From: Price, Jason [mailto:jason.price@persimmonhomes.com]
Sent: 01 October 2018 16:50
To: Thomas, Edward
Cc: 'Joel.Hockenhull@balfourbeatty.com'; 'Ruth.Blair@balfourbeatty.com'
Subject: FW: 180964 - Land between The Seven Stars and Gosmore Road comments

Ed,

I write further to the submission of information pursuant to the discharge of condition no. 19 of the outline planning permission and attach for your consideration the requested information.

For completeness, listed below are the original comments together with a response from our engineer.

I trust this is sufficient to expedite the application. If however you require additional information or wish to discuss the matter further please do not hesitate to contact me

Regards

Jason Price
Strategic Land Manager
Persimmon Homes East Wales
Charles Church East Wales
Llantrisant Business Park
Llantrisant
CF72 8YP
Tel No: 01443 223653
Direct Dial: 01443 445432
Fax: 01443 237328
jason.price@persimmonhomes.com
www.persimmonhomes.com

From: Thomas, Edward [mailto:Edward.Thomas@herefordshire.gov.uk]
Sent: 25 June 2018 09:27
To: Price, Jason
Cc: Hockenhull, Joel (Joel.Hockenhull@balfourbeatty.com); Blair, Ruth (Ruth.Blair@balfourbeatty.com)
Subject: FW: 180964 - Land between The Seven Stars and Gosmore Road comments
Importance: High

Dear Jason,

I previously omitted to share comments in respect of condition 19. Please see these below.

Can you confirm whether you are in discussion with the Council's Drainage Consultants (BBLP) in respect of discharge consent? Phoenix will be making the application to BBLP for discharge consent

Kind regards
Ed Thomas

Hi Ed,

We have reviewed the reserved matters for this application and recommend that the Council do not approve the discharge of condition 19 until further information is provided as summarised below. Given the extent of information required before we can complete a detailed review we have provided this summary via email instead of our usual response template.

Whilst the applicant has provided some information regarding the proposed drainage design, we do not believe the principals of the drainage design have been established, principally:
The principles of drainage design have been followed – see below.

- No infiltration testing has been carried so the hierarchy of surface water drainage has not been correctly assessed. At minimum the following should be provided:
  a. Proposal for discharge demonstrating the hierarchy of preference:
     i. Infiltration Infiltration tests were carried out in February 2017 where zero infiltration was recorded. The ground consists of stiff clay thus preventing the use of infiltration systems. See SI report (attached)
     ii. Watercourse This option was considered following the failure of infiltration. A ditch was confirmed to run along the eastern boundary which we have discharged the proposed storm water at a restricted QBAR rate.
     iii. Sewer (for this site this is not permitted by condition 17 and 18)
  b. Discharge rate to the proposed location if not via infiltration
  c. Attenuation requirements to meet this discharge rate Storm Water has been restricted to QBAR rate

Additionally:

- The information submitted by the applicant discusses the culvert under the adjacent road flooding and causing a potential risk to the properties (as shown within the EA flood maps). However no assessment has been carried out beyond review of the maximum flood depth indicated by the EA flood maps. We would recommend that the existing culvert is cleared out to maximise capacity, the site already discharges to the ditch therefore we would be replicating the existing situation. As the restriction is to QBar, and this will only be achieved as the basin fills, there is actually an improvement on a larger storm return periods.
- The adoption of the foul raising main should be clarified as it is not marked as S104 adoptable. The rising main is adoptable and shown on the S104 drawing

If following review of the above points the preferred surface water drainage solution remains as the proposed surface water sewer network connecting to a drainage ditch/watercourse via an attenuation pond, then the following will need to be addressed:

- It is suggested that the maintenance of the surface water system is to be by residents or the community, which is not appropriate. The surface water drainage is laid out as if it was S104 adoptable, and it’s not an appropriate suggestion for residents to maintain it, or the pond and outfall. The surface water system will be maintained by a management company as is common place on residential estates. The storm water will be maintained in line with the SUDS Manual with regular inspections and annual maintenance.
- As part of a drainage strategy the applicant should propose a discharge rate to the receiving waterbody. The applicant should calculate the Greenfield runoff rate and volume for the site and submit calculations of this, noting these should use FEH methods and 2013 rainfall data. Additionally the applicant should submit calculations to show the required attenuation and storage on site to achieve required rates and volumes in accordance with the Non-Statutory Technical Standards for SuDS. Calculations attached

- The design of the proposed basin is as an offline structure so it fills and empties through the same pipe. This is not best practice in terms of treatment and it is unclear why an offline basin has been designed when there is no apparent impediment to online storage (with the flow control downstream of the basin) being designed in this location. This system is the system accepted by DCWW as they do not permit online storage. As a consequence, the system could be offered to DCWW for adoption in the future if we decide to progress that route.

- No calculations to support design of piped systems have been provided. Attached
- The capacity of the receiving watercourse is also in doubt owing to the poor condition of the culvert underneath the B4349 which has not been investigated, but from the photos the inlet and outlet are clearly poor-functioning leading to flood risk (below). The culvert accommodates flows from the site in its greenfield state and therefore the proposals are not of detriment to the existing system. Furthermore, the system is attenuated to QBAR which is an improvement on events in excess of 2 year storm thus reducing the chances of flooding. It is recommended that the culvert be cleaned out to maximise capacity and further reduces the chances of flooding

Figure 6 Entrance of the road culvert, beneath the B4349

Figure 7 Stream emerges from the B4349 culvert

If you have any questions, please do not hesitate contact me or Joel

Regards,

Ruth Blair BSc (Hons)

Graduate Civil Engineer | Balfour Beatty Living Places

E: ruth.blair@balfourbeatty.com | M: +44 (0)7815 555232

Balfour Beatty Living Places | Unit 3, Thorn Business Park | Rotherwas | Hereford | HR2 6JT

www.balfourbeatty.com | @balfourbeatty | LinkedIn

Balfour Beatty Living Places

Build to Last
Lean. Expert. Trusted. Safe.

copies of it.”

_

_

_

This email has been scanned by the Symantec Email Security.cloud service.
For more information please visit http://www.symanteccloud.com

---

_

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	SAAR (mm)	728	Urban	0.000
Area (ha)	2.750	Soil	0.410	Region Number	Region 9

Results	**l/s**
QBAR Rural	10.3
QBAR Urban	10.3
Q100 years	22.5
Q1 year	9.1
Q30 years	18.2
Q100 years	22.5

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for STORM WATER NETWORK.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.410	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	150

Designed with Level Soffits

Time Area Diagram for STORM WATER NETWORK.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.473	4-8	0.631	8-12	0.018

Total Area Contributing (ha) = 1.122

Total Pipe Volume (m³) = 41.810

Network Design Table for STORM WATER NETWORK.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	24.077	0.779	30.9	0.070	6.00	0.0	0.600	o	225	Pipe/Conduit	🔓
1.001	30.096	0.756	39.8	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	🔓
1.002	16.976	0.557	30.5	0.076	0.00	0.0	0.600	o	225	Pipe/Conduit	🔓
2.000	31.949	1.005	31.8	0.078	6.00	0.0	0.600	o	225	Pipe/Conduit	🔓
2.001	18.495	0.473	39.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔓
1.003	16.028	0.427	37.5	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	🔓
1.004	23.325	0.632	36.9	0.066	0.00	0.0	0.600	o	300	Pipe/Conduit	🔓
1.005	26.737	2.075	12.9	0.074	0.00	0.0	0.600	o	300	Pipe/Conduit	🔓

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.17	93.158	0.070	0.0	0.0	0.0	2.36	93.9	9.5
1.001	50.00	6.41	92.379	0.111	0.0	0.0	0.0	2.08	82.7	15.0
1.002	50.00	6.53	91.623	0.187	0.0	0.0	0.0	2.38	94.6	25.3
2.000	50.00	6.23	92.544	0.078	0.0	0.0	0.0	2.33	92.6	10.6
2.001	50.00	6.38	91.539	0.078	0.0	0.0	0.0	2.10	83.4	10.6
1.003	50.00	6.63	90.991	0.318	0.0	0.0	0.0	2.57	182.0	43.1
1.004	50.00	6.78	90.564	0.384	0.0	0.0	0.0	2.60	183.5	52.0
1.005	50.00	6.88	89.932	0.458	0.0	0.0	0.0	4.40	311.3	62.0

Network Design Table for STORM WATER NETWORK.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	36.176	0.391	92.5	0.173	6.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	26.268	0.175	150.1	0.043	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	34.557	0.230	150.0	0.010	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	54.745	0.549	99.7	0.312	6.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	22.850	0.152	150.3	0.062	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	18.662	0.124	150.5	0.040	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.010	19.358	0.129	150.0	0.024	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.000	5.000	0.025	200.0	0.000	6.00	0.0	0.600	o	525	Pipe/Conduit	
1.011	12.173	0.061	200.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.012	10.902	0.073	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.013	5.519	0.037	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	6.32	88.173	0.173	0.0	0.0	0.0	1.88	208.1	23.4
1.006	50.00	7.15	87.707	0.674	0.0	0.0	0.0	1.66	263.6	91.3
1.007	50.00	7.50	87.532	0.684	0.0	0.0	0.0	1.66	263.6	92.6
4.000	50.00	6.58	88.000	0.312	0.0	0.0	0.0	1.57	111.3	42.2
1.008	50.00	7.71	87.226	1.058	0.0	0.0	0.0	1.82	395.0	143.3
1.009	50.00	7.88	87.074	1.098	0.0	0.0	0.0	1.82	394.8	148.7
1.010	50.00	8.05	86.950	1.122	0.0	0.0	0.0	1.83	395.4	151.9
5.000	50.00	6.05	86.921	0.000	0.0	0.0	0.0	1.58	342.1	0.0
1.011	50.00	6.29	86.821	0.000	10.2	0.0	0.0	0.71	12.5	10.2
1.012	50.00	6.51	86.760	0.000	10.2	0.0	0.0	0.82	14.5	10.2
1.013	50.00	6.62	86.687	0.000	10.2	0.0	0.0	0.82	14.5	10.2

Free Flowing Outfall Details for STORM WATER NETWORK.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013	HW2	87.300	86.651	86.650	600	600

Simulation Criteria for STORM WATER NETWORK.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	7.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.410		

Online Controls for STORM WATER NETWORK.SWS

Hydro-Brake® Optimum Manhole: 12 HB, DS/PN: 1.011, Volume (m³): 7.1

Unit Reference	MD-SHE-0146-1030-1144-1030
Design Head (m)	1.144
Design Flow (l/s)	10.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	86.821
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.144	10.3	Kick-Flo®	0.749	8.4
Flush-Flo™	0.341	10.3	Mean Flow over Head Range	-	8.9

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)	Depth (m)	Flow (l/s)
0.100	5.2	0.800	8.7	2.000	13.4	4.000	18.7	7.000	24.4
0.200	9.8	1.000	9.7	2.200	14.0	4.500	19.7	7.500	25.2
0.300	10.3	1.200	10.5	2.400	14.6	5.000	20.8	8.000	26.0
0.400	10.2	1.400	11.3	2.600	15.2	5.500	21.7	8.500	26.8
0.500	10.1	1.600	12.1	3.000	16.3	6.000	22.7	9.000	27.5
0.600	9.7	1.800	12.8	3.500	17.5	6.500	23.6	9.500	28.3

Storage Structures for STORM WATER NETWORK.SWS

Tank or Pond Manhole: Pond, DS/PN: 5.000

Invert Level (m) 86.921

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	358.6	1.279	691.0

Summary of Critical Results by Maximum Level (Rank 1) for STORM WATER NETWORK.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	7.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0   Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.410 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	2.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Winter	100	+30%					93.258	-0.125
1.001	2	15 Winter	100	+30%					92.529	-0.075
1.002	3	15 Winter	100	+30%	100/15 Winter				92.089	0.241
2.000	15	15 Winter	100	+30%					92.651	-0.118
2.001	16	15 Winter	100	+30%					91.655	-0.108
1.003	4	15 Winter	100	+30%	100/15 Winter				91.448	0.157
1.004	5	15 Winter	100	+30%	100/15 Winter				91.024	0.160
1.005	6	15 Winter	100	+30%	100/15 Winter				90.238	0.006
3.000	17	15 Winter	100	+30%	100/15 Winter				89.316	0.768
1.006	7	15 Winter	100	+30%	100/15 Winter				89.163	1.007
1.007	8	15 Winter	100	+30%	100/15 Winter				88.908	0.927
4.000	18	15 Winter	100	+30%	100/15 Winter				89.361	1.061
1.008	9	15 Winter	100	+30%	100/15 Winter				88.592	0.841
1.009	10	15 Winter	100	+30%	100/15 Winter				88.308	0.709
1.010	11	15 Winter	100	+30%	100/15 Winter				88.011	0.536
5.000	Pond	240 Winter	100	+30%	100/15 Winter				87.945	0.499
1.011	12 HB	240 Winter	100	+30%	100/15 Winter				87.983	1.012
1.012	13	1440 Winter	100	+30%					86.861	-0.049
1.013	14	960 Winter	100	+30%					86.795	-0.043

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.41		35.6	OK	
1.001	2	0.000	0.75		58.1	OK	
1.002	3	0.000	1.07		90.0	SURCHARGED	
2.000	15	0.000	0.46		39.6	OK	
2.001	16	0.000	0.53		39.7	OK	
1.003	4	0.000	0.99		153.0	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for STORM WATER NETWORK.SWS

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	5	0.000	1.12		181.5	SURCHARGED	
1.005	6	0.000	0.77		216.3	SURCHARGED	
3.000	17	0.000	0.39		73.0	SURCHARGED	
1.006	7	0.000	1.21		268.5	SURCHARGED	
1.007	8	0.000	1.17		269.8	SURCHARGED	
4.000	18	0.000	1.17		122.9	SURCHARGED	
1.008	9	0.000	1.36		407.4	SURCHARGED	
1.009	10	0.000	1.54		416.8	SURCHARGED	
1.010	11	0.000	1.53		422.3	SURCHARGED	
5.000	Pond	0.000	0.06		10.3	SURCHARGED	
1.011	12 HB	0.000	0.90		10.3	SURCHARGED	
1.012	13	0.000	0.79		10.3	OK	
1.013	14	0.000	0.86		10.3	OK	