NUTRIEN LTD.

LANIGAN POTASH

NATIONAL INSTRUMENT 43-101 TECHNICAL REPORT ON

LANIGAN POTASH DEPOSIT (KLSA 001 C),

SASKATCHEWAN, CANADA

FEBRUARY 20, 2019

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The scientific and technical information included in this report has been prepared under the supervision of persons who are ‘‘qualified persons’’ under Canadian National Instrument 43-101. **Craig Funk, P. Eng., P. Geo.** is the qualified person who supervised the preparation of the information presented in this report and who verified the data disclosed herein.

	/s/ “Craig Funk”
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Date	**February 20, 2019**

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TABLE OF CONTENTS

LIST OF FIGURES

Unless otherwise noted, figures for which a source and / or date are not provided are current as of the effective date of this report and were prepared by the Company.

LIST OF TABLES

EFFECTIVE DATE OF REPORT

The effective date of this report is December 31, 2018, other than where otherwise noted.

1.0 SUMMARY

Effective January 1, 2018, Potash Corporation of Saskatchewan Inc. ("PotashCorp") and Agrium Inc. ("Agrium") completed a court-approved plan of arrangement (the "Arrangement"), involving, among others, PotashCorp, Agrium and Nutrien Ltd. ("Nutrien") the new parent company of PotashCorp and Agrium. As a result of completing the Arrangement, PotashCorp and Agrium are wholly-owned subsidiaries of Nutrien. References to "the Company" means Nutrien, indirectly through PotashCorp, or, for references prior to the completion of the Merger, PotashCorp, as the context requires.

Nutrien is the world's largest provider of crop inputs and services, with operations and investments in 14 countries. It produces the three primary plant nutrients: potash, phosphate, and nitrogen. It also has a retail network that services over 500,000 growers worldwide.

Nutrien is a corporation organized under the *Canada Business Corporations Act*, the common shares of which listed and publicly traded on the Toronto and New York stock exchanges (symbol NTR).

The Company owns and operates a potash mine at Lanigan, Saskatchewan, Canada (Lanigan Potash, Lanigan mine, or Lanigan). An aerial view of the Lanigan surface operations is shown in Figure 1. The Lanigan Crown Subsurface Mineral Lease is numbered KLSA 001 C. Production of potash from the Lanigan mine began in 1968.

Figure 1: Aerial photo of Lanigan surface operations, fall, 2012.

As of December 31, 2018, annual nameplate capacity for Lanigan was 3.8 million tonnes and annual operational capability is 2.0 million tonnes of finished potash products (concentrated KCl). Estimates of nameplate capacity are based on capacity as per design specifications or Canpotex entitlements once these have been determined. Operational capability is the estimated annual achievable production level at current staffing and operational readiness (estimated at beginning of year), not including any inventory-related shutdowns and unplanned downtime.

Mill rehabilitation, mine expansion and hoist improvement projects were completed at Lanigan between 2005 and 2010. The expansion construction was carried out without significant disruption to existing potash production from the site.

While the term potash refers to a wide variety of potassium bearing minerals, in the Lanigan region of Saskatchewan, the predominant potash mineralization is sylvinite, which is comprised mainly of the minerals sylvite (KCl / potassium-salt) and halite (NaCl / rock salt), with minor amounts water insolubles. Carnallite ($KMgCl_3 \cdot 6H_2O$) usually occurs in minor amounts at Lanigan; areas of the B Zone where carnallite layering is sporadically present are avoided through selective mining (i.e. by identifying and avoiding cutting through these layers). Potash fertilizer is concentrated, nearly pure KCl (i.e. greater than 95% pure KCl), but ore grade is traditionally reported on a % K_2O equivalent basis. The "% K_2O equivalent" gives a standard measurement of the nutrient value of different potassium-bearing rocks and minerals. To convert from % K_2O equivalent tonnes to actual KCl tonnes, multiply by 1.58.

Virtually all Lanigan underground mining rooms are in one of two potash mineralized zones within the Patience Lake Member of the Prairie Evaporite Formation (the host evaporite salt). The potash mineralized zones are referred to as A Zone (the upper seam) and B Zone (the lower seam). The Lanigan mine is a conventional underground mining operation whereby continuous mining machines are used to excavate potash ore by the stress-relief mining method in one ore zone (the A Zone) and the long-room and pillar mining method in another ore zone (the B Zone). Currently, in any specific mining block, only one zone is mined (i.e. bi-level mining is not in practice). Continuous conveyor belts transport ore from the mining face to the bottom of the production shaft. In addition to hoisting potash ore to surface, the production shaft provides fresh air ventilation to the mine and serves as secondary egress. The Service Shaft is used for service access, and exhausting ventilation from the mine. Raw potash ore is processed and concentrated on surface, and concentrated finished potash products (near-pure KCl) are sold and shipped to markets in North America and offshore.

At Lanigan, mine elevations range from approximately 940 m to 1030 m, averaging approximately 990 m. These depths to potash mineralization are anticipated over most of the Lanigan lease area. Mine workings are protected from aquifers in overlying formations by salt and potash beds which overlie the mineralized zone. Conservative local extraction rates (never exceeding 45% in any mining block) are employed at Lanigan to minimize potential detrimental effects of mining on overlying strata; this is common practice in flat-lying, tabular ore bodies overlain by water-bearing layers.

Part of the normal surface infrastructure associated with operating the potash mine in Saskatchewan includes waste disposal on the land and disposal of salt brine into deep subsurface aquifers. The Company stows salt tailings within an engineered and licensed Tailings Management Area (TMA) and operates three brine disposal wells near the surface plant of the Lanigan mine.

Over the 50-year mine life, 207.762 million tonnes of potash ore have been mined and hoisted at Lanigan to produce 60.276 million tonnes of finished potash products (from startup in 1968 to December 31, 2018). The life-of-mine average concentration ratio (raw ore / finished potash products) is 3.45 and the overall extraction rate over this time period is 26%. Actual production of finished potash products at Lanigan for the last 10 years is shown in Figure 2.

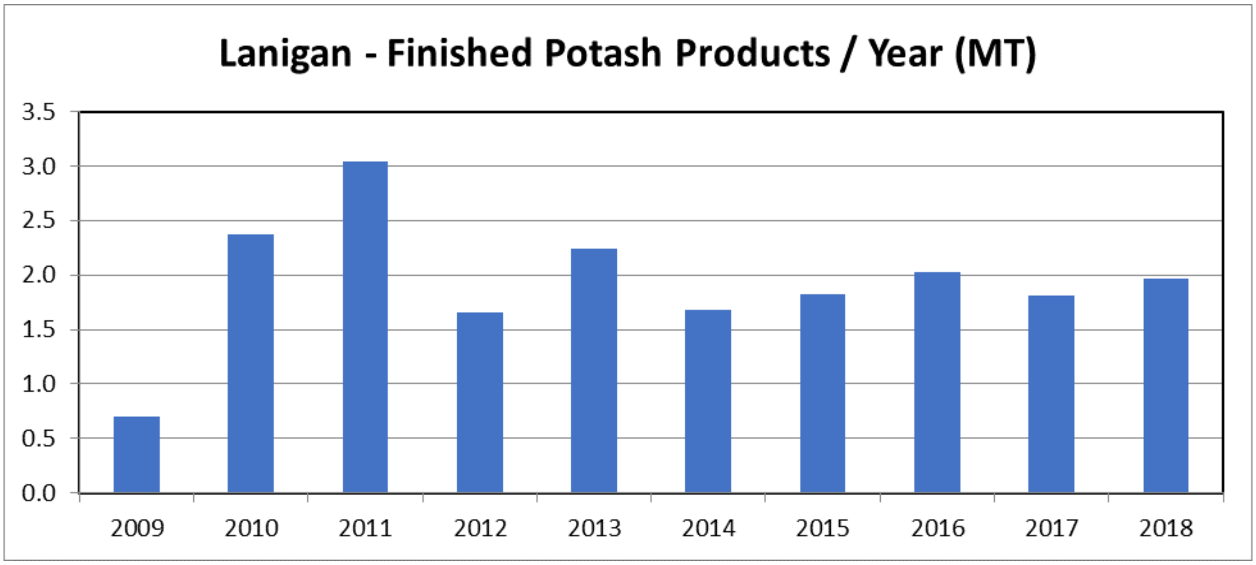


Figure 2: Actual finished potash products production from the Lanigan mine over the past 10 years (in million tonnes per year).

Over the past three years (2016, 2017, 2018), actual potash production at Lanigan has totaled:

- 20.384 million tonnes of ore mined and hoisted (6.795 million tonnes per year, on average)
- 5.809 million tonnes of concentrated finished potash products produced (1.936 million tonnes per year, on average)
- Average mill feed ore grade was 20.9% K_20 equivalent
- Average concentration ratio (ore mined / potash produced) was 3.51

The Canadian Institute of Mining and Metallurgy and Petroleum (CIM) has defined Mineral Resources and Reserves in *The CIM Definition Standards for Mineral Resources and Reserves* (2014). Based on these guidelines, all mineral rights owned or leased by the Company at Lanigan Potash can be assigned to Mineral Resource categories (Inferred, Indicated, and Measured) and Mineral Reserve categories (Probable and Proven). Mineral Resources (reported as in-place tonnes) and Mineral Reserves (reported as recoverable ore tonnes) for Lanigan as of December 31, 2018 are outlined in Table 1. Mineral Resources reported are exclusive of Mineral Reserves.

Table 1: Mineral Resources and Reserves for Lanigan Potash, as of December 31, 2018.

Proven Mineral Reserve - A Zone (millions of tonnes recoverable ore)	19
Proven Mineral Reserve - B Zone (millions of tonnes recoverable ore)	92
Probable Mineral Reserve - A Zone (millions of tonnes recoverable ore)	142
Probable Mineral Reserve - B Zone (millions of tonnes recoverable ore)	287
Total Mineral Reserve (millions of tonnes recoverable ore)	**540**
Measured Mineral Resource - A Zone (millions of tonnes in-place)	2,142
Measured Mineral Resource - B Zone (millions of tonnes in-place)	2,578
Indicated Mineral Resource - A Zone (millions of tonnes in-place)	1,325
Indicated Mineral Resource - B Zone (millions of tonnes in-place)	1,775
Inferred Mineral Resource - A Zone (millions of tonnes in-place)	671
Inferred Mineral Resource - B Zone (millions of tonnes in-place)	899
Total Mineral Resource (millions of tonnes in-place)	**9,390**
Average % K_2O Grade - A Zone (from Lanigan in-mine samples)	23.5%
Average % K_2O grade - B Zone (from Lanigan in-mine samples)	20.3%
Years of Remaining Mine Life (A Zone)	**24**
Years of Remaining Mine Life (B Zone)	**56**
Total Years of Remaining Mine Life (A Zone + B Zone)	**80**

The average mineral grade of the Lanigan A Zone Mineral Resource and Mineral Reserve is 23.5% K_20 equivalent, and was determined from 1,485 in-mine samples at Lanigan to the end of December 2017 (discussed further in Section 11.2). The average mineral grade of the Lanigan B Zone Mineral Resource and Mineral Reserve is 20.3% K_20 equivalent, and was determined from 20,230 in-mine samples at Lanigan to the end of December 2017 (discussed further in Section 11.2).

Potash production in any given year at the Lanigan mine is a function of many variables, so actual production in any given year can vary dramatically from tonnages produced in previous years. The Mineral Reserve tonnage and historic average production are used to estimate remaining mine life. If the average mining rate seen over the past three years (6.79 million tonnes of potash ore mined and hoisted per year) is sustained, and if Mineral Reserves remain unchanged, then Lanigan A Zone mine life is 24 years from December 31, 2018, and Lanigan B Zone mine life is 56 years from December 31, 2018. Total years of remaining mine life at Lanigan is 80 years from December 31, 2018.

The mining of potash is a capital-intensive business subject to the normal risks and capital expenditure requirements associated with mining operations. The production and processing of ore may be subject to delays and costs resulting from mechanical failures and such hazards as: unusual or unexpected geological conditions, subsidence, water inflows of varying degree, and other situations associated with any potash mining operation.

2.0 INTRODUCTION

The purpose of this document is to give a formal reporting of potash Mineral Resource and Reserve for Lanigan Potash, and to provide a description of the method used to compute Mineral Resource and Reserve tonnages. Sources of geological and geotechnical information analysed from this study include:

- Publicly available geological maps, reports, and publications (listed in Section 27.0)
- Internal reports on historic exploration drillholes
- Hydrogeological analysis conducted in historic exploration drillholes
- Geological studies conducted at the Lanigan mine over the past 50 years
- In-mine geophysical studies conducted at the Lanigan mine over the past 50 years
- Geotechnical studies conducted for the Lanigan mine over the past 50 years
- 2D surface seismic exploration data (approximately 621 linear km collected to date)
- 3D surface seismic exploration data (an area covering approximately 520 km^2 to date)

All data and reports are archived at Nutrien's corporate office in Saskatoon and at the Lanigan mine. In addition, drillhole data (well-log data, drilling reports, drill-stem test results, etc.) are archived with the Saskatchewan Ministry of the Economy, Integrated Resource Information System (IRIS), and surface seismic data (shot records and stack) are archived through an offsite commercial data storage service.

All geological and geophysical data and information presented in this report were personally reviewed and inspected by Nutrien technical staff under the supervision of Craig Funk (P. Eng., P. Geo., Director, Earth Science). All historic mining and mineral rights data and information presented in this report were personally reviewed and inspected by Lisa MacKenzie (GIS Cert.) and Jodi Derkach (GIS Cert., P. Geo.). Jodi Derkach (GIS Cert., P. Geo.), Tanner Soroka (P. Geo.), and James Isbister (G.I.T) conducted or were involved with geological studies and investigations at Lanigan, and Randy Brehm (G.I.T.), and Matthew van den Berghe (G.I.T) conducted or were involved with geophysical studies and investigations at Lanigan. Each of these staff visits the Lanigan mine numerous times every year. Additionally, geological and geophysical data and information pertaining to the Lanigan mine are regularly presented to and discussed with technical and engineering staff from the Lanigan mine.

The authors of this report would like to acknowledge former staff, Arnfinn Prugger and Terry Danyluk for their past contributions to this report. The authors would also like to thank the many staff who provided information and expert reviews on portions of this report.

3.0 RELIANCE ON OTHER EXPERTS

Responsibility for the accuracy of the technical data presented in this report is assumed by the authors. Outside experts were not used in the preparation of this report.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 GENERAL

The Lanigan mine is located in central Saskatchewan, approximately 100 kilometers east of the city of Saskatoon, Saskatchewan. The general location is shown on the map in Figure 3.

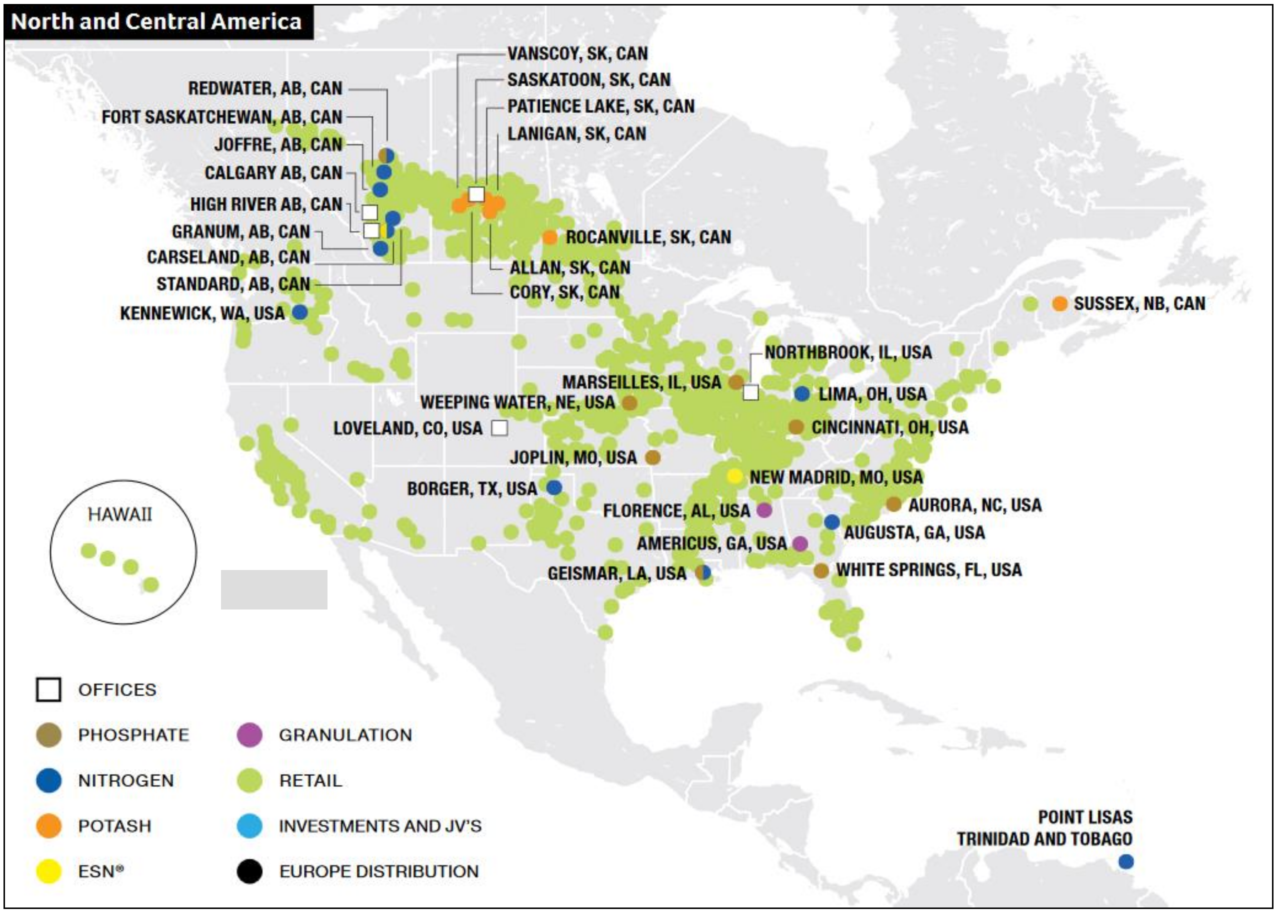


Figure 3: Map showing location of Nutrien Operations, including Lanigan.

The Legal Description (Saskatchewan Township / Range) of the Lanigan surface operation is Section 28 Township 33 Range 23 West of 2^{nd} Meridian. More precisely, the Lanigan Shaft #2 collar is located at:

- Latitude: 51 degrees 51 minutes 20.48 seconds North
- Longitude: 105 degrees 12 minutes 34.79 seconds West
- Elevation: 535.34 metres above mean Sea Level (SL)

- Easting: 485,560.306m
- Northing: 5,745,008.726m
- Projection: UTM
- Datum: NAD83
- Zone: 13

The Company owns approximately 3,700 hectares (9,140 acres) of surface rights required for current Lanigan mine operations, including all areas covered by the existing surface plant and tailings management area, and all surface lands required for anticipated future Lanigan mine and expanded milling operations.

All permits and approvals required for the operation of a potash mine in Saskatchewan are in place at Lanigan.

Figure 4 is a more detailed map showing the location of Lanigan relative to the potash deposits in Saskatchewan.

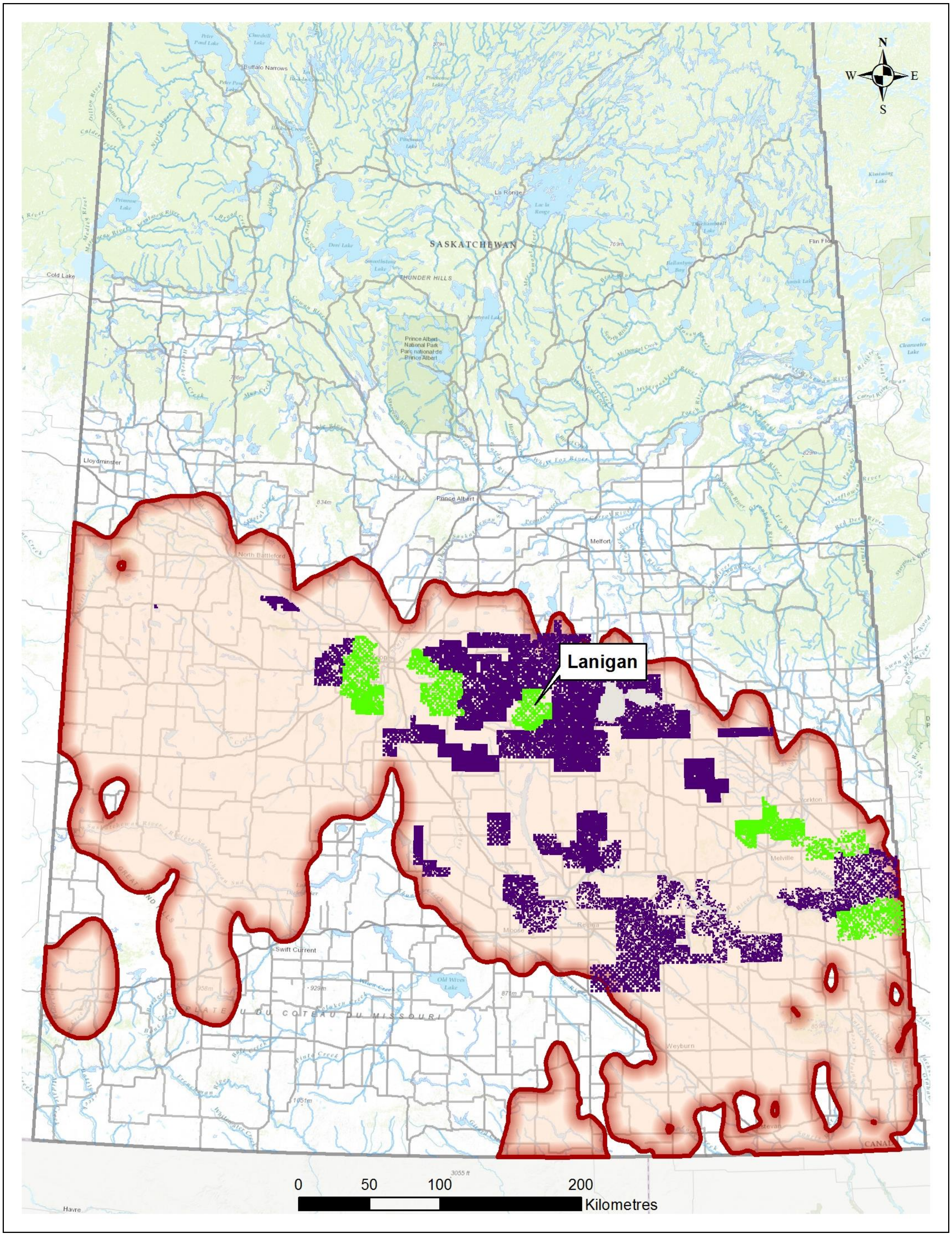


Figure 4: Map showing Lanigan Potash relative to Saskatchewan potash mineralization (pink). Also shown are Company (green) and other (purple) Crown Subsurface Mineral Leases (Saskatchewan Mining and Petroleum GeoAtlas).

4.2 MINERAL RIGHTS

Mineral rights at Lanigan are mined pursuant to mining leases with the Province of Saskatchewan, Canada (the Crown), and with non-Crown (Freehold) mineral rights owners. Crown mineral rights are governed by *The Subsurface Mineral Tenure Regulations, 2015,* and Crown Leases are approved and issued by the Ministry of the Economy.

The original Lanigan Crown Subsurface Mineral Lease, numbered KL 100, was entered into in March 1964. A minor amendment to this Lease in September 1989 resulted in KL 100R. In November 2009, a large area of land was added to the Lease resulting in KLSA 001. Shortly after that, in June 2011, a minor amendment to the Lease resulted in KLSA 001A. KLSA 001B was issued in September 2014 when portions of the adjacent Exploration Permits, granted in September 2011, were added to the Lease. Finally, in November 2015, a minor change to the lease resulted in KLSA 001 C.

KLSA 001 C covers an area of approximately 56,328 hectares (139,190 acres), as shown in Figure 5. At Lanigan, the Company has leased potash mineral rights for 38,188 hectares (94,365 acres) of Crown Land and owns or has leased approximately 17,913 hectares (44,265 acres) of Freehold Land within the lease boundary. The Lanigan Crown Lease term is for a period of 21 years from March 2006, with renewals (at the Company's option) for 21-year periods. Freehold Lands also remain under lease providing, generally, that production is continuing and that there is a continuation of the Crown Lease.

Within the Lanigan Crown Lease area, 55,950 hectares (138,256 acres) are mined pursuant to Unitization Agreements with mineral rights holders (Crown and Freehold) within two Unitized Areas shown in Figure 5. Lanigan Unit Area #1 includes 19,990 hectares (49,395 acres), while Lanigan Unit Area #2 includes 35,961 hectares (88,861 acres).

When underground workings of a potash mine are designed, there are inevitably regions that are mined with higher mining extraction (e.g. production panels) and other regions where mining extraction is lower (e.g. conveyor-belt development rooms). To treat mineral rights holders in both low extraction and high extraction areas fairly, and to promote good mining practices, a Unitization Agreement is the preferred method for determining royalty payouts. Under a Unitization Agreement, each mineral rights holder is paid a royalty based on their proportional share of the entire Unit Area regardless of whether or not their lands are actually mined. For example, if one mineral rights holder owns rights to 4,000 hectares within a 40,000-hectare Unit Area, they would be paid 10% of the total monthly royalty payout from that Unit Area.

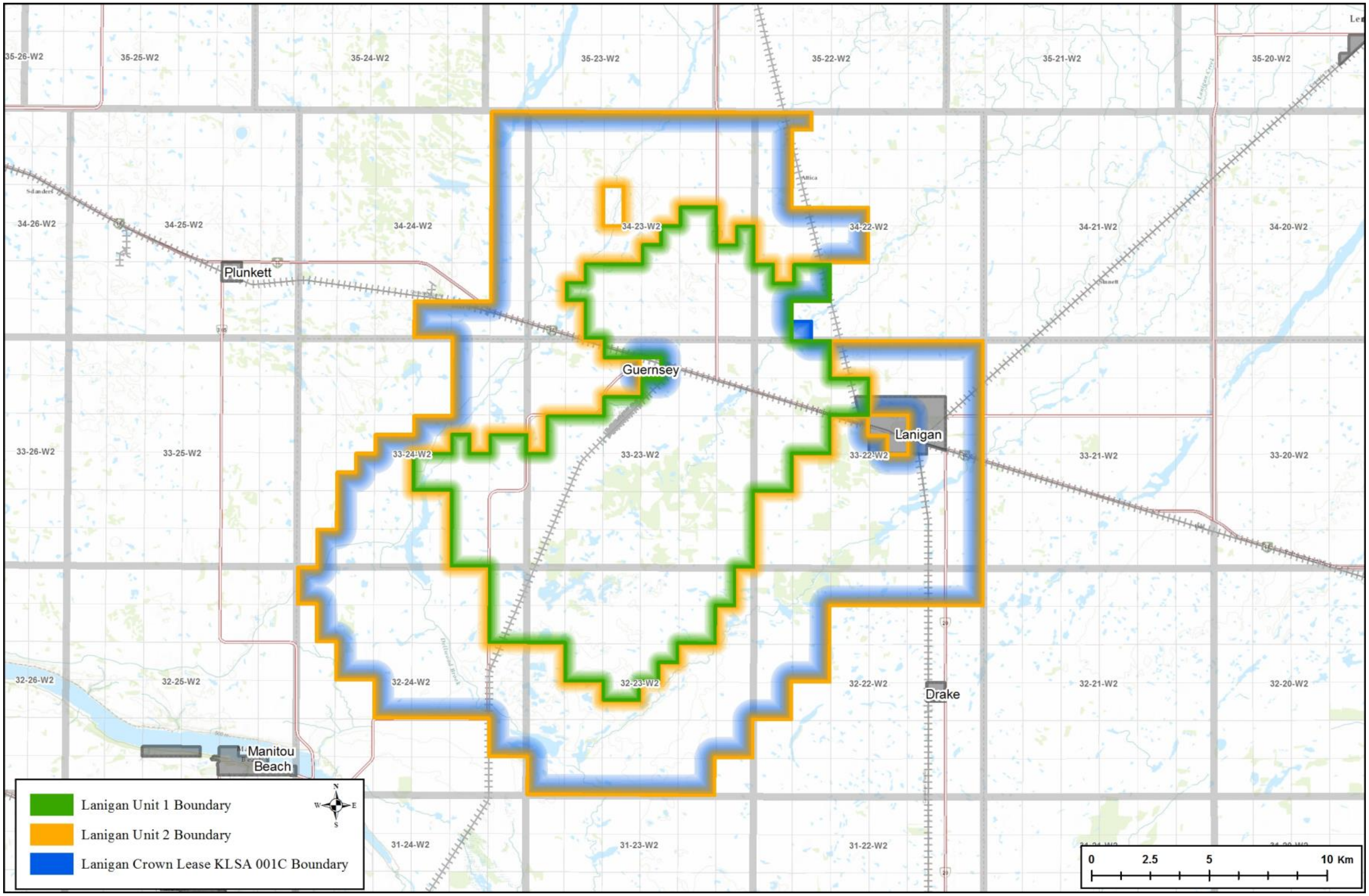


Figure 5: Map showing Lanigan Crown Lease KLSA 001 C (blue), Unitization Area #1 (green), and Unitization Area #2 (orange).

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The Lanigan mine surface facilities are accessed by an existing paved road that is part of the Saskatchewan Provincial Highway System. All potash product is shipped by rail over existing track. The location of Lanigan Potash with respect to the features described in this section (major road and rail infrastructure, as well as nearby river systems) is shown in Figure 6.

The Lanigan mine is served by a number of villages within 50 kilometres of the minesite. The nearest cities are Humboldt (approximately 45 km north of Lanigan) and Saskatoon (approximately 100 km west of Lanigan).

Lanigan is situated near the northern extent of the Great Plains of North America. Topography is relatively flat, with gently rolling hills and occasional valleys. There are no rivers or other major watercourse channels near the Lanigan minesite. Climate at the Lanigan mine is typical for an inland prairie location at latitude 52º North (often characterized as "mid-latitude steppe" climate).

Part of the normal surface infrastructure associated with operating the potash mine in Saskatchewan includes waste disposal on the land and disposal of salt brine into deep subsurface aquifers. Facilities to carry out all aspects of these tasks are in place at Lanigan (see Section 20.0).

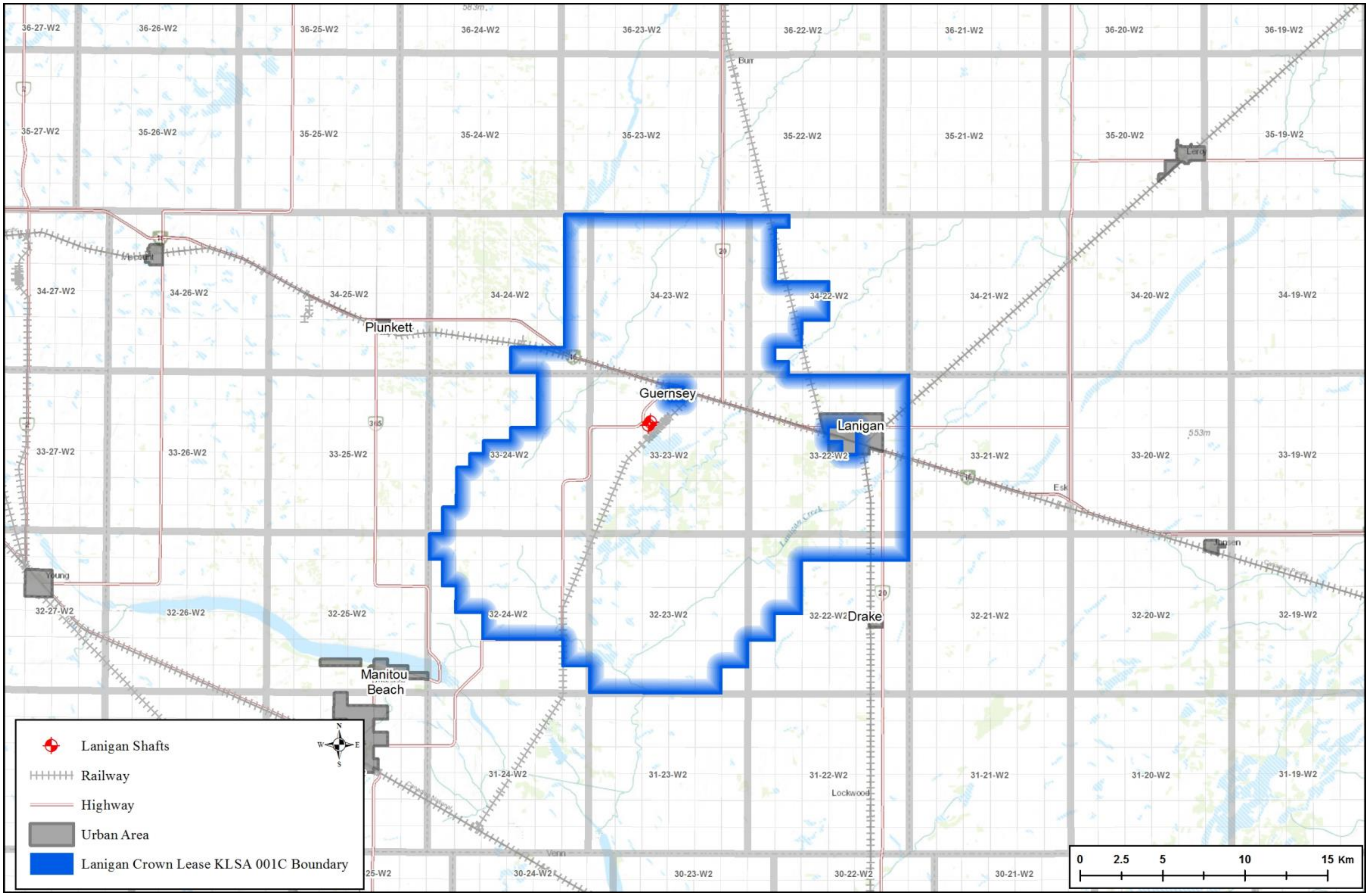


Figure 6: Map showing infrastructure (towns, rivers, roads, and railways) near Lanigan Potash. Lanigan shaft locations are shown by red markers.

6.0 HISTORY

Ten potash mines were brought into production in Saskatchewan in the period 1962 through 1970. With nearly 50 years of production history, most potash mines have contracted or expanded production in response to the demand for potash. No new mines had been commissioned until 2017, when a solution mine and production facility near Moose Jaw, Saskatchewan began production. At present, eight of the eleven operating mines are conventional underground mines, and three operate using solution mining methods.

Exploration drilling for potash in the Lanigan area was carried out in the 1950s and 1960s. The Lanigan mine was built by a company named Alwinsal Potash of Canada Ltd., a consortium of German and French mining and fertilizer companies. Potash production began at Lanigan in 1968 and the mine has run on a continuous basis since then (other than short-term shutdowns taken for inventory management purposes or occasional plant maintenance and construction work). PotashCorp acquired the Lanigan mine in 1976.

Effective January 1, 2018, PotashCorp and Agrium completed the Arrangement. As a result of completing the Arrangement, PotashCorp and Agrium are wholly-owned subsidiaries of Nutrien.

Mill rehabilitation, mine expansion and hoist improvement projects were completed at Lanigan between 2005 and 2010. The expansion construction was carried out without significant disruption to existing potash production from the site.

Both flotation and crystallization methods are used at Lanigan to produce granular, standard and suspension grade potash for agricultural use. The annual nameplate capacity at Lanigan as of December 31, 2018 is 3.8 million tonnes and the annual operational capability is 2.0 million tonnes of concentrated finished potash products.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

Much of southern Saskatchewan is underlain by the Prairie Evaporite Formation, a layered sequence of salts and anhydrite which contains one of the world's largest deposits of potash. The potash extracted from the predominantly sylvinite ore has its main use as a fertilizer. A map showing the extent of the potash deposits in Saskatchewan is shown in Figure 7.

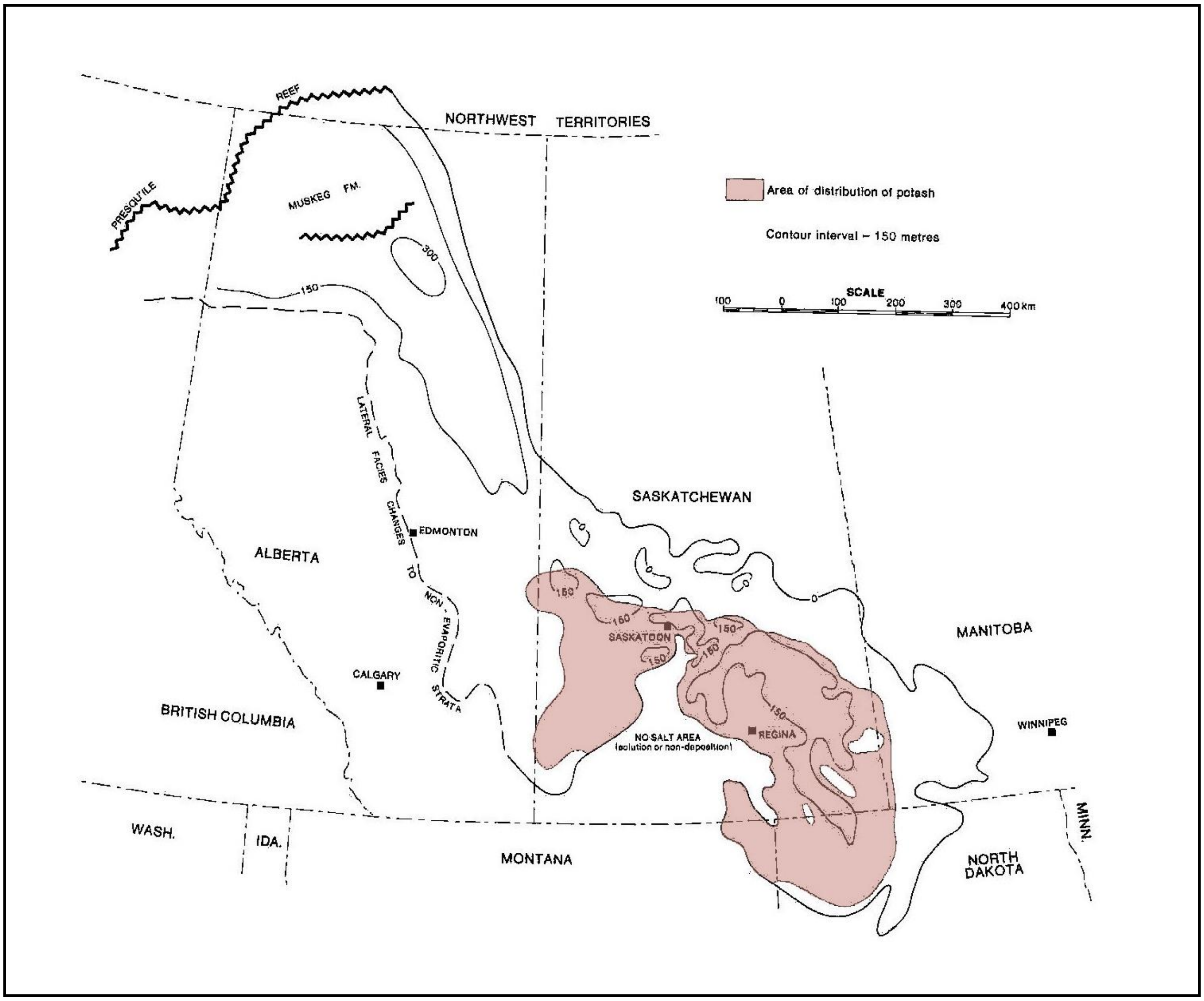


Figure 7: Thickness of the Prairie Evaporite Formation and area of potash distribution within these salts (from Fuzesy, 1982).

The 100 m to 200 m thick Prairie Evaporite Formation is overlain by approximately 500 m of Devonian carbonates, followed by 100 m of Cretaceous sandstone, and 400 m of Cretaceous shales and Pleistocene glacial tills to surface; it is underlain by Devonian carbonates (Fuzesy, 1982). The Phanerozoic stratigraphy of Saskatchewan is remarkable in that units are flat-lying and relatively undisturbed over very large areas. A geological section representing Saskatchewan stratigraphy is shown in Figure 8. A geological section representing the Prairie Evaporite Formation stratigraphy in the Saskatoon area is shown in Figure 9.

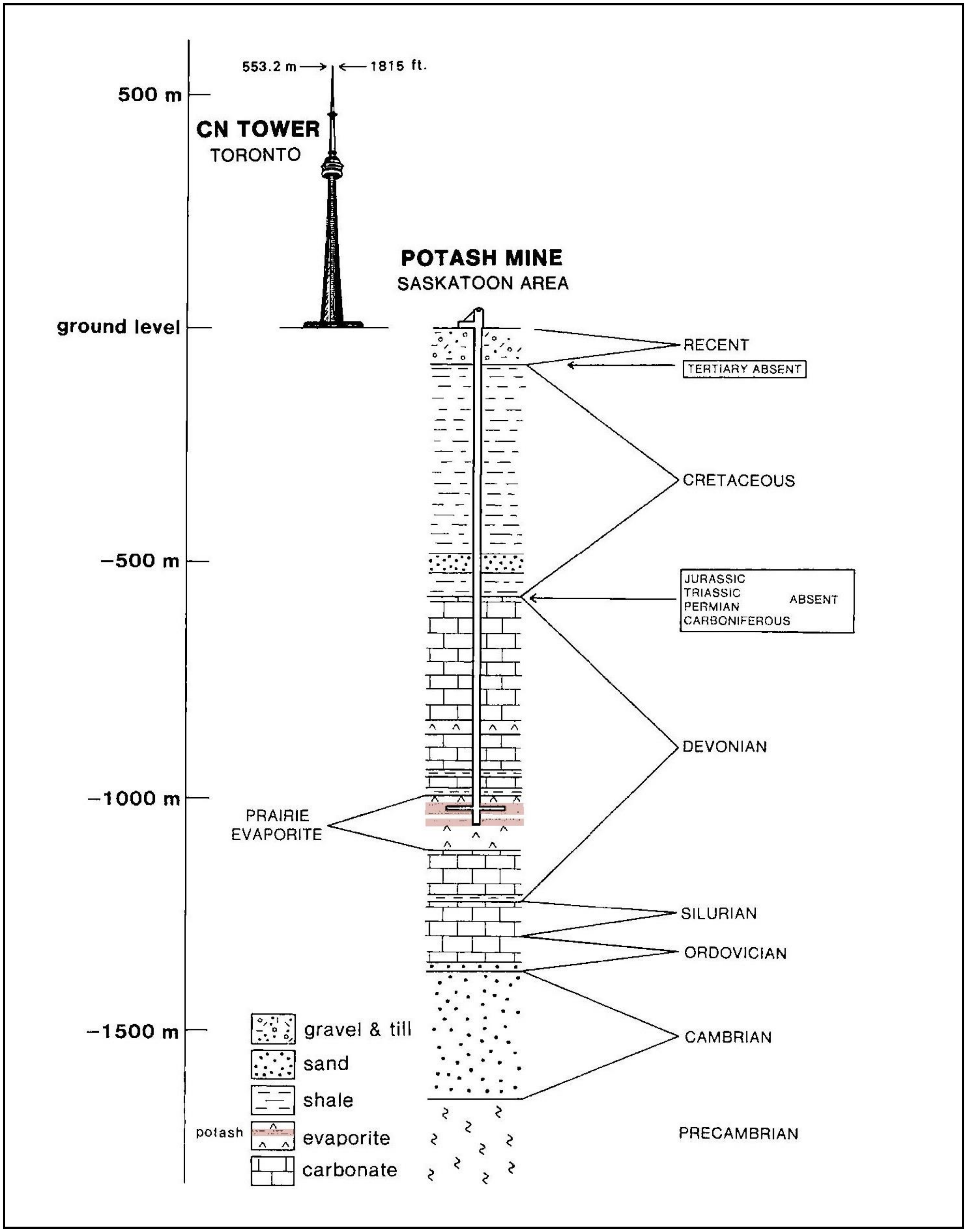


Figure 8: Diagrammatic vertical section showing basic layered-Earth stratigraphy in a typical Saskatchewan potash region (from Fuzesy, 1982).

Potash mineralization in this region of Saskatchewan is predominantly sylvinite, which is comprised mainly of the minerals sylvite (KCl) and halite or rock salt (NaCl), with minor amounts of water insolubles. Carnallite ($KMgCl_3 \cdot 6H_2O$) usually occurs in minor amounts at Lanigan; areas of the B Zone where carnallite layering is sporadically present are avoided through selective mining (i.e. by identifying and avoiding cutting through these layers). Potash fertilizer is concentrated, nearly pure KCl (i.e. greater than 95% pure KCl), but ore grade is traditionally reported on a % K_2O equivalent basis. The "% K_2O equivalent" gives a standard measurement of the nutrient value of different potassium-bearing rocks and minerals. To convert from % K_2O equivalent tonnes to actual KCl tonnes, multiply by 1.58.

Over the past three years (2016, 2017, 2018), the average, measured potash ore grade of the mill feed at Lanigan was 20.9% $K_2$0 equivalent. The average ore grade reported from 19 historic surface drillhole intersections, all within Lanigan Subsurface Mineral Lease KLSA 001 C, is 25.29% $K_2$0 equivalent for A Zone, and 23.21% $K_2$0 equivalent for B Zone (discussed further in Section 10.0). The average A Zone ore grade observed from 1,485 in-mine samples is 23.5% K_2O equivalent, and the average B Zone ore grade observed from 20,230 in-mine samples is 20.3% K_2O equivalent.

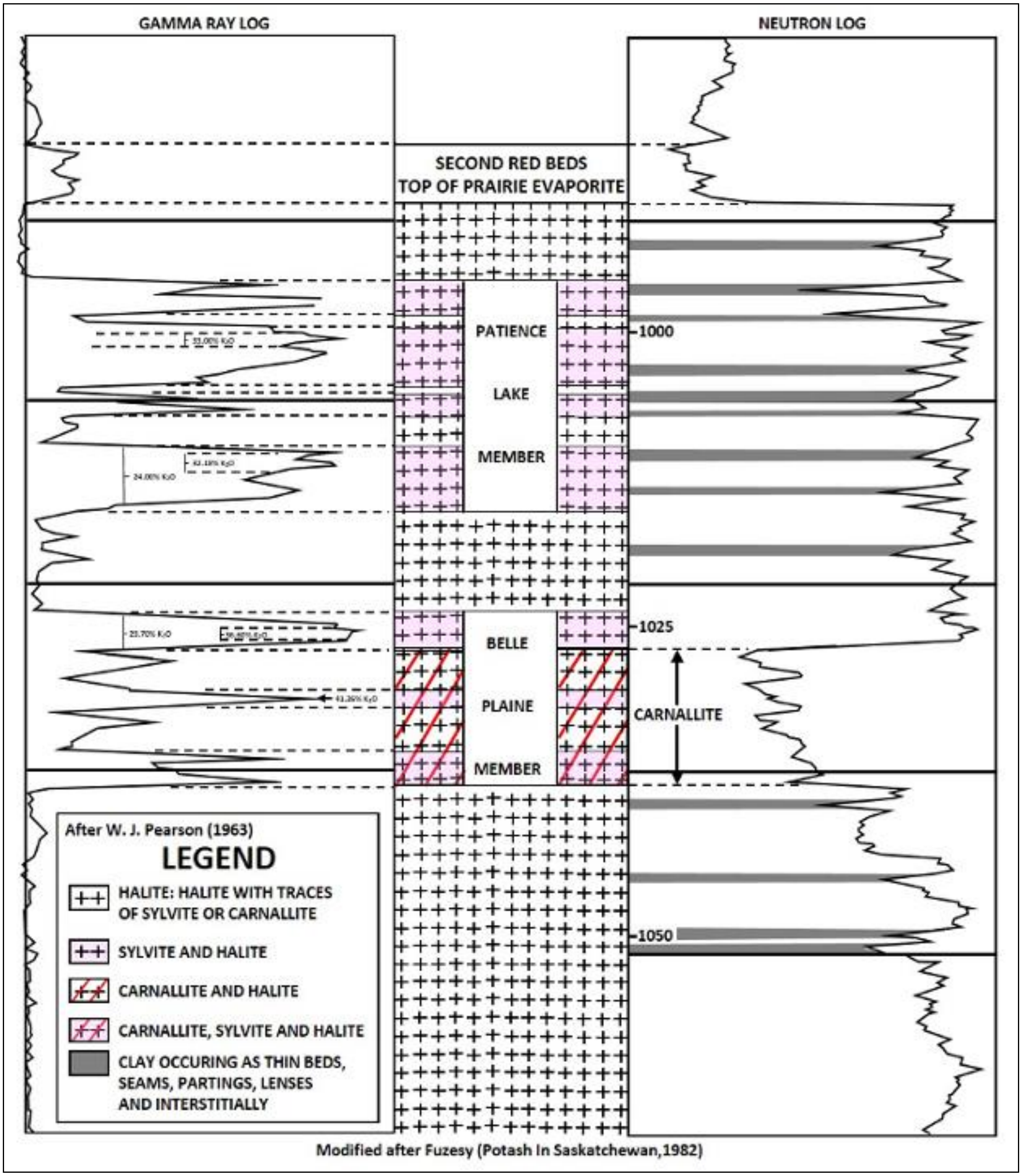


Figure 9: Diagrammatic vertical section showing basic stratigraphy of the Prairie Evaporite Formation in the Saskatoon area (from Fuzesy, 1982).

8.0 DEPOSIT TYPE

There are three mineable potash members within the Prairie Evaporite Formation of Saskatchewan. Stratigraphically highest to lowest, these members are: Patience Lake, Belle Plaine, and Esterhazy. A geological section showing potash members that occur in Saskatchewan is shown in Figure 10.

The Lanigan potash deposit lies within the Patience Lake Member of Prairie Evaporite Formation. There are two potash seams named A Zone and B Zone within this Member; both the A Zone and B Zone are being mined at Lanigan. The Belle Plaine potash member is present at Lanigan but is not economically mineable, while the Esterhazy Member is poorly developed and not economically mineable.

Lanigan potash mineralization occurs at an average of about 990 m depth below surface. Salt cover from the top of the A Zone mining horizon to overlying units is approximately 7 metres thick, and salt cover from the top of the B Zone mining horizon to overlying units is approximately 14 metres thick. The Lanigan mine operates as a conventional, underground potash mine.

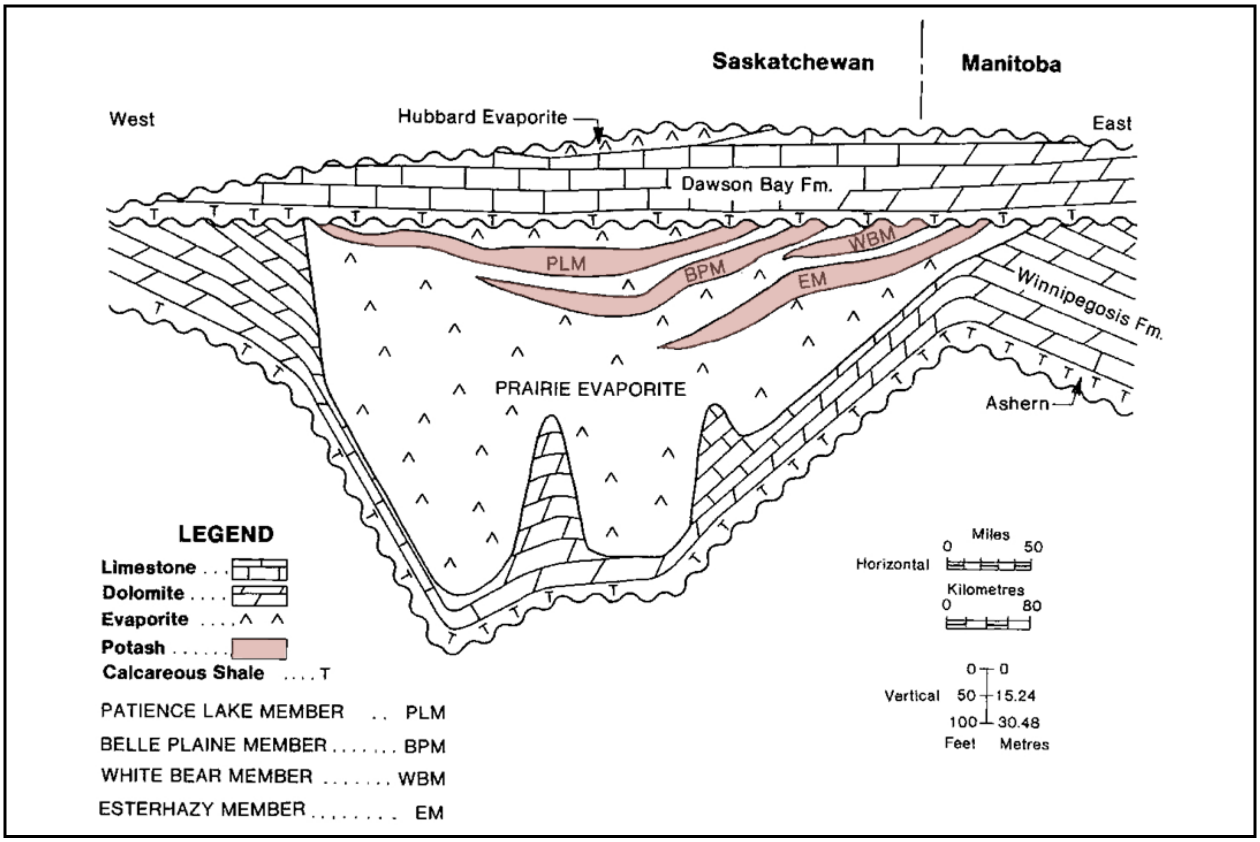


Figure 10: Schematic cross-section across southern Saskatchewan of the Prairie Evaporite Formation showing relative position of potash members. At Lanigan, potash is mined from the Patience Lake Member, labeled "PLM" (from Fuzesy, 1982).

9.0 EXPLORATION

Before the Lanigan mine was established in 1968, all exploration consisted of drilling from surface and analysis of core from these drillholes; drilling results are discussed in Section 10.0. Since mining began in 1968, there have been just seven potash test holes; two of which targeted seismic (geological) anomalies as part of a seismic data verification process. A map showing potash exploration coverage at Lanigan Potash (drillholes, 2D and 3D seismic coverage) is shown in Figure 11. A detailed air photo showing the area around the Lanigan surface operations is shown in Figure 12.

In most of southern Saskatchewan, potash mineralization is in place wherever Prairie Evaporite Formation salts exist, are flat-lying, and are undisturbed. Since the surface seismic exploration method is an excellent tool for mapping the top and bottom of Prairie Evaporite salts, this has become the main potash exploration tool in any existing Saskatchewan Subsurface (potash) Mineral Lease. Historically, 2D seismic, and now the more accurate 3D seismic methods are used to map continuity and extent of potash beds in flat-lying potash deposits. Seismic data are relied upon to identify collapse structures that must be avoided in the process of mine development since these structures can act as conduits for water. As a result, isolation pillars or mining buffer zones are left around these anomalous features. This practice reduces the overall mining extraction ratio, but the risk of inflow to mine workings are effectively mitigated.

A total of 621 linear kilometres of 2D seismic lines have been acquired at Lanigan. A total of 520 square kilometres of 3D seismic have been acquired at Lanigan between 1988 and 2018. The most recent seismic survey was conducted in 2017 and accounted for 10 square kilometres of the total square kilometres stated above.

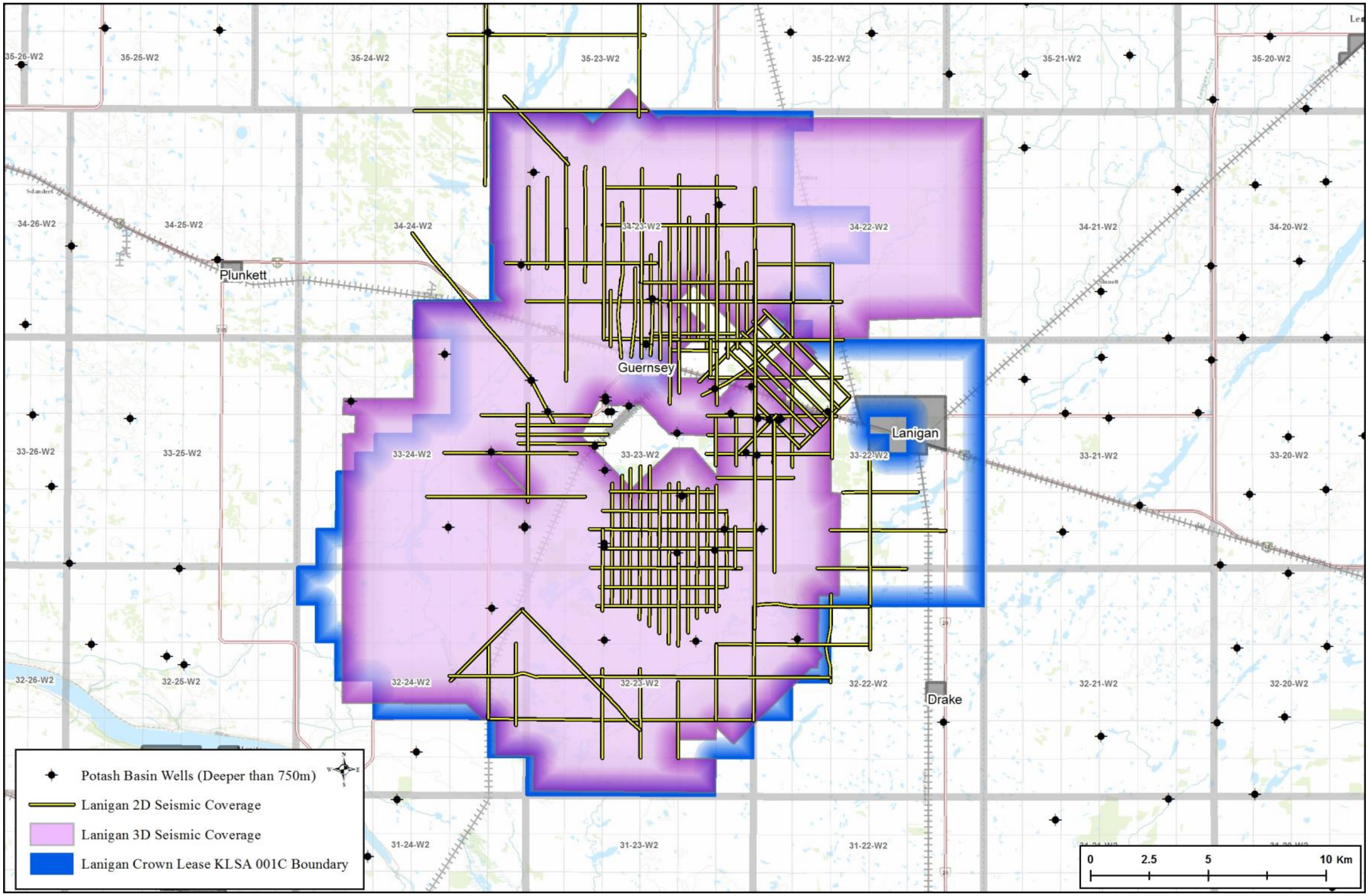


Figure 11: Potash exploration at Lanigan (2D & 3D surface seismic and potash exploration drillholes).

Figure 12: Air photo showing Lanigan Potash surface operations and Tailings Management Area.

A typical seismic section from the Lanigan area is shown in Figure 13. This is a fence section extracted from the "Lanigan 2008" 3D survey. A 2x vertical stretch has been applied to these data. The vertical scale is in metres relative to sea level (SL). The seismic section is coloured with rock velocities computed from the seismic data: blues are slow (shales), reds are fast (carbonates), and pinks / whites are intermediate (sand, salt). Note that the reflectors at both top and bottom of the unit marked Prairie Evaporite (salt) are continuous. This indicates an undisturbed, flat-lying salt within which potash is likely to be found based on 50 years of mining experience at Lanigan. The reflection from a Lanigan mine panel also shows up.

Figure 14 is a detailed (zoomed-in) view of the data plotted in Figure 13. In this figure, mine elevations from the in-mine level survey are added into the seismic data volume; the seismic data were acquired in 2008 and the room plotted in the figure was cut before seismic acquisition.

Experience has shown that the potash mining zone is continuous when seismic data are undisturbed and flat-lying, as shown in Figure 13. Surface seismic data are generally collected three to five years in advance of mining. Any area recognized as seismically unusual is identified early, and mine plans are adjusted to avoid these regions.

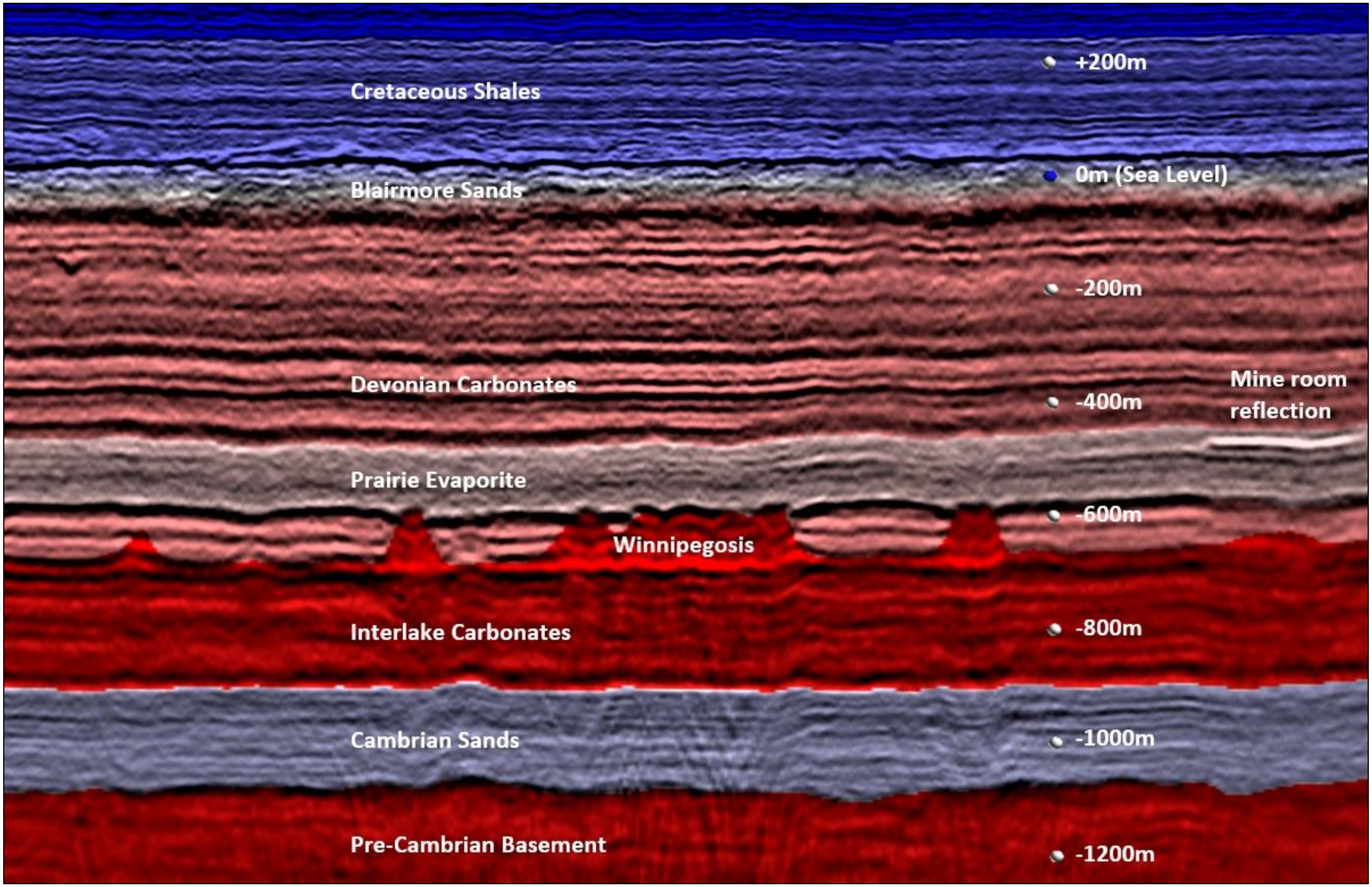


Figure 13: Seismic section from the Lanigan 2008 3D seismic data volume showing relative rock velocities. Sea level (SL) is marked in metres and major geological units are labeled.

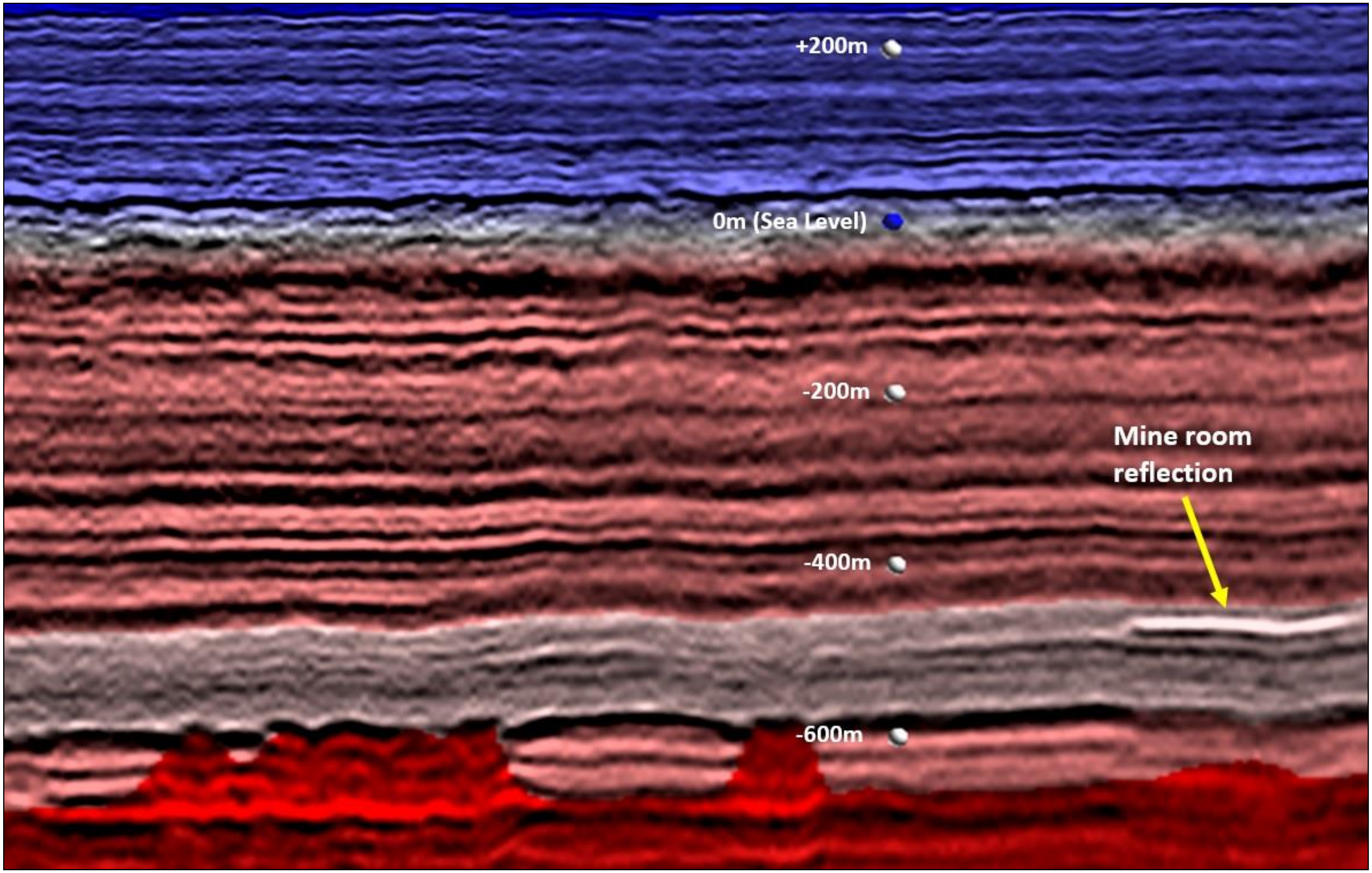


Figure 14: Detail of seismic section from the Lanigan 3D seismic data volume. Actual mine room reflection is marked in yellow. Ground surface is at approximately +500 m above Sea Level.

10.0 DRILLING

For the original Lanigan potash test holes drilled in the 1950s and 1960s, the primary objective of this drilling was to sample the potash horizons to establish basic mining parameters. Seismic surveys (2D) were done sparingly in those days, so the drillhole information was relied upon heavily to evaluate potash deposits. Test holes would penetrate the evaporite section with a hydrocarbon based drilling mud (oil-based or diesel fuel) to protect the potash mineralization from dissolution. Basic geophysical well-logs were acquired, and in many cases, drill stem tests were run on the Dawson Bay Formation to help assess mine inflow potential. Core samples from the targeted potash intersections were split or quartered (cut with a masonry saw) crushed and analysed to establish potash grades.

Drilling activity was limited at Lanigan during the 1970s. In 1973, a single exploration drillhole was completed, although assay results proved to be unusable. Subsequently, in 1975, a second salt water disposal well, from which assay data were taken, was constructed.

In 1981, further exploration drilling was carried out at Lanigan as part of a mine expansion project. Five additional drillholes were completed, following similar drilling and sampling methodologies as the original 1950s and 1960s drillholes. Geophysical well-logging technology had improved and therefore the log suites collected in the 1981 drill program were of better quality than those collected previously. A 2D seismic survey had been carried out prior to the 1981 drilling program. Two of the five drillholes completed in 1981 targeted seismic (geological) anomalies as part of a seismic data verification process. The anomalies were confirmed and areas around these drillholes were excluded from mine development.

Relatively thin interbeds or seams, referred to as clay seams in the potash industry, are an ever-present component of the A Zone and B Zone at Lanigan. Figure 15 shows the basic stratigraphic relationships. These seams, along with the clay or clay-like material disseminated throughout the rock, make up the water insoluble portion of the mineralized horizons. The same sequences of clay seams can be correlated for many kilometres across the central Saskatchewan potash mining district.

At Lanigan, a particular sequence of two clay seams marks the top of the A Zone. A distinct clay seam marks the top of the B Zone; this clay seam is immediately overlain by a much less consistent clay seam referred to as Shadowband at Lanigan. In 2013, Lanigan modified its cutting practices in the B Zone to improve mine roof stability. This modification involved cutting a slightly higher horizon, just above Shadowband, thus removing the hazard associated with the seam. The goal of improved mine roof stability was achieved; however, less potash and more salt is now being mined resulting in a slightly lower reported ore grade for B Zone.

Clay seams are illustrated in Figure 15. These seams are used to guide the vertical positioning of the mining machine. The uppermost portion of the sequence of three seams is maintained at the top of the mining cut to keep the cutting “on grade”. Cutting too high above this upper seam or top marker results in dilution, as lower grade material immediately overlies the production zone. In practice though, the top marker seam is slightly overcut (between 10 cm to 20 cm) to prevent an unstable condition from being created. Clay seams are often planes of weakness, and if they are undercut, material immediately below the clay seam becomes a hazard as it may separate and fall. Since the hazard must be remediated prior to proceeding, thus slowing production, the moderately diluted mineral grade that results from the overcutting is preferable from a safety point of view.

The A Zone mining interval is fixed at 3.66 m (12'). B Zone mining machines have a fixed mining height of 2.74 m (9'). In a normal B Zone production room, ore is extracted in two lifts resulting in a mining height of approximately 4.88 m (16'). These mining heights allow for comfortable working headroom and efficient extraction of potash ore.

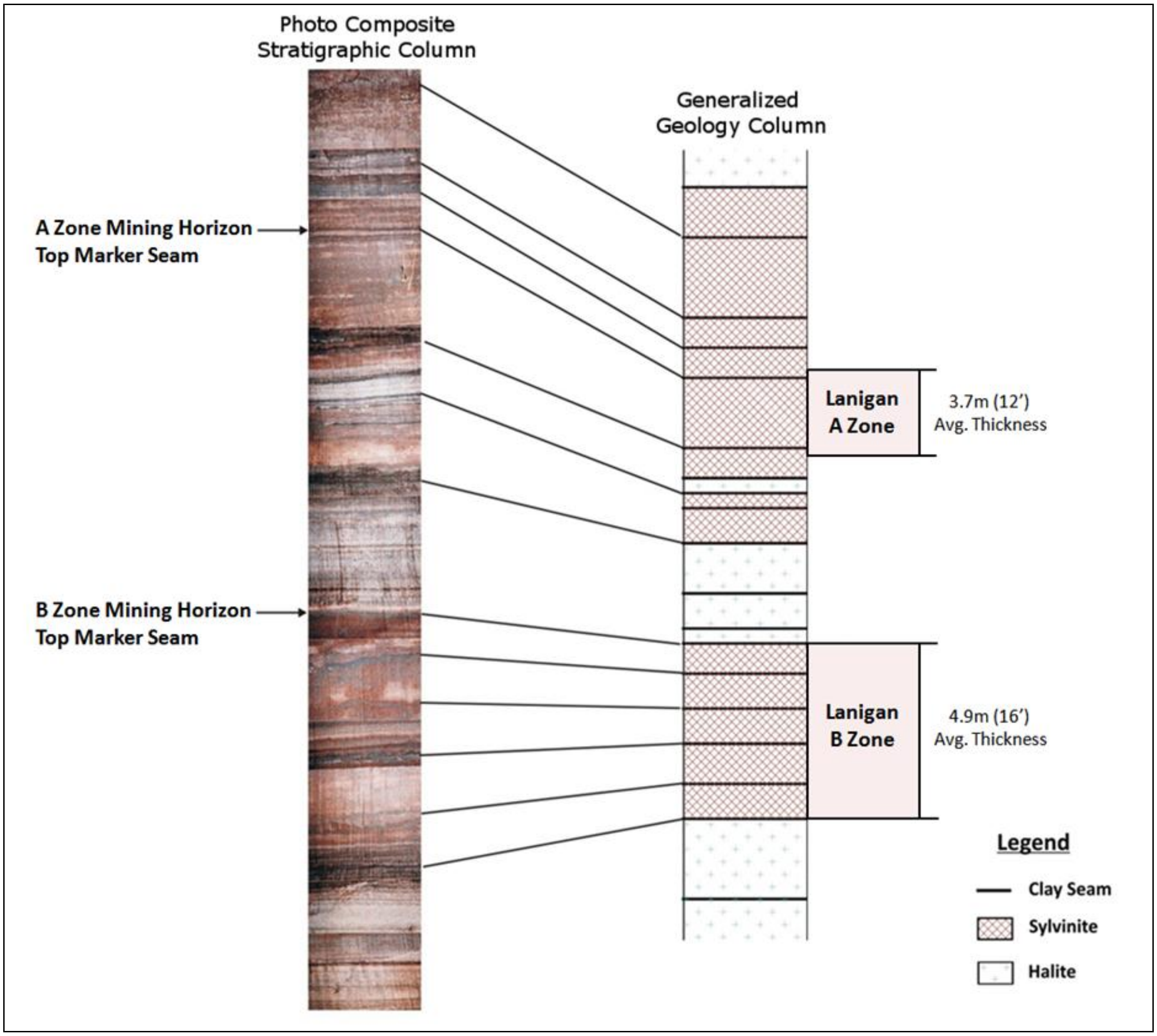


Figure 15: Typical stratigraphic section correlated with composite photos covering both the A Zone and B Zone production intervals.

Drill core assay results were studied by independent consultant David S. Robertson and Associates (1976) and by Nutrien technical staff (see Section 12.1). Results are found in Table 2. The best 3.66 m (12') mining interval in A Zone, and the best approximately 4.88 m (16') mining interval in B Zone was determined from the assay values in each potash test well, using clay marker seams as a guide. Note that while B Zone drillhole assays were derived using intervals of between 4.07 m to 7.30 m averaging 5.08 m, a more conservative mining height of 4.88 m is used for Mineral Resource and Reserve estimates.

The original Lanigan exploration area was explored with 12 test holes spaced at intervals of 1.6 km to 3.4 km (1 – 3 miles). In total, 27 potash test holes have been drilled within Lanigan Lease KLSA 001 C, but only 19 are used in the average ore grade calculation for A Zone in Table 2, and only 19 are used in the average ore grade calculation for B Zone in Table 2. Certain drillholes within KLSA 001 C were not assayed, while others intersected abnormal geology whereby a normal potash zone could not be picked given the limited data available and, therefore, the resulting % K_2O and % water insoluble content could not be evaluated with confidence.

Drillhole assay data for the A Zone at Lanigan gives an estimated mean grade of 25.29% K_2O with 5.78% water insolubles. Drillhole assay data for B Zone at Lanigan gives an estimated mean grade of 23.21% K_2O with 5.59% water insolubles.

Due to the remarkably consistent mineralogy and continuity of the resource, as experienced through 50 years of mine production, very little potash exploration drilling has been done at Lanigan since 1961. Instead of exploration drillholes, seismic surveying has been relied upon more and more to explore ahead of mine development. Where normal Prairie Evaporite sequences are mapped in the seismic data, potash beds have unfailingly been present. Localized, relatively small mine anomalies, not mapped in seismic data do occur. When they do, they are dealt with in the normal course of mining and extraction through these anomalous areas is typically minimized. Anomalies associated with possible water inflow problems, which are mapped in the seismic data, are avoided.

Table 2: Assay results for all potash test holes within Lanigan Lease KLSA 001 C

Location	Year Drilled	A Zone			B Zone		
		Interval (m)	% K_20 Equiv.	% Water Insol.	Interval (m)	% K_20 Equiv.	% Water Insol.
01-29-033-22 W2	1955	3.66	27.68	6	*5.49*	*	*
13-34-033-23 W2	1956	-	*	*	-	*	*
16-12-034-24 W2	1956	-	*	*	*4.51*	*25.77*	*
12-24-034-23 W2	1957	3.66	25.61	2.78	5.12	18.51	2.37
04-28-033-23 W2	1958	3.66	25.87	2.13	*4.85*	*25.75*	*6.3*
04-29-032-22 W2	1959	-	*	*	-	*	*
13-11-033-23 W2	1959	3.66	21.17	9.65	*4.16*	*26.85*	*5.5*
09-26-033-23 W2	1959	3.66	27.33	2.24	*4.51*	*25.18*	*6.6*
03-10-034-23 W2	1959	3.66	22.06	*	*4.07*	*23.97*	*5.7*
01-10-033-24 W2	1959	3.66	27.32	*	*4.92*	*24.58*	*4.2*
04-24-033-24 W2	1959	3.66	25.68	1.91	*5.19*	*24.02*	*5*
13-18-033-22 W2	1960	3.66	26.29	7.1	4.72	22.84	8.15
08-02-033-23 W2	1960	3.66	26.93	7.1	7.59	15.73	5.25
12-04-033-23 W2	1960	3.66	26.53	6.54	*4.76*	*24.61*	*5.8*
12-16-033-23 W2	1960	3.66	23.87	8.4	*4.31*	*25.89*	*4.2*
09-22-033-23 W2	1960	3.66	29.45	5.69	*5.04*	*25.15*	*6.8*
02-30-033-23 W2	1960	-	*	*	-	*	*
13A-30-033-23 W2	1960	3.66	25.36	8.88	7.3	14.79	3.51
01-12-033-24 W2	1960	3.66	24.72	7.33	*5.02*	*26.62*	*4.8*
12-04-033-23 W2	1961	-	*	*	-	*	*
08-03-033-23 W2	1973	-	*	*	-	*	*
01-20-033-23 W2	1975	-	*	*	*5.96*	*22.4*	*5.6*
04-07-033-22 W2	1981	3.66	22.8	4.15	-	*	*
03-26-032-23 W2	1981	3.66	20.59	6.21	4.57	18.8	7.17
04-28-032-23 W2	1981	3.66	25.67	*	4.94	25.59	6.88
16-25-033-23 W2	1981	-	*	*	-	*	*
13-25-032-24 W2	1981	3.66	25.57	6.4	4.88	24.01	6.8
Average (of usable values):		**3.66**	**25.29**	**5.78**	**5.10**	**23.21**	**5.59**

Italicized numbers from Robertson Associates 1976

* Assay sampling incomplete. In drillholes that intersected abnormal potash geology, a normal potash zone could not be picked given the limited data available and, therefore, the resulting % K_2O and % water insoluble content could not be evaluated with confidence.

11.0 SAMPLING METHOD AND APPROACH

11.1 BASIC APPROACH

Exploration in the Lanigan area was conducted in the 1950s and 1960s. A second phase of drilling associated with a mine expansion project occurred in 1981. Sampling and assaying of potash core samples was done using methods considered consistent with standard procedures for potash exploration at these times.

Drillhole sampling methods have remained essentially the same over the years. Potash core samples are acquired as described in earlier sections of this report. Short segments of core usually about 0.3 m (1') in length are labeled based on visible changes in mineralization, and sometimes based on more or less fixed intervals. Each segment of core is then split using some type of rock or masonry saw. The split portion of core is then bagged and labeled and sent to a laboratory for chemical analysis. Historical potash samples remain stored at the Subsurface Geological Laboratory (Regina, Saskatchewan) of the Saskatchewan Ministry of the Economy. Most of these have deteriorated substantially.

An assay plot for drillhole PCS Lanigan 04-28-032-23 W2 is shown below in Figure 16. Similar data were compiled for all historical potash test holes. In the A Zone, the best 3.66 m (12') mining interval intersected in each drillhole, as discussed in Section 10.0, is determined from the assay values using clay seams as a guide. Likewise, the best approximately 4.88 m (16') B Zone mining interval is determined from the assay values using clay seams as a guide. Note that while B Zone drillhole assays were derived using intervals of between 4.07 m to 7.30 m averaging 5.08 m, a more conservative mining height of 4.88 m is used for Mineral Resource and Reserve estimates. Table 3 lists the assay values plotted in Figure 16.

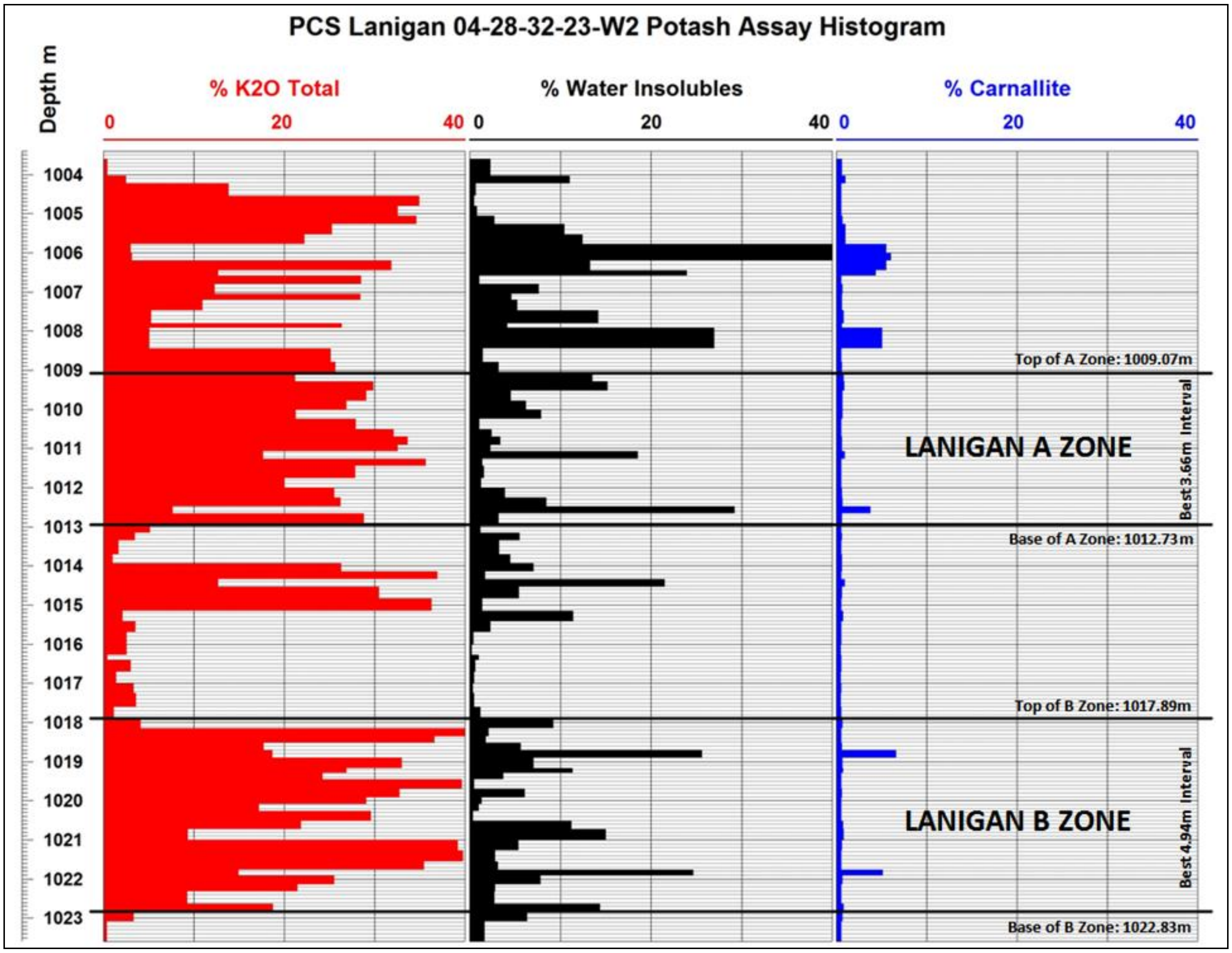


Figure 16: Potash assay plot for drillhole PCS Lanigan 04-28-032-23 W2 indicating the best 3.66 m (12’) mining interval for A Zone and the best 4.94 m (~16’) mining interval for B Zone.

Table 3: Values for potash assay plot in Figure 16.

PCS LANIGAN 04-28-032-23 W2 ASSAY VALUES						
#	Depth (metres)		Interval Thick.	% K_2O Total	% Water Insol.	% Carnallite
	From	To				
20	1008.44	1008.79	0.35	25.19	1.44	0.62
21	1008.79	1009.07	0.28	25.70	3.17	0.65
3.66m (12') A Zone Mining Interval Top of Zone: 1009.07m						
22	1009.07	1009.28	0.21	21.20	13.53	0.83
23	1009.28	1009.52	0.24	29.88	15.22	0.91
24	1009.52	1009.78	0.26	29.10	4.54	0.70
25	1009.78	1010.02	0.24	26.92	6.21	0.73
26	1010.02	1010.25	0.23	21.29	7.89	0.75
27	1010.25	1010.51	0.26	27.95	1.10	0.59
28	1010.51	1010.70	0.19	32.16	2.43	0.63
29	1010.70	1010.90	0.20	33.66	3.36	0.64
30	1010.90	1011.07	0.17	32.55	2.32	0.64
31	1011.07	1011.27	0.20	17.70	18.58	1.02
32	1011.27	1011.45	0.18	35.68	1.42	0.61
33	1011.45	1011.76	0.31	27.86	1.61	0.61
34	1011.76	1012.00	0.24	20.08	1.27	0.59
35	1012.00	1012.25	0.25	25.55	3.91	0.65
36	1012.25	1012.48	0.23	26.26	8.48	0.74
37	1012.48	1012.66	0.18	7.69	29.24	3.85
38s	1012.66	1012.73	0.07	28.82	3.22	0.65
3.66m (12') A Zone Mining Interval Base of Zone: 1012.73m						
38s	1012.73	1012.95	0.220	28.82	3.22	0.65
39	1012.95	1013.16	0.210	5.17	1.22	0.59
3.66m (12') A Zone Mining Interval Weighted Average				**26.08**	**7.29**	**0.89**
56	1017.25	1017.61	0.36	3.64	0.50	0.56
57	1017.61	1017.89	0.28	1.17	1.17	0.57
4.94m (16') B Zone Mining Interval Top of Zone: 1017.89m						
58	1017.89	1018.15	0.26	4.16	9.23	0.72
59	1018.15	1018.37	0.22	41.05	2.11	0.62
60	1018.37	1018.53	0.16	36.65	1.80	0.61
61	1018.53	1018.71	0.18	17.76	5.61	0.68
62	1018.71	1018.90	0.19	18.74	25.62	6.67
63	1018.90	1019.17	0.27	33.02	7.08	0.70
64	1019.17	1019.30	0.13	26.88	11.37	0.80
65	1019.30	1019.45	0.15	24.28	3.74	0.63
66	1019.45	1019.69	0.24	39.66	0.50	0.59
67	1019.69	1019.93	0.24	32.77	6.10	0.67
68	1019.93	1020.08	0.15	29.12	1.36	0.59
69	1020.08	1020.27	0.19	17.23	0.98	0.59
70	1020.27	1020.52	0.25	29.59	0.35	0.58
71	1020.52	1020.74	0.22	21.84	11.25	0.79
72	1020.74	1021.00	0.26	9.38	15.03	0.84
73	1021.00	1021.27	0.27	39.20	5.39	0.66
74	1021.27	1021.56	0.29	39.83	2.81	0.63
75	1021.56	1021.77	0.21	35.50	3.11	0.63
76	1021.77	1021.92	0.15	14.97	24.66	5.21
77	1021.92	1022.14	0.22	25.56	7.85	0.73
78	1022.14	1022.32	0.18	21.47	2.80	0.62
79	1022.32	1022.63	0.31	9.32	2.73	0.61
80	1022.63	1022.83	0.20	18.75	14.41	0.87

4.94m (16’) B Zone Mining Interval Base of Zone: 1022.83m						
81	1022.83	1023.09	0.26	3.38	6.33	0.70
82	1023.09	1023.59	0.50	0.39	1.62	0.57
4.94m (~16’) B Zone Mining Interval Weighted Average				**25.59**	**6.88**	**1.04**

A total of 1,485 A Zone in-mine ore grade samples, and 20,230 B Zone in-mine ore grade samples were collected at Lanigan to the end of December 2017 (discussed further in Section 11.2). All in-mine samples were analysed in the Lanigan mill laboratory using analysis techniques that were up-to-date for the era in which the sample was collected.

Regarding quality assurance for analytical results of in-mine samples, the Company participates in the Saskatchewan Potash Producers Association (SPPA) Sample Exchange Program to monitor the accuracy of analytical procedures used in its labs. In the early 1970s, the SPPA initiated a round-robin Sample Exchange Program, the purpose of which was to assist the potash laboratories in developing a high level of confidence in analytical results. This program has continued up to the present, and participants include all major Canadian potash mine site labs, the Nutrien Pilot Plant Lab, and an independent surveyor lab. The Sample Exchange Program provides the participants with three unknown potash samples for analysis four times per year. Results for the unknown sample analysis are correlated by an independent agency that distributes statistical analysis and a summary report to all participants. Completed SPPA samples can be used for control standards as required in QA/QC sections of standard analytical procedures.

The Nutrien Pilot Plant is secured in the same way as modern office buildings are secured. Authorized personnel have access and visitors are accompanied by staff. No special security measures are taken beyond that. Currently, no external laboratory certification is held by the Nutrien Pilot Plant. On occasion, product quality check samples are sent to the Saskatchewan Research Council, a fully certified analytical facility.

In the opinion of the authors, the sampling methods are acceptable, are consistent with industry standard practices, and are adequate for Mineral Resource and Reserve estimation purposes.

11.2 MEAN POTASH MINERAL GRADE FROM IN-MINE SAMPLES

In the Lanigan A Zone, in-mine grade samples are taken from the floor at the start of every cutting sequence. This is equivalent to a sample taken approximately every 23 m (76’) in production panels, and a sample taken approximately every 47 m (155’) in development panels. Since mining began in the A Zone in 2007 through to the end of December 2017, a total of 1,485 in-mine potash mineral grade samples were collected from the Lanigan A Zone. In- mine samples collected and analysed in 2018 contributed no meaningful change to the overall mineral ore grade. All samples were analysed in the Lanigan mill laboratory using up-to-date analysis techniques. Figure 17 shows a histogram of A Zone in-mine grade sample results from the Lanigan mine.

The median ore grade for this family of in-mine samples is 24.5% K_2O equivalent and the mean ore grade is 23.5%. This is considered to be a more representative estimate of expected potash ore grade in the A Zone at Lanigan than drillhole assay results presented in Section 10.0.

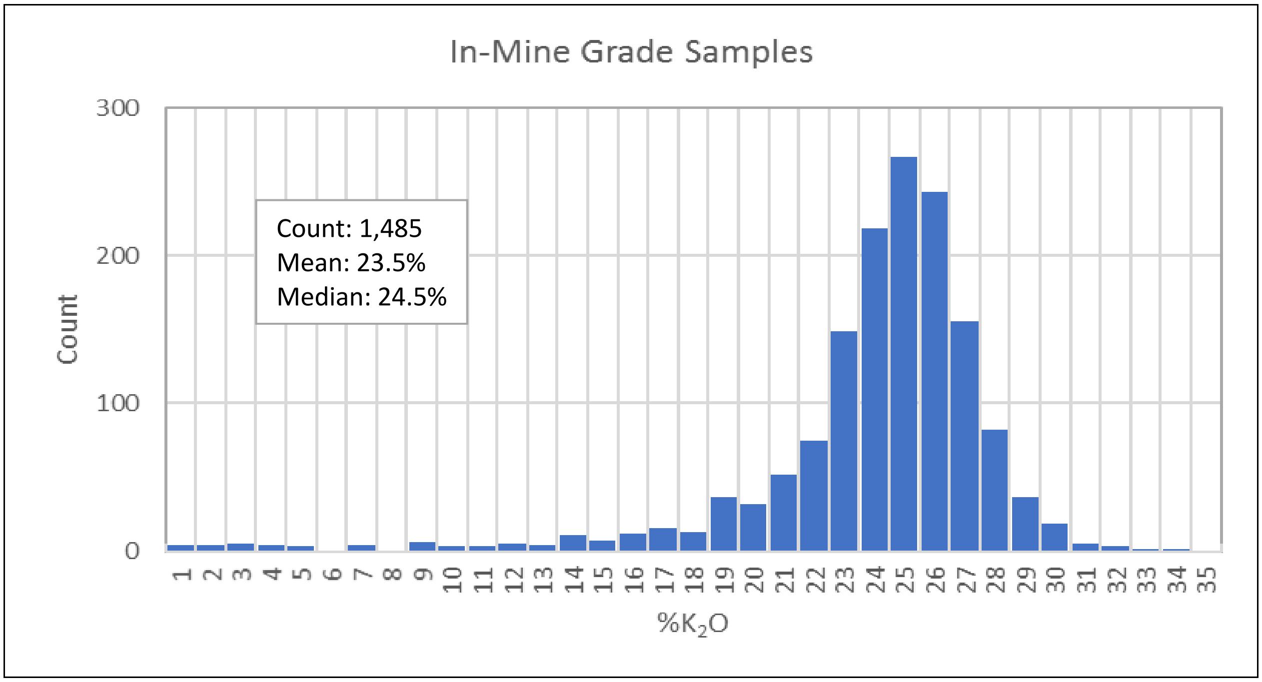


Figure 17: Histogram of potash ore grade from 1,485 A Zone in-mine grade samples at Lanigan (data from 2007 through to the end of December 2017).

In the Lanigan B Zone, in-mine grade samples are taken from the floor every 60 m (200') in newly mined rooms. In-mine grade data is available from 1999 through to the end of December 2017. A total of 20,230 in-mine potash mineral grade samples were collected from the Lanigan B Zone. In-mine samples collected and analysed in 2018 contributed no meaningful change to the overall mineral ore grade. All samples were analysed in the Lanigan mill laboratory using analysis techniques that were up-to-date for the era in which the sample was collected. Figure 18 shows a histogram of B Zone in-mine grade sample results from the Lanigan mine.

The median ore grade for this family of in-mine samples is 20.8% K_2O equivalent and the mean ore grade is 20.3%. This is considered to be a more representative estimate of expected potash ore grade in the B Zone at Lanigan than drillhole assay results presented in Section 10.0.

In 2013, Lanigan modified its cutting practices in the B Zone to improve mine roof stability. This modification involved cutting in a slightly higher, but more stable horizon (described in more detail in Section 10.0). The goal of improved mine roof stability was achieved, however, less potash and more salt is now being mined resulting in a slightly lower reported ore grade for B Zone.

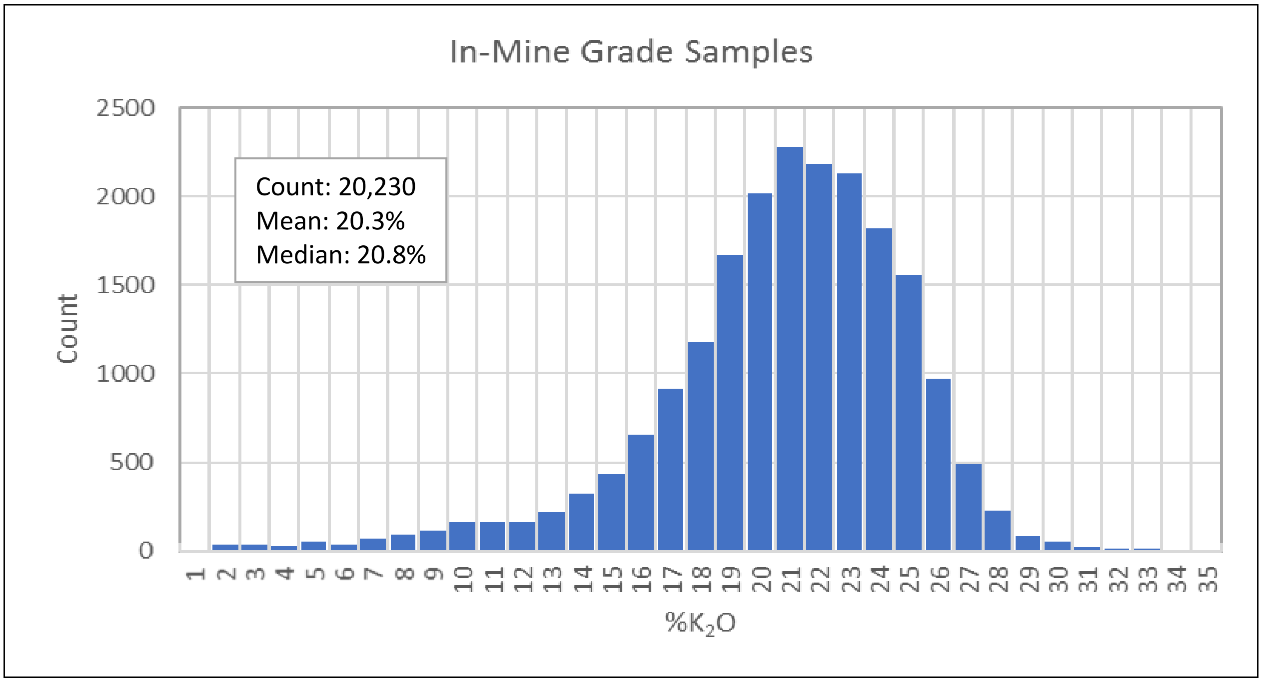


Figure 18: Histogram of potash ore grade from 20,230 B Zone in-mine grade samples at Lanigan (data from 1999 through to end of December 2017).

11.3 POTASH ORE DENSITY FROM IN-MINE MINERAL GRADE MEASUREMENTS

An estimate of in-situ rock density is used to calculate potash mineralization volumes in Mineral Resource and Reserve assessments. A common approach is to determine in-place Mineral Resource and Reserve volumes (m^3) to a certain degree of confidence, then multiply this number by in-situ bulk-rock density (kg / m^3) to give in-place Mineral Resource and Reserve tonnes. However, establishing an accurate bulk-rock density value is not an easy or trivial task. Well-log data from drillholes can be used for this if accurate and calibrated well-logs are acquired during exploration drilling. In practical terms, modern well-logs tend to meet these criteria, but historic well-logs (collected before the 1990s) do not. In Saskatchewan, almost all potash exploration drilling took place in the 1950s and 1960s, well before density logs were accurate and reliable.

Another approach is to look up density values for the minerals which constitute potash rock – values determined in a laboratory to a high degree of accuracy and published in reliable scientific journals / textbooks – then apply these densities to the bulk-rock in some way. Given that the density of each pure mineral is quantified and known, the only difficult aspect of this approach is determining what proportion of each mineral makes up the bulk-rock at a particular sample location. This is the methodology that was used to determine an estimate of bulk-rock density for the Lanigan B Zone. An obvious benefit of this approach is that a mean value computed on the distribution shown in Figure 18 (20,230 sample points) has a much greater confidence interval than a mean value computed from 19 drillhole assays.

The main mineralogical components of the ore zones of Saskatchewan's Prairie Evaporite Formation are:

- Halite – NaCl
- Sylvite – KCl
- Carnallite – $KMgCl_3 \cdot 6(H_2O)$
- Insolubles – dolomite, muscovite, clinochlore, potassium feldspar, illite, quartz, anhydrite, and other minor mineral components

All Nutrien potash facilities measure and record the in-mine % K_2O grade and insoluble content of the mined rock. In addition, carnallite content is also measured at Lanigan since it can be a component of the lower portion of the B Zone. Selective mining is generally employed when carnallite is encountered in B Zone production mining. This is performed by taking only a single lift with the mining machine through the upper portion of the B Zone mining horizon, leaving much of the carnallite mineralization in the floor unmined. The B Zone carnallite that does remain in the ore stream is accounted for during analysis. From this set of measurements, the density of the ore can be estimated. The required composition and mineral density information for each mineral component is given below (Webmineral Mineralogy Database):

Halite – NaCl

- Na 39.34%
- Cl 60.66%
- Oxide form Na_2O 53.03%
- Mineral density 2170 kg / m^3

Sylvite – KCl

- K 52.45%
- Cl 47.55%
- Oxide form K_2O 63.18%
- Mineral density 1990 kg / m^3

Carnallite – $KMgCl_3 \cdot 6H_2O$

- K 14.07%
- Mg 8.75%
- H 4.35%
- Cl 38.28%
- O 34.55%
- Oxide form K_2O 16.95%
- Oxide form MgO 14.51%
- Oxide form H_2O 38.90%
- Mineral density 1600 kg / m^3

Insolubles (Lanigan B Zone)

- Component minerals: dolomite, muscovite, clinochlore, potassium feldspar, illite, quartz, anhydrite, and other minor mineral components
- Average density 2870 kg / m^3 (Nutrien Pilot Plant, 2018)

Note that the estimate of the value for insoluble density is based on known densities of the constituent parts of the insoluble components of B Zone mineralization and the average occurrence of these insoluble components, which is known from the nearly 50 years of mining experience at Lanigan. Assuming the lowest plausible density of insolubles known for Saskatchewan potash deposits of this nature, the effect upon overall bulk-rock ore density and reserve calculations would be negligible.

The mineral composition of B Zone potash ore is halite, sylvite, carnallite and insolubles. The effect of % K_2O as carnallite is removed from the total % K_2O measurements leaving % K_2O values that are only due to sylvite. From 20,230 Lanigan B Zone in-mine grade samples, raw ore composition is:

% Sylvite = 30.8 (converted from % K_2O)
% Insolubles = 4.8
% Carnallite = 4.9

The percent of halite is assumed to be:

% Halite = (100 - % Sylvite - % Insol. - % Carnallite)
= (100 – 30.8 - 4.8 – 4.9)
= 59.5

Applying this methodology, and using these mean grade data gives a mean bulk-rock density for Lanigan B Zone potash of:

$\mathbf{RHO_{bulk\text{-}rock}}$ = (Halite density * % Halite) +
(Sylvite density * % Sylvite) +
(Carnallite density * % Carnallite) +
(Insol. density * % Insol.)
= (2170 * % Halite) +
(1990 * % Sylvite) +
(1600 * % Carnallite) +
(2870 * % Insol.)
= 2120

$\mathbf{RHO_{bulk\text{-}rock}}$ (Lanigan B Zone) = 2120 kg / $\mathbf{m^3}$

This method is as accurate as the B Zone ore grade measurements and mineral density estimates.

To date, not enough A Zone mining has been carried out at Lanigan to permit the calculation of a proper in-situ bulk-rock potash density based solely on in-mine grade samples. A Zone mining has proven successful at Lanigan and takes place in several different geographic locations within the Mineral Lease. Therefore, it is likely that, in the future, enough in-mine samples will be available to support the calculation of an accurate in-situ bulk-rock density for A Zone potash ore. However, in the interim, Allan Potash's in-situ bulk-rock density for A Zone potash is used; this has been calculated using 6,738 in-mine samples from the Allan A Zone:

$$\mathbf{RHO_{bulk\text{-}rock}\ (Lanigan\ A\ Zone) = RHO_{bulk\text{-}rock}\ (Allan\ A\ Zone) = 2110\ kg\ /\ m^3}$$

This estimate is considered acceptable since both Allan A Zone and Lanigan A Zone are the same potash seam. Should the Lanigan A Zone bulk density change from the predicted value of 2110 kg / m^3, the later defined Lanigan A Zone Mineral Resources and Reserves in Sections 14.2 and 15.2 will also change, albeit, insignificantly.

12.0 DATA VERIFICATION

12.1 ASSAY DATA

Original drill core assays were studied by independent consultant David S. Robertson and Associates (1976). The original assay results for core samples from historical drillholes were taken as accurate in these studies, as there is no way to reliably reanalyse these samples. Most of the remaining samples in storage have long since deteriorated to the point where they are not usable. Robertson (1976) assay analyses for the A Zone are not reported in Section 10.0 as they assumed a 3.4 m (11') mining interval. Instead, Nutrien technical staff Jennifer Scott (P. Geo.) and Tanner Soroka (P. Geo.) reevaluated the historical assay results from the A Zone using a 3.66 m (12') mining interval, the mining height currently used in the Lanigan A Zone. Robertson (1976) assay analyses for the B Zone are reported in Section 10.0. Former Company staff evaluated assay results from potash test holes drilled in 1981.

Ore grades of in-mine samples are measured inhouse at the Lanigan mine laboratory by Company staff using modern, standard chemical analysis tools and procedures; an independent agency does not verify these results. However, check sampling through the SPPA program, discussed in Section 11.1, does occur.

It should be noted that assay results from historical drillholes match mine sample results closely – within approximately 0.9% for A Zone and 1.4% for B Zone – even though sample spacing is obviously much greater in the case of drillholes. This fact is a validation of the methodology. Based on 50 years of in-mine experience at Lanigan, historical assay results are considered acceptable and provide a good basis for estimating ore grade in areas of future mining at Lanigan. However, the A Zone mean mineral grade of 23.5% K_2O equivalent determined from 1,485 in-mine grade samples, and the B Zone mean mineral grade of 20.3% K_2O equivalent determined from 20,230 in-mine grade samples is thought to provide the most accurate measurement of potash grade for the Lanigan mine.

12.2 EXPLORATION DATA

The purpose of any mineral exploration program is to determine extent, continuity, and grade of mineralization to a certain level of confidence and accuracy. For potash exploration, it is important to minimize the amount of cross-formational drilling, since each drillhole is a potential conduit for subsurface groundwater from overlying (or underlying) water-bearing formations into future mine workings. Every potash test hole from surface sterilizes potash mineralization; a safety pillar is required around every surface drillhole once underground mining commences. This is the main reason that minimal exploration drilling has been carried out at Lanigan in recent years.

Initial sampling and assaying of cores was done during potash exploration at Lanigan in the 1950s and 1960s. Methods were consistent with standard procedures for that era. The mine began production in 1968 and, with the exception of a potash test hole in 1975 and six potash test holes in 1981, no further core drilling has been carried out since then. This approach to potash sampling is in accordance with widely accepted industry practice for areas adjacent and contiguous to an existing operating potash mine.

Assay of physical samples (drillhole cores and / or in-mine samples) is the only way to gain information about mineral grade, but extent and continuity of mineralization are correctly determined using data collected from geophysical surveys correlated with historic drilling information. To date, surface seismic data at Lanigan have been collected, analysed, and verified by Company staff, at times, in cooperation with an independent consultant. Ultimate responsibility for final analyses including depth conversion (seismic depth migration), as well as the accuracy of these data, rests with Nutrien qualified persons.

Data for the Mineral Resource and Reserve estimates for Lanigan mine reported in Sections 14.0 and 15.0 were verified by Nutrien staff as follows:

- Annual review of potash assay sample information (drillholes and in-mine grade samples),
- Annual review of surface geophysical exploration results (3D and 2D seismic data),
- Annual crosscheck of mined tonnages reported by minesite technical staff with tonnages estimated from mine survey information, and
- Annual crosscheck of Mineral Resource and Reserve calculations carried out by corporate technical staff.

This approach to data verification of potash mineral grade and surface seismic information is in accordance with generally accepted industry practice for areas adjacent and contiguous to an existing operating potash mine.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

At Lanigan, potash ore has been mined and concentrated to produce saleable quantities of high-grade finished potash products since 1968. Products include granular, standard and suspension grade potash for agricultural use.

Over the 50-year mine life, 207.762 million tonnes of potash ore have been mined and hoisted to produce 60.276 million tonnes of finished potash product (from startup in 1968 to December 31, 2018). Given this level of sustained production over 50 years, basic mineralogical processing and prospective metallurgical testing of Lanigan potash is not considered relevant.

See also Section 17.0.

14.0 MINERAL RESOURCE ESTIMATES

14.1 DEFINITIONS OF MINERAL RESOURCE

The Canadian Institute of Mining and Metallurgy and Petroleum (CIM) has defined Mineral Resource in *The CIM Definition Standards for Mineral Resources and Reserves* (2014) as:

1) **Inferred Mineral Resource:** that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

2) **Indicated Mineral Resource**: that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade quality continuity between points of observation.

3) **Measured Mineral Resource**: that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

CIM defines Modifying Factors as “considerations used to convert Mineral Resources into Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.”

In south-central Saskatchewan, where geological correlations are straightforward, and within a (potash) Subsurface Mineral Lease with an operating potash mine, Mineral Resource categories are generally characterized by PotashCorp as follows:

1) **Inferred Mineral Resource**: areas of limited exploration, such as areas that have been investigated through regional geological studies, or areas with 2D regional surface seismic coverage, little or no drilling, at some distance from underground workings, and within Crown Subsurface Mineral Lease KLSA 001 C.

2) **Indicated Mineral Resource:** areas of adequate exploration, such as areas with 3D surface seismic coverage, little or no drilling, at some distance from underground workings, and within Crown Subsurface Mineral Lease KLSA 001 C.

3) **Measured Mineral Resource:** areas of detailed, physical exploration through actual drilling or mine sampling, near existing underground workings, and within Crown Subsurface Mineral Lease KLSA 001 C.

The mine began production in 1968, and since then just seven potash exploration drillholes have been drilled in the Lanigan lease area; two of which are unusable for assay analysis (see Section 10.0). Instead, exploration involved collecting surface seismic data, which became better in quality over the years. Exploration drilling has demonstrated the presence of the potash horizon, and seismic coverage shows the continuity of the Prairie Evaporite Formation within which the potash horizon occurs.

Along with this approach, analysis of in-mine samples for potash grade has provided an observation-based understanding of the potash mineralized zones at Lanigan that is far superior to the level of understanding provided by any surface drilling based exploration program. The authors believe that this approach provides a body of information that guides and constrains exploration inferences in a much better way than could be achieved from any conventional exploration investigation in areas immediately surrounding, and contiguous to, the Lanigan potash mine.

14.2 LANIGAN POTASH RESOURCE CALCULATIONS

Exploration information used to calculate reported Mineral Resource tonnages at Lanigan consist of both physical sampling (drillhole and in-mine) and surface seismic (2D and 3D) as discussed in earlier sections. Based on the definitions and guidelines in Section 14.1, all mineral rights leased or owned by the Company, and within Crown Subsurface Mineral Lease KLSA 001 C, are assigned to one of the three Mineral Resource categories.

Mineral Resources are reported as mineralization in-place and are exclusive of Mineral Reserves. In-place tonnes were calculated for each of the Mineral Resource categories using the following parameters:

Mining Height (A Zone):	3.66 metres (12')
Mining Height (B Zone):	4.88 metres (16')
Ore Density (A Zone):	2.110 tonnes / cubic metre
Ore Density (B Zone):	2.120 tonnes / cubic metre

The Mineral Resources for Lanigan, as of December 31, 2018 are as follows:

Lanigan A Zone:

Inferred Resource	671	millions of tonnes
Indicated Resource	1,325	millions of tonnes
Measured Resource	2,142	millions of tonnes
Total A Zone Resource	4,137	millions of tonnes

Lanigan B Zone:

Inferred Resource	899	millions of tonnes
Indicated Resource	1,775	millions of tonnes
Measured Resource	2,578	millions of tonnes
Total B Zone Resource	5,251	millions of tonnes

Total for Lanigan (A Zone + B Zone):

Inferred Resource	1,570	millions of tonnes
Indicated Resource	3,099	millions of tonnes
Measured Resource	4,719	millions of tonnes
Total A Zone + B Zone Resource	9,390	millions of tonnes

Lanigan Mineral Resources are plotted in Figure 19.

The average mineral grade of the Lanigan A Zone Mineral Resource is 23.5% K_20 equivalent, and was determined from 1,485 in-mine samples at Lanigan. The average mineral grade of the Lanigan B Zone Mineral Resource is 20.3% K_20 equivalent, and was determined from 20,230 in-mine samples at Lanigan. See Section 11.2 for more detail.

The tonnage reported as Lanigan A Zone Measured Resource is comprised of both potash ore that is within 1.6 km (1 mile) of A Zone mine workings, and potash ore that is left behind as pillars in mined-out areas of the A Zone at Lanigan. Also included as Lanigan A Zone Measured Resource is the potash ore within 1.6 km (1 mile) of drillholes for which A Zone assay results are available.

Similarly, the tonnage reported as Lanigan B Zone Measured Resource is comprised of both potash ore that is within 1.6 km (1 mile) of B Zone mine workings, and potash ore that is left behind as pillars in mined-out areas of the B Zone at Lanigan. Also included as Lanigan B Zone

Measured Resource is the potash ore within 1.6 km (1 mile) of drillholes for which B Zone assay results are available.

In a potash mine, it is common practice to consider mining remnant pillar mineralization using solution methods after conventional mining is complete, or after a mine is lost to flooding. The Patience Lake mine was successfully converted from a conventional mine to a solution mine after being lost to flooding in 1989. Since conversion to a solution mine is not anticipated in the near future at Lanigan, in-place pillar mineralization remains as a Mineral Resource rather than a Mineral Reserve at this time.

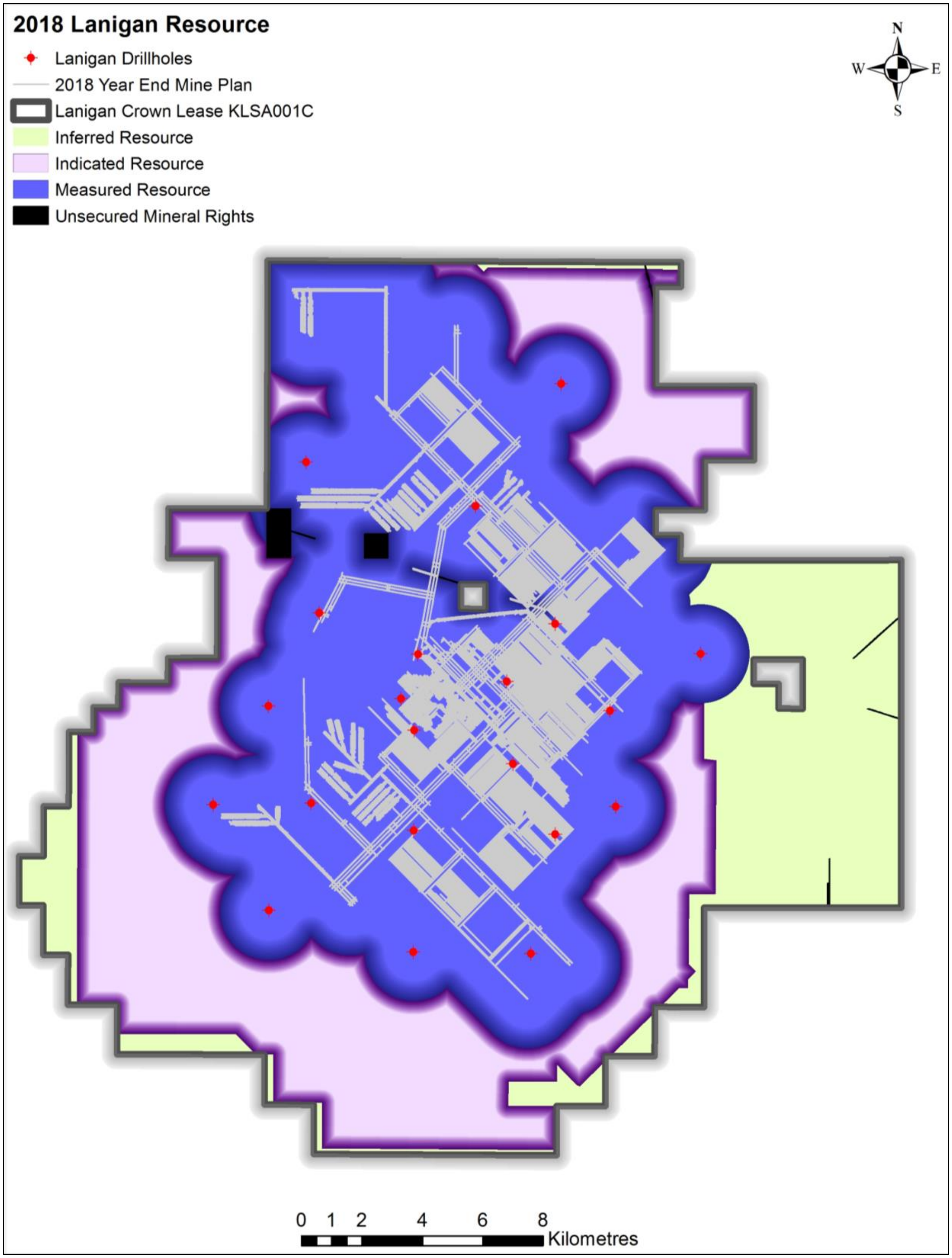


Figure 19: Map showing Lanigan A Zone Mineral Resource with mine workings to December 2018.

15.0 MINERAL RESERVE ESTIMATES

15.1 DEFINITIONS OF MINERAL RESERVE

The Canadian Institute of Mining and Metallurgy and Petroleum (CIM) has defined Mineral Reserve in *The CIM Definition Standards for Mineral Resources and Reserves* (2014) as:

1) **Probable Mineral Reserve:** the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

2) **Proven Mineral Reserve**: the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

CIM defines Modifying Factors as "considerations used to convert Mineral Resources into Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors."

For Saskatchewan, in regions adjacent and contiguous to an operating potash mine, Mineral Reserve categories are characterized by PotashCorp as follows:

1) **Probable Mineral Reserve:** identified recoverable potash mineralization classified as a Measured Resource, within a 1.6 km (1 mile) radius of a sampled mine entry or exploration drillhole, and within Crown Subsurface Mineral Lease KLSA 001 C.

2) **Proven Mineral Reserve**: identified recoverable potash mineralization classified as a Measured Resource, delineated on at least three sides by sampled mined entries or exploration drillholes to a maximum of 3.2 km (2 miles) apart, and within Crown Subsurface Mineral Lease KLSA 001 C.

Along with this approach, analysis of in-mine samples for potash grade has provided an observation-based understanding of the potash mineralized zone at Lanigan that is far superior to the level of understanding provided by any surface drilling based exploration program. An understanding of the amount of ore that can be conventionally mined from the Measured Resource category using current mining practices comes from nearly 50 years of potash mining experience at Lanigan.

15.2 LANIGAN POTASH RESERVE CALCULATIONS

Using the definitions outlined in Section 15.1, part of the Lanigan A Zone and B Zone Measured Resource has been converted to Mineral Reserve. The assigned Mineral Reserve category is dependent on proximity to sampled mined entries also described in Section 15.1. An overall extraction rate for the Lanigan mine has been applied to the qualifying area outlined as Measured Resource in Figure 19. This extraction rate is significantly lower than the local extraction rate described in Section 16.1, as it takes into account areas which cannot be mined due to unfavorable geology.

The overall extraction rate at the Lanigan mine is 26%. It was derived by dividing the total tonnes mined to date by the tonnage equivalent of the total area of the mine workings (i.e. the perimeter around the mine workings). Since an extraction rate has been applied, Mineral Reserves are considered recoverable ore, and are reported as such.

Currently, in any specific mining block at Lanigan, only one zone is mined (i.e. bi-level mining is not in practice). As such, Mineral Reserve has been split by ore zone that will be mined in the future; A Zone Mineral Reserve and B Zone Mineral Reserve do not overlap. Unmined B Zone potash mineralization directly underlying the defined A Zone Mineral Reserve is classified as B Zone Measured Resource. In the same way, unmined A Zone potash mineralization directly overlying the defined B Zone Mineral Reserve is classified as A Zone Measured Resource.

The Mineral Reserves for Lanigan as of December 31, 2018 are as follows:

Lanigan A Zone:

Probable Reserve	142	millions of tonnes
Proven Reserve	19	millions of tonnes
Total A Zone Reserve	161	millions of tonnes

Lanigan B Zone:

Probable Reserve	287	millions of tonnes
Proven Reserve	92	millions of tonnes
Total B Zone Reserve	379	millions of tonnes

Total for Lanigan (A Zone + B Zone):

Probable Reserve	429	millions of tonnes
Proven Reserve	111	millions of tonnes
Total A Zone and B Zone Reserve	540	millions of tonnes

Lanigan Mineral Reserves are plotted in Figure 20.

The average mineral grade of the Lanigan A Zone Mineral Resource is 23.5% K_20 equivalent, and was determined from 1,485 in-mine samples at Lanigan. The average mineral grade of the Lanigan B Zone Mineral Resource is 20.3% K_20 equivalent, and was determined from 20,230 in-mine samples at Lanigan. See Section 11.2 for more detail.

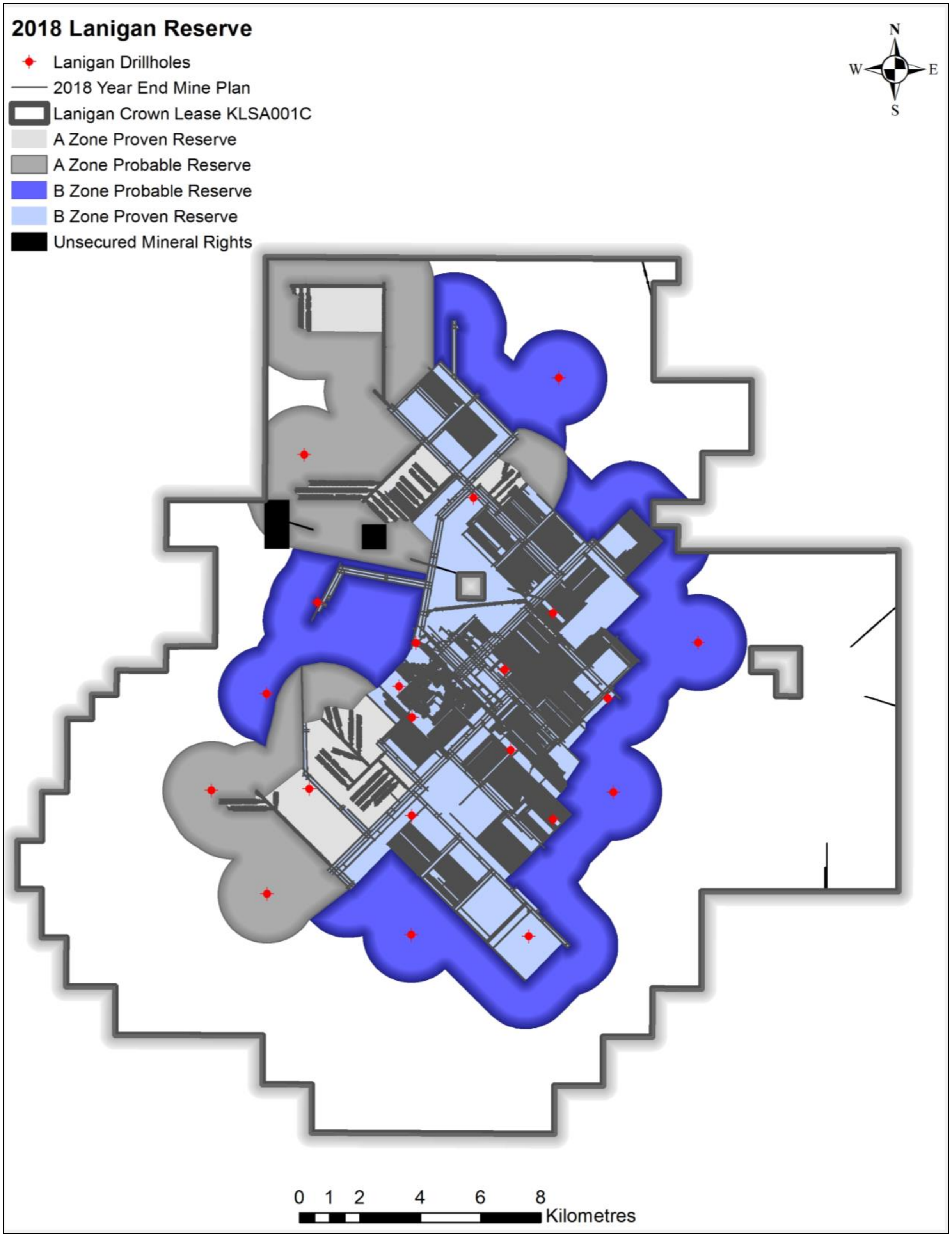


Figure 20: Map showing Lanigan A Zone Mineral Reserve with mine workings to December 2018.

16.0 MINING METHOD

16.1 MINING OPERATIONS

All conventional potash mines in Saskatchewan operate at 900 m to 1200 m below surface within 9 m to 30 m of the top of the Prairie Evaporite Formation. Over the scale of any typical Saskatchewan potash mine, potash beds are tabular and regionally flat-lying, with only moderate local variations in dip. At Lanigan, potash ore is mined using conventional mining methods, whereby:

- Shafts are sunk to the potash ore body;
- Continuous mining machines cut out the ore, which is hoisted to surface through the production shaft;
- Raw potash is processed and concentrated in a mill on surface; and
- Concentrated finished potash products (near-pure KCl) are sold and shipped to markets in North America and offshore.

Potash ore was first hoisted at Lanigan in the fall of 1968. The Lanigan mine has run on a continuous basis since then, other than short-term shutdowns taken for inventory management purposes or occasional plant maintenance and construction work.

Most recently, mill rehabilitation, mine expansion and hoist improvement projects were completed at Lanigan between 2005 and 2010. The expansion construction was carried out without significant disruption to existing potash production from the site. As of December 31, 2018, annual nameplate capacity for Lanigan was 3.8 million tonnes and annual operational capability is 2.0 million tonnes of finished potash products (concentrated KCl).

Virtually all Lanigan underground mining rooms are in one of two potash mineralized zones within the Patience Lake Member of the Prairie Evaporite Formation (the host evaporite salt). In this Member, there are two potash seams named A Zone (the upper seam) and B Zone (the lower seam); at present, both the A Zone and B Zone are being mined at Lanigan. The A Zone and B Zone are separated by approximately 4 m to 6 m of tabular salt. In contrast, some potash mines further east in Saskatchewan mine in a different potash layer, the Esterhazy Member of the Prairie Evaporite Formation. Saskatchewan potash geology is illustrated in Figure 21. At Lanigan, mine elevations range from approximately 940 m to 1030 m, averaging approximately 990 m. These depths to potash mineralization are anticipated over most of the Lanigan lease area. Mine workings are protected from aquifers in overlying formations by approximately 7 m (A Zone) to 14 m (B Zone) of overlying salt and potash beds, along with salt plugged porosity in the Dawson Bay Formation, a carbonate layer lying immediately above potash hosting salt beds.

The Lanigan mine is a conventional underground mining operation whereby continuous mining machines are used to excavate potash ore by the stress-relief mining method in the A Zone and the long-room and pillar mining method in the B Zone. Currently, in any specific mining block, only one zone is mined (i.e. bi-level mining is not in practice). Continuous conveyor belts transport ore from the mining face to the bottom of the production shaft. Mining methods employed in Saskatchewan are discussed in Jones and Prugger (1982) and in Gebhardt (1993).

The actual mining thickness at Lanigan is dictated by the height of continuous boring machines used to cut the ore. The A Zone mining interval is fixed at 3.66 m (12'). The 3.66 m (12') mining height also allows for comfortable working headroom and efficient extraction of potash ore. The thickness of the B Zone mining horizon varies somewhat and there is some flexibility in the thickness of the potash ore that is extracted there. Production mining machines have a fixed mining height of 2.74 m (9'). In a normal production room, ore is extracted in two lifts resulting in a mining height of approximately 4.88 m (16').

Carnallite sometimes occurs in minor amounts in the basal part of the B Zone. Carnallite is an undesirable mill feed material. If more than minor amounts of carnallite are detected in the floor after the first lift of a production room in the B Zone, it is left in the floor (i.e. a second lift is not cut). In these instances, the B Zone mining height is just 2.74 m (9'). Carnallite is found in trace amounts in the A Zone; however, due to its low occurrence, mining practices remain unchanged when it is encountered.

As discussed in Section 10.0, mining systems used in both A Zone and B Zone cut to a marker (clay) seam that is slightly above the high-grade mineralized zone to establish a safe and stable mine roof. In both zones, the top marker seam is slightly overcut by 10 to 20 cm. Clay seams are often planes of weakness, and if they are undercut, material immediately below the clay seam becomes a hazard as it may separate and fall. Since the hazard must be remediated prior to proceeding, thus slowing production, the moderately diluted mineral grade that results from the overcutting is preferable from a safety point of view.

In 2013, Lanigan modified its cutting practices in the B Zone to improve mine roof stability. This modification involved cutting in a slightly higher, but more stable horizon. The goal of improved mine roof stability was achieved; however, less potash and more salt is now being mined resulting in a slightly lower reported ore grade for B Zone.

Conservative local extraction rates (never exceeding 45% in any mining block) are employed at all Saskatchewan mines, including Lanigan, in order to minimize potential detrimental effects of mining on overlying strata; this is common practice in flat-lying, tabular ore bodies overlain by water-bearing layers.

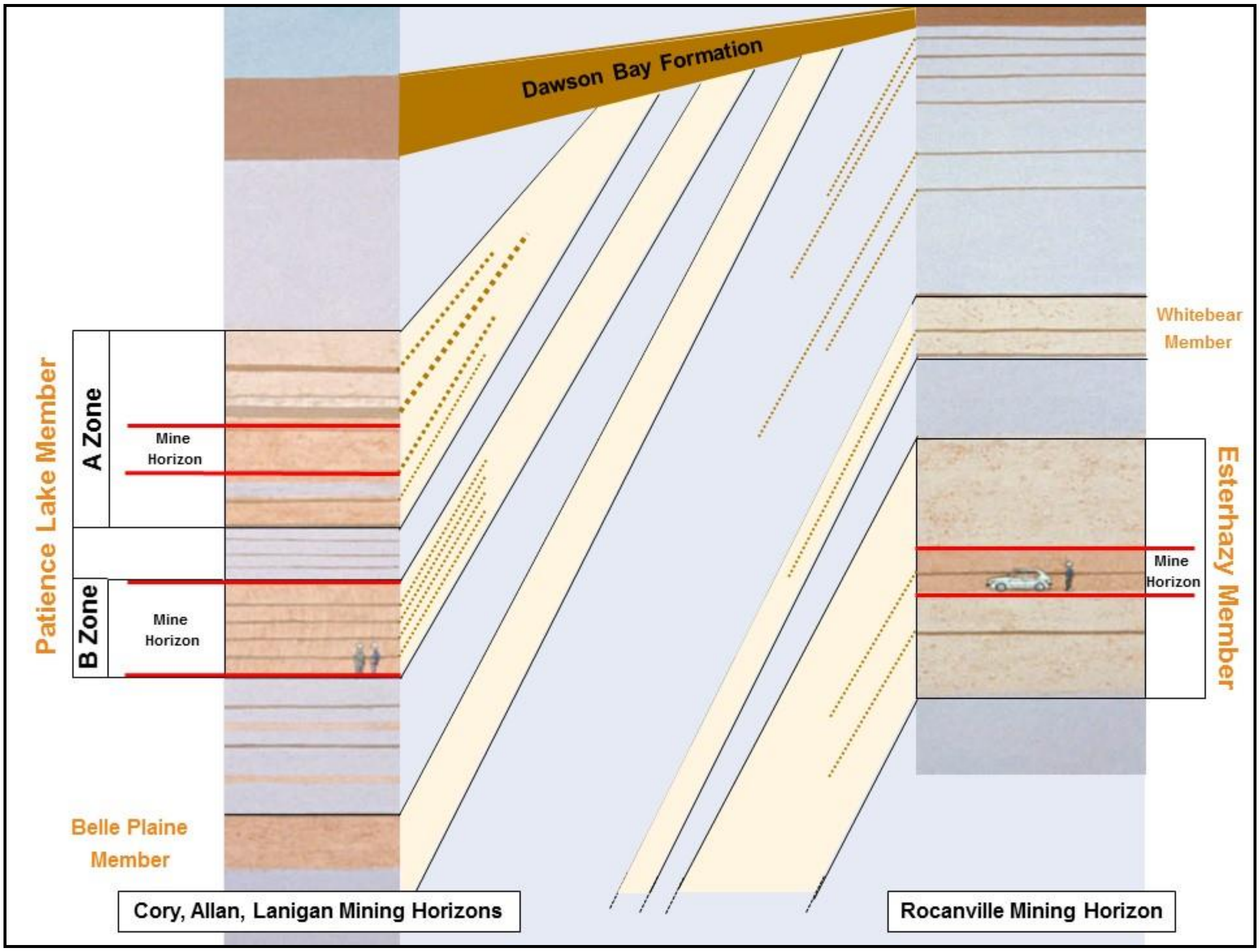
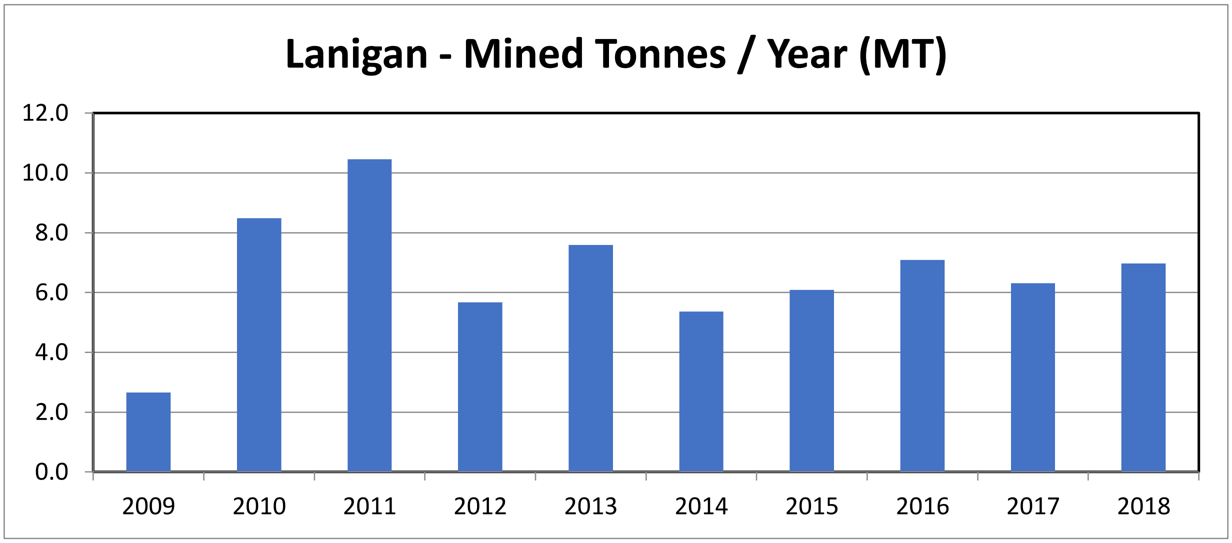


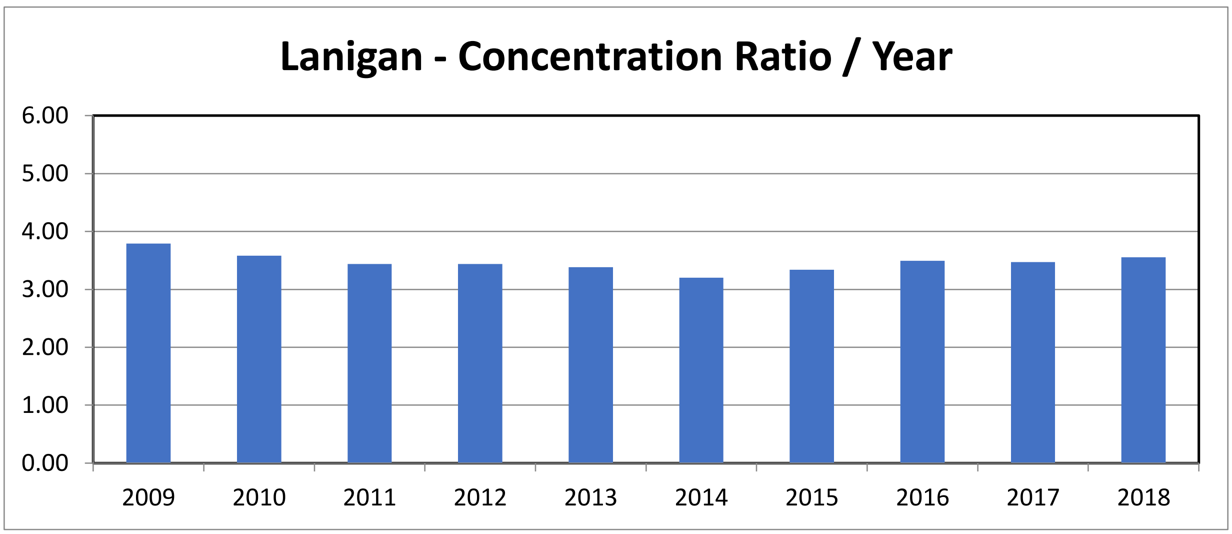
Figure 21: Typical stratigraphic section correlated with composite photos covering both the Patience Lake Member and the Esterhazy Member potash production intervals. At Lanigan, mining takes place in both the Upper and Lower Patience Lake Member (A Zone and B Zone).

From the shaft-bottom, potash ore is hoisted approximately 1000 m from the potash level through the vertical shafts to a surface mill. In addition to hoisting potash ore to surface, the production shaft provides fresh air ventilation to the mine and serves as secondary egress. The Service Shaft is used for service access, and exhausting ventilation from the mine.

Over the 50-year mine life, 207.762 million tonnes of potash ore have been mined and hoisted at Lanigan to produce 60.276 million tonnes of finished potash products (from startup in 1968 to December 31, 2018). The life-of-mine average concentration ratio (raw ore / finished potash products) is 3.45 and the overall extraction rate over this time period is 26%.

Actual potash production tonnages for the Lanigan mine, along with concentration ratios (tonnes mined / tonnes product), are plotted for the past decade in Figure 22.





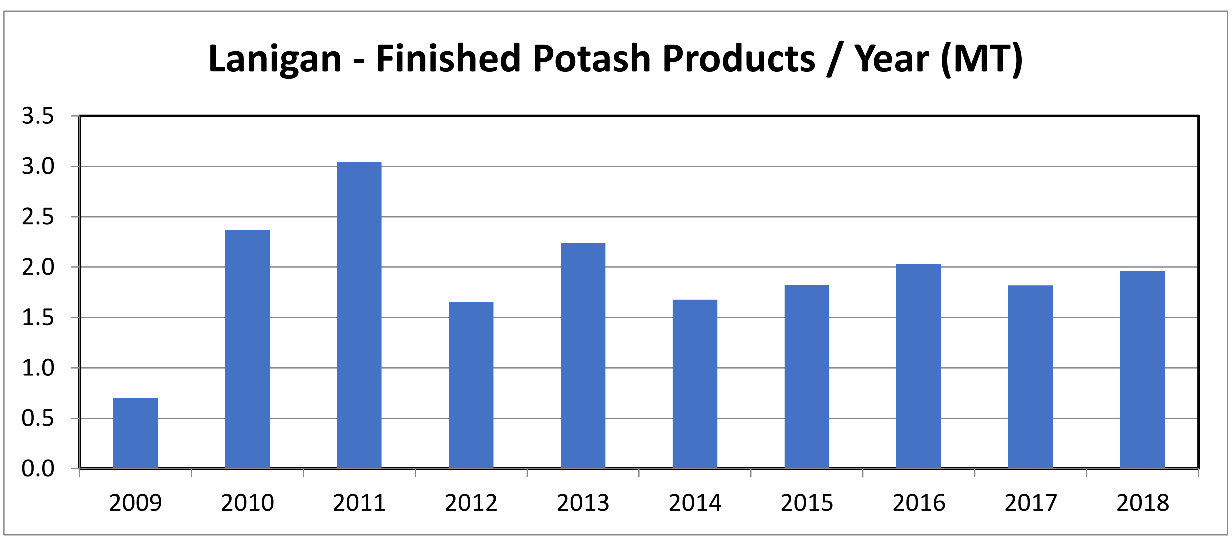


Figure 22: Actual mining, production and concentration ratio for the Lanigan mine over the past 10 years.

16.2 RISKS TO POTASH MINING OPERATIONS, WITH EMPHASIS ON WATER INFLOWS

The mining of potash is a capital-intensive business, subject to the normal risks and capital expenditure requirements associated with mining operations. The production and processing of ore may be subject to delays and costs resulting from mechanical failures and such hazards as unusual or unexpected geological conditions, subsidence, water inflows of varying degree, and other situations associated with any potash mining operation.

Potash beds in all regions of Saskatchewan are overlain by a number of water-bearing formations, and there are water zones underlying the potash beds as well. A water inflow into mine workings is generally significant in a potash mine since salt dissolves in water; an inflow can lead to anything from increased costs at best to closure of the mine at worst (e.g. see Prugger and Prugger, 1991).

Over the past 50 years of mining at Lanigan, there have been numerous small brine inflows into underground workings. Analysis of water chemistry and stable isotope composition shows that these brines are from connate pockets of ancient, saturated brine trapped in the Prairie Evaporite Formation and / or the Dawson Bay Formation.

More recently, during the summer of 2012, a minor inflow was detected in underground workings at Lanigan. At present, the inflow is estimated at approximately 170 litres / minute. Since it was discovered, work to fully characterize and manage this inflow has been focused and sustained, and is ongoing. To date, this inflow has had no impact on Lanigan potash production.

Inflow into each existing shaft at Lanigan, which were both designed to be water-tight, is estimated at nil (i.e. not measurable).

17.0 RECOVERY METHODS

At Lanigan, potash ore has been mined and concentrated to produce saleable quantities of high-grade finished potash products since 1968. Products include granular, standard and suspension grade potash for agricultural use.

Both floatation methods and crystallization methods are used to concentrate potash ore into finished potash products at the Lanigan mill. A simplified process flow diagram is shown in Figure 23. Raw potash ore is processed on surface, and concentrated red potash products are sold and shipped to markets in North America and offshore.

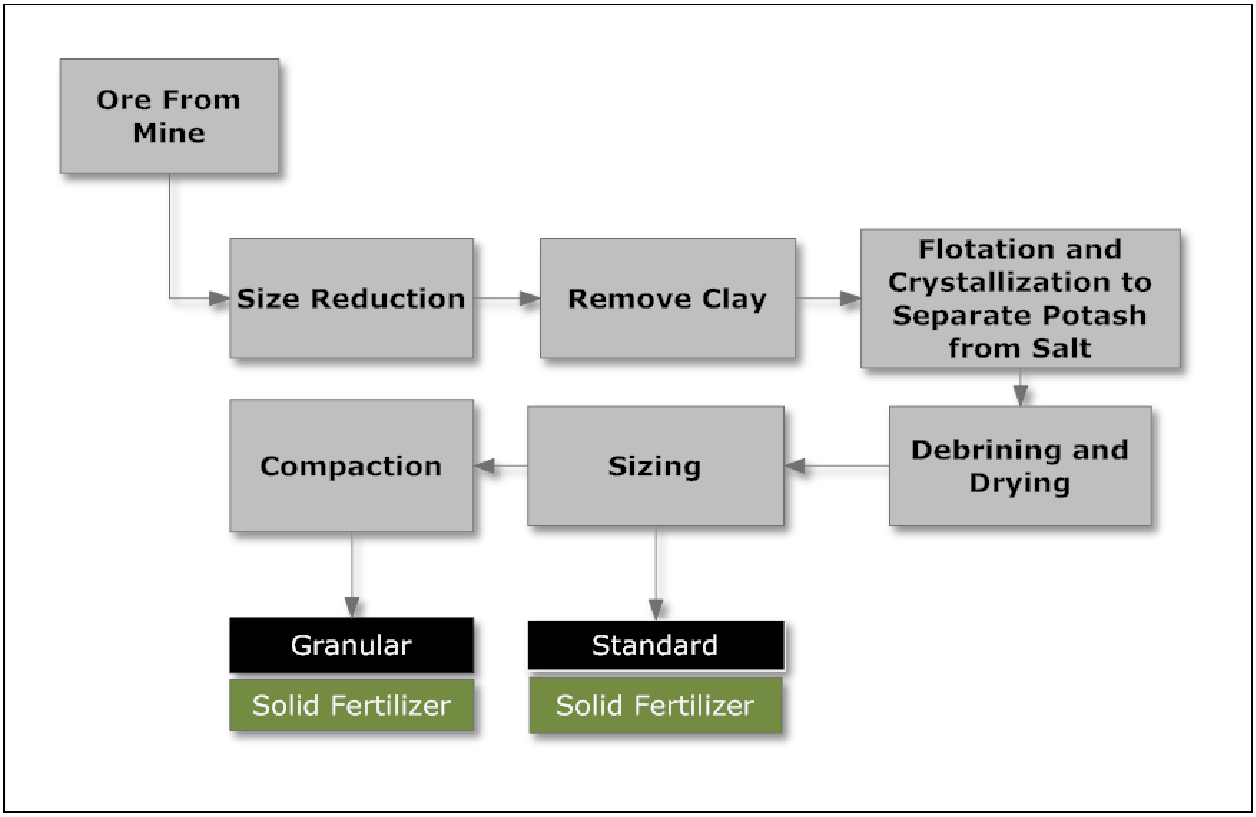


Figure 23: Simplified flow diagram for potash floatation and crystallization milling methods used at Lanigan.

Over the past three years, production of finished potash products at Lanigan was:

2016: 2.030 million tonnes finished potash products at 60.72% K_2O (average grade)
2017: 1.817 million tonnes finished potash products at 60.92% K_2O (average grade)
2018: 1.962 million tonnes finished potash products at 60.97% K_2O (average grade)

Over the past decade, actual mill recovery rates have been between 75.6% and 85.9%, averaging 82.7% (see Figure 24).

Given the long-term experience with potash geology and actual mill recovery at Lanigan, no fundamental potash milling problems are anticipated in the foreseeable future.

Quality control testing and monitoring geared towards fine-tuning and optimizing potash milling and concentrating processes are conducted on a continual basis at all Nutrien minesites and at Nutrien research facilities. At Lanigan, this is no exception; test work to optimize circuit performance and ensure product quality is carried out on an ongoing basis.

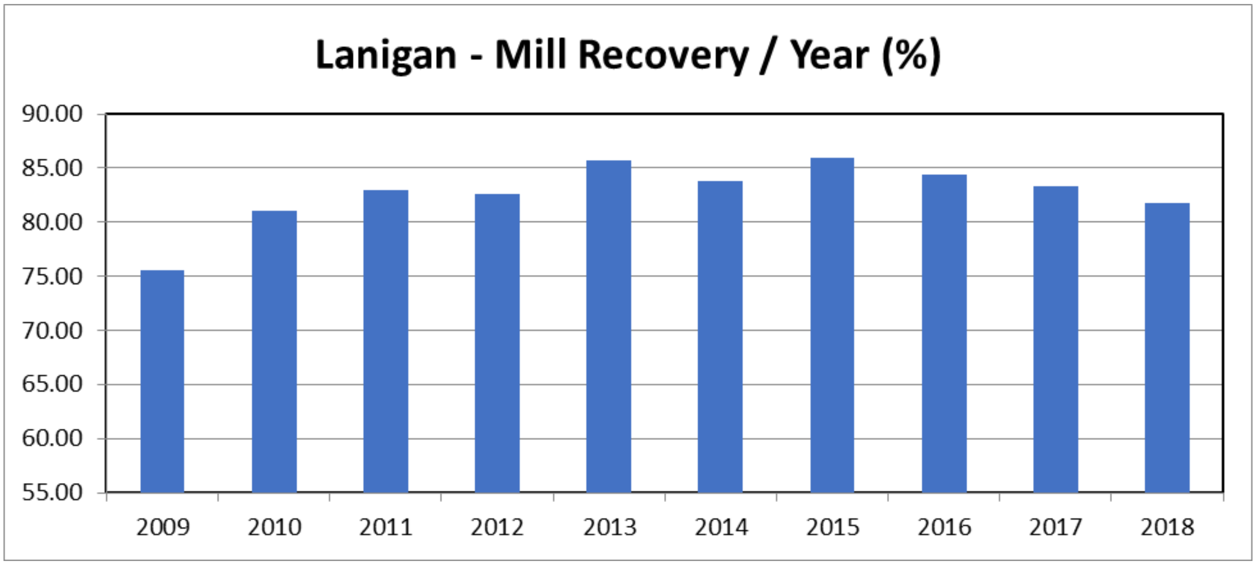


Figure 24: Lanigan mill recovery rate over the past 10 years.

18.0 PROJECT INFRASTRUCTURE

Infrastructure is in place to meet current and projected requirements for transportation, energy (electricity and natural gas), water and process materials at Lanigan. See also Section 5.0.

The Lanigan mine is served by a number of villages within 50 kilometres of the minesite. The nearest cities are Humboldt (approximately 45 km distant) and Saskatoon (approximately 100 km distant).

The Lanigan surface facilities are accessed by existing paved roads and highways that are part of the Saskatchewan Provincial Highway System. All potash product is shipped by rail over existing track.

At present, high voltage power capacity at Lanigan is 52 MVA. The ten-year projection of power utilization indicates that the utility can meet all foreseeable future demand.

The Lanigan operation requires a sustained fresh water supply for the milling process which is provided by a waterline from the Dellwood Reservoir (approximately 10 km distant) and from a regional aquifer called the Hatfield Valley Aquifer. This water supply provides a sustainable source of process water for Lanigan milling operations without having any impact on other users of water in the area.

19.0 MARKET STUDIES AND CONTRACTS

Potash from Company mines (including Lanigan) has been sold on a continuous basis since mining began in 1968. At present, Nutrien products are sold in more than 50 countries, to three types of end-use:

1. **Fertilizer**, focused on balanced plant nutrition to boost crop yields in order to meet the world's ever-increasing appetite for food (nitrogen, phosphate, potash)

2. **Feed Supplements**, focused on animal nutrition (mainly phosphate)

3. **Industrial**, focused on products for high-grade food, technical and other applications (nitrogen, phosphate, as phosphoric acid, potash)

The Company owns and operates six potash mines in Saskatchewan and owns one potash mine in New Brunswick, Canada. The potash mine in New Brunswick is currently in care-and-maintenance mode and is planned to be permanently shut down. Over the past three years (2016, 2017, 2018) the Company had potash sales of 30.959 million tonnes[1]. Historical Company potash sales data for the past 10 years are plotted in Figures 25 and 26[1].

Potash is mainly used for fertilizer, which typically makes up approximately 90 percent of the company's annual potash sales volumes. By helping plants develop strong root systems and retain water, it enhances yields and promotes greater resistance to disease and insects. Because it improves the taste and nutritional value of food, potash is often called the "quality nutrient." Industrial applications of potash include use in soaps, water softeners, de-icers, drilling muds and food products.

Potash fertilizer is sold primarily as solid granular and standard products. Granular product has a larger and more uniformly shaped particle than standard product and can be easily blended with solid nitrogen and phosphate fertilizers. It is typically used in more advanced agricultural markets such as the US and Brazil.

Most major potash consuming countries in Asia and Latin America have limited or no indigenous production capability and rely primarily on imports to meet their needs. This is an important difference between potash and the other major crop nutrient businesses. Trade typically accounts for approximately three-quarters of demand for potash, which ensures a globally diversified marketplace.

The most significant exporters are producers with mines in the large producing regions of Canada, the Middle East and the former Soviet Union, which all have relatively small domestic requirements.

[1] Company potash sales data for years prior to 2018 includes only PotashCorp sales.

World consumption of potash fertilizer has grown over the last decade, with the primary growth regions being developing markets in Asia and Latin America. These are countries with expanding crop production requirements, where potash has historically been under-applied and crop yields lag behind those of the developed world. Although temporary pauses can occur in certain countries, the underlying fundamentals of food demand that encourage increased potash application are expected to continue the growth trends in key importing countries. See Figure 27 for world potash production and demand in 2017.

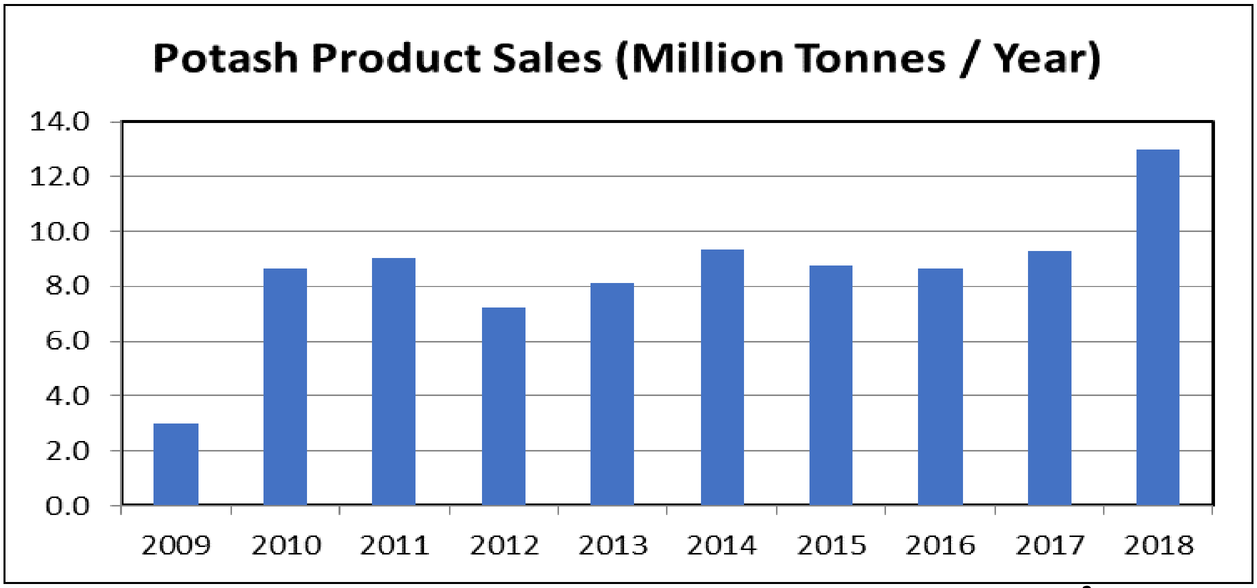


Figure 25: Historical Company potash sales 2009 to 2018 in million tonnes / year [2].

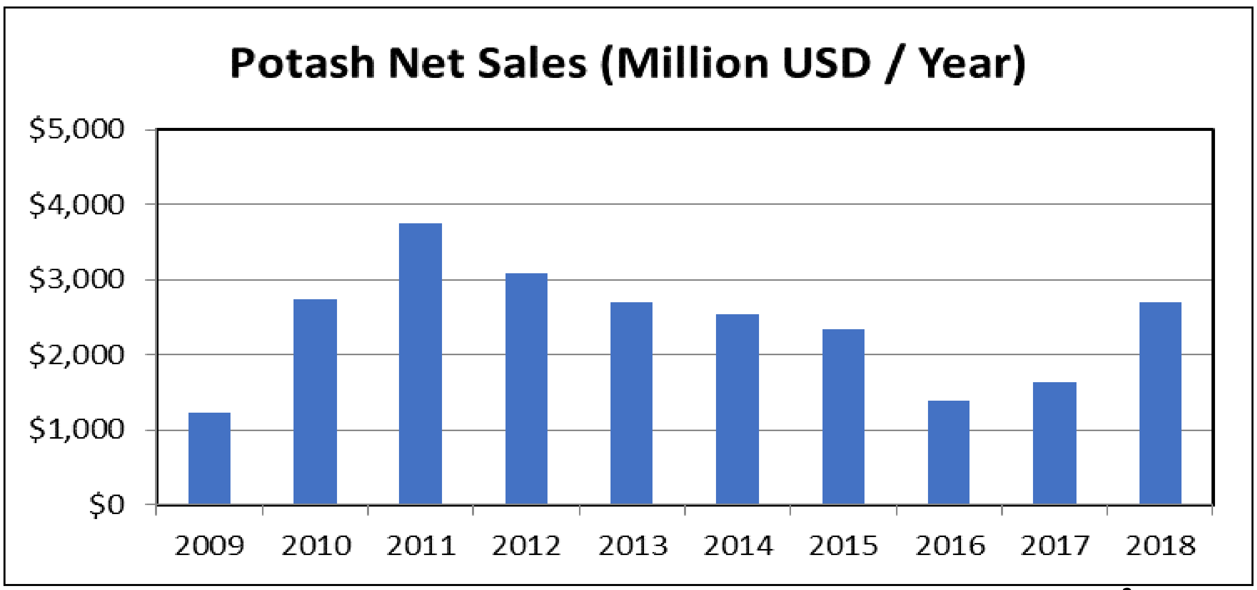


Figure 26: Historical Company potash net sales 2009 to 2018 in million USD $ / year [2].

[2] Company potash sales data for years prior to 2018 includes only PotashCorp sales.

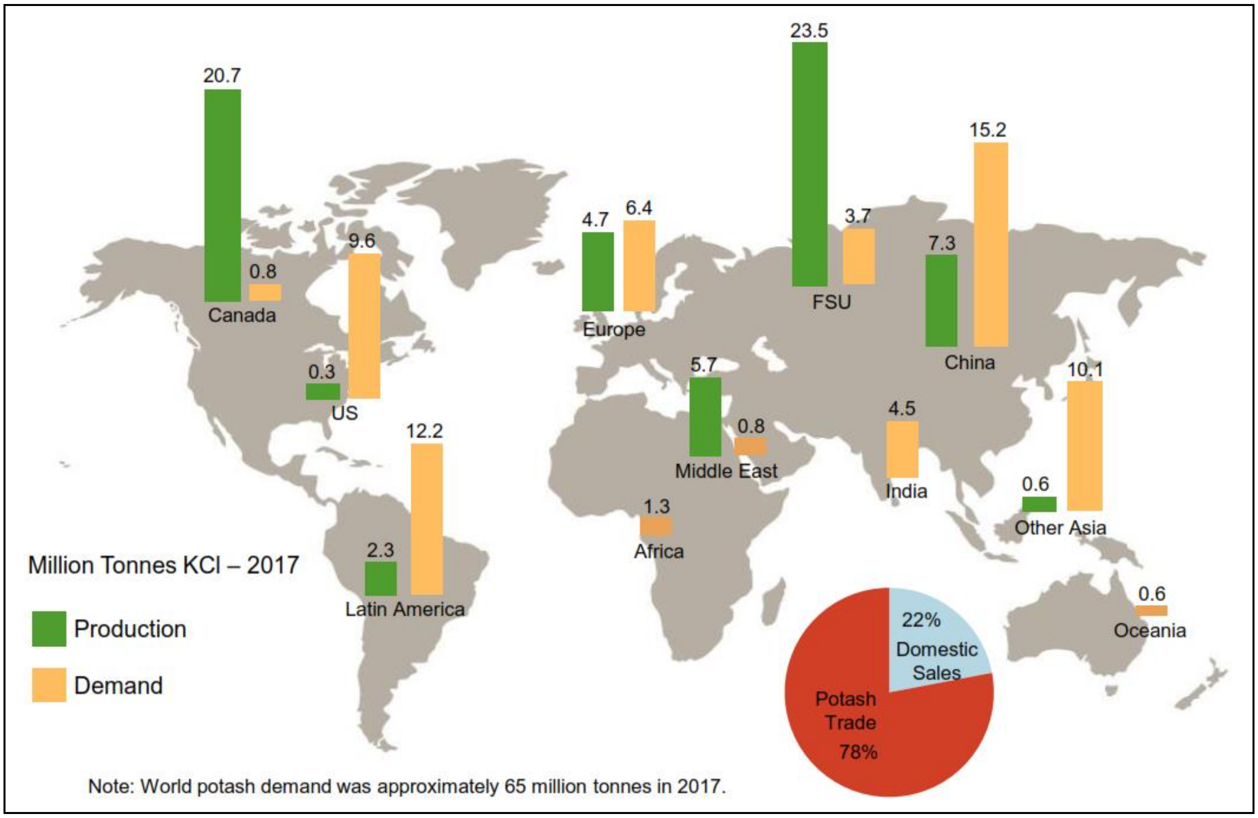


Figure 27: World potash production and demand for 2017.

Potash is used on many agricultural commodities. Wheat, rice, corn, oilseed, and sugar crops consume over half of the potash used worldwide. Fruits and vegetables are also important users of potash fertilizers, accounting for about 19 percent of the total consumption. The remainder goes to other consumer and industrial crops such as oil palm, rubber, cotton, coffee, and cocoa. See Table 4 for primary potash market profile. This diversity means that global potash demand is not tied to the market fundamentals for any single crop or growing region.

Table 4: Primary Potash Market Profile

Country/Region	Growth Rate*	Key Consuming Crops
China	8.1%	Vegetables, rice, fruits, corn
India	4.9%	Rice, wheat, vegetables, sugar crops
Other Asia	4.1%	Oil palm, rice, sugar crops, fruits, vegetables
Latin America	3.4%	Soybeans, sugar crops, corn
North America	2.1%	Corn, soybeans

*5-year CAGR for consumption (2013-2018E)

Global potash shipments surpassed 66 million tonnes in 2018, an increase of more than 1 million tonnes from the previous record set in 2017. Potash demand has grown at an annualized rate of more than 4 percent over the past 5 years, well above the long-term average of 2.5 to 3.0 percent. This growth is driven by strong potash consumption trends in all major potash markets.

North American and South American growers applied significant amounts of potash to replenish soil nutrients removed by large harvests. Potash application rates are increasing in China and Southeast Asian countries as a result of increased soil testing and improved agronomic practices. Growers in these countries are also increasing acreage of potassium-intensive crops such as fruits, vegetables and oil palm. India continues to face political barriers to significantly growing potash demand, however, the agronomic need and willingness of farmers to improve yields persists. The Company believes that supportive agriculture fundamentals and the need to address declining soil fertility levels will enable strong demand growth in the years ahead. World potash shipments and consumption in recent years is shown in Figure 28.

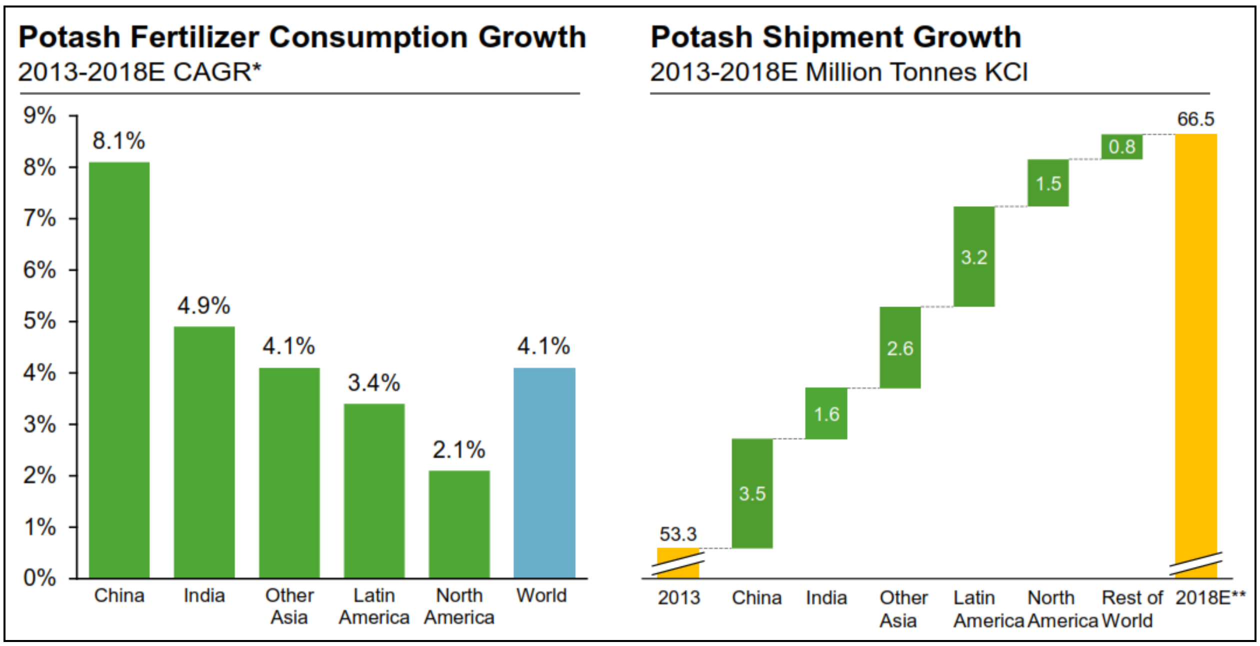


Figure 28: World potash shipments and consumption, 2013-2018E.

Canpotex Limited (Canpotex), the offshore marketing company owned by the Company and other Saskatchewan potash producers, handles all sales, marketing and distribution of potash produced by its member companies to customers outside of the US and Canada (including the potash produced at Allan).

In North America, Nutrien sells potash to retailers, cooperatives, and distributors, who provide storage and application services to farmers, the end-users. This includes sales to Nutrien's retail distribution business, which has the largest retail distribution network in North America. Typically, the Company's North American potash sales are larger in the first half of the year. The primary customers for potash fertilizer products for the Lanigan operation are retailers, dealers, cooperatives, distributors and other fertilizer producers who have both distribution and application capabilities.

Nutrien's market research group provides management with market information on a regular basis including global agriculture and fertilizer markets, demand and supply in fertilizer markets and general economic conditions that may impact fertilizer sales. These may include specific market studies and analyses on different topics as may be required. This information is reviewed on a regular basis and the author of this report takes this information into account in understanding the markets and the assumptions within this report.

Plans and arrangements for potash mining, mineral processing, product transportation, and product sales are established by Nutrien and are within industry norms.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

The tailings management strategy at all Nutrien potash mines in Saskatchewan, including Lanigan, is one of sequestering solid mine tailings in an engineered and provincially licenced Tailings Management Area (TMA) near the surface plant site. The Lanigan TMA currently covers an area of approximately 708 hectares (1,750 acres) of land owned by the Company. Solid potash mine tailings typically consist of 85% to 95% rock-salt (NaCl) and 5% to 15% insolubles (carbonate mud = $CaCO_3$, anhydrite mud = $CaSO_4$, and clays like chlorite, illite, and so on). An engineered slurry-wall has been constructed on the south and south-west sides of the Lanigan TMA in the areas where near-surface aquifers could be impacted by mine waters. Near-surface geology on all other sides of the TMA limits the possibility of brine migration into these areas. The slurry-wall provides secondary containment of any saline mine waters, stopping these brines from reaching surrounding near-surface aquifers. Areas surrounding the TMA are closely monitored; this includes everything from daily visual perimeter inspections to annual investigations and inspections of surrounding groundwater and aquifers.

Lanigan currently operates three brine disposal well near the surface plant of the Lanigan mine (marked in Figure 12) where clear salt brine (i.e. no silt, clay-slimes, or other waste) is borehole-injected into the Winnipeg / Deadwood Formations, deep subsurface aquifers approximately 1500 m to 1700 m below surface (marked in Figure 13). The groundwater in these extensive deep aquifers is naturally saline.

Emissions to air (mostly salt dust and potash dust) are kept below regulatory limits through various modern air pollution abatement systems (e.g. dust collection systems built into mill processes) that are provincially licensed. This same procedure is followed at all Nutrien mines in Saskatchewan.

The Lanigan operation requires a sustained fresh water supply for the milling process which is provided by a waterline from the Dellwood Reservoir (approximately 10 km distant) and from a regional aquifer called the Hatfield Valley Aquifer. This water supply is provincially licensed and provides a sustainable source of process water for Lanigan milling operations without having any impact on other users of water in the area.

In Saskatchewan, all potash tailings management activities are carried out under an “Approval to Operate” granted by the Saskatchewan Ministry of Environment (MOE), the provincial regulator. The Lanigan mine is in compliance with all regulations stipulated by the Environmental Protection Branch of Saskatchewan MOE. The current Lanigan Approval to Operate has been granted to July 1, 2028, the renewal date.

In terms of long-term decommissioning, environmental regulations in the Province of Saskatchewan require that all operating potash mines in Saskatchewan create a long-term decommissioning and reclamation plan that will ensure all surface facilities are removed, and the site is left in a chemically and physically stable condition once mine operations are complete. PotashCorp has conducted numerous studies of this topic, and the most recent decommissioning and reclamation plan for Lanigan was approved by MOE technical staff in October 2016. Because the current expected mine life for Lanigan is many decades into the future, it is not meaningful to come up with detailed engineering designs for decommissioning at present. Instead, decommissioning plans are reviewed every five years, and updated to accommodate new ideas, technological change, incorporation of new data, and adjustments of production forecasts and cost estimates. Any updated decommissioning and reclamation reports generated by this process are submitted to provincial regulatory agencies. For Lanigan, a revised decommissioning and reclamation plan is required in July 2021.

In addition to the long-term decommissioning plan, provincial regulations require that every potash producing company in Saskatchewan set up an Environmental Financial Assurance Fund, which is to be held in trust for the decommissioning, restoration and rehabilitation of the plant site after mining is complete. This fund is for all mines operated by Nutrien in the province of Saskatchewan (i.e. Allan, Cory, Lanigan, Patience Lake, Lanigan, Rocanville, and Vanscoy).

21.0 CAPITAL AND OPERATING COSTS

The Lanigan mine has been in operation since 1968; in the years immediately preceding this, major capital investment was made to bring this mine into production. Since then, capital expenditures were made on a regular and ongoing basis to sustain production, and to expand production from time to time.

Most recently, mill rehabilitation, mine expansion and hoist improvement projects were completed at Lanigan between 2005 and 2010. The expansion construction was carried out without significant disruption to existing potash production from the site.

22.0 ECONOMIC ANALYSIS

22.1 FUNDAMENTALS

The Company conducts ongoing and detailed economic analyses on each of its operations and on all aspects of its business. While the Company considers its operating costs and results on a per mine basis to be competitively sensitive and confidential information, the Company is confident that the economic analysis conducted routinely for each of the Company's operating potash mines is complete, reasonable, and meets industry standards.

On a cash flow basis, the Company's potash segment generated USD $5,702 million in net sales over the past three years (2016, 2017 and 2018) based on sales volume of 30.959 million tonnes of finished potash products[3]. The annual average realized potash price for manufactured products (includes North American and offshore sales) over a 10-year period (2009 – 2018) is plotted in Figure 29.

Over the past three years (2016, 2017, and 2018) the Lanigan mine produced 5.809 million tonnes of finished potash products. In the past three years (2016, 2017, and 2018), the Lanigan mine accounted for 16% of total potash production at the Company over this time period. Allan is currently making a positive contribution to the Company's potash segment.

Given the Company's previous history (including 50 years of mining at the Lanigan operation), recent market conditions, and extensive reserve base, the economic analysis for Lanigan has met the Company's internal hurdle rates.

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[3] Company potash sales data for years prior to 2018 includes only PotashCorp sales.

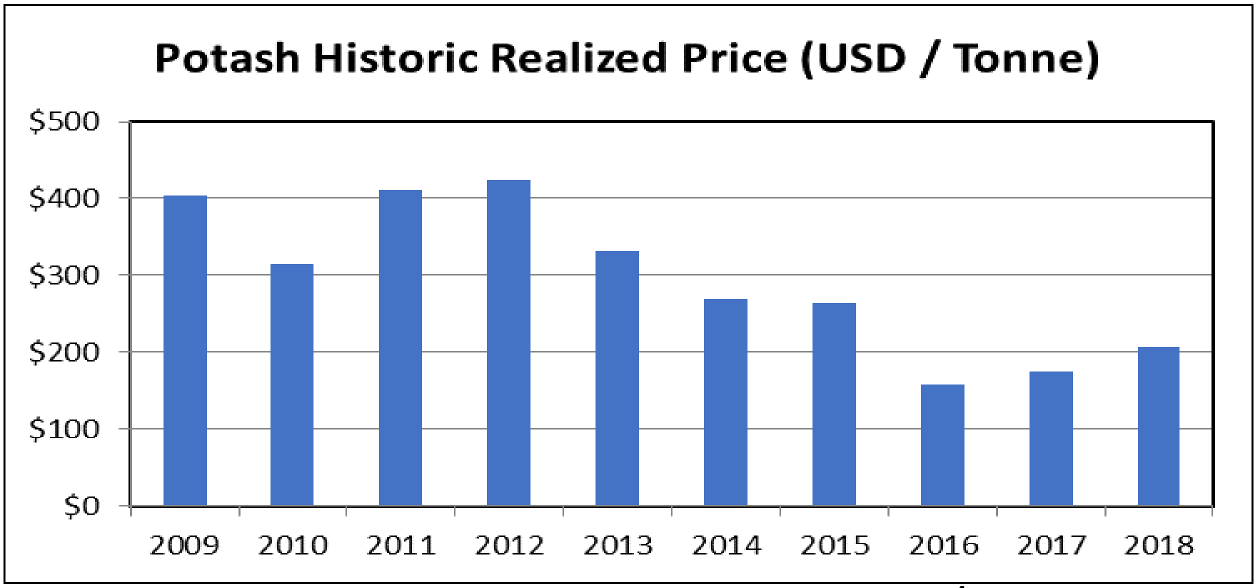

Figure 29: Historic annual average realized potash price in USD / tonne [4].

22.2 TAXES

Royalties are paid to the Province of Saskatchewan, which holds approximately half of the mineral rights in the Lanigan Crown Subsurface Mineral Lease. Royalties from non-Crown lands are paid to various freeholders of mineral rights in Saskatchewan. The crown royalty rate is 3% and is governed by *The Subsurface Mineral Royalty Regulations, 2017*. The actual amount paid is dependent on selling price and production tonnes.

Municipal taxes are paid based on site property values.

Saskatchewan potash production is taxed at the provincial level under *The Mineral Taxation Act, 1983*. This tax, governed by *The Potash Production Tax Regulations,* consists of a base payment and a profit tax, collectively known as the potash production tax. As a resource corporation in the Province of Saskatchewan, Nutrien is also subject to a resource surcharge that is a percentage of the value of its resource sales (as defined in *The Corporation Capital Tax Act of Saskatchewan*).

In addition to this, Nutrien pays federal and provincial income taxes based on corporate profits from all its operations in Canada.

[4] Company annual average realized potash price for years prior to 2018 includes only PotashCorp sales.

23.0 ADJACENT PROPERTIES

The Company Lanigan Lease KLSA 001 C is adjacent to the following potash dispositions (Figure 30).

Producing Subsurface Mineral Leases:

- Mosaic Potash Colonsay ULC (KL 108)

Non-producing Potash Exploration Permits and Subsurface Mineral Leases:

- BHP Billiton Canada Inc.
- Canada Golden Fortune Potash Corp.

For up-to-date information on Crown Potash Leases and Exploration Permits, see the Saskatchewan Mining and Petroleum GeoAtlas which is available online at the Government of Saskatchewan website.

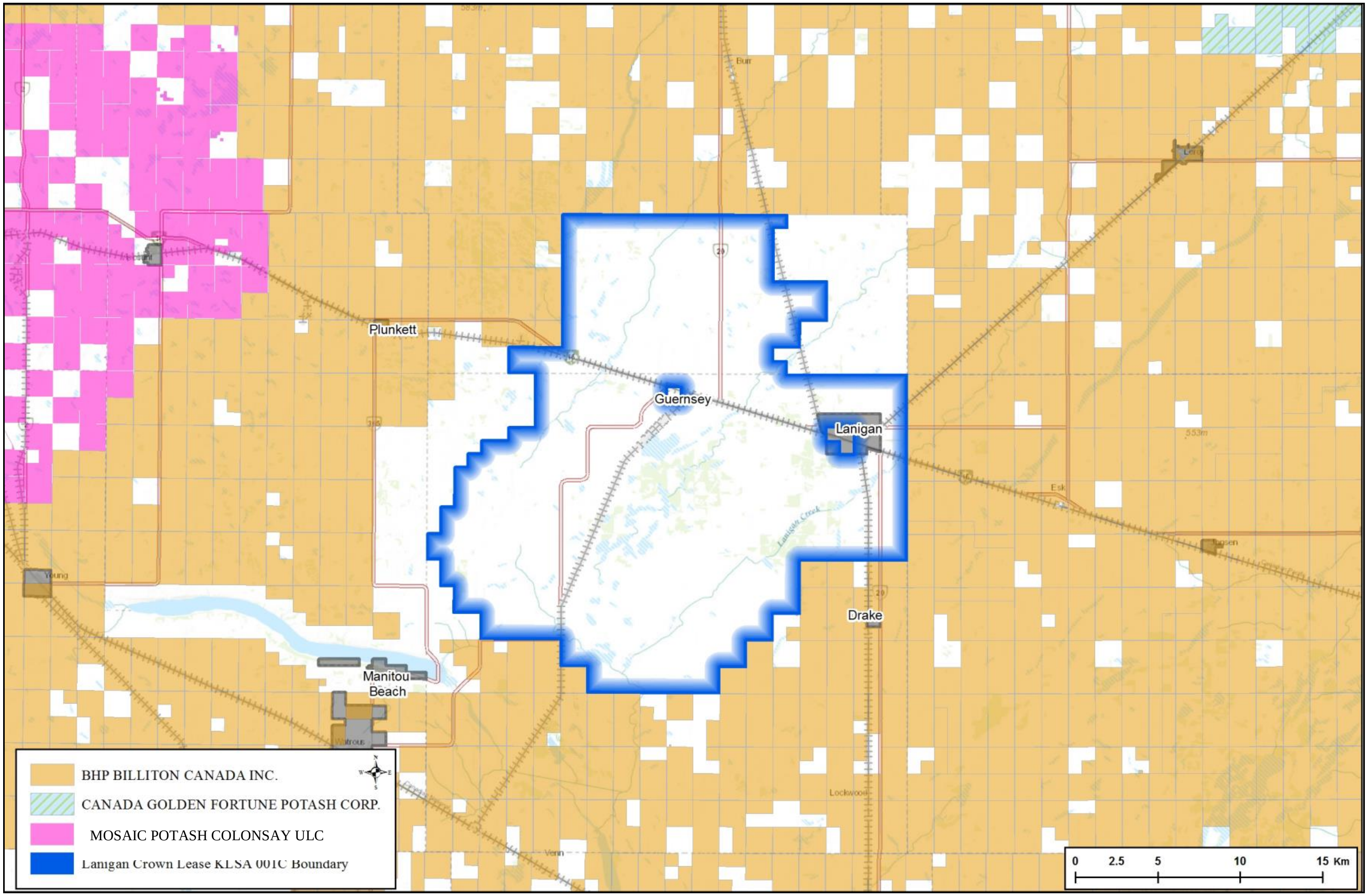

Figure 30: Potash properties adjacent to Lanigan Potash.

24.0 OTHER RELEVANT DATA AND INFORMATION

Not applicable.

25.0 INTERPRETATION AND CONCLUSIONS

PotashCorp has a long history of successful potash mining at Lanigan, where potash has been produced for the past 50 years. The Company believes that the experience gained mining and milling potash for this length of time has produced a reliable body of information about potash mineralization, mining and milling at Lanigan.

In a Saskatchewan potash mine that has been producing for many decades, reduction of mine life through increased production is counter-balanced by development mining into new mineral land parcels. This increases mine life through increasing the potash Mineral Reserve.

For Lanigan, mine life can be estimated by dividing the total Mineral Reserve (Proven + Probable) of 540 million tonnes by the average annual mining rate (million tonnes of ore hoisted per year). For Lanigan, the mining rate is defined as equal to the actual three-year running average (consecutive, most recent years). The average mining rate at Lanigan over 2016, 2017 and 2018 was 6.79 million tonnes of potash ore mined and hoisted per year.

If this mining rate is sustained and if Mineral Reserves remain unchanged, then the Lanigan mine life would be 24 years for A Zone and 56 years for B Zone, totaling 80 years.

This estimate of mine life is likely to change as mining advances further into new mining blocks, and / or if mining rates change.

26.0 RECOMMENDATIONS

Not applicable for a potash mine that has been in operation since 1968.

27.0 REFERENCES

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