

RHINO ENVIRONMENTAL SERVICES

Oscar Long.

Registered Onsite Wastewater Practitioner

2848 Schmid Road Sorrento B.C V0E 2W1



Cell 1-250-515-2619 Home Office 1-250-803-4623 email: rhinoenvironmental@hotmail.ca

Preamble

On Tuesday 13th of November, I attended the property of Mr. Mike Zappone to perform a site and soil assessment with the aim of providing suitable on- site waste water management options, for a land parcel which is over 18.26 Hectares. As the remainder parcel is over 2Hectares a site and soil assessment would be adequate to prove that a Type 1 trench based onsite wastewater system would be possible. This document is a summary of my findings.

Legal Description: Lot1, Section 22, TWP 21, Range 10, W6M, KDYLD, Plan38427.

Street address: 3453 Ford Road, Tappen, B.C

Owner: 688490 BC LTD, INC.NO. 688490

Owner Address: 3121 16th Avenue NE, Salmon Arm, BC, V1E 2Y8

This property encompasses 18.6 Hectares and has been mostly cleared and is currently operating as a gravel pit. The proposed subdivision encompasses 1.99 Hectares. During the site investigation, it was my aim to determine the most suitable area to design and install an on- site waste water system, taking into consideration the requirements set out in the Standard Practice Manual. The assessment consists of soil observation test pits, permeameter testing and visual observation in generality of the site. Test pit and permeameter summary shall be included this document for review. There is a well on the property and the critical setbacks to water are easily met. I chose this location to allow for a primary dispersal area and also a reserve dispersal area. This will support sustainable wastewater dispersal options, should this property be developed for residential use. This site did not exhibit any sign of groundwater. While I did not observe any seepage, I also did not observe gleyed soils or any strong redoxomorphic features in the soil horizons. Slope was also conducive to linear loading and therefore overall system contour length.

Rational For Design

The subdivision report criteria require that this dispersal system has enough area of infiltrative surface to accommodate flows from a 4 bedroom home with a minimum daily design flow of 1600 litres per day. There are no plans for the homeowner to install a Garburator (Installation of a Garburator will require a 50% larger septic tank, which represents significant cost increase to the installation of this system.)

I have come to the conclusion, that a Type 1 Trench gravity Distribution based Sewage Dispersal System would be an appropriate choice of technology for this site. Vertical separation within the soil profile is more than adequate for a Type One system >240cm. The restrictive layer is located at >2.8m depth. As the proposed on-site waste water system will be gravity based, I require that 24" of clean drain rock should be installed above the native soil to facilitate the positive interface of effluent with the soil Matrix. The reason for my choice is related mostly to lot soil type, (brunisolic soil type Gravelly Sand) and general topography (minimum 2% linear, slope type). My methods of practice are supported by utilization of the Kent-Watson Field Guide to Soil. The overall footprint of the dispersal area required shall be approximately 40m², which will provide adequate soil dispersal and address efficient oxygen flux.

The soils examined in this area of the property were found to be uniform in terms of structure and consistence. A total of 4 soil observation test pits were excavated for both the initial and reserve dispersal areas. I have assigned the same Hydraulic and Linear loading rates. Dispersal to this type of soil can be gravity based, as vertical separation exceeds the minimum standard as per Table II-14 SPM version 3.

1. It is my opinion that this type of system, as long as it is used within the design parameters, should have longevity and effectiveness for an extended period of time.
2. Hydraulic Loading Rate = 40 litres/meter²/Day
3. Daily Design Flow = 1600 litres / Day
4. Linear Loading Rate = 400 Litres/Day/meter

Area of infiltrative surface required = DDF/ HLR = 1600l/d÷40l/m²/d = **40 meters²**



Below are some images of the soil test pit profile



Image showing well setback 43 meters





Image showing strong blocky appearance in ped





Image showing gravelly sand exped.





Image showing strong blocky gravelly sand





Image showing a hand sample of this coarse granular soil





Image showing setback distance from well to soil test locations

If you require more information please do not hesitate to contact me by phone or e-mail.

Sincerely

Oscar Long R.O.W.P.

Declaration:

These plans and specifications are consistent with standard practice with regard to the Sewerage System Regulation and the Sewerage System Standard Practices Manual of the B.C. Ministry of Health. I have conducted a complete site evaluation and have exercised due diligence. I am a registered on-site practitioner authorized to plan and install onsite wastewater systems herein.



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Cell 1-250-515-2619 Home Office 1-250-803-4623 email: rhinoenvironmental@hotmail.ca

Health Authority Initial Filing For Construction of Sewerage System:

Site investigation report, record of design and specifications for Subject Subdivision

Date: November 13th, 2018

Legal Description : Lot 1, Section 22, Township 21, Range 10, W6M KDYLD, Plan 38427

Street Address: 3453 Ford Road, Tappen BC

Property Owner: 688490 B.C LTD. INC. NO 68849

Summary of Proposed Works: *(also see site plan attached)*

New onsite wastewater system to serve a 4 bedroom, @ up to 320m² residence(s)

Proposed wastewater system:

- daily design flow 1600L/day
- type 1 effluent residential strength
- 1200IG septic tank, 2 compartment with effluent filter
- gravity dispersal to 3 – 15m laterals, end feed so that each lateral section is 15m

Site Information:

Total parcel size: 1.99 Ha.

Potable Water Source: Onsite well >30 meters from onsite wastewater system

Proposed residence 4 bedroom, 320m² residence

Site/ Soil Evaluation: *see attached drawing for test pit locations*

Native Soil in area of proposed dispersal field:

Test pit #1

- 0 – 16" Gravelly sand with organics, brown, dry
- 16 – 23" Gravelly Sand, light brown, dry
- 23" - 96" Gravelly sand, dry,
roots, established

Test pit #2

- 0 – 8" Gravelly sand with organics, brown, dry
- 8 – 27" Gravelly Sand, light brown, dry
- 27" - 94" Gravelly coarse sand, dry
roots established



Test pit #3

- 0 – 12" Gravelly sand with organics, brown, dry
- 12 – 28" Gravelly Sand, light brown, dry
- 28" - 93" Gravelly sand, dry,
roots, established

Test pit #4

- 0 – 12" Gravelly sand with organics, brown, dry
- 12 – 30" Gravelly Sand, light brown, dry
- 30" - 99" Gravelly coarse sand, dry
roots established

☐ **Permeameter Test Summary**

- ☐ AH1 – KFS = 7225 mm/day
- ☐ AH2 - KFS = 7451 mm/day
- ☐ AH3 - KFS = 7431 mm/day
- ☐ AH4 - KFS = 7500 mm/day
- AH5 - KFS = 7621 mm/day
- AH6 - KFS = 7429 mm/day
- AH7 - KFS = 7500 mm/day
- AH8 - KFS = 7710 mm/day

**Limiting layer/design limit:**

Vertical separation will be designed from the design limit elevation selected at **240cm** based on the shallowest elevation of Gravelly Sand within the proposed dispersal area, as indicated by test pits.

Topography:

In vicinity of dispersal 1.5% falling North to South, ... remainder of lot generally level

Setbacks:

- No neighbouring wells
- No other breakout points within 15m.
- All other setbacks are also greater than required minimum SPM guidelines.

Constraints and design rationale:

- Overall site and soil constraints are minimal a sand blinding layer should be utilized to reduce the rate of vertical flow into soil
- Native soil depth above a restrictive layer of reduced permeability is from 240 cm to 280cm
- Gravity dispersal is selected.
- Proposed AIS of 40m².
- Vertical separation is maximum possible by at grade placement of trench dispersal

- Soil remediation will include scarification of native soil surface
- Resulting vertical separation will be greater than original native soil depth, approx. 270cm

Record of Design Information and Calculations:

Soil Type at Infiltrative Surface:

Receiving soil/infiltrative surface for this proposed system is native gravelly sand

(VS) Vertical separation:

Soil remediation will result in vertical separation slightly greater than original native soil depth, approx. **240cm** to 270cm, which meets the SPM standard of 90cm (36") VS for gravity dispersal.

(HLR) Hydraulic Loading Rate for Design: 40L/day/sq.m. for type 1 effluent to gravelly sand (SPM table ii 22)

Wastewater flow:

Typical residential "strength"

(DDF) Daily design flow: based on SPM table ii-8 4 bedroom residence with up to 330m²
= **1600L/day DDF**

(AIS) Calculation of minimum infiltrative surface: $1600/\text{day} \div 40\text{L}/\text{day}/\text{m}^2 = 40\text{m}^2$

(LLR) Linear loading proposed is 400 l/m/d

Configuration of Dispersal System:

selected trench width is **0.9m** for 3 laterals 1.8m apart.

Trench length is AIS/trench width, = **15m**



Specifications: see attached drawings

Trench Area:

- Remove sod with minimal excavation of underlying soil
- Scarify infiltrative surface
- Place washed drain rock at minimum of 60cm under laterals, 5cm (2") over the laterals
- Cover drain rock with Hydrophylic landscape cloth
- Place cover soil at minimum 15cm (6") depth, maximum 30cm (12")

Aggregates:

- Drain rock to be washed with minimal clay or silt and less than 1% passing the #200 sieve
- Cover soil to be loamy sand or sandy loam

Pipe:

- 4" sewer connections to be CSA
- 3" headers and laterals to be CSA
- End feed D box placement and headers...9 hole D box
- ensure accessibility to D box by appropriate service box

- 1.8m separation between laterals
- level placement of laterals to encourage even distribution...Cleanouts at end
- ensure 2% fall for 4" lines entering septic tank
- ensure 1% fall for effluent line from tank to D box and 1% for 3" headers from D box to laterals

Septic tank:

- 1250 IG 2 compartment
- install outflow effluent filter with handle extended to within 6" of access lid
- ensure easy access by installing risers as required to bring lids to slightly above surface grade

Miscellaneous specs

- Install all tanks on minimum of 5cm of bedding sand, level, consistent support, ...native backfill is OK for sides but with no cobbles or larger rock contacting tank walls, cover with sand
- Ensure easy access to tank lids for inspection and maintenance by installing risers to bring lids to slightly above finished surface
- Effluent filter handle extension to within 15 cm (6") of the access rims to avoid confined space entry issues.
- Ensure all piping is adequately bedded with sand, well supported
- ensure well supported, level placement of D box with careful leveling of flow by speed levelers. Confirm by water testing
- Do not alter structure of original soil in dispersal area, do not back trucks onto area, minimize loads/smearing/compaction, scarify shallow, do not install in wet conditions
- Establish appropriate vegetation cover of the dispersal field (grass)
- Protect the dispersal field and tanks from traffic, heavy loads, surface or sub surface flows of water

Declaration:

These plans and specifications are consistent with standard practice with regard to the Sewerage System Regulation and the Sewerage System Standard Practices Manual of the B.C. Ministry of Health. I have conducted a site evaluation and exercised due diligence. I am a registered on-site practitioner authorized to plan and install the system designed herein.



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Cell 1-250-515-2619 Home Office 1-250-803-4623 email: rhinoenvironmental@hotmail.ca

Health Authority Initial Filing For Construction of Sewerage System:

Site investigation report, record of design and specifications for Remainder Parcel

Date: November 13th, 2018

Legal Description : Lot 1, Section 22, Township 21, Range 10, W6M KDYLD, Plan 38427

Street Address: 3453 Ford Road, Tappen BC

Property Owner: 688490 B.C LTD. INC. NO 68849

Summary of Proposed Works: (also see site plan attached)

New onsite wastewater system to serve a 4 bedroom, @ up to 320m² residence(s)

Proposed wastewater system:

- daily design flow 1600L/day
- type 1 effluent residential strength
- 1200IG septic tank, 2 compartment with effluent filter
- gravity dispersal to 3 – 15m laterals, end feed so that each lateral section is 15m

Site Information:

Total parcel size: 16.27 Ha.

Potable Water Source: Onsite well >30 meters from onsite wastewater system

Proposed residence 4 bedroom, 320m² residence

Site/ Soil Evaluation: see attached drawing for test pit locations

Native Soil in area of proposed dispersal field:

Test pit #1

0 – 10" Gravelly sand with organics, brown, dry
10 – 39" Gravelly Sand, light brown, dry
39" - 81" Gravelly sand, dry,
No seepage

Test pit #2

0 – 9" Gravelly sand with organics, brown, dry
9 – 40" Gravelly Sand, light brown, dry
40" - 83" Gravelly coarse sand, dry
minimal roots established



Test pit #3

- 0 – 5" Gravelly sand with organics, brown, dry
- 5 – 24" Gravelly Sand, light brown, dry
- 24" - 85" Gravelly sand, dry,
roots, established no seepage

Test pit #4

- 0 – 5" Gravelly sand with organics, brown, dry
- 5 – 25" Gravelly Sand, light brown, dry
- 25" - 84" Gravelly coarse sand, dry
roots established

☐ **Permeameter Test Summary**

- ☐ AH1 – KFS = 4741 mm/day
- ☐ AH2 - KFS = 4782 mm/day
- ☐ AH3 - KFS = 4611 mm/day
- ☐ AH4 - KFS = 4719 mm/day
- AH5 - KFS = 5284 mm/day
- AH6 - KFS = 5269 mm/day
- AH7 - KFS = 5199 mm/day
- AH8 - KFS = 5381 mm/day

**Limiting layer/design limit:**

Vertical separation will be designed from the design limit elevation selected at **210cm** based on the shallowest elevation of Gravelly Sand within the proposed dispersal area, as indicated by test pits.

Topography:

In vicinity of dispersal 1.5% falling North to South, ... remainder of lot generally level

Setbacks:

- No neighbouring wells
- No other breakout points within 15m.
- All other setbacks are also greater than required minimum SPM guidelines.

Constraints and design rationale:

- Overall site and soil constraints are minimal a sand blinding layer should be utilized to reduce the rate of vertical flow into soil
- Native soil depth above a restrictive layer of reduced permeability is from 210 cm to 240cm
- Gravity dispersal is selected.
- Proposed AIS of 40m².
- Vertical separation is maximum possible by at grade placement of trench dispersal

- Soil remediation will include scarification of native soil surface
- Resulting vertical separation will be greater than original native soil depth, approx. 270cm

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Trench length is AIS/trench width, = **15m**



Specifications: see attached drawings

Trench Area:

- Remove sod with minimal excavation of underlying soil
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Aggregates:

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- 3" headers and laterals to be CSA
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- ensure accessibility to D box by appropriate service box

- 1.8m separation between laterals
- level placement of laterals to encourage even distribution...Cleanouts at end
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Septic tank:

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- install outflow effluent filter with handle extended to within 6" of access lid
- ensure easy access by installing risers as required to bring lids to slightly above surface grade

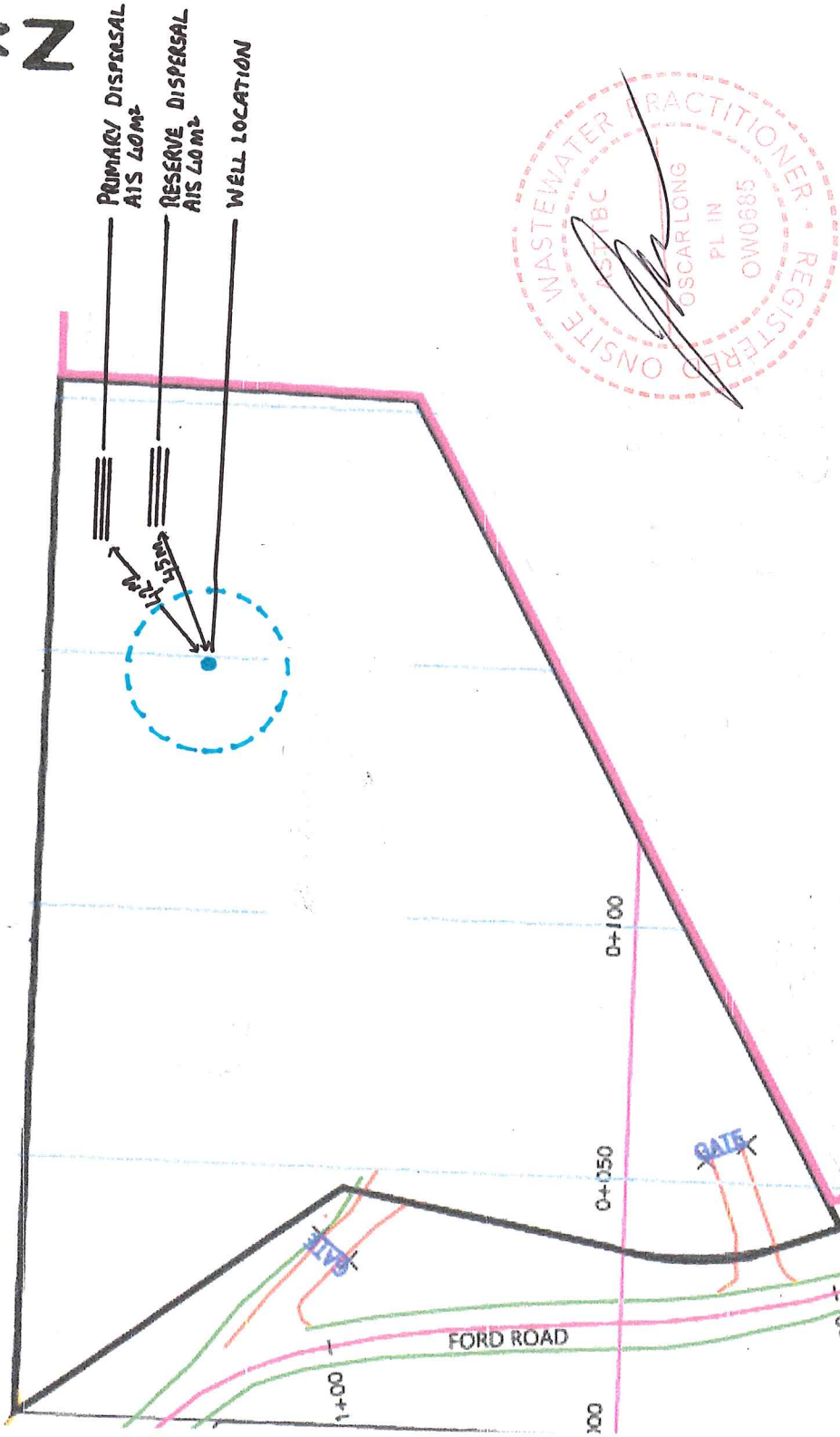
Miscellaneous specs

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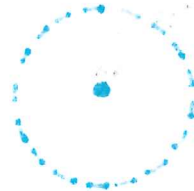
Declaration:

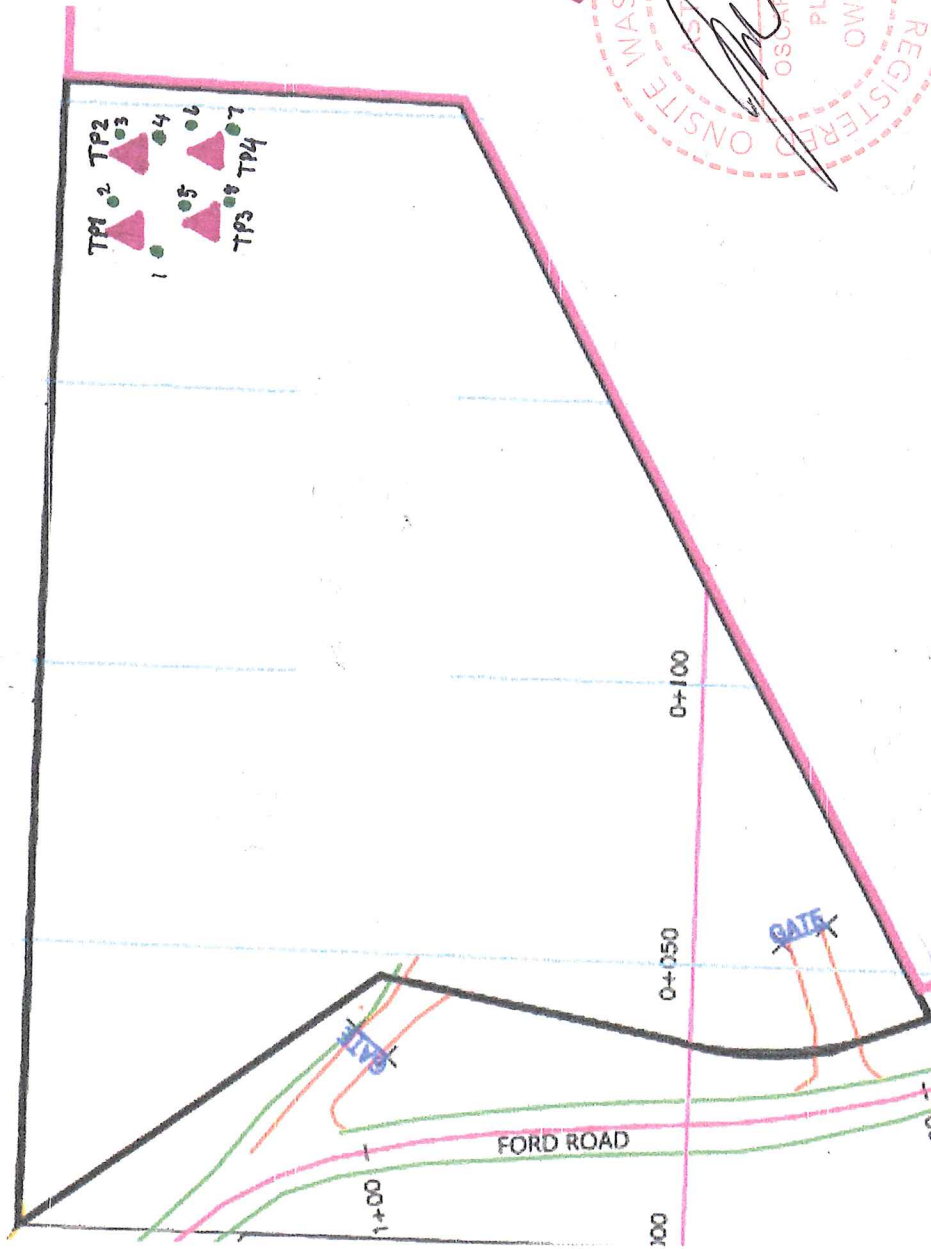
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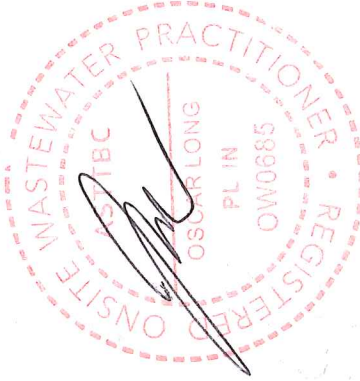
<u>Notes:</u> See construction detail documents for special notes.	<u>Client:</u> Zappone <u>Land Description:</u> Lot 1, Section 22, Township 21, Range 10, Plan Kap38427	RHINO ENVIRONMENTAL SERVICES <u>Aspect:</u> Plan View show PRIMARY AND SECONDARY DISPOSAL LOCATIONS <u>Scale:</u> 1:125
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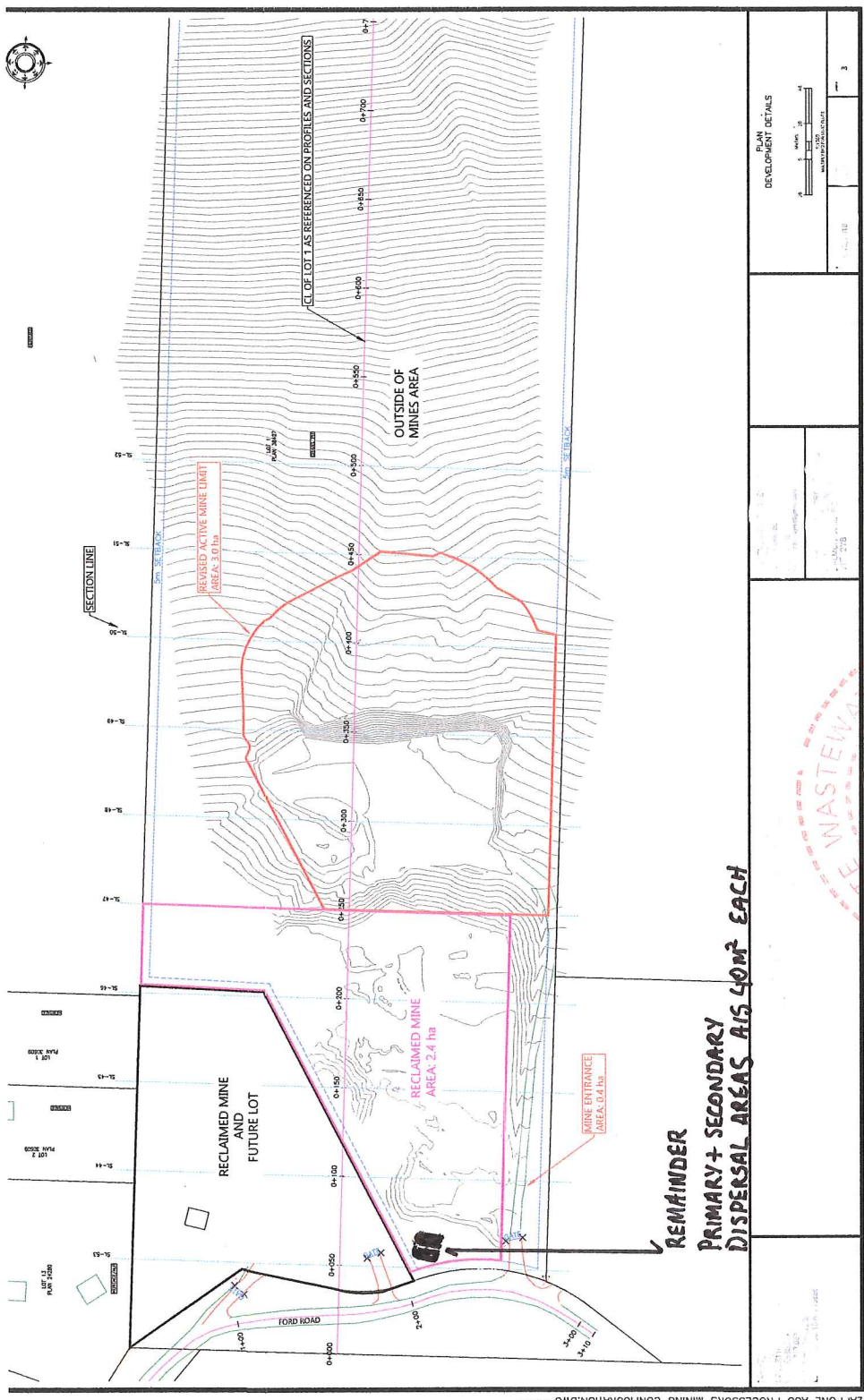


● - PERMEAMETER AUGER HOLE

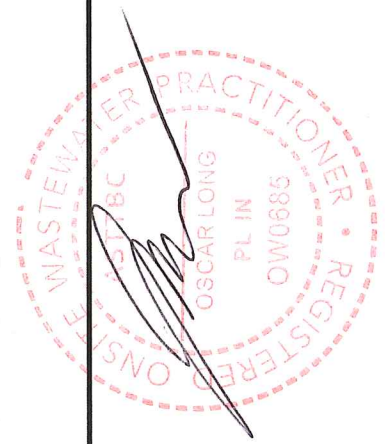
▲ - SOIL TEST PIT



<u>Notes:</u> See construction detail documents for special notes.	<u>Client:</u> Zappone <u>Land Description:</u> Lot 1, Section 22, Township 21, Range 10, Plan Kap38427	RHINO ENVIRONMENTAL SERVICES Aspect: Plan View show soil test pit locations and permeameter auger holes Scale: 1:125
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REMAINDER
PRIMARY + SECONDARY
DISPENSAL AREAS ARE 40M² EACH



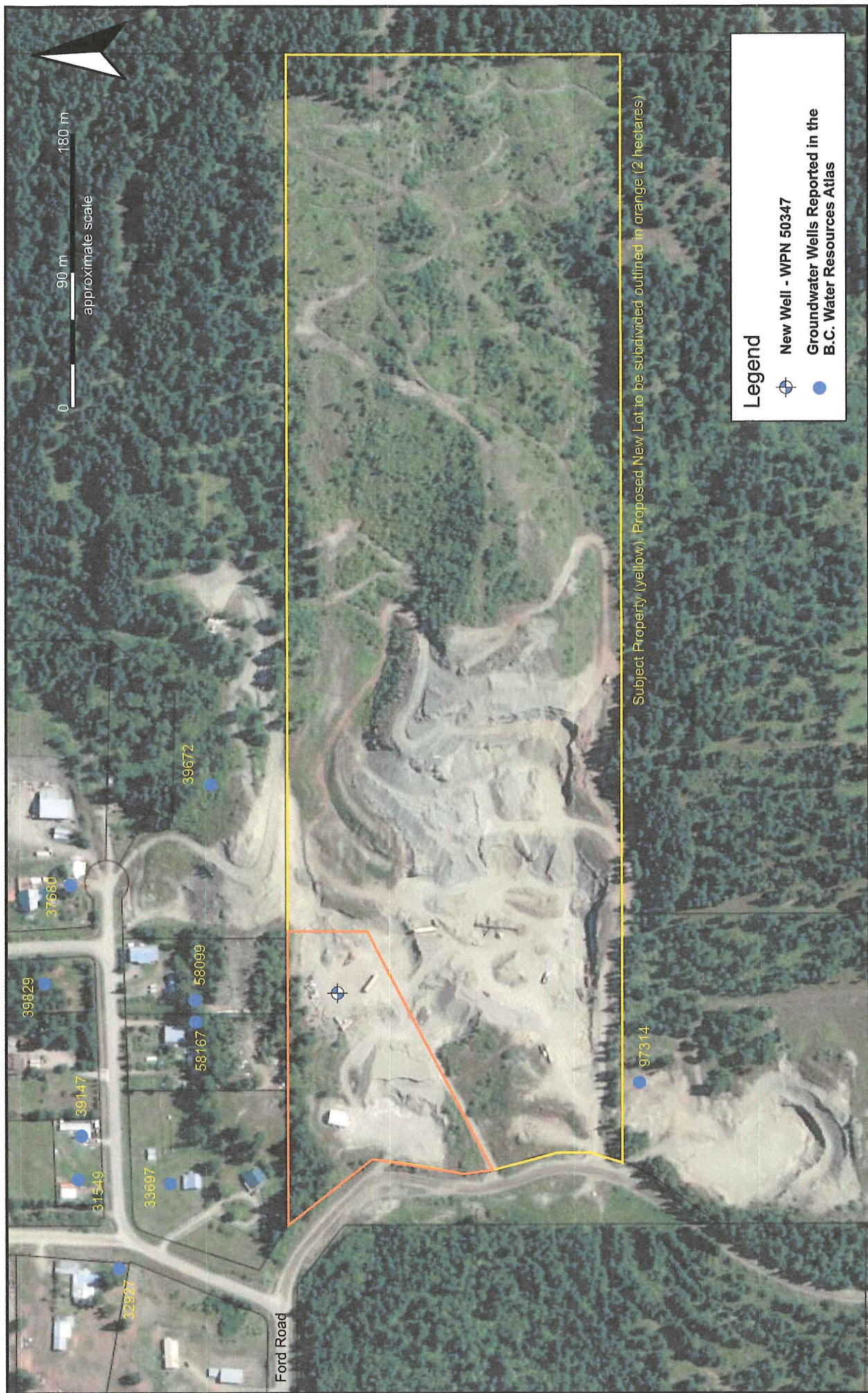


Figure 2 - Detailed Site Orthophoto and Well Site

Date: July 2018	Image Source: BC Water Resources Atlas	WWAL Project: 18-030-01
Drawn by: RR	Checked by: DG	Client Project:

