RIDGE

CHOICE HILL ROAD,
OVER NORTON
BUILDERS EDE
12 January 2021

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12 January 2021

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CONTENTS

1. INTRODUCTION

Ridge and Partner LLP have been appointed by Builders Ede limited to prepare a Technical Note in aid to discharging Condition 13 relating to Planning Permission 16/03761/OUT, at Land West of Quarhill Close, Over Norton, Oxfordshire.

The proposed development comprises of new residential dwellings with associated soft landscaping and garden areas, including a new hardstanding road and parking areas.

The condition 13 and its respective response is presented in section 2 of this report.

2. CONDITION 13 STATEMENT

No development shall begin until a surface water drainage scheme for the site, based on sustainable drainage principles and an assessment of the hydrological and hydro-geological context of the development, has been submitted to and approved in writing by the local planning authority. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed. The scheme shall also include:
Discharge Rates
Discharge Volumes
Maintenance and management of SUDS features (this may be secured by a Section 106 Agreement)
Sizing of features – attenuation volume
Infiltration tests to be undertaken in accordance with BRE365
Detailed drainage layout with pipe numbers
SUDS (list the SuDS features mentioned within the FRA to ensure they are carried forward into the detailed drainage strategy)
Network drainage calculations
Phasing Plans
Flood Risk Assessment

3. CONDITION 13 RESPONSE

3.1. General

Due to good infiltration rates obtained during the in-situ tests, the proposed development will incorporate traditional soakaways methods in order to discharge the entire generated runoff. The infiltration rates can be reviewed in the Site Investigation Extract which is shown in A**ppendix A**.

The SUDS features used to mange surface water on site are as follows:

- An infiltration basin located in the south-west corner of the site
- Permeable block paving with a system of baffles to manage runoff on the west section of the access road, south-east corner car park and all the driveways and visitors parking spaced.

To size the attenuation and infiltration features, two infiltration rates have been used. For the permeable section of the access road (west side of the site), the car park (south-east corner of the site) and all the driveways and visitor car parking spaces, it has been used the infiltration rate in TP02 (8.89 * 10^{-06}m/s), due to its more conservative value. To size the infiltration basin, it has been used the infiltration rate in TP03 (5.53 * 10^{-04}m/s), due to its location being very close to where the pond has been located.

3.2. Surface Water Drainage Network

The runoff generated by the roof area and the bituminous access road, will be manged using a system of gutters, rainwater pipes and gullies, all draining into a drainage system formed of manholes and underground pipes.

The drainage network will finally discharge the runoff through a headwall into a permanent pond which will overflow into an infiltration basin. The permanent pond will be formed by lining the bottom and sides of the pond using an impermeable membrane. The sides of both the pond and infiltration basin have a slope of 1 in 3 and will have different invert levels, with the pond deeper than the infiltration basin.

The drainage system has been designed not to flood for an event of 1 in 100 years + 40% climate change.

The Drainage Layout can be reviewed in **Appendix B** and the Microdrainage calculations in **Appendix C**. Both should be read in conjunction with the Proposed Levels layout which can be reviewed in **Appendix D**.

3.3. Permeable block paving access road

On the west side of the site, there is a section of the road that has been proposed to have a porous sub-base to both attenuate and infiltrate the runoff generated by its own surface. Although steep (1 in 20 longitudinal gradient) the road can attenuate and infiltrate using a system of baffles 6.4m apart.

The calculations have been done for an event of 1 in 100 years +40% climate change.

The baffles layout can be reviewed in **Appendix B** and the Microdrainage calculations in **Appendix C.**

3.4. Permeable block paving car park

In the south-east corner of the site, there is a car park which has also been proposed to have a porous sub-base to both attenuate and infiltrate the runoff generated by its own surface. Similarly, steep (1 in 20) the car park incorporates a system of baffles 6.0m apart.

The calculations have been done for an event of 1 in 100 years +40% climate change.

The baffles layout can be reviewed in **Appendix B** and the Microdrainage calculations in **Appendix C.**

3.5. Driveways and visitors parking spaces

Both the driveways across the site and the visitor parking space have been designed to incorporate a porous sub-base to both attenuate and infiltrate the runoff generated by its own surface.

As these have gentler gradients than the permeable access road and the permeable car park, no separate calculations have been carried out specifically, as they have various lengths and widths.

3.6. Water Quality

The main pollutants will be the hydrocarbons. These will mainly be managed by the porous sub-base in the driveways which will have 2 layers of filtration geotextile, one at the top the other at the bottom. The geotextile layers will stop the hydrocarbons which will be broken down by bacteria. For the bituminous access road, the infiltration basin will have a layer of filtration geotextile which will manage the hydrocarbons in a similar way.

3.7. Exceedance Flow Routes

The exceedance flow routes have been shown to inform in case a storm event exceeds the designed event (1 in 100 years + 40% climate change). It can be noted on the drainage layout (**Appendix B**) that all driveway have been designed to drain the water away from the dwellings and that the road acts as a channel, conveying all runoff on the western vegetation strip, following the existing ground profile.

4. MANAGEMENT AND MAINTENANCE PLAN

4.1. General

Builders Ede Limited will retain ownership of the SuDS system and will be responsible for its management and maintenance.

Regular inspections and maintenance of the surface water drainage system is essential to ensure the effective operation of the drainage system.

4.2. General

The permeable block paving should be inspected regularly, preferably during and after heavy rainfall, to check for effective operation and identify any areas of surface ponding.

Permeable paving should be regularly cleaned of silt and other sediment to preserve its infiltration capability. A brush and suction cleaner, which can be a lorry mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows.

- End of winter (April) – to collect winter debris.
- Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
- After autumn leaf fall (November).

Care should be taken in adjusting the vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced.

It is recommended that approximately every 25 years the following remedial work is undertaken:

- Lift the existing blocks and retain them for re-use.
- Remove the laying course stone and geotextile filter layer. These should be disposed of at a suitably licensed tip as they may contain heavy metals and hydrocarbons.
- Inspect the sub-base and remove, wash, and replace as necessary.
- Renew the geotextile filter layer and laying course stone.
- Relay the existing block paving replacing any damaged blocks.

Care should be taken to avoid stockpiling of any materials, in particularly granular material or soil on the permeable paving so that underlying granular sub-base and laying course are not contaminated. Vacuum sweeping should be undertaken immediately if a spillage occurs.

A summary of the maintenance requirements, set out in the SUDS Manual, are provided in the schedule below.

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Figure 1 - Operation and Maintenance requirements for pervious systems as set out in SuDS Manual

4.3. Infiltration/Detention Basins

Maintenance of a detention basin is relatively straight forward, and typically there should only be a small amount of extra work required for a SuDS detention basin over and above what is necessary for a standard public open space.

Regular ongoing maintenance of the basin is required to ensure continuing operation to design performance standards.

The basin should be inspected on a regular basis (typically monthly) and any build-up of litter (including leaf litter in the autumn), debris and trash should be removed as required.

Routine maintenance of the landscaped areas, including grass cutting and the aquatic vegetation will also be required on a regular basis particularly during the growing season. Slope areas that have become bare should be re-vegetated and any eroded areas should be regraded before replanting.

Silt removal should be undertaken, as required, to ensure the effective operation of the basin and to maintain aesthetic appearance of the site. Care should be taken to avoid disturbance to nesting birds during the breeding season and habitats of target species at critical times. The window for carrying out maintenance to achieve this is usually towards the end of the growing season (typically September/October). Invasive silt and vegetation removal should only be carried out to limited areas at a time (25/30% of the basin on one occasion each year) to minimise the impact on biodiversity.

Operation and maintenance requirements for detention basins		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Figure 2 – Detention Basin Operation and Maintenance Schedule

4.4. Catchpits

Catchpits will be provided upstream of all the permeable paving storage to prevent silt and debris entering the network. The catchpits should be inspected on a monthly basis for the first year and then on an annual basis and any build-up of detritus or silt should be removed.

5. CONCLUSIONS

1. The development has been designed to incorporate SuDS features.

2. The drainage networks including the SuDS features have bene designed to a 1 in 100 + 40% climate change event.

3. It has been demonstrated the water quality is ensured.

6. LIST OF REFERENCES

1. National Planning Policy Framework, February 2019
2. Planning Practice Guidance on Flood Risk and Coastal Change
3. CIRIA SuDS Manual 2015

7. APPENDICES

Appendix A - Site Investigation Extract

Appendix B - Drainage Layout

Appendix C - Microdrainage Calculations

Appendix D - Proposed Levels

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