317 COUNTY ROAD 4

DOURO TOWNSHIP

COUNTY OF PETERBOROUGH

STORMWATER MANAGEMENT REPORT

Prepared for:

TD Consulting Inc.

April, 2024

TABLE OF CONTENTS **Page No.**

1. INTRODUCTION

The site is located on the east side of County Road 4 in the County of Peterborough.

It is proposed to construct storage building and parking facilities on the site.

This report examines how the site will be serviced in compliance with the requirements of Duro Township and the County of Peterborough.

The Report has used the following documentation in its preparation:

1. Site Plan by TD Consulting Inc.
2. Peterborough County Design Criteria and Standard Detail Drawings.
3. Stormwater Management Report by BaseTech Consulting Inc.

2. EXISTING SITE CONDITIONS

The site measures 35.92 ha. and has been used as an aggregate pit in the past.

It is understood that historically the Site was used as a wayside pit for construction of County Road 4 in the early to mid-1900's. Currently, the Site is used to receive topsoil and other soils excavated from construction projects as well as asphalt and concrete material. The topsoil is stockpiled, screened, and reused offsite. Granular materials are stockpiled, screened, and reused offsite or are used onsite for backfilling of the wayside pit area.
Non-granular materials, generally described as higher in silt and clay content, are used for backfilling the wayside pit area. This soil is initially stockpiled in various locations on the east portion of the Site.
Asphalt and concrete are crushed and sorted into piles and sold as recycled materials.
The Site also receives hydro-vac trucks with slurry material collected primarily from daylighting of underground utilities. The slurry from the hydro-vac trucks is deposited in the receiving pond where settling of material occurs. The receiving pond has been constructed out of the non-granular materials. Water from the slurry generally evaporates off or infiltrates into the ground. The pond is dredged on an approximate weekly basis and the material is piled and dried on the north side of the pond.

The site is traversed by an unnamed creek adjacent to County Road 4 and by Meade Creek at the east side of the site.

Drainage is via sheet flow towards the low point on the site and infiltrates.

There is an existing gravel access road into the site.

3. PROPOSED DEVELOPMENT

It is proposed to construct a 849 m^2 structure to store construction implements such as backhoes, hydro-vac trucks and other tools related to activities related to the site along with a new driveway (624m^2) and some parking (1064 m^2).

4. QUANTITY CONTROL

The County of Peterborough require that pre-development run-off conditions be maintained for the 2-100-year storm events with additional runoff retained on site and discharged at pre-development rates.

Calculation of the Impermeability Factors has been based on the following impermeability factors:

	2–10 Year	25 Year	50 Year	100 Year
Buildings	0.90	1.00	1.00	1.00
Paving	0.90	1.00	1.00	1.00
Grass/Landscape	0.30	0.33	0.36	0.38

The impermeability factors for the lower figures have been increased for the 100-year storms by 25% as recommended by MTO Design Chart 1.07.

Discharges have been calculated using the formula $Q = \frac{Api}{360}$

where Q = discharge (m^3/sec)
A = area (ha)
p = impermeability factor
i = rainfall intensity (mm/hr)

Rainfall intensities have been based on the 2002 Peterborough Airport IDF curves for the area and are defined by the following equation.

$$I = \frac{A}{(T+B)^C} \text{ mm/m}$$

Storm	A	B	C
2 year	662	7.5	0.790
5 year	1098	10.1	0.830
10 year	1560	13.0	0.860
25 year	2010	14.0	0.880
50 year	2200	14.6	0.870
100 year	2507	14.8	0.880

and T = duration (min.).

It is proposed to direct runoff from the proposed structure and parking area to an infiltration bed and infiltrate the difference between the pre and post development runoff from the 100 year storm.

The 100 year pre-development runoff coefficient will be 0.30.

The 100 year post-development runoff coefficient will be 0.95.

The runoff flows will be calculated using the Rational Method and assuming a time of concentration of 10 minutes for the site. The rainfall intensity for the 10 minute storm will be 148.61mm/hr.

The 100-year pre-development runoff flow will be:

$$\text{Pre } Q_{100} = \frac{0.2537 \times 0.38 \times 148.61}{360}$$
$$= 0.0398 m^3/sec.$$

During the 10 minute period, the volume of runoff will be:

$$\text{Pre } V_{100} = 0.0398 \times 10 \times 60 = 23.88 m^3$$

The 100-year post-development runoff flow will be:

$$\text{Post } Q_{100} = \frac{0.2537 \times 0.95 \times 148.61}{360}$$
$$= 0.0995 m^3/sec.$$

During the 10 minute period, the volume of runoff will be:

$$\text{Post } V_{100} = 0.0995 \times 10 \times 60 = 59.70 m^3$$

Therefore, 35.82m^3 of runoff should be retained on site and infiltrated. This is equivalent to a stone volume of 89.55m^3 assuming a stone porosity of 0.40.
A 6.0 x 10.0 bed will be provided with an area of 60.0m^2. This will result in the bed having a depth of 1.5m to provide the required retention volume.

5. QUALITY CONTROL

The roofs of the building does not require quality control. Only paved areas susceptible to fuel spills, etc. require quality controls.

It is proposed to provide a sand filter layer in the infiltration bed to filter out any pollutants.

Table 3.2 in the MOE Stormwater Management Planning and Design Manual requires an infiltration volume of 42 cu.m./ha. for a site with a 90% impermeability factor. This will require a volume of 7.08m^3 for the 0.1688ha. of paving.

The area of the filter layer is calculated by the equation:

$$A = \frac{1000Vd}{k(h+d)t}$$

Where
- A = surface area of the filter(m^2)
- V = volume to be infiltrated (m^3)
- d = depth of the controlling filter medium(m)
- k = coefficient of permeability of the controlling filter medium
- h = operating head of water on the filter(m)
- t = Retention time (hr)

The filter layer will consist of a 200mm layer of sand at the top of the infiltration bed.

The will require an infiltration volume of 4.39m^3 for the 0.1042 ha. asphalt area.

Therefore, the required area of the filter layer is,

$$A = \frac{1000 \times 7.08 \times 0.2}{45 \times (0.0+0.20) \times 3}$$
$$= 52.44\ m^2$$

The area of the infiltration bed is 60.0m^2.

6. GROUNDWATER RECHARGE

The proposed infiltration bed will provide groundwater recharge to maintain the water balance for the site.

7. SEDIMENT AND EROSION CONTROL

Sedimentation and erosion controls should be provided during construction using the following techniques depending on site development phasing and seasonal considerations:

1) Minimizing the amount of disturbance to the site
2) Grading and vegetating disturbed areas as soon as possible after disturbance
3) Protect existing catchbasins and area drains.
4) Place a Silt Fence around the construction area.

All sedimentation and erosion control measured should be carried out in accordance with current City of Peterborough guidelines.

8. SUMMARY

This Report has presented stormwater management details for the development and is to be used as the basis for the detailed project design.

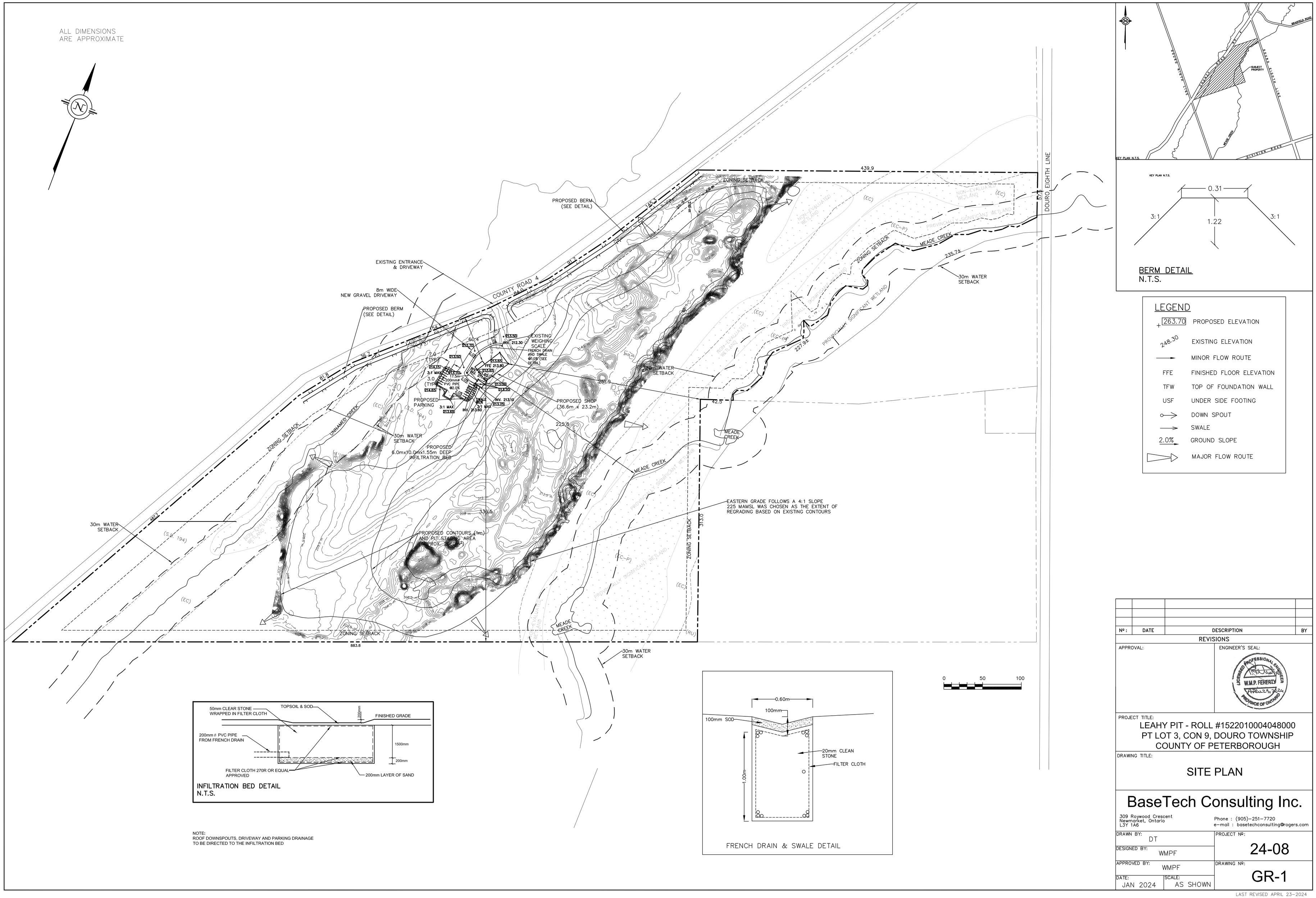
The key points are:

1. Excess runoff will be retained on site and infiltrated.
2. Quality control for the paved areas will be provided by a sand filter.
3. Sedimentation and erosion controls will be provided during construction.
4. The water balance for the site will be maintained.

Peter Feherty, M.Sc., P.Eng.
BaseTech Consulting Inc.

APPENDIX 1
SITE PLAN

ALL DIMENSIONS
ARE APPROXIMATE



BERM DETAIL
N.T.S.

LEGEND

+263.70	PROPOSED ELEVATION
248.30	EXISTING ELEVATION
→	MINOR FLOW ROUTE
FFE	FINISHED FLOOR ELEVATION
TFW	TOP OF FOUNDATION WALL
USF	UNDER SIDE FOOTING
⟶	DOWN SPOUT
→	SWALE
2.0%	GROUND SLOPE
⟹	MAJOR FLOW ROUTE

INFILTRATION BED DETAIL
N.T.S.

NOTE:
ROOF DOWNSPOUTS, DRIVEWAY AND PARKING DRAINAGE
TO BE DIRECTED TO THE INFILTRATION BED

FRENCH DRAIN & SWALE DETAIL

Nº :	DATE	DESCRIPTION	BY

REVISIONS

APPROVAL:

ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
W.M.P. FEHERTY
PROVINCE OF ONTARIO

PROJECT TITLE:
LEAHY PIT - ROLL #1522010004048000
PT LOT 3, CON 9, DOURO TOWNSHIP
COUNTY OF PETERBOROUGH

DRAWING TITLE:
SITE PLAN

BaseTech Consulting Inc.
309 Roywood Crescent
Newmarket, Ontario
L3Y 1A6
Phone : (905)-251-7720
e-mail : basetechconsulting@rogers.com

DRAWN BY: DT	PROJECT Nº: 24-08
DESIGNED BY: WMPF	
APPROVED BY: WMPF	DRAWING Nº: GR-1
DATE: JAN 2024	SCALE: AS SHOWN

LAST REVISED APRIL 23-2024