CANADIAN ZINC CORPORATION

a wholly-owned subsidiary of NorZinc Ltd

POST-EA INFORMATION PACKAGE INCLUDING AN UPDATED PROJECT DESCRIPTION ALL SEASON ROAD TO PRAIRIE CREEK MINE

APPENDIX 9-1

SUBMITTED IN SUPPORT OF:

Water Licences MV/PC2014L8-0006, and
Land Use Permits MV/PC2014F0013

SUBMITTED TO:

Mackenzie Valley Land and Water Board
Yellowknife, NT X1A 2N7

Parks Canada,
Nahanni National Park Reserve
Fort Simpson, NT X0E 0N0

SUBMITTED BY:

Canadian Zinc Corporation
Vancouver, BC, V6B 4N9

February 2019

PRAIRIE CREEK ACCESS ROAD

INVASIVE SPECIES MANAGEMENT PLAN

DECEMBER 2018

CANADIAN ZINC CORPORATION

TETRA TECH

Revision History

Revision	Description	Revised By (Initials)	Revision Date
A	Initial Version	Allnorth	2015
B	Updated Content		2018-11-30

Review and Approval

The following signatures indicate that the undersigned have read and agreed to the contents of this document, and that they approve and accept its distribution and use.

Description	Authority	Signature	Date
Document Owner	David Harpley VP Environment & Permitting		2018-11-30
Reviewed by: Full Name, Job Title			
Approved by: Full Name, Job Title			

Distribution List

This Plan and the most recent revisions have been distributed to:

Copy #1 –

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PLAIN LANGUAGE SUMMARY

This Invasive Species Management Plan (ISMP) was prepared for Canadian Zinc Corporation (CZN) by Tetra Tech Canada Inc. (Tetra Tech). The ISMP focuses on vascular plants and presents invasive species management practices to be employed during the construction and operation of the Prairie Creek All-Season Road (ASR) and associated infrastructure.

The Project is located in the south-west corner of the Northwest Territories, approximately 500 km southwest of Yellowknife in the Nahanni National Park Reserve area. The proposed Prairie Creek Access Road will span 170 kilometres through varying mountainous terrain. Some 85 km of the proposed route passes through the Nahanni National Park Reserve.

The purpose of the ISMP is to identify best management practices to identify, control, monitor, and prevent the spread and introduction of invasive species along the Prairie Creek ASR and the surrounding environment during the construction and operation phases of the Project. The ISMP has also been developed in direct response to the following measure presented in the Mackenzie Valley Review Board's Report of Environmental Assessment and Reasons for Decision – Canadian Zinc Corp. Prairie Creek All Season Road – Project EA1415-01 (2017):

In order to prevent significant adverse impacts to vegetation communities (which also serve as wildlife habitat), CZN will revise the invasive species management framework and create an Invasive Species Management Plan prior to construction, considering off-site as well as on-site prevention and control. CZN will include the adaptive management principles within the invasive species management framework, the Invasive Species Management Plan, and any individual weed control plans, if or as they are developed.

Roadways provide a vector for the establishment of invasive species. Many invasive plants have the ability to aggressively establish and quickly spread in new environments, altering natural habitats, displacing native species, and reducing habitat effectiveness for wildlife. Oldham and Delisle-Oldham (2017) detected 118 invasive plant species along highways and rest stops in the NWT, including the Liard Highway. In past surveys for rare plants near the Mine and through the NNPR along the ASR, no invasive species were detected. However, in August 2018, twenty-two (22) of the 118-invasive species listed, plus one species not documented by Oldham and Delisle-Oldham (2017) were found in high densities between KP 155 to KP 179.5 (south of the Liard River, see Section 6.0; Figures 3a - 3q) of the ASR. No invasive species were detected between KP 155 (just north of the Liard River) to KP 0. However, four invasive species were observed around the Mine site in small numbers. Detailed identification and control measures are provided for each of the 23 species.

The main land management goals and objectives with respect to invasive plant species are as follows:

- As much as possible, prevent invasive species from spreading into the area north of the Liard River and into the NNPR. Vehicle inspections will occur at the Liard River crossing, which will include a wheel wash during the open water season;
- Collaborate with the community of Nahanni Butte to prevent further spread through education, engagement, and involvement with prevention, detection, control, and restoration measures;
- Collaborate with the Government of the Northwest Territories – Environment and Natural Resources' Invasive Alien Species Program to stay apprised of upcoming threats from adjacent districts and innovative treatment technologies; and
- Manage infestation levels so that the project does not result in an increase relative to local and regional background levels.

Four key principles (prevention, detection, control, and restoration) can be applied to any species detected throughout the lifetime of the Project to provide the most applicable mitigation for control. There are several mitigation measures suggested for each principle. Through monitoring, adaptive management can be applied to further refine prevention, detection, and control measures.

Monitoring provides the means to gather information to evaluate the success of prevention, detection, and control measures. Once control measures have been implemented, regular monitoring and follow-up reporting will occur to verify whether the eradication goal has been met and the site has been sufficiently restored to target conditions (e.g., pre-infestation conditions or some equivalent level of acceptability).

Adaptive management will be used to evaluate the effectiveness of the ISMP; the Plan is effective if the goals are being met. The ISMP is a living document. As part of the adaptive management approach, this document will require revisions if and when new species are detected/introduced, control methods are added or removed (based on effectiveness), new vectors for spread/propagation are introduced (e.g., natural disturbances such as fire or flood), and/or invasive species legislation changes.

Regular evaluation and self-assessment of all stages of the management process provide information on the outcome of previous interventions and allow for ongoing improvement (Timko & Innes 2009). Consistent, long-term management and control of invasive species is required. Should follow-up operations cease, any advances achieved may be lost in a very short time.

Prior to construction, invasive species should be controlled along the Nahanni Butte community access road, the old logging road and areas proximal to the road cleared by the community, and around the Mine. These areas pose significant risk for spreading invasive species along the ASR.

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ACRONYMS

Acronyms	Definition
ALS	Acetolactate synthase
ASR	Prairie Creek All-Season Road
CZN	Canadian Zinc Corporation
DAR	Developer's Assessment Report
EA	Environmental Assessment
EM	Environmental Monitor
GNWT	Government of the Northwest Territories
HPPD	Hydroxyphenylpyruvate dioxygenase
ISMP	Invasive Species Management Plan
NNPR	Nahanni National Park Reserve
NT	Northwest Territories
PCA	Parks Canada Agency
PPO	Protoporphyrinogen oxidase
ROMP	Road Operations and Management Plan

GLOSSARY OF TERMS

Glossary of Terms	Definition
Achene	A small, dry, indehiscent fruit with a single locule and a single seed (ovule), and with the seed attached to the ovary wall at a single point, as in the sunflower
Annual	A plant that completes its lifecycle in one year
Auricles	A small, ear-shaped appendage
Biennial	A plant that completes its lifecycle in two years
Bipinnatifid	A pinnatifid leaf having its segments or divisions also pinnatifid
Calyx	The outter perianth whorl; collective term for all the sepals of a flower
Culms	A hollow or pithy stalk or stem, as in the grasses, sedges or rushes
Corolla	The collective name for all the petals of a flower; the inner perianth whorl
Cymes	A flat-topped or round-topped determinate inflorescence, paniculate, in which the terminal flower blooms first
Glabrous	Smooth; hairless
Indehiscent	Not opening at maturity along definite lines or by pores
Involucre	A whorl of bracts subtending a flower or flower cluster
Leaflet	A division of a compound leaf
Ligule	Strap-shaped organ. The flattened part of the ray corolla in the Compositae (Asteraceae) family
Panicle	A loose, branching cluster of flowers. A branched, racemose inflorescence with flowers maturing from the bottom upwards
Pappus	Th modified calyx of the Compositae (Asteraceae) family, consisting of awns, scales, or the bristles at the apex of the achene
Pedicel	The stalk of a single flower in an inflorescence, or of a grass spikelet
Perennial	A plant that lives more than two years
Perianth	The calyx and corolla of a flower, collectively, especially when they are similar in appearance
Petiole	A leaf stalk
Pinnatifid	Lobed half the distance or more to the midrib, but not reaching the midrib
Raceme	An unbranched, elongated inflorescence with pedicellate flowers maturing from the bottom upwards
Rachis	The main axis of a structure, such as a compound leaf or an inflorescence
Ray Flower	A ligulate flower of the Compositae (Asteraceae) family
Rhizome	A horizontal underground stem; rootstock
Sepals	A segment of the calyx of a flower, enclosing the petals and usually green and leaflike

Glossary of Terms	Definition
Sessile	Attached directly, without a supporting stalk, as a leave without a petiole.
Sheath	The portion of an organ which surrounds, at least partly, another organ, as the leaf base of a grass surrounds the stem.
Spike	An unbranched, elongated inflorescence with sessile or subsessile flowers or spikelet maturing from the bottom upward
Spikelets	A small spike or secondary spike; the ultimate flower cluster of grasses and sedges consisting of 1-many flowers subtended by two bracts (glumes)
Stamen	The male reproductive organ of a flower, consisting of an anther and a filament
Stipule	One pair of leaf-like appendages found at the base of a petiole in some leaves

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Canadian Zinc Corporation (CZN) and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than CZN, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in Appendix C or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

This Invasive Species Management Plan (ISMP) was prepared for Canadian Zinc Corporation (CZN) by Tetra Tech Canada Inc. (Tetra Tech). The ISMP focuses on vascular plants and presents invasive species management practices to be employed during the construction and operation of the Prairie Creek All-Season Road (ASR) and associated infrastructure.

This plan is at a conceptual stage as the mine has not yet been permitted.

1.1 Company Name, Location and Mailing Address

Company Name:
Canadian Zinc Corporation

Head Office:
Address: Suite 1710 - 650 West Georgia Street, Vancouver, BC, V6B 4N9
Phone: +1-604-688-2001
Fax: +1-604-688-2043
Email: david@canadianzinc.com

Prairie Creek Mine:
Iridium 9555 Satellite Phone 1 (yellow) 011-8816-315-30998
Iridium 9505A Satellite Phone 2 (black) 011-8816-315-30997
Iridium 9505A Satellite Phone 3 (orange) 011-8816-315-30996
Ground-To-Air Radio Handheld FREQ 122.800

1.2 Purpose

The purpose of the Invasive Species Management Plan is to identify best management practices to identify, control, monitor, and prevent the spread and introduction of invasive species along the Prairie Creek ASR and the surrounding environment during the construction and operation phases of the Project.

1.3 Related Documents

The Invasive Species Management Plan is linked to a number of other CZN management plans including:

- Rare Plant Management Plan;
- Health, Safety and Emergency Response Plan;
- Spill Contingency Plan;
- Sediment and Erosion Control Plan;
- Wildlife Management and Monitoring Plan;
- Road Operations and Maintenance Plan;
- Specific Borrow Pit Development Plans; and
- Road Closure and Reclamation Plan.

Details of the road, together with the schedule of road construction and operations/maintenance, are provided in CZN's Road Construction Plan (RCP) and Road Operations and Management Plan (ROMP). A map book of the road is provided in Appendix A.

1.4 Regulatory and Permitting Context

Concerns over the establishment and spread of invasive plant species, along the ASR and into the Nahanni National Park Reserve (NNPR), were raised during the EA of the ASR. In response to information requests during the EA, Tetra Tech developed an Invasive Species Management Framework. In response to the Framework, the Mackenzie Valley Review Board, within the Report of Environmental Assessment and Reasons for Decision – Canadian Zinc Corp. Prairie Creek All Season Road – Project EA1415-01 (2017, the 'REA') included the following measures:

CZN will survey the entire right-of-way for the presence of invasive species, prior to ground disturbance during construction, focussing on areas with higher likelihood for the establishment of invasive species.

In order to prevent significant adverse impacts to vegetation communities (which also serve as wildlife habitat), CZN will revise the invasive species management framework and create an Invasive Species Management Plan prior to construction, considering off-site as well as on-site prevention and control. CZN will include the adaptive management principles within the invasive species management framework, the Invasive Species Management Plan, and any individual weed control plans, if or as they are developed.

Prior to the commencement of construction, the Invasive Species Management Plan will be reviewed and approved by Parks Canada and the Mackenzie Valley Land and Water Board, with input from the Government of Northwest Territories where appropriate, as conditions in their respective land use permits. The developer will implement the approved plan(s).

Tetra Tech previously undertook rare plant surveys ……. (dates and road sections). While the focus of these surveys was rare plants, observations for the presence/absence of invasive species also occurred. A survey specific to the presence of invasive species, to complement the previous surveys and to fully address Measure 11-2, Part 2 of the REA, was completed in August 2018. The results of these surveys were used to inform mitigation measures and this ISMP, consistent with Measure 11-2, Parts 2-4.

1.5 Roles and Responsibilities

The ISMP is a living document which incorporates an adaptive management approach. This document will be reviewed every five (5) years and updated accordingly. More frequent revisions may be required if and when new species are detected/introduced, control methods are added or removed (based on effectiveness), and/or invasive species legislation changes. CZN's Environmental Monitor (EM), in collaboration with affected communities and regulatory agencies, will be responsible for implementing the ISMP. CZN will be responsible for appointing appropriate, qualified staff to identify and control invasive species.

CZN's EM will be properly certified and trained in the detection and management of invasive species and will be responsible for:

- Ensuring prevention measures for invasive species are followed;
- Monitoring current infestations of invasive species;
- Monitoring control measure success;

- Detecting new infestations and/or new invasive species;
- Reporting, maintaining a database, record keeping, and trend tracking; and
- Updating this management plan to reflect changes to legislation, new invasive species, changing control measures, etc.

All staff utilizing the road should be introduced to the concept and importance of invasive species during orientation and provided with contact to report suspicious plants.

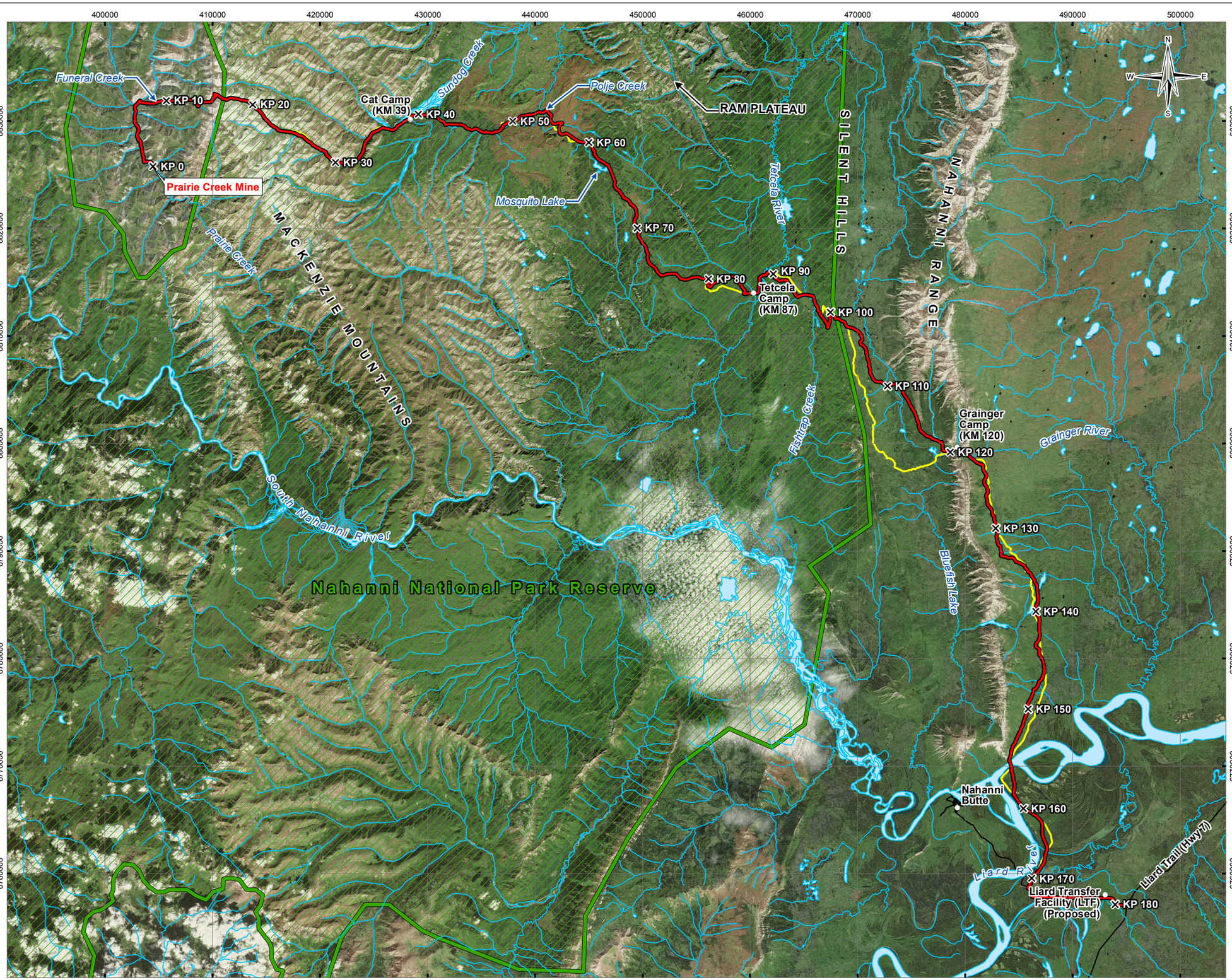
2.0 PROJECT DESCRIPTION

CZN is planning to operate the Prairie Creek Mine. The Mine is located at approximately 61° 33' north latitude and 124° 48' west longitude adjacent to Prairie Creek, a tributary of the South Nahanni River, south-west NWT (Figure 1).

A 179.5 km All Season Road (ASR) connecting the Mine (at Km 0) to the Liard Highway via the Nahanni Butte access road (Figure 2) will generally follow the alignment of a previously permitted Winter Road, while reflecting the terrain, site characteristics, and road specifications suitable and preferred for the ASR. Approximately half of the proposed ASR (85 km between Km 17-102)) is located within the NNPR. The NNPR, a world heritage site, is known for its globally-significant karst terrain, as well as the South Nahanni River, a Canadian Heritage River. Approximately half of the ASR alignment will directly overlap with the alignment of the permitted Winter Road.

Construction of the ASR will take approximately 3 years to complete. Initial winter roads will be built to gain access to the Mine, allow further investigation of the ASR alignment to complete detailed design, and to provide access for ASR construction. CZN's intent is to build the initial winter roads on the ASR alignment as much as possible to minimize the total extent of disturbance

The ASR will cross approximately 18 major streams with clear span bridges or large diameter culverts, and 85 minor streams with culvert diameters ranging from 800 mm to 2000 mm based on the size of the stream. Construction of the ASR will be supported by temporary camps at Km 23 (Sundog), Km 39 (Cat Camp), Km 65, Km 87, Km 121 (Grainger Gap), Km 151 or 158, and Km 177.5. The camps at Km 39, Km 87 and Km 121 will likely be retained in a reduced form to support on-going road maintenance.



LEGEND

- Access Road Kilometre Marker
- Proposed Prairie Creek Access Road
- Proposed Winter Road Alignment
- Existing Road
- Nahanni National Park Reserve Boundary
- Watercourse
- Waterbody

NOTES
Base data source:
Road alignment provided by AllNorth (July 2018)
Existing roads from CanVec (1:50,000)
Watercourses from CanVec (1:250,000)

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Proposed Access Road Alignment

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:350,000 5 2.5 0 5 Kilometres				TETRA TECH
FILE NO. EARC03145-01_Figure2.mxd				
OFFICE Tt-VANC	**DWN** SL	**CKD** BB	**APVD** RH	**REV** 0
DATE December 3, 2018	**PROJECT NO.** ENG.EARC03145-01			**Figure 2**

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3.0 BACKGROUND

Invasive alien plant species are those that have been introduced into areas beyond their natural range and are capable of causing significant harm to the environment, economy, or society (GNWT and NWT Biodiversity Team 2010). Generally, the Northwest Territories (NT) has fewer documented occurrences of invasive species despite its size compared to the rest of Canada. The NT does not have legislation pertaining specifically to weed control. Invasive species are likely to cause economic and environmental damage and should be controlled and/or prevented from dispersing. Increasing development, disturbance, and climate change may promote conditions favorable for the establishment of invasive species.

Roadways provide a vector for the establishment of invasive species. Invasive plants have the ability to aggressively establish and quickly spread in new environments, altering natural habitats, displacing native species, and reducing habitat effectiveness for wildlife. Once native species are displaced, conditions become favorable for the establishment of other invasive species, further compounding the issue. Invasive species can degrade riparian areas, destabilize slopes, increase fire hazards, reduce sightlines, and damage road infrastructure.

3.1 Invasive Plant Species within the Northwest Territories

Oldham and Delisle-Oldham (2017) detected 118 invasive plant species along highways and rest stops in the NWT, including the Liard Highway (Table1). Not including those that are already present along the existing portions of the ASR (see Section 3.2 below), the remaining species also have the potential to spread along the existing road network to the ASR. Not all of the species will require control as they are not aggressively invasive. Note that White Cockle (*Silene latifolia* ssp. *alba*) was found along the existing portions of the ASR but is not listed by Oldham and Delisle-Oldham (2017).

Table 1: Invasive Species Documented in the Northwest Territories

Common Name	Scientific Name
Manitoba Maple	*Acer negundo*
Pearl Yarrow	*Achillea ptarmica*
Crested Wheat Grass	*Agropyron cristatum* spp *pectinatum (Agropyron pectiniforme)*
Siberian Wheat Grass	*Agropyron fragile (Agropyron sibiricum)*
Black Bentgrass	*Agrostis gigantean*
Spreading Bentgrass	*Agrostis stolonifera*
Welsh Onion	*Allium fistulosum*
Creeping Meadow-foxtail	*Alopecurus arundinaceus*
Field Meadow-foxtail	*Alopecurus pratensis*
Green Amaranth	*Amaranthus retroflexus*
Annual ragweed	*Ambrosia artemisiifolia*
Wooly Burdock	*Arctium tomentosum*
Biennial Sagebrush	*Artemisia biennis*
Garden Orache	*Atriplex hortensis*
Spreading Orache	*Atriplex patula*
Wild Oats	*Avena fatua*
Cultivated Oats	*Avena sativa*
Russian Pigweed	*Axyris amaranthoides*
Mexican Summer-cypress	*Bassia scoparia*
English Daisy	*Bellis perennis*

Table 1: Invasive Species Documented in the Northwest Territories

Common Name	Scientific Name
Hoary False-alyssum	*Berteroa incana*
Chinese Mustard	*Brassica juncea*
Turnip	*Brassica napus*
Bird Rape	*Brassica rapa* var. *rapa (Brassica campestris)*
Meadow Brome	*Bromus commutatus*
Soft Brome	*Bromus hordeaceus (Bromus mollis)*
^*Awnless Brome	*Bromus inermis*
Corn Brome	*Bromus squarrosus*
Downy Brome	*Bromus tectorum*
Large-seeded False Flax	*Camelina sativa*
Shepherd's Purse	*Capsella bursa-pastoris*
Siberian Pea-tree	*Caragana arborescens*
Wild Caraway	*Carum carvi*
Common chickweed	*Cerastium fontanum (C. glomeratum,Cerastium vulgatum)*
Nodding Chickweed	*Cerastium nutans*
Dwarf Snapdragon	*Chaenorhinum minus*
Lamb's Quarters	*Chenopodium album*
Maple-leaved Goosefoot	*Chenopodium simplex (Chenopodium hybridum* var *igantospermum)*
^Creeping Canada Thistle	*Cirsium arvense*
Golden Clematis	*Clematis tangutica*
Narrow-leaved Collomia	(*Collomia linearis*)
Hairy Bugseed	*Corispermum villosum*
*Narrow-leaf Hawksbeard	*Crepis tectorum*
Orchard Grass	*Dactylis glomerata*
Dwarf Delphinium	*Delphinium elatum*
Cut-leaved Tansy Mustard	*Descurainia incisa*
Herb Sophia	*Descurainia sophia*
Thyme-leaf Dragonhead Nettle	*Dracocephalum thymiflorum*
Creeping Wild Rye	*Elymus repens (Agropyron repens, Elytrigia repens)*
Siberian Wild Rye	*Elymus sibiricus*
Canada Horseweed	*Erigeron canadensis*
Common Dog Mustard	*Erucastrum gallicum*
Worm-seed Wallflower	*Erysimum cheiranthoides*
Black Bindweed	*Fallopia convolvulus (Polygonum convolvulus)*
Hard Fescue	*Festuca trachyphylla*
Steppe Fescue	*Festuca valesiaca*
Great Blanket-flower	*Gaillardia aristate*
Brittle-stem Hemp	*Galeopsis tetrahit*
Catchweed Bedstraw (Cleavers)	*Galium aparine*
Herb-Robert	*Geranium robertianum*
Low Cudweed	*Gnaphalium uliginosum*
Low Baby's-breath	*Gypsophila muralis*
Tall Baby's-breath	*Gypsophila paniculata*
Common Sunflower	*Helianthus annuus*
Dame's Rocket	*Hesperis matronalis*
Barley	*Hordeum vulgare*

Table 1: Invasive Species Documented in the Northwest Territories

Common Name	Scientific Name
Mexican Summer-cypress (Burningbush)	*Kochia scoparia*
Prickly Lettuce	*Lactuca serriola*
Common Dead Nettle	*Lamium amplexicaule*
European Stickseed	*Lappula squarrosa (Lappula echinata)*
Dense-flower Peperwort	*Lepidium densiflorum*
Garden Pepperwort	*Lepidium sativum*
Poor-man's Peppergrass	*Lepidium virginicum*
*Ox-eye Daisy	*Leucanthemum vulgare (Chrysanthemum leucanthemum)*
Great Basin Lymegrass	*Leymus cinereus*
Butter-and-Eggs	*Linaria vulgaris*
Common Yellow Flax	*Linum usitatissimum*
Tall Rye Grass	*Lolium arundinaceum*
Annual Rye Grass	*Lolium multiflorum*
Perennial Rye Grass	*Lolium perenne*
Tatarian Honeysuckle	*Lonicera tatarica*
Bird's-foot Trefoil	*Lotus corniculatus*
Dwarf Mallow	*Malva neglecta*
Pineapple Weed	*Matricaria discoidea (M. matricarioides; M. suaveolens)*
*Yellow Alfalfa	*Medicago falcata*
Black Medick	*Medicago lupulina*
*Alfalfa	*Medicago sativa*
^*White Sweet-clover	*Melilotus albus*
^*Yellow Sweet-clover	*Melilotus officinalis*
Yellow Ball Mustard	*Neslia paniculata*
Sainfoin	*Onobrychis viciifolia*
Wild Parsnip	*Pastinaca sativa*
Pale Smartweed	*Persicaria lapathifolia*
Common Canary Grass	*Phalaris canariensis*
Two-row Stonecrop	*Phedimus spurius*
Common Timothy	*Phleum pretense*
Nipple-seed Plantain	*Plantago major*
Annual Bluegrass	*Poa annua*
Flat-stem Bluegrass	*Poa compressa*
Striate Knotweed	*Polygonum achoreum*
Prostrate Knotweed	*Polygonum aviculare (Polygonum buxiforme)*
Speading Alkali Grass	*Puccinellia distans*
Common Buttercup	*Ranunculus acris*
Wild Radish	*Raphanus raphanistrum*
Garden Radish	*Raphanus sativus*
Rhubarb	*Rheum rhabarbarum*
Curly Dock (Yellow Dock)	*Rumex crispus*
Procumbent Pearlwort	*Sagina procumbens*
Autumn Hawkbit	*Scorzoneroides autumnalis*
Tall Rye Grass (Tall Fescue)	*Schedonorus arundinaceum (Lolium arundinaceum; Festuca arundinacea)*
Cultivated Rye	*Secale cereale*

Table 1: Invasive Species Documented in the Northwest Territories

Common Name	Scientific Name
Common Ragwort	*Senecio vulgaris*
Rough Bristlegrass	*Setaria verticillata*
Green Bristlegrass	*Setaria viridis*
Balkan Cathfly	*Silene csereii*
Corn Mustard	*Sinapis arvensis*
Tall Hedge Mustard	*Sisymbrium altissimum*
False London Rocket	*Sisymbrium loeselii*
*Field Sow Thistle	*Sonchus arvensis*
Common Sow-thistle	*Sonchus oleraceus*
False Spiraea	*Sorbaria sorbifolia*
Corn Spurrey	*Spergula arvensis*
Garden Spinach	*Spinacia oleracea*
Hispid Hedge-nettle	*Stachys hispida*
Common Starwort	*Stellaria media*
*Common Tansy	*Tanacetum vulgare*
Red-seeded Dandelion	*Taraxacum erythrospermum (T. laevigatum; T. scanicum)*
Common Dandelion	*Taraxacum officinale*
Intermediate Quackgrass	*Thinopyrum intermedium*
Field Pennycress / Stinkweed	*Thlaspi arvense*
Yellow Goatsbeard	*Tragopogon dubius (major)*
*Alsike Clover	*Trifolium hybridum*
*Red Clover	*Trifolium pretense*
White Clover	*Trifolium repens*
*Scentless Chamomile (False Mayweed)	*Tripleurospermum inodorum (Tripleurospermum perforata, Atricaria perforata)*
Bread Wheat	*Triticum aestivum*
Long-leaf Speedwell	*Veronica longifolia*
Tufted Vetch (Bird Vetch)	*Vicia cracca*
Johnny-jump-up	*Viola tricolor*
Brome Six-weeks Grass	*Vulpia bromoides*

Notes:

*Denotes priority species in the NWT according to Oldham and Delisle-Oldham (2017) (12 in total)

^Denotes species of concern listed in a pamphlet called Invaders in the Northwest Territories produced by the GNWT and the Government of Canada

Species highlighted in blue were found along the existing CZN access road corridor in 2018

Species highlighted in green were found along the existing CZN access road and Highway 7

Species highlighted in yellow were found along Highway 7

3.2 Invasive Plant Surveys

Four rare plant surveys of the ASR alignment, 1980's winter road, and other areas of proposed development (e.g., borrow sources) have been completed to date (2009, 2010, 2016, and 2017) at various times in the summer (June to August) to capture a range of flowering periods. No invasive species were observed during any of these surveys.

In August 2018, Tetra Tech conducted an invasive plant species survey. The survey generally followed the walking survey methodology as presented in Oldham and Delisle-Oldham (2017). The invasive plants listed in Oldham and Delisle-Oldham (2017) were the focus of the survey. The 2018 baseline invasive plant survey scope of work on and near the proposed access road alignment included:

- Survey areas of the access road that overlap with previous anthropogenic vehicular/machine disturbance, including the historic winter road and exploration cut-lines;
- Survey the Nahanni Butte community access road from the Liard Highway to the Liard River that overlaps with the CZN access road;
- Survey the old logging road from the Nahanni Butte access road to the Liard River that was cleared by the Nahanni Butte community previously, sections of which will be overlapped by the ASR;
- Survey the Prairie Creek Mine site;
- Survey/spot check pristine areas along the ASR that are currently undisturbed; and
- Provide a summary report of findings.

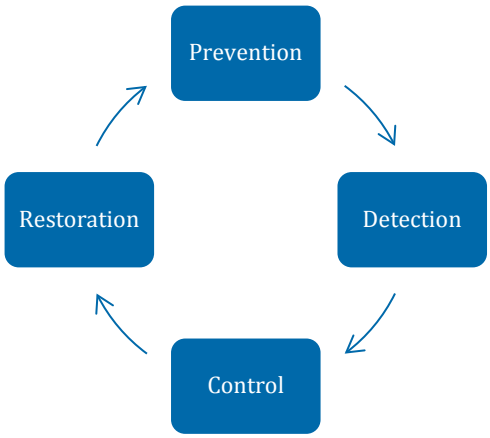
Twenty-three (23) invasive species were identified in high densities between KP 155 to KP 179.5 (south of the Liard River, see Section 6.0; Figures 3a - 3q). No invasive species were detected between KP 155 (just north of the Liard River) to KP 0. However, four invasive species were observed around the Mine site in small numbers. Previous vegetation surveys within the NNPR did not detect invasive species.

Bison may be a contributing factor to the spread of invasive species south of the Liard River. One year after the community of Nahanni Butte conducted additional clearing proximal to the old logging road, high densities of invasive species were found along the cut-line. These species may also have resulted from contaminated equipment. Community members do not use the cutline (it is relatively inaccessible due to terrain) however, it seems to be favored by bison to move between habitats, as evident from well-trodden trails and wallows.

The challenge for invasive plant management along the ASR will be keeping invasive species from spreading into the area north of the Liard River and into the NNPR.

4.0 INVASIVE SPECIES MANAGEMENT

Four key principles (prevention, detection, control, and restoration) can be applied to any species detected throughout the lifetime of the Project to provide the most applicable mitigation for control. Through monitoring, adaptive management can be applied to further refine prevention, detection, and control measures.



4.1 Land Management Goals and Objectives

The land management goals and objectives with respect to invasive plant species are as follows:

- As much as possible, prevent invasive species from spreading into the area north of the Liard River and into the NNPR;
- Collaborate with the community of Nahanni Butte to prevent further spread through education, engagement, and involvement with prevention, detection, control, and restoration measures;
- Collaborate with the Government of the Northwest Territories – Environment and Natural Resources' Invasive Alien Species Program to stay apprised of upcoming threats from adjacent districts and innovative treatment technologies;
- Manage infestation levels so that the project does not result in an increase relative to local and regional background levels;
- Protect public health, environmental resources, and ecologically sensitive areas; and
- Prevent the establishment of new invasive species through early detection and rapid response.

4.2 Prevention

Preventative measures are controls used to stop the initial establishment or further spread of invasive species through construction and operation of the ASR. Examples of preventative measures include:

- Minimize the spread of invasive species through measures such as mowing. Where possible, mow in areas with native vegetation first and mow infested areas last. Invasive species should be mowed before seed set. Depending on the species and growth stage, ditch clippings may require collection and formal disposal (e.g., in a designated area). A mow height of 15 cm is recommended. Ensure equipment is properly cleaned after each use;
- At the planned Liard River vehicle inspection station, check for dirt and debris and wash if necessary. A wheel wash is planned for the open water season. The inspection station should be contained such that contaminated water may not flow into the surrounding environment;
- Road use monitoring – to deter access and use of the road by unauthorized persons. Off-road vehicles have a high potential of introducing invasive species; road use monitoring (a checkpoint) is proposed on the ASR north of the Liard River;
- Recontour, seed, and/or plant with native species in disturbed areas as soon as possible to inhibit the establishment of invasive species. Ensure seed mixes consist of native species and free of weeds (request a certificate of seed analysis). See Canada's *Seeds Act* (2018a), *Seeds Regulations* (2018b) and *Weed Seeds Order* (2018c);
- Any fill or rock brought on site should be clean and free of debris. Avoid using sediment erosion control materials such as straw bales, unless they have been certified to be free of weeds;
- Limit vehicle traffic, staging areas, roadside parking (where possible) through areas with known weed infestations;
- Wildlife, especially bison, may contribute to the spread of invasive species. Consider using devices such as cattle guards to discourage wildlife from using the ASR; and
- Encourage the establishment of native vegetation in disturbed areas through natural encroachment. Native vegetation, once established, is often effective at keeping invasive species out.

4.3 Detection

During the growing season, an invasive species survey will be completed once per month. Early detection and rapid response are the most effective ways to control the spread of invasive species. Accurate species identification and detection will help the EM to understand growth rates, mechanisms for spread, preferred environmental conditions, and the most suitable control method (if warranted). For consistency, survey methods will generally follow those described by Oldham and Delisle-Oldham (2017; Appendix A); when a detection is first made, the following information will be recorded:

- Geographic location;
- Percent cover;
- Other species present amongst the infestation; and
- Extent of infestation

Other considerations will include:

- Potential effects of the species (e.g., is it altering ecosystem processes? How competitive is it with native species?);

- By what means does the species spread (e.g., vegetatively vs. seed);
- How valuable and/or rare is the habitat with the infestation; and
- How difficult would it be to treat the infestation (and maintain it over time to limit re-infestations) and to re-establish with native species.

Once an invasive species is identified, control measures will begin promptly as this is the best method for reducing the risk of spread.

4.4 Management Strategies, Control Options, and Restoration

If prevention measures fail and an invasive species infestation is detected, mitigation measures may be required. First, the EM should determine and address the condition that caused the infestation (e.g., how invasive species were introduced to an area). Next, a control measure and eradication goal should be determined. For treatment, a combined approach between mechanical (e.g., mowing, pulling, etc.) and chemical practices often work best depending on the target species and adjacent landscape features. Invasive species should be removed prior to seed set.

The treatment type will be determined based on the following criteria:

- Species – composition of native species and invasive species. Some areas will have several invasive species in one location;
- Percent bare ground;
- Accessibility (e.g., terrain);
- Safety issues to contractors, the community, and the environment;
- Short and long-term effects of the treatment options being considered;
- Effectiveness of the treatment options considered;
- Cost of the treatment;
- Benefits and limitations of each method;
- Weather conditions (e.g., wind, precipitation) for chemical application;
- Land use management practices of adjacent land, especially around the community of Nahanni Butte and waterbodies;
- Sensitive environmental features such as watercourses, wetlands, lakes, and habitat for species at risk (plants and wildlife);
- Herbicide properties such as toxicity, use around water, lag time before replanting/seeding, selectiveness, etc.;
- Revegetation strategies will consider soil type, moisture regime, compaction, growing season, etc.;
- Mulch from grass clippings can supress or stunt growth of invasive species; and
- Hand pulling is useful for annuals and tap-rooted plants where the infestation is small or in sensitive areas such as riparian zones. Weeds will be bagged, removed from site, and disposed of in a manner that will not result in an infestation in the disposal area.

Some control measures may require consultation with applicable stakeholders; existing regulations may also potentially limit the application of specific mitigation measures (e.g., the use of herbicides in National Parks or other treatment measures such as prescribed burns). Suggested treatments for the 23 species observed during the

baseline survey are detailed in Section 6.0. As new species are discovered, appropriate treatment plans will be developed.

4.5 Monitoring and Reporting

Monitoring provides the means to gather information to evaluate the success of prevention, detection, and control measures. Once control measures have been implemented, regular monitoring and follow-up reporting will occur to verify whether the eradication goal has been met and the site has been sufficiently restored to target conditions (e.g., pre-infestation conditions or some equivalent level of acceptability). Once an area has been treated, the EM should assess the effectiveness for all species treated, percent cover before and after treatment (of invasive and native species), and the overall condition of the treated area. If eradication goals are not met, alternative control measures may need to be deployed.

If control measures are effective, the site can enter back into regular monitoring with the rest of the ASR. The ultimate focus is to maintain native vegetation communities. Areas that are likely the most vulnerable to invasive species are areas disturbed by construction and road operation. In these areas, if invasive species are detected, additional techniques may warrant consideration to encourage native plant encroachment and limit pathways for the establishment of invasive species.

Monitoring for invasive species should occur at regular intervals (a minimum of once per month) during the growing season (June to August), during operation of the access road as recommended for appropriate detection (Section 4.3). Monitoring during construction should also occur once vehicle access from either the Mine or the Nahanni Butte access road is possible. Inventories of species and their infestation areas should be maintained. Depending on the time of year when treatment is applied, effectiveness will be monitored within two weeks of treatment. A database will be developed to track all activities and an annual report will be prepared summarizing yearly activities and progress.

4.6 Adaptive Management

Adaptive management will be used to evaluate the effectiveness of the ISMP; the Plan is effective if the goals are being met. The ISMP is a living document. As part of the adaptive management approach, this document will require revisions if and when new species are detected/introduced, control methods are added or removed (based on effectiveness), new vectors for spread/propagation are introduced (e.g., natural disturbances such as fire or flood), and/or invasive species legislation changes.

Regular evaluation and self-assessment of all stages of the management process provide information on the outcome of previous interventions and allow for ongoing improvement (Timko & Innes 2009). Consistent, long-term management and control of invasive species is required. Should follow-up operations cease, any advances achieved may be lost in a very short time.

5.0 RECOMMENDATIONS

Prior to construction, invasive species should be controlled along the Nahanni Butte community access road, the old logging road and areas proximal to it cleared by the community (cut-line), and around the Mine. These areas pose significant risk for spreading invasive species along the ASR.

6.0 SPECIES IDENTIFICATION AND CONTROL PLANS

Lifecycles, physical descriptions, key identification features, avenues of disbursement, favorable habitats, and applicable control measures are listed for each invasive plant species observed during the 2018 baseline survey. Certain features are more obvious in some species (e.g., seeds) than others and therefore may not be described for each species.

6.1 Biennial Sagebrush (*Artemisia biennis*)

Synonyms
Biennial wormwood

Life Cycle
Annual or biennial

Leaves
Leaves are hairless, have toothed margins, and grow alternately. The lower leaves are bipinnatifid and the upper leaves are pinnatifid

Stems
Reddish-green stems about 5cm in diameter, growing 30-100 cm tall

Flowers
A rod of densely clustered greenish-yellow flower heads. Each globe-like flower is about 0.3 cm in diameter

Similar Species
Biennial Sagebrush plants can appear very similar to Common Ragweed (*Ambrosia artemisiifolia*). However, Common Ragweed have hairs on the leaves and stems while Biennial Sagebrush is hairless. Additionally, Biennial Sagebrush releases a carrot or sage-like odour when crushed while Common Ragweed does not.

Dispersal and Reproductive Mechanisms
Seed

Favourable Habitat
Moist riparian areas such as marshes and along banks and shorelines, and in areas with anthropogenic disturbance such as roadsides, railway embankments, quarries, ditches, field edges, and waste places.

Control Measures
One of the most effective control methods of Biennial Sagebrush is hand-pulling and/or mowing repeatedly before seed heads are mature (Kegode & Darbyshire 2013).

Chemical control is another option; however, Biennial Sagebrush is tolerant of several herbicides, including dinitroanalines and many acetolactate synthase (ALS), hydroxyphenylpyruvate dioxygenase (HPPD), and protoporphyrinogen oxidase (PPO) inhibitors, acetamides, and more (Kegode et al 2007). It also avoids most exposure to herbicides through late emergence in the spring/summer (Johnson et al. 2004). Post-emergence control of Biennial Sagebrush can be achieved at an 80% success rate by applying Atrazine, Bentazon, Clopyralid, Dicamba, Glufosinate, Glyphosate, MCPA, 2,4-D to seedlings under 8 cm (Kegode & Darbyshire 2013). When seedlings are taller, 90% control can be attained with Benzaton and Glyphosate (Kegode & Fronning 2005).

Biennal Sagebrush
Artemisia biennis

Mature Plant

Flowers

Juvenile Plant

Awnless Brome
Bromus inermis

Mature Plant

Nick Kurzenko

Flowers

John M. Randall, The Nature Conservancy, Bugwood.org

Seeds

6.2 Awnless Brome (*Bromus inermis*)

Synonyms
Smooth Brome, Bromegrass, Austrian Brome, Hungarian Brome, Russian Brome

Life Cycle
Perennial

Leaves
Flat, nearly hairless blades growing 15-40 cm long and 5-15 mm wide. Sheath is closed, creating a V-shaped notch

Stems
Erect stems 20-150 cm tall

Flowers
The panicle is open and nodding, and 5-20 cm long. Several branches grow per node, each branch bearing purple to brown spikelets

Similar Species
Awnless Brome can be distinguished from Nodding Brome (*B. anomalus*) by the presence of an open panicle (not a drooping panicle) and a creeping rhizome

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction (tillers, rhizomes, stolons)

Favourable Habitat
Fields, pastures, roadsides, and sandy river banks and islands

Control Measures
Hand-pulling can be an effective control measure for small infestations. For larger infestations, the most effective control of Awnless Brome is through four repetitions of intensive mowing (Sather 1987). The timing of mowing is important: cutting should occur during the boot and/or short blade stages (Sather 1987) and not during stem elongation, which may actually accelerate growth.

Prescribed burns may also be effective control measures (Howard 1996), depending on the timing of the burn and the community composition, as native species must be able to re-establish the burned area (Otfinowski et al. 2006). One study found that peak reduction in tiller density and Awnless Brome biomass was achieved when fire was prescribed during tiller elongation (Willson & Stubbendieck 2000). Another study found that a springtime (May) prescribed fire in conjunction with a high watering regime to increase soil moisture decreased the percent Awnless Brome more than burning conducted with low soil moisture levels (Blankenspoor & Larson 1994). Having a high soil-moisture may give native grasses the competitive edge competitive edge necessary to outcompete the Awnless Brome post-fire.

Awnless Brome may also be effectively controlled using Glyphosate, Dalapon or Atrazine before flowering (Howard 1996, Otfinowski et al. 2006).

Shepherd's Purse
Capsella bursa-pastoris

Mature Plant

Bubar et al. 2000

Flowers

Bubar et al. 2000

Triangular Seed Pods

Bubar et al. 2000

6.3 Shepherd's Purse (*Capsella bursa-pastoris*)

Synonyms
None

Life Cycle
Annual, Winter Annual

Leaves
Rosette of wavy to deeply lobed basal leaves. Small, stalkless stem leaves, decreasing in size toward the top of the plant, with smooth to lobed margins

Stems
Grow up to 80 cm tall

Flowers
Small white flowers with 4 sepals and petals

Seeds
Seeds are oblong, 1mm long, and orange to yellow in colour with a punctured surface. Seed pods are flattened and almost heart-shaped (triangular with a notch at the top). Each seed pod contains about 20 seeds

Dispersal and Reproductive Mechanisms
Seeding. Several stems can arise from the same root

Favourable Habitat
Cultivated areas, waste areas, meadows, roadways

Control Measures
Hand-pulling can be an effective control measure for small infestations (Government of Alberta 2009b)

Chemical control, however is the recommended means of control (Government of Alberta 2009b). Control of fall rosettes is most important, as over-winter rosettes overtake quickly in the spring (Government of Alberta 2009b, Government of Manitoba 2017g). Late fall applications of some Group 2 and 4 herbicides such as 2,4-D and MCPA are recommended (Government of Alberta 2009b, Government of Manitoba 2018). Alternatively, burndown herbicides may be applied in the spring when weeds are small and actively growing and fall rosettes have not bolted (Government of Alberta 2009b).

Tillage is not recommended as a form of control for this invasive species.

Maple-leaved Goosefoot
Chenopodium simplex

Mature Plant

Flowers

Leaves

6.4 Maple-leaved Goosefoot (*Chenopodium simplex*)

Synonyms
Giant Seed Goosefoot

Life Cycle
Annual

Roots
Has a taproot

Leaves
Alternate, bright green, oval to triangular in shape and resembling maple leaves, with 2-4 deep teeth or waves on the margins

Stems
Bright green, grooved, hairless stem growing 30-150 cm tall

Flowers
Small green flowers less than 2mm wide

Seeds
Shiny, black, disk-shaped seeds 1.5-2mm diameter

Similar Species
Maple-leaved Goosefoot is similar to several other species in the *Chenopodium* genus. Lamb's Quarters (*C. album*) has wider leaves with a mealy underside, Oak-leaved Goosefoot (*C. glaucum*) has leaves with white undersides, and Strawberry Blite (*C. capitatum*) has fleshy red flowers

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Waste areas, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

Chemical control may be effective using some Group 4 and 7 herbicides such as MCPA and Linuron (Government of Manitoba 2018)

Lamb's Quarters
Chenopodium album

Mature Plant

Bubar et al. 2000

Flowers

Bubar et al. 2000

Striped Stem

Bubar et al. 2000

6.5 Lamb's Quarters (*Chenopodium album*)

Synonyms
Pigweed, Fat-hen, White Goosefoot

Life Cycle
Annual

Leaves
Alternate, stalked leaves of variable shape (often triangular) with toothed margins. The upper surface is green. The lower surface is greyish-green and often covered with white mealy particles

Stems
Erect, branched stems growing 60-250 cm tall. Stems are green and grooved, with purple or red vertical striping

Flowers
Small and inconspicuous green or blue-green flowers with no petals growing at the top of the stem and in the leaf axils

Seeds
Shiny, black, disk-shaped seeds about 1mm in diameter, often covered in a white papery envelope

Similar Species
Lamb's Quarters is similar to several other species in the *Chenopodium* genus. Maple-Leaved Goosefoot (*C. gigantospermum*) has thinner leaves and larger seeds, Oak-leaved Goosefoot (*C. glaucum*) has smaller leaves with white undersides and is a shorter plant, and Strawberry Blite (*C. capitatum*) has fleshy red flowers and triangular leaves with wavy or toothed margins

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Fields, waste places, roadsides

Control Measures
Hand-pulling may be an effective control measure for small, localized infestations. For larger infestations, tillage may be effective, as Lamb's Quarters cannot recover once uprooted

Chemical control may be effective using Group 1,2,4, and 5 herbicides such as Glyphosate, Bromoxynil, Dicamba, or Thifensulfron (Cowbrough 2017, Government of Manitoba 2018, Parks et al. 1995). Note that Lamb's Quarters resistant to some Group 2 and 5 herbicides have been found in Ontario and in some regions of the United States (Cowbrough 2017)

Narrow-leaved Collomia
Collomia linearis

Mature Plant

© 2016 Kier Morse

Flowers

Royer & Dickinson 2000

Seeds

© 2011 Jean Pawek

6.6 Narrow-leaved Collomia (*Collomia linearis*)

Synonyms
Tiny Trumpet, Slenderleaf Collomia, Narrow-leaved Mountain-trumpet

Life Cycle
Annual

Leaves
Leaves are simple, alternate, linear to lance-shaped, hairy, and greyish-green, with smooth margins. Leaves grow 2-5 cm long and 10-15 mm wide

Stems
Stems are velvety, erect, simple or branched, and grow up to 40 cm tall

Flowers
Flowers are pink, trumpet-shaped, have five rounded petals, and are 10-15 mm long

Seeds
Seeds are sticky when wet

Dispersal and Reproductive Mechanisms
Capsules explode at maturity and disperse seeds short distances

Favourable Habitat
Roadways, railroad right-of-ways, gravel pits, rocky outcrops

Control Measures
Hand-pulling can be an effective control measure for small infestations

Herbicide is likely effective

Narrow-leaf Hawsbeard
Crepis tectorum

Mature Plant

Bubar et al. 2000

Flowers

Bubar et al. 2000

Juvenile Plant

Bubar et al. 2000

6.7 Narrow-leaf Hawksbeard (*Crepis tectorum*)

Synonyms
Narrow-leaved Hawksbeard, Narrow-leaved Hawk's-beard

Life Cycle
Annual, Winter Annual

Leaves
Lance-shaped, stalked basal leaves with a margin of backward-pointing teeth or lobes. Stem leaves are alternate, stalkless, and clasp the stem

Stems
Stems are hairless, leafy, contain a milky juice, and grow up to 100 cm tall

Flowers
Flower cluster is 10-15 mm in diameter with 30-70 yellow ray florets

Seeds
Dark brown to purple achene with a pappus of white bristles

Similar Species
Smooth Hawksbeard (*C. capillaris*) is similar but has head bracts are smooth (not hairy) and has pale brown (not purple) seeds

Dispersal and Reproductive Mechanisms
Seeding

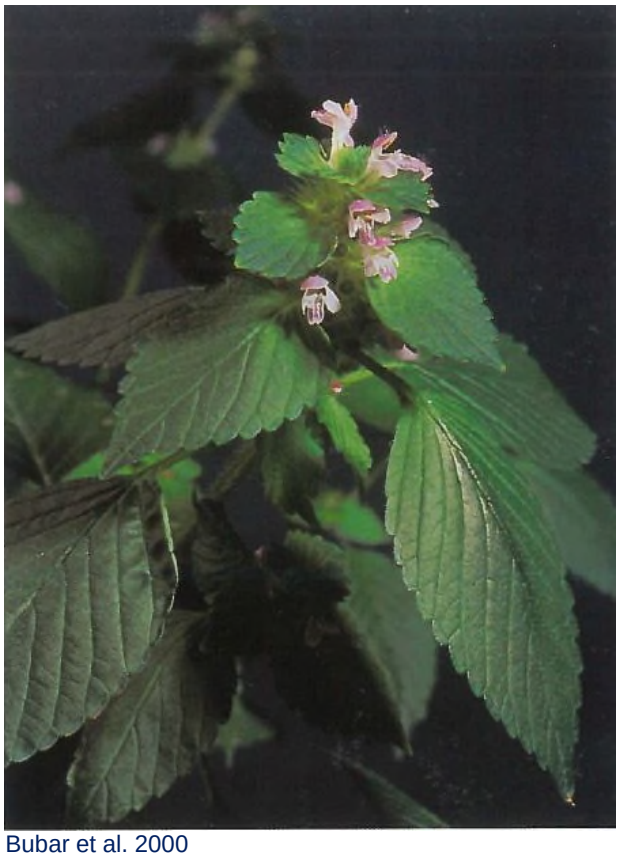
Favourable Habitat
Roadsides, fields, railway yards, waste places

Control Measures
Hand-pulling can be an effective control measure for small infestations

For larger infestations, effective control methods include tillage in the spring or fall and applications of some Group 2 and 4 herbicides such as Reclaim II and 2,4-D in the fall (Government of Manitoba 2018, Nadja *et al*. 1982)

Brittle-stemmed Hemp-nettle
Galeopsis tetrahit

Mature Plant



Bubar et al. 2000

Flower

Bubar et al. 2000

Bristly Hairs on Square Stem

Bubar et al. 2000

6.8 Brittle-stemmed Hemp-nettle (*Galeopsis tetrahit*)

Synonyms
Common Hemp-nettle

Life Cycle
Annual

Leaves
Opposite, elliptical, toothed, and hairy leaves 5-10 cm long with long stalks

Stems
Stems are square and hairy and grow 30-75 cm tall. Nodes appear swollen

Flowers
Clusters of white, pink, or purple flowers growing in the axils of the upper leaves

Seeds
Seeds are teardrop-shaped, with a mottled surface of brown, grey, and black

Similar Species
It is indistinguishable from Yellow-flowered Hemp-nettle (*G. speciosa*) when in the seedling stage. At the mature stage, the yellow flowers of the Yellow-flowered Hemp-nettle set the two species apart

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Open and wooded areas and cultivated fields

Control Measures
Hand-pulling can be an effective control measure for small infestations

For larger infestations, the Government of Manitoba (2018) recommends chemical control using select herbicides in Groups 1,2,4,6,9,14 and 27, such as Ares (Imazamox and Imazapyr), Barricade II, Enforcer D (fluroxypyr, 2,4-D, and Bromoxynil), and Flexstar GT (Glyphosate and Fomesafen). Note that Brittle-stemmed Hemp-nettle is resistant to some Group 2 and 4 herbicides in Manitoba and Alberta (Government of Manitoba 2018).

Barley
Hordeum vulgare

Mature Plant

Bubar et al. 2000

Barley Spike

Bubar et al. 2000

Large Claw-like Auricles

Bubar et al. 2000

6.9 Barley (*Hordeum vulgare*)

Synonyms
Common Barley

Life Cycle
Annual

Roots
Fibrous root system

Leaves
Hairless leaf blades with large, white, claw-like auricles

Stems
Erect stems

Flowers
Inflorescence is a spike with two or six rows of kernels with three spikelets at each rachis node. The central spikelet has a floret that develops into a grain or seed

Similar Species
Common wheat

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Fields, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

Chemical control may be effective with some Group 1, 2,4,9, and 14 herbicides such as Quizalofop, Imazamox, Flucarbazone, Tribenuron, Glyphosate and Fomesafen and (Government of Manitoba 2018).

Dense-flower Pepperwort
Lepidium densiflorum

Mature Plant

Bubar et al. 2000

Seedpods

Bubar et al. 2000

Juvenile Plant

Bubar et al. 2000

6.10 Dense-flower Pepperwort (*Lepidium densiflorum*)

Synonyms
Common Peppergrass, Green-flowered Peppergrass

Life Cycle
Annual, Winter Annual

Leaves
Basal rosette of deeply lobed leaves. Stem leaves are alternate and linear to lanceolate, with toothed to deeply lobed or divided margins

Stems
Stems are erect, covered with short hairs, grow up to 60 cm tall, highly branched near the top. Stems are covered in short hairs

Flowers
Flowers grow in a raceme, and are small and white to pale pink, though the petals are shorter than the calyx or lacking altogether, so the flowers often appear green

Seeds
Seeds are bright red to yellow, flattened, oblong, and about 1.5 mm long. Seed pods are round and flattened and encase only one or two seeds each

Similar Species
Dense-flower Pepperwort is similar to Poor Man's Pepperwort (*L. virginicum*), Clasping-leaved Pepperwort (*L. perfoliatum*), and Field Peppergrass (*L. campestre*). However, Poor Man's Pepper has petals twice as long as the sepal, Clasping-leaved Peppergrass has yellow flowers, and Field Peppergrass has seed pods covered in scales

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Fields, waste places, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

Chemical control may be effective with applications of some Group 2 and 4 herbicides such as Metsulfron, 2,4-D and MCPA (Government of Manitoba 2018)

Pineapple Weed
Matricaria discoidea

Mature Plant

© 2008 Steve Matson

Flowers

© 2009 Barry Breckling

Flowers – Detail

© 2008 Steve Matson

6.11 Pineapple Weed (*Matricaria discoidea*)

Synonyms
Disc Mayweed, Pineapple Mayweed, Rayless Mayweed, Rayless Chamomile, Wild Chamomile

Life Cycle
Annual

Roots
Taproot

Leaves
Bright green, alternate, glabrous leaves divided into narrow segments growing from stem branches. Smell like pineapple when crushed

Stems
Hairless, branched stem, growing up to 50 cm tall

Flowers
Conical flowerheads with greenish-yellow corollas and lacking ray florets. About 1cm in diameter. Look somewhat like pineapples

Seeds
Become sticky when wet to aid in long-distance dispersal

Similar Species
None

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Roadsides, footpaths, fields, waste areas

Control Measures
Hand-pulling is recommended for small infestations, as well as mulching seedlings. Mowing is not an effective method of control for this species (North Dakota State University 2012)

Chemical control may be effective with applications of some Group 4 herbicides such as 2,4-D (Government of Manitoba 2018), pre-emergence applications of Devrinol (Napropamide) or post-emergence applications of Glyphosate (North Dakota State University 2012).

Narrow-leaf Hawsbeard
Crepis tectorum

Mature Plant

Bubar et al. 2000

Flowers

Bubar et al. 2000

Juvenile Plant

Bubar et al. 2000

6.12 Black Medick (*Medicago lupulina*)

Synonyms
Nonesuch, Hop Clover

Life Cycle
Annual

Roots
Wiry taproot

Leaves
Alternate, hairy leaves consisting of three leaflets, with the middle leaflets on a longer stalk than the other two. Two sharply-pointed stipules at the base of each leaf

Stems
Prostrate, trailing, hairy stems growing 20-80 cm long. Often forming mats on the ground

Flowers
Spherical racemes with 20-50 irregular yellow flowers. Flowers are small and pea-like

Seeds
Black seed pods each containing one amber seed

Dispersal and Reproductive Mechanisms
Seed

Favourable Habitat
Waste areas, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

Chemical control may be effective using applications of some Group 4 herbicides such as mecoprop-p, 2,4-D, and dichlorprop (Government of Manitoba 2018).

Alfalfa
Medicago sativa

Flowers

Seedpods

Mature Plant

6.13 Alfalfa (*Medicago sativa*)

Synonyms
Lucerne, Purple Medic

Life Cycle
Perennial

Roots
Deep taproot. Root system grows deep, usually 2-3m, but sometimes up to 15m deep

Leaves
Alternate, compound leaves with three oval leaflets

Stems
Erect stems growing up to 90 cm tall. Stems are branched and either glabrous or slightly hairy on the upper parts of the stems and branches

Flowers
Oval racemes with 1-30 purple or blue irregular flowers

Seeds
Seeds are kidney-shaped and range from yellow to brown in colour. Each seed pod contains 6-8 seeds

Similar Species
Yellow alfalfa

Dispersal and Reproductive Mechanisms
Seeding.

Favourable Habitat
Disturbed areas

Control Measures
Hand-pulling can be an effective control measure for small infestations

Chemical control methods may be effective using Group 2,4,9 and 14 herbicides such as Florasulam, Halauxlfen, MCPA, Flurozypyr, Glyphosate, Fomesafen (Government of Manitoba 2018), picloram, 2,4,-D, and 2,4,5-T (Sullivan 1992).

Burning is not an effective control method, as root systems remain unaffected (Sullivan 1992).

White Sweetclover
Melilotus albus

Mature Plant

Flowers

Leaves

6.14 White Sweetclover (*Melilotus albus*)

Synonyms
Honey Clover, White Melilot, Bokhara Clover, Sweet Clover

Life Cycle
Annual or biennial

Roots
Roots form an extensive system with a semiwoody taproot and lateral roots and produce root crown buds

Leaves
Alternate, compound leaves with three leaflets

Stems
Sweet-smelling stem, grows up to 2.5m long

Flowers
Lots of white flowers, can be up to 350,000 flowers on one plant

Similar Species
Yellow sweetclover

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Flourishes in well-drained clay and clay loam soils as well as saline soils. Often found along roadsides, railways, grasslands, and riparian areas

Control Measures
Hand-pulling is a successful control method for small infestations if conducted when the ground is moist, to maximize the possibility of removing the entire root system (Gucker 2009). Mulching is also considered quite effective (Tu et al. 2001). Mulch may either be applied in a layer at least 10 cm prior to seed germination or over seedlings in a thicker layer, usually at least 15 cm or until no light may reach the plants (University of California 2017). Cutting and mowing may also be somewhat effective, though they primarily reduce seed generation in the plant, rather than reducing the abundance of the plants themselves (Gucker 2009).

Another potential method of control for White Sweetclover is to seed with native perennial plants, as an established cover of perennial species has been found to reduce White Sweetclover abundance within two years (Gucker 2009).

Burning may be used as a form of control, though controlled burns must be conducted two years in a row during late spring or summer, as fall and winter burns increase the plant's abundance (Gucker 2009, Tu et al. 2001).

White Sweetclover can be controlled using most herbicides designed for broad-leaved plants (Government of Manitoba 2017h), such as 2,4,-D, Quinclorac, and Dicamba, though Conn & Seefeldt (2009) found Chlorsulfron to be the most effective chemical control.

Common Timothy
Phleum pratense

Mature Plant

© 2009 Barry Breckling

Flowers

© 2002 Steve Matson

Infestation

© 2013 Jean Pawek

6.15 Common Timothy (*Phleum pratense*)

Synonyms
Timothy-grass, Meadow Cat's-tail, Common Cat's-tail, Herd Grass

Life Cycle
Perennial

Roots
The root system is shallow, fibrous, and non-rhizomatous

Leaves
Leaves are glabrous, flat, growing 7-40 cm long and 0.5-1.5 cm wide, tapering toward tip

Stems
Multiple culms grow in a bunch up to 1m tall from a bulblike base

Flowers
Flowering heads are 15 cm long, conical, and spiky, with pink stamens. Each spikelet has one flower and produces one seed

Seeds
Seeds are small and housed un urn-shaped glumes. Cured seeds are tan or buff in colour

Similar Species
Common Timothy resembles Alpine Timothy (*P. alpinum*), Meadow Foxtail (*Alopecurus pratensi*), and Creeping Foxtail (*A. arundinaceus*). Alpine Timothy is shorter overall and has shorter seed heads, while Meadow Foxtail and Creeping Foxtail have twisted awns, giving their inflorescences a more bushy or fuzzy look, and have darker (almost black) cured seeds.

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Moist grasslands, fields, deciduous and coniferous forest stands, roadsides, ditches

Control Measures
Hand-pulling may be an effective control method for small infestations

Effective chemical control methods include applications of some Group 15 herbicides such as Propyzamide (Government of Manitoba 2018)

Tillage and burning are not recommended, as underground regenerative organs grow into new plants (Esser 1993).

Common Plantain
Plantago major

Mature Plant

Bubar et al. 2000

Flowering Spike

Bubar et al. 2000

Seedling

Bubar et al. 2000

6.16 Common Plantain (*Plantago major*)

Synonyms
Broad-leaved Plantain, Dooryard Plantain, Whiteman's Foot

Life Cycle
Simple perennial

Roots
Short but thick rootstock with many lateral root strands

Leaves
Basal rosette of dark green, ribbed, slightly hairy oval leaves that are either entire or with coarse teeth. The leaves grow on thick stalks that are usually about as long as the leaf itself. Leaves are ribbed, with 3-7 main veins. No stem leaves

Stems
Stems are leafless and grow up to 60 cm tall

Flowers
Dense rods of small and inconspicuous green flowers growing from the stems

Seeds
Seeds are dark brown to black, marked with wavy ridges, and about 1mm long. Seed pods hold 5-16 seeds. Seed pods are brown, ovoid, and 3mm long

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Fields, meadows, waste places, and roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations.

For larger infestations, Common Plantain can be controlled using some Group 4,9, and 10 herbicides such as Aminopyralid, 2,4-D, Pyroxsulam, Lalauxlfen, Dicamba, and MCPA (Government of Manitoba 2017a).

Prostrate Knotweed
Polygonum aviculare

Mature Plant

Flowers

Wiry Stems with Swollen Nodes

6.17 Prostrate Knotweed (*Polygonum aviculare*)

Synonyms
Common Knotgrass, Birdweed, Pigweed, Lowgrass, Doorweed, Mat-grass

Life Cycle
Annual

Roots
Taproot

Leaves
Leaves are alternate, glabrous, either lanceolate, elliptic, or oblong, have smooth margins, and grow on short stalks. Upper leaves may be stalkless

Stems
The stem is prostrate to semi-erect, wiry, highly branched, with swollen nodes. Stems grow up to 2m long, often forming mats

Flowers
Flowers grow in axillary cymes of 2-4 green flowers with white or pink margins

Seeds
Small, brown, 3-sided achenes 1.5-4mm long

Similar Species
Prostrate Knotweed is similar to Prostrate Spurge (*Euphorbia supina*), Spotted Spurge (*E. maculata*), and Striate Knotweed (*Polygonum erectum*). Prostrate Spurge and spotted Spurge have opposite leaves, purple blotches on the leaves, and stems containing milky sap. Striate Knotweed has coarser, more erect stems, and more rounded leaves.

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Wetlands, riparian areas, floodplain forests, upland forests, grasslands, rocky outcrops, fields, waste places, roadsides, pathways, disturbed areas

Control Measures
Hand-pulling can be an effective control measure for small infestations. Improving soil aeration may allow native species to gain a competitive advantage over Prostrate Knotweed, which grows well in compact soils (University of California 2018).

In terms of chemical control, pre-emergence chemical control methods are generally considered more effect than post-emergence controls. Pre-emergence controls suitable for Prostrate Knotweed include applications of some Group 2,4,5,6,7,9,14 and 20 herbicides (Cowbrough 2017, Government of Manitoba 2018). Cowbrough (2017) reports that Metribuzin, Pinnacle SG (Thifensulfron), Classic (Chlorimuron Ethyl), and First Rate (Cloransulam-methyl) were effective controls.

For larger infestations, mowing, cutting, hand-pulling, mulching, flaming, and hot-steaming are not considered effective (Stone 2010).

White Cockle
Silene latifolia ssp. alba

Mature Plant

Flowers

Flower - Detail

Royer & Dickinson 2007

6.18 White Cockle (*Silene latifolia ssp. alba*)

Synonyms
White Campion

Life Cycle
Perennial

Roots
Deep, persistent, thick, and fleshy roots

Leaves
Hairy, pointed, oblong, opposite leaves with a prominent center line

Stems
Hairy, sticky stem growing up to 100 cm tall

Flowers
Large, hairy white or pink flowers blooming from loose terminal clusters. Flowers are fragrant and open in the evening

Seeds
Kidney-shaped, greyish in colour, and bumpy

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Fields, waste places, roadsides

Control Measures
Hand-pulling is the most effective form of control for small infestations of this species (Wheatland County 2010)

Chemical control is possible for larger infestations, using some Group 4,5,9, and 10 such as Dicamba, 2,4-D, MCPA, Atrazine, Glyphosate, and Glufosinate-Ammonium (Government of Manitoba 2017i, Government of Manitoba 2018).

Field Sow-thistle
Sonchus arvensis

Mature Plant

Bubar et al. 2000

Flower

Bubar et al. 2000

Infestation

Bubar et al. 2000

6.19 Field Sow-thistle (*Sonchus arvensis*)

Synonyms
Perennial Sow-thistle, Creeping Sow-thistle, Field Milk-thistle

Life Cycle
Creeping perennial

Roots
Extensive, deep (up to 2m), creeping rhizomatous roots. Roots are pale, fleshy, and easily broken

Leaves
Basal rosette of prickly leaves, and alternate, toothed leaves growing from the stem

Stems
One or two stems growing up to 1.5m tall. Stems are hollow and erect, often containing a milky sap. Stems are branched toward the top where flower clusters are born

Flowers
Flowerheads are dandelion-like, with bright yellow ray flowers, growing from branches at the top of the stem. Involucral bracts are covered with dense orange hair

Seeds
Small, winged brown achene seeds with a wrinkled appearance

Similar Species
Field Sow-thistle is often confused with Annual Sow-thistle (*S.uliginosus*), which lacks hair on the involucral bracts

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Fields, woodlands, meadows, waste places, roadsides, sloughs, beaches, river and lake shores

Control Measures
Hand-pulling may be an effective control measure for smaller infestations

Auxin-type herbicides, clopyralid, and glyphosate are considered the most effective chemical control, though 2,4-D, 2,4-DB, and MCPA may have a moderate effect (Cowbrough 2017, McWilliams 2004). Additionally, chemical control has been shown to be more effective when applied to larger rosettes (with 9 or more leaves) and to plants approaching the beginning of the bud stage, rather than younger plants (Cowbrough 2017).

Tillage may sometimes be an effective control measure for Field Sow-thistle. However, tillage must be conducted to a depth of 30 cm when the plants have 7-9 leaves per rosette and must be repeated every 2-4 weeks during the summer to be effective (Cowbrough 2017, Government of Alberta 2011b). Any other tillage regime may result in fragmentation the creeping roots and budding from each root fragment, increasing the number and density of the plants (Government of Alberta 2011b, McWilliams 2004).

Mowing is found to be less effective than tillage, though grazing by sheep and cows may be an effective control measure if Field Sow-thistle is one of the preferred fodder species growing in the area (Government of Alberta 2011b).

Burning is not an effective form of control, as underground buds would likely remain viable (McWilliams 2004).

Common Dandelion
Taraxacum officinale

Mature Plant

Bubar et al. 2000

Seed Heads

Bubar et al. 2000

Juvenile Plant

Bubar et al. 2000

6.20 Common Dandelion (*Taraxacum officinale*)

Synonyms
Lion's Tooth, Blowball

Life Cycle
Simple perennial

Roots
Thick overwintering taproot growing up to 15 cm long

Leaves
A basal rosette of lobed or toothed leaves. No stem leaves

Stems
1-10 stems typically grow from the taproot. Stems may be upright or lax and are typically green but may be tinged with purple. Stems are hollow and usually glabrous, though sometimes sparsely hairy. Stems contain sticky, white latex

Flowers
Bright yellow flower head with 100-300 ligulate ray florets. Involucral bracts around each flower head are green and in two whorls, with the outer whorl having shorter bracts that are bent backward

Seeds
Achene seeds topped with a parachute of bristly pappus to aid windborne dissemination

Similar Species
Young Common Dandelion may resemble some Sow-thistles but can be distinguished by a lack of prickles on the leaf margins

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Waste areas, roadsides, railroad rights-of-way, lawns, fields, shorelines, and disturbed areas such as avalanche chutes, burned forests, and overgrazed areas

Control Measures
Hand-pulling can be an effective control measure for small infestations. An effective method to control larger infestations of Common Dandelion is tilling to a depth of 10 cm. The Government of Alberta (2009a) suggests tilling before seed set occurs, which will sever taproots and kill seedlings, while the Government of Manitoba (2017b) recommends tilling in the fall (Government of Alberta, 2009a). A mouldboard plough is the most effective tillage tool for reducing dandelion populations, followed by the tandem disc (Cowbrough 2017). Use of a chisel plough is not effective as it tends to sever the tap roots instead of completely uprooting the plant (Cowbrough 2017).

Common Dandelion may also be controlled using systemic herbicides such as Glyphosate, PrePass, 2,4-D, and MCPA (Esser 1993, Government of Alberta, 2009a). The most effective time of year to apply herbicides for Common Dandelion is in the fall, when both perennial plants and new seedlings can be affected by the herbicide (Cowbrough 2017, Government of Alberta, 2009a; Government of Manitoba 2017b). The Government of Manitoba (2017b) recommends 1.5L/acre of Glyphosate or Amitrol, while Cowbrough (2017) recommends Infinity.

Field Pennycress
Thlaspi arvense

Mature Plant

Bubar et al. 2000

Flowers

Bubar et al. 2000

Notched Seedpods

Bubar et al. 2000

6.21 Field Pennycress (*Thlaspi arvense*)

Synonyms
Stinkweed, Fanflower, Fanweed, Frenchweed, Mithridate Mustard

Life Cycle
Annual, winter annual

Leaves
Stalked, oblong basal leaves, and alternate, stalkless and smaller, glabrous stem leaves with arrow-shaped bases. Leaves release an unpleasant garlic or turnip odor when crushed

Stems
Stems are erect, green to yellow in colour, hairless, 2-80 cm tall, with upright branches

Flowers
Small white flowers with four petals 3-4 mm long

Seeds
Seeds are ovoid in shape, brown to black in colour, and 1.5-2 mm long. Seed pods contain 4-16 seeds

Similar Species
Field Pennycress can be distinguished from Peppergrasses (*Lepidium sp*.) by checking the pods. Field Pennycress has 4-16 seeds per pod while Peppergrasses have only two

Dispersal and Reproductive Mechanisms
Seeding

Favourable Habitat
Fields, grasslands, waste areas, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

For larger infestations, chemical control may be effective using some Group 1, 2, 4, 6, 9, 14, and 15 herbicides such as Imazamox, Fluroxypyr, 2,4-D, Glyphosate, Carfentrazone, and Pyroxasulfone (Government of Manitoba 2018).

Alsike Clover
Trifolium hybridum

Mature Plant

© 2013 Jean Pawek

Flowers

© 2016 Kier Morse

Infestation

© 2013 Jean Pawek

6.22 Alsike Clover (*Trifolium hybridum*)

Synonyms
None

Life Cycle
Perennial

Roots
A taproot and secondary roots

Leaves
Alternate, stalked, trifolate leaves with small stipulates and toothed margins

Stems
Grooved, semi-erect, sparsely-branched stem

Flowers
Pink flowers growing in rounded flowerheads on flowering stalks

Similar Species
Alsike Clover can be distinguished from White Clover (*Trifolium repens*) and Red Clover (*Trifolium pretense*) by a lack of white chevron-like markings on the leaves

Dispersal and Reproductive Mechanisms
Seeding, vegetative reproduction

Favourable Habitat
Waste areas, roadsides

Control Measures
Hand-pulling can be an effective control measure for small infestations

In terms of chemical control, application of some Group 4 and 5 herbicides such as Clopyralid and simazine may be effective (Government of Manitoba 2018).

Tufted Vetch
Vicia Cracca

Mature Plant

Nick Kurzenko

Flowers

Flowers and Seedpods

Royer & Dickinson 2007

6.23 Tufted Vetch (*Vicia cracca*)

Synonyms
Cow Vetch, Bird Vetch, Blue Vetch, Boreal Vetch

Life Cycle
Perennial

Roots
White taproot, capable of growing 1m long

Leaves
Alternate and pinnately compound with 10-24 linear to oblong leaflets

Stems
The stem is week, often climbing on other vegetation for support. Can grow up to 150 cm long

Flowers
Blue and/or purple flowers growing from one-sided racemes

Seeds
Seeds are reddish-brown, velvety, and scarred along the length by a white to brown scar. Seeds range from rounded to oval in shape and from 2.5-3mm long. Tufted Vetch has seed pods resembling pea pods

Similar Species
Tufted Vetch is similar to Hairy Vetch (*V. villosa*) but can be distinguished by it's smooth (not hairy) stem

Dispersal and Reproductive Mechanisms
Seeding, "wiry rootstocks"

Favourable Habitat
Waste areas, roadsides, fields

Control Measures
Hand-pulling can be an effective control measure for small infestations. For larger infestations, tilling with a mouldboard plough may reduce abundance of Tufted Vetch (Cowbrough 2017)

In terms of chemical control, post-emergence application of some Group 2,4, and 9 herbicides such as Glyphosate, Dicamba, Fluroxypyr, MCPA, and 2,4-D are recommended (Cowbrough 2017, Government of Manitoba 2018)

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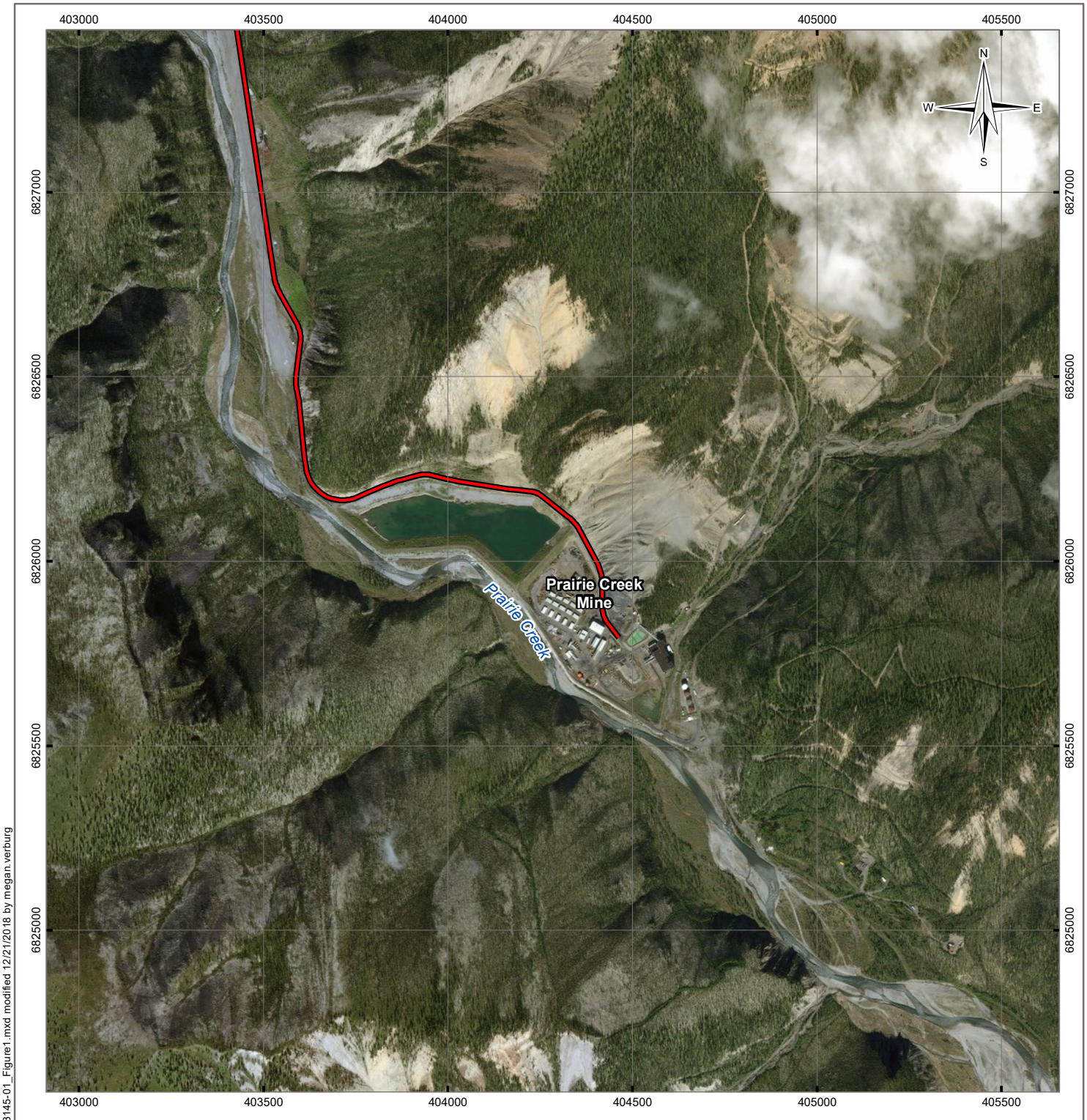
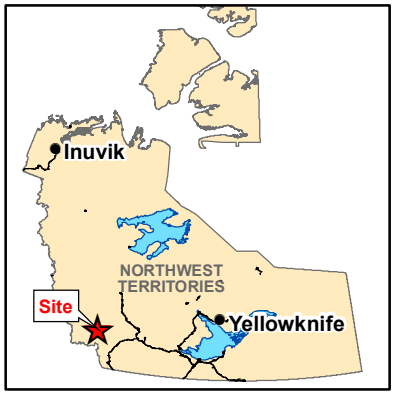
FIGURES



LEGEND

Proposed Prairie Creek Access Road



NOTES
Base data source:
Imagery from ESRI; DigitalGlobe (2016).

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Prairie Creek Mine Overview

PROJECTION	DATUM	CLIENT
NWT Lambert	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:15,000
200 100 0 200
Metres

FILE NO. EARC03145-01_Figure1.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	SL	BB	RH	0

DATE December 21, 2018
PROJECT NO. ENG.EARC03145-01

TETRA TECH

Figure 1

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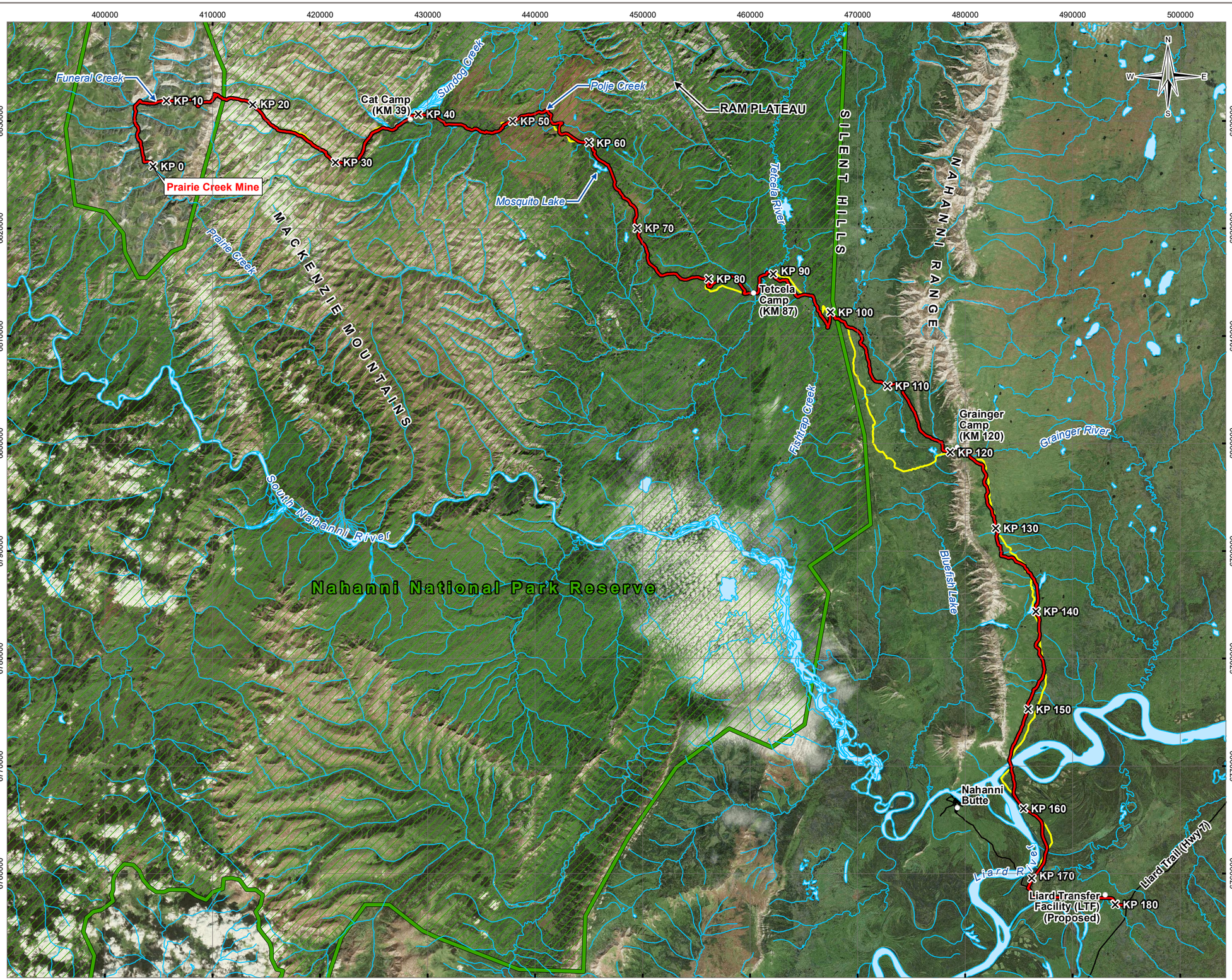

LEGEND

- Access Road Kilometre Marker
- Proposed Prairie Creek Access Road
- Proposed Winter Road Alignment
- Existing Road
- Nahanni National Park Reserve Boundary
- Watercourse
- Waterbody

NOTES
Base data source:
Road alignment provided by AllNorth (November 2018)
Existing roads from CanVec (1:50,000)
Watercourses from CanVec (1:250,000)

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Proposed Access Road Alignment

PROJECTION UTM Zone 10	**DATUM** NAD83	**CLIENT** CANADIAN ZINC CORPORATION	
Scale: 1:350,000 (5 2.5 0 5 Kilometres)		TETRA TECH	
FILE NO. EARC03145-01_Figure2.mxd			
OFFICE Tt-VANC	**DWN** SL / **CKD** BB / **APVD** RH / **REV** 0		**Figure 2**
DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01		

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403750 404000 404250 404500 404750 405000 405250

6826500 6826250 6826000 6825750 6825500

N W E S

KP 1

KP 0

Prairie Creek

Common Dandelion

Common Plantain
Low Scattered - Sporadic

Prostrate Knotweed

Common Plantain
Low Scattered - Sporadic

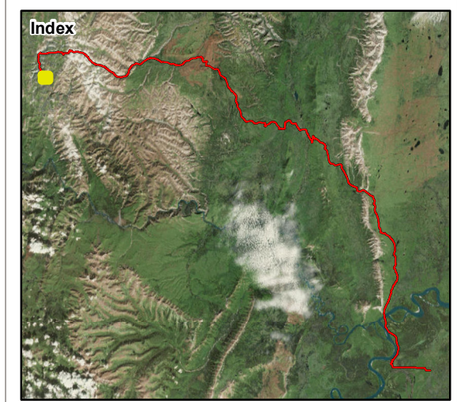
Common Plantain

Common Plantain

Dense-flower Pepperwort

LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 Metres				TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4
DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01			3a

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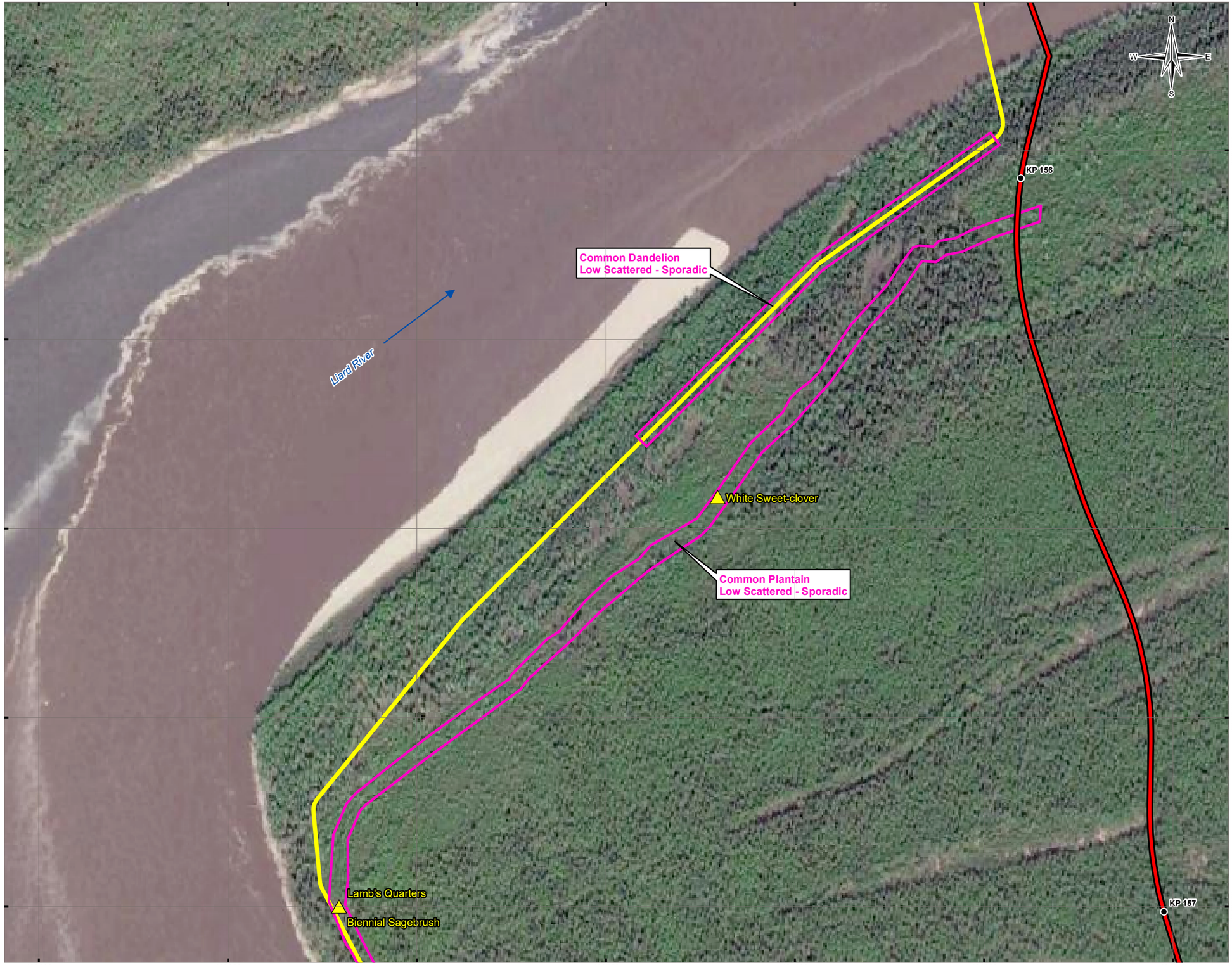
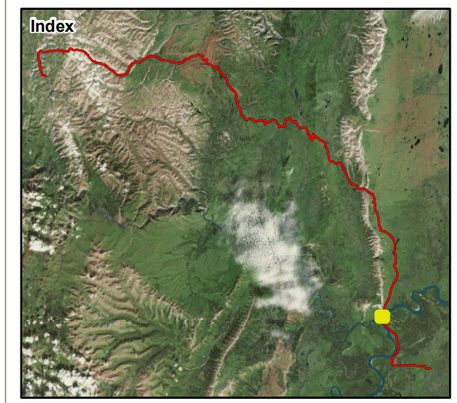


LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd					
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DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01				

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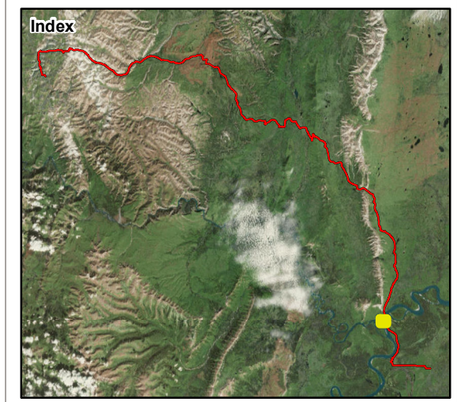
LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres				TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4
DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01			3c

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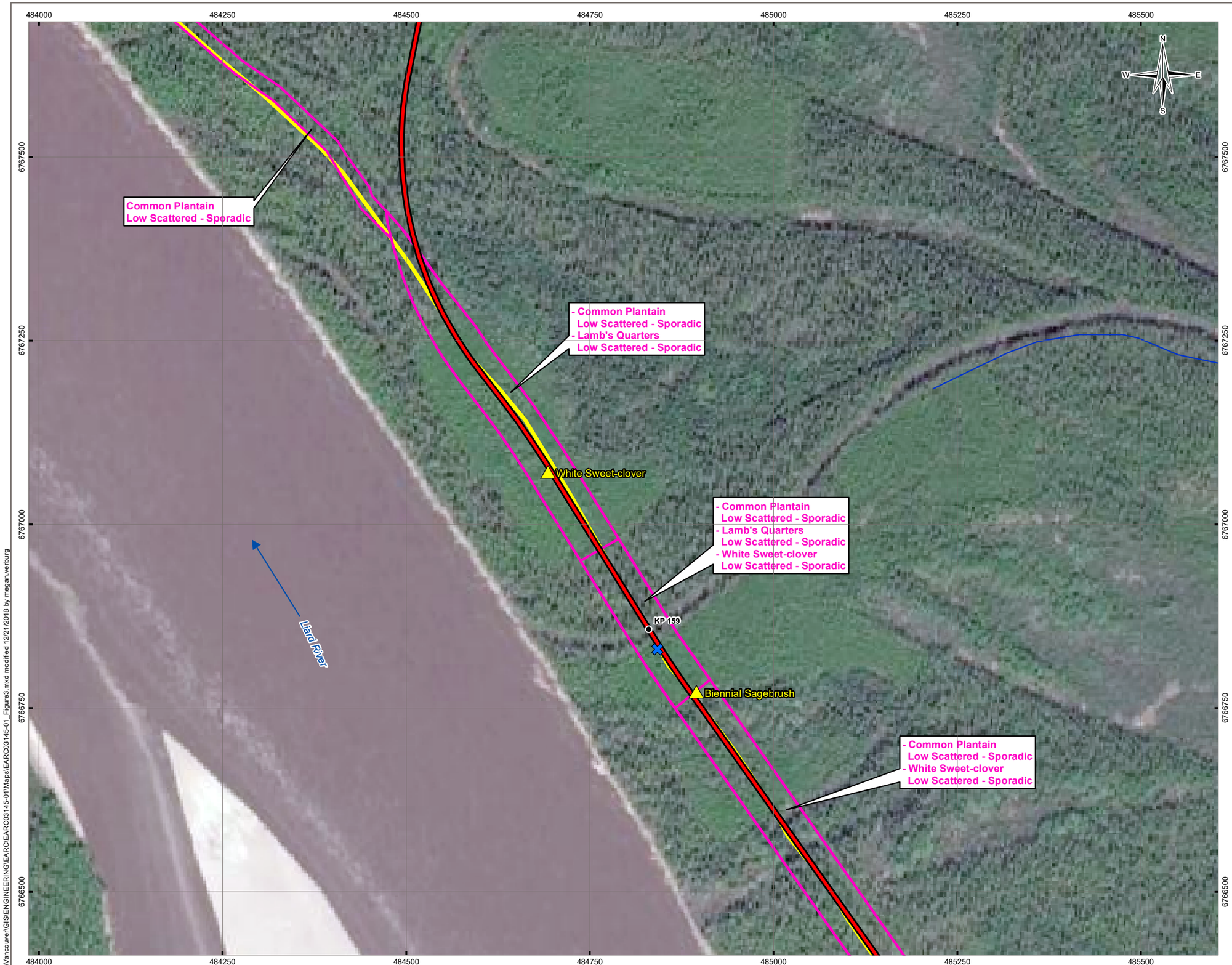
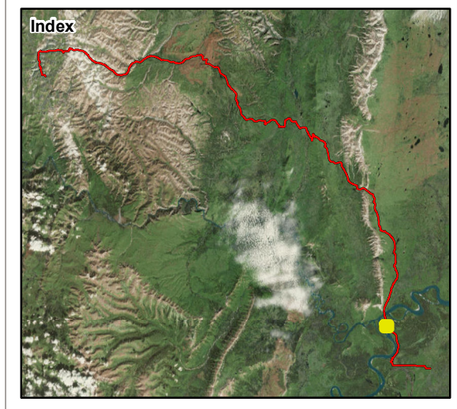


LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
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Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
December 21, 2018	ENG.EARC03145-01			

3d

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485000 485250 485500 485750 486000 486250 486500

6766250 6766000 6765750 6765500 6765250

- Common Plantain
  Low Scattered - Sporadic
- White Sweet-clover
  Low Scattered - Sporadic

KP 160

Common Plantain
Low Scattered - Sporadic

- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- White Sweet-clover
  Low Scattered - Sporadic

KP 161

Common Plantain
Low Scattered - Sporadic

Liard River

N W E S

LEGEND

- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
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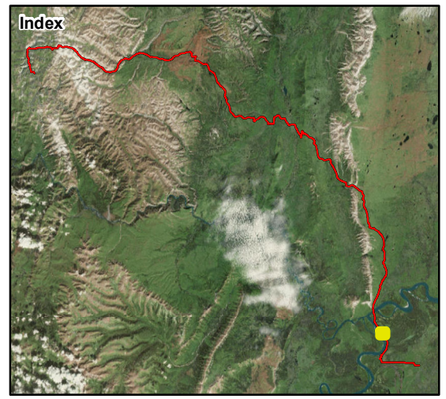
LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
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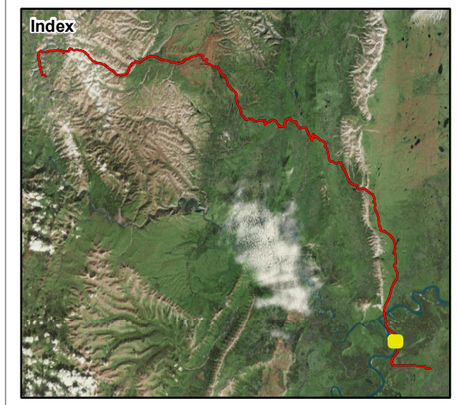
LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres				TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd				
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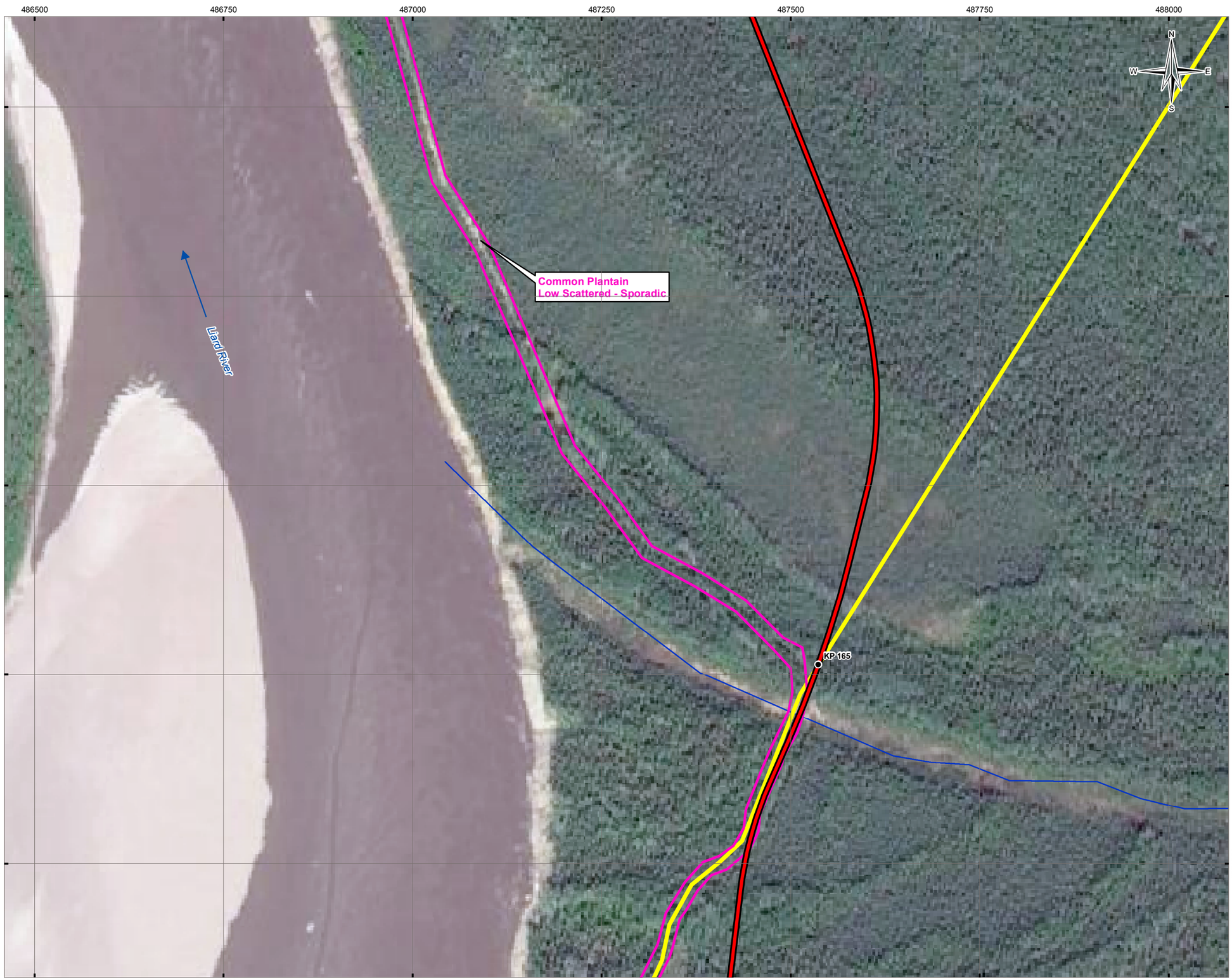
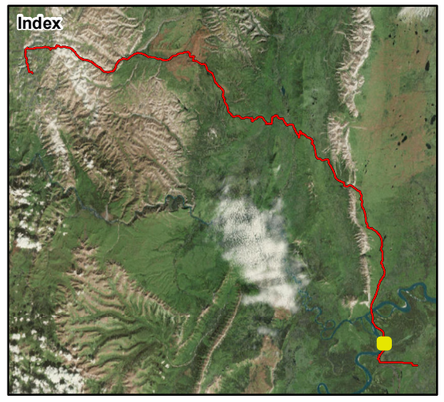


LEGEND

- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EARC03145-01_Figure3.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE December 21, 2018
PROJECT NO. ENG.EARC03145-01

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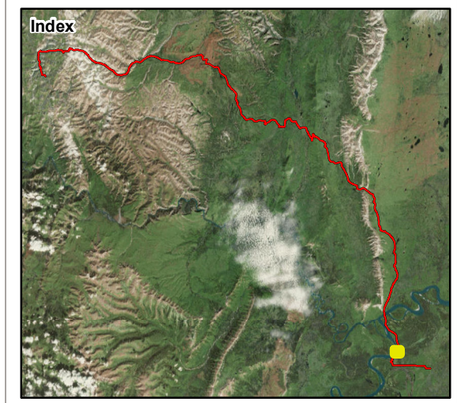
LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION
Scale: 1:5,000 (100 50 0 100 Metres)		TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd		
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DATE December 21, 2018	PROJECT NO. ENG.EARC03145-01	

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485750 486000 486250 486500 486750 487000 487250

6760250 6760000 6759750 6759500 6759250

Liard River

KP 167

KP 170

KP 168

Bay Creek

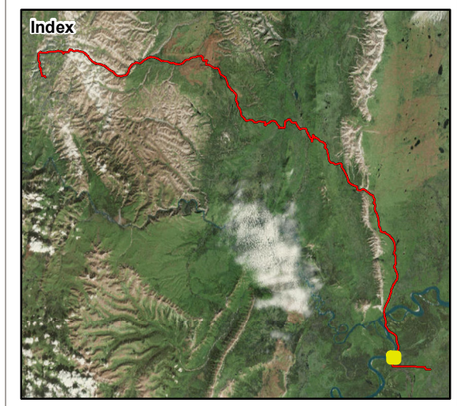
Common Plantain
Low Scattered - Sporadic

Tufted Vetch
Low Scattered - Sporadic

N W E S

LEGEND

- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
EARC03145-01_Figure3.mxd				
OFFICE	**DWN**	**CKD**	**APVD**	**REV**
Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
December 21, 2018	ENG.EARC03145-01			

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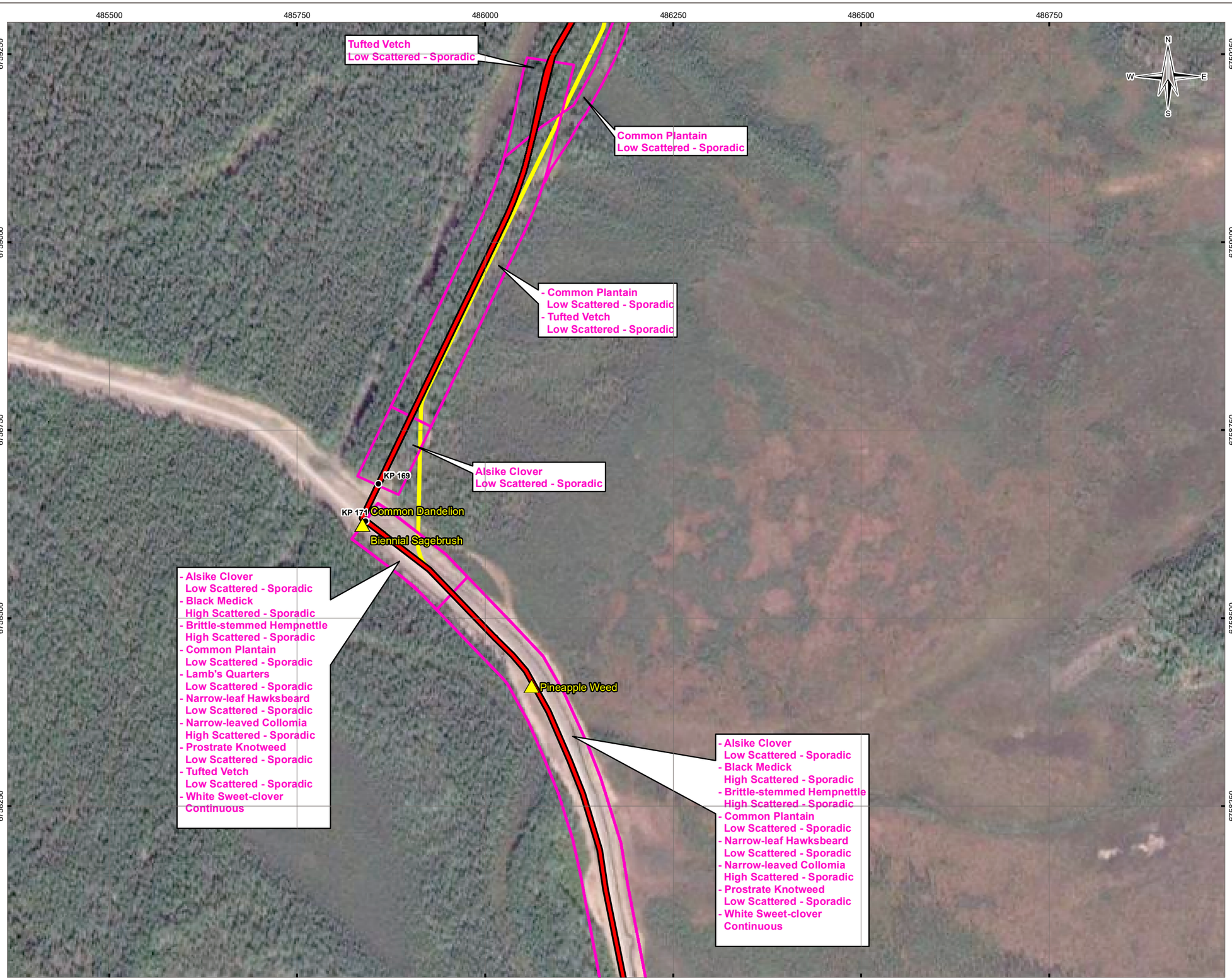
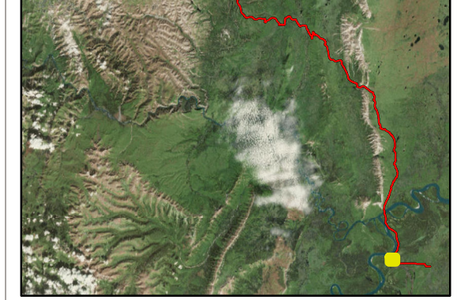


LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EARC03145-01_Figure3.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE December 21, 2018
PROJECT NO. ENG.EARC03145-01

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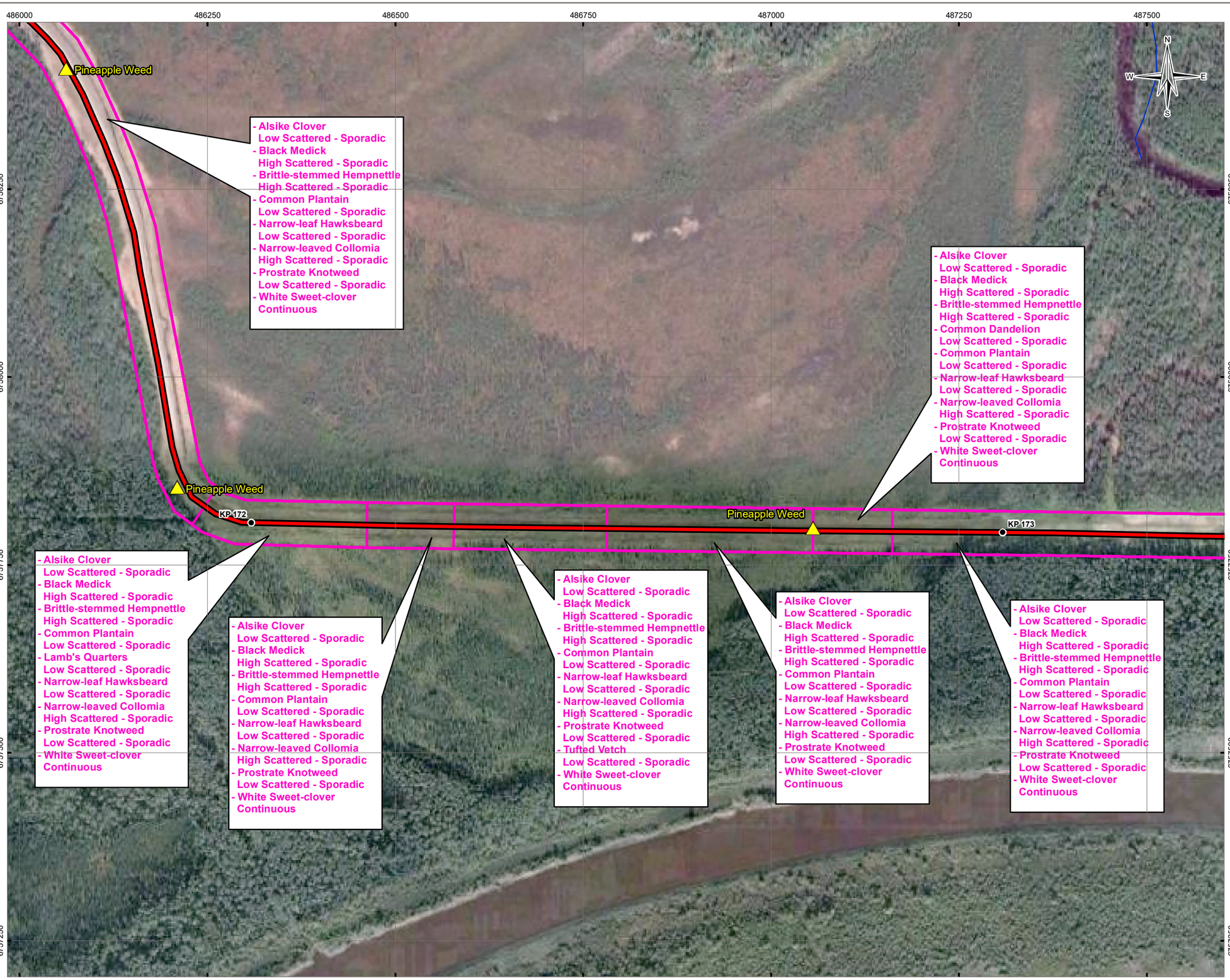

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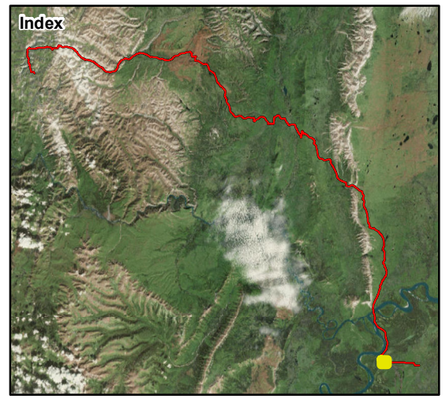
LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10	**DATUM** NAD83				**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd					
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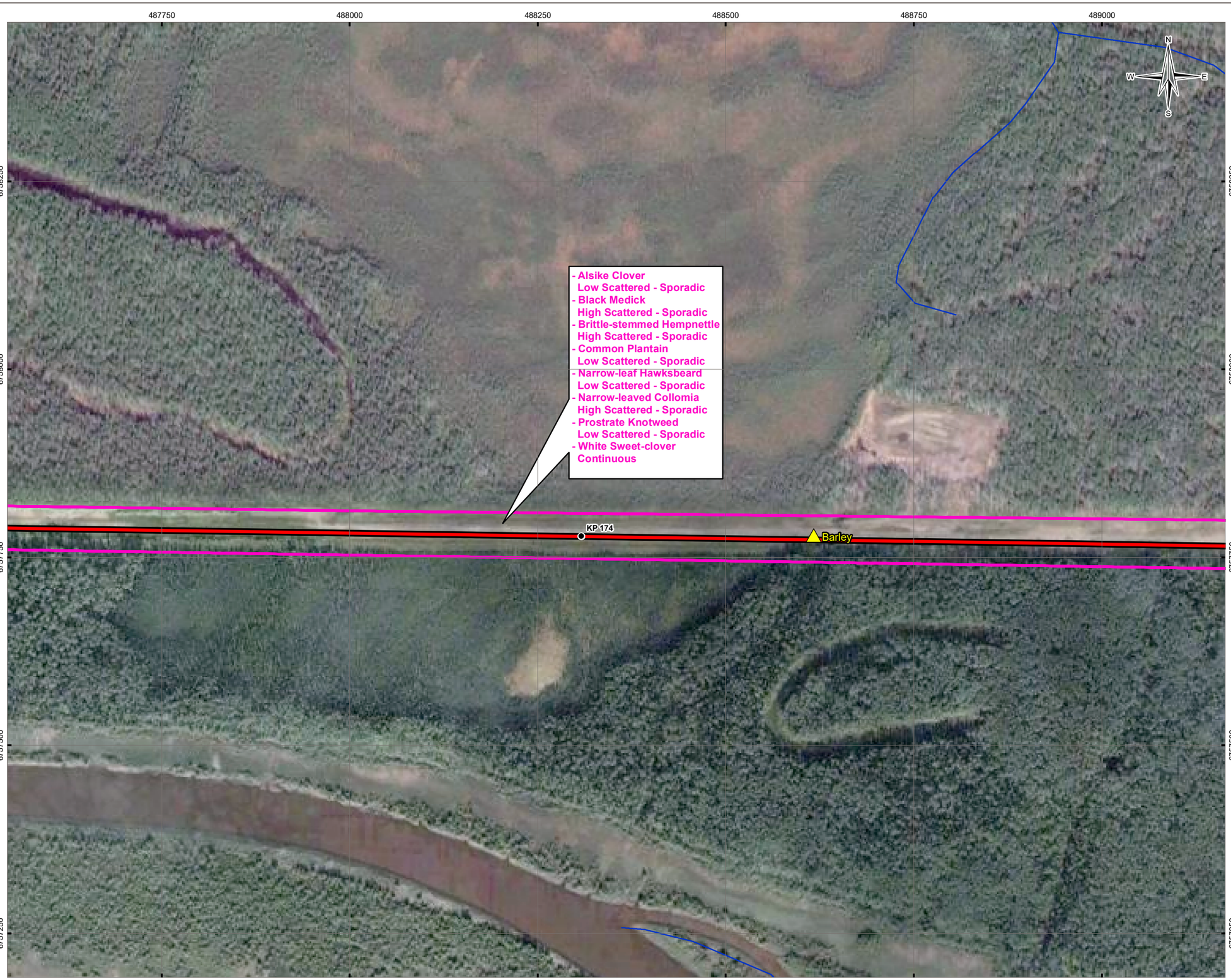
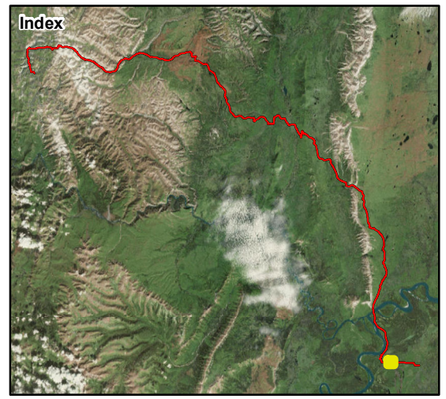
DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01				



LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres				TETRA TECH
FILE NO. EARC03145-01_Figure3.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM / **REV** 4	3m
DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01			

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489250 489500 489750 490000 490250 490500

6758250 6758000 6757750 6757500 6757250

KP 175 KP 176

Shepherd's Purse

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

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EARC03145-01_Figure3.mxd				
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Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
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490750 491000 491250 491500 491750 492000 492250

6758250 6758000 6757750 6757500 6757250

KP 177

KP 178

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

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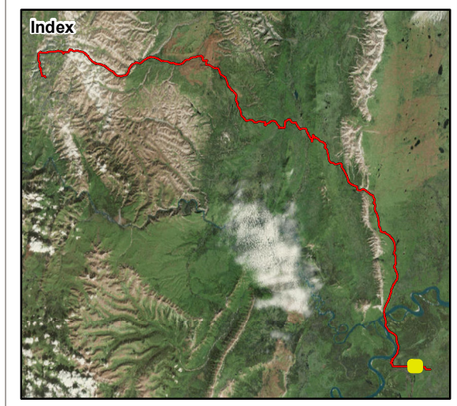
LEGEND

- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10				**DATUM** NAD83	**CLIENT** CANADIAN ZINC CORPORATION
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DATE December 21, 2018	**PROJECT NO.** ENG.EARC03145-01				

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6758250 6758000 6757750 6757500 6757250

N W E S

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

KP 178

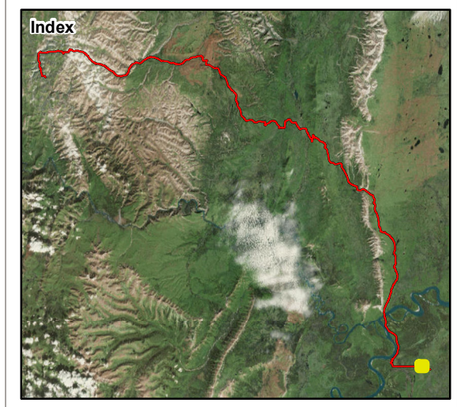
KP 179

- Alsike Clover
  Low Scattered - Sporadic
- Barley
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
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DATE	**PROJECT NO.**			
December 21, 2018	ENG.EARC03145-01			

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494000 494250 494500 494750 495000 495250

6757500 6757250 6757000 6756750 6756500

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Awnless Brome
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Common Timothy
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Common Timothy
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

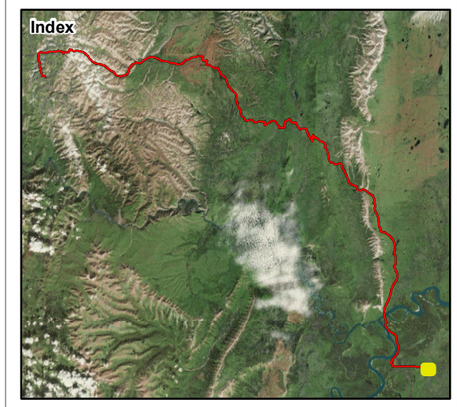
KP 180

KP 181

N W E S

LEGEND

- Invasive Plant Species
- Access Road Kilometre Marker
- Prairie Creek Access Road (November 2018)
- Proposed Winter Road Alignment
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
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APPENDIX A

ACCESS ROAD MAP BOOK

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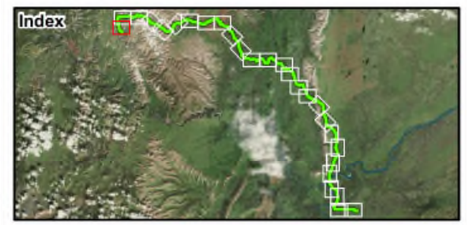
6830000 6829000 6828000 6827000 6826000 6825000

KP 5
KP 4
KP 3
KP 2
KP 1
KP 0
Prairie Creek

N W E S

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
- 2014 Testpit (Allnorth, 2014)
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (November 2018)
- Potential Permafrost Section
- Proposed Winter Road Alignment
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
- 2014 Testpit (Allnorth, 2014)
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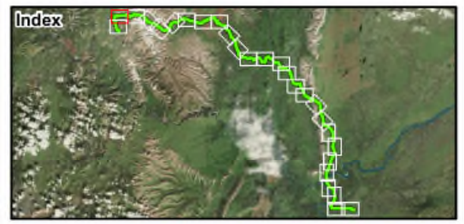
- Potential Permafrost Section
- Proposed Winter Road Alignment
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
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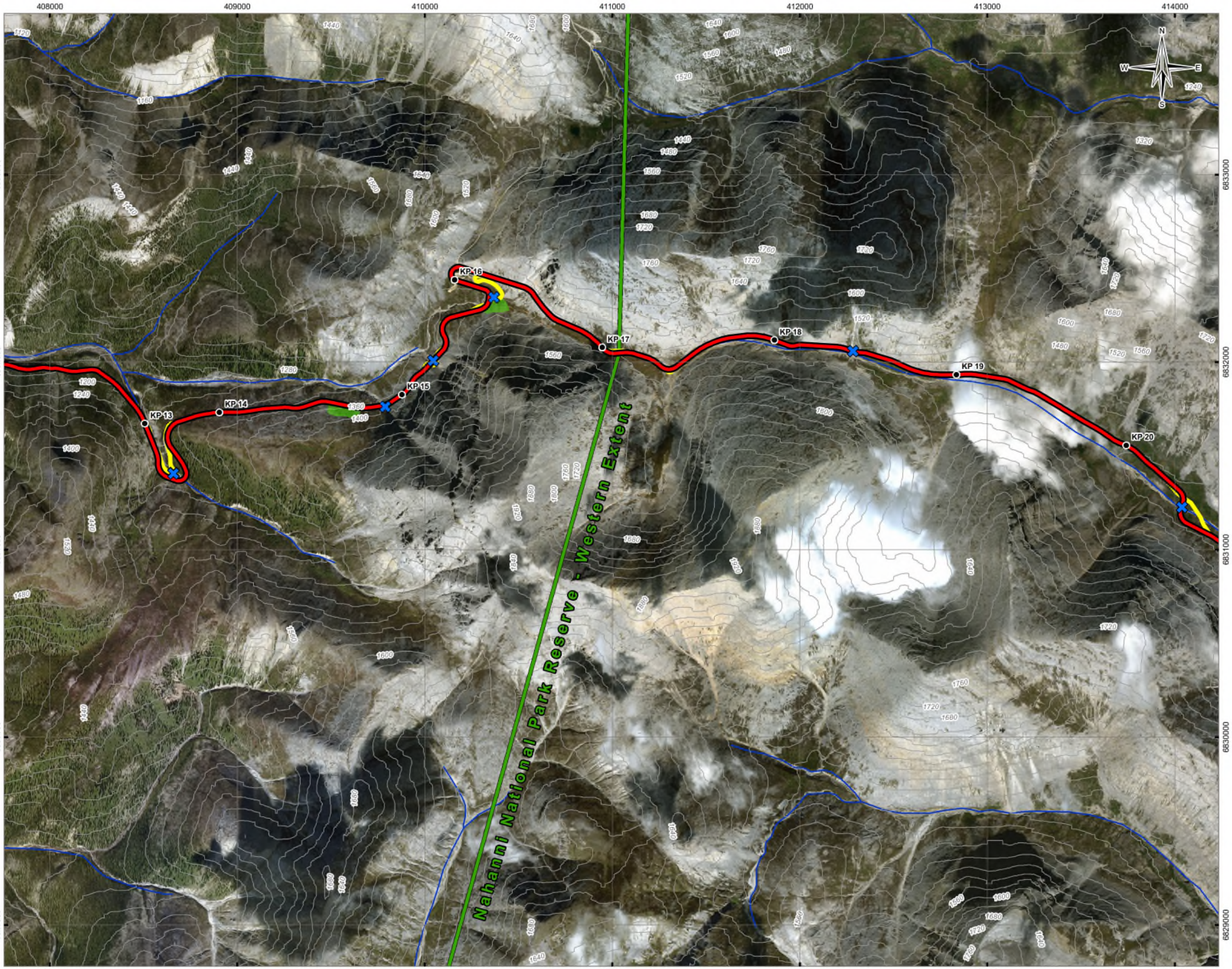

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
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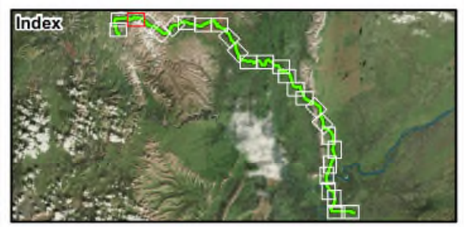
- Potential Permafrost Section
- Proposed Winter Road Alignment
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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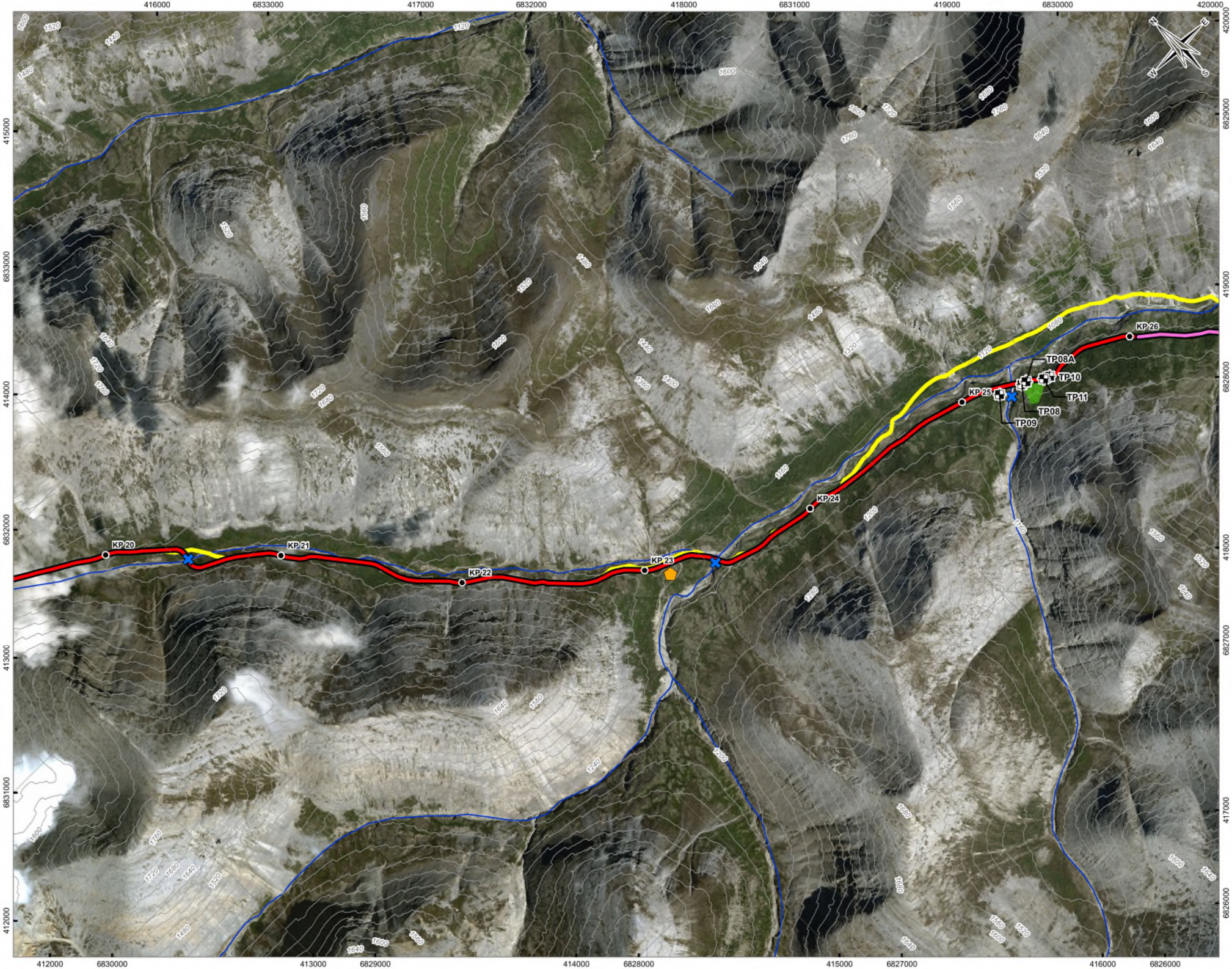

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
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- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
400 200 0 400
Metres

TETRA TECH

FILE NO.				
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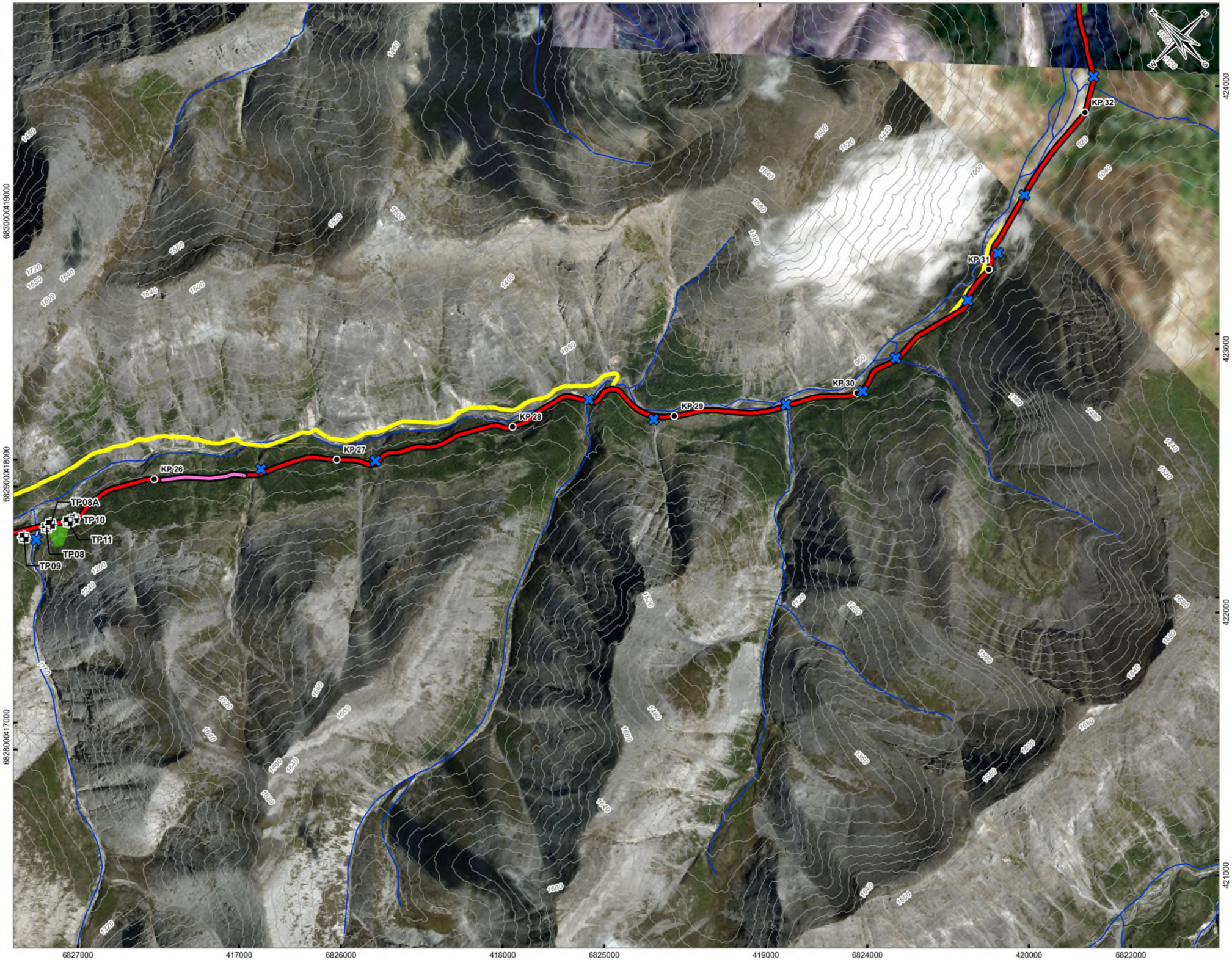

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
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- Potential Borrow Source
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- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
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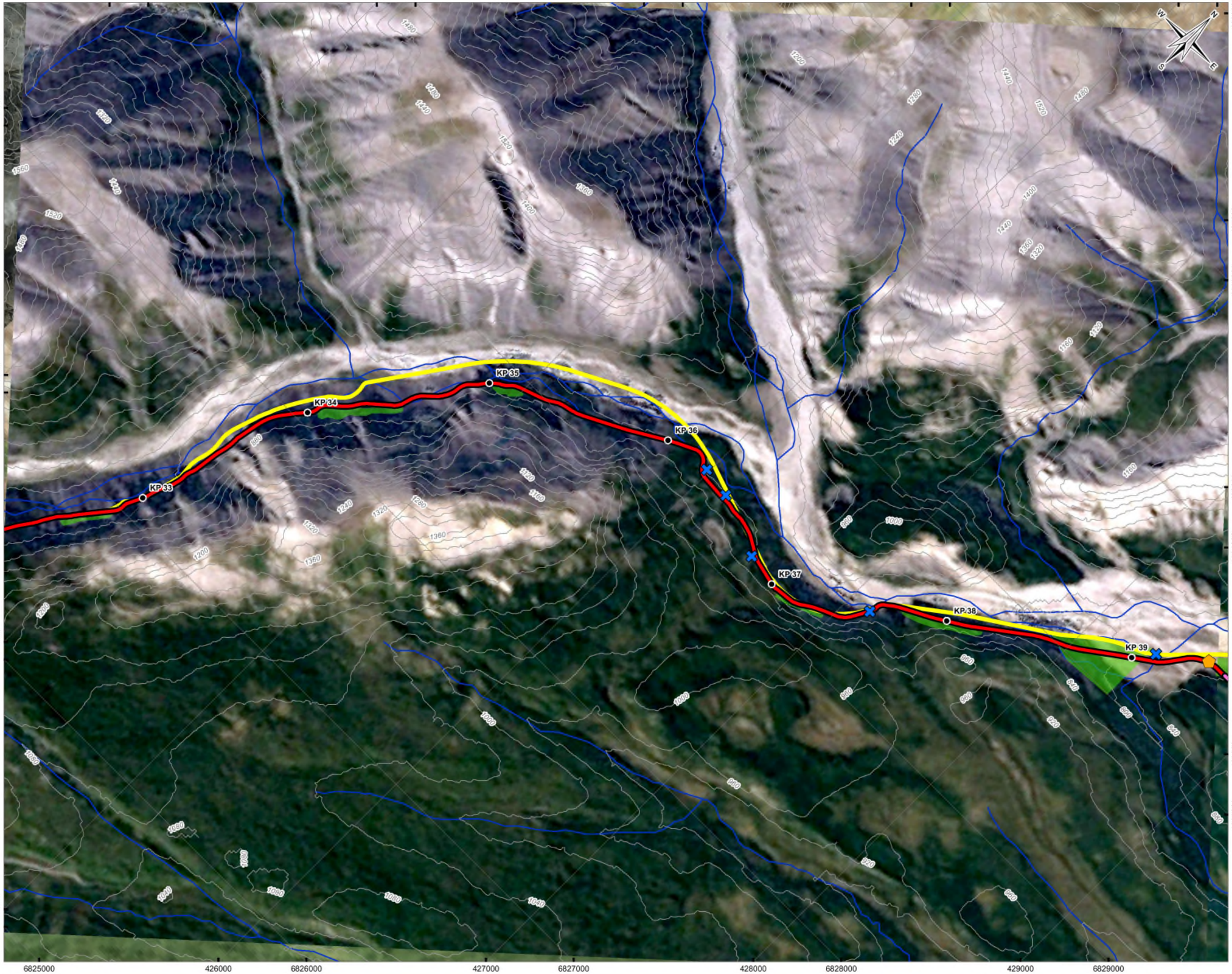

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
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- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
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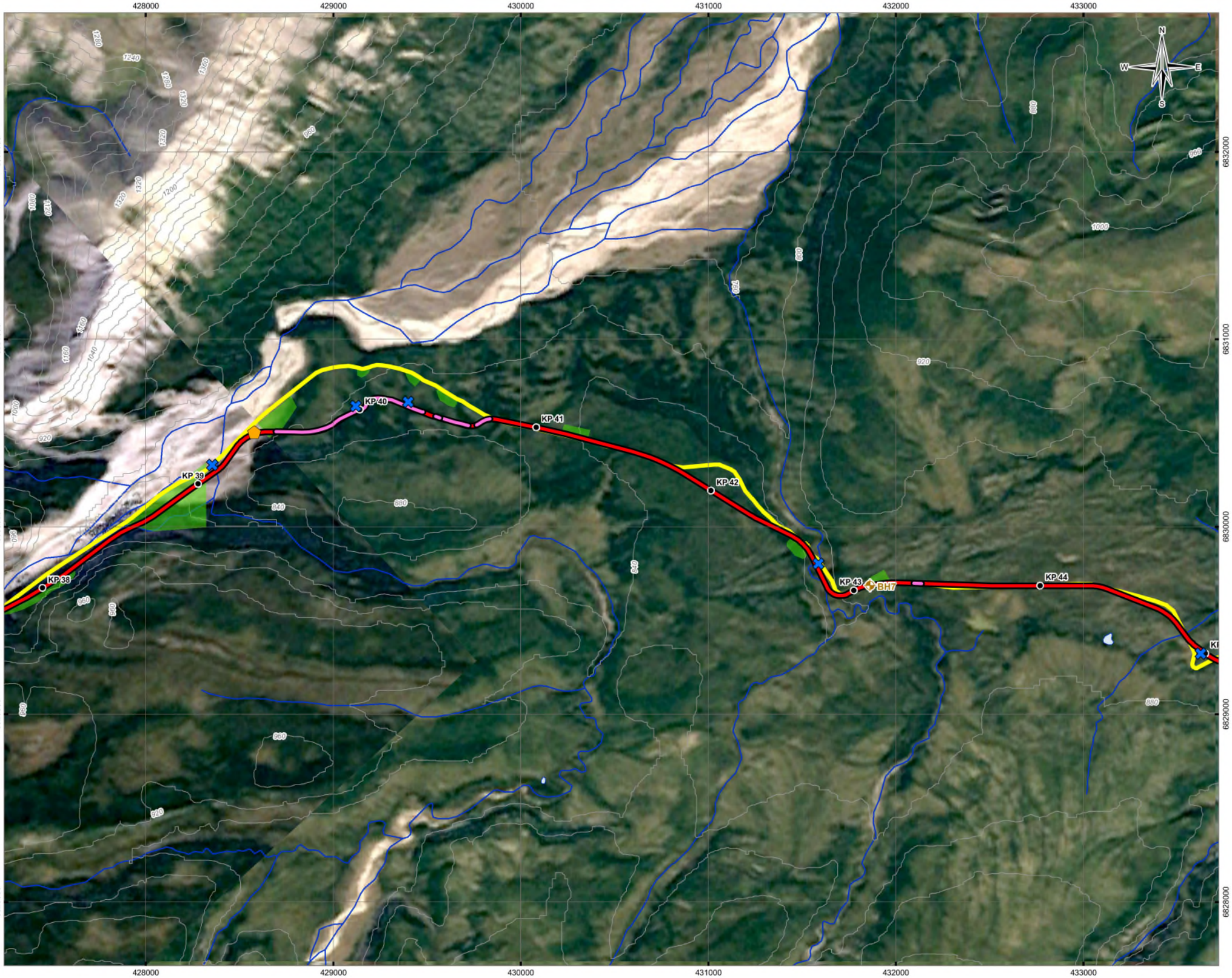

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
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- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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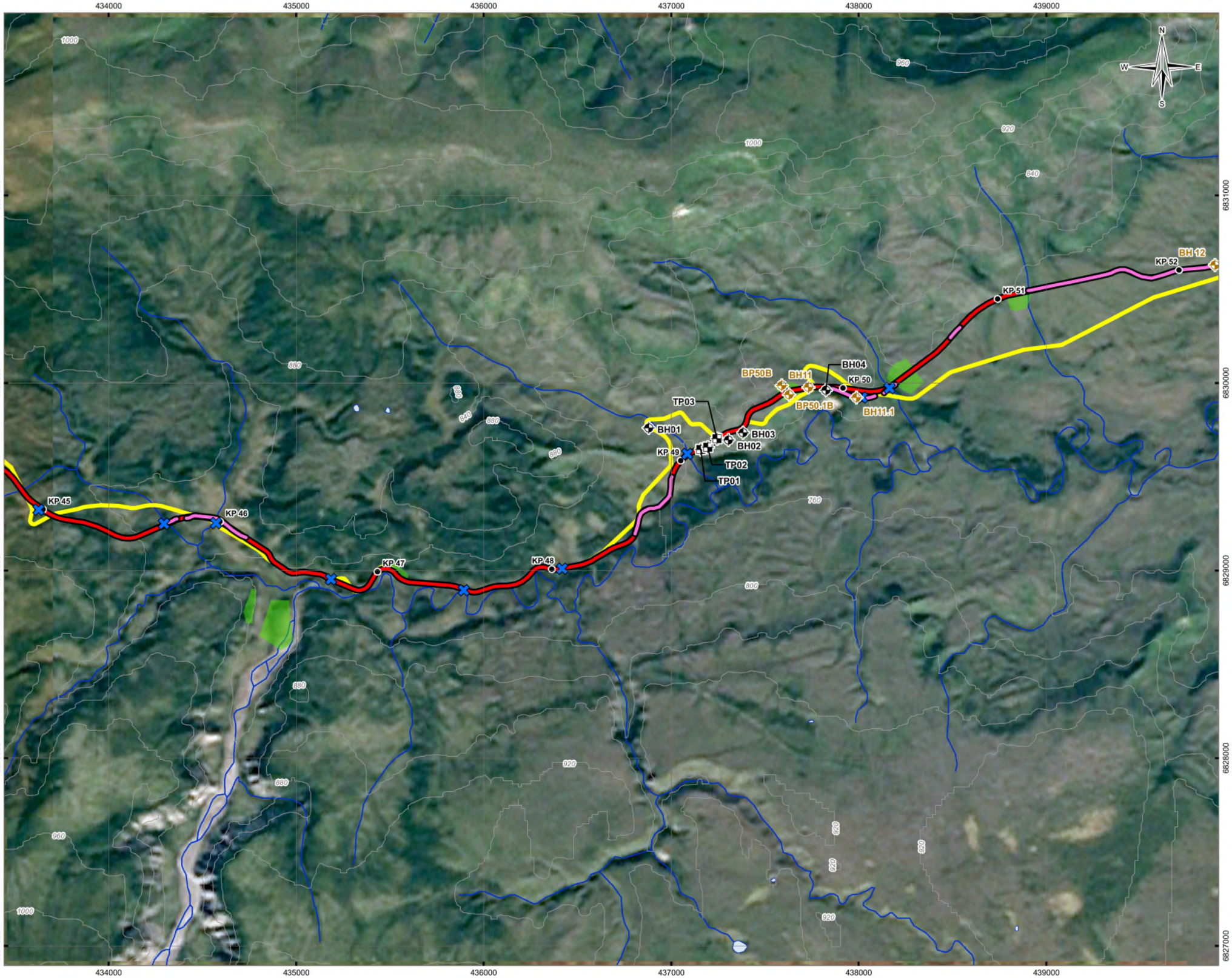

LEGEND

- Access Road Kilometre Marker
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- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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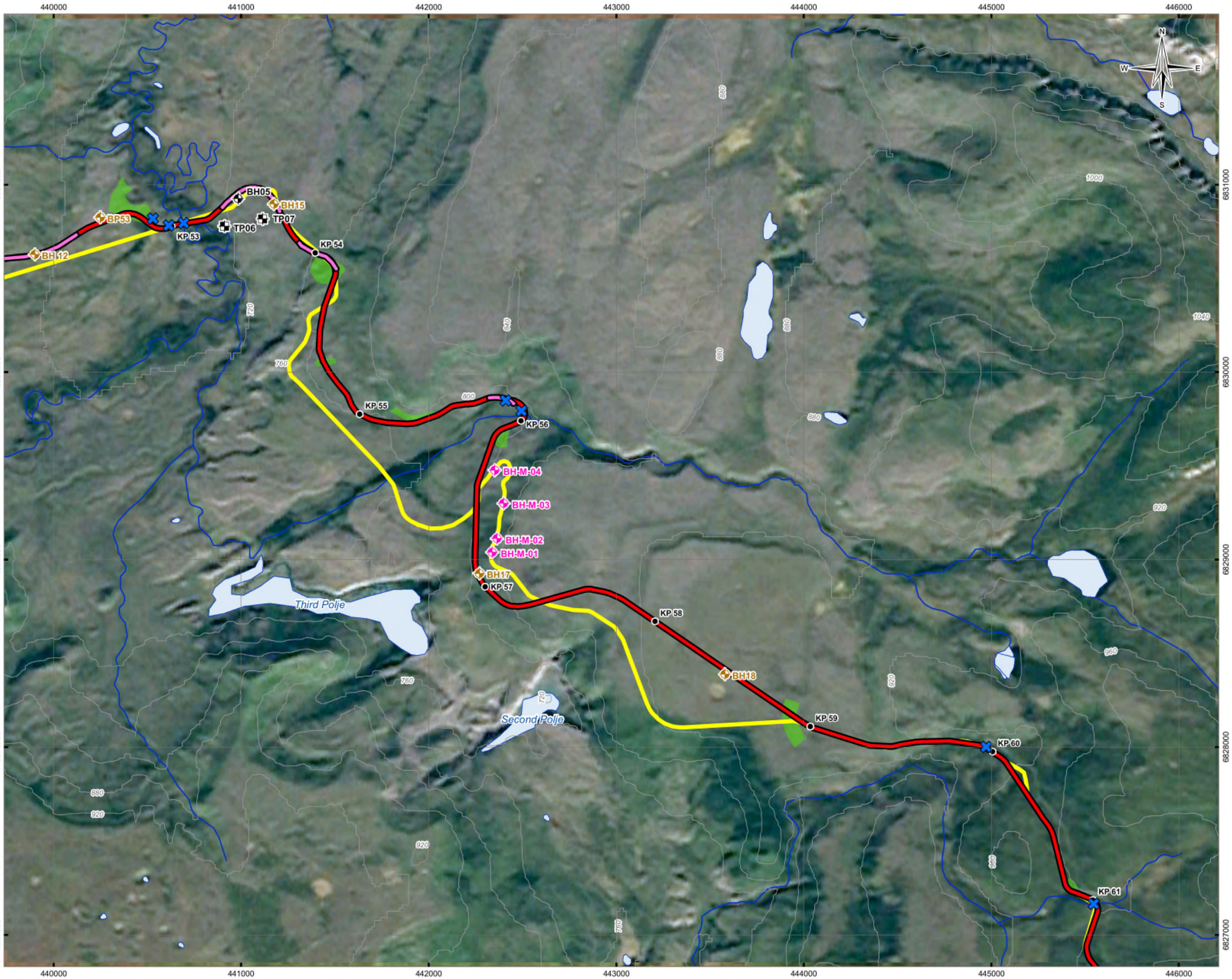

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
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- Contour (40 m)
- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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DATE: November 29, 2018	PROJECT NO.: ENG.EARC03145-01				

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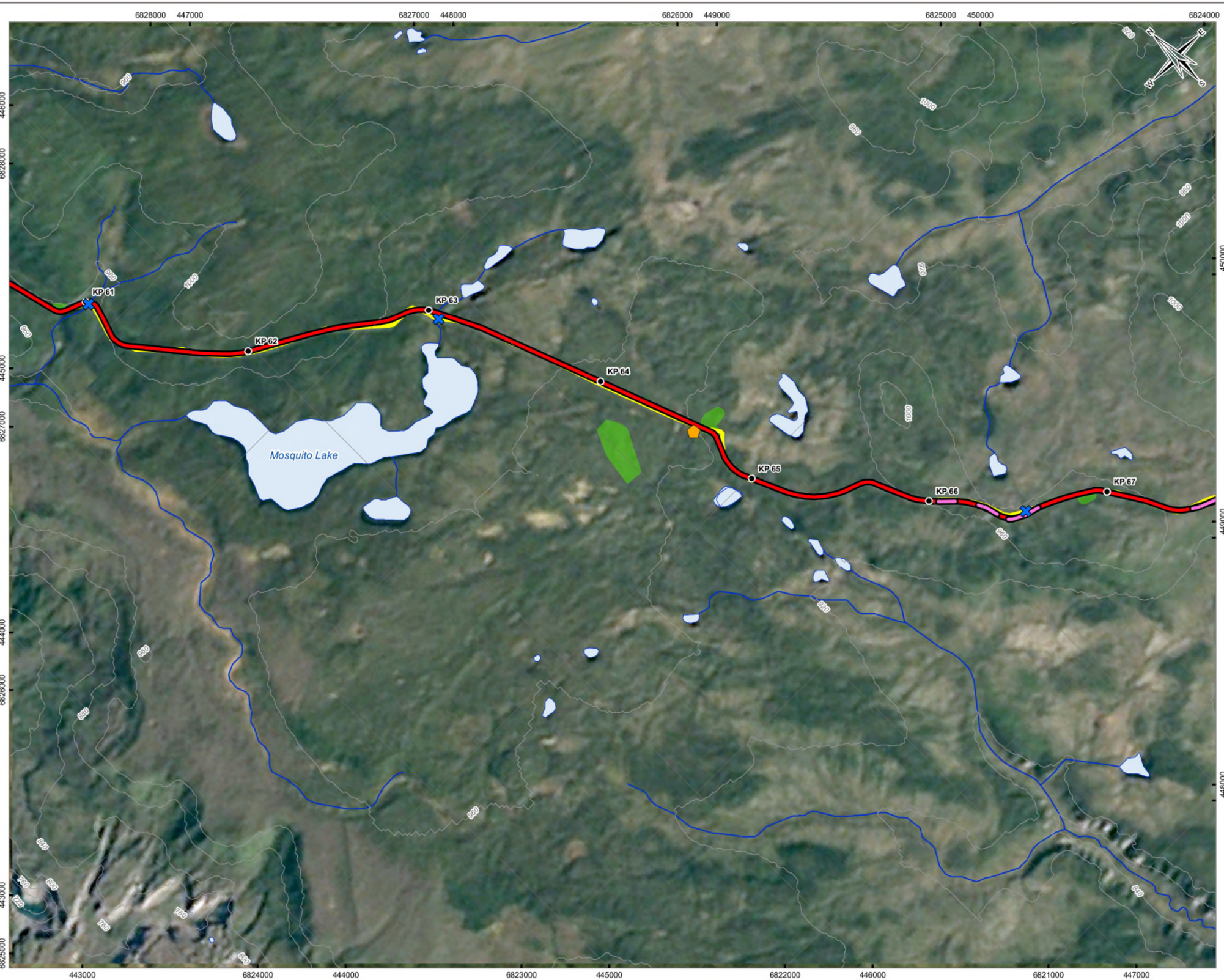

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
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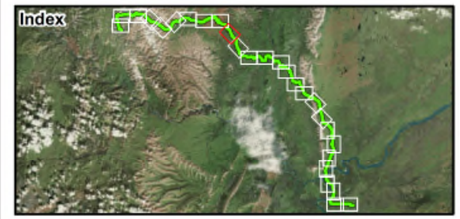
- Proposed Winter Road Alignment
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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Metres

TETRA TECH

FILE NO.
EARC03145-01_FigureA.mxd

OFFICE	DWN	CKD	APVD	REV
TI-VANC	MRV	SL	TB	4

DATE
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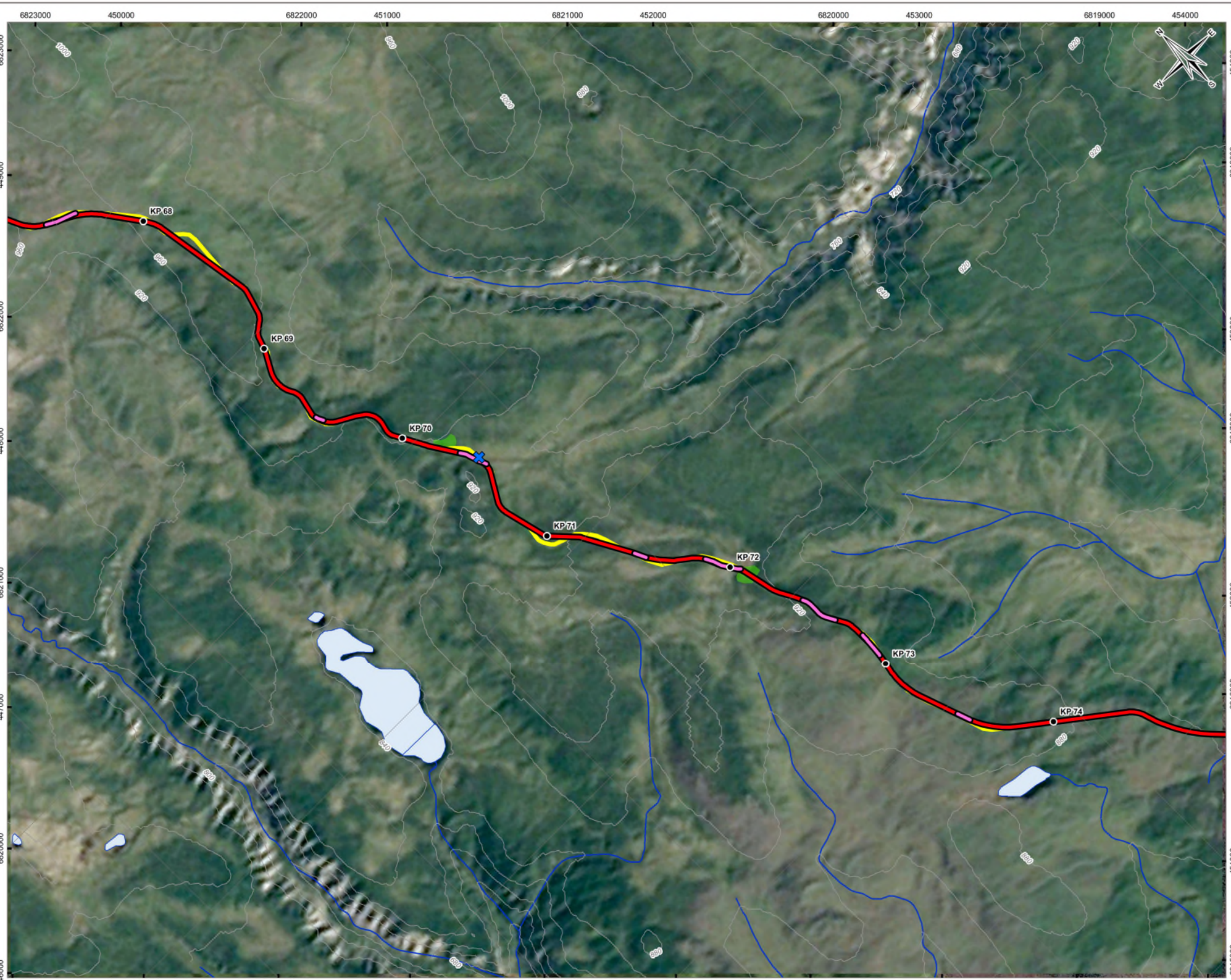

LEGEND

- Access Road Kilometre Marker
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- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2016

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
400 200 0 400
Metres

TETRA TECH

FILE NO. EARC03145-01_FigureA.mxd

OFFICE	DWN	CKD	APVD	REV
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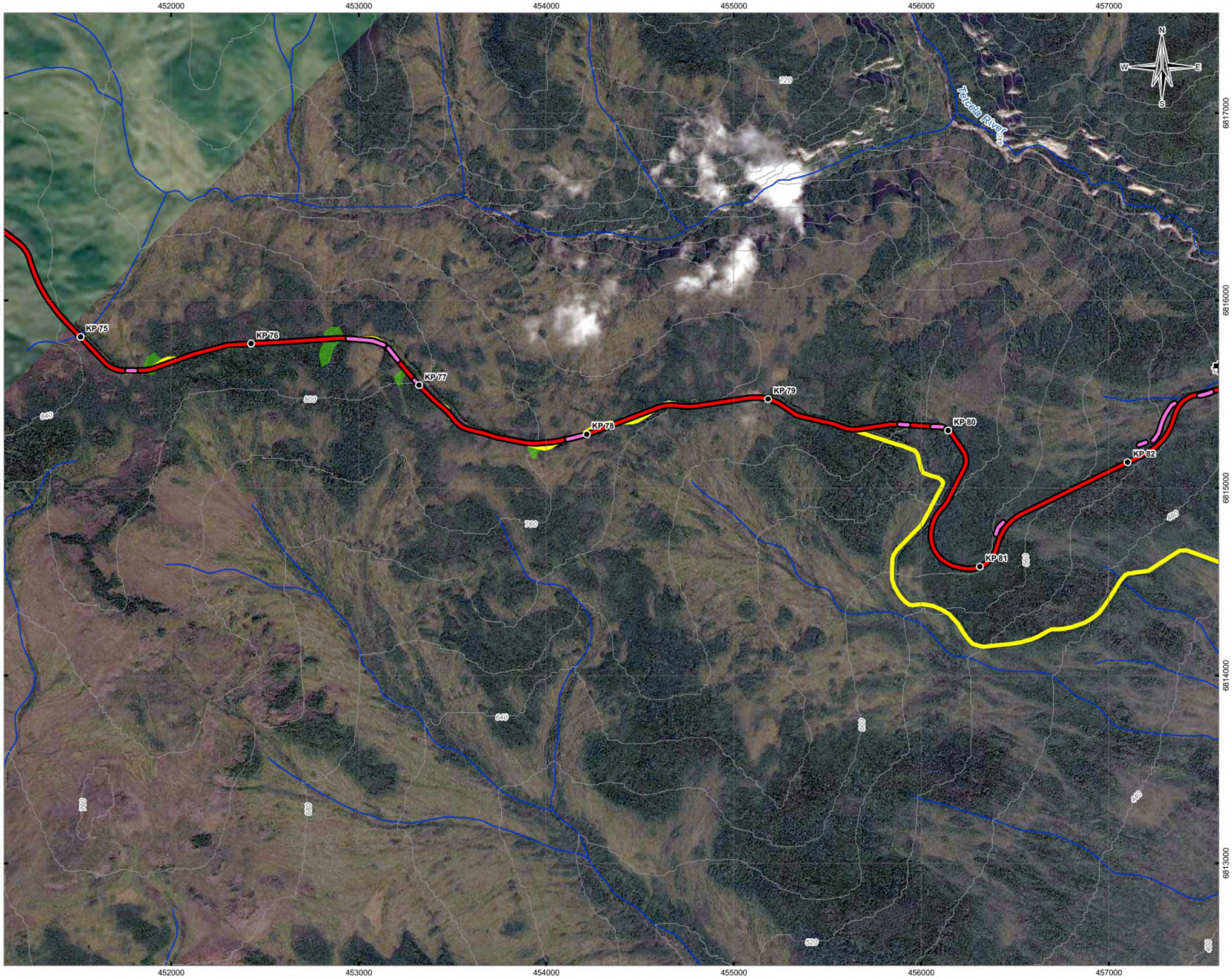

LEGEND

- Access Road Kilometre Marker
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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION: UTM Zone 10				DATUM: NAD83	CLIENT: CANADIAN ZINC CORPORATION
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TP12A
TP12/BH06
TP13/BH07
KP 83
KP 84
KP 85
KP 86
KP 87
KP 88
KP 89
KP 90
KP 91
KP 92
Tetcela River
BH-TTF-01
BH-TTF-02
TP18/BH09
BH10
BH11
TP-Allnorth-EK-1
BH08

N W E S

LEGEND

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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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Metres

TETRA TECH

FILE NO.
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November 29, 2018

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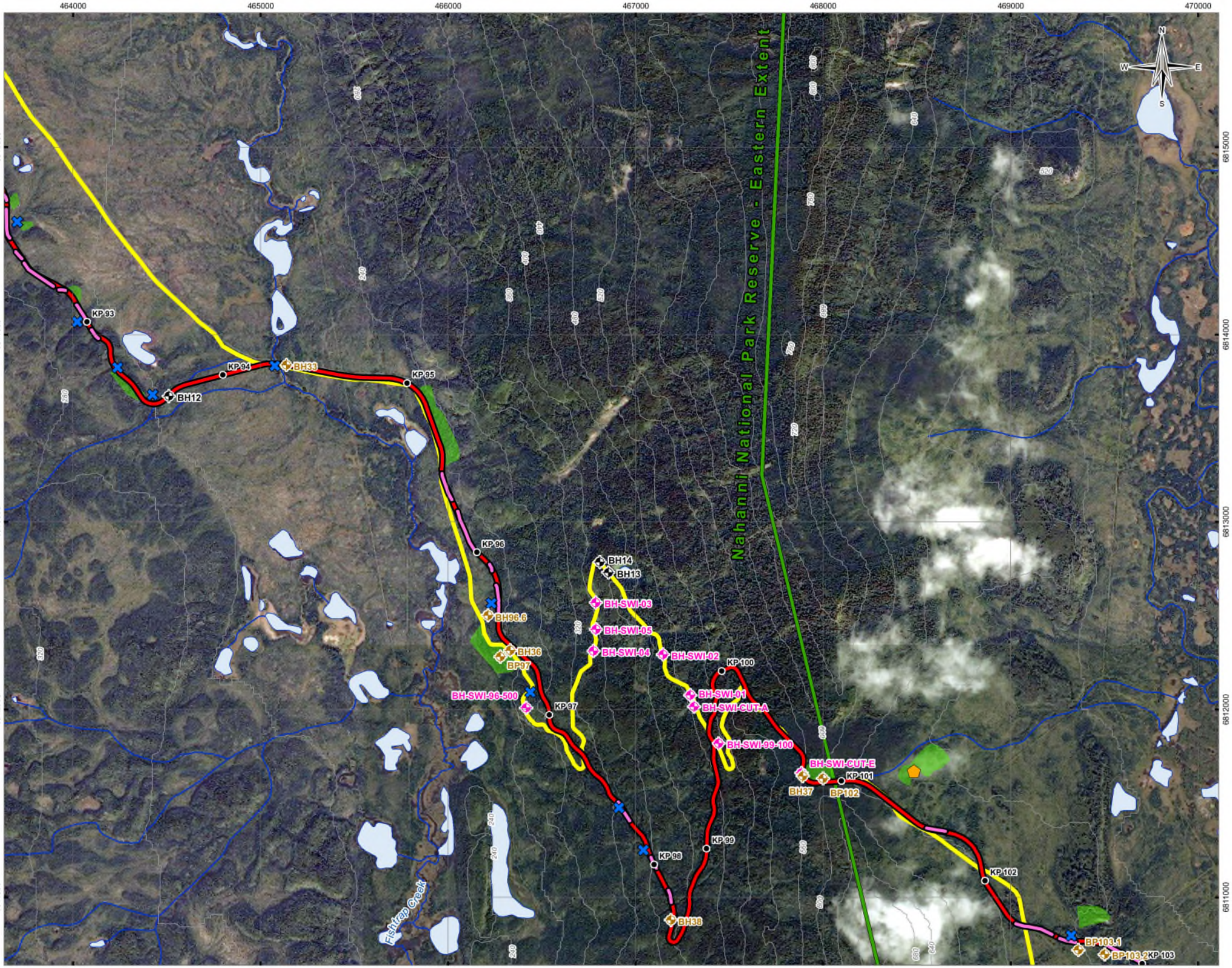

LEGEND

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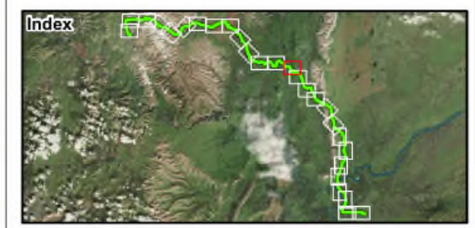

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

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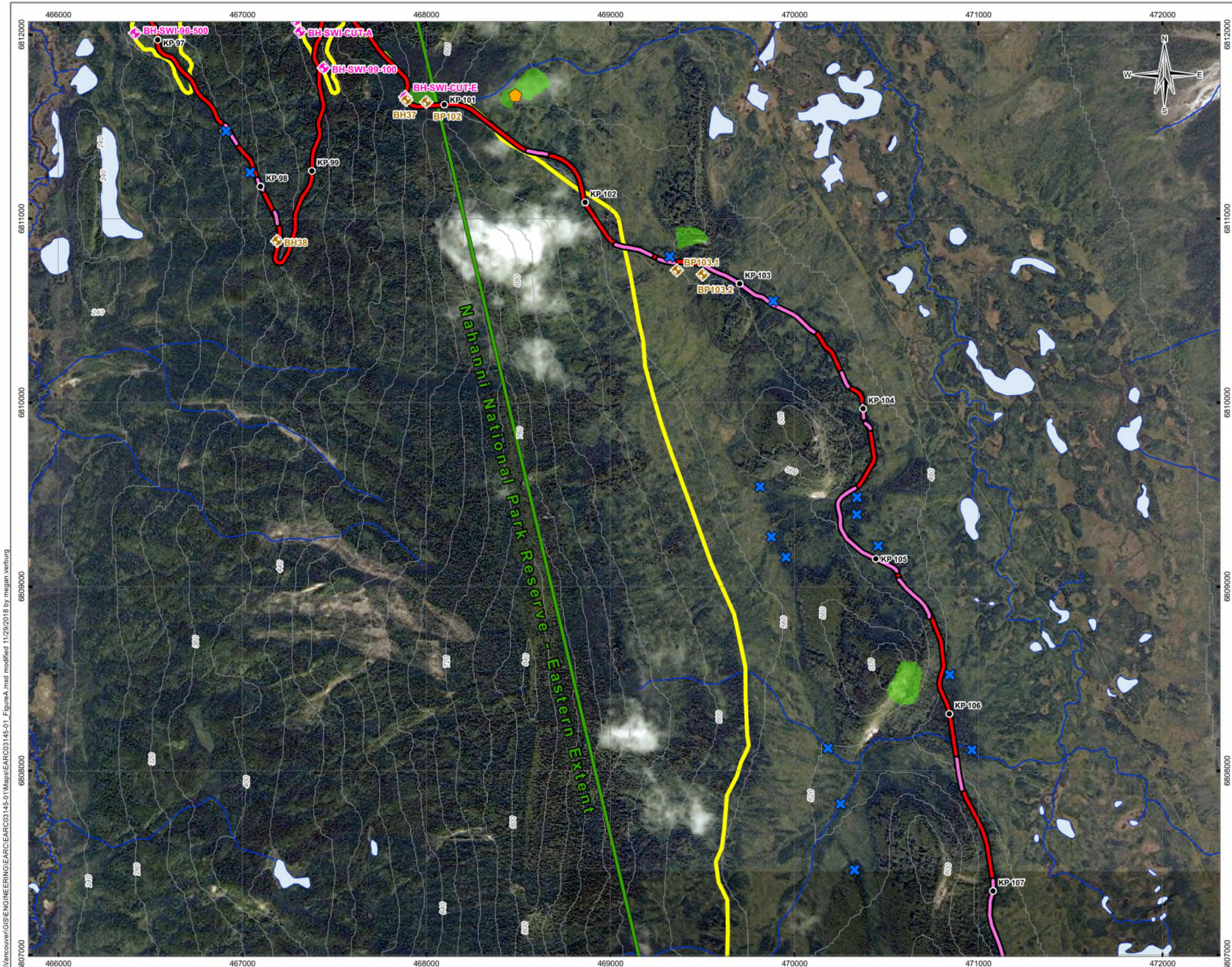

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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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Metres

TETRA TECH

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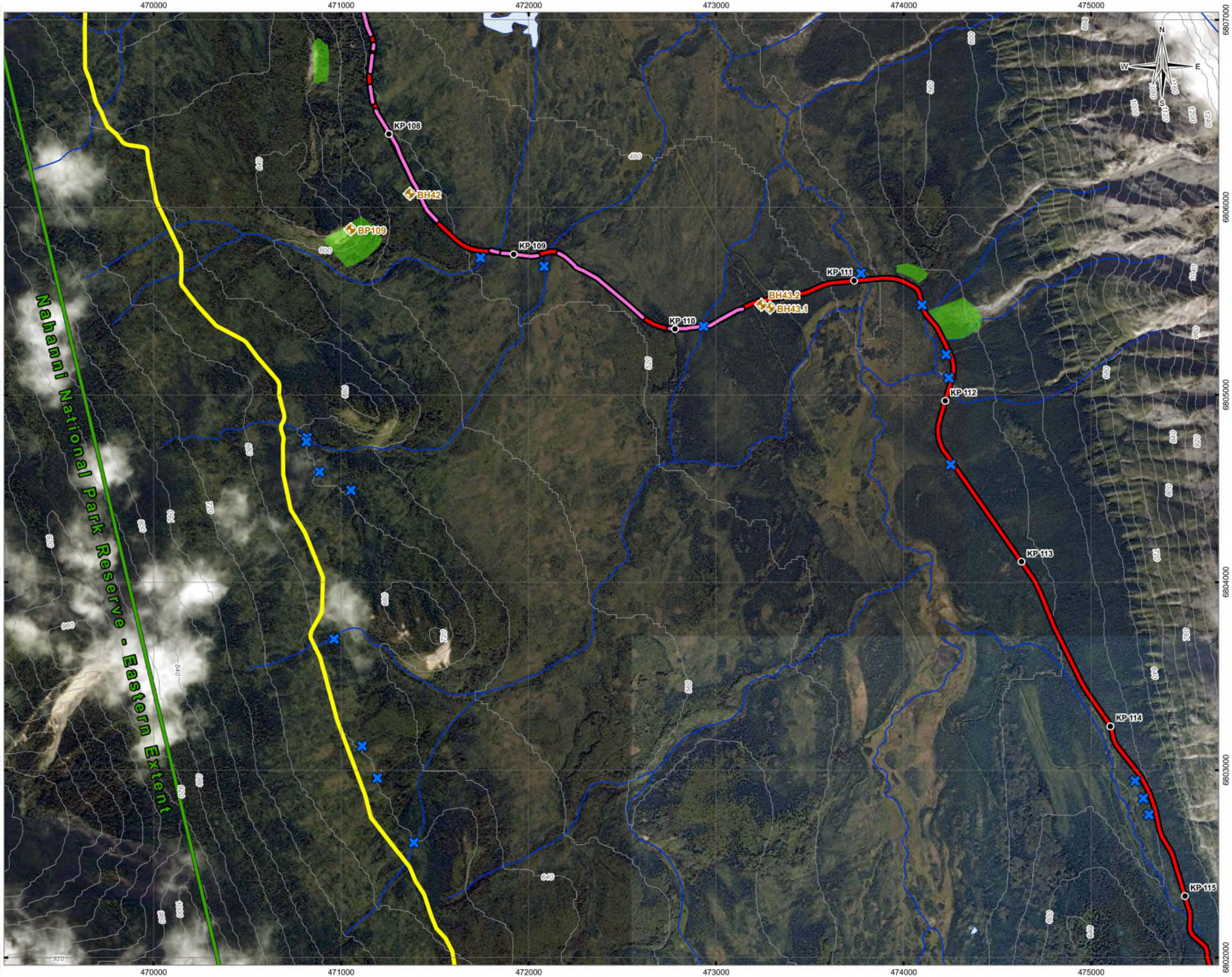

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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

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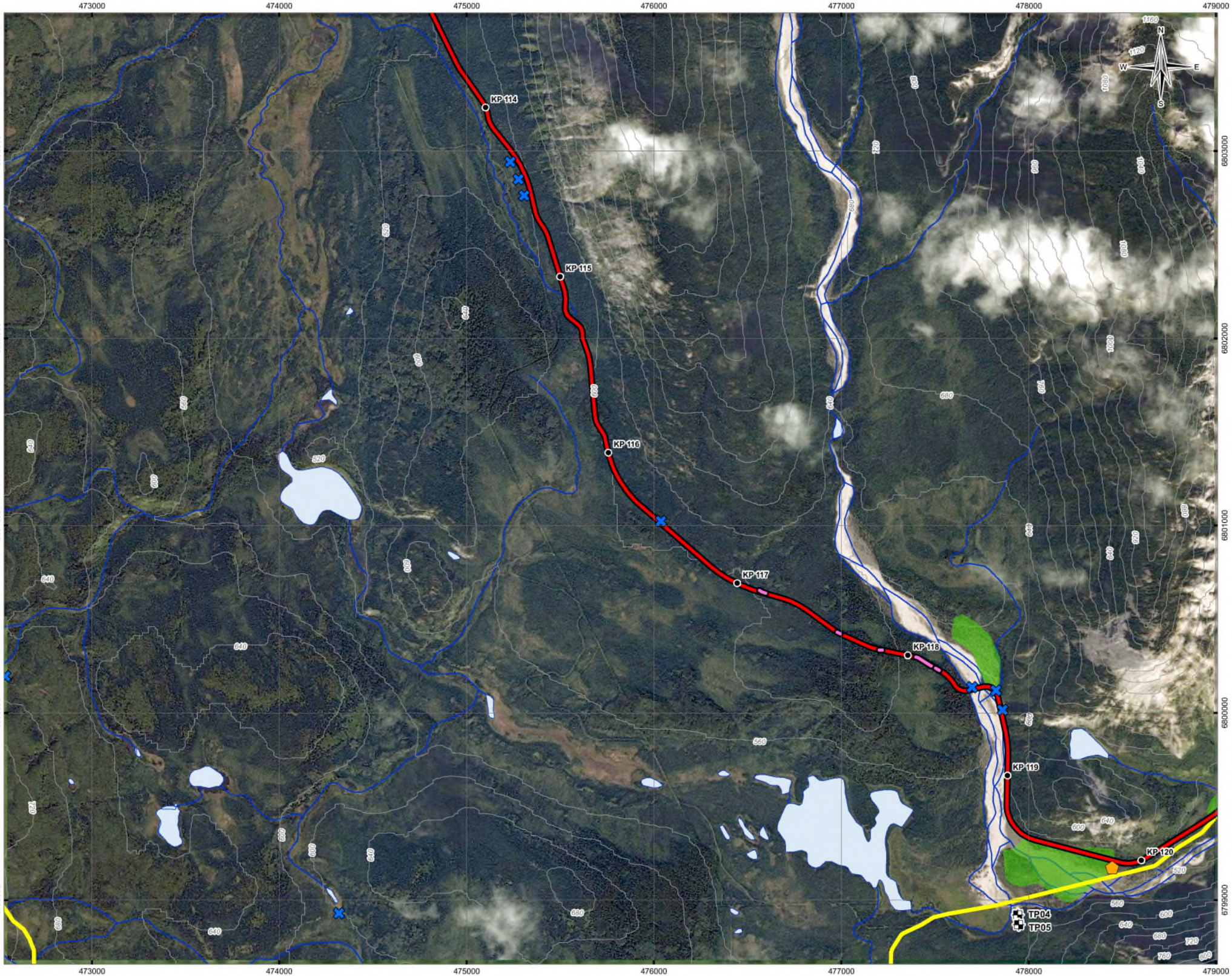

LEGEND

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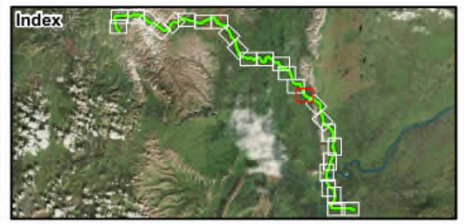

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

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BH49.2 BH49.1 BH15 BH16 TP15 TP25 TP17 TP16 TP04 TP05

LEGEND

- Access Road Kilometre Marker
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Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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Metres

TETRA TECH

FILE NO.
EARC03145-01_FigureA.mxd

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DATE
November 29, 2018

PROJECT NO.
ENG.EARC03145-01

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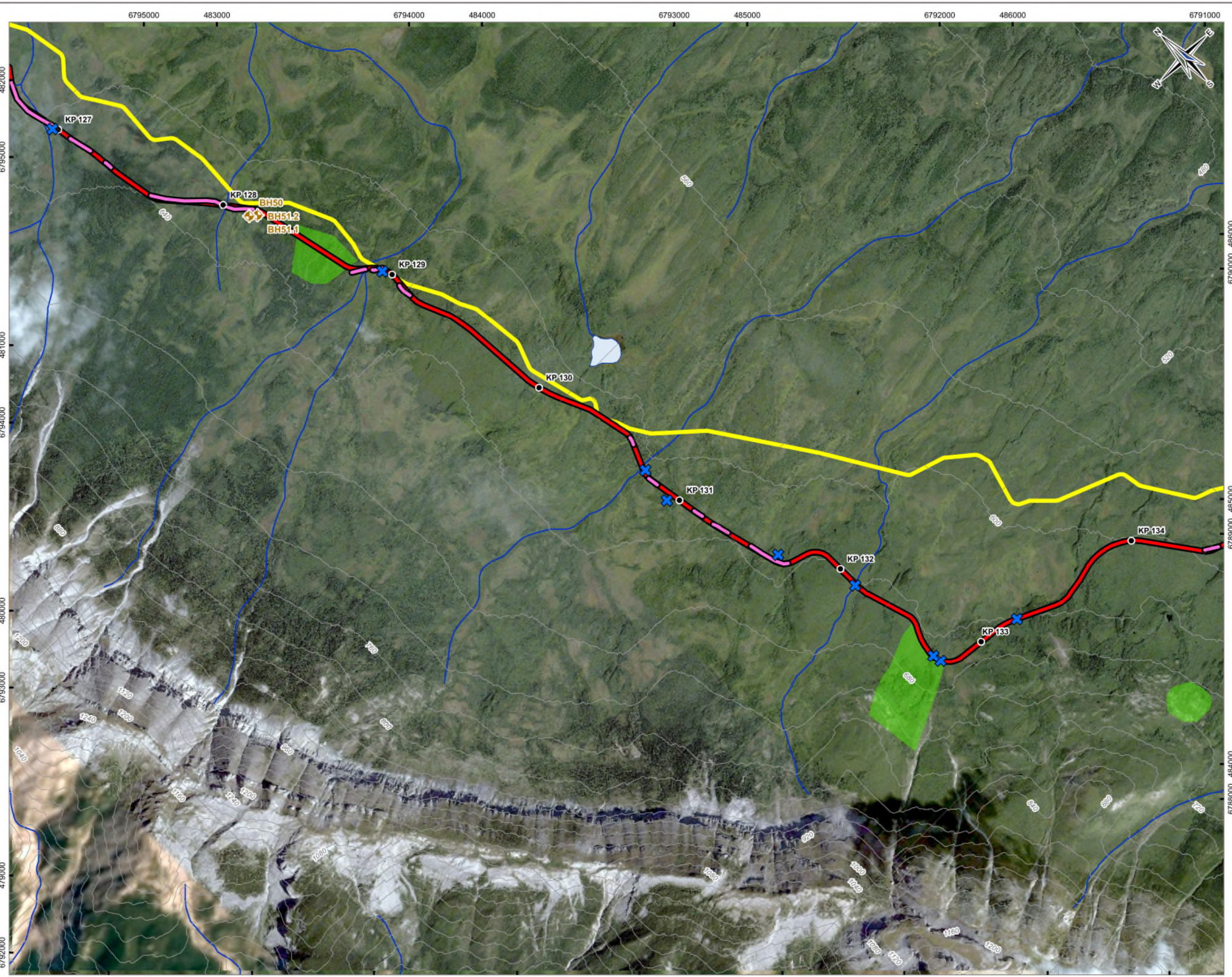

LEGEND

- Access Road Kilometre Marker
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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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TETRA TECH

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LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION: UTM Zone 10	DATUM: NAD83			CLIENT: CANADIAN ZINC CORPORATION
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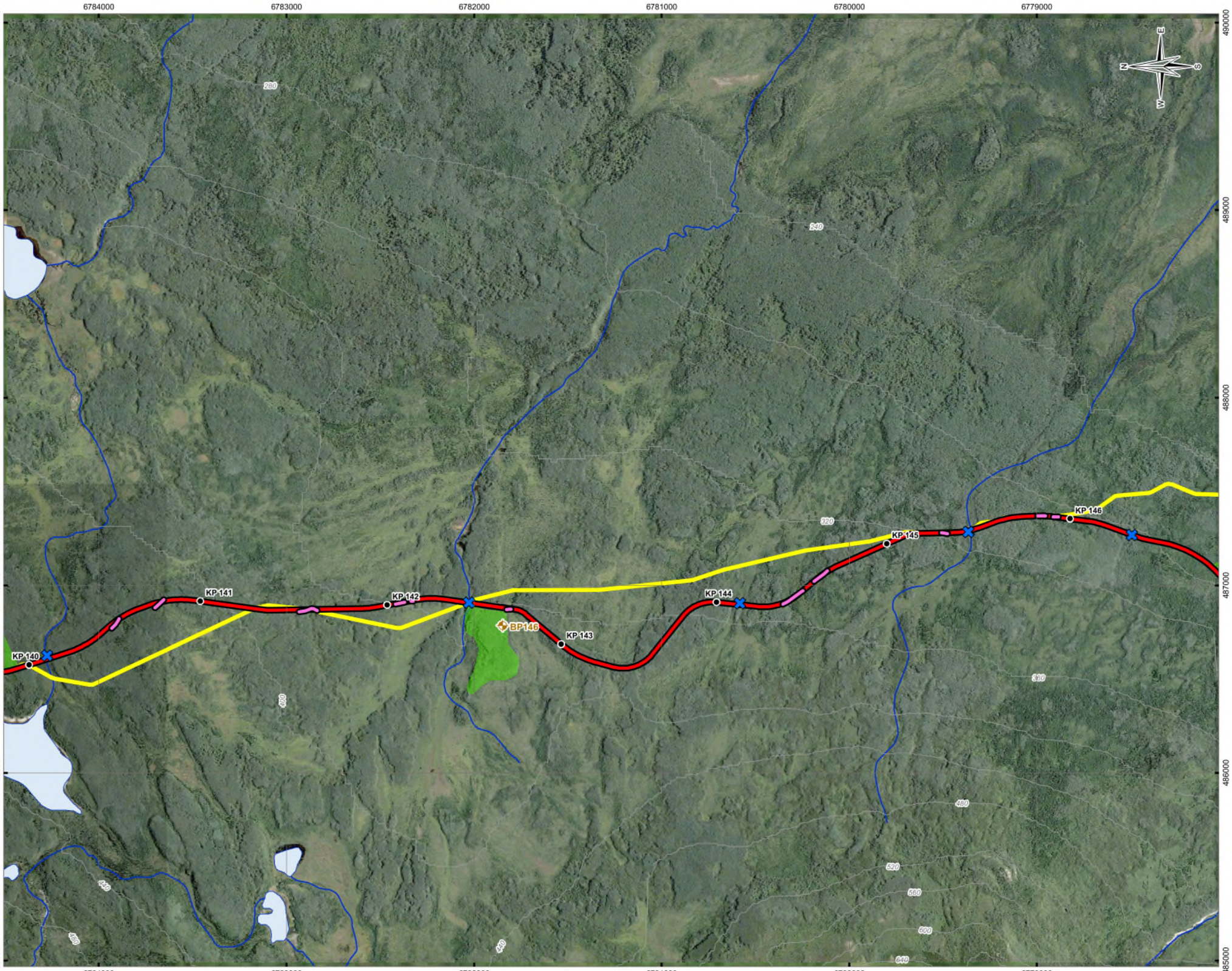

LEGEND

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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION UTM Zone 10				**DATUM** NAD83
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FILE NO. EARC03145-01_FigureA.mxd				TETRA TECH
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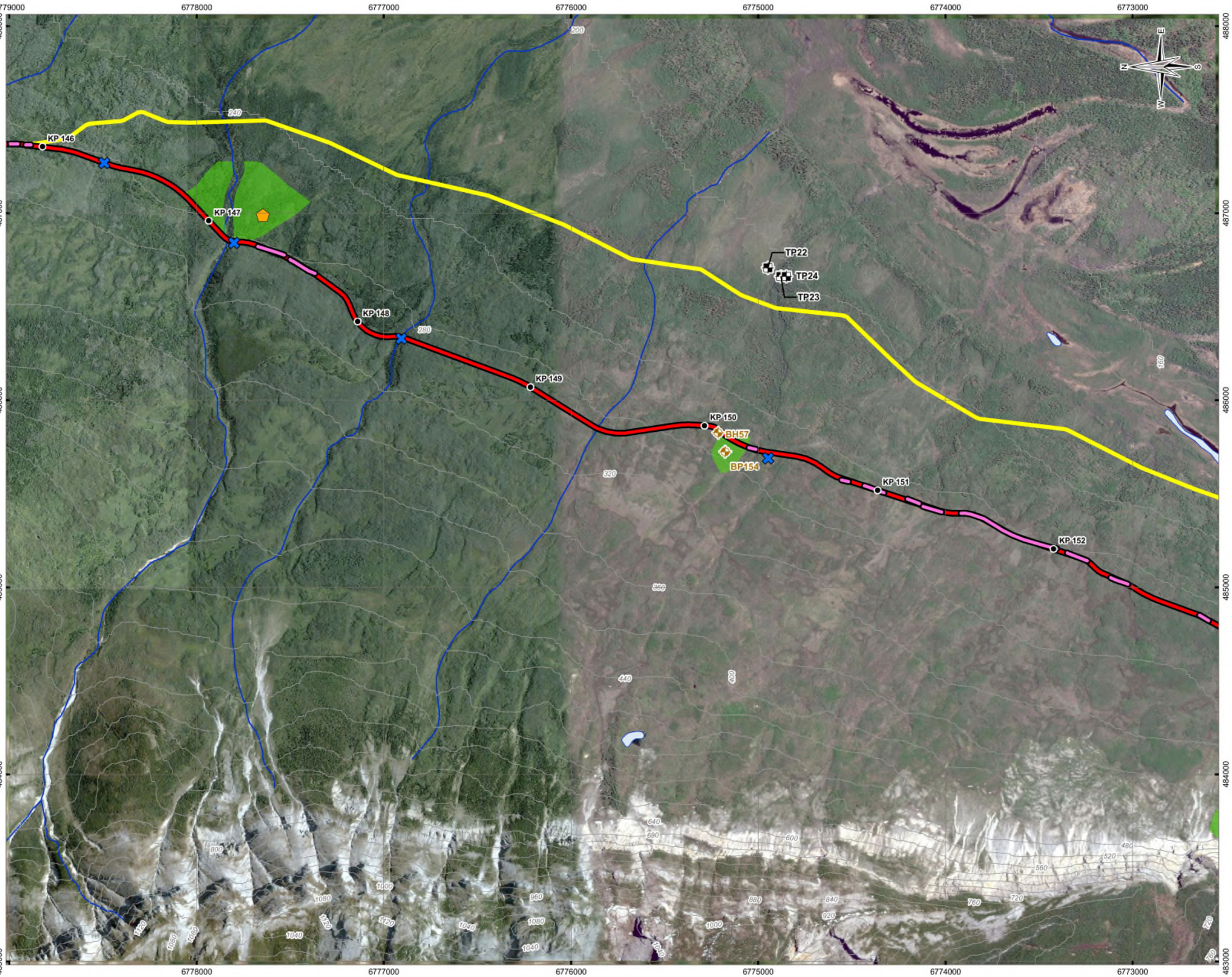

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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
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PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
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Metres

TETRA TECH

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KP 153
KP 154
KP 155
KP 156
KP 157
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BH62
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TP20
TP21
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LEGEND

- Access Road Kilometre Marker
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NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
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PRAIRIE CREEK ACCESS ROAD

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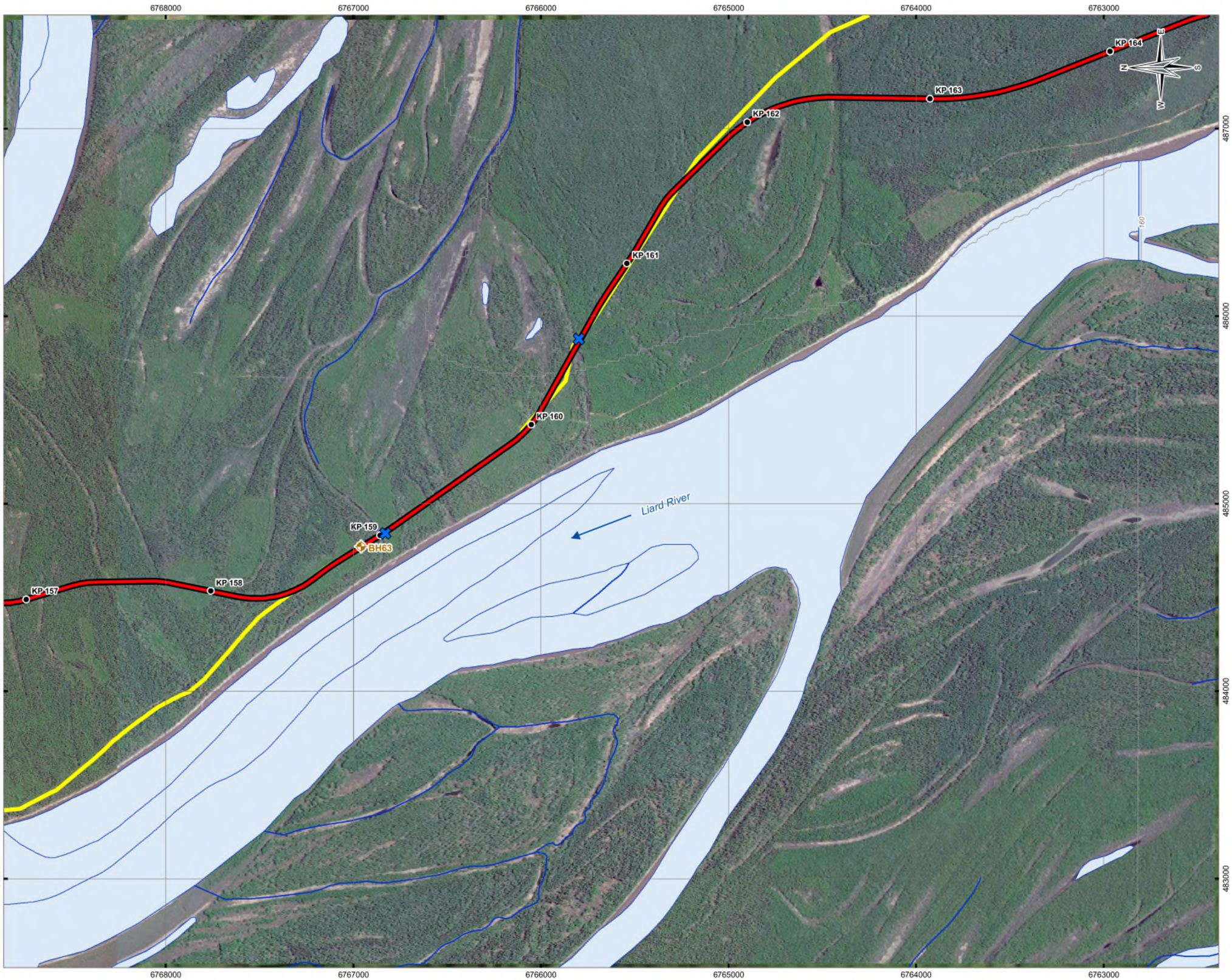

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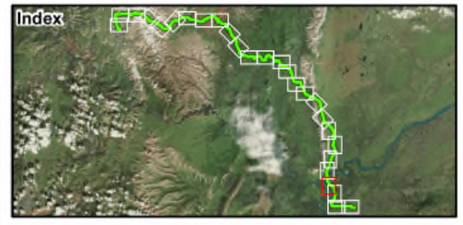

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Base imagery source: Google Earth, 2015

STATUS
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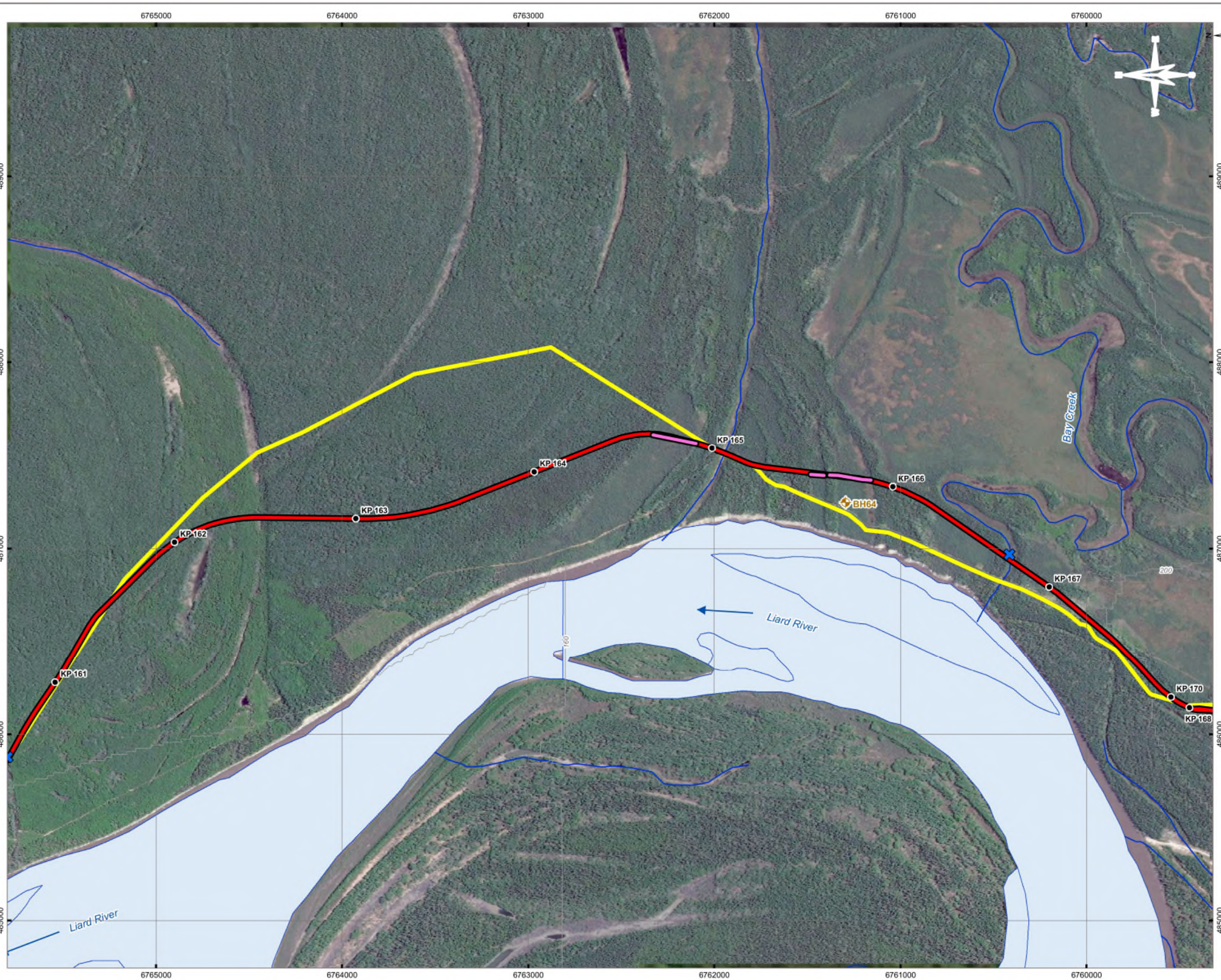
PRAIRIE CREEK ACCESS ROAD

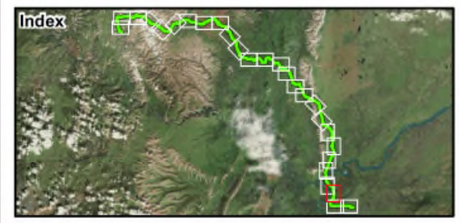
Map Book

PROJECTION: UTM Zone 10	DATUM: NAD83			CLIENT: CANADIAN ZINC CORPORATION
Scale: 1:20,000 (400 200 0 400 Metres)				TETRA TECH
FILE NO.: EARC03145-01_FigureA.mxd				
OFFICE: TI-VANC	DWN: MRV	CKD: SL	APVD: TB	REV: 4
DATE: November 29, 2018	PROJECT NO.: ENG.EARC03145-01			A24



LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
- 2014 Testpit (Allnorth, 2014)
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (November 2018)
- Potential Permafrost Section
- Proposed Winter Road Alignment
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2015

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:20,000
400 200 0 400
Metres

TETRA TECH

FILE NO. EARC03145-01_FigureA.mxd

OFFICE	DWN	CKD	APVD	REV
TI-VANC	MRV	SL	TB	4

DATE November 29, 2018
PROJECT NO. ENG.EARC03145-01

A25

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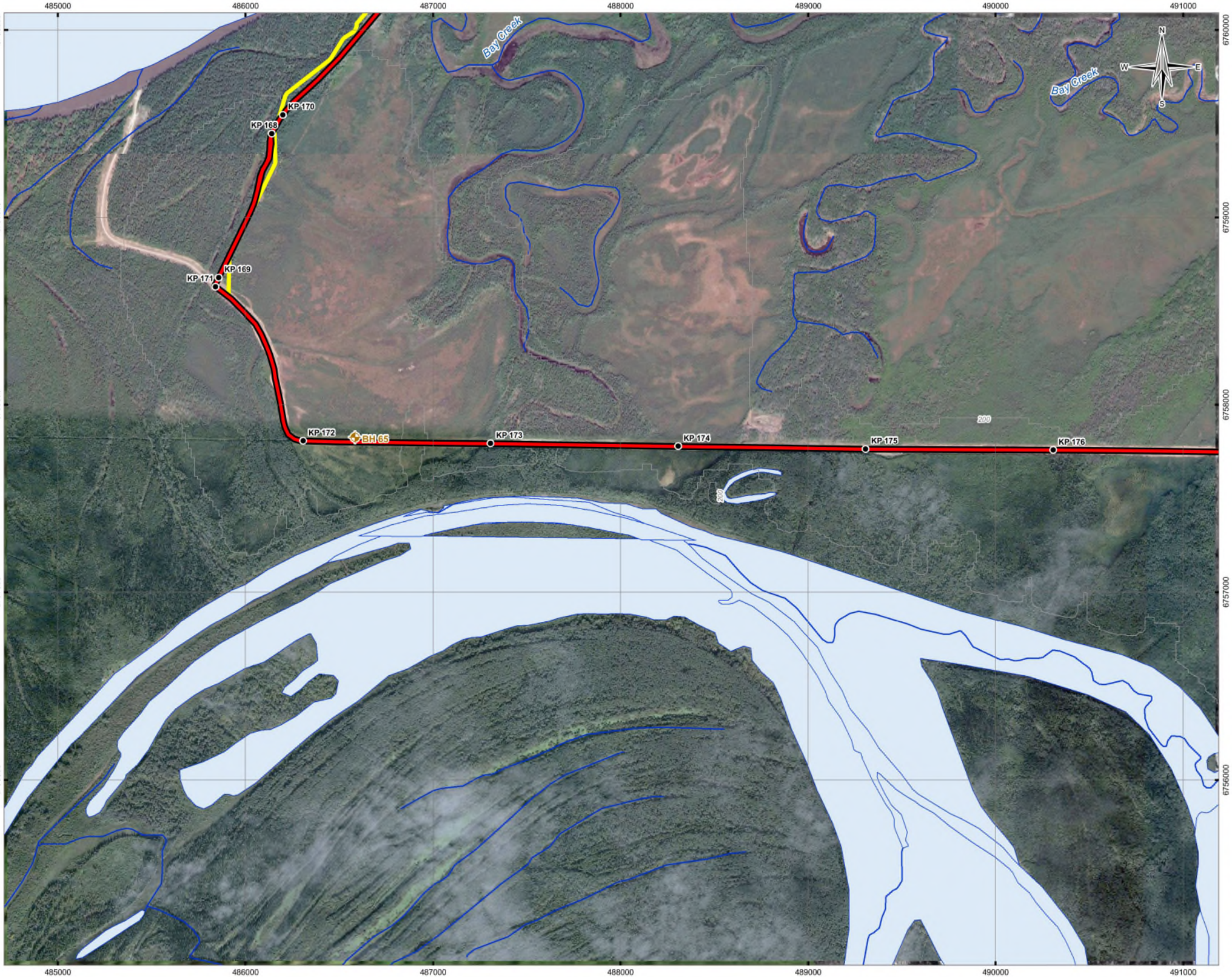

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
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- Potential Borrow Source
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- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2007-2015

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:20,000 400 200 0 400 Metres					TETRA TECH
FILE NO. EARC03145-01_FigureA.mxd					
OFFICE TI-VANC	**DWN** MRV	**CKD** SL	**APVD** TB	**REV** 4	**A26**
DATE November 29, 2018	**PROJECT NO.** ENG.EARC03145-01				

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491000 492000 493000 494000 495000 496000

6760000 6759000 6758000 6757000 6756000

Bay Creek

KP 176 KP 177 BH66 KP 178 KP 179 KP 180 KP 181 BH 67

200

N W E S

LEGEND

- Access Road Kilometre Marker
- 2018 Borehole (Tetra Tech, 2018)
- 2014 Borehole (Tetra Tech EBA, 2014)
- 2012 Borehole (SNC-Lavalin, 2012)
- 2014 Testpit (Tetra Tech EBA, 2014)
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- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Contour (40 m)
- Watercourse
- Waterbody

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR REVIEW

PRAIRIE CREEK ACCESS ROAD

Map Book

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION
Scale: 1:20,000 (400 200 0 400 Metres)		TETRA TECH
FILE NO. EARC03145-01_FigureA.mxd		
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DATE November 29, 2018	PROJECT NO. ENG.EARC03145-01	

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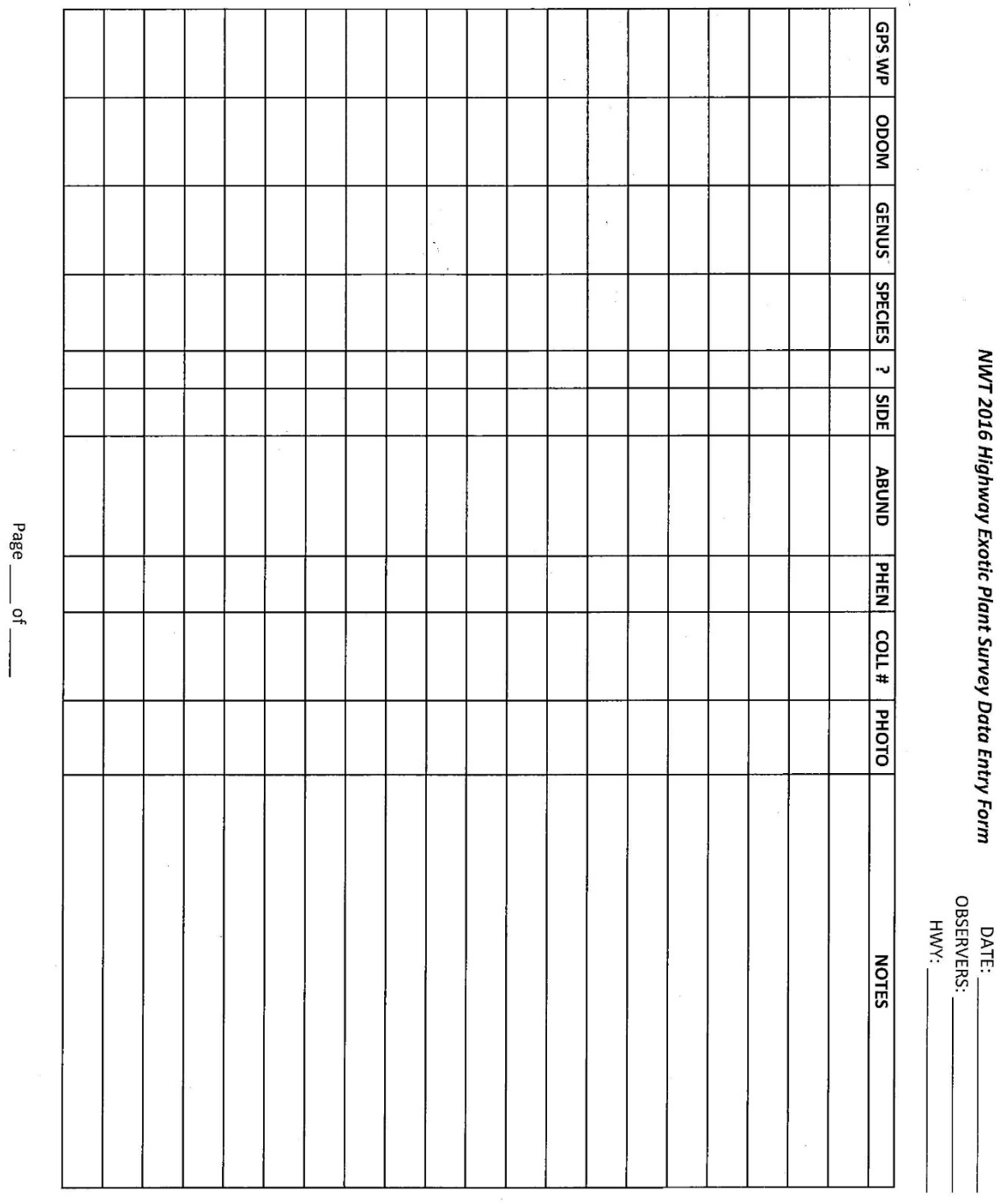
APPENDIX B

METHODS AND SURVEY FORMS

Appendix A. NWT 2016 Highway Survey Exotic Plant Data Entry Form



NWT 2016 Highway Exotic Plant Survey Data Entry Form

DATE: _____
OBSERVERS: _____
HWY: _____

GPS WP	ODOM	GENUS	SPECIES	?	SIDE	ABUND	PHEN	COLL #	PHOTO	NOTES

Page ____ of ____

APPENDIX C

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

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Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

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1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

PRAIRIE CREEK ACCESS ROAD

CANADIAN ZINC CORPORATION

TETRA TECH

CANADIAN ZINC CORPORATION

a wholly-owned subsidiary of NorZinc Ltd

POST-EA INFORMATION PACKAGE INCLUDING AN UPDATED PROJECT DESCRIPTION ALL SEASON ROAD TO PRAIRIE CREEK MINE

APPENDIX 9-2

SUBMITTED IN SUPPORT OF:

Water Licences MV/PC2014L8-0006, and
Land Use Permits MV/PC2014F0013

SUBMITTED TO:

Mackenzie Valley Land and Water Board
Yellowknife, NT X1A 2N7

Parks Canada,
Nahanni National Park Reserve
Fort Simpson, NT X0E 0N0

SUBMITTED BY:

Canadian Zinc Corporation
Vancouver, BC, V6B 4N9

February 2019

TETRA TECH

February 6, 2019

ISSUED FOR USE
FILE: ENW.EENW03326
Via Email: david@canadianzinc.com

Canadian Zinc Corporation
Suite 1710, 650 West Georgia Street
PO Box 11644
Vancouver, BC V6B 4N9

Attention: David Harpley
VP Environmental & Permitting Affairs

Subject: 2018 Baseline Invasive Plant Survey

1.0 INTRODUCTION

Canadian Zinc Corporation (CZN) is planning to operate the Prairie Creek Mine, located at approximately 61o 33' north latitude and 124o 48' west longitude adjacent to Prairie Creek, a tributary of the South Nahanni River, in the southwest NWT. A 169.5 km All Season Road (ASR) connecting the Prairie Creek Mine (at Km 0) to the Liard Highway (Hwy 7) via the Nahanni Butte access road (Figure 1) will generally follow the alignment of a previously permitted Winter Road, while reflecting the terrain, site characteristics, and road specifications suitable and preferred for the ASR (Figure 1).

Roadways can act as a vector for the establishment of invasive species. Invasive plants have the ability to aggressively establish and quickly spread in new environments, altering natural habitats, displacing native species, and reducing habitat effectiveness for wildlife. Once native species are displaced, conditions become favorable for the establishment of other invasive species, further compounding the issue.

Concerns over the establishment and spread of invasive plant species, along the ASR and into the Nahanni National Park Reserve (NNPR), were raised during the Environmental Assessment (EA) of the ASR. In response to information requests during the EA, Tetra Tech developed an Invasive Species Management Framework. In response to the Framework, the Mackenzie Valley Review Board, within the Report of Environmental Assessment and Reasons for Decision – Canadian Zinc Corp. Prairie Creek All Season Road – Project EA1415-01 (2017, the 'REA') requested an invasive plant survey be completed to establish baseline conditions. CZN retained Tetra Tech Canada Inc. (Tetra Tech) to conduct this survey in summer 2018.

The 2018 baseline invasive plant survey scope of work on and near the proposed access road alignment included:

- Survey areas of the access road that overlap with previous anthropogenic vehicular/machine disturbance, including the historic winter road and exploration cut-lines;
- Survey the Nahanni Butte community access road from the Liard Highway to the Liard River that overlaps with the CZN access road;
- Survey the old logging road from the Nahanni Butte access road to the Liard River that was cleared by the Nahanni Butte community previously, sections of which will be overlapped by the ASR;
- Survey the Prairie Creek Mine site;
- Survey/spot check pristine areas along the ASR that are currently undisturbed; and
- Provide a summary report of findings.

Tetra Tech Canada Inc.
14940 - 123 Avenue
Edmonton, AB T5V 1B4 CANADA
Tel 780.451.2121 Fax 780.454.5688

2.0 METHODOLOGY

The survey generally followed the walking survey methodology outlined in the Report on the 2016 Survey of Exotic Plants along the Northwest Territories Highways (Oldham and Delisle-Oldham 2017)[1]. Invasive plants listed in this Report were the focus of the survey. A list of invasive plants was compiled along with estimates of relative abundance and phenology, which assisted with identification. Abundance categories used are as follows:

Table 1: Abundance Categories[1]

Category	Sub-Category	Description
Continuous	N/A	Plants generally in a dense, continuous patch >100 m. Density distribution class of 7 or 8[2]
Sporadic	High scattered abundance	Occasional patches <100 m long which are broken by large sections (i.e., several hundred metres) of no growth. Density distribution is class 5 or 6[2]
	Low scattered abundance	Occasional patches <100 m long which are broken by large sections (i.e., several hundred metres) of no growth. Density distribution is class 3 or 4[2]
Rare	N/A	Very few plants observed. Density distribution is class 1 or 2[2]
Absent	N/A	No plants observed

3.0 RESULTS

A baseline survey for invasive species was completed August 10 to 18, 2018; a total of 97 km were surveyed. Twenty-three (23) invasive species were identified in high densities between KP 155 to KP 179.5 (south of the Liard River, Figures 2-1 to 2-43). No invasive species were detected between KP 155 (just north of the Liard River) to KP 0. However, four invasive species were observed around the Mine site in small numbers. Previous vegetation surveys within the NNPR did not detect invasive species.

The following species, densities, and locations were observed along the proposed access road (Table 2).

Table 2. Invasive Plant Species Observations

Waypoint #	Easting (Zone 10V)	Northing	Common Name	Scientific Name	Density	Photo #	Feature Type and Comment
1	485837	6758624	Alsike Clover	*Trifolium hybridum*	Low Scattered - Sporadic	1	Polygon - Ends at KP 179.5
			White Sweet-clover	*Melilotus officinalis*	Continuous	2	Polygon - Ends at KP 179.5
			Narrow-leaf Hawksbeard	*Crepis tectorum*	Low Scattered - Sporadic	3	Polygon - Ends at KP 179.5
			Brittle-stemmed Hempnettle	*Galeopsis tetrahit*	High Scattered - Sporadic	4	Polygon - Ends at KP 179.5

[1] Oldham, M.J., M. Delisle-Oldham. 2017. Report on the 2016 Survey of Exotic Plants along the Northwest Territories Highways. Available online at: https://www.enr.gov.nt.ca/sites/enr/files/resources/report_on_the_2016_survey_of_exotic_plants_along_northwest_territories_h.pdf

[2] Luttmerding, H.A., D.A. Demarchi, E.C. Lea, D.V. Meidinger, and T. Vold (editors). 1990. Describing Ecosystems in the Field. 2nd Edition. B.C. Ministry of Environment, Lands and Parks and B.C. Ministry of Forestry. Ministry of the Environment (MOE) Manual 11. Victoria, B.C.

Waypoint #	Easting (Zone 10V)	Northing	Common Name	Scientific Name	Density	Photo #	Feature Type and Comment
			Common Plantain	*Plantago major*	Low Scattered - Sporadic	5	Polygon - Ends at KP 179.5
			Black Medick	*Medicago lupulina*	High Scattered - Sporadic	6	Polygon - Ends at KP 179.5
			Prostrate Knotweed	*Polygonum aviculare*	Low Scattered - Sporadic	7	Polygon - Ends at KP 179.5
			Tufted Vetch	*Vicia cracca*	Low Scattered - Sporadic	8	Polygon - Ends at 150 m east of point
			Narrow-leaved Collomia	*Collomia linearis*	High Scattered - Sporadic	9	Polygon - Ends at KP 179.5
			Lamb's Quarters	*Chenopodium album*	Low Scattered - Sporadic	10	Polygon - Ends at 150 m east of point
			Biennial Sagebrush	*Artemisia biennis*	Rare	11	Point
			Common Dandelion	*Taraxacum officinale*	Rare	12	Point
2	486062	6758410	Pineapple Weed	*Matricaria discoidea*	Rare	13	Point
3	486210	6757853	Pineapple Weed	*Matricaria discoidea*	Rare		Point
4	486243	6757823	Lamb's Quarters	*Chenopodium album*	Low Scattered - Sporadic		Polygon - Ends at 200 m east of point
5	486578	6757798	Tufted Vetch	*Vicia cracca*	Low Scattered - Sporadic		Polygon - Ends at 200 m east of point
6	487056	6757799	Common Dandelion	*Taraxacum officinale*	Low Scattered - Sporadic		Polygon - Ends at 100 m east of point
			Pineapple Weed	*Matricaria discoidea*	Rare		Point
7	488617	6757779	Barley	*Hordeum vulgare*	Rare	14	Point
8	489504	6757768	Shepherd's Purse	*Capsella bursa-pastoris*	Rare	15	Point
36	493475	6757718	Field Sow-thistle	*Sonchus arvensis*	Rare	16	Point
37	493753	6757610	Barley	*Hordeum vulgare*	Low Scattered - Sporadic		Polygon - Ends at 150 m east of point
38	493947	6757190	Field Sow-thistle	*Sonchus arvensis*	Low Scattered - Sporadic		Polygon - Ends at KP 179.5
39	493996	6757109	Awnless Brome	*Bromus inermis*	Low Scattered - Sporadic	17	Polygon - Ends 250 m east of point
40	494642	6757079	Common Timothy	*Phleum pratense*	Low Scattered - Sporadic	18	Polygon - Ends at KP 179.5
41	494684	6757076	Awnless Brome	*Bromus inermis*	Low Scattered - Sporadic		Polygon - Ends at KP 179.5
42	494917	6757078	Alfalfa	*Medicago sativa*	Rare	19	Point
43	485926	6758755	Alsike Clover	*Trifolium hybridum*	Low Scattered - Sporadic		Polygon - Ends at KP 169
			Tufted Vetch	*Vicia cracca*	Low Scattered - Sporadic		Polygon - Ends 500 m NE of point

Waypoint #	Easting (Zone 10V)	Northing	Common Name	Scientific Name	Density	Photo #	Feature Type and Comment
			Common Plantain	*Plantago major*	Low Scattered - Sporadic		Polygon - Ends at KP 156
44	487011	6760879	Alsike Clover	*Trifolium hybridum*	Rare		Point
45	486613	6763846	Narrow-leaf Hawksbeard	*Crepis tectorum*	Low Scattered - Sporadic		Ends 500 m NW of point
			Alsike Clover	*Trifolium hybridum*	Rare		Point
46	486265	6764364	Biennial Sagebrush	*Artemisia biennis*	Rare		Point
			Narrow-leaf Hawksbeard	*Crepis tectorum*	Rare		Point
47	486105	6764395	Lamb's Quarters	*Chenopodium album*	Rare		Point
			White Cockle	*Silene latifolia* ssp. *alba*	Rare	20	Point
48	485989	6764522	Field Pennycress	*Thlaspi arvense*	Rare	21	Point
			Narrow-leaved Collomia	*Collomia linearis*	Rare		Point
			Maple-leaved Goosefoot	*Chenopodium simplex*	Rare	22	Point
49	485513	6765449	White Sweet-clover	*Melilotus albus*	Low Scattered - Sporadic		Polygon - Ends 200 m NW of point
			Narrow-leaf Hawksbeard	*Crepis tectorum*	Low Scattered - Sporadic		Polygon - Ends 200 m NW of point
50	485336	6766143	White Sweet-clover	*Melilotus albus*	Low Scattered - Sporadic		Polygon - Ends 1,000 m NW of point
51	484895	6766772	Lamb's Quarters	*Chenopodium album*	Low Scattered - Sporadic		Polygon - Ends 1,000 m NW of point
			Biennial Sagebrush	*Artemisia biennis*	Rare		Point
52	484693	6767071	White Sweet-clover	*Melilotus albus*	Rare		Point
53	483478	6768584	Lamb's Quarters	*Chenopodium album*	Rare		Point
54	483397	6768750	Biennial Sagebrush	*Artemisia biennis*	Rare		Point
			Lamb's Quarters	*Chenopodium album*	Rare		Point
55	483898	6769292	White Sweet-clover	*Melilotus albus*	Rare		Point
			Common Dandelion	*Taraxacum officinale*	Low Scattered - Sporadic		Polygon - Ends 600 m NW of point
56	484123	6770459	Common Dandelion	*Taraxacum officinale*	Low Scattered - Sporadic		Ends 1,000 m NE of point

Waypoint #	Easting (Zone 10V)	Northing	Common Name	Scientific Name	Density	Photo #	Feature Type and Comment
64	404417	6825824	Common Plantain	*Plantago major*	Low Scattered - Sporadic		Polygon - Surrounds main mine buildings
65	404772	6826002	Common Dandelion	*Taraxacum officinale*	Rare		Point
66	404391	6825878	Common Plantain	*Plantago major*	Low Scattered - Sporadic		Polygon - Surrounds main mine buildings
67	404391	6825879	Prostrate Knotweed	*Polygonum aviculare*	Rare		Point
69	404429	6825681	Dense-flower Pepperwort	*Lepidium densiflorum*	Rare	23	Point
70	404378	6825792	Common Plantain	*Plantago major*	Rare		Point
71	404295	6825800	Common Plantain	*Plantago major*	Rare		Point

Bison may be a contributing factor to the spread of invasive species south of the Liard River, as evident from well-trodden trails and wallows in areas cleared proximal to the old logging road (Photo 24). One year after the community of Nahanni Butte conducted this additional clearing, high densities of invasive species were found along the cut-line. These species may have been introduced to the area via dirty equipment; however, community members do not use the cutline (it is relatively inaccessible due to terrain) and it does seem to be favored by bison as a movement corridor between habitats.

4.0 RECOMMENDATIONS

The challenge for invasive plant management along the ASR will be keeping invasive species from spreading into the area north of the Liard River and into the NNPR. The Invasive Species Management Plan (Tetra Tech 2018) should be followed to prevent the establishment of invasive species and control their spread, if present.

Prior to construction, invasive species should be controlled along the Nahanni Butte community access road, the old logging road and areas proximal to it cleared by the community (cut-line), and around the Mine. These areas pose significant risk for spreading invasive species along the ASR.

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Canadian Zinc Corporation and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Canadian Zinc Corporation, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

6.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

Prepared by:
Amy McLenaghan, B.Sc., P. Biol., L.A.T.
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Environment & Water Practice
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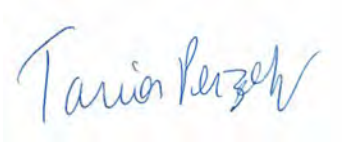

Reviewed by:
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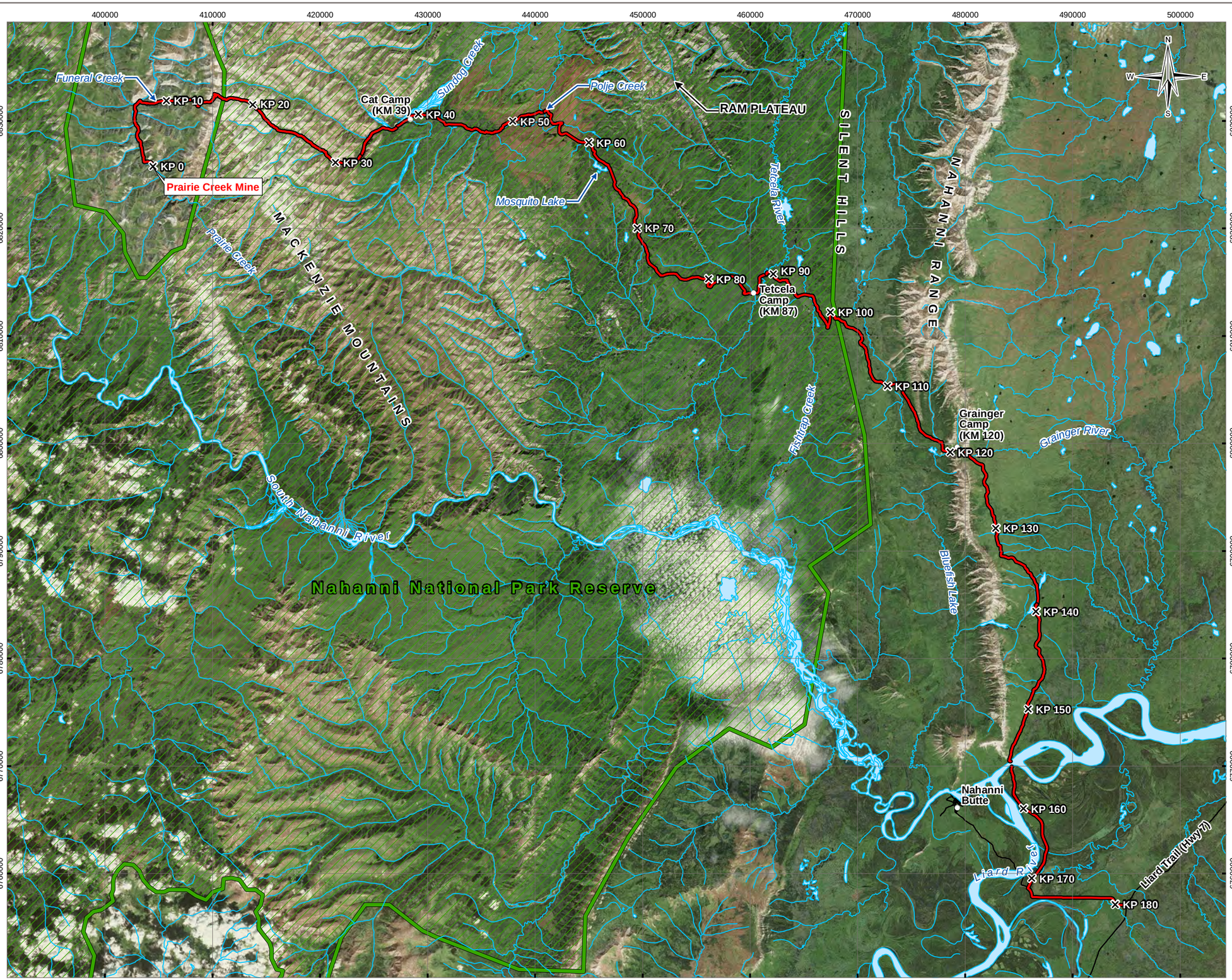
Engineering Practice
Direct Line: 778.945.5717
Tania.Perzoff@tetratech.com

/jmt

Attachments: Figures (44)
Appendix A – Photographs
Appendix B – Tetra Tech's Limitations on the Use of this Document

FIGURES



LEGEND

- Access Road Kilometre Marker
- Proposed Prairie Creek Access Road
- Existing Road
- Nahanni National Park Reserve Boundary
- Watercourse
- Waterbody

NOTES
Base data source:
Road alignment provided by AllNorth (December 2018)
Kilometre markers provided by AllNorth (November 2018)
Existing roads from CanVec (1:50,000)
Watercourses from CanVec (1:250,000)

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Proposed Access Road Alignment

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:350,000 5 2.5 0 5 Kilometres				TETRA TECH
FILE NO. EENW03326-01_Figure1.mxd				
OFFICE Tt-VANC	**DWN** SL	**CKD** BB	**APVD** RH	**REV** 0
DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01			**Figure 1**

Q:\Edmonton\GIS\ENVIRONMENTAL\EENW\EENW03326-01\Maps\EENW03326-01_Figure1.mxd modified 1/28/2019 by megan.verburg

404750 405000 405250 405500 405750 406000

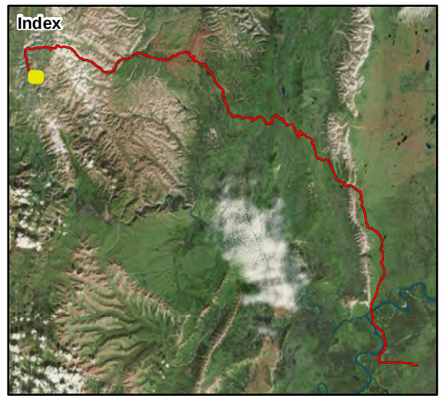
6825500 6825250 6825000 6824750 6824500

N W E S

Prairie Creek

LEGEND

- Invasive Species Transect
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

2-01

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404000 404250 404500 404750 405000 405250

6826750 6826500 6826250 6826000 6825750

N W E S

Common Dandelion

Common Plantain
Low Scattered - Sporadic

Prostrate Knotweed

Common Plantain
Low Scattered - Sporadic

Prairie Creek

Common Plantain

KP 0

Common Plantain

Dense-flower Pepperwort

LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000

100 50 0 100

Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

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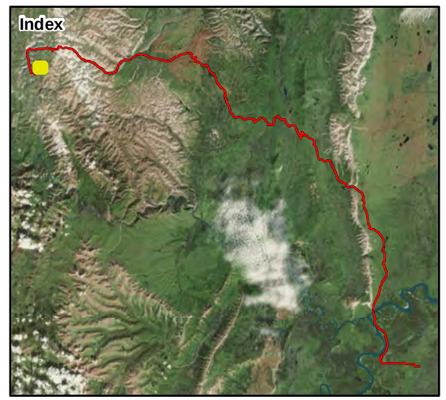
405250 405500 405750 406000 406250 406500

6828000 6827750 6827500 6827250 6827000

N W E S

LEGEND

- Invasive Species Transect
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000

100 50 0 100

Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

2-03

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402750 403000 403250 403500 403750 404000

6827250 6827000 6826750 6826500 6826250

KP 2

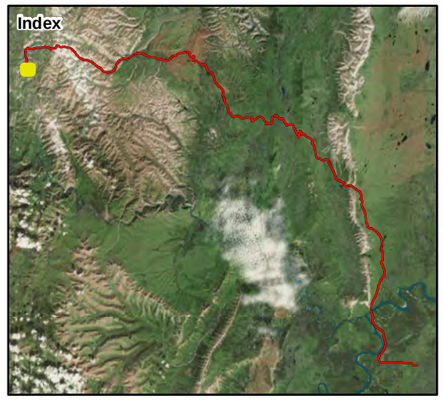
KP 1

Prairie Creek

N W E S

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 28, 2019

PROJECT NO.
ENW.EENW03326-01

2-04

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402750 403000 403250 403500 403750 404000

6828500 6828250 6828000 6827750 6827500

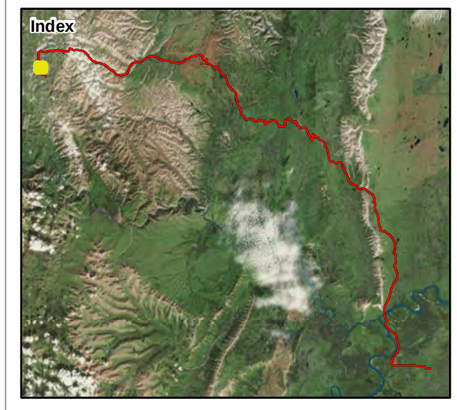
KP 3

Prairie Creek

N W E S

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	**2-05**
DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01				

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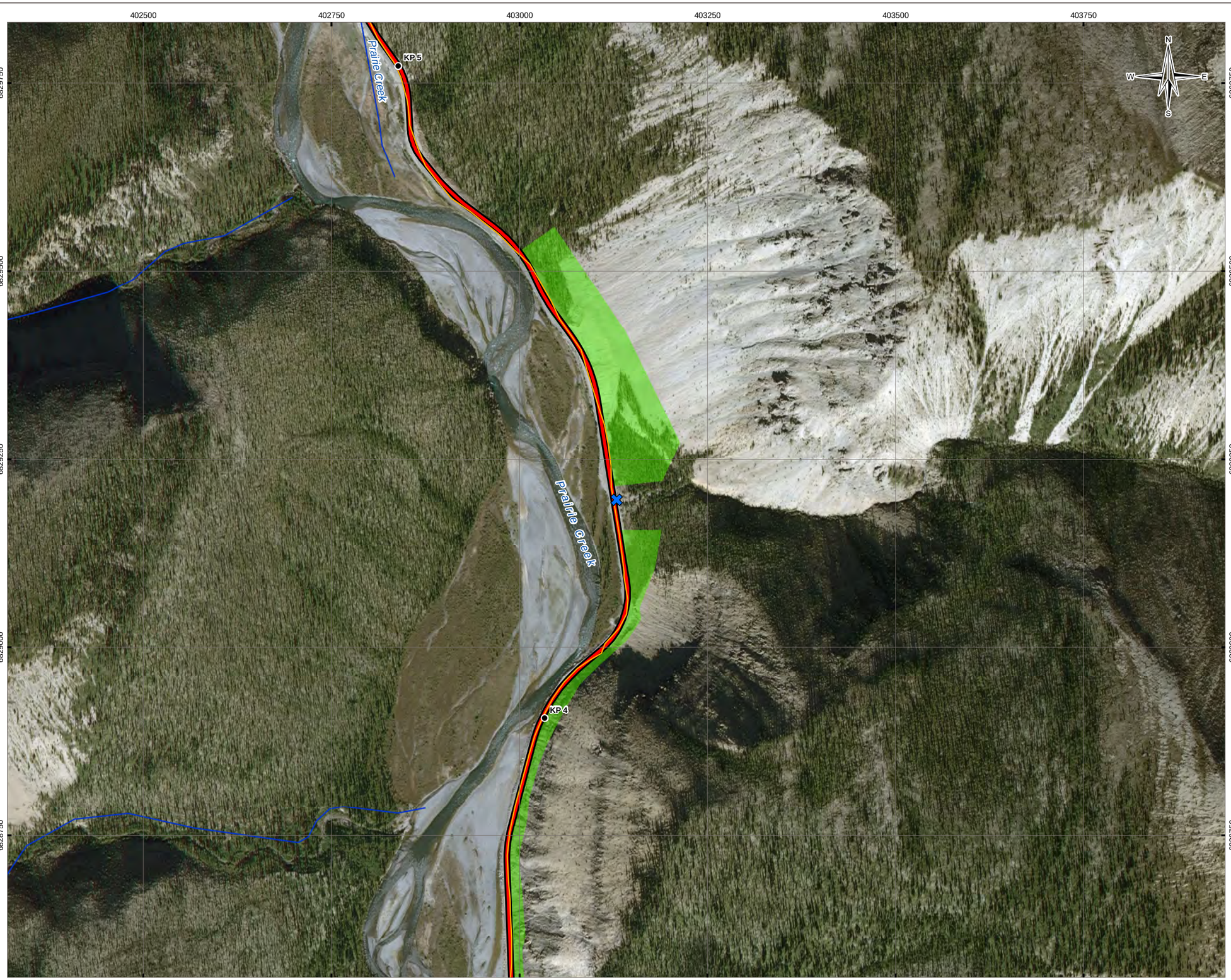
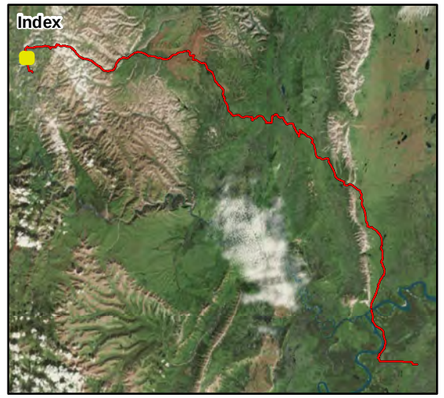


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 28, 2019

PROJECT NO.
ENW.EENW03326-01

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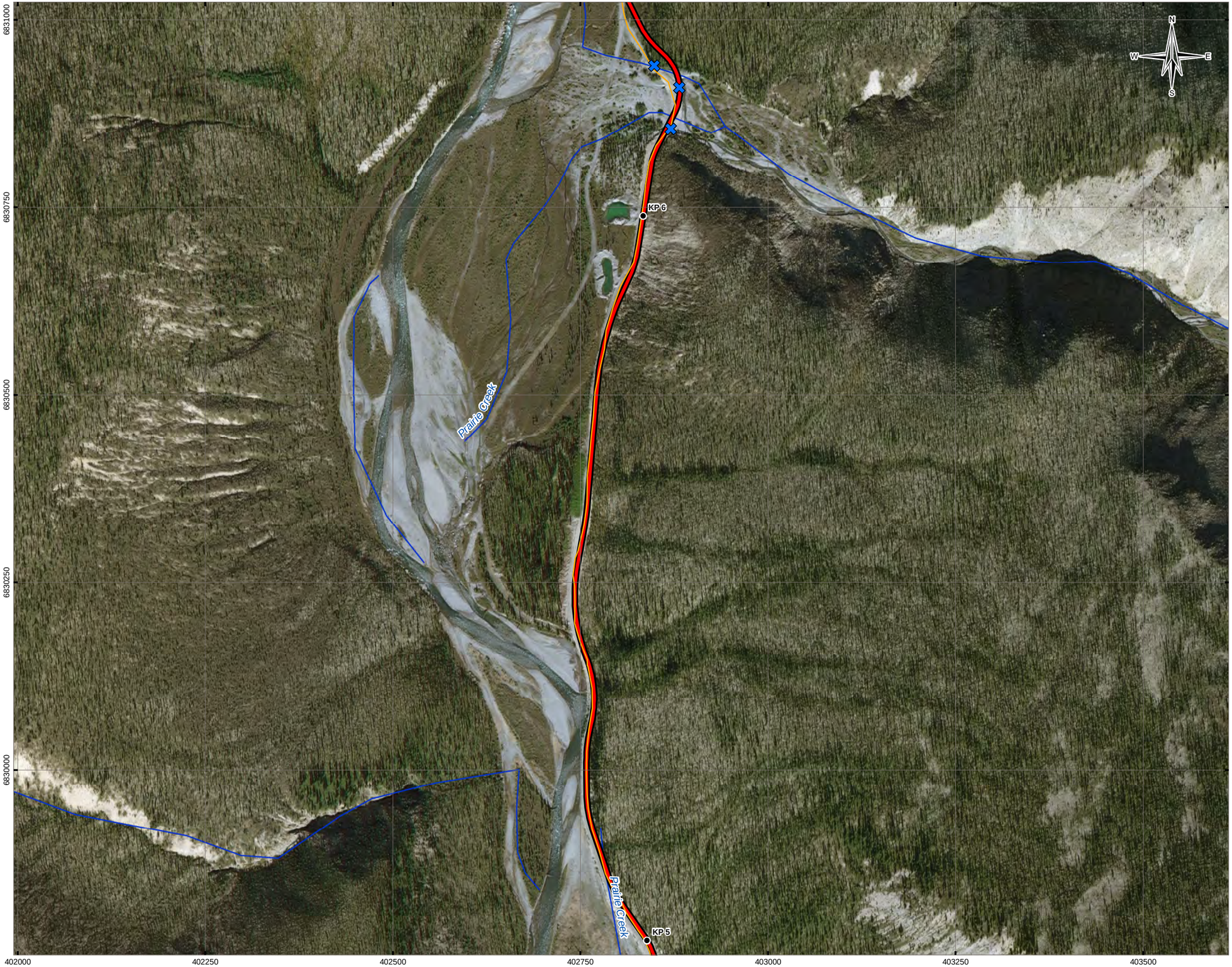
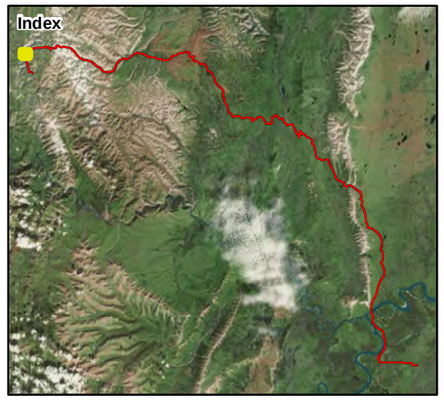


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	**2-07**
DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01				

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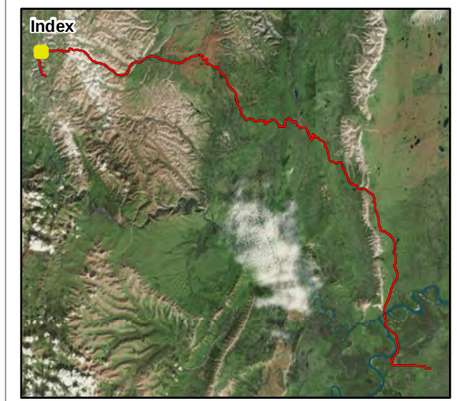
402750 403000 403250 403500 403750 404000

6832000 6831750 6831500 6831250 6831000

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-08
DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01				

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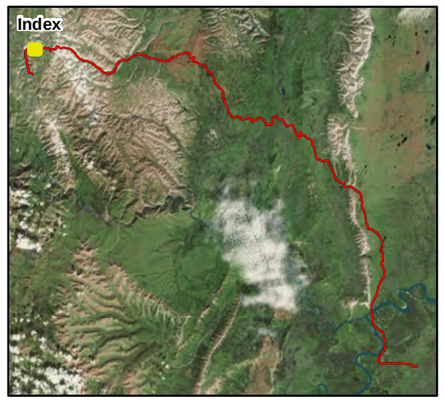
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 28, 2019

PROJECT NO.
ENW.EENW03326-01

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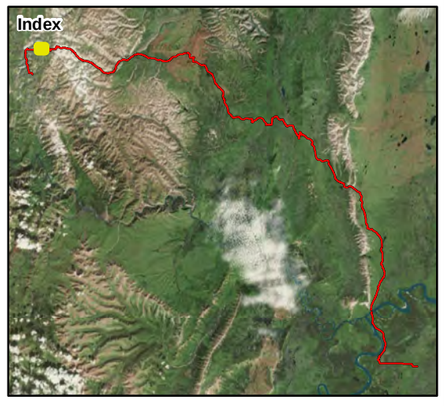
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 28, 2019

PROJECT NO.
ENW.EENW03326-01

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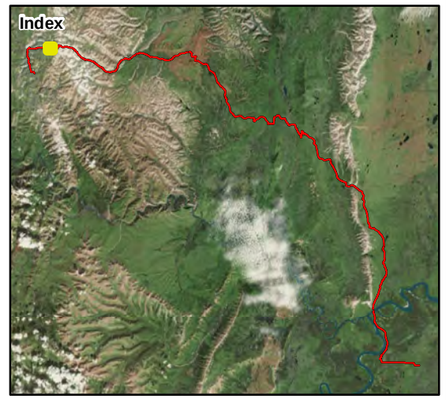
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

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409000 409250 409500 409750 410000 410250

6832500 6832250 6832000 6831750 6831500

KP 16

KP 15

KP 14

N W E S

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000

100 50 0 100

Metres

TETRA TECH

FILE NO.				
EENW03326-01_Figure2.mxd				
OFFICE	**DWN**	**CKD**	**APVD**	**REV**
Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
January 28, 2019	ENW.EENW03326-01			

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410500 410750 411000 411250 411500 411750 412000

6832750 6832500 6832250 6832000 6831750

Nahanni National Park Reserve - Western Extent

Nahanni National Park Reserve

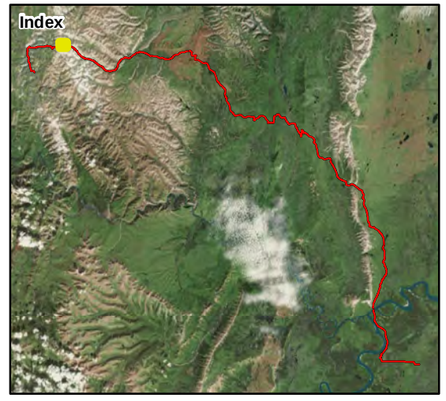
KP 17

KP 18

N W E S

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: DigitalGlobe, 2016

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
EENW03326-01_Figure2.mxd				
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Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
January 28, 2019	ENW.EENW03326-01			

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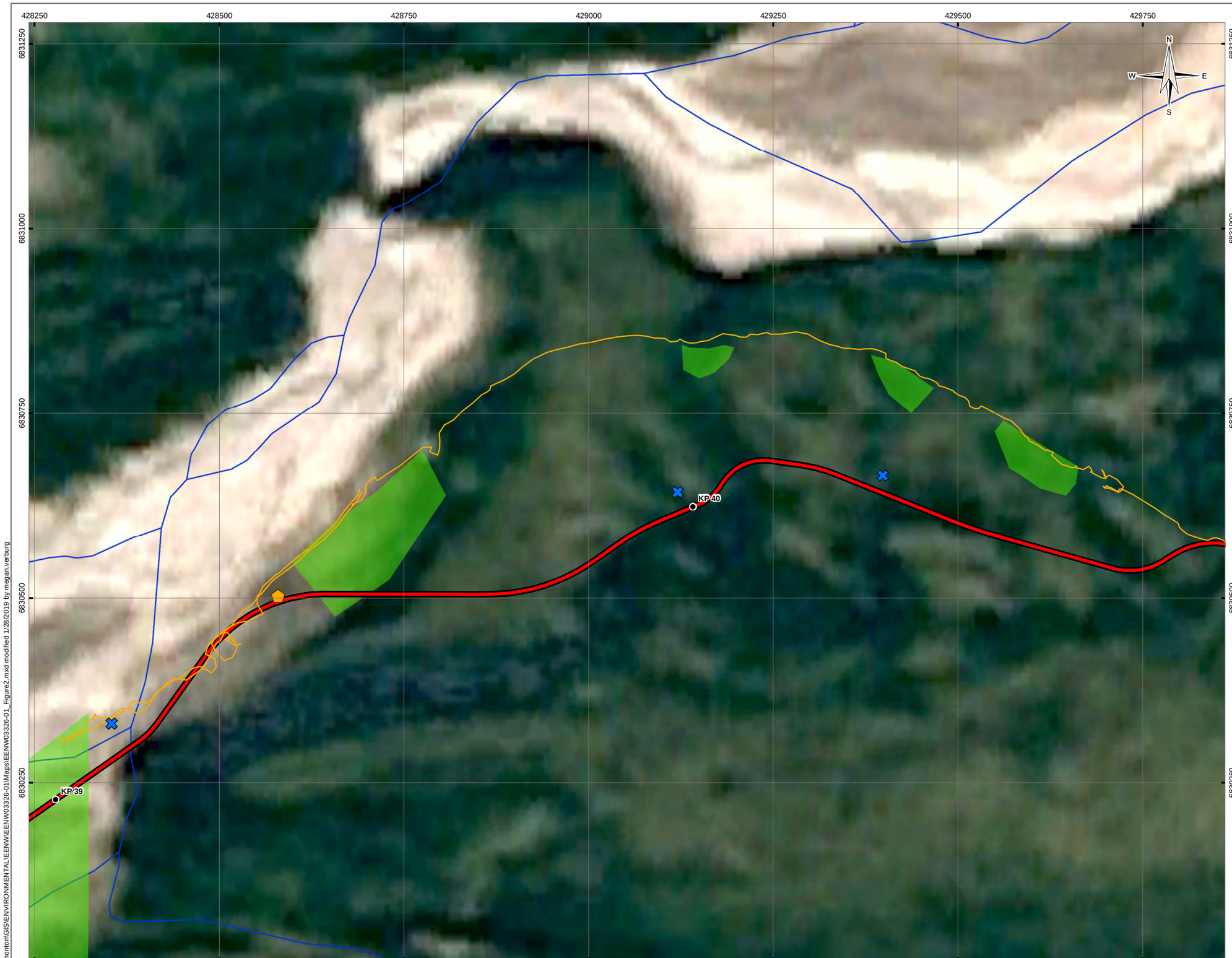
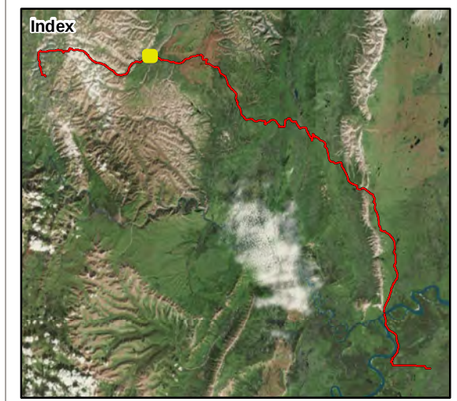


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
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DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01				

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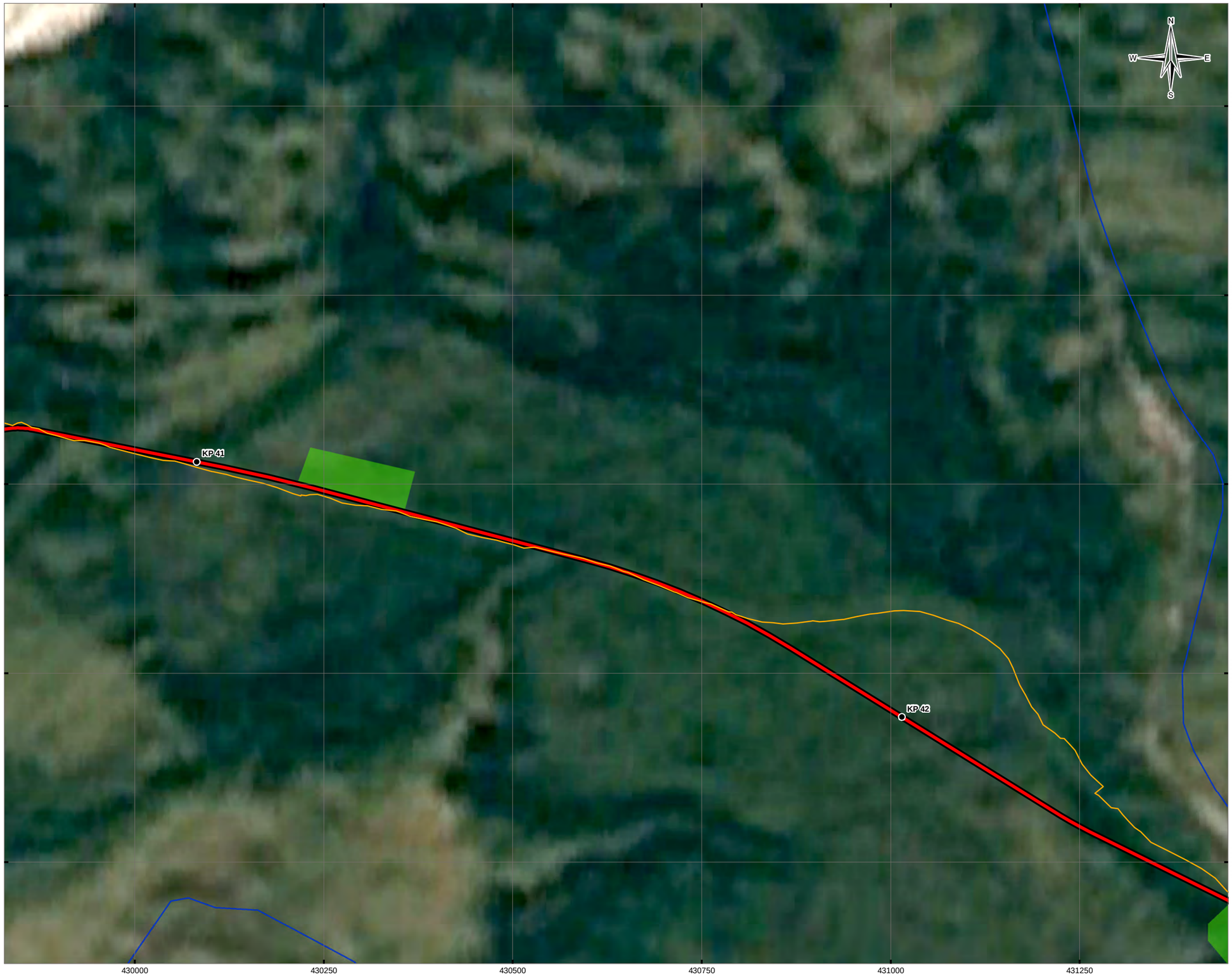

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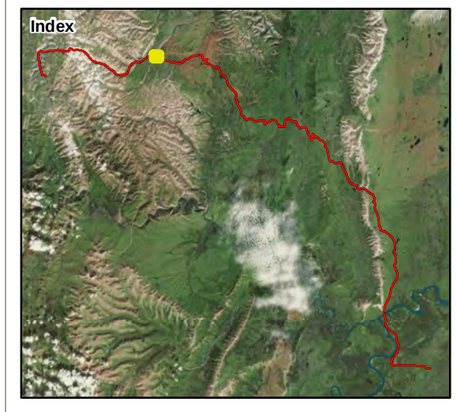
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000

100 50 0 100

Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

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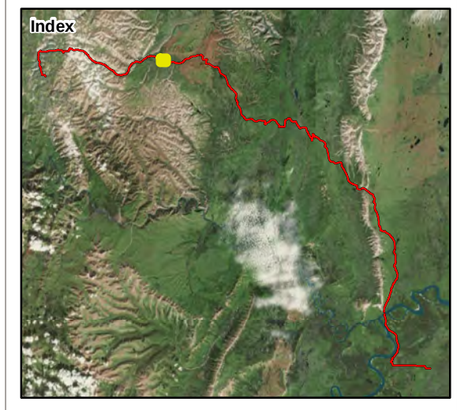
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019
PROJECT NO. ENW.EENW03326-01

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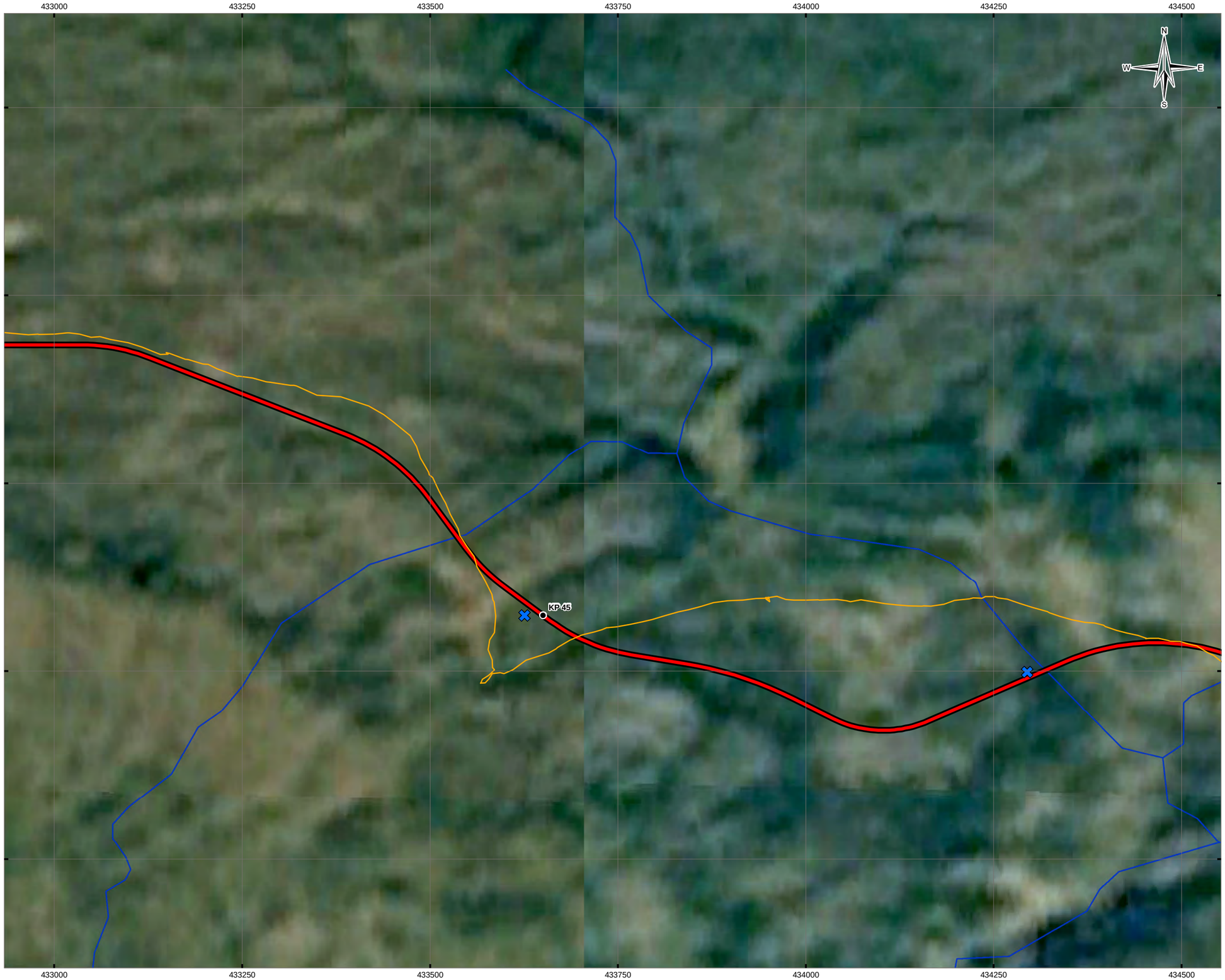
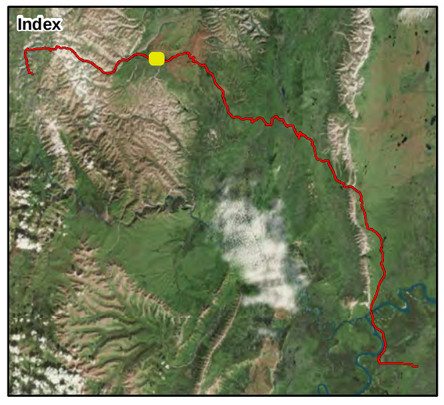


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE	PROJECT NO.
January 28, 2019	ENW.EENW03326-01

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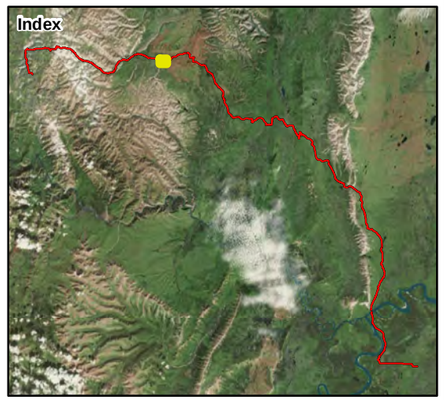
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 28, 2019

PROJECT NO.
ENW.EENW03326-01

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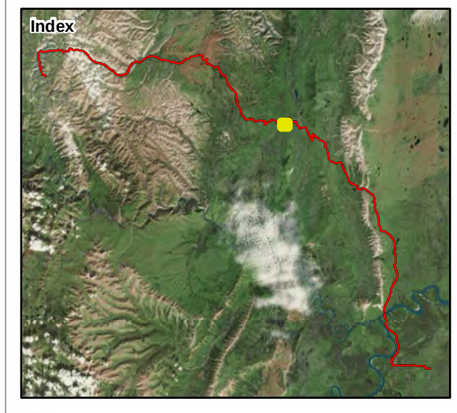
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	**2-19**
DATE January 28, 2019	**PROJECT NO.** ENW.EENW03326-01				

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461000 461250 461500 461750 462000 462250

6816000 6815750 6815500 6815250 6815000

Tetcela River

KP 89

KP 90

KP 88

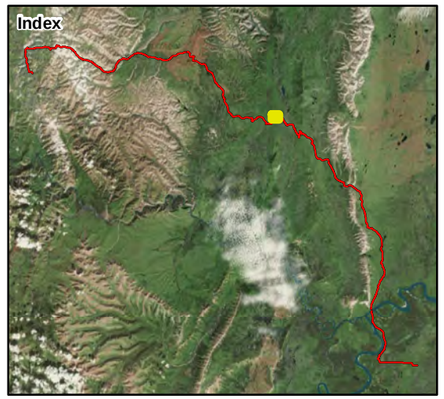
Tetsela River

Tetsela River

N W E S

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 28, 2019

PROJECT NO. ENW.EENW03326-01

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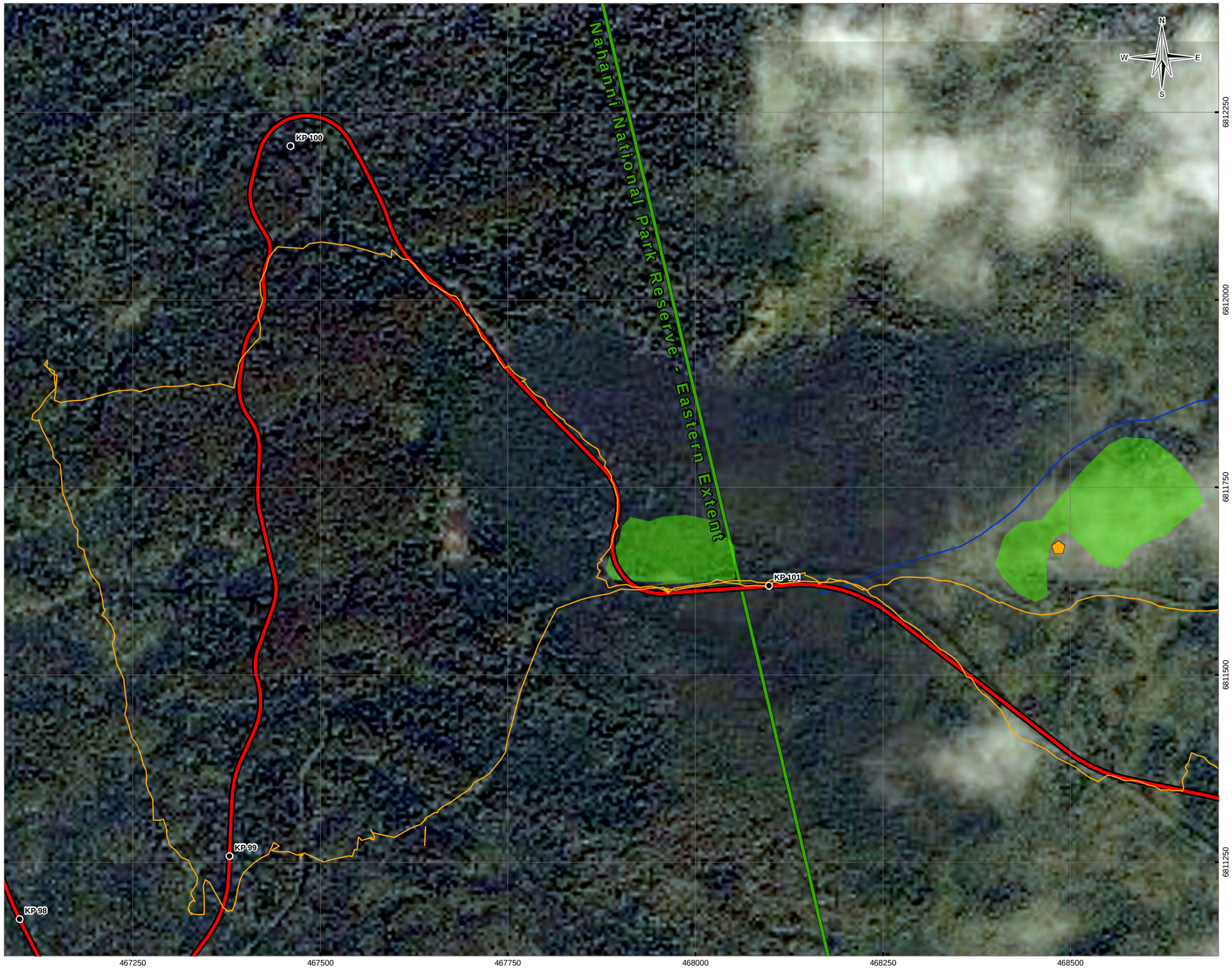
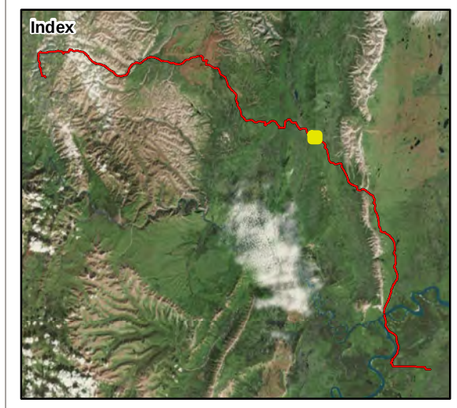


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Camp/Laydown
- Prairie Creek Access Road (December 2018)
- Nahanni National Park Reserve Boundary
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 — Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-21
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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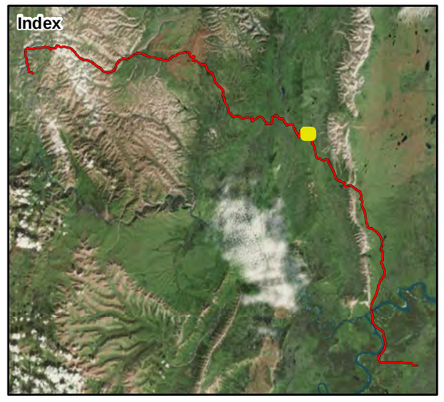
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.
EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE
January 29, 2019

PROJECT NO.
ENW.EENW03326-01

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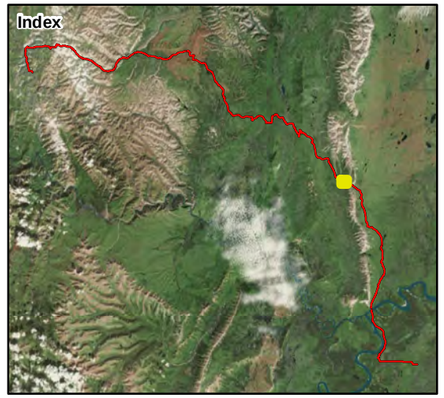
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
EENW03326-01_Figure2.mxd				
OFFICE	**DWN**	**CKD**	**APVD**	**REV**
Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
January 29, 2019	ENW.EENW03326-01			

2-23

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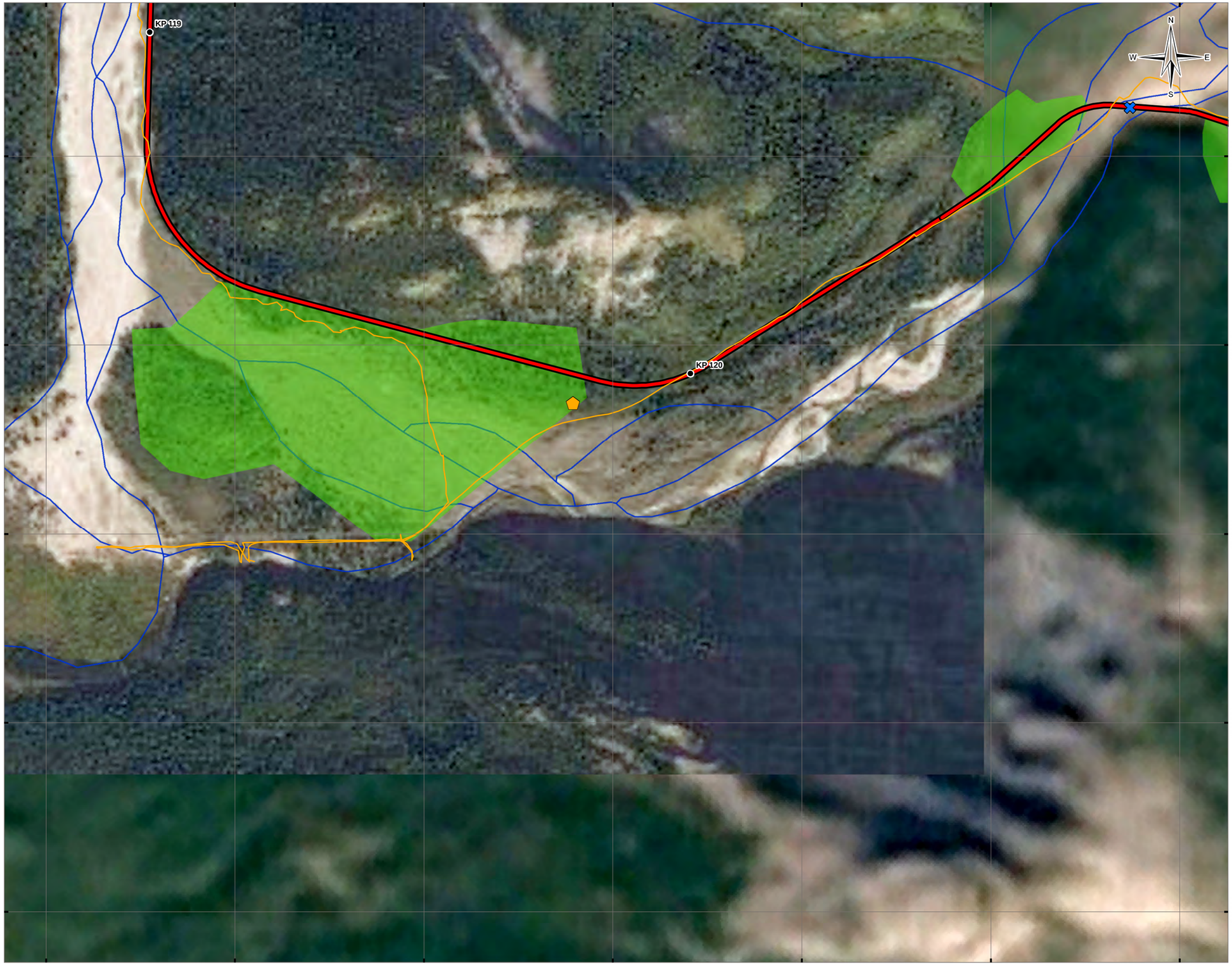
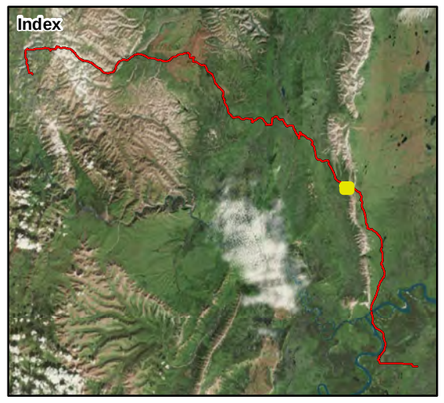


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-24
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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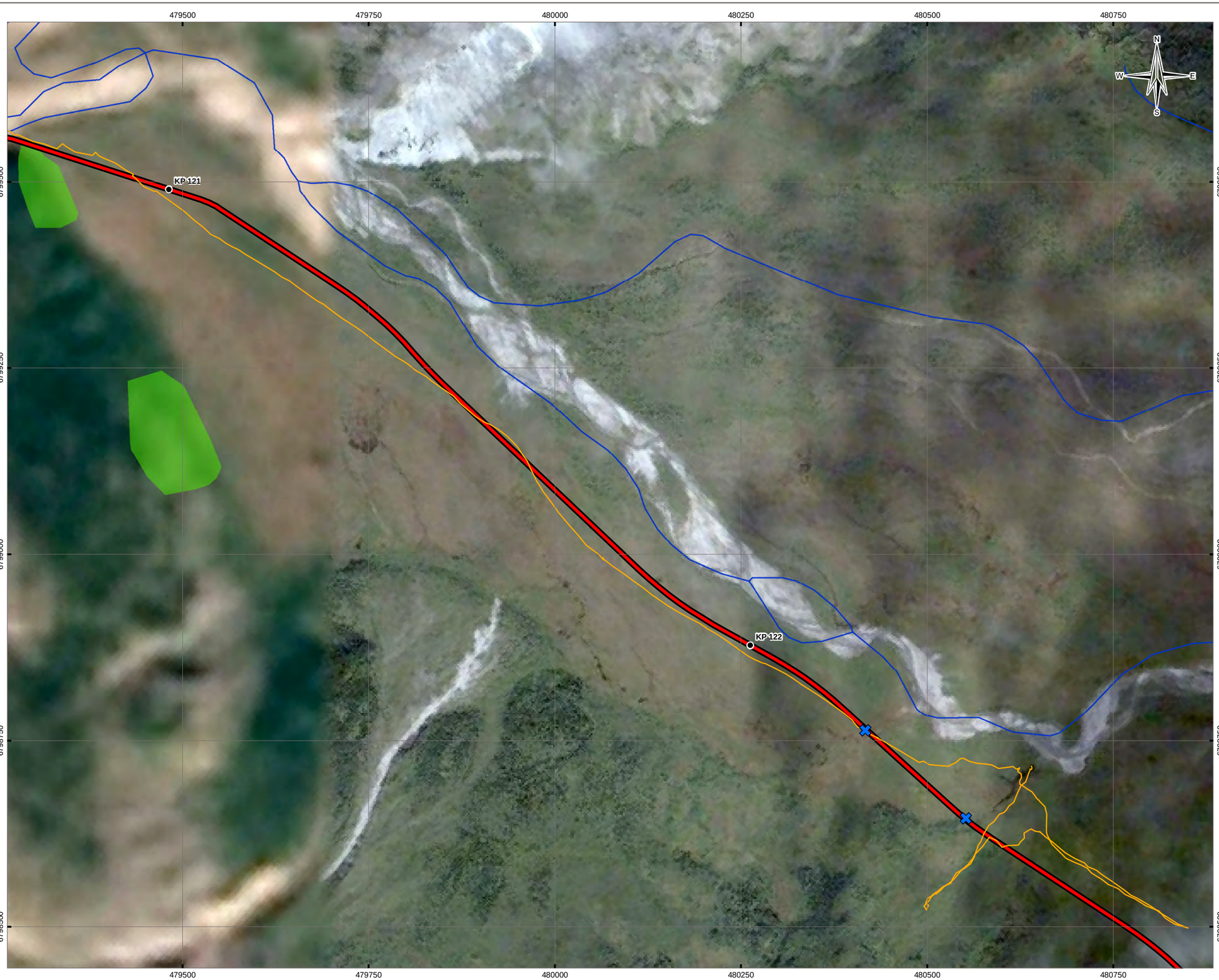
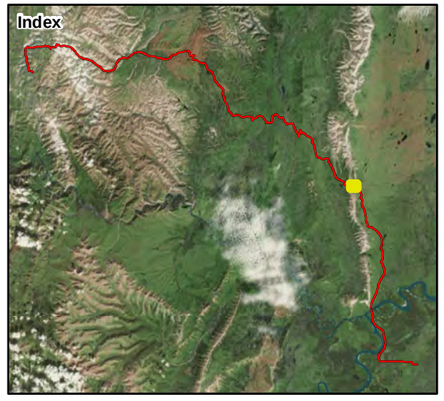


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-25
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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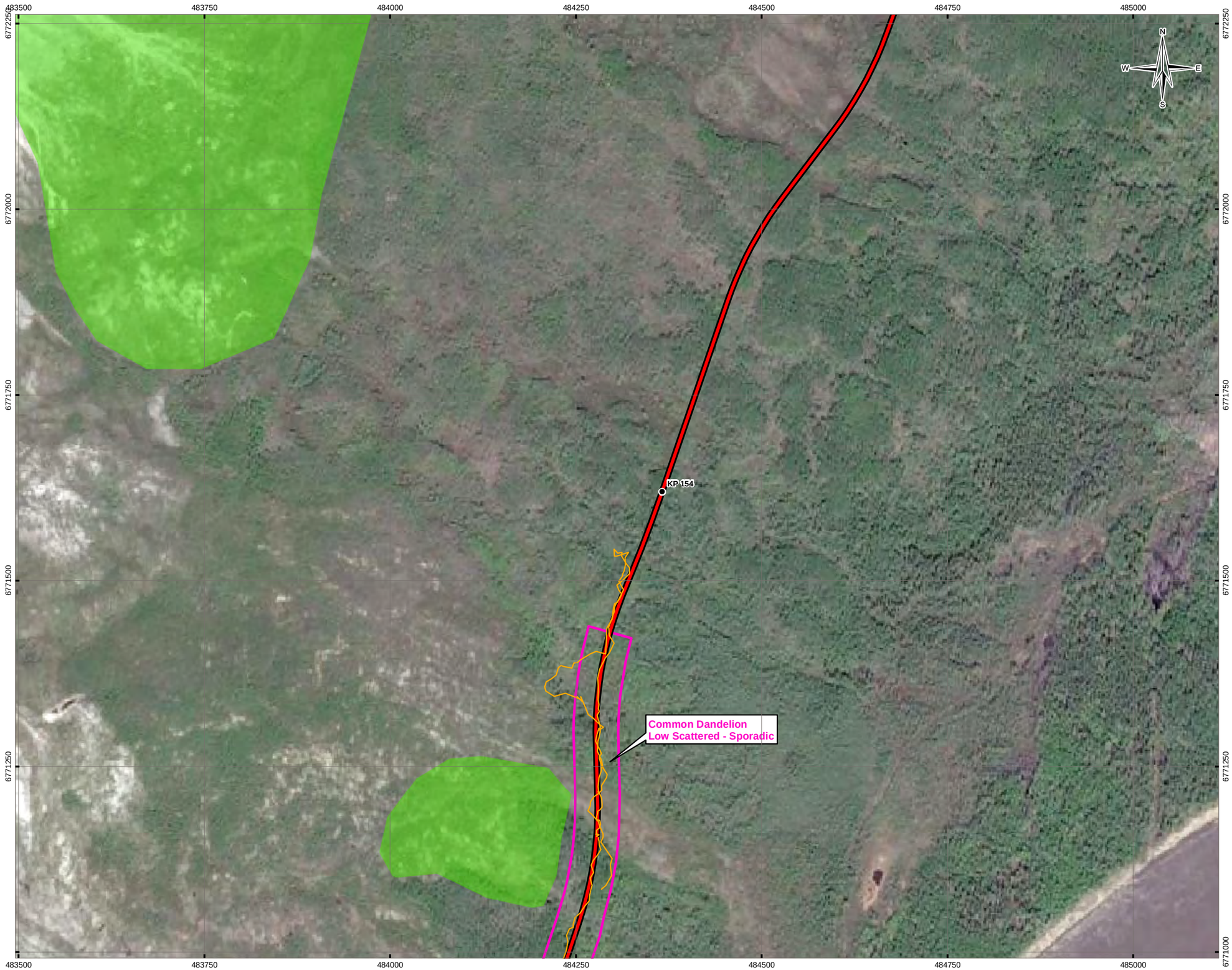
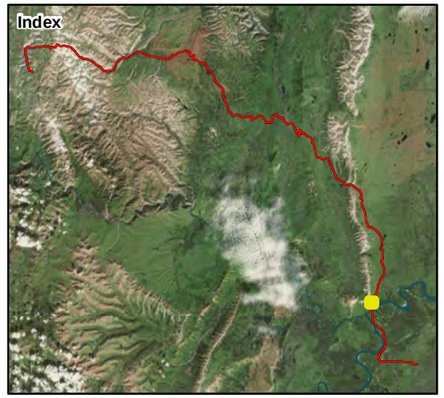


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10	**DATUM** NAD83	**CLIENT** Canadian Zinc Corporation
Scale: 1:5,000 — 100 50 0 100 Metres		TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd		
OFFICE Tt-VANC	**DWN** MRV / **CKD** SL / **APVD** AM / **REV** 4	2-26
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01	

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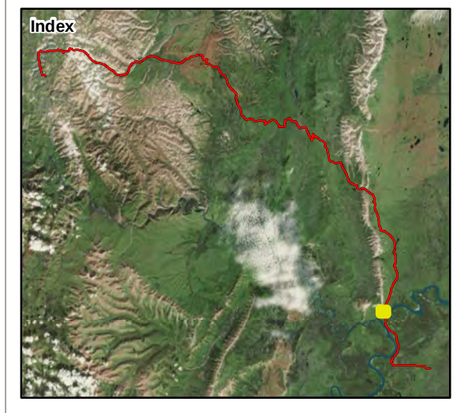
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Camp/Laydown
- Watercourse Crossing
- Prairie Creek Access Road (December 2018)
- Potential Borrow Source



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-27
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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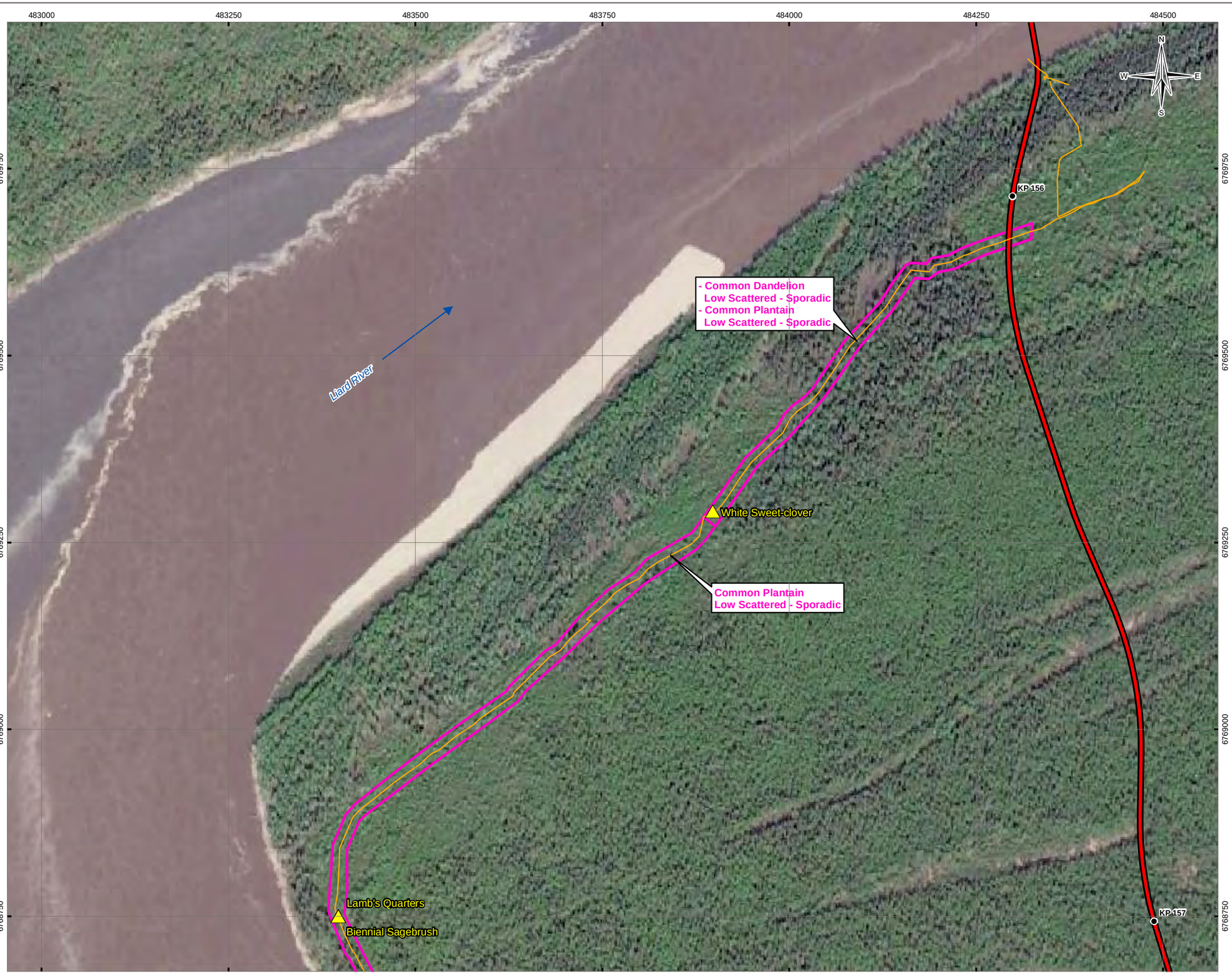
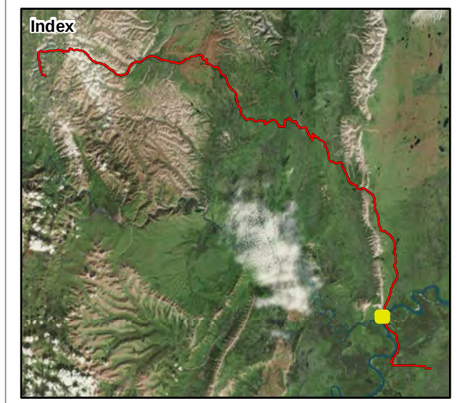


LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-28
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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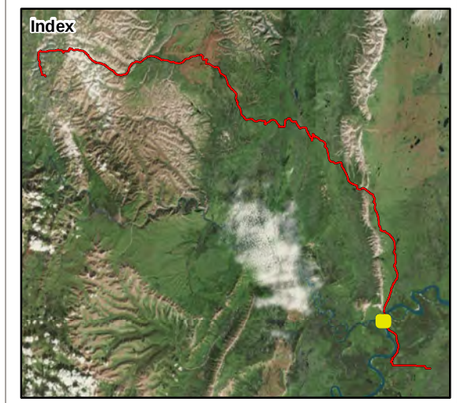
LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10	**DATUM** NAD83	**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 — Metres		TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd		
OFFICE Tt-VANC	**DWN** MRV / **CKD** SL / **APVD** AM / **REV** 4	2-29
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01	

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484000 484250 484500 484750 485000 485250 485500

6767500 6767250 6767000 6766750 6766500

Common Plantain
Low Scattered - Sporadic

- Common Plantain
  Low Scattered - Sporadic
- Lamb's Quarters
  Low Scattered - Sporadic

White Sweet-clover

- Common Plantain
  Low Scattered - Sporadic
- Lamb's Quarters
  Low Scattered - Sporadic
- White Sweet-clover
  Low Scattered - Sporadic

KP 159

Liard River

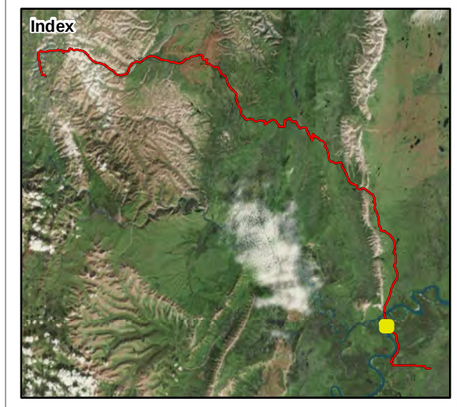
Biennial Sagebrush

- Common Plantain
  Low Scattered - Sporadic
- White Sweet-clover
  Low Scattered - Sporadic

N W E S

LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
EENW03326-01_Figure2.mxd				
OFFICE	**DWN**	**CKD**	**APVD**	**REV**
Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
January 29, 2019	ENW.EENW03326-01			

2-30

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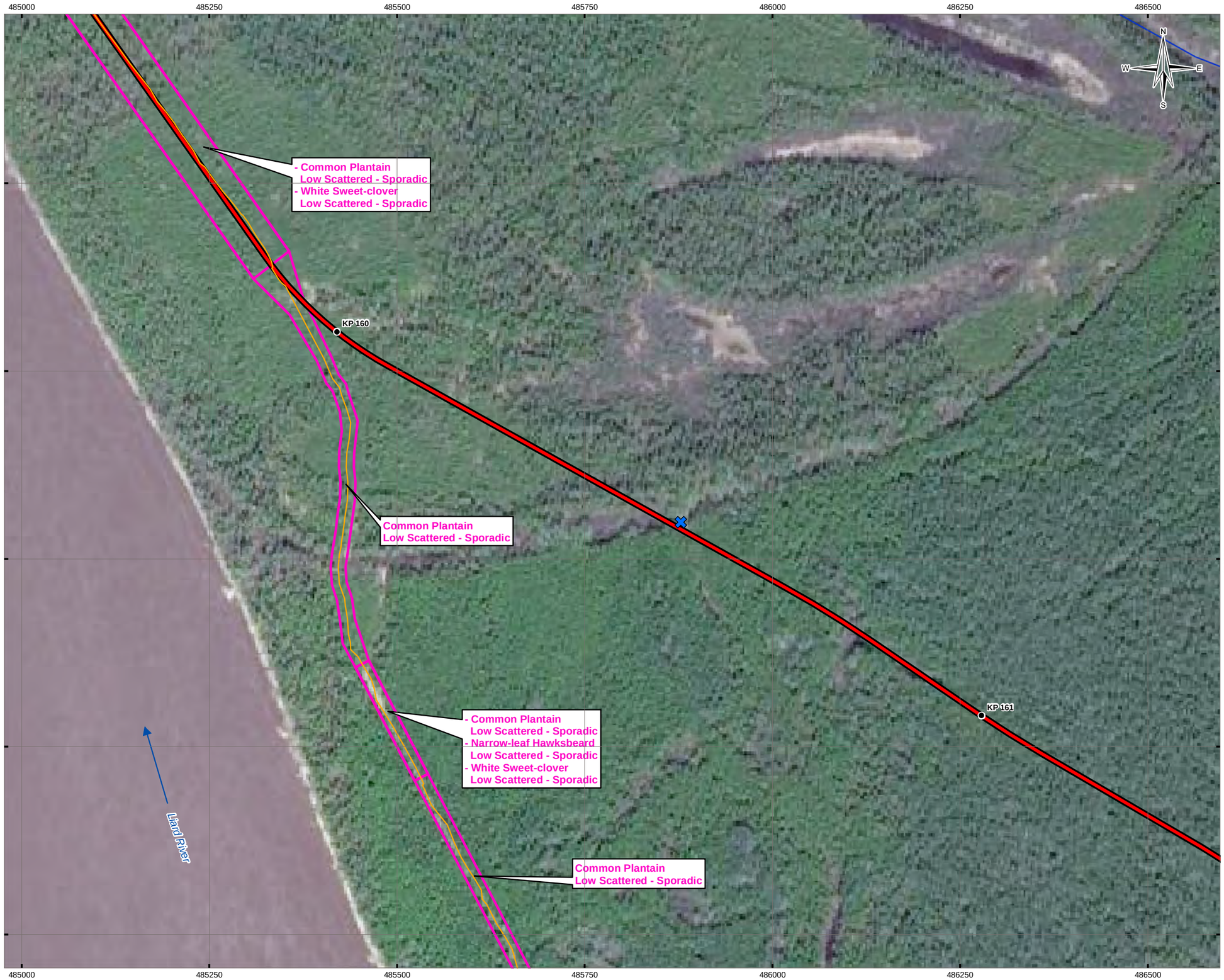
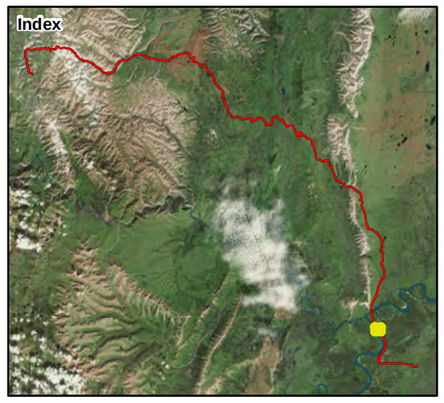


LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 29, 2019
PROJECT NO. ENW.EENW03326-01

2-31

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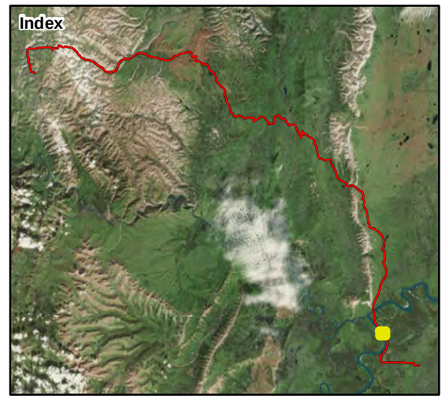
LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10			**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-32
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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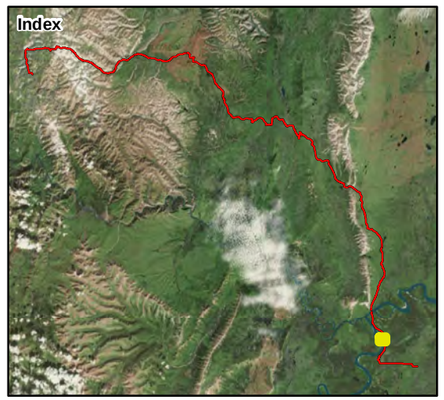
LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10	**DATUM** NAD83	**CLIENT** Canadian Zinc Corporation
Scale: 1:5,000 — 100 50 0 100 Metres		**TETRA TECH**
FILE NO. EENW03326-01_Figure2.mxd		
OFFICE Tt-VANC	**DWN** MRV / **CKD** SL / **APVD** AM / **REV** 4	**2-33**
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01	

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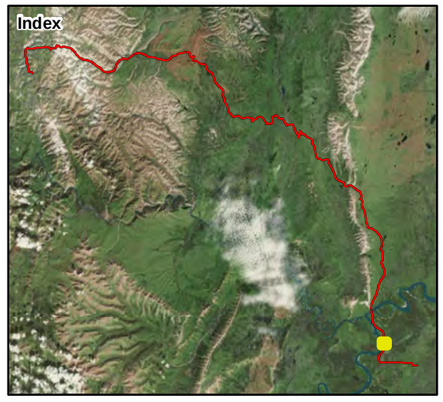
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10				**DATUM** NAD83	**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-34
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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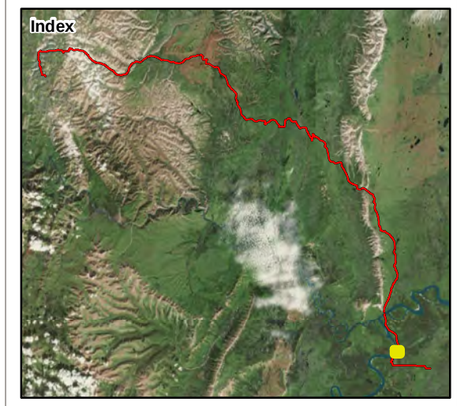
LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 29, 2019

PROJECT NO. ENW.EENW03326-01

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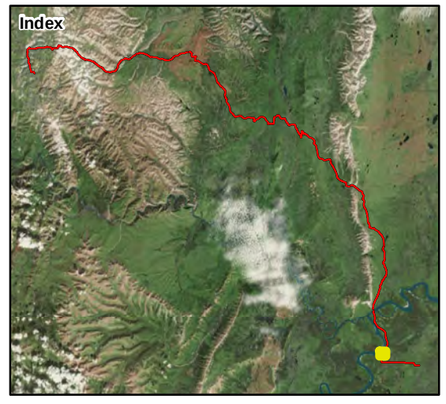
LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83		**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres				TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01			**2-36**

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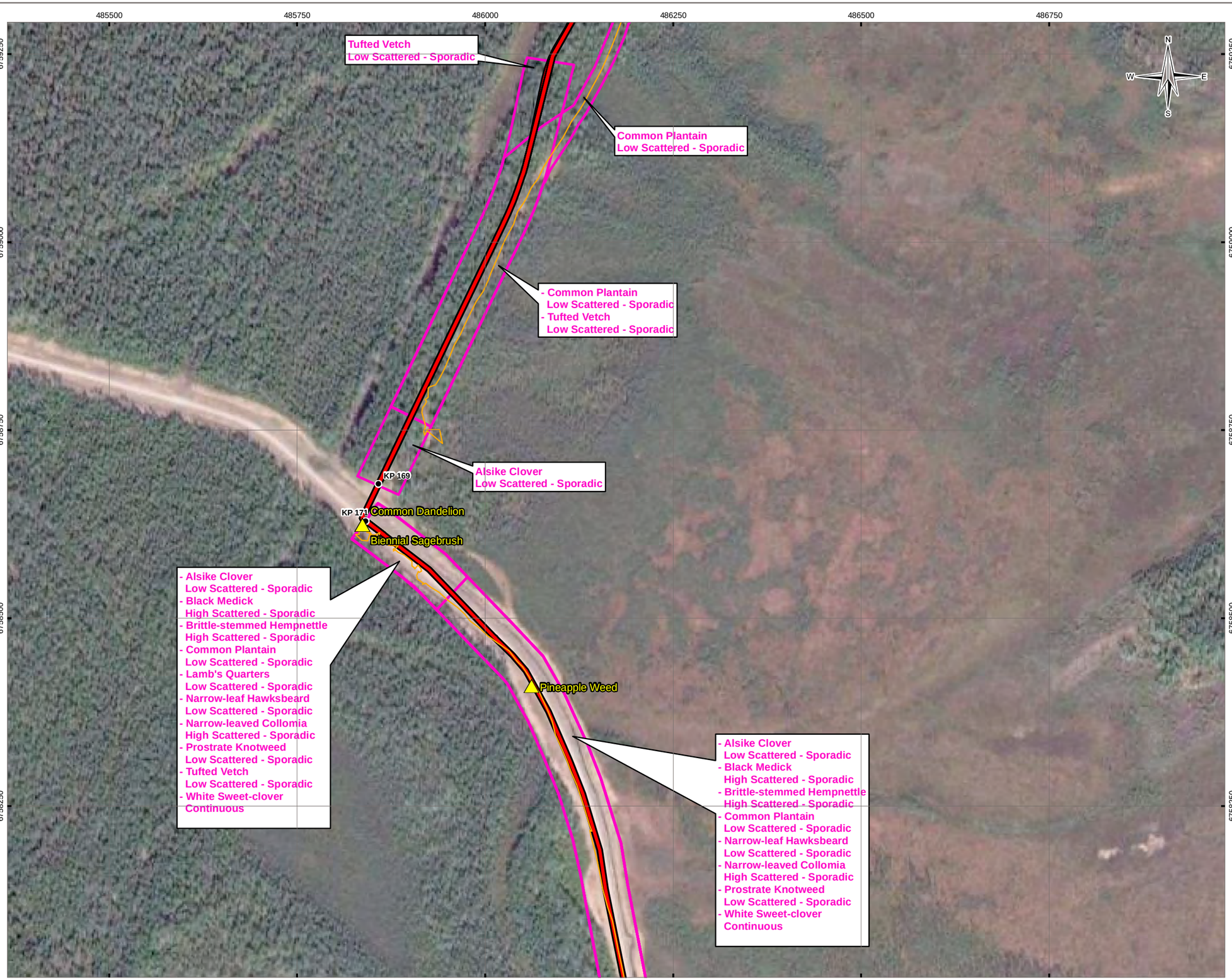
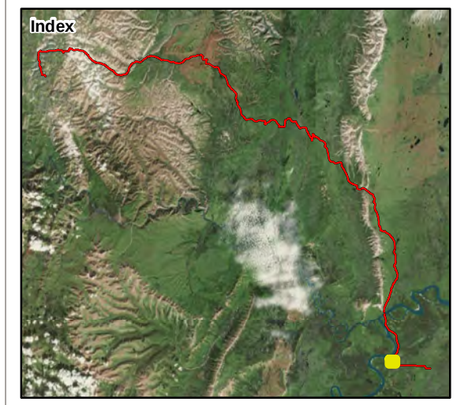


LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO. EENW03326-01_Figure2.mxd

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE January 29, 2019
PROJECT NO. ENW.EENW03326-01

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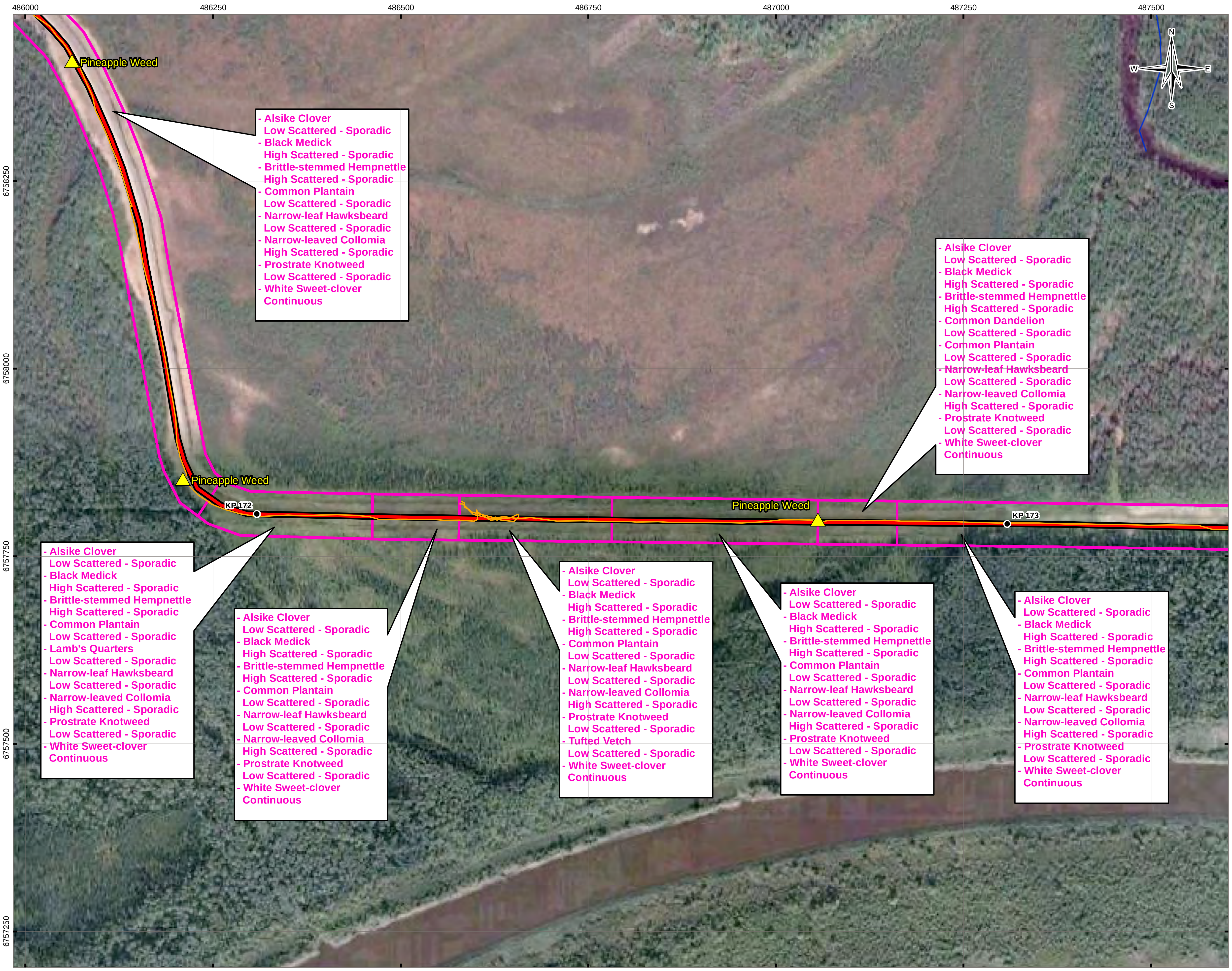

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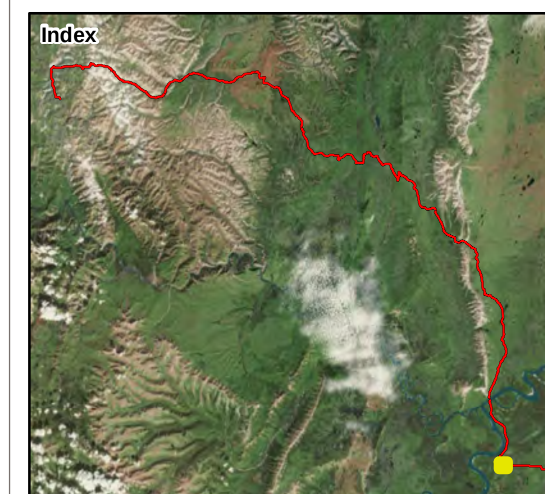
LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

FILE NO.
EENW03326-01_Figure2.mxd

TETRA TECH

OFFICE	DWN	CKD	APVD	REV
Tt-VANC	MRV	SL	AM	4

DATE	PROJECT NO.
January 29, 2019	ENW.EENW03326-01

2-38

487750 488000 488250 488500 488750 489000

6758250 6758000 6757750 6757500 6757250

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

KP 174

Barley

N W E S

LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
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489250 489500 489750 490000 490250 490500

6758250
6758000
6757750
6757500
6757250

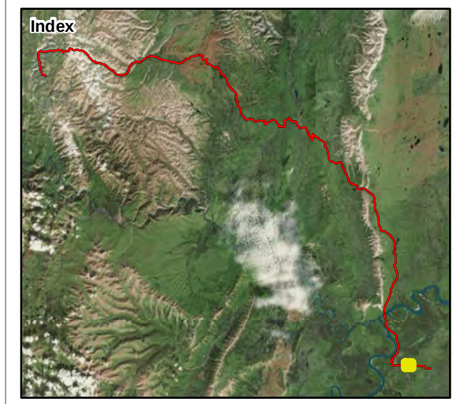
N
W E
S

KP 175
Shepherd's Purse
KP 176

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Google Earth, 2018

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10	**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 — 100 50 0 100 — Metres				TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd				
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01			**2-40**

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490750 491000 491250 491500 491750 492000 492250

6758250 6758000 6757750 6757500 6757250

KP 177

KP 176

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

LEGEND

- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10		**DATUM** NAD83			**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
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DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

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492500 492750 493000 493250 493500 493750

6758250 6758000 6757750 6757500 6757250

N W E S

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

KP 178

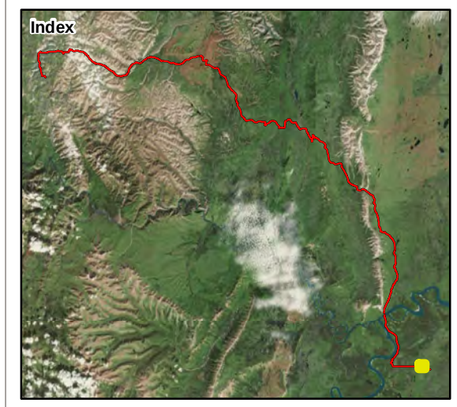
KP 179

- Alsike Clover
  Low Scattered - Sporadic
- Barley
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse



NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	CANADIAN ZINC CORPORATION

Scale: 1:5,000
100 50 0 100
Metres

TETRA TECH

FILE NO.				
EENW03326-01_Figure2.mxd				
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Tt-VANC	MRV	SL	AM	4
DATE	**PROJECT NO.**			
January 29, 2019	ENW.EENW03326-01			

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494000 494250 494500 494750 495000 495250

6757500 6757250 6757000 6756750 6756500

N W E S

KP 180

KP 181

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Awnless Brome
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Common Timothy
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

- Alsike Clover
  Low Scattered - Sporadic
- Black Medick
  High Scattered - Sporadic
- Brittle-stemmed Hempnettle
  High Scattered - Sporadic
- Common Plantain
  Low Scattered - Sporadic
- Common Timothy
  Low Scattered - Sporadic
- Field Sow-thistle
  Low Scattered - Sporadic
- Narrow-leaf Hawksbeard
  Low Scattered - Sporadic
- Narrow-leaved Collomia
  High Scattered - Sporadic
- Prostrate Knotweed
  Low Scattered - Sporadic
- White Sweet-clover
  Continuous

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LEGEND

- Invasive Plant Species
- Invasive Species Transect
- Access Road Kilometre Marker
- Prairie Creek Access Road (December 2018)
- Watercourse

Index

NOTES
Base data source: CanVec; GeoBase.
Base imagery source: Bing Maps Aerial

STATUS
ISSUED FOR USE

PRAIRIE CREEK ACCESS ROAD

Invasive Plant Species Locations and Survey Area

PROJECTION UTM Zone 10				**DATUM** NAD83	**CLIENT** CANADIAN ZINC CORPORATION
Scale: 1:5,000 100 50 0 100 Metres					TETRA TECH
FILE NO. EENW03326-01_Figure2.mxd					
OFFICE Tt-VANC	**DWN** MRV	**CKD** SL	**APVD** AM	**REV** 4	2-43
DATE January 29, 2019	**PROJECT NO.** ENW.EENW03326-01				

APPENDIX A

PHOTOGRAPHS

Photo 1: Alsike Clover (***Trifolium hybridum***) with tufted vetch (***Vicia craca***) and Fox-Tail Barley (***Hordeum jubatum***)

Photo 2: White Sweet-clover (***Melilotus officinalis***) with Alsike Clover and Fox-Tail Barley

Photo 3: Narrow-leaf Hawksbeard (***Crepis tectorum***) with White Sweet-clover

Photo 4: Brittle-stemmed Hempnettle (***Galeopsis tetrahit***) with Fox-Tail Barley and Alsike clover

Photo 5: Common Plantain (***Plantago major***)

Photo 6: Black Medick (***Medicago lupulina***) with Common Plantain

Photo 7: Prostrate Knotweed (***Polygonum aviculare***)

Photo 8: Tufted Vetch (***Vicia cracca***) with Fox-Tail Barley, Alsike clover and Yellow Avens (***Geum aleppicum***)

Photo 9: Narrow-leaved Collomia (***Collomia linearis***) Red Raspberry (***Rubus idaeus***)

Photo 10: Lamb's Quarters (***Chenopodium album***) with White Sweet-Clover, Field Horsetail (***Equisetum arvense***) and Norwegian Cinquefoil (***Potentilla norvegica***)

Photo 11: Biennial Sagebrush (***Artemisia biennis***) with Alsike Clover

Photo 12: Common Dandelion (***Taraxacum officinale***)

Photo 13: Pineapple Weed (***Matricaria discoidea***) with Field Horsetail

Photo 14: Barley (***Hordeum vulgare***) with Fox-Tail Barley and White Sweet-Clover

Photo 15: Shepherd's Purse (***Capsella bursa-pastoris***)

Photo 16: Field Sow-thistle (***Sonchus arvensis***)

Photo 17: Awnless Brome (***Bromus inermis***)

Photo 18: Common Timothy (***Phleum pretense***) with Alsike Clover and Common Yarrow (***Achillea millefolium***)

Photo 19: Alfalfa (***Medicago sativa***) with Field Horsetail and Narrow-leaved Collomia

Photo 20: White Cockle (***Silene latifolia*** ssp. ***alba***)

Photo 21: Field Pennycress (***Thlaspi arvense***)

Photo 22: Maple-leaved Goosefoot (***Chenopodium simplex***) with Red Raspberry

Photo 23: Dense-flower Pepperwort (***Lepidium densiflorum***)

Photo 24: Bison trail and wallow

APPENDIX B

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT