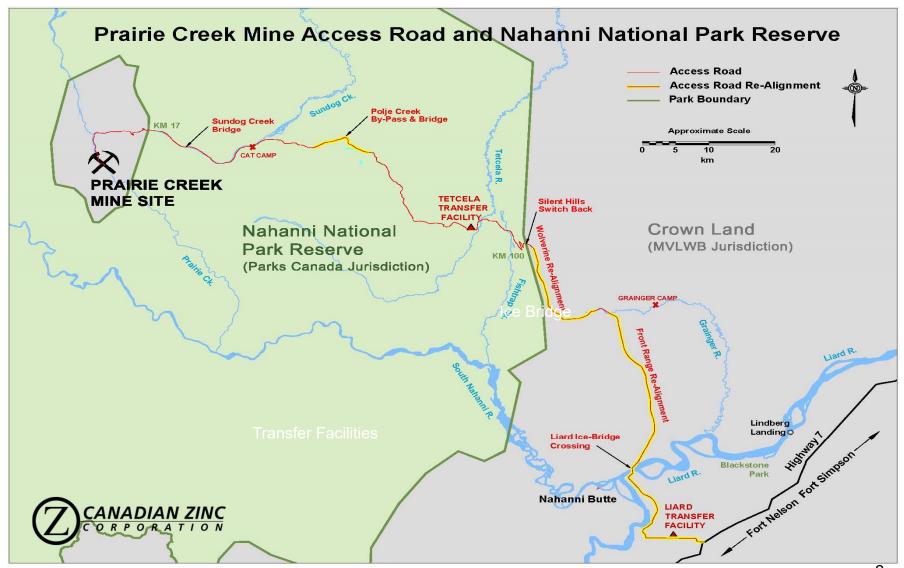


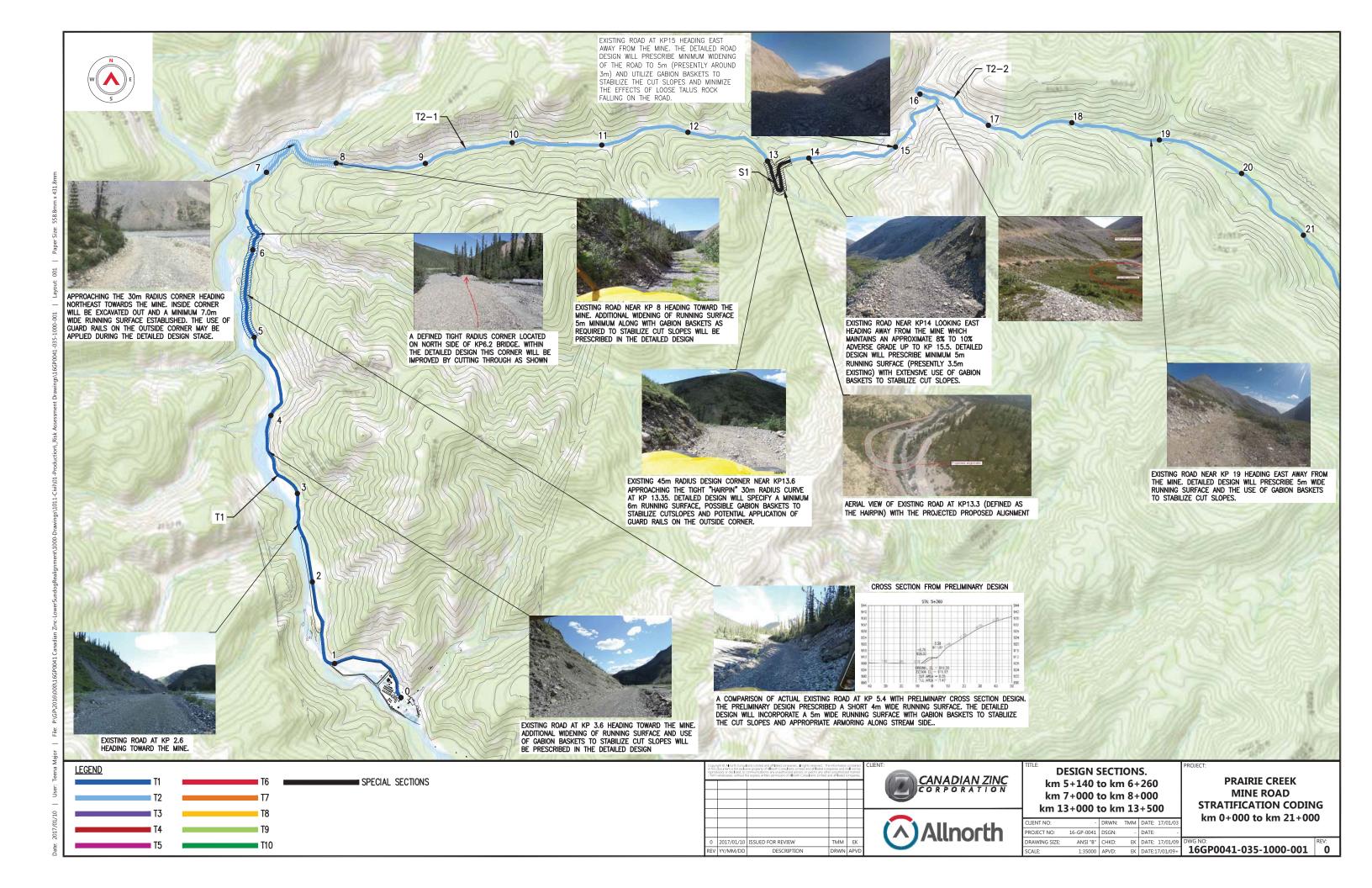


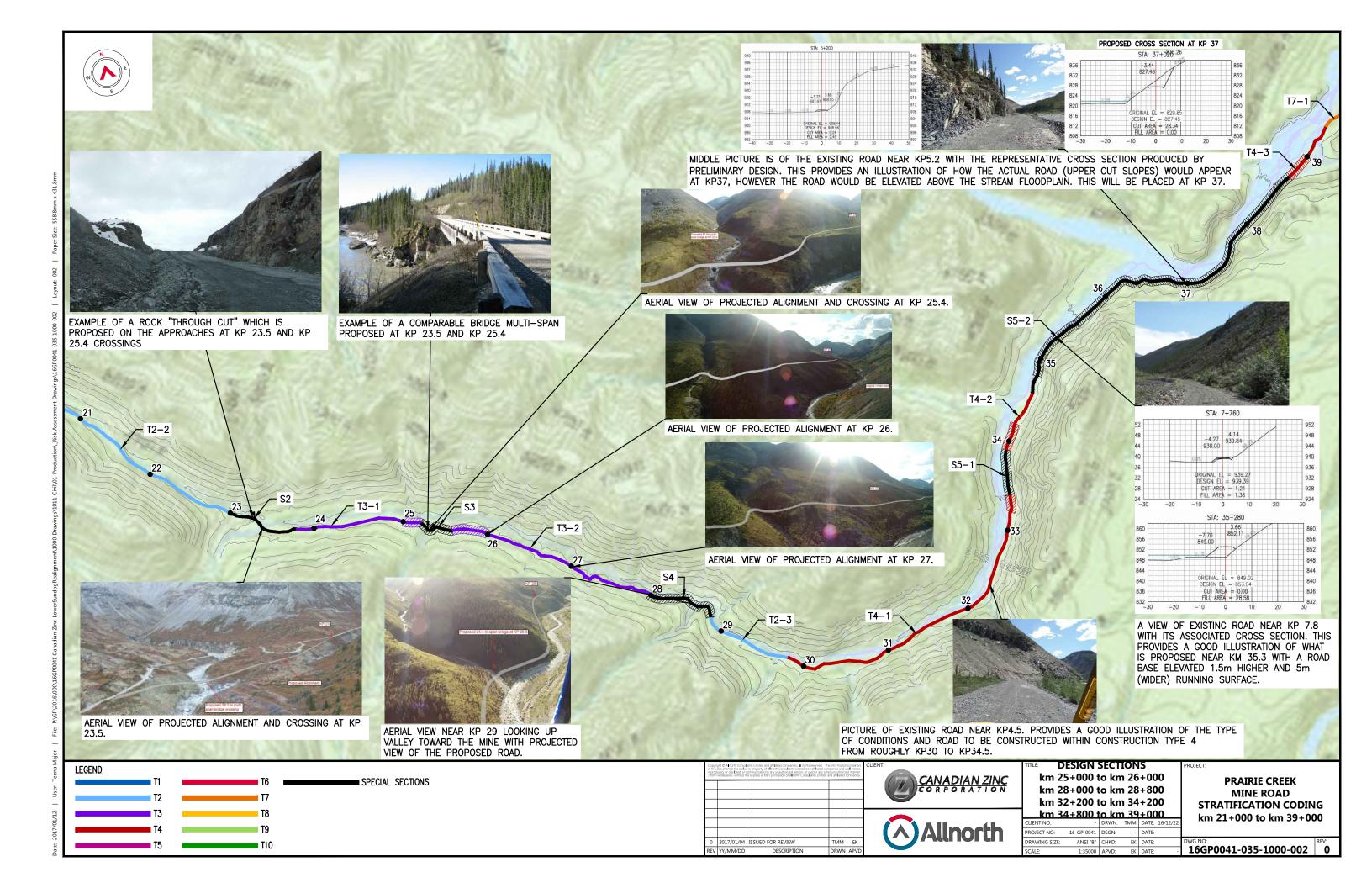
# PRAIRIE CREEK MINE ALL SEASON ROAD COMMUNITY HEARINGS April 24-25, 2017

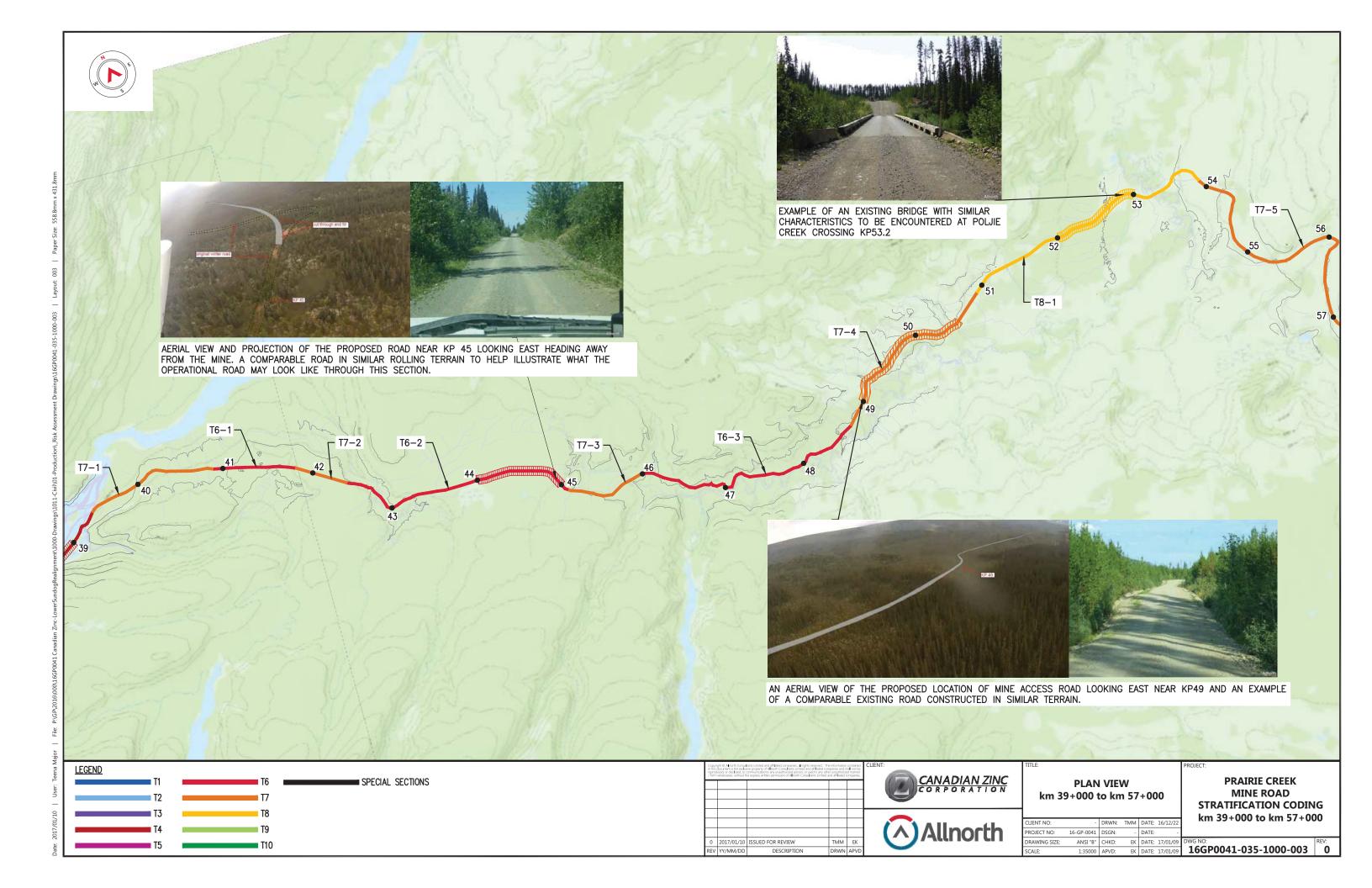


# **Access Road Alignment**

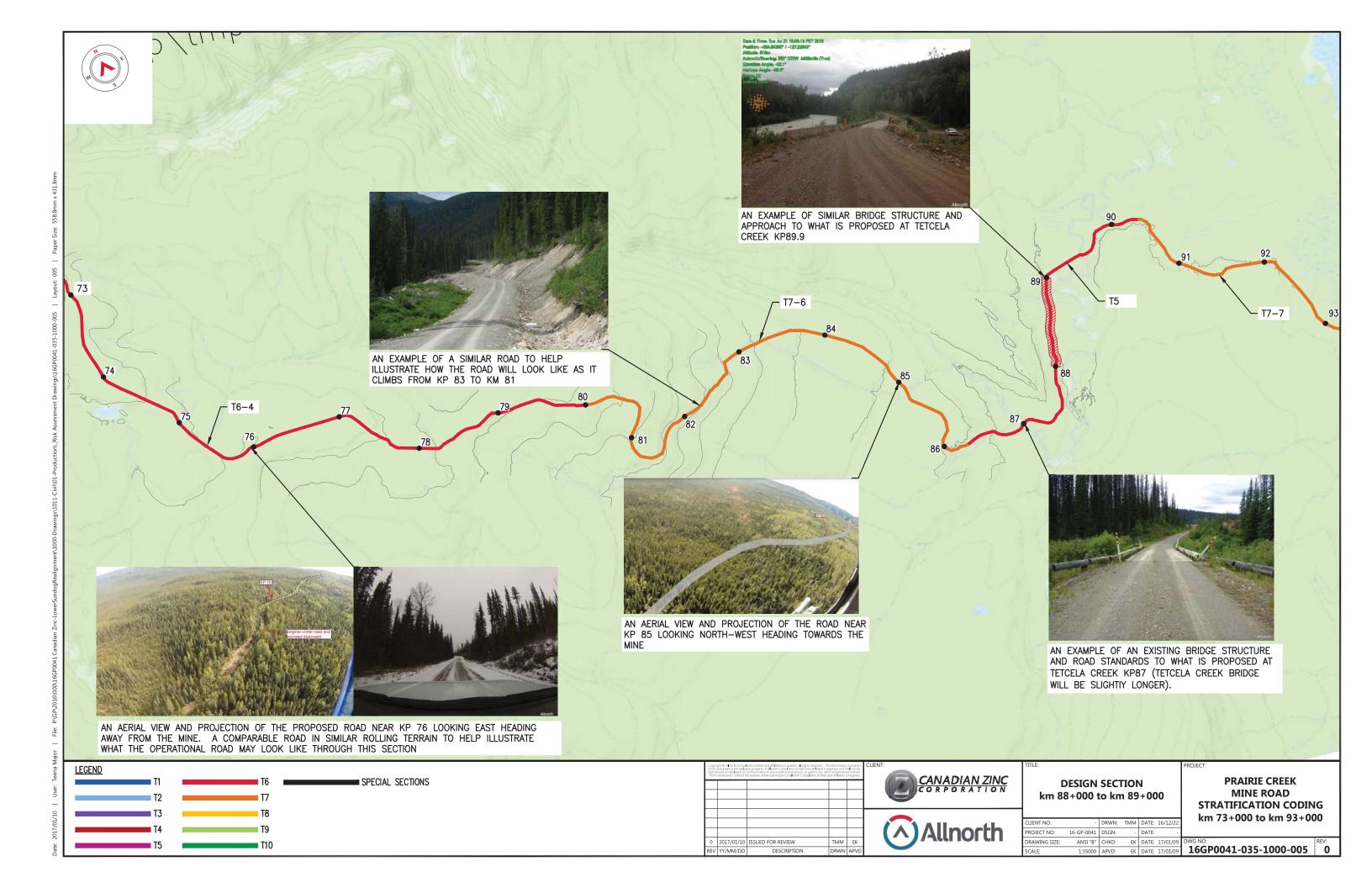


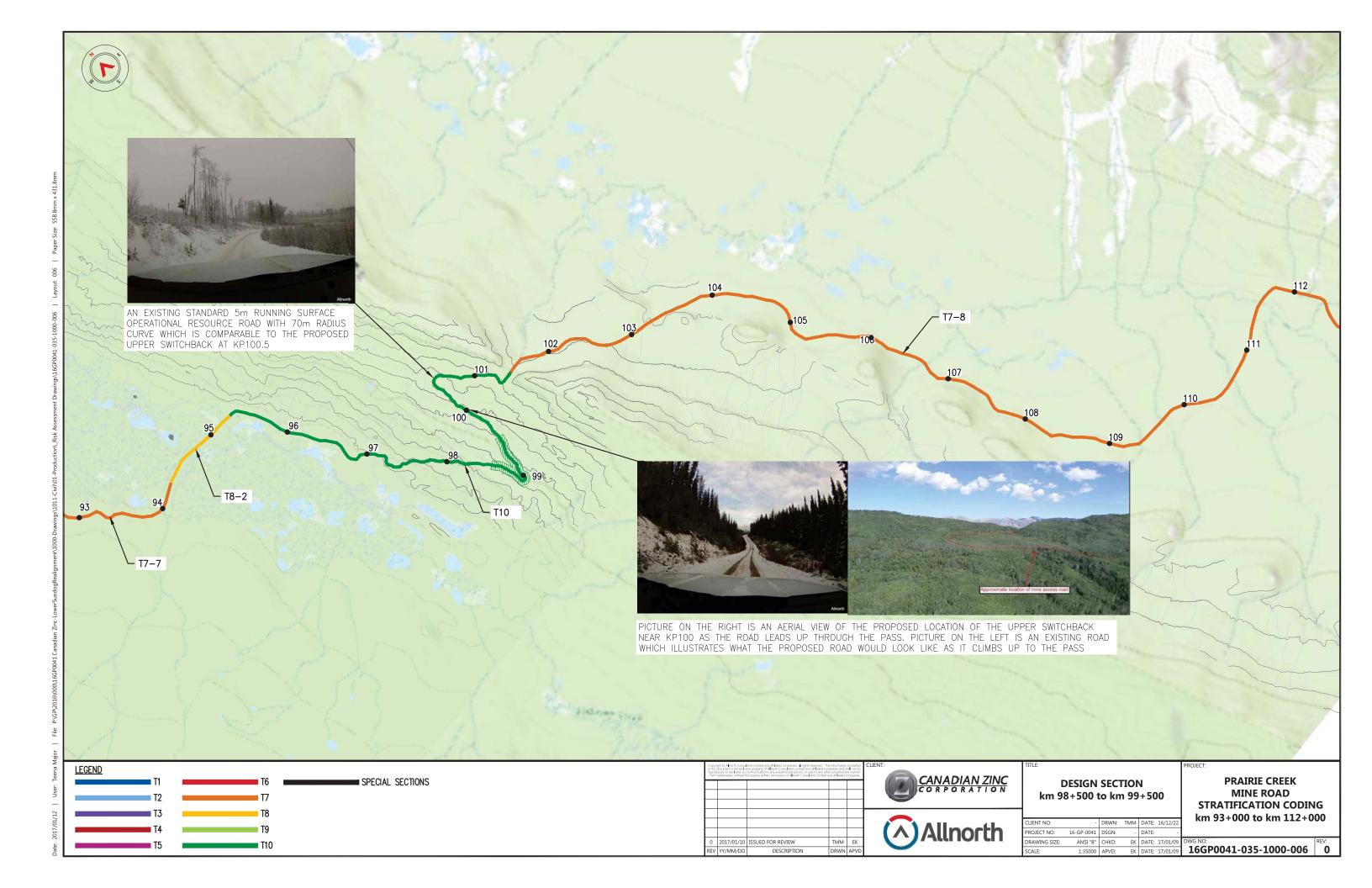


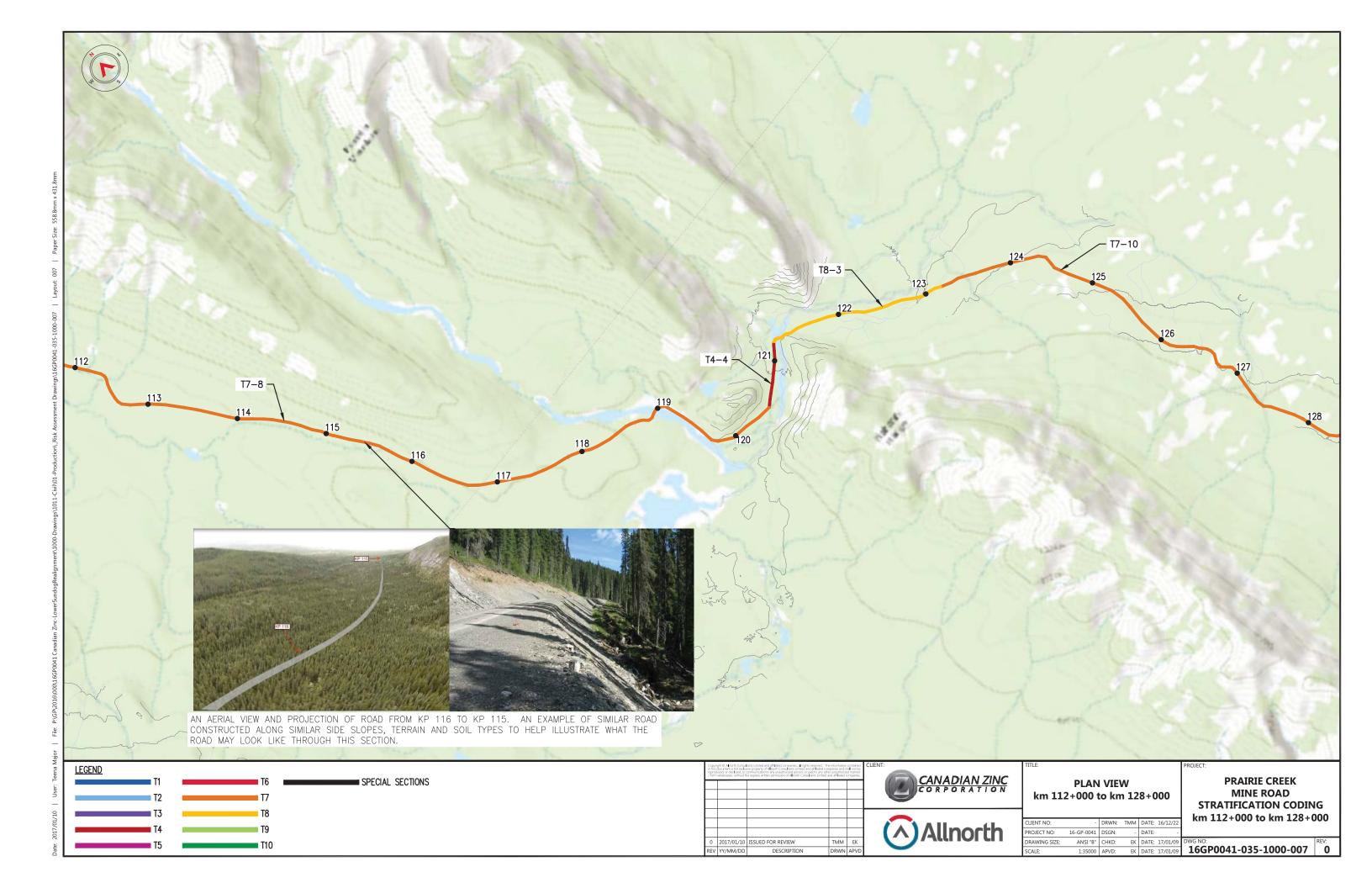


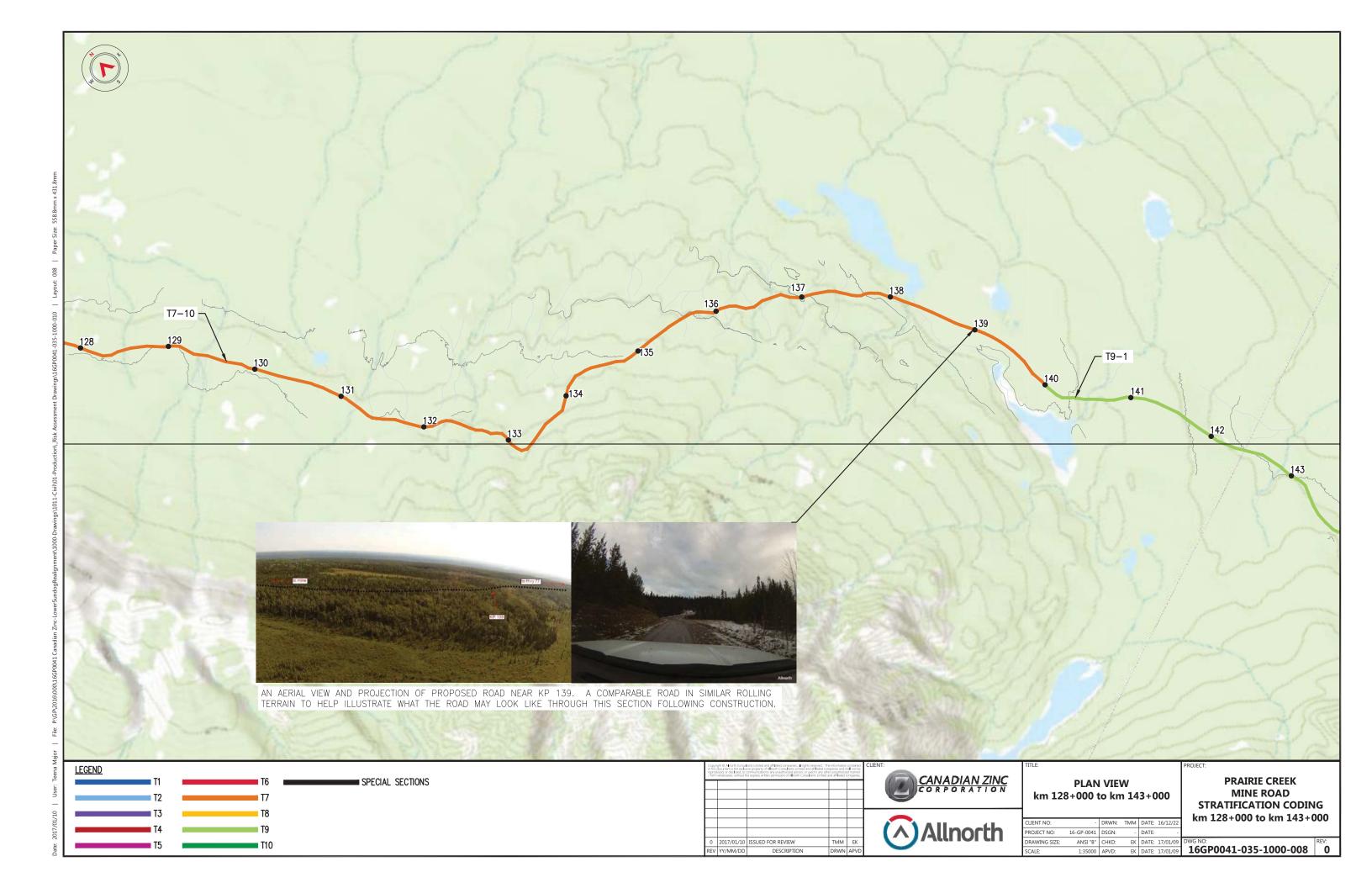


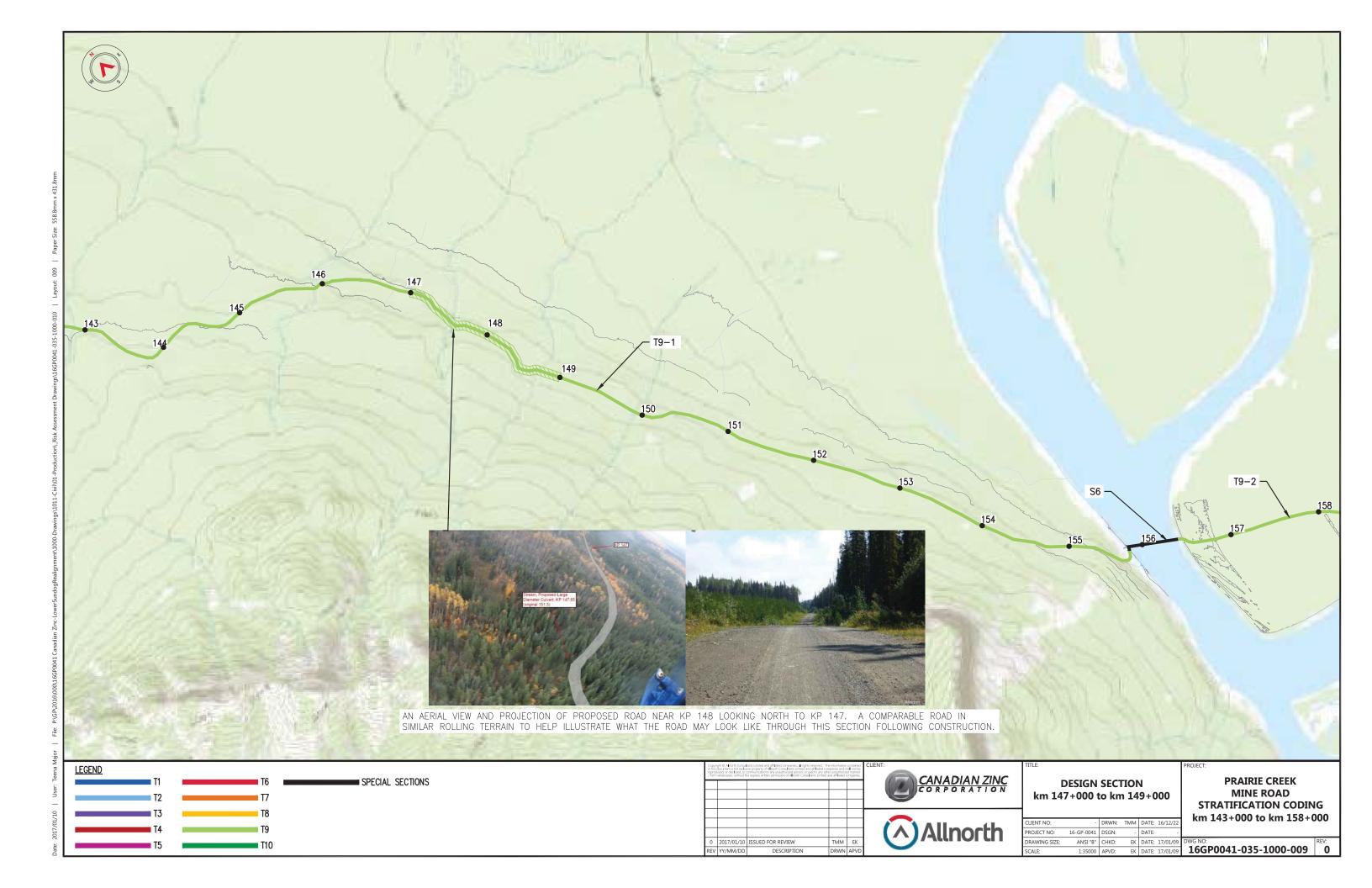


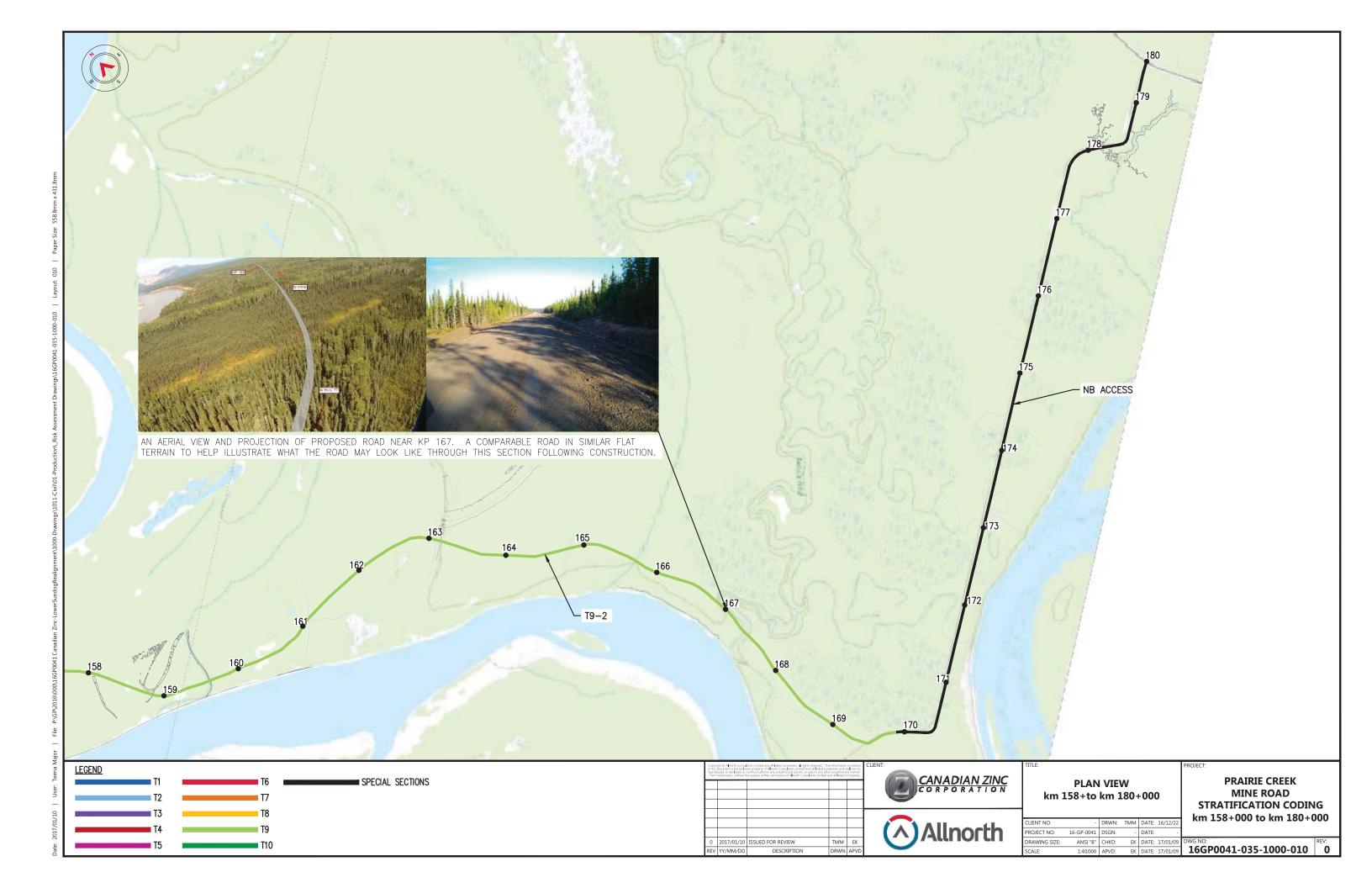












# Access Control, Leases, IAB Lands



# Schedule and Timing Road Construction

Year 1 Winter Subgrade KP 170 to Liard R

Liard R Ice Bridge, Barge Ramps

Subgrade Liard R to Grainger G

Surfacing KP 170 to Liard R

Winter Road to Mine (Mine construction)

Fall Surfacing Liard R to Grainger G

Year 2 Winter Liard R Ice Bridge

Winter Road to Mine (equipment in)

Subgrade Grainger G to KP 102

and KP 95-59

Install major crossings to KP 87

# Schedule and Timing Construction

Year 2 Summer Surfacing Grainger G to KP 102

Subgrade KP 28 to Mine, KP 102-95

Install KP 23.3 and 25.4 crossings

Fall Surfacing KP 102-86

Sundog Creek Realignment

Mill Commissioning

Year 3 Winter Liard R Ice Bridge

Winter Road to Mine

Subgrade KP 59-39

Install remaining major crossings

Summer Surfacing KP 86-39

CANADIAN ZINC

# Infrastructure - Camps

- > KP 23.2
- KP 40 Cat Camp\*
- > KP 65
- > KP 87\*
- > KP 102 Wolverine Pass
- KP 120 Grainger Gap\*
- > KP 148 (alternate to KP 156)
- > KP 156 Liard River
- Retain for Road Maintenance

# Camps Grey & Brown Water

- Grey Water
  - ➤ Disposal off-site or in on-site sump after filtration
  - > YTG Specifications
- Brown Water
  - Disposal off-site or in on-site treatment plant with effluent disposal to a sump
  - > Camp KP 23.2 & 40 disposal off-site

# Schedule and Timing Road Operations

Years 3-20 Mine Operations

Winter Liard R Ice Bridge construction

Haul period Jan 1 - Mar 31

Spring Break-up

Highway load restrictions

Summer Liard R Barge operation

Haul period Jun 15 - Nov 4

#### Concentrates

- Either in bags inside a truck box with solid lid, or
- > in bulk in lockable containers

#### Supplies

- Diesel
- Reagents (sodium sulphide, acid)
- Explosives (ammonium nitrate)

#### Road Design

- MoF Guidelines
- > 5 m width, except for 550 m in controlled rock-cut areas, 330 m of which are "cut-through's"
- > Straightening, improved corners and grade reduction of winter road
- Crossings and drainage management
- Signage (speed limits, bends, hazards)

#### Road Operating Parameters

- Supervisor and Monitors
- Journey Management System
- Pre-trip checks and tail-gates
- Radio/GPS communication
- > Convoys, road rules, speeds
- Access control

#### Risk Assessment

- Accident likelihood
  - ➤ All season lower risk than winter only
  - > Road bed sloped in
  - > 30 km/h average speed, speed reductions
  - > Operating procedures/monitoring

#### Risk Assessment (cont.)

- Consequence
  - Cargo properties and effects
  - > Fish bearing streams
  - > Karst

#### Spill Contingency

- Spill kits and training
- Response teams
- > Equipment and trailers
- Control points

#### Risk Assessment (cont.)

- Oboni assessment
  - > Inappropriate example comparisons
  - ➤ Off-road excursion estimates an order of magnitude greater than BC Forestry road statistics
  - Did not 'ground-truth' findings
  - Did not constructively respond to review comments

#### Revised Risk Assessment

- Additional mitigation
  - Cab safety belts
  - Cargo anchoring
  - ➤ Consider 0.5-1 m widening and/or perimeter barriers for high risk sections
  - > Operations level risk assessment

# Permafrost, Soils and Terrain

#### Permafrost

- Discontinuous presence in lowland soils expected
- Overland construction minimizes effects
- Investigation of suspect areas and borrows
- Mitigation and monitoring plans

# Permafrost, Soils and Terrain

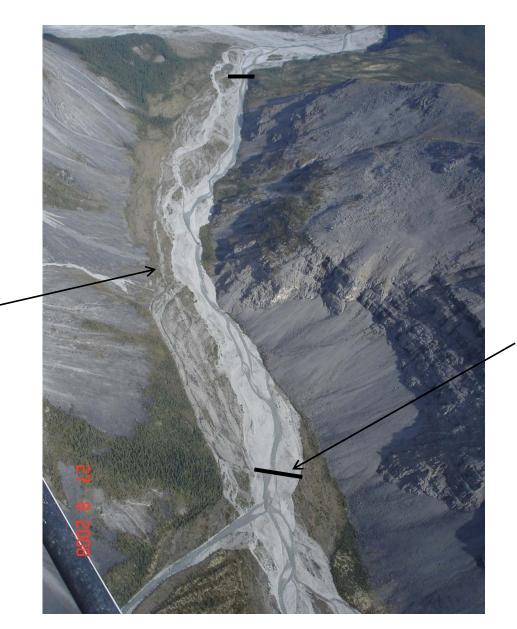
#### Soils

- Baseline metals concentrations
- Dustfall monitoring
- > Operations Monitoring

# Permafrost, Soils and Terrain

#### Terrain

- Mapping, hazard identification, mitigation
- No major slope stability issues
- Some rockfall protection may be required
- Monitoring for debris flows



Old

winter

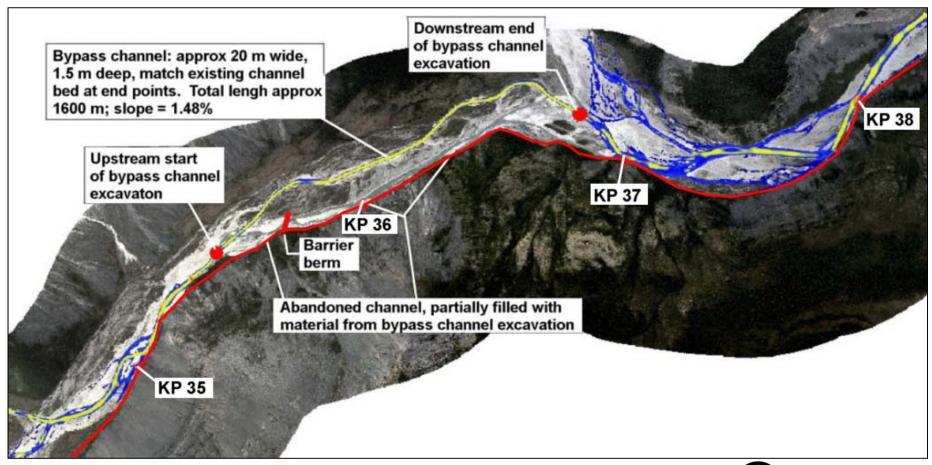
road

Bridge location

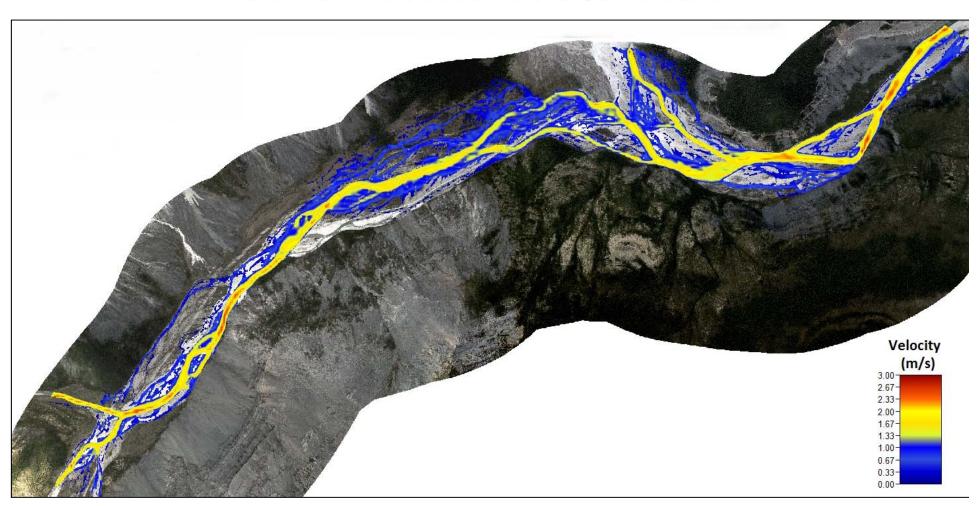




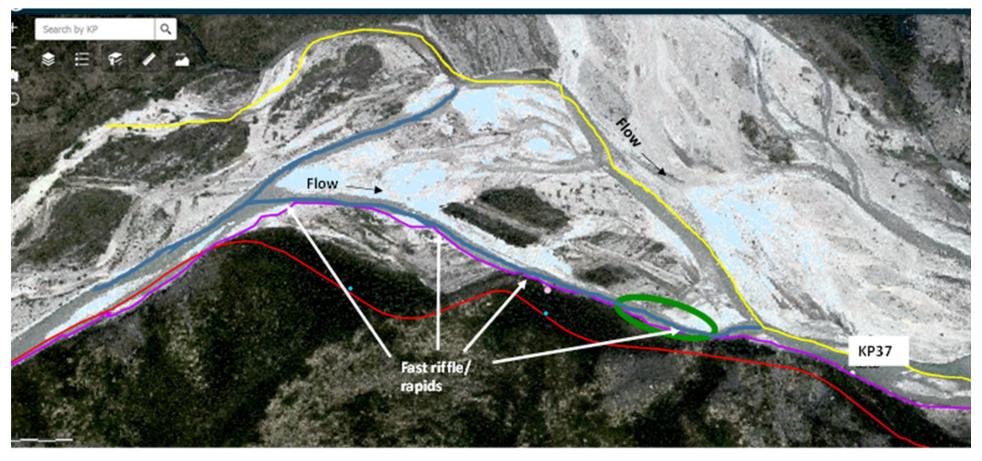
Conceptual Design Channel Realignment 2-year flow

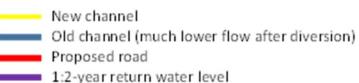


Realigned Channel 100-year Inundation Limits and Flow Velocities Before Construction



#### **Habitat Offset**







Location of overwintering pool(s) build to offset lost habitat

Downstream Environment - Summer/Fall



#### Construction

- Late summer/fall schedule in dry conditions
- Isolated from existing channel until completion during no flow
- Diversion berm built late season, no flow

#### Sediment

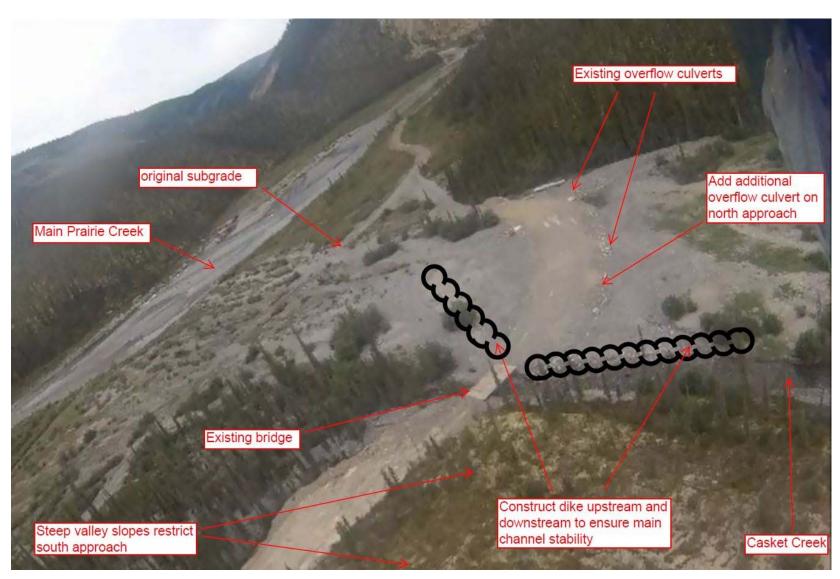
- Alluvium in new channel same as in existing channel
- Wash down during construction using off-channel groundwater
- Initial spring flows unlikely to mobilize significant sediment, and in any event, limited potential for impacts as adjustment period will be over before grayling migration
- High flows will mobilize sediment, but no different than normal



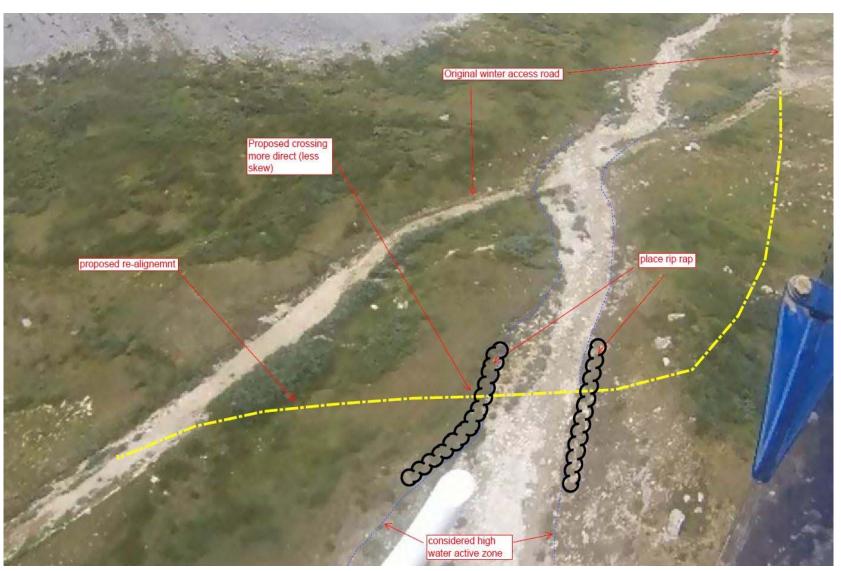
# Water Quality and Quantity

- Sediment and Erosion Control Plan
- Borrow pit development plans
- Silt controls
- Maintenance of road and drainage structures
- Inspections of crossings and other drainage structures
- Monitoring

# Major Watercourse Crossing Casket Creek KP 6.2



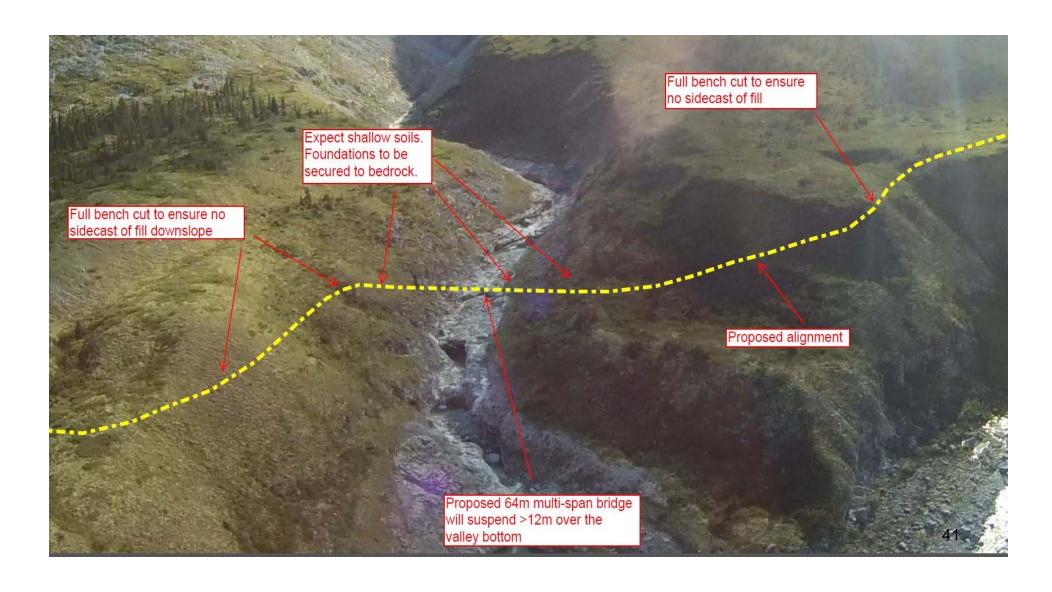
### Major Watercourse Crossing Sundog Creek KP 20.3



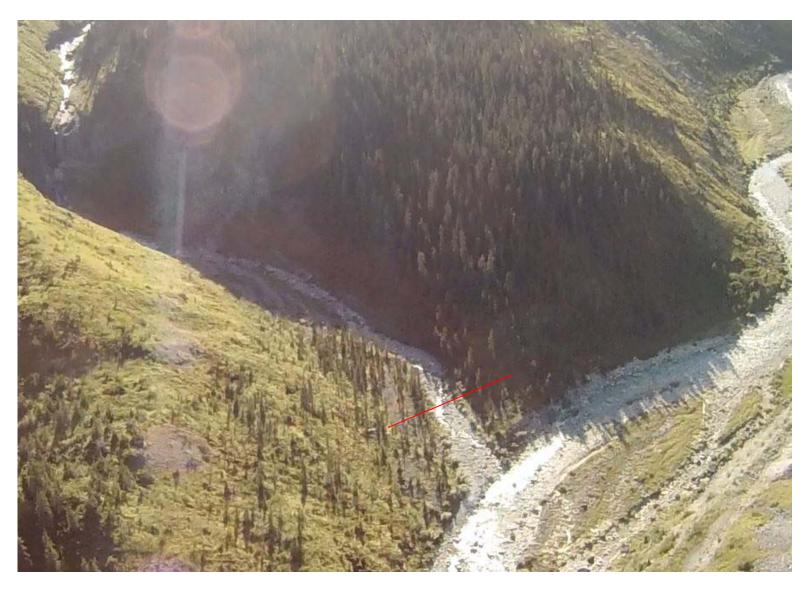
# Major Watercourse Crossing Sundog Creek KP 23.3



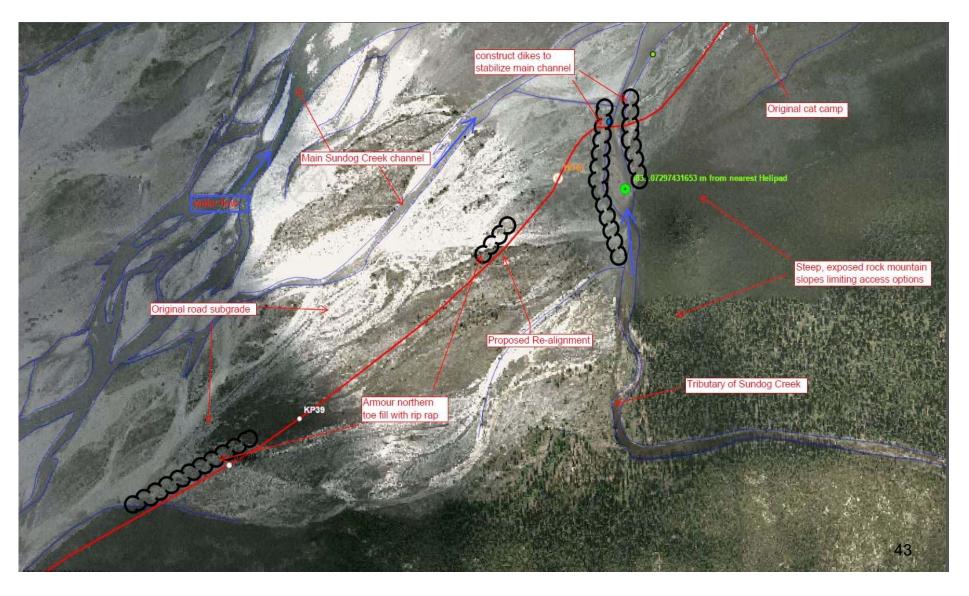
# Major Watercourse Crossing Sundog Creek KP 25.4



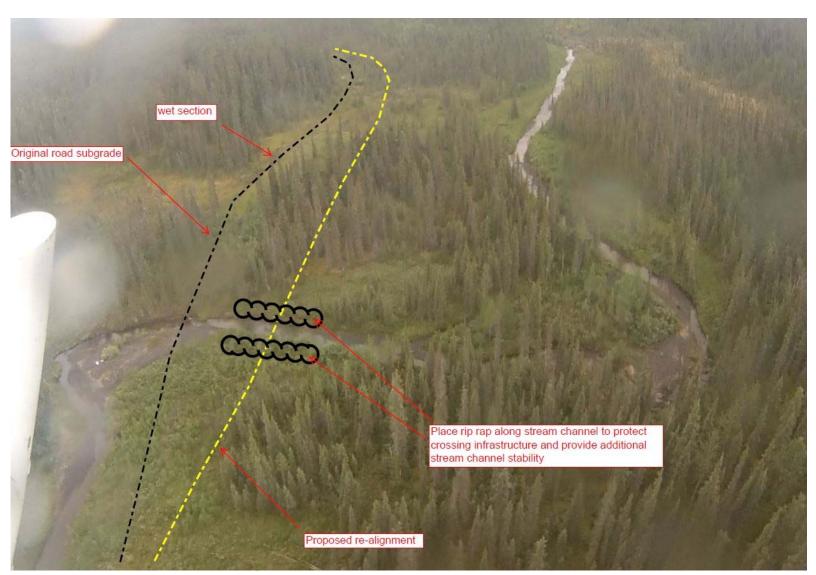
# Major Watercourse Crossing Sundog Creek KP 28.6



### Major Watercourse Crossing Sundog Creek KP 39.4



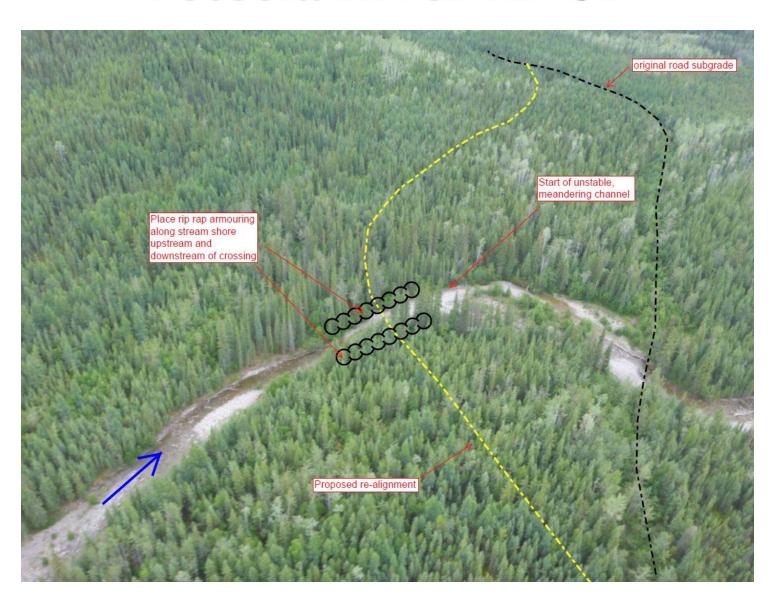
# Major Watercourse Crossing Sundog Creek KP 43.2



# Major Watercourse Crossing Polje Creek KP 53.3



#### Major Watercourse Crossing Tetcela River KP 87



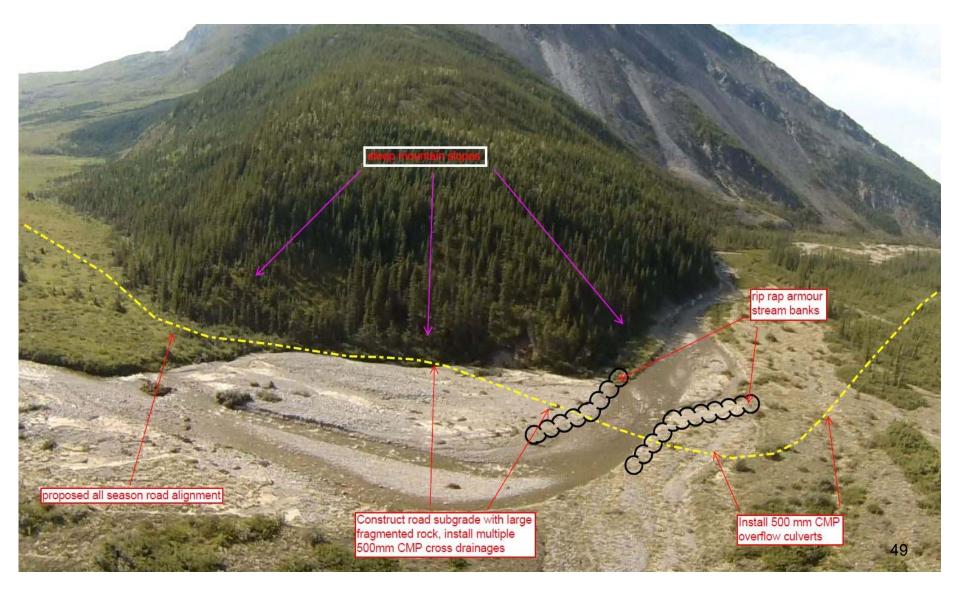
#### Major Watercourse Crossing Tetcela River KP 89.5



# Major Watercourse Crossing Grainger River KP 119



# Major Watercourse Crossing Grainger River KP 121.2



#### The all season road route at the Liard River Crossing: Location of Barge and Ice Bridge

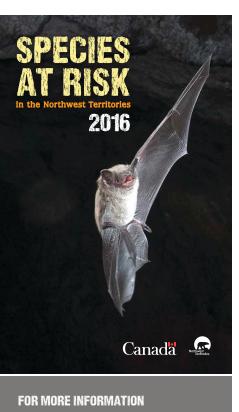


Facing East

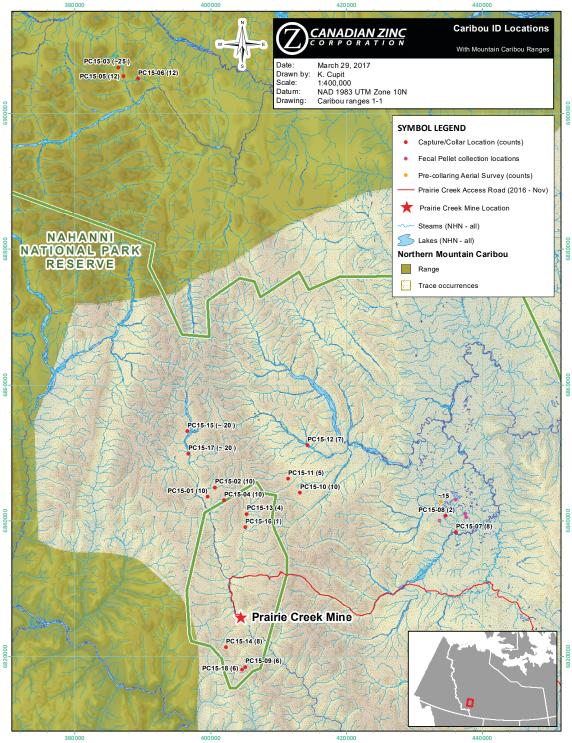


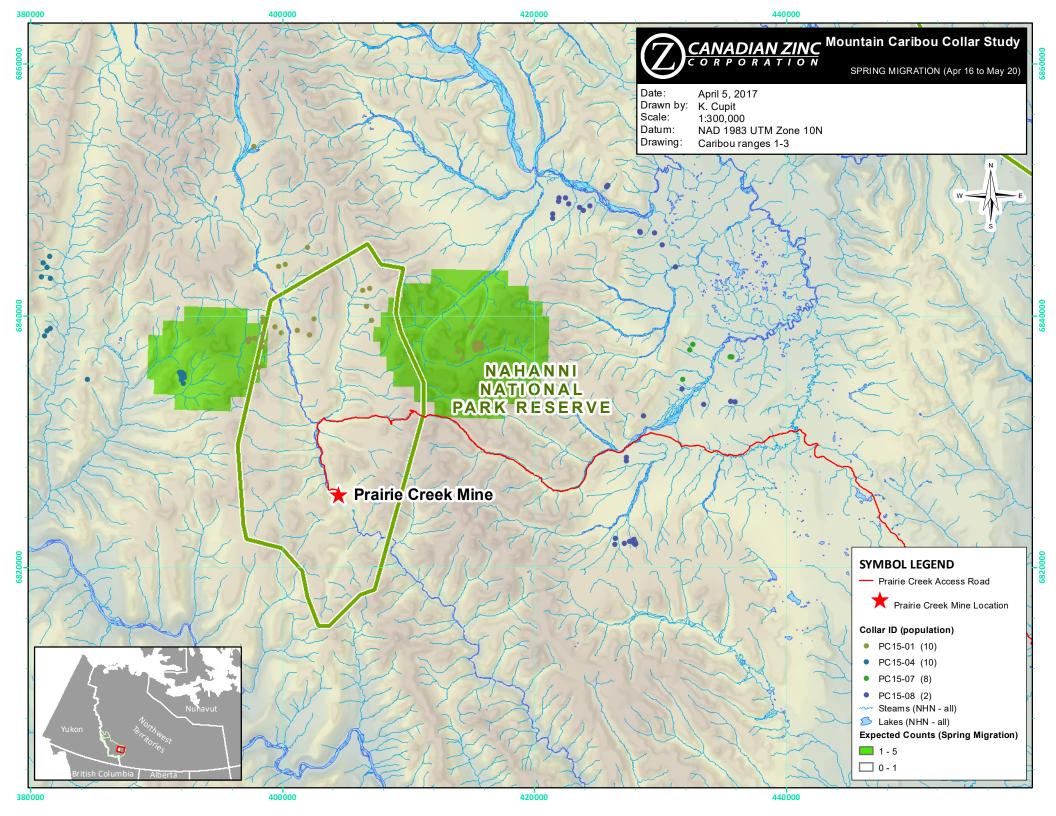
#### Mountain caribou

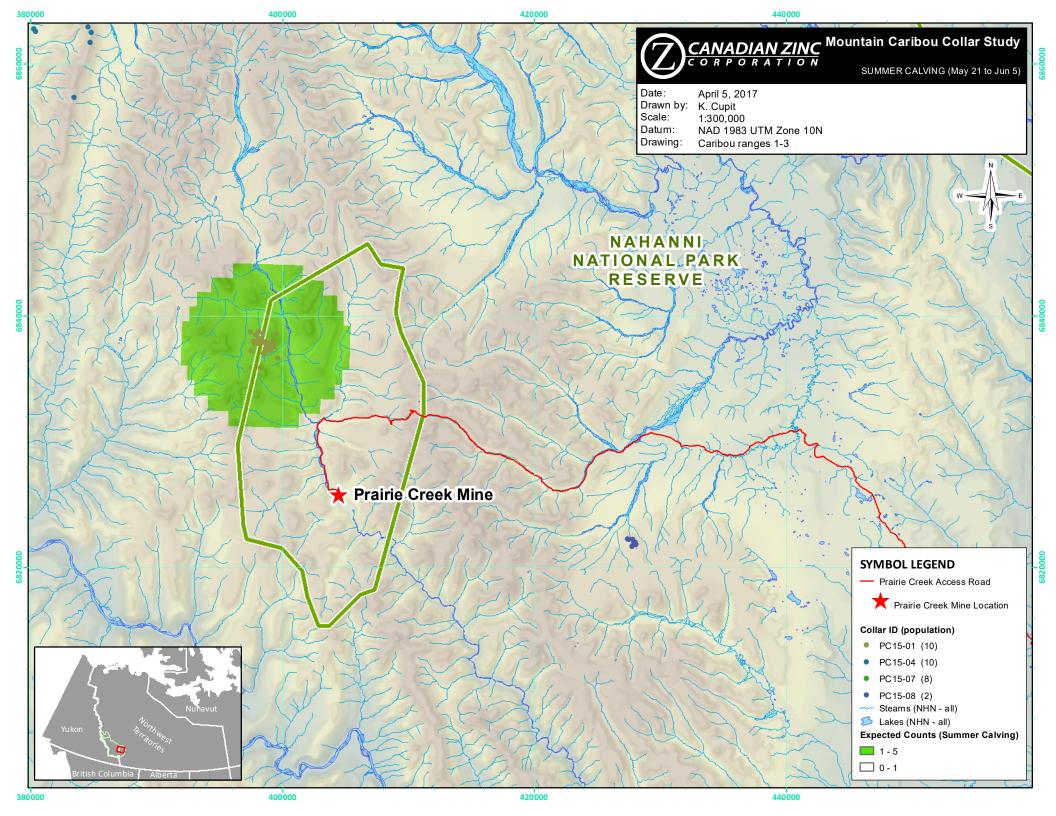
- Official range does not extend to road
- Congregations to north and west
- Collars show a few animals cross the road, consistent with anecdotal observations
- Mitigations such as collision avoidance, speed restricted crossing zones appropriate
- Structured recording of road user and communitybased monitor sightings, appropriate adaptive management

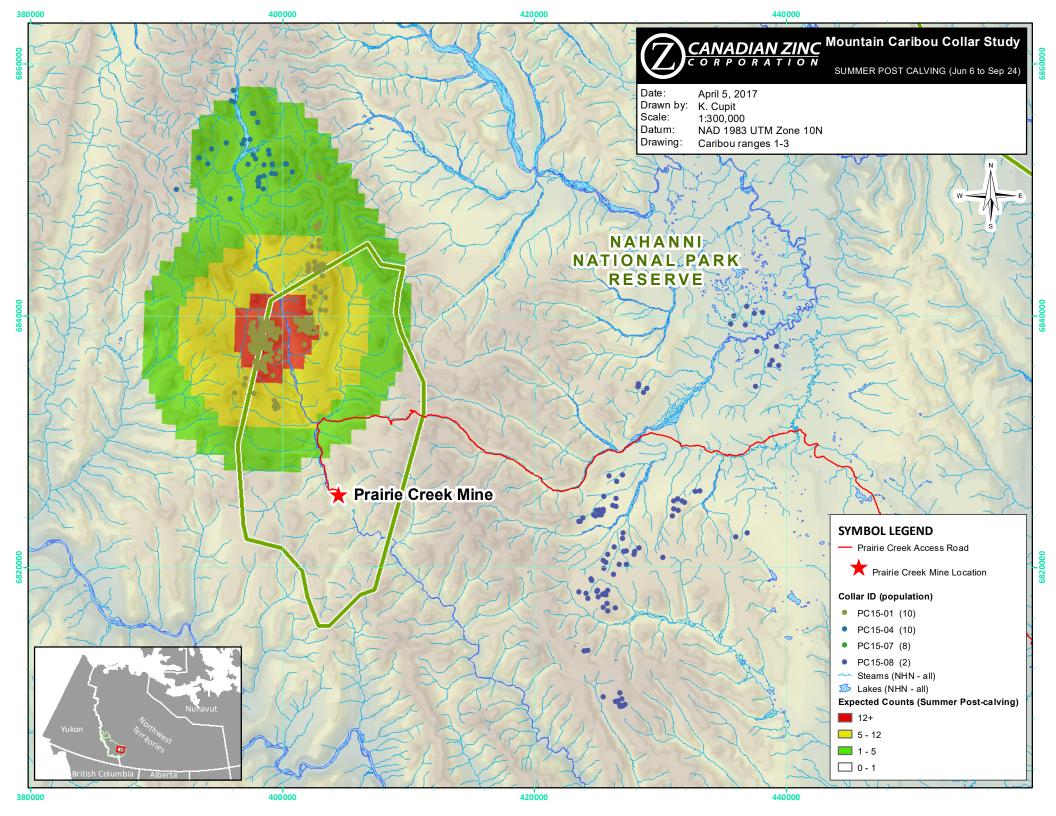


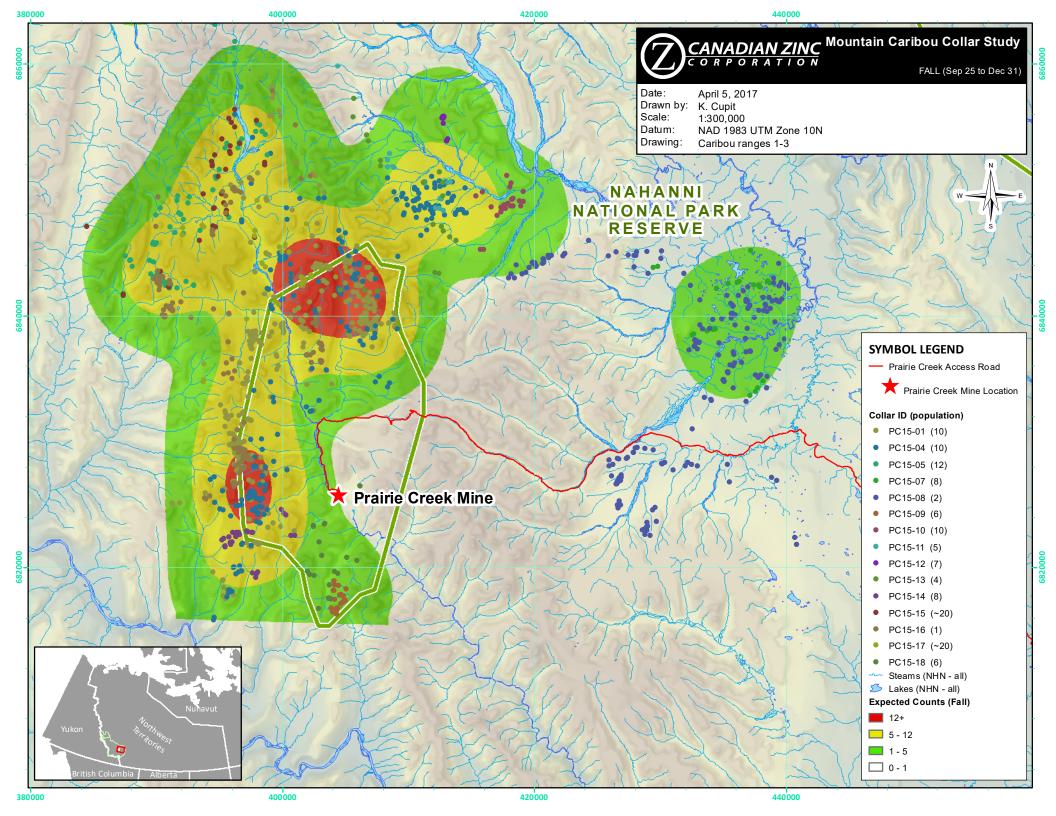


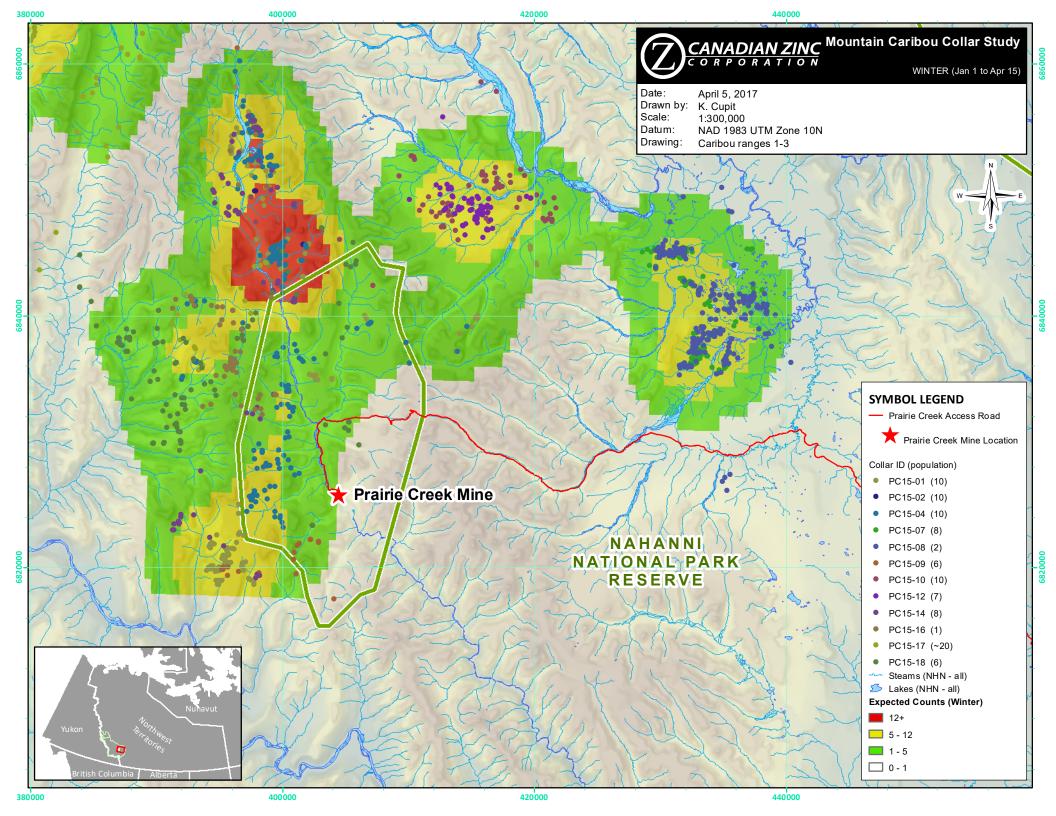












#### **Boreal caribou**

- Road crosses "buffer" range
- Front Range upland terrain not preferred
- Reported congregations to the north and south (N. Larter, GNWT biologist)
- > No sightings during any CZN studies

# Traditional Harvesting and Traditionally harvested species

- Main harvest is NBDB members opportunistically hunting moose in readily accessible areas e.g. along rivers
- Caribou seldom harvested (boreal)
- > Traplines in Grainger Gap area (R. Vital has a cabin), but not operated for "about a decade"
- Moose, bear and rabbit harvesting proximal to Nahanni Butte, as well as medicinal plants and berries

#### Cultural and Heritage Resources

- No heritage resources found in 2 previous surveys of "high potential" areas
- Commitment to doing suitable AIA prior to construction, involving NBDB members
- Heritage resource brochure for road planning and construction personnel
- > Clear policy re heritage resource protection

#### Closure and Reclamation

- Borrow Pit Management and Reclamation Plans and Closure Reclamation Plan
- Topsoil salvage and storage
- Scarification, ripping and roughening of surfaces
- Maintain drainage, no ponding, surface stabilization and sediment control
- Revegetation by natural invasion. No seed mixes

# Impacts from Employment

- Positive benefits of employment
- Minimize negative side-effects consistent with previous EA (social supports, restricted entry to Nahanni Butte)
- Existing SEA

#### Mahsi Cho