

Technical Note

Project: Glan Llyn redevelopment, Newport

Subject: Condition 35: Oil Interceptors

Client:	St. Modwen Homes Limited	Version:	C
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Date:	10/05/2021	Approved:	Andrew Catmur

I Introduction

I.1 Terms of Reference

- 1.1.1 This document has been prepared to detail evidence by which Condition 35 attached to outline planning permission (06/0471) can be discharged for all further development parcels going forward.

I.2 Planning Condition 35

- 1.2.1 Planning condition 35 for outline planning permission (06/0471) states:

Prior to being discharged into any watercourse, surface water sewer or soakaway system, all surface water drainage from road, parking areas and hardstandings shall be passed through an oil interceptor or another mechanism that removes hydro-carbons from surface water. The design and capacity of which shall be submitted to and approved in writing by the Local Planning Authority prior to its installation. The interceptor or other mechanism shall be installed as approved and shall be retained thereafter.

- 1.2.2 For context, approval to amend the wording of the original condition 35 was granted in June 2017 by the submission of a Section 96a (Non-Material Amendment) application. The wording of condition 35 was formally amended via an NMA application (ref. 17/0514) which now enables hydro-carbons from surface water to be passed through an oil interceptor or ‘**another mechanism**’. This amendment allowed for more flexibility for other sustainable, appropriate and available treatment trains for surface water drainage, such as the site’s reen network and ponds.

- 1.2.3 Condition 35 for Phase 2B was previously discharged following a demonstration that the required level of treatment within the reens and pond system was met without the need for oil interceptors. However, more recently, the application to discharge this condition for Phases 3B and 3D (ref. 20/1053) has had objection from NRW.
- 1.2.4 This position by NRW appears to be contra to NRW's 2014 document: '*Additional guidance for: water discharge and groundwater (from point source) Activity Permits (EPR 7.01)*' where it is stated that "*discharge of surface water from public roads and parking areas is generally considered acceptable if it has passed through a well-designed and maintained oil separator or sustainable drainage (SuDS) system.*"¹
- 1.2.5 Within this note, the demonstration of a sufficient surface water treatment train is presented for Phases 3B and 3D and all potential future phases of development so that Condition 35 can be discharged in a consistent and informed manner going forward.

2 Proposed Drainage and Water Quality Strategy

2.1 Summary of Strategy

- 2.1.1 As set out in the Glan Llyn site wide drainage strategy, surface water will be attenuated, treated and transferred by a network of reens, greenways, ponds and lakes.
- 2.1.2 It is proposed that surface water runoff from the Glan Llyn development is pumped into the Monks Ditch at a rate akin to the natural greenfield runoff rate of 3.5l/s/ha. Peak rate of runoff will be managed using flow control and attenuation techniques on site.
- 2.1.3 Attenuation is provided by the reens network, ponds and green infrastructure to manage flows up to the 1 in 100 year plus 30% for climate change.
- 2.1.4 To attenuate the surface water runoff from the development site and northern catchments during the 1% AEP plus climate change (30%) surface water event, 180,437m³ of storage would need to be provided. This volume is the entire volume produced during this event and assumes that discharge into the Monk's Ditch cannot be operational due to tide locking.
- 2.1.5 In addition to the storage requirements for the surface water event, the site has also been designed to compensate for the flood storage volume displaced during a tidal breach event on the Transporter Bridge embankment and Gold Cliff sea defence during a 0.1% AEP tidal event. This accounts for an additional volume of 148,350m³ accounted for in the site's design. It should be noted that flood volume compensation due to a tidal flood risk is generally not required as the tidal level is absolute and therefore the design of the site is with regards to storage is conservative.

¹ Additional guidance for: water discharge and groundwater (from point source) Activity Permits (EPR 7.01). NRW 2014. <https://naturalresources.wales/media/2124/how-to-comply-with-your-environmental-permit-additional-guidance-for-water-discharge-and-groundwater-from-point-source.pdf>

- 2.1.6 The whole site has a storage capacity of 399,000m³ which provides the capacity to store both the surface water runoff from the development site and northern catchments with no outfall to the Monks Ditch in addition to the tidal breach flood water with a surplus volume capacity of 70,213m³ or an additional 20% which provides a buffer for the additional climate change allowance requested by the SAB and a degree of urban creep. This has been agreed in principle with the SAB.
- 2.1.7 On completion of the whole development, the attenuated and treated surface water runoff will eventually be pumped into the receiving watercourse, namely the Monks Ditch, at an the attenuated greenfield rate. However, during the current site construction phase the treated and attenuated surface water runoff enters the neighbouring Tata surface water management system and is pumped into the Severn Estuary.
- 2.1.8 The ground water quality within the old steelworks site reflects the leachate data with elevated concentrations of some metals and ammonia. Infiltration of surface water is not an appropriate form of discharging due to the potential impact on water resources. Therefore water quality functions at Glan Llyn are managed on the surface where possible.
- 2.1.9 The proposed drainage strategy ensures that water being pumped into Monks Ditch or entering the Tata surface water system is clean, having been through an appropriate treatment train. To deliver the treatment train, the development incorporates a combination of source control SuDS techniques to replicate the natural drainage of the site enhanced with the reed system and trapped gullies to further remove hydrocarbons from the surface water runoff.

2.2 Simple Index Approach to Water Quality Assessment

- 2.2.1 Table 4.3 of the SuDS Manual advocates the use of the “simple index approach” to determine an appropriate level of pollution mitigation for development sites. This splits pollution into three contaminant types (Total Suspended Solids, Metals and Hydrocarbons) and assigns a “pollution hazard index” to each type.
- 2.2.2 Different SuDS features are then assigned a “SuDS Mitigation Index” and sufficient treatment is deemed to be provided if the “SuDS Mitigation Index” is equal to or greater than the “pollution hazard index” for each pollutant type. When more than one SuDS component is required a multiplication factor of 0.5 is applied to mitigation indices for secondary and tertiary components to account for reduced performance.
- 2.2.3 The proposed uses at the residential site will comprise residential roofs, property driveways and low traffic roads. The CBP land use to the east of Monks Ditch will comprise of commercial roofs, yards and delivery areas and low traffic roads. Roofs and low traffic roads are classified as at ‘very low’ and ‘low’ pollution level respectively in Table G3.1 of the Statutory Standards for sustainable drainage systems in Wales. Commercial yards and delivery areas are classified as ‘medium’ pollution hazard level.

2.2.4 Both 'Low' and 'Medium' hazard pollution levels require application of a 'simple index approach' for water quality risk assessment for discharged to surface and groundwaters. The "pollution hazard indices" for the different pollution hazards on the site are given in the table below.

Table 2-1: : Pollution Hazard Indices

Hazard pollution risk based on land-use	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Very Low	0.2	0.2	0.05
Low	0.5	0.4	0.4
Medium	0.7	0.6	0.7

2.2.5 The site wide drainages strategy consists of the following treatment trains where every parcel of land enters at least two treatment phases:

- Trapped gullies for all road drainage in conjunction with a reen/swale/Blueway
- Reens/swales/Blueways as part of the overall site development.
- A final retention pond adjacent to the pumping station which transfers the treated water into Monks Ditch.

2.2.6 The reens (blueways) will be planted with native vegetation species and further establishment of this vegetation will be encouraged and actively managed as shown in the example planting plan for Julians Reen in Appendix A.

2.2.7 Biodegradation of hydrocarbons will occur within the reens as the accumulated silt alternately wets and dries, especially in summer when water quality will be more of a risk.

2.2.8 Table 2-2 below provides the indicative SuDS mitigation indices for the proposed SuDS features for the site with reens and greenways being defined as swales and the lakes being defined in the SuDS manual as ponds.

2.2.9 If runoff from a parcel of development land enters a swale (reen) followed by a pond (the final retention pond), the overall mitigation indices for hydrocarbons will be $0.6 + 0.25 (0.5 \times 0.5) = 0.85$. 0.85 is higher than the hydrocarbon pollution hazard indices for all risk levels and therefore the requirements with regards to water quality are met.

Table 2-2: Indicative SuDS Mitigation Indices

SuDS component	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Swale	0.5	0.6	0.6
Pond	0.7	0.7	0.5

2.2.10 However, the water quality functions of the surface water drainage strategy at Glan Llyn are even more efficient than that suggested through the above "simple index approach". The

green/blue corridors consisting of swales and reens have very low gradients which mean that the flows will be very slow moving. The retention time of surface water onsite will be significant allowing maximum deposition of pollutants. It is understood that every 50m of reen provides the equivalent of one treatment component.

- 2.2.11 The predicted on-site dwell distances and times for surface water run-off from all the phases of development shown in Figure 2-1 are calculated in Table 2-3.
- 2.2.12 By reviewing both Table 2-2 and Table 2-3, it can be seen that the site wide drainage design for all parcels of development provides at least three treatment components whose combined mitigation index will exceed the pollution hazard index for each pollutant type shown in Table 2-1.
- 2.2.13 For example, for Phase 2D the distance surface water runoff will travel along the reens and pond accounts for 2225m (1420m within the reens) or a dwell time of up to 31 hours, which will provide a significant number of treatment phases (44). This means that the SuDS mitigation indices for treatment to remove hydrocarbons within runoff from this plot would be at least $0.6 + (28 * 0.3) + 0.25 = 9.25$. Significantly larger than the pollution hazard indices noted in Table 2-1.
- 2.2.14 The reens and swales will be allowed to regenerate naturally to mimic the water courses in the adjacent Gwent Levels and the water treatment function of these features and the retention lakes will improve as they become established.

3 Summary

- 3.1.1 The above information demonstrates that a sufficient level of treatment is provided by the Glan Llyn drainage strategy to ensure that water quality entering the receiving waterbody has been cleaned of hydrocarbons in line with the CIRIA SuDS Manual and best practice, without the requirement to install oil interceptors.
- 3.1.2 The reens (blueways) will be planted with native vegetation species and further establishment of this vegetation will be encouraged and actively managed. The biodegradation of hydrocarbons will occur within the reens as the accumulated silt alternately wets and dries, especially in summer when water quality will be more of a risk.
- 3.1.3 The above also demonstrates that the *design and capacity* of the reen and pond systems is considered to be sufficient to satisfy the requirements of the condition.
- 3.1.4 Condition 35 states that *surface water drainage shall be passed through an oil interceptor or another mechanism that removes hydro-carbons from surface water*. As long as the reen and pond systems are in place and that surface water dwell distances and times at the point of construction of each development phase are sufficient to meet the requirements of the 'simple index approach' to water quality assessment, Condition 35 should be discharged.

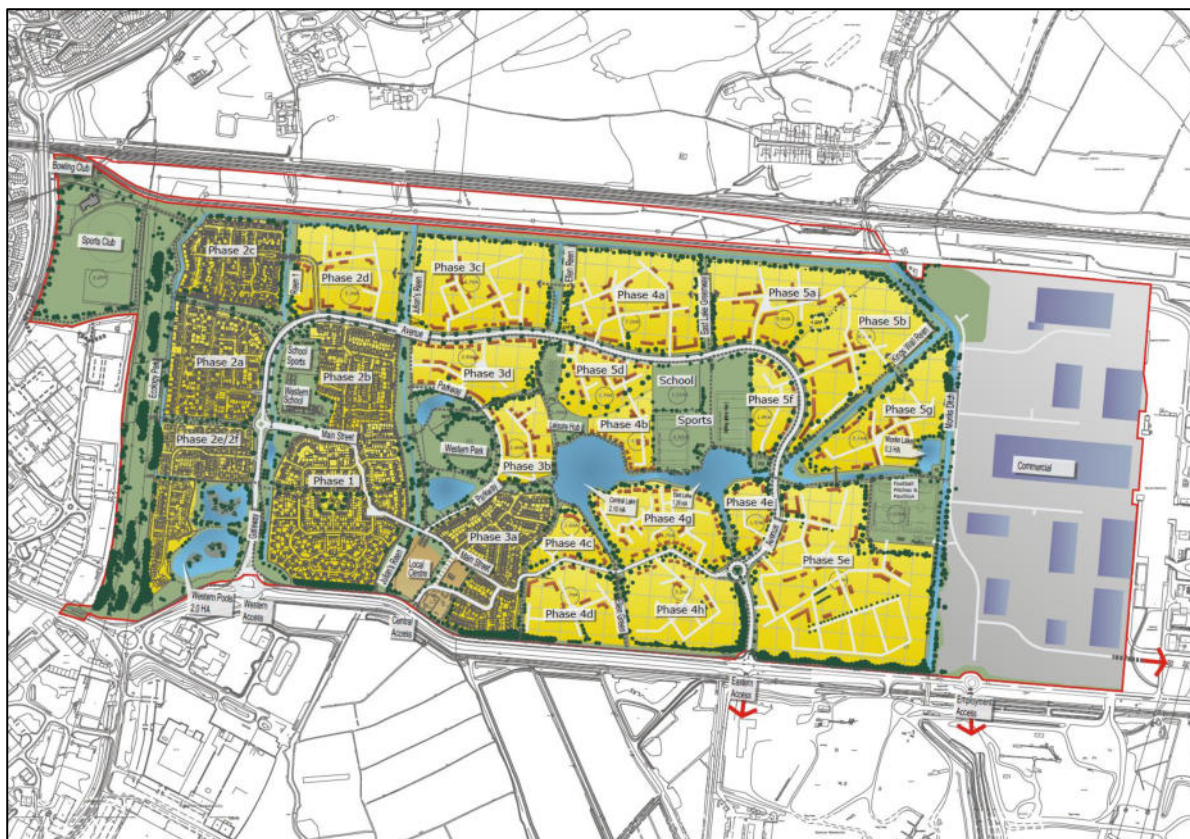


Figure 2-1: Masterplan and location of plots

Table 3-1: Dwell times for surface flows from each development parcel

Phase Reference	Distance in reens	Distance in Blueways	Distance in lakes	Total Distance (D)	Dwell Time Hrs	Number of 50m long treatment components (D/50)
Phase 1	1290	1460	20	2770	50	55
Local Centre	1290	1500	20	2810	51	56
Western School	1565	1140	20	2725	42	54
Eastern School	420	785	20	1225	29	24
2a	2110	785	20	2915	33	58
2e/2f	2400	785	20	3205	34	64
2b	1290	500	20	1810	23	36
2c	1800	785	20	2605	32	52
2d	1420	785	20	2225	31	44
3a	0	280	400	680	119	13
3b	0	280	400	680	119	13
3c	1165	905	400	2470	139	49
3d	1165	905	400	2470	139	49
4a	810	50	20	880	9	17
4b	0	280	350	630	105	12
4c	0	280	400	680	119	13
4d	0	280	400	680	119	13
4e	0	280	50	330	22	6
4g	0	280	200	480	63	9

4h	0	280	200	480	63	9
5a	460	785	20	1265	29	25
5b	0	785	20	805	27	16
5e	0	140	20	160	9	3
5g	0	280	20	300	13	6

Appendix A: Julian's Reen Planting Plan

LLANWERN

PLANTING SCHEDULE

TREES

Abb.	Scientific Name	Height	Girth	Specification	Density	No.
Ag	Alnus glutinosa	2.0 - 2.5m	-	Feather: Multi-stemmed; 5 breaks: 2x: B	-	22
Ar	Acer rubrum 'Scanlon'	min 4.5m	18-20 cm	Extra Heavy Std: Clear stem min. 200: 3x: BR	-	10
Bn	Betula nigra 'Heritage'	2.0 - 2.5m	-	Feather: Multi-stemmed; 5 breaks: 2x: B	-	23
Oc	Ostrya carpinifolia	min 4.5m	18-20 cm	Extra Heavy Std: Clear stem min. 200: 3x: BR	-	7
Oc	Ostrya carpinifolia	2.0 - 2.5m	-	Feather: Multi-stemmed; 5 breaks: 2x: B	-	15
Tc	Tilia cordata 'Green Spire'	min 4.5m	18-20 cm	Extra Heavy Std: Clear stem min. 200: 3x: BR	-	10

HEDGES

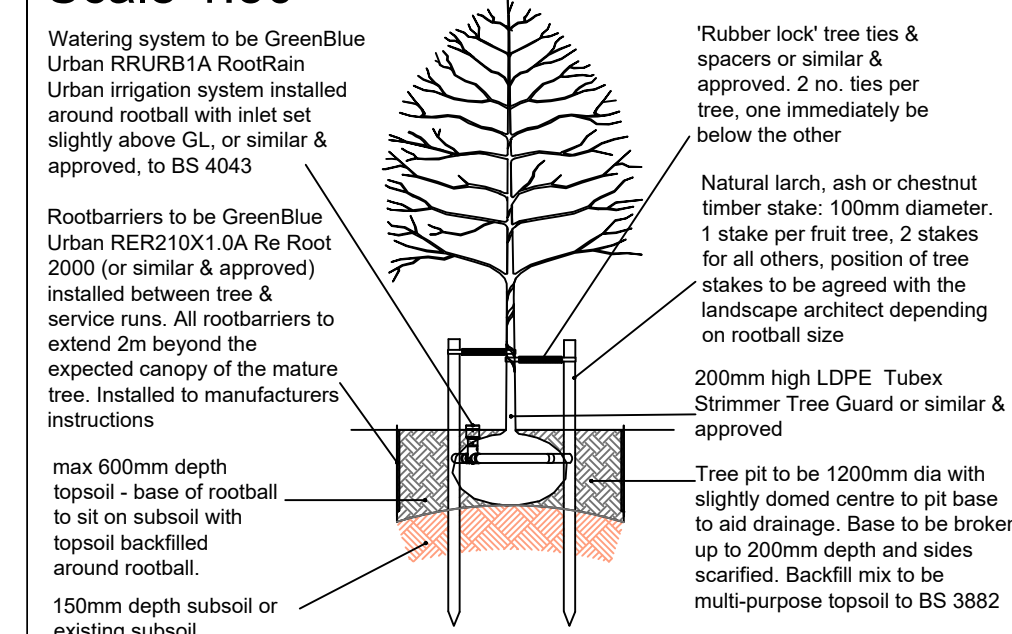
Ac	Acer campestre	40-60cm	-	Transplant: 1+1: B	4/m ²	248
Cav	Corylus avellana	40-60cm	-	Transplant: 1+1: BR: Branched: 2/4 Breaks:	4/m ²	248
Cmo	Crataegus monogyna	40-60cm	-	Transplant: 1+1: B: Bushy: 3 Breaks:	4/m ²	827
Ia	Ilex aquifolium	40-60cm	-	Transplant: 1+1: B: Bushy: 3 brks: C	4/m ²	82
Psp	Prunus spinosa	40-60cm	-	Transplant: 1+1: BR: Branched: 2/3 Breaks:	4/m ²	248

BULBS

	Narcissus 'Thalia'	-	12/14	Planting depth 15cm, random spacing	50/m ²	23660
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TREE PIT DETAIL

Scale 1:50



LEGEND

- Phase Boundary
- Feature/Avenue Tree
- Multi Stemmed Trees
- Amenity Grass sown at 35g/m²
- Damp grassland -RE3 River Flood Plain/Water Meadow mix sown at 5g/m²
- Germinal Seed RE2 Lowland Meadow Mix sown at 5g/m²
- Hedges (with 1.2m high timber post & 3 wire fence to BS EN1722 Part 2 to Avenue).
- Furnitubes Cheshunt seats CH5B6 constructed from FSC certified timber
- Tarmac paths
- Bound Gravel paths
- Reen Channel
- 1.2m high 150mm square timber bollards
- Litter bins

NOTE: Existing grassland & marginal species to be retained where possible. Areas damaged by planting works & installation of reen crossing or hardworks to be oversown by the seeding mixes as shown. Invasive species such as buddleia and pernicious weeds to be removed

Phase 3C

PHASE 2D

PHASE 3C

Julian's Reen - Planting Plan - Scale - 1:500@A1



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F	Seeding rates added	SC	16.07.20
E	Drawing No. changed. Drawing revised in accordance with PJA dwg 02554-E-132-C8	SC	16.07.20
D	Drawing No. changed. Drawing revised in accordance with PJA dwg 02554-E-132-C9	SC	01.06.20
C	Drawing No. changed. Drawing revised in accordance with PJA dwg 02554-E-132-C4 & C5	SC	07.05.20
B	Planting details added	AI	06.02.20
A	Pedestrian link across Julian's Reen revised to latest engineers constraints plan	DP	04.12.19
*	This drawing added to drawings M11.113(q), D.076, D.079 & D.080 as Sheet 4 of 4	DP	29.11.19

DRAWING STATUS: PRELIMINARY

PROJECT: LLANWERN



TITLE: Julian's Reen Landscape Layout

DATE: 19/03/2020 SCALE: 1:500@A1

DRAWN: AI / DP CHECKED: SC

DRAWING N°: M11.113(q).D134 REVISION: F

BIM DRAWING NO: 401100-PSL-19-00-DR-L-00134

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