June 19, 2018

Re: The North Dakota Society of Professional Land Surveyors (NDSPLS) comments and concerns with regard to the North Dakota Industrial Commission Docket for Hearing on Case No. 26584 to consider comments on the review of the delineation of the ordinary high water mark (OHWM).

About the NDSPLS

The NDSPLS is made up of over 300 members, of which some 185 are registered professional land surveyors who live and practice in this state. Overall, approximately 500 registered land surveyors are licensed to practice in North Dakota. We are licensed and regulated by the North Dakota State Board of Registration for Professional Engineers and Professional Land Surveyors. Our mission and objective is to unite all of the professional land surveyors in the state of North Dakota; to elevate the standards of the surveying profession; to establish basic minimum standards and requirements for surveys; to assist in promoting legislative and educational programs to improve the professional status of the land surveyor; to work in cooperation with local, county, state, federal, and tribal governments in our field of endeavor; to uphold a rigid code of ethics; to strive to improve our relations with our clients and the public by doing our work with precision and integrity; and to maintain a good relationship between land surveyors and engineers.

NDSPLS and the OHWM Report

On April 17th, NDSPLS representatives attended the presentation of the technical report to the NDIC. At this time, concerns arose about the report.

The NDSPLS board of directors met for their quarterly meeting on April 20th and the concerns with the report were brought to the attention of the NDSPLS board. Based on these concerns, an ad hoc committee was formed to review the report and prepare technical testimony pursuant to the NDIC Docket for Hearing. In accordance with the NDIC request for testimony, NDSPLS submits the following testimony for your review and consideration.

Note that NDSPLS has no financial interest in this report and neither gains nor loses financially in any way from the outcome. NDSPLS respectfully submits this statement because, in our professional opinion, the report does not reflect proper survey principles and practices, which has resulted in many inaccuracies. In fact, we feel the consequences of such a report may reflect poorly on our profession as a whole.

Concerns about Methodology
NDSPLS urges the NDIC and other stakeholders to respect the critical nature of this report and the need for accurate determinations of land boundaries for the protection of both public and private property rights. Furthermore, NDSPLS urges the NDIC to note that surface boundaries define mineral boundaries, and that monuments set by the original Government Land Office (GLO) surveyors control both the surface and mineral boundaries.

As such, NDSPLS is very concerned with the use of a secondary source for tract boundaries, the methods used to georeference the tract boundaries, and the methodology used for “refinements” to the tract boundaries. This data and methodology have subsequently been used to determine acreages that are in conflict with proper survey procedures, which are defined by federal and state laws. This has resulted in the reporting of inaccurate acreages that will likely lead to incorrect mineral payment determinations.

Availability of Credible Sources

The upland title throughout the extent of this project originates from federal patents at the time of entry. The land description used in these patents are in reference to the Public Land Survey System (PLSS) – e.g. the Northeast Quarter of Section 12, Township 153 North, Range 97 West of the 5th Principal Meridian. Prior to the issuance of these federal patents, the federal government required that the land be surveyed by the GLO and that corners were monumented prior to entry. The monuments set per the original survey control the location of the PLSS lines and are free from error. When these monuments cannot be found, a hierarchy of methods are used to reestablish these points based on the GLO township plats and the corresponding field notes. This is in accordance with the Act of February 11, 1805 (2 Stat. 313; 43 U.S.C. 752).

Our issue with the OHWM report in its current state is that no reference has been made to the GLO records. The GLO township plats and field notes can be found online through the North Dakota State Water Commission website. NDSPLS believes that this data is necessary to formulate an accurate, comprehensive, retraceable, and defensible report. Furthermore, all decisions regarding the development of the cadastral layer must be predicated on GLO records. The need for this will be discussed in more depth throughout this statement. (Examples of GLO records are appended to this statement for review. The examples were obtained from the State Water Commission website.)

In addition to the need for incorporating GLO records into the report, numerous subsequent survey records accurately depict the points and lines of the PLSS represented in this project. The US Army Corps of Engineers (USACE) contracted the survey, marking, and platting of the USACE boundary lines (take-line) surrounding Lake Sakakawea. These plats contain accurate descriptions of the monuments found and set per the USACE survey as well as the dimensions between the monuments. These surveys also contain precise state plane coordinates. Most importantly, these documents bear the seal and signature of the North Dakota professional land surveyor that was in responsible charge of the survey. The USACE surveys are on file in the respective county recorder’s office. NDSPLS believes that the USACE take-line plats should be used for the proper development and georeferencing of the PLSS layer. (Several examples of these plats have been appended to this statement for review. The examples were obtained from the McKenzie County Recorder’s Office.)

Along with the CORPS plats, a certified well plat corresponding to the permit for each well lateral that now exists under the current lake bed is on file with the NDIC (see the copy of the NDIC map showing the well laterals). Upon review of the NDIC GIS map, nearly every section of land within this project has been surveyed for this purpose and is available to the public through the NDIC website.
Again, these plats contain descriptions of the monuments found and set, the dimensions of the PLSS lines, geographic coordinates on the well location, and certifications by a North Dakota professional land surveyor. (Examples of the well plats are appended to this statement. The examples were obtained from the NDIC.)

In addition, many other survey records could be used to develop a much more accurate PLSS layer. They include, but are not limited to the following: land survey monument records, recorded plats, records kept by other state and federal agencies, and records from utility companies. Also, numerous corner locations exist throughout the extent of the project that are easy to access and could be verified by a field survey.

**NDSPLS believes that the above records should serve as the primary sources of information from which to develop an accurate PLSS cadastral GIS layer.**

Turning now to the deficiency of the data used for the basis of the report and acreage calculations, Chapter 4.2 of the report states, “The USACE property survey boundaries or tract boundaries were received from the State in GIS format.” The report goes on to acknowledge apparent discrepancies between the shapefile and the apparent occupation lines depicted on the 1951 aerial photos. Furthermore, the report discloses that the metadata corresponding to the GIS file is unknown. In review of the tract maps prepared by the USACE, each map bears a note stating, “Boundary lines of this segment were determined by deed descriptions, General Land Office Plats, and aerial photos.” From a surveyor’s perspective, this statement very likely means that the map is strictly a compilation of record information and not based on an actual field boundary survey. With all of this in mind, it is very likely that the shapefile was generated by simply digitizing the tract maps and somehow georeferencing them by unknown and inaccurate means. This renders the data unreliable for land boundary determination.

To further distort the PLSS cadastral data, the stated methodology per Chapter 4.2 to “shift the boundaries” has only served to introduce more error into the base map. The “rubber-sheeting” spatial adjustment used to tie the cadastral data is not a method that a competent land surveyor would use to accurately determine the location of PLSS lines; furthermore, this method is not defined in any survey text as an acceptable methodology for land boundary determination. In effect, this method forces already vague data to match up by further distorting the distances and directions of the lines embedded in the shapefile, thus further distorting the resulting acreages. The report goes on to state that, “inferences were made in adjusting the field boundaries,” and that, “in places where a tree line or roads existed and the boundary discrepancy was less than 100 feet, the boundary was adjusted to the aerial demarcation.” This would give the appearance that 100 feet, more or less, is the accuracy achieved by these so-called “refinements.” (Keep in mind that the report’s stated accuracy of the georeferencing of aerial photography per Chapter 4.1.2 was 48.5 feet.) Besides all of this, the report shows no evidence that a duly registered North Dakota land surveyor was consulted in the decision making process with regards to the recommended tract boundary adjustments. This aspect of the report and associated mapping is completely inaccurate and should not be relied upon, especially for the distribution of mineral payments that, in several cases, are sure to be quite sizable.

**NDSPLS recommends that the PLSS layer used to determine acreage for this report be derived from the GLO plats and field notes, the USACE take-line plats, the well location plats, and any available subsequent survey records. The USACE take-line plats and well location plats should be used to determine the geographic locations of the found monuments that are reported on said plats.**
should be field verified at several locations by proper survey methods. From there, the controlling PLSS corners that are either missing or in areas inundated by water should be calculated using proper proportionate methods and the methods for subdivision of sections based on the dimensions per the GLO plats and field notes as set forth per the 2009 BLM Manual of Surveying Instructions. All of this should proceed under the responsible charge of a duly registered North Dakota Professional Land Surveyor. Given the availability of this data and the ease with which it can be assembled, any other methodology is simply unacceptable and unnecessarily leaves the end-user of this report unprotected. (An example of the differences between the existing map and the suggested methodology is appended to this statement.)

Concerns regarding acreage determinations

NDSPLS has a number of concerns about the schedule of acreages. These include incorrect reference to the proper legal descriptions, improper partitioning of accreted land in conflict with established survey procedures and ND case law, and the obvious discrepancies in acreage due to grossly erroneous positions of PLSS lines (as previously discussed).

Legal Descriptions. The legal descriptions of the tracts of land along the OHWM are incorrectly labeled. The report completely ignores the fact that government lots were created per the original plat. Furthermore, the report mistakenly protracts quarter-quarters both in riparian areas and through accreted lands. This is grossly erroneous and does not protect the interests of the upland mineral owners both in terms of their rights to the shoreline and patented area.

Partitioning. In addition to omitting references to government lots, the report makes no consideration for the proper apportionment of accreted lands. The assumption that quarter-quarters are to be protracted across these areas is completely erroneous and represents a complete abandonment of proper surveying procedures and the rules set forth in North Dakota Supreme Court rulings.

Section 8-133 of the Manual of Surveying Instructions 2009 sets forth five different methods for establishing partition lines of accreted lands. These include the proportionate shoreline method, the perpendicular method, the proportionate acreage method, the extension of property line method, and a combination of the proportionate shoreline method and the perpendicular method. The methods set forth in the BLM Manual of Surveying Instructions 2009 are consistent with the rulings of the North Dakota Supreme Court, particularly in Jennings v. Shipp and Gardner v. Green. The primary principle behind these methods is that accreted lands are to be partitioned equitably between intermingled upland owners. It is impossible to properly apportion accreted land without first reviewing GLO data to determine the original distance of the shoreline and the record acreage of the government lots.

Acreage. As discussed above, because acreages have been determined from very course and approximate PLSS lines, it should come of no surprise that the acreages are likely inaccurate.

NDSPLS’ primary concern is that the schedule of acreages—which is inaccurate—will lead to inaccurate transactions as well.

Concerns with regards to the ability in which shapefiles can be used to accurately locate land boundaries both on the ground and on a plat or map
Pursuant to NDAC 28-02.1-13 – Documents Used to Convey Real Property Or Any Interest Therein, North Dakota professional land surveyors must prepare surveys that are tied to monumentation either found or set at the time of survey. Furthermore, surveyors are to produce maps in which surveys can be retraced with confidence and precision. An ESRI shapefile does not provide the information needed to accurately establish boundaries on the ground. In essence, the shapefile is a coordinate-based product. Other requirements exist within NDCC regarding the use of state plane coordinates for land boundaries. NDCC 47-20.2-04 states that:

Whenever coordinates based on the North Dakota coordinate system are used to describe any tract of land which in the same document is also described by reference to any subdivision, line, or corner of the United States public land surveys, the description by coordinates must be construed as supplemental to the basic description of each subdivision, line, or corner contained in the official plats and field notes filed of record, and, in the event of any conflict, the description by reference to the subdivision, line, or corner of the United States public land surveys prevails over the description by coordinates, unless the coordinates are upheld by adjudication, at which time the coordinate description will prevail. This chapter does not require any purchaser or mortgagee to rely on a description, any part of which depends exclusively upon the North Dakota coordinate system, unless the description has been adjudicated as provided in this section.

NDCC 47-20.2-06 goes on to state that:

The use of the North Dakota coordinate system of 1927 north zone or south zone or the North Dakota coordinate system of 1983 north zone or south zone on any map, report of survey, or other document must be limited to coordinates based on the North Dakota coordinate systems as defined in this chapter. The map, report, or document must include a statement describing the standard of accuracy, as defined by the national ocean survey/national geodetic survey, maintained in developing the coordinates shown therein. The coordinates must be established in conformity with these standards:

1. No coordinates based on the North Dakota coordinate system, purporting to define the position of a point on a land boundary, may be presented to be recorded in any public records or deed records unless the point is connected to a triangulation or traverse station established in conformity with the standards prescribed in this chapter.

2. Coordinate values used in land descriptions under this section must be certified by a duly registered land surveyor under the laws of this state.

Concerns regarding professional practice and licensing requirements

NDSPLS believes that this report is a technical report. Per NDCC 43-19.1-02.11 – Responsible Charge, NDCC 43-19.1-21 – Seals, and multiple NDAC Title 28 rules, the report should be sealed and signed by the individual(s) in responsible charge of this project. This report does not contain such information. Furthermore, the individuals listed as the authors and reviewers of this report are not currently registered in the State of North Dakota as either professional engineers or professional land surveyors.

Finally, NDSPLS believes that much of this report falls under the definition of a land survey per NDCC 43-19.1-02.8 which states the following:
a. Means making land boundary determinations by providing or offering to provide professional services using such sciences as mathematics, geodesy, and photogrammetry and involving the making of geometric measurements and gathering related information pertaining to the physical or legal features of the earth; improvements on the earth; and improvements on the space above, on or below the earth and providing, utilizing, or developing the same into land survey products such as graphics, data, maps, plans, reports, descriptions, or projects. As used in this subsection, professional services include acts of consultation, investigation, testimony evaluation, expert technical testimony, planning, mapping, assembling and interpreting gathered measurements and information related to any one or more of the following:

(1) Determining by measurement the configuration or contour of the earth’s surface or the position of fixed objects on the earth’s surface;
(2) Determining by performing geodetic land surveys the size and shape of the earth or the position of any point on the earth;
(3) Locating, relocating, establishing, re-establishing, or retracing property lines or boundaries of any tract of land, road, right of way, or easement;
(4) Making and land survey for the division, subdivision, or consolidation of any tract of land;
(5) Locating or laying out alignments, positions, or elevations for the construction of fixed works;
(6) Determining by the use of principles of land surveying the position for any survey monument, boundary or non-boundary, or reference point and establishing or replacing any such monument or reference point; and
(7) Creating, preparing, or modifying electronic or computerized or other data for the purpose of making land boundary determinations relative to the performance of the activities in paragraphs 1 through 6.

b. Includes:

(1) Engaging in land surveying;
(2) By verbal claim, sign, advertisement, letterhead, card, or any other way representing to a person to be a professional land surveyor;
(3) Through the use of some other title implying to be a professional land surveyor or that the person is licensed or authorized under this chapter; and
(4) Holding out as able to perform or performing any land surveying service or work or any other service designated by the practitioner which is recognized as land surveying.

Per Chapter 5.6 of the report, no mention appears of any part of this report being developed and reviewed under the responsible charge of a duly registered North Dakota professional land surveyor. The specific issues brought to light by this statement should clearly show the obvious deficiencies, inaccuracies, and the incomplete nature of its content. Many of these issues should have been addressed prior to the initial release of this information.

Summary

NDSPLS acknowledges that this project requires the expertise of many technical and legal professionals; however, this report in its current state does not provide the assurance and expertise that only a duly registered North Dakota professional land surveyor can provide with respect to land boundaries. The NDSPLS respectfully requests that all those involved with the preparation, review, and acceptance of the OHWM report review this statement and address the issues that we have presented.
Respectfully submitted,

[Signature]

Ed Rintamaki, PLS
President of the North Dakota Society of Professional Land Surveyors

Cc: North Dakota Society of Professional Engineers,
American Council of Engineering Companies of North Dakota, North Dakota,
Board of Registration for Professional Engineers and Professional Land Surveyors