CORA
Consulting Engineers
Behan House
10 Lower Mount Street
Dublin
D02 HT71

+353 1 6611100
www.cora.ie
info@cora.ie

CORA
CONSULTING ENGINEERS

Ms. Francesca Rowson,
KPMG Future Analytics,
1 Stokes Place,
St. Stephen's Green,
Dublin,
D02 DE03

By email: francesca.rowson@kpmg.ie

Date: 28th March, 2023

Our Ref: CORA-2127-LO-02-A

Planning Ref: SD22A/0342

Re: **Development at Tay Lane, Rathcoole**

Dear Francesca,

In relation to the proposed age-friendly residential development proposed for lands located to the east of Tay Lane, Newcastle Road, Rathcoole, Dublin 24 for Riverside Projects Limited, we have reviewed the request for clarification of additional information, dated 25th January, 2023, received from South Dublin County Council (Decision Order Number: 0091) and would like to make the following comments in relation to the engineering items raised. These are addressed individually below:

1. Traffic and Transport Assessment

The applicant is requested to submit a Traffic and Transport assessment of the nearby junctions, to confirm that the development will have no impact on the traffic flows on the Rathcoole Main Street, showing the RFC results of all arms of the junction.

Subsequent to the request, a meeting on site was arranged with Mr. Graham Murphy of the South Dublin County Council on Friday 17th February to discuss the above. John Pigott of CORA Consulting Engineers and Martin Rogers of Martin Rogers Consulting Ltd. were also in attendance.

During the meeting, the scope of the Traffic and Transport Assessment submitted was discussed. It was agreed to extend the scope of the traffic surveys to include:

1. Traffic at junction of Main Street and Forest Hill.
2. Roundabout at the intersection of Beechwood Lawns and R120.

The updated Traffic and Transport Assessment as prepared by Martin Rogers Consulting Ltd. has been updated to reflect the above and is submitted as part of the response documentation.

4. Tay Lane Footpath

The applicant is requested to submit a revised layout not less than 1:200 scale showing an improved footpath along the entire east side of Tay Lane connecting to Rathcoole Main Street, the footpath must be 2.0m wide.

During our meeting with Mr. Graham Murphy of South Dublin County Coincil, the requirement for a 2.0m wid footpath to the east side of Tay Lane was discussed.

The existing restrictions, including the requirement to open the existing culvert to the east of Tay Lane along with the restricted width of the carriageway was reviewed in detail.

As part of our discussions, it was proposed to carry out the following works as part of the development works:

1. The existing culvert to the east of Tay Lane was to be opened as requested by the drainage department of South Dublin County Council.
2. The existing footpath to the west of Tay Lane was to be widened to a minimum dimension of 1800mm.
3. A provision for a 2.0m wide footpath within the site boundary of the proposed development is to be constructed to the east of the opened culvert. This would extent from the northern to the southern boundary.

All of the above are shown and detailed on CORA drawing C.006 (Revision P2) which is included with the response documentation submitted.

6. Surface Water and SuDS

John Pigott of CORA had a number of telephone conversations with Mr. Brian Harkin of South Dublin County Council in relation to the surface water drainage provisions for the proposed site. During the conversations, the items raised below were discussed in detail. Below is a summary of the discussions in relation to each individual item raised.

The applicant is requested to submit revised information based on the following:

A. The applicant states a soakaway would be provided, noting a Wavin Aquacell attenuation area to the south of the site. It is not clear therefore that this is a soakaway. Soakways are not generally permitted for apartments because soakaways must be individually owned and not shared – the applicant is requested to clarify what is meant by soakaway at this location and satisfy themselves that the proposal is in accordance with the SDCC SuDS Guidance Document

It is proposed to dispose of all surface water generated from the site by means of a surface water soakaway. On-site testing was carried out which confirmed a soil infiltration rate of 61.7×10^{-6} m/s. The overall contributing area draining to the soakaway has been confirmed as 1660m^2. Calculations in accordance with BRE 365, based on rain fall data as provided by Met Eireann were included in the original additional information documentation confirming a storage volume requirement of 83.91m^2 to cater for the proposed development. This calculation also included a 20% increase in the Met Eireann data to account for climate change. The calculation of the soakaway has been based on the following parameters:

Soil Infiltration Rate:	61.7×10^{-6}m/sec (Site Testing)
Contributing Roof Area :	1,660m^2
M5_60 :	19.8mm (Met Eireann)
R :	0.266
Allowance for Climate Change :	20%

Updated calculations justifying the size of surface water soakaway provided are appended to this letter.

B. In exceptional circumstances underground attenuation systems are permitted but only if there is insufficient attenuation provided by SuDS (Sustainable Drainage Systems). The applicant is required to seek alternative attenuation solutions or provide a robust rationale for the provision of concrete underground attenuation at the site.

The proposed drainage scheme does not include for attenuation as suggested and no provision for a below ground concrete attenuation is proposed for this site.

C. The applicant is to submit a drawing and report showing a flow route analysis of existing site.

CORA drawing C.004 (Rev P01) was included in the original additional information response documentation which details both the existing and the proposed flow paths. This clearly demonstrates that the existing flow paths are replicated in the post development layout.

The development of the surface water flow routes throughout the site should correlate as closely as possible to the natural flow of surface water on site.

The existing and proposed flow routes through the site is as demonstrated on CORA drawing C.004 submitted as part of the original additional information response documentation.

D. Submit a drawings showing all SuDS systems in plan and cross sectional view. Show the treatment train and conveyance of surface water above ground over the site. Show the capacity in m^3 of proposed SuDS systems.

As part of the discussions with Mr. Harkin, the Aquacell units proposed have been omitted in favour of a Stormtech system. A detailed design has been provided by Resolute Group which details the configuration of the soakaway which will provide the required volume. Calculations demonstrate that an overall volume of 82.8m^3 of storage volume is required. The proposed Stormtech system provides an overall storage volume of 91.2m^3. Calculations justifying the soakaway size along with the details of the Stormtech system proposed are appended to this letter.

E. The use of concrete attenuation tanks is heavily discouraged by SDCC Drainage section. The applicant is required to submit a drawing and report providing alternative means of attenuating surface water through the use of Sustainable Urban Drainage Systems features. SuDs features could include but are not limited to:

a. Green Roofs
b. Blue Roofs
c. Swale
d. Treepits
e. Grasscrete
f. Raingardens Biodiversity areas
g. Detentation basins
h. Green areas
i. Other such SuDS

As outlined above, and in the additional information submission, there is no intention of implementing attenuation on this site, nor is a below ground attenuation system proposed.

As part of the overall SuDS strategy for the development, the following measures have been adopted:

1. A green roof is proposed to the multi-storey development. This provides for 1,120m^2 of green roof, with the remaining flat roof area of 320m^2 remaining

CORA
CONSULTING ENGINEERS

as a traditional build-up. This would equate to circa 77% green roof coverage for the development. Details of the extent and proposed build up are detailed on CORA drawing C.004 (P02) which is submitted as part of the clarification of additional information documentation.

2. All surface water generated within the site will be disposed of by means of the surface water soakaway. It is not proposed to discharge surface water from the site.
3. Permeable pavement build-ups will be adopted throughout.
4. Extensive landscaping areas will be adopted at ground floor level.

The above strategy will enhance biodiversity within the site whilst eliminating the discharge of surface water from the site.

F. The applicant is required to submit a drawing and report which give greater detail regarding the attenuation capacity provided on site. Details required will include the proposed attenuation capacity provided by drainage features given in units of m3.

If 129m3 surface water attenuation is provided then the attenuation provided is undersized by approximately 300%. Any report and drawings submitted should show where and how much (in m3) surface water attenuation is provided on site. Prior to submission of revised drawings and reports contact water services in South Dublin County Council to discuss same.

As previously commented, there is no intention to attenuate surface water discharges from the site. All surface water generated within the site will be managed within the development by means of the SuDS measures outlined in E above with no proposal to discharge surface water from the site.

Calculations justifying the soakaway sizing along with details of the proposed construction of the soakaway are appended to this letter.

We believe the above, along with the enclosed documentation should address the engineering items as part of the Clarification for Additional Information, but should you have any queries, please don't hesitate to contact me.

Regards,

John Pigott BE, Cert. Eng Tech., CEng, MIEI
CORA Consulting Engineers

Encl: *CORA Drawing 2127-C.001 (Rev P04)*
CORA Drawing 2127-C.002 (Rev P03)
CORA Drawing 2127-C.003 (Rev P02)
CORA Drawing 2127-C.004 (Rev P02)
CORA Drawing 2127-C.006 (Rev P02)

Surface Water Soakaway Calculations
Stormtech Soakaway Construction Details

CORA CONSULTING ENGINEERS CORA Consulting Engineers Behan House 10 Lower Mount Street	Project Tay Lane, Rathcoole				Job no. 2127	
	Calcs for Surface Water Soakaway				Start page no./Revision 1 /B	
	Calcs by KF	Calcs date 28/03/2023	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.05

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **1660.0** m²
Return period	Period = **50** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.266**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.8** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **20** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1060** mm
Width of pit	w = **10100** mm
Length of pit	l = **12000** mm
Percentage free volume	V_{free} = **71** %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l_{trial} = **1000** mm
Width of trial pit	b_{trial} = **1000** mm
Depth of trial pit (below invert)	d_{trial} = **1000** mm
Free volume (if fill used)	V_{trial} = **100** %
75% depth of pit	d_{75} = (d_{trial} × 0.75) = **750.00** mm
50% depth of pit	d_{50} = (d_{trial} × 0.50) = **500.00** mm
25% depth of pit	d_{25} = (d_{trial} × 0.25) = **250.00** mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = **41** min
Test 2 - time to fall from 75% depth to 25% depth	T2 = **45** min
Test 3 - time to fall from 75% depth to 25% depth	T3 = **45** min
Longest time to fall from 75% depth to 25% depth	t_{lg} = max(T1, T2, T3) = **45** min
Storage volume from 75% to 25% depth	V_{p75_25} = (l_{trial} × b_{trial} × (d_{75} - d_{25})) × V_{trial} = **0.50** m³
Internal surface area to 50% depth	a_{p50} = ((l_{trial} × b_{trial}) + (l_{trial} + b_{trial}) × 2 × d_{50}) = **3.00** m²
Surface area of soakaway to 50% storage depth	A_{s50} = 2 × (l_{trial} + b_{trial}) × d_{trial} / 2 = **2.000** m²
Soil infiltration rate	f = V_{p75_25} / (a_{p50} × t_{lg}) = **61.7**×**10**$^{-6}$ m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **23426000** mm²

Table equations

Inflow (cl.3.3.1)	I = M50 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	50 year rainfall, M50 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
5	0.33;	7.8;	1.66;	12.9;	21.42;	0.43;	20.98
10	0.48;	11.3;	.1.69;	19.2;	31.87;	0.87;	31.00
15	0.58;	13.7;	1.70;	23.3;	38.65;	1.30;	37.35

CORA CONSULTING ENGINEERS CORA Consulting Engineers Behan House 10 Lower Mount Street	Project Tay Lane, Rathcoole				Job no. 2127	
	Calcs for Surface Water Soakaway				Start page no./Revision 2 /B	
	Calcs by KF	Calcs date 28/03/2023	Checked by	Checked date	Approved by	Approved date

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	50 year rainfall, M50 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
30	0.76;	18.0;	1.68;	30.2;	50.14;	2.60;	47.54
60	1.00;	23.8;	1.64;	39.1;	64.88;	5.21;	59.67
120	1.27;	30.3;	1.61;	48.7;	80.83;	10.41;	70.42
240	1.65;	39.2;	1.56;	61.3;	101.75;	20.82;	80.92
360	1.90;	45.0;	1.54;	69.4;	115.15;	31.23;	83.91
600	2.26;	53.7;	1.51;	81.1;	134.64;	52.06;	82.58
1440	3.13;	74.4;	1.45;	108.1;	179.39;	124.94;	54.45

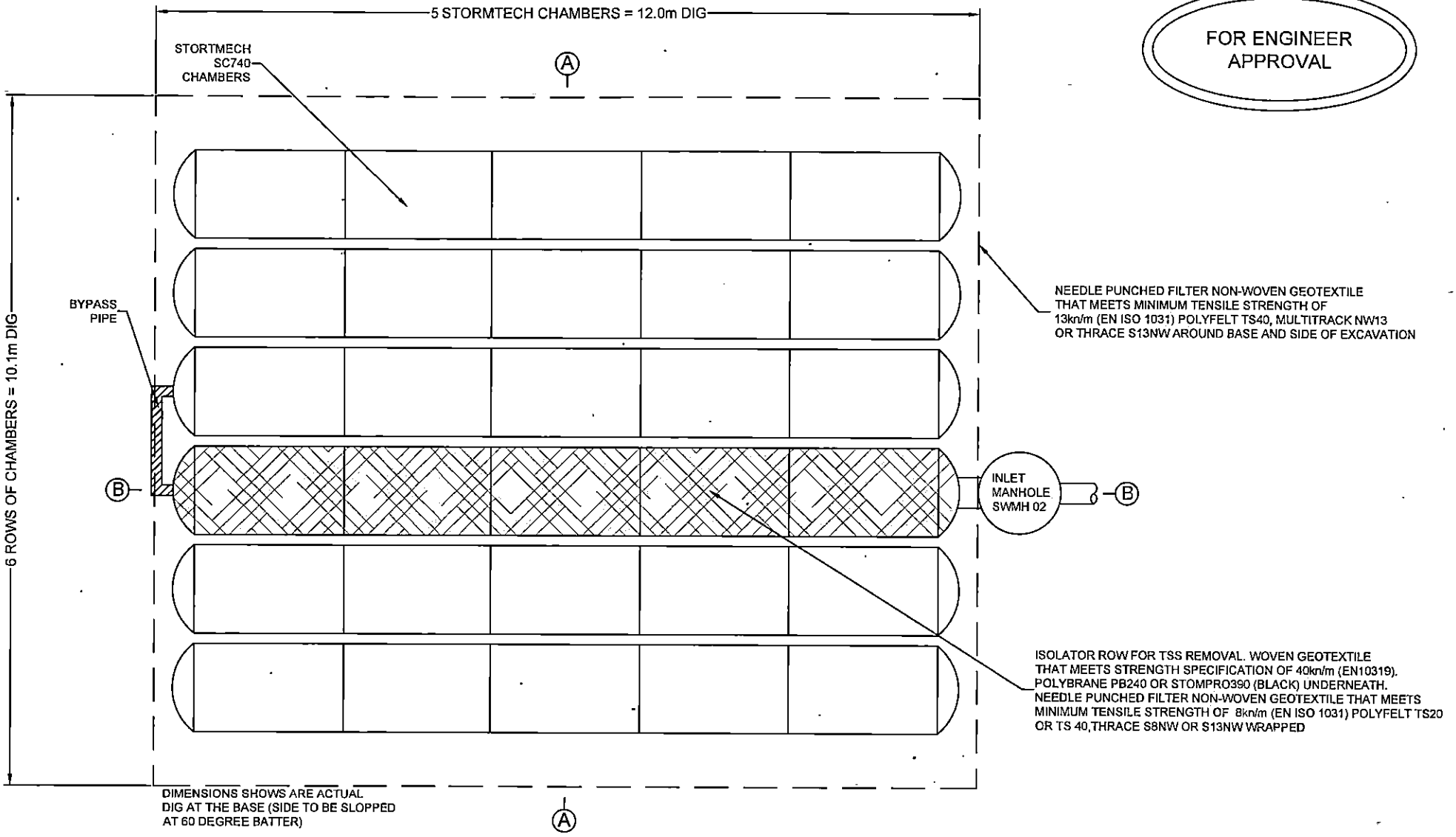
Required storage volume S_{req} = **83.91** m^3

Soakaway storage volume $S_{act} = l \times d \times w \times V_{free}$ = **91.22** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f)$ = 8hr 3min 34s

PASS - Soakaway discharge time less than or equal to 24 hours



FOR ENGINEER APPROVAL

SITE: TAY LANE, RATHCOOLE 91.2m3	JN230138 DRAWING NO.		1 PAGE NO.	15/02/23 DATE.
TITLE: PLAN	NTS SCALE	LP DRAWN.	LP CHECKED.	A REVISION.

StormTech Resolute Group

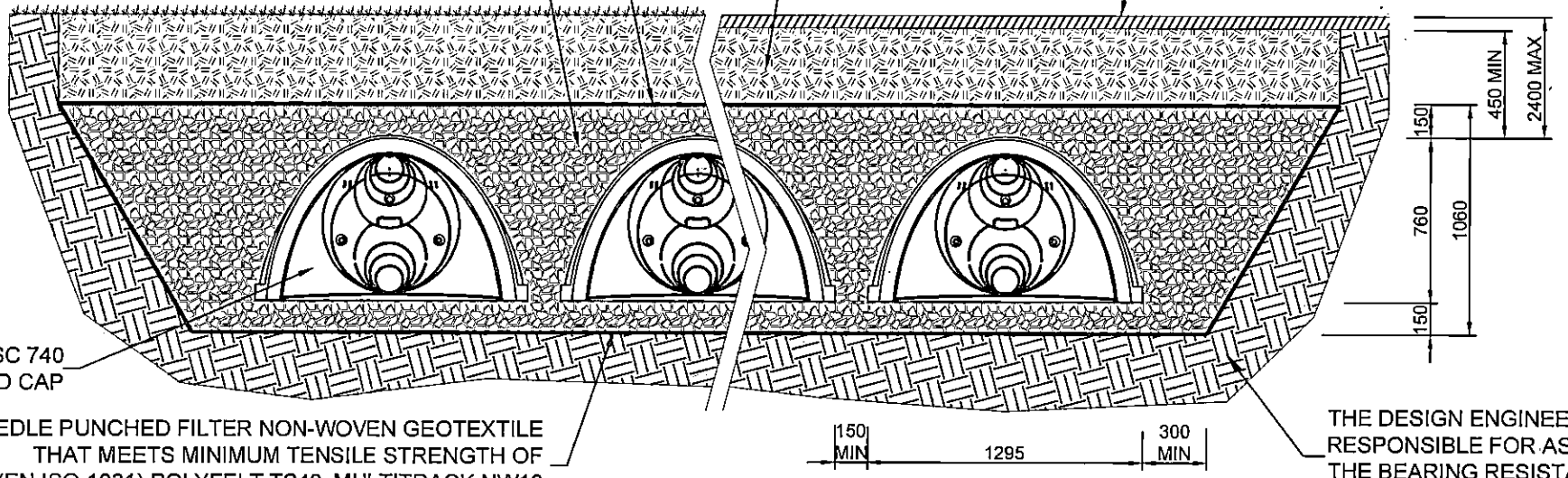
FOR ENGINEER APPROVAL

LAYER OF NEEDLE PUNCHED NON-WOVEN GEOTEXTILE BETWEEN COVER STONE AND LAYER ABOVE THAT MEETS MINIMUM TENSILE STRENGTH OF 13kn/m (EN ISO 1031). POLYFELT TS40, MULTITRACK NW13 OR THRACE S13NW

GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, < 35% FINES COMPACT IN 150mm LIFTS TO 95% PROCTOR DENSITY SEE TABLE OF ACCEPTABLE FILL MATERIALS IN STORMTECH DESIGN MANUAL

CLAUSE 505B, ANGULAR STONE

FINISHED SURFACE



SC 740 END CAP

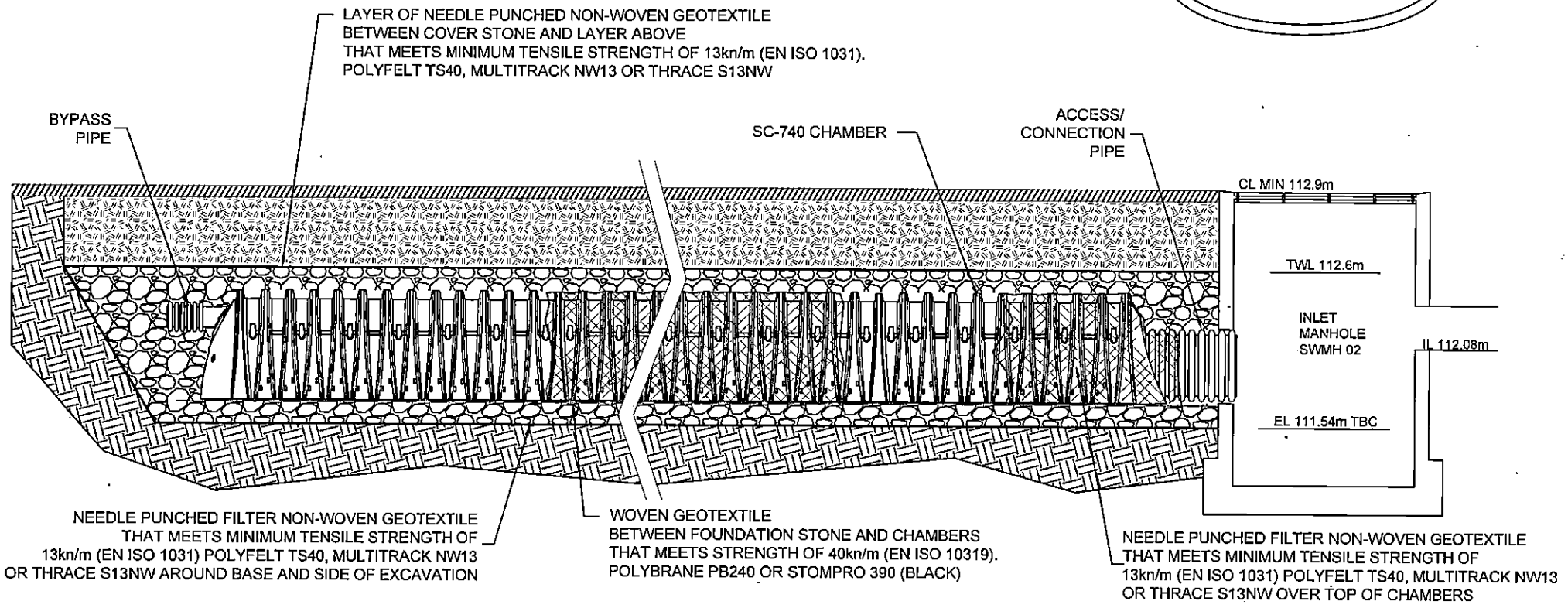
NEEDLE PUNCHED FILTER NON-WOVEN GEOTEXTILE THAT MEETS MINIMUM TENSILE STRENGTH OF 13kn/m (EN ISO 1031) POLYFELT TS40, MULTITRACK NW13 OR THRACE S13NW AROUND BASE AND SIDE OF EXCAVATION

THE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE OF THE SUBGRADE SOILS*

* REFER TO STORMTECH DESIGN MANUAL

SITE: TAY LANE, RATHCOOLE 91.2m3	JN230138 DRAWING NO.		2 PAGE NO.	15/02/23 DATE.	StormTech Resolute Group
TITLE: CROSS SECTION A-A CHAMBER	NTS SCALE	LP DRAWN.	LP CHECKED.	A REVISION.	

FOR ENGINEER APPROVAL



SITE: TAY LANE, RATHCOOLE 91.2m3	JN230138 DRAWING NO.		3 PAGE NO.	15/02/23 DATE.
TITLE: CROSS SECTION B-B ISOLATOR ROW DETAIL	NTS SCALE	LP DRAWN.	LP CHECKED.	A REVISION.

StormTech Resolute Group