Our Ref: J-2060-01
23 July 2021

Mr. R. Parker
17 Kennel Hill Close
Plympton
Plymouth
PL17 1QE
By Email

RE: Proposed Demolition and Replacement of Existing Garages at Kennel Close, Plympton, Plymouth.

Surface Water Drainage Statement

Mr. R. Parker is proposing the demolition and replacement of existing garages at Kennel Close Plympton, Plymouth, PL17 1QE. The approximate Ordnance Survey NGR for the site is SX 53433 55926.

The site currently consists of 2 garages located within a hard standing turning area.

The proposal is to demolish the existing 2 garages and to replace them with 2 new garages which include a mezzanine floor. The proposed layout is shown in Annex A.

The Plymouth area critical drainage guidance states that the preferred way to dispose of surface water is to discharge to a water body, however, the nearest water body is located 250m to the north of the site and provision of an outfall to this receptor would require crossing third party land, as such this is not achievable.

Second in the surface water disposal hierarchy is infiltration, however the minimum 5m clearance from the surrounding buildings required to comply with Building Regulations cannot be achieved. As such infiltration is ruled out as a means of surface water disposal.

The most practical discharge point for surface water from the site is the South West Water (SWW) surface water sewer which passes through Kennel Hill Close which forms the northern part of the site. The sewer travels in an easterly direction downhill and away from the site.

As such it is proposed, to attenuate surface water on site using an underground attenuation tank and flow control device to manage surface water from storm events up to and including the 1 in 100 year plus 40% allowance for climate change with discharge to the SWW surface water sewer.

The greenfield runoff rate has been calculated for the site as less than 0.1 litres per second using the ICP SuDS method in Microdrainage software. Due to this low flow rate, a discharge rate of 1 litre per second is proposed for the discharge off site to reduce the risk of blockage within the system.

An attenuation tank with dimensions 1.5m x 1m x 0.8m (LxWxD) would provide the required storage for the system. All calculations are included in Annex B.

The proposed surface water drainage layout is provided as Drawing J-2060 3001A and included in Annex A.

Yours Sincerely,
Joshua Munyard

[redacted]

For and on behalf of EDS Ltd.
Joshua Munyard
Graduate Engineer

Enc. Annex A – Proposed Development Layout
Annex B – Calculations and SWW Correspondence

ANNEX A –PROPOSED DEVELOPMENT LAYOUT

KEY

FLOOD ROUTING

PROPOSED PRIVATE SURFACE WATER POLYPROPYLENE INSPECTION CHAMBER (475ø/450ø P.P.I.C.)

CATCHPIT WITH LEAF AND DEBRIS FILTER

PROPOSED FLOW CONTROL DEVICE

PROPOSED ATTENUATION TANK CONSTRUCTED USING MODULAR UNITS

PROPOSED PRIVATE SURFACE WATER

SWW SURFACE WATER SEWER

SWW FOUL WATER SEWER

18

13

12

KENNEL HILL CLOSE

SWW SURFACE WATER SEWER

DISCHARGE TO THE SWW SURFACE WATER SEWER (SUBJECT TO s.106 AGREEMENT)

SWW FOUL SEWER

PROPOSED ATTENUATION TANK FORMED OF MODULAR UNITS WITH DIMENSIONS AS FOLLOWS: 15m (l) X 1m (w) X 12m (d)

PROPOSED OUTFALL TO THE SWW SURFACE WATER SEWER

PROPOSED HYDROBRAKE FLOW CONTROLLER LIMITING FLOWS TO 1l/s in 12m ø PCC MANHOLE

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NOTES

1. This drawing is copyright. Refer to details above.
2. This drawing is only to be used for the purposes described in the status box below.
   Work to figured dimensions only, do not scale.
3. This drawing is to be read in conjunction with all other drawings, details and specifications pertaining to the work described. It should only be used for the purpose marked in the status box below, and shall not be used for construction unless clearly marked CONSTRUCTION.
4. Materials and workmanship shall comply to the appropriate British Standards and Codes of Practice unless otherwise stated.
5. The activities required to construct the work, shown on drawings clearly marked CONSTRUCTION, may be subject to the provisions of the Construction (Design & Management) Regulations 2015. The Contractor and Client must ensure that they are adequately conversant with these regulations and that the appropriate procedures required under the regulations are observed at all times.
6. Design Risk Assessment

   A risk assessment relating to potential hazards associated with the works described within this drawing, in so far as they have been designed by EDS Ltd, has been undertaken. Risks identified have been eliminated by design wherever practicable. The status with regard to residual risks is as follows:

   The work is at an early planning stage and is not sufficiently advanced to allow a meaningful assessment of risks to be undertaken at this time.

Designer - EDS Drawing revision - A
Date - 23.07.21

DATE	DRWN	CHKD.	REV.	NOTES.
23.07.21	JM	BD	A	PRELIMINARY ISSUE

PROJECT MANAGER:-	JAN CLARK
PROJECT ENGINEER:-	JOSHUA MUNYARD
DRAWN DATE:-	JULY 2021
SCALE & SHEET SIZE:-	1:100 @ A1

PRELIMINARY

EDS
Engineering & Development Solutions
- Flood Risk Assessment
- SuDS and Surface Water
- Foul and Sewage Treatment
- Highway Design
- Civil Engineering
- Statutory Approvals

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CLIENT
MR. R. PARKER

PROJECT
KENNEL HILL CLOSE, PLYMPTON

DRAWING TITLE
CONCEPTUAL SURFACE WATER DRAINAGE LAYOUT

PROJECT No.	DRAWING No.	REV.
J-2060	3001	A

ANNEX B – Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 9 minutes.

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15	min Summer	98.974	0.474	0.0	0.9	0.0	0.9	0.7	O K
30	min Summer	99.029	0.529	0.0	0.9	0.0	0.9	0.8	O K
60	min Summer	98.996	0.496	0.0	0.9	0.0	0.9	0.7	O K
120	min Summer	98.813	0.313	0.0	0.9	0.0	0.9	0.4	O K
180	min Summer	98.682	0.182	0.0	0.9	0.0	0.9	0.3	O K
240	min Summer	98.614	0.114	0.0	0.9	0.0	0.9	0.2	O K
360	min Summer	98.567	0.067	0.0	0.7	0.0	0.7	0.1	O K
480	min Summer	98.553	0.053	0.0	0.6	0.0	0.6	0.1	O K
600	min Summer	98.546	0.046	0.0	0.5	0.0	0.5	0.1	O K
720	min Summer	98.541	0.041	0.0	0.4	0.0	0.4	0.1	O K
960	min Summer	98.535	0.035	0.0	0.4	0.0	0.4	0.1	O K
1440	min Summer	98.529	0.029	0.0	0.3	0.0	0.3	0.0	O K
2160	min Summer	98.525	0.025	0.0	0.2	0.0	0.2	0.0	O K
2880	min Summer	98.522	0.022	0.0	0.2	0.0	0.2	0.0	O K
4320	min Summer	98.518	0.018	0.0	0.1	0.0	0.1	0.0	O K
5760	min Summer	98.516	0.016	0.0	0.1	0.0	0.1	0.0	O K
7200	min Summer	98.515	0.015	0.0	0.1	0.0	0.1	0.0	O K
8640	min Summer	98.514	0.014	0.0	0.1	0.0	0.1	0.0	O K
10080	min Summer	98.513	0.013	0.0	0.1	0.0	0.1	0.0	O K
15	min Winter	99.052	0.552	0.0	0.9	0.0	0.9	0.8	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15	min Summer	110.491	0.0	1.2	0.0	14
30	min Summer	76.555	0.0	1.7	0.0	22
60	min Summer	50.812	0.0	2.3	0.0	40
120	min Summer	32.576	0.0	2.9	0.0	70
180	min Summer	24.705	0.0	3.3	0.0	98
240	min Summer	20.126	0.0	3.6	0.0	126
360	min Summer	15.031	0.0	4.1	0.0	184
480	min Summer	12.210	0.0	4.4	0.0	244
600	min Summer	10.380	0.0	4.7	0.0	302
720	min Summer	9.085	0.0	4.9	0.0	366
960	min Summer	7.352	0.0	5.3	0.0	478
1440	min Summer	5.443	0.0	5.9	0.0	732
2160	min Summer	4.018	0.0	6.5	0.0	1076
2880	min Summer	3.234	0.0	7.0	0.0	1468
4320	min Summer	2.375	0.0	7.7	0.0	2184
5760	min Summer	1.911	0.0	8.3	0.0	2840
7200	min Summer	1.614	0.0	8.7	0.0	3608
8640	min Summer	1.407	0.0	9.1	0.0	4256
10080	min Summer	1.253	0.0	9.5	0.0	5144
15	min Winter	110.491	0.0	1.4	0.0	14

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow Σ (l/s)	Max Volume (m³)	Status
30 min Winter	99.093	0.593	0.0	0.9	0.0	0.9	0.8	O K
60 min Winter	99.009	0.509	0.0	0.9	0.0	0.9	0.7	O K
120 min Winter	98.713	0.213	0.0	0.9	0.0	0.9	0.3	O K
180 min Winter	98.595	0.095	0.0	0.8	0.0	0.8	0.1	O K
240 min Winter	98.565	0.065	0.0	0.7	0.0	0.7	0.1	O K
360 min Winter	98.548	0.048	0.0	0.5	0.0	0.5	0.1	O K
480 min Winter	98.540	0.040	0.0	0.4	0.0	0.4	0.1	O K
600 min Winter	98.536	0.036	0.0	0.4	0.0	0.4	0.1	O K
720 min Winter	98.533	0.033	0.0	0.3	0.0	0.3	0.0	O K
960 min Winter	98.529	0.029	0.0	0.3	0.0	0.3	0.0	O K
1440 min Winter	98.524	0.024	0.0	0.2	0.0	0.2	0.0	O K
2160 min Winter	98.520	0.020	0.0	0.1	0.0	0.1	0.0	O K
2880 min Winter	98.518	0.018	0.0	0.1	0.0	0.1	0.0	O K
4320 min Winter	98.515	0.015	0.0	0.1	0.0	0.1	0.0	O K
5760 min Winter	98.514	0.014	0.0	0.1	0.0	0.1	0.0	O K
7200 min Winter	98.513	0.013	0.0	0.1	0.0	0.1	0.0	O K
8640 min Winter	98.512	0.012	0.0	0.1	0.0	0.1	0.0	O K
10080 min Winter	98.511	0.011	0.0	0.0	0.0	0.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
30 min Winter	76.555	0.0	1.9	0.0	24
60 min Winter	50.812	0.0	2.6	0.0	42
120 min Winter	32.576	0.0	3.3	0.0	72
180 min Winter	24.705	0.0	3.7	0.0	98
240 min Winter	20.126	0.0	4.1	0.0	124
360 min Winter	15.031	0.0	4.5	0.0	184
480 min Winter	12.210	0.0	4.9	0.0	246
600 min Winter	10.380	0.0	5.2	0.0	306
720 min Winter	9.085	0.0	5.5	0.0	364
960 min Winter	7.352	0.0	5.9	0.0	480
1440 min Winter	5.443	0.0	6.6	0.0	750
2160 min Winter	4.018	0.0	7.3	0.0	1116
2880 min Winter	3.234	0.0	7.8	0.0	1448
4320 min Winter	2.375	0.0	8.6	0.0	2120
5760 min Winter	1.911	0.0	9.2	0.0	2912
7200 min Winter	1.614	0.0	9.8	0.0	3784
8640 min Winter	1.407	0.0	10.2	0.0	4320
10080 min Winter	1.253	0.0	10.6	0.0	4768

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.294	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) From:	To:	Area (ha)
0	4	0.006

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1.5	1.5	0.801	0.0	5.5
0.800	1.5	5.5			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	98.500
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Pipe Overflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	10.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	99.300
Roughness k (mm)	0.600		