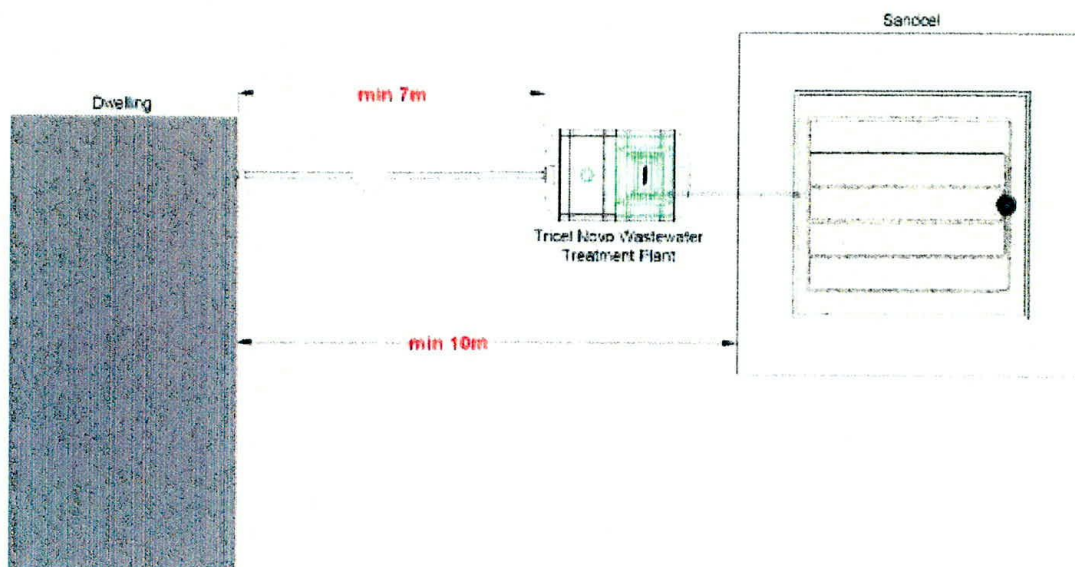

Date 24/08/2022
Report No: TSA_D_12434
Client Name Keith Justice
Site Location & Townland Glenaraneen, Brittas, Dublin

Thank you for choosing Tricel for your wastewater treatment requirements. This report contains the following information for your site and is based on a population of 11 and a subsurface/surface value of between 3-20.

Based on the information provided to us and using SR66 and the EPA Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. ≤ 10), the appropriate solution for treating wastewater on your site is a Tricel Novo Package Plant and Tricel Sand Polishing Filter.

Typical layout of a Tricel Novo Package Plant and Tricel Sand Polishing Filter:



Note:

In the above named site, a substitute wastewater treatment system may not be put in place of the following recommendation.

This recommendation only applies to the above named site based on the information supplied to Tricel.

A Site Characterisation Form should accompany this report. Tricel cannot be responsible for misinformation due to misleading information being received by us from clients.

Section 1: Information on the Novo Package Plant

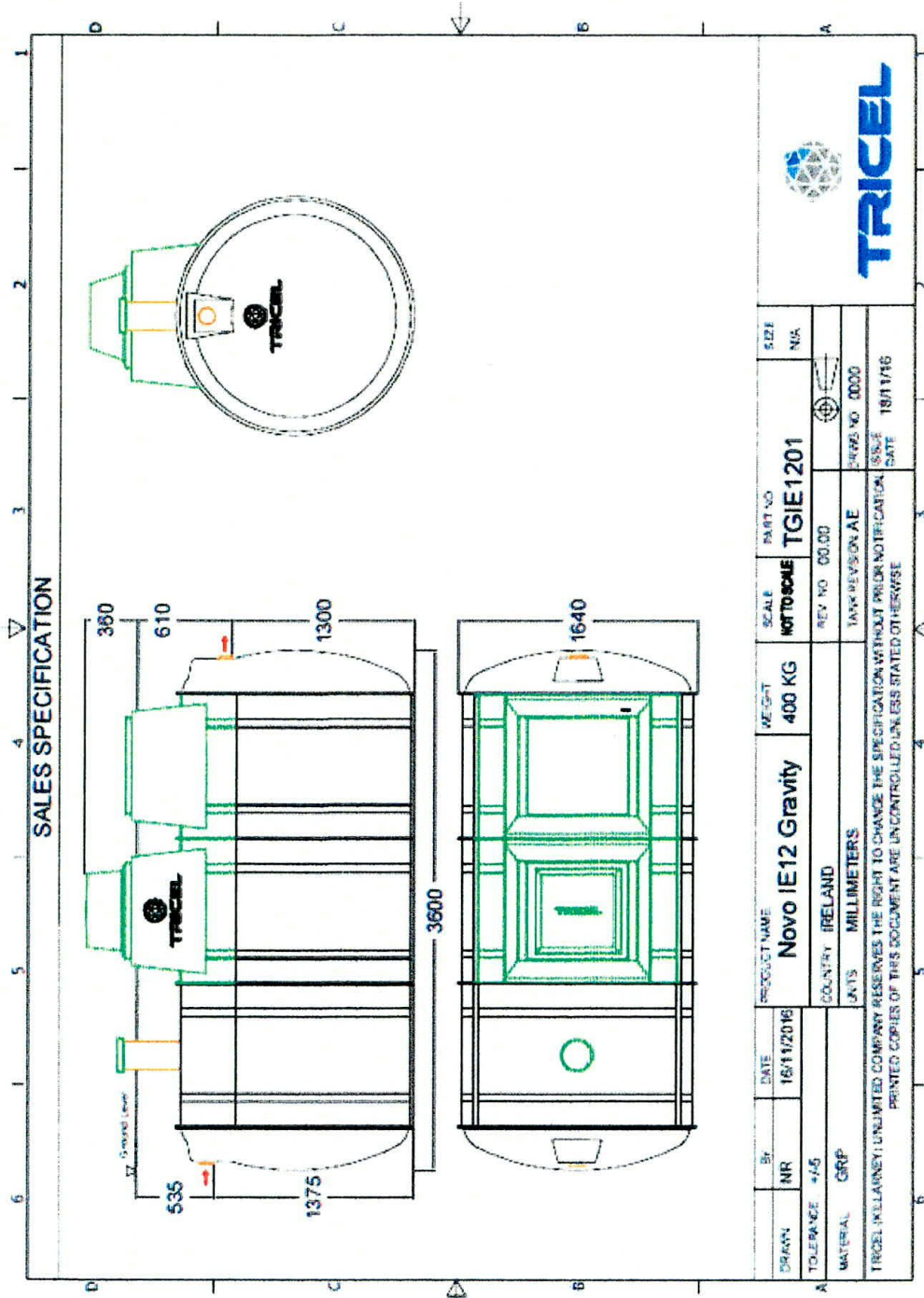
- Manufacturers report and sizing of the Tricel Novo Package Plant.
- Drawings of the Novo Package Plant.
- Certification of the selected Novo Package Plant.
- Brochure on the Novo Package Plant.
- Optional Novo maintenance agreement.

For your site, we recommend a Novo IRL12 wastewater treatment plant which is designed to treat a maximum of 1800 litres of wastewater per day. The Tricel Novo range of wastewater treatment plants is fully in conformance with EN12566-3 and complies with SR66.

The Novo IRL12 has a capacity of 5550 litres, of which 2300 are in the primary chamber, this ensures a long desludging interval.

This solution will require a Pump to be determined at the point of installation.

Section 1



BY	DATE	PRODUCT NAME	WEIGHT	SCALE	PART NO	SIZE
NR	15/11/2016	Novo IE12 Gravity	400 KG	NATTOSCALE	TGIE1201	N/A
TOLERANCE		COUNTRY		REV NO		
MATERIAL		UNIT		00.00		
TRICEL (KILLARNEY) UNLIMITED COMPANY RESERVES THE RIGHT TO CHANGE THE SPECIFICATION WITHOUT PRIOR NOTIFICATION. PRINTED COPIES OF THIS DOCUMENT ARE UNCONTROLLED UNLESS STATED OTHERWISE.			TRICEL ENVIRONMENTAL			

Certificate in accordance with SR66 for EN12566-Part 3



TREATMENT PERFORMANCE RESULTS

Tricel (Killarney)
 Ballyspillane Industrial Est., Killarney, Co. Kerry, Ireland

EN 12566-3
 Results corresponding to EN 12566-3 and S.R. 66
 PIA-SR66-1512-1062

Novo
 Submerged fixed film

Nominal organic daily load	0.26 kg/d		
Nominal hydraulic daily load	0.90 m ³ /d		
Material	Glass reinforced plastic		
Watertightness	Pass		
Structural behaviour (Calculation)	Pass (also wet conditions)		
Durability	Pass		
Treatment efficiency (nominal sequences)		Efficiency	Effluent
	COD	91.6 %	52 mg/l
	BCD ₅	95.9 %	11 mg/l
	NH ₄ -N	79.9 %	8 mg/l
	SS	95.3 %	16 mg/l
Number of desludging	Not more than once		
Electrical consumption	1.1 kWh/d		

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
 (PIA GmbH)
 Hergenrather Weg 30
 52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking



Notified body
 No. 1759



Certified according to
 ISO 9001:2008



Prüfinstitut für Abwassertechnik GmbH

 geprüft - testiert - tested

Elmar Lancé

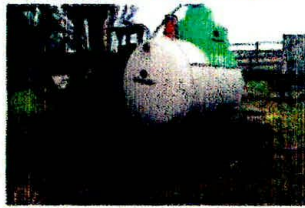
July 2015

NOVO BROCHURE

Homeowners: Individual domestic installation



► The lightweight nature of the system makes for easy on-site delivery.

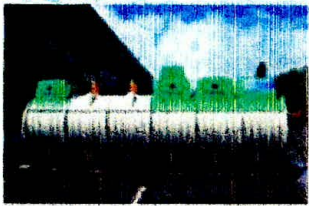


► No need for big excavators and large holes that disrupt and disturb your garden.



► Very low visual impact from fully installed units.

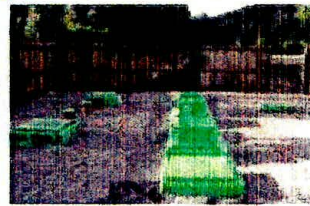
Larger projects: Commercial installations up to 50PE



► These units are suitable for installation at housing estates, camping sites, hotels etc. and have low maintenance and running costs.



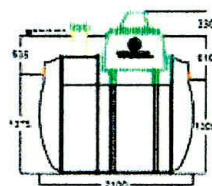
► Each WWT Plant is constructed of lightweight SMC and is easy to manoeuvre which simplifies the installation process.



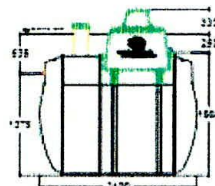
► Example of a fully installed 50PE Novo wastewater treatment unit in a 50PE house.

Technical characteristics/ Plant dimensions

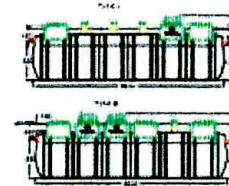
Model	Number of people	Length	Width	Height	Weight (without manhole riser)	Weight (with manhole riser)	Volume (litres)	Volume (gallons)	Volume (cubic feet)	Volume (cubic metres)	
NS	1-6	2.3	1.64	2.24	110	270	1.375	1.5	0.535	60	
NS+4	2-6	2.6	1.64	2.24	110	300	1.375	1.5	0.535	60	
NS	2-8	2.6	1.64	2.26	110	300	1.375	1.5	0.535	60	
NS10	3-10	3.3	1.64	2.24	110	370	1.375	1.5	0.535	60	
NS12	4-12	3.6	1.64	2.27	110	400	1.375	1.5	0.535	100	
NS18	6-18	4.6	1.64	2.27	110	500	1.375	1.5	0.535	200	
NS24	6-24	6.6	1.64	2.27	150	700	1.55	1.5	0.56	200	
NS30	Tank A	10-30	2.6	1.64	1.99	150	300	1.55	1.5	0.46	
	Tank B		3.6	1.64	2.27	150	600	1.55	1.5	0.56	200 + 60
NS36	Tank A	12-36	3.6	1.64	1.99	150	400	1.55	1.5	0.46	
	Tank B		6.6	1.64	2.27	150	700	1.55	1.5	0.56	200 + 60
NS42	Tank A	14-42	3.6	1.64	2.27	150	600	1.55	1.5	0.46	
	Tank B		3.6	1.64	2.27	150	600	1.55	1.5	0.56	200 + 2
NS50	Tank A	16-50	6.6	1.64	2.27	150	700	1.55	1.5	0.46	
	Tank B		6.6	1.64	2.27	150	700	1.55	1.5	0.56	200 + 100 + 60



► 15A gravity outlet
To connect domestic premises to house



► 15B pressure outlet
To connect premises to pump-out for pumping to a failed discharge area



► Gravity NSO outlet
Suitable for premises with existing plumbing for up to 50 people

Tricel Novo riser options for deep installation

Tricel offer 3 different manhole riser heights to suit different invert/inlet levels. Manhole risers allow for the positioning of the treatment plants at the depth which is optimum to each individual installation. Wastewater is gravity fed from the home to your treatment plant. The inlet pipe's position from the premises determines the excavation depth for the WWT plant. Tricel offer a choice of manhole risers 250mm/500mm/750mm to help with installation where site conditions require a flexible solution.

Tricel Novo: Wastewater Treatment System
Service Agreement

Establishing a regime of yearly inspections and maintenance is advised to ensure that your Tricel Novo continues to perform to the same high standards throughout its lifetime. The service agreement covers travel, the service and the labour cost of servicing only. Other labour costs are excluded, as are all replacement parts.

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland ("the Company") enter this Tricel Novo service agreement with the Customer named below.

Customer Details:			
Name:			
Address:		Address of Site: (if other)	
Telephone No.:			
Date of Tricel Novo Order:			
Work Order No.:			
Date of Delivery of Tricel Novo:			
Date of System Commissioning:			
Service Agreement Fee Paid:			
Date of Service Agreement Commencement:			
Unit Serial No.:			

During routine servicing, the service technician will perform a series of checks and procedures:

Checks:

- The air-diffuser is monitored to check for sufficient dispersion of air.
- The sludge return system is functioning correctly.
- The covers and locks are in place and in good condition.
- General appearance and condition of the treatment system is good.

Procedures:

- The blower is tested.
- The blower filter is replaced.
- The system alarm is tested.
- The pump and float-switch are tested (if applicable).
- The vents are cleared of any blockages.
- The sludge level in the primary chamber is measured.

Notes:

- Full inspection labour is covered (including any immediate minor system adjustment required). This service agreement does not cover the cost of any labour or materials that may arise as a result of this inspection.
- Components that require replacing will incur additional charges.
- All service agreements exclude de-sludging.

Tricel (Killarney) Unlimited Company trading as Tricel.

March 2017

Section 2: Information on Tertiary Treatment and Disposal route

The proposed solution to use on site is a Sandcel.

This system will provide tertiary treatment a total of 30m². This is designed to treat the hydraulic load of 1800 litres from a packaged secondary treatment plant.

The tertiary treated liquids is disposed into the ground through a gravel distribution layer required underneath the Sandcel. The gravel distribution layer must be 300mm thick and should be 41.25m² based on a population of 11 and a Subsurface/surface Value of 3-20.

The location and construction of the Tertiary infiltration area is the responsibility of the site engineer. A full site layout drawing should accompany this report.

The EPA CoP 2021 outlines the design, siting and construction requirements for tertiary polishing filters. The tables below outline some of the key factors to take into consideration when designing and locating a tertiary polishing filter.

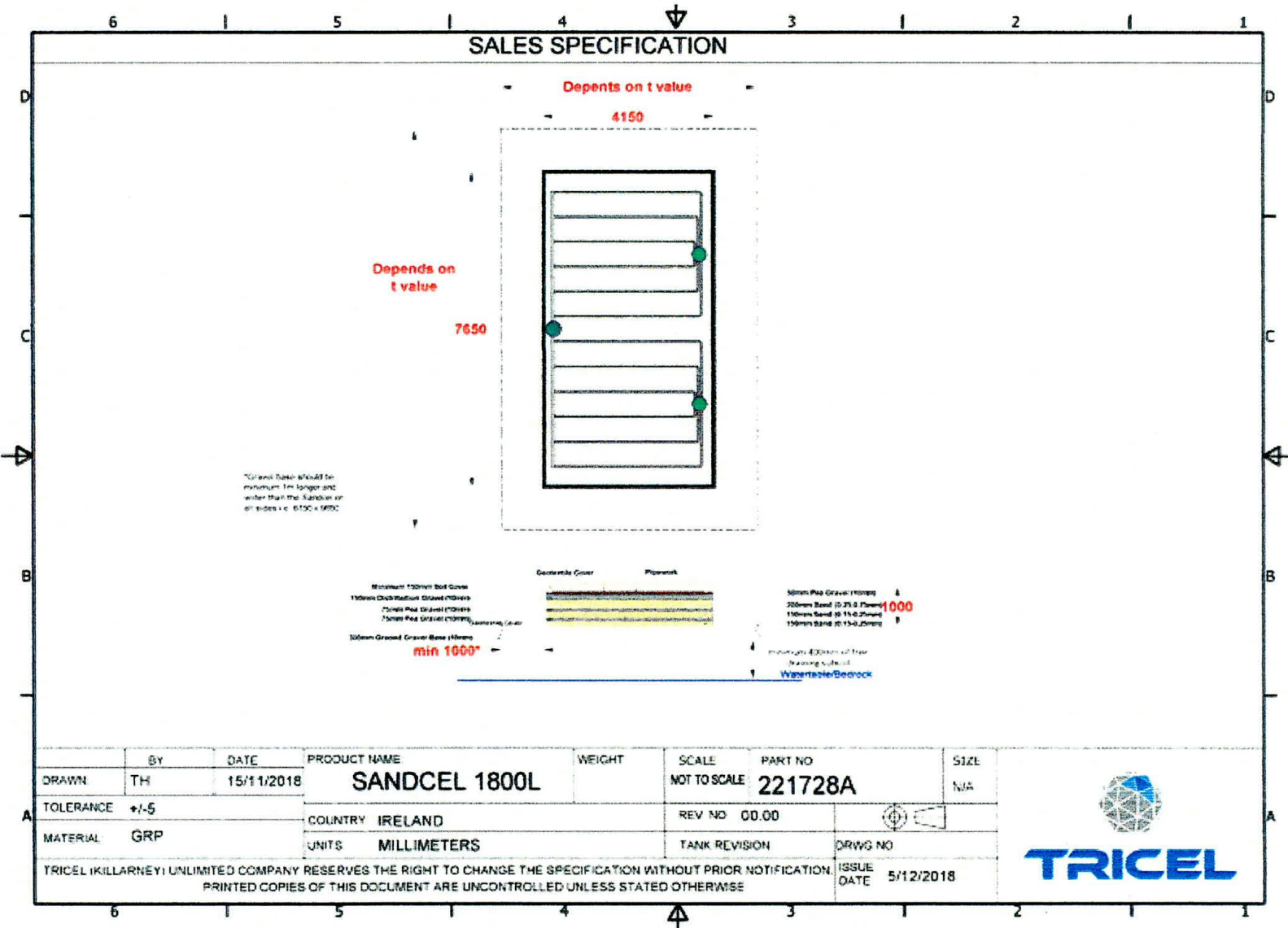
Table 6.2: Minimum separation distances from the entire DWWTS

Feature	DISTANCE – periphery of tank/plant and infiltration treatment area (m)	
Public/group water supply abstraction points/wells	60	
Down gradient domestic well	5 x PV < 10 usually SAND or GRAVEL-dominated material	60
	Depth of soil/substrate > 2.0 m between invert level and bedrock, and water table > 2.0 m	
	Depth of soil/substrate 2.0-8.0 m between invert level and bedrock, and water table > 2.0 m	40
	Depth of soil/substrate > 8.0 m between invert level and bedrock, and water table > 2.0 m	30
10 x PV < 30 usually SILT or SAND, or silty GRAVEL-dominated material	Depth of soil/substrate 2.0-8.0 m between invert level and bedrock	45
	Depth of soil/substrate > 8.0 m between invert level and bedrock	30
30 x PV < 120 usually SILT CLAY- or CLAY-dominated material	Depth of soil/substrate 1.2-3.0 m between invert level and bedrock	40
	Depth of soil/substrate > 3.0 m between invert level and bedrock	30
Alongside domestic well	25	
Up gradient domestic well	15	
Karst feature	15	
Lake or lough	50	
Watercourse/stream	10	
Open drain or drainage ditch	10	
Adjacent tank/plant and percolation area, polishing filter or infiltration area	10	
On-site dwelling house	7 (tank/plant)	
	10 (free water surface constructed wetland)	
	10 (infiltration/treatment area)	
Neighbouring dwelling house	7 (tank/plant)	
	25 (free water surface constructed wetland)	
	10 (infiltration/treatment area)	
Surface water soakaway	5	
Road	4	
Slope breakouts	4	
Trees	3	
Site boundary	3	
Heritage features, BHA/SAC/SPA	See note	
<p>10% percolation value</p> <p>The soakaway for surface water drainage should be located down gradient of the infiltration/treatment area. It should also be ensured that this distance is maintained from neighbouring storm water disposal areas or soakaways.</p> <p>* Free roots may lead to PIPs developing. The canopy spread indicates potential root coverage.</p> <p>The distances required depend on the importance of the feature. The plans which should be sought from the local authority and/or from the Department of Housing, Local Government and Heritage, specifically the National Monuments Service and the National Parks and Wildlife Service.</p>		

Table 6.1 EPA CoP 2021: Minimum separation distances

Please see attached the accompanying documents in Section 2 for the Tricel Sandcel Sand Polishing filter

- Separation Distances
- Sandcel Sand Polishing Filter Drawing
- Sandcel Technical Specification
- Optional Sandcel Maintenance Agreement
- Technical information on the Sandcel sand polishing filter



The Sandcel sand polishing filter is a tertiary filter designed to the EPA CoP. It can be located above or below ground depending on the existing bedrock or subsoil. According to the EPA CoP the treated effluent which passes through a sand polishing filter is treated to a high enough standard to be allowed to discharge to groundwater through a distribution bed of gravel.

The Sandcel is a complete supply and fit product including a detailed report containing photographic evidence of works carried out, certification of sands used, testing of pipe network and sign off by a certified engineer.

The Sandcel comprises of three layers, an upper layer of coarse sand and two lower layers of fine sand separated from each other by a thin layer of gravel as per **Fig. 1.0**.

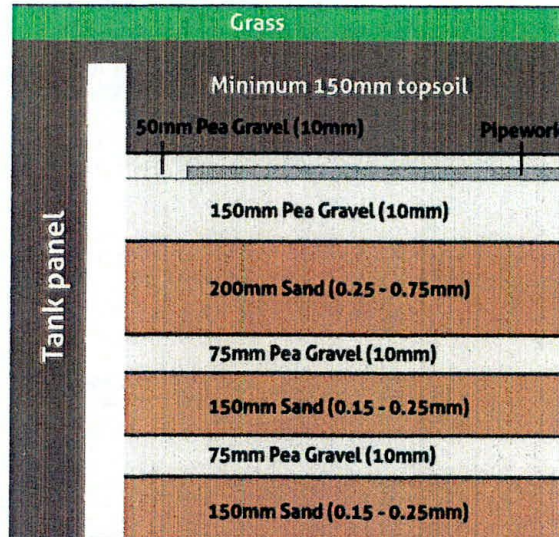


Fig. 1.0 Sandcel stratified layers

The sands used throughout are provided with certification to ensure compliance with the EPA Code of Practice. This washed and graded sands ensure little or no binding of sand particles during use. A sample copy of the certs are contained in **Fig 2.0**

Fig 2.0 Examples of sand grading certificates supplied with Sandcel

The Sandcel must be placed on a gravel distribution bed to disperse the treated effluent. Its size is based on the EPA Code of practice which recommends a maximum hydraulic loading rate of 60l/m²/d.

The plan area of this distribution bed is dependent on the Subsurface/surface or percolation rate of the receiving subsoil. It is compulsory that the Subsurface/surface test is carried out at the infiltration level which is located at the base of the proposed Sandcel. This distribution bed should comprise of a 300mm layer of 10mm pea gravel as in Fig 3.0.

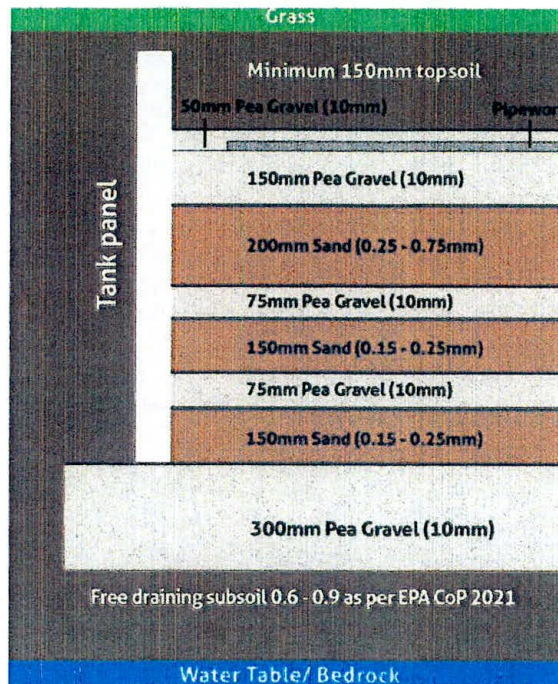


Fig 3.0 Cross section through Sand filter

For subsoil with a Subsurface/surface the distribution area is calculated using the below table from EPA Code of Practice 2021

Table 10.1: infiltration/treatment area and trench length design for tertiary treatment, per PE

Percolation values (PVs)	Pumped or underlying gravity discharge (Options 1 and 2)	Gravity discharge into 500 mm wide trenches (Option 3)	Low-pressure pipe distribution into 300 mm wide trenches (Option 4)	Drip dispersal system (Option 5)	Tertiary infiltration area (Option 6)
	Area required per person (m ²)	Trench length required per person (m)	Trench length required per person (m)	Area required per person (m ²)	Area required per person (m ²)
3 ≤ PV ≤ 20	≥7.5	≥6	≥6	≥5	≥3.75
21 < PV ≤ 40	≥15	≥12	≥12	≥14	≥7.5
41 < PV ≤ 50	≥30	≥17	≥17	≥16	≥15
51 < PV ≤ 75	≥50	≥19	≥19	≥22	≥25
76 < PV ≤ 90	-	-	≥28	≥34	-
91 < PV ≤ 120	-	-	-	≥54	-

The distribution gravel layer must be located on a 0.6-0.9 (min) layer of free draining subsoil as highlighted in Fig. 3.0

Critical to the life of the sand filter is the impermeable liner as dictated in the EPA CoP.

Tricel use a unique panel liner manufactured from a hybrid material known as Sheet Moulding Compound, SMC, which is a form of Glass Reinforced Plastic. These panels are used to form a durable, chemically and impact resistant, watertight, long-lasting structure.

The distribution pipework in each zone, which is designed as a low-pressure uPVC pipe network, is housed within the top pea-gravel layer. It comprises of 32mm dia. uPVC pipe, which disperses the effluent evenly of the entire surface area of the filter media. The pipework consists of a series of 3.4m laterals spaced at 0.6m centers. Each lateral contains 6 no orifices 4.8mm in diameter spaced at 0.6m along each length. The laterals are fed from a pump in the wastewater treatment unit through the main pipe manifold.

The network is designed with the following pipework dimensions:

Sandcel 1800		
Description	Unit	Qty
No of Residents	Persons	12
Daily Flow rate	litres	1800
Polishing filter Loading Rate	l/m ²	60
Size of Polishing Filter	m ²	30
Length of Polish Filter	m	4
Width of Polishing Filter	m	7.5
Orifice Diameter	mm	4.8
Orifice Spacing	m	0.6
Lateral Spacing	m	0.6
No. of laterals		12
Length of laterals	m	3.4
Lateral Diameter	mm	32
No of Orifices/lateral		6
Total No. of Orifices		72
Size of rising Main	mm	37.5
Min Dose Volume	litres	400
Discharge Rate	l/min	180
Total Head	m	0.750

A full set of Sandcel design calculations is available on request.

Sandcel: Sand Polishing Filter System
Service Agreement

Establishing a regime of yearly inspections and maintenance is advised to ensure that your Sandcel sand polishing filter continues to perform to the same high standards throughout its lifetime. This service agreement covers travel, the service and the labour cost of servicing only. Other labour costs are excluded, as are all replacement parts.

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland ("the Company") enter this Sandcel service agreement with the Customer named below:

Customer Details:			
Name:			
Address:		Address of Site: (if other)	
Telephone No.:			
Date of Sandcel Order:			
Work Order No.:			
Date of Delivery of Sandcel:			
Date of Sandcel Commissioning:			
Service Agreement Fee Paid:			
Date of Service Agreement Commencement:			
Unit Serial No.:			

During routine servicing, the service technician will perform a series of checks and procedures:

Checks:

- The should be no evidence of ponding.
- There must be no planting of vegetation in or around the Sandcel.
- The surface of the Sandcel is in good condition i.e. there is no damage from traffic/machinery passing over the surface area.
- The panels are aligned correctly (above-ground Sandcels only).
- The soil level is correct within the Sandcel.
- The access cover of the sampling chamber is in good condition.
- The pipework within the sampling chamber is secure and there are no signs of leakage.
- The connection at the outlet of wastewater treatment system/pump-chamber is secure.
- The pipework at the inlet is secure and no signs of leakage (above-ground Sandcels only).

Procedures:

- The vents in the sampling chamber are cleared.
- The vent from the gravel layer in service pod is cleared.
- The pipework within the Sandcel is rodded to ensure there are no blockages.
- The pipework is flushed, after rodding, to ensure there are no leakages in the sampling chamber and the pipework is secure.

Tricel (Killarney) Unlimited Company trading as Tricel

March 2017

Service Agreement Options:

TICK THE SERVICE AGREEMENT OPTION YOU WISH TO AVAIL OF: (Please tick one option only)	
Annual Service Agreement 1 year: (covers system for 2 years overall): One standard scheduled service visit per year	<input type="checkbox"/>
Annual Service Agreement 4 year: (covers system for 5 years overall): One standard scheduled service visit per year	<input type="checkbox"/>

The first years' service is included in the original purchase of your Sandcel.

Note: In cases in which multiple service agreements have been purchased by a customer for individual components of a complete wastewater treatment plant, i.e. a Tricel Novo, Tricel Puraflo or Sandcel - a discount will apply.

This contract is subject to terms & conditions. For the terms & conditions, please contact Tricel:

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland
 Tel: +353 (0)64 6632421 Fax +353 (0)64 6632777
 Email: sales@tricel.ie | Web: www.tricel.ie

This service agreement relates only to the Sandcel sand polishing filter, manufactured by Tricel, its subsidiaries and associated companies, and is between the company, or person named in this document, & Tricel.

By signing the declaration below, I hereby acknowledge that I, the Customer, have read, understand and agree to the information in the Sandcel Technical Manual, this service agreement and also the relevant terms & conditions.

<i>Tricel agrees to provide the services listed on this service agreement subject to the terms and conditions:</i>	<i>Please supply the services listed on this service agreement subject to the terms and conditions:</i>
<i>Signed on behalf of the Company:</i>	<i>Signed by the Customer:</i>
Name (Block Capitals)	Name (Block Capitals)
Signature	Signature
Date	Date

Important: Original signed service agreements must be returned to Tricel with payment in full and in advance, in order for the service agreements to be initiated. You are reminded of your obligations to the relevant County Council.

Tricel (Killarney) Unlimited Company trading as Tricel

March 2017

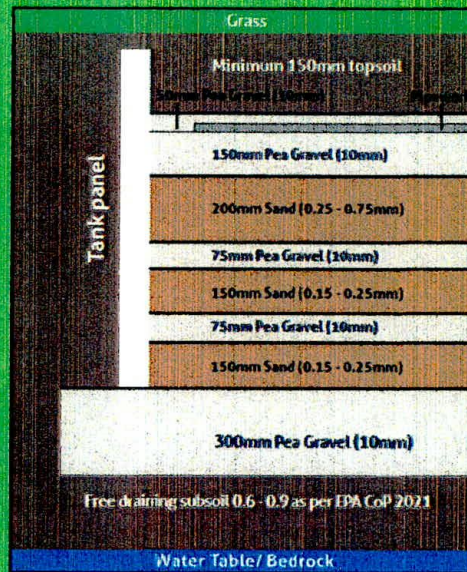
SANDCEL BROCHURE

How a Tricel Sandcel works

Sandcel sand polishing filters are designed to the EPA Code of Practice as tertiary treatment systems. These filters are the perfect solution for treatment and disposal of effluent from a secondary treatment unit. The filters comprise of stratified layers of certified sands according to the EPA Code of Practice.

They are enclosed in GRP impermeable panels which will not rot or decay, ensuring the structure of the filter will hold for many years. The filters can be installed above or below ground with all pipe work accessible from a service pod.

Treatment efficiency:
Sandcel filters provide excellent polishing of treated effluent. Sample testing of some sites where a Sandcel and Tricel Novo wastewater treatment plant were in operation have shown final effluent quality of <1 mg/ltr BOD.



Why buy a Tricel Sandcel?

Solid impermeable structure

Filter enclosure will not rot or decay like timber surrounds.

Small footprint

Only 16m² area for a 6 person application eliminating the need of large percolation area.

Aesthetic finish

Filter can be covered with topsoil and planted with a lawn to blend into garden.

Long life components

Certified sands and gravel used as the filter bed which will not break down over time.

Flexible design

Under and overground applications possible.

Future

Pipework accessible from service pod to future proof your system.

Engineered design

Specifically designed pipework network to ensure equal distribution over the entire bed.

High performance

Excellent treatment of effluent.

Legacy sites

Ideal compact solution designed to the EPA CoP fulfilling most Local Authority requirements.

Quick installation

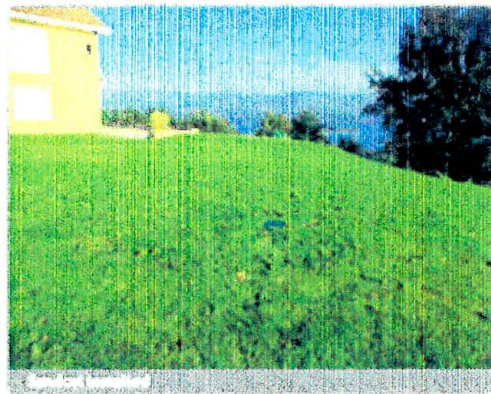
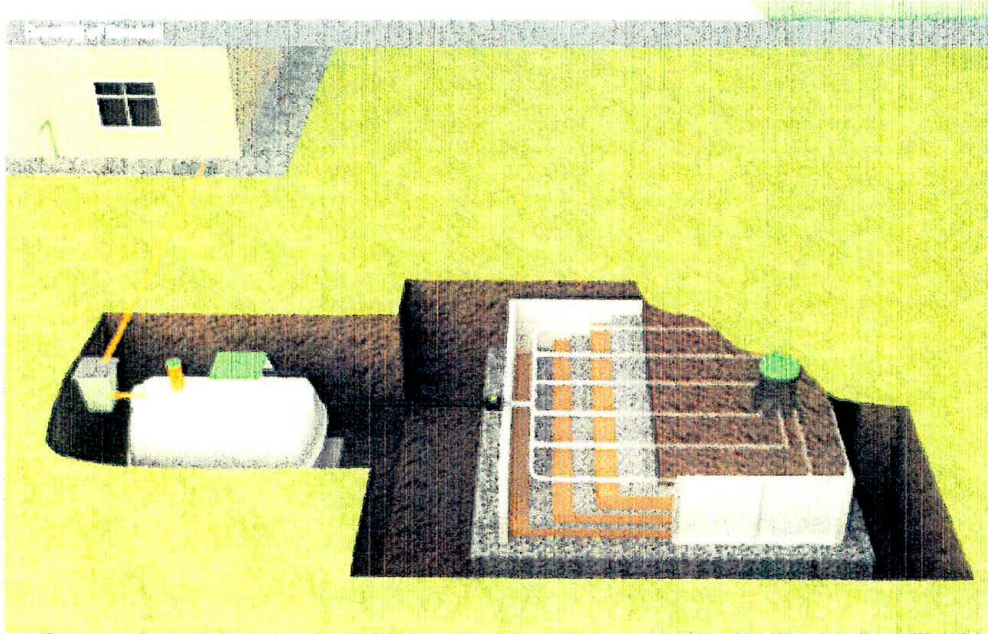
Reduced on site labour costs.

Certification

Certified components used.

Peace of mind

Tricel have earned an unrivalled reputation in the environmental field in over 20 countries worldwide.



Tricel Sandcel -Up to 10 persons-			
	Sandcel 900	Sandcel 1200	Sandcel 1500
Capacity	900 litres per day	1200 litres per day	1500 litres per day
Length	4000mm	4000mm	4000mm
Width	3850mm	5000mm	6350mm
Depth	1000mm	1000mm	1000mm
Footprint	15.4m ² (165.77 sq/ft)	20.0m ² (215.28 sq/ft)	25.4m ² (269.10 sq/ft)

>10 persons available on request.

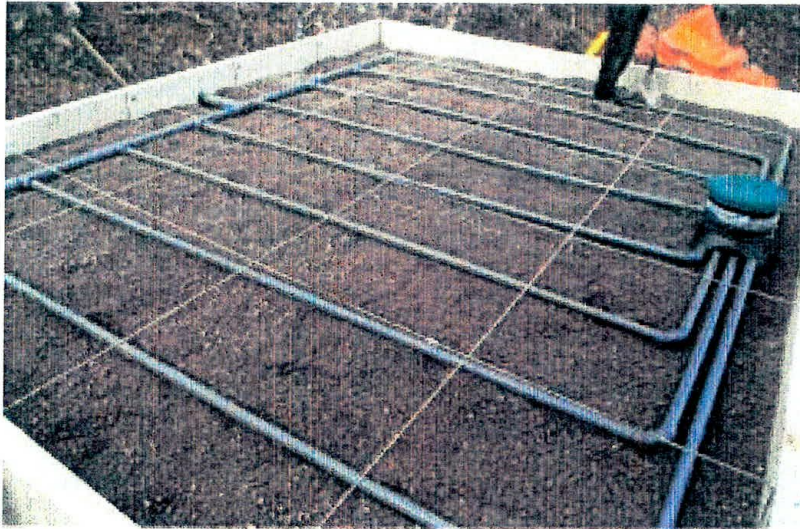


Fig 4.0 Completed pipe network on a Sandcel before placement of final gravel layer

All Sandcel filters have a service pod which is designed to provide access to the complete pipe network. All laterals terminate in the pod and are capped and sealed to maintain the pressure within the network. This ensures access to the pipe network for service and rodding if required.



Fig. 5.0 Servicing pod

A layer of geotextile is placed on top of the final layer of gravel to protect the filter from silt being washed down. On this geotextile a layer of topsoil can be placed to blend the entire unit in with its surroundings.

Terms and conditions:

Tricel cannot accept responsibility for incorrect site details or calculations as these are based on user inputs which are outside of Tricel control.

Full terms of website use are available at www.tricelsiteassessor.ie/TermsOfWebsiteUse