer operator to make sure the topsoil pile was staying within the ROW. Dozers were used to strip the topsoil to the appropriate depth. While on-site it appeared the average topsoil depth was approximately 6-inches (**Appendix B, Photos 2, 3, 6, 7**). After the dozer had taken the appropriate amount of topsoil, they came through with a grader to finish or smooth out the area in the ROW for the track hoe and other equipment. A track hoe was used to remove the subsoil for the trench. A padding machine was used for the subsoil replacement around the pipe. Subsoil was replaced back into the trench in 2-foot lifts. A sheepsfoot roller was also used over the trench area. Contractors often employ a combination of graders and dozers depending on the equipment available, depth of topsoil, land use and procedure used to remove the topsoil.

The contractors/equipment operators seemed competent at topsoil stripping. Contractors removed topsoil according to color change in the soil rather than to a fixed 12-inch depth throughout the pipeline ROW. This was appropriate for site conditions, since topsoil did not reach 12-inch depth along most of the route. Working with heavy equipment can be difficult to accurately strip topsoil; some areas had a little topsoil left on the stripped ROW, while other areas had a little subsoil scraped up with the topsoil. Overall it was a minor volume of mixing.

For the majority of the project, the subsoil pile was placed on the opposite side from the topsoil pile, except where two-toning/side sloping and bell holes were located. Two-toning or side sloping refers to a construction technique where the uphill side of the construction ROW is cut during grading. The material removed from the cut is used to fill the downhill side of the construction ROW to provide a safe and level surface from which heavy

equipment can operate. It usually requires extra workspace to accommodate the additional volumes of material generated by using this technique (Folga, 2007). A bell hole is a widening of the trench over a given distance, to provide space for installing a tie-in, valve, etc.; in this area more subsoil is removed creating a bell-shaped trench. Two-toning areas appeared to be in good condition for topsoil segregation, with the exception of a few locations around bore areas and a point of intersect where the piles were observed too close or touching (**Appendix B, Photo 9, 10**). Also near a bore area at a bell hole, subsoil was observed on top of a topsoil pile (**Appendix B, Photo 18, 19**).

The pipeline utilized a 75-ft construction ROW; but the area was only staked to 65-ft (5-ft additional space available on each side); additional temporary workspace was sometimes used for bore locations, this was dependent on the landowner agreement. For this project, most bore areas did not have additional workspace. The pipeline ROW was able to be easily accessed by nearby county roads and highways.

As part of the inspection, Wenck looked at the route disturbance area where Caliber went off the right of way and they are requesting a route variance. It was stated in a letter to the PSC (Docket #41, Construction notification – off right-of-way incident and request for route variance) that the Dakota access pipeline (DAPL) was installed in the same ROW corridor that Caliber intended to construct in. This led to a route change within Caliber's 250-ft study corridor. The survey crew proceeded with survey and staking. Once data concerning the potential re-route was gathered, Caliber intended to request a route variance from the PSC. However, Caliber's construction contractor continued with ROW clearing in the potential re-route area. Caliber notified the PSC of the disturbance area. No further construction activities were to take place in the affected area until a route variance was approved.

While on-site on 5 December the entire route disturbance area was unable to be looked at due to bad weather conditions and snow drifts. After talking with the on-site inspector, it sounded like approximately 75 percent of the area had been topsoil stripped and some rock piles were moved. However, no work had been done in the area since the incident (**Appendix B, Photo 20**). The DAPL was observed north of the incident area (**Appendix B, Photo 21**).

4.0 Issues to Resolve and Recommendations

4.1 TOPSOIL SEGREGATION

When the topsoil inspection of the project was conducted, there were locations where the topsoil and subsoil piles were in contact, with the probability for mixing, near a bore location at a two-tone area (Observation Point 1, **Appendix A, Figure 1**), and at a point of intersect. Subsoil was observed on top of a topsoil pile near a bell hole at a bore location (Observation Point 5, **Appendix A, Figure 1**). Contractors/equipment operators need to take special care in these areas not to mix the topsoil and subsoil when it is replaced. Wenck recommends monitoring and documentation of these areas to ensure vegetation becomes established after reclamation.

5.0 Conclusions

Overall, the Project appeared to have been constructed as designed, with minimal impacts to the surrounding natural or human environment. The Project site was maintained and in satisfactory condition. There were a few noteworthy issues that included: Topsoil and subsoil piles in contact with each other, and subsoil on top of topsoil. These issues were observed at bore locations in a bell hole and two-tone area, and at a point of intersect. Wenck recommends monitoring of these areas after reclamation.

6.0 References

North Dakota Public Service Commission (ND PSC). 2016. Online Case Search. Available from: http://www.psc.nd.gov/database/company_case_list.php. Accessed November 2016-December 2016.

Hamilton, Roy. 2016. PSSI/ Caliber Inspector. Personal Communication: discussion during site visit on 8 November 2016, 5 December 2016.

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Folga, S. M. 2007. Natural Gas Pipeline Technology Overview. Argonne National Laboratory. http://corridoreis.anl.gov/documents/docs/technical/apt_61034_evs_tm_08_5.pdf. Accessed December 2015.

Sedivec, K., C. Piper, J. Printz, A. Wick, A. Daigh, R. Limb. 2014. Successful reclamation of lands disturbed by oil and gas development and infrastructure construction. North Dakota State University Extension Service Pub. R1728.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook.

7.0 Signatures

The services performed by Wenck staff for this project have been conducted in a manner consistent with the degree of care and technical skill appropriately exercised by professionals currently practicing in this area under similar time and budget constraints. Recommendations and findings contained in this report represent our professional judgment and are based upon available information and technically accepted practices at the present time and location. Other than this, no warranty is implied or expressed.

Lead Project Manager, Kevin Magstadt, and Environmental Scientist, Samantha Swanberg, prepared the report.

_____ _____

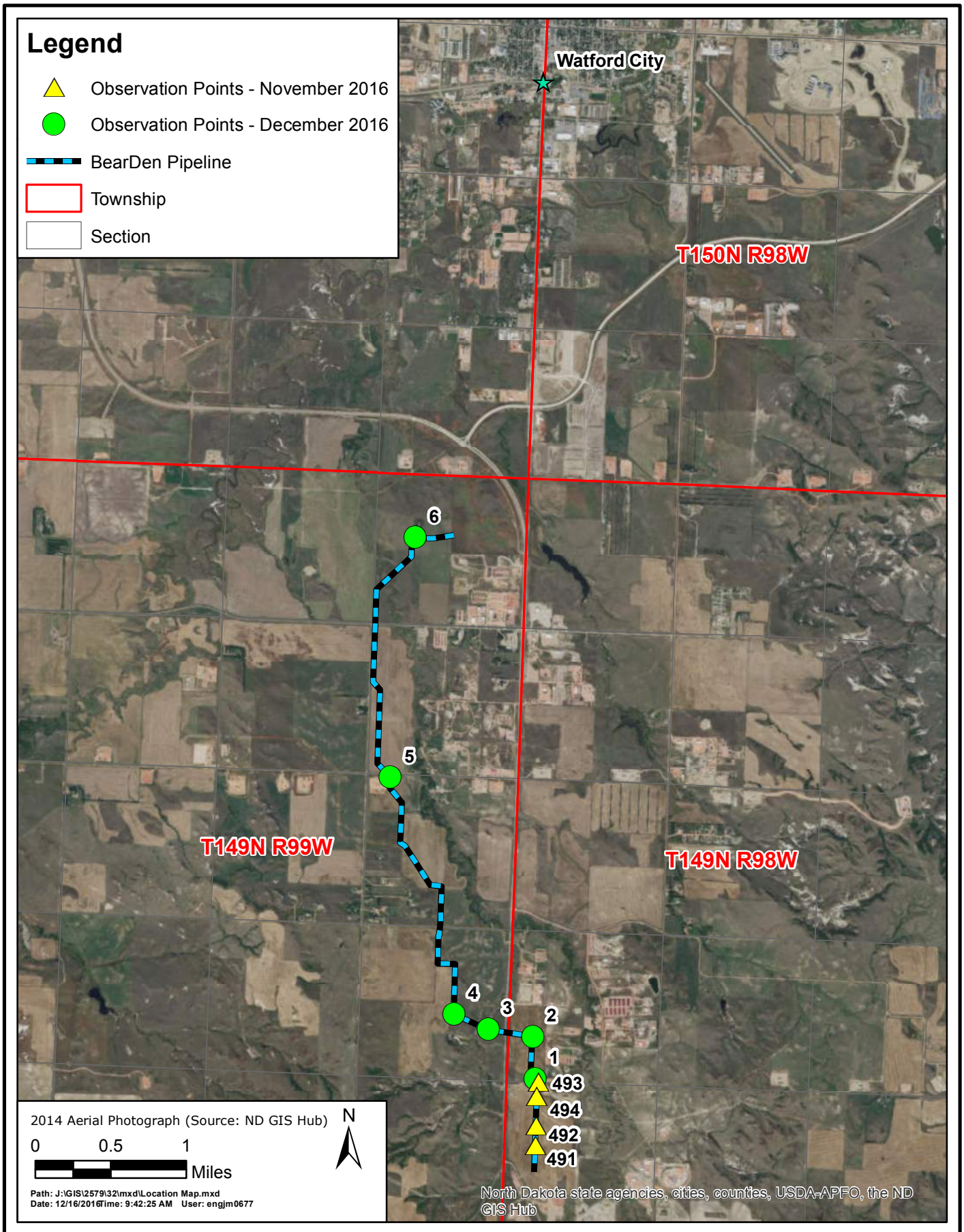
Kevin J. Magstadt, P.E., Principal/Regional Manager Date

_____ _____

Samantha Swanberg, Environmental Scientist Date

Appendix A

Map of Project and Observation Points



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Overview Map

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Figure 1

Photographs

Above: Photo 1 (Point 491) – Start of topsoil stripping. The dozer and grader are marking the edge of the ROW. Another dozer is in the background stripping topsoil. Direction: South.

Below: Photo 2 (Point 491) – Start of topsoil stripping. A spotter (to the left of photo) was used to help the dozer operator make sure the topsoil pile was staying within the ROW. Direction: South.

Above: Photo 3 (pt. 491) – Topsoil is being stripped. Direction: South.

Below: Photo 4 (pt. 492) – Topsoil is being stripped. Spotters are helping direct the dozer operators as to where the topsoil pile should be. Grader is stripping topsoil along the edge of the ROW. Direction: South.

Above: Photo 5 (pt. 493) – Grader is stripping topsoil along the edge of the ROW. Next dozers will come and strip the rest of the topsoil. Direction: Northwest.

Below: Photo 6 (pt. 494) – Two-tone area. Topsoil stripped. Another line crosses the ROW. Mats (to the left of photo) are put in place to drive across that area. Direction: South.

Above: Photo 7 (pt. 492) – Topsoil stripped. Equipment operators left space in the topsoil pile for the drainage area (near spotter). Direction: South.

Below: Photo 8 (pt. 493) – Crew installing warning signs for construction area.

Above: Photo 9 (pt. 1) – Topsoil pile to the far left. Topsoil and subsoil piles touching/too close to each other. Possible subsoil on top of topsoil. Trench to the far right of photo. Near road bore. Area was two-toned/side-sloped. Direction: South.

Below: Photo 10 (pt. 1) – Topsoil and subsoil piles in contact with each other. Near road bore. Same area as photo #9. Direction: South.

Above: Photo 11 (pt. 2) – Pipe has been buried. Topsoil to the left. Direction: South.

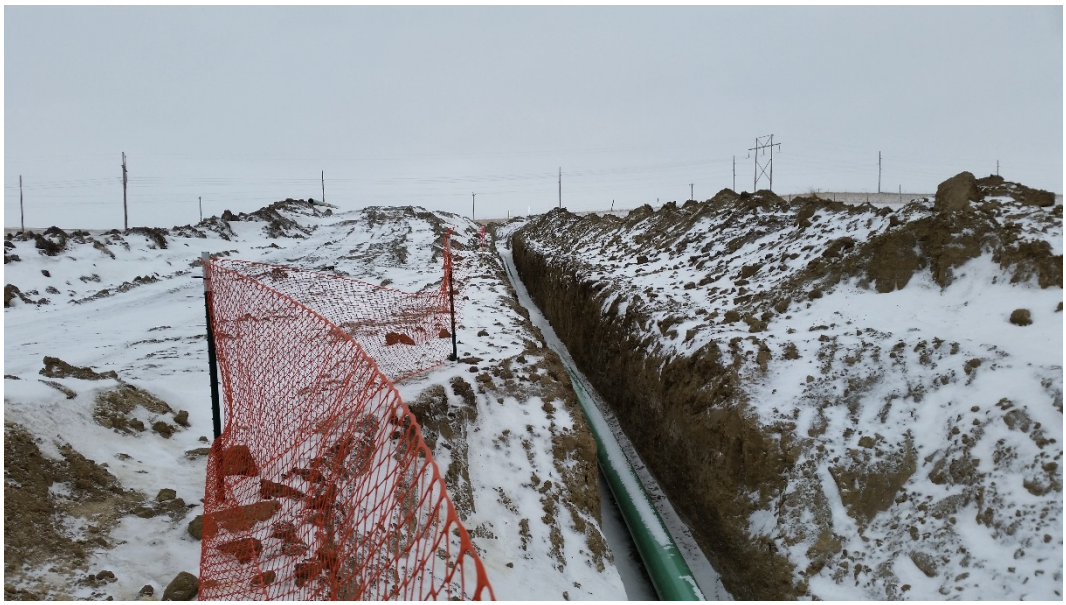
Below: Photo 12 (near pt. 1, north of the road) – Track hoe is covering up the trench (replacing subsoil). Direction: South.

Above: Photo 13 (pt. 4) – Topsoil pile to the far right, subsoil spoil to the far left of pipe trench.

Below: Photo 14 (pt. 4) – Two-tone area. Topsoil to the left of photo. Direction: East.

Above: Photo 15 (near pt. 3) – Drainage/creek area. Mats through creek area. Topsoil on the right side of the ROW. Direction: West-northwest.

Below: Photo 16 (pt. 3) – Same area as photo 15. This drainage area/creek will be double ditched. Mats were placed across the area. Fence around open trench. Snow in trench. Direction: West-northwest.



Above: Photo 17 (pt. 3) – Topsoil to the far left, fence around bell hole/end of trench, subsoil to the right of trench. Snow in trench. Direction: East-southeast.

Below: Photo 18 (pt. 5) – Subsoil on topsoil pile near road bore location. Direction: Southwest.

Above: Photo 19 (pt. 5) – Subsoil on topsoil pile near bore location. Topsoil pile to the far right. Same area as Photo 18. Direction: Northeast.

Below: Photo 20 (pt. 6) – The route disturbance/adjustment area had topsoil stripped. The inspector stated about 75 percent of the area had topsoil stripped and a rock pile was moved. Unless or until the route variance is approved, no further construction activities will take place on the affected area. Direction: East.

Above: Photo 21 (pt. 6) – Photo taken from area where Caliber stripped topsoil at their requested route variance. Dakota Access pipeline is where the red fence gate and yellow pipeline marker is located (shown with arrow). There is also a pipeline scar along the ground that is hard to see due to the snow cover. Caliber's pipeline was originally supposed to be over near where the Dakota Access pipeline is located (Docket #41). Direction: North.

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