

# Management and Maintenance Manual addendum

*Ford Lane, Yapton – Regularisation scheme*

## Client

### Redrow

Redrow Homes Limited  
Redrow House Unit 1 Faraday Office Park  
Rankine Road, Basingstoke  
Hampshire, RG24 8QB

**Ref:** H20160  
**Issue:** 1  
**Date:** 12.08.2021

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## 1.0 INTRODUCTION

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- 1.1.1 Gyoury Self has been commissioned by Redrow Homes to prepare this addendum to the original Odyssey Management and Maintenance Manual, to support the Regularisation application.
- 1.1.2 The Regularisation application involves amendments to the layout in some locations of the site, including the infiltration basin at the southern end of the site.
- 1.1.3 The philosophy of the drainage design has not changed from the Odyssey report, and therefore the intentions of the management and maintenance on the site remains broadly the same.

### Limitations

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## 2.0 PROPOSED SITE

- 2.1.1 The Regularisation scheme has affected the location of certain plots on the site, which have been re-designed to suit the proposed latest scheme design.
- 2.1.2 The surface water drainage has been re-routed to the south east corner of the site to the location of the revised infiltration basin. However, this is designed to the same principles of the original scheme.
- 2.1.3 The adoptable foul pump station has been removed and now all of the 100 units drain via a gravity system to the existing foul sewer in North End Road. The main sewer runs are proposed to be adopted by Southern water under a Section 104 application. Therefore, all adoptable sewers and manholes will be maintained by the sewer authority, and all private foul drainage will be maintained by the management company.

2.1.4 The surface water catchment and implementation plan has been updated to reflect the latest layout, as shown in appendix A.

2.1.5 The construction phase plan has also been updated to reflect the latest layout, as shown in appendix B.

2.1.6 The methodology for the management and maintenance on the site should still follow the original design. Therefore, refer to the Odyssey Manual in appendix C for the ways in which the SUDS features will be maintained on the site.

### **3.0 CONCLUSION**

3.1.1 The Regularisation scheme does not affect the original methodology for the management and maintenance of the surface water system. The manual set out by Odyssey in appendix C is applicable for the maintenance of all SUDS features.

3.1.2 The latest scheme is proposed to drain all plots foul waste via gravity to the existing sewer and the main runs will be maintained by Southern water. The adoptable foul pump station has been removed from the design.

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For and on behalf of Gyoury Self Partnership LLP

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Approved by: Martin Roberts I.Eng, ACIWEM, MCIHT

For and on behalf of Gyoury Self Partnership LLP

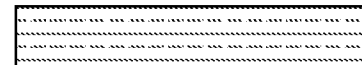
## Appendix A – Surface water catchment and implementation plan

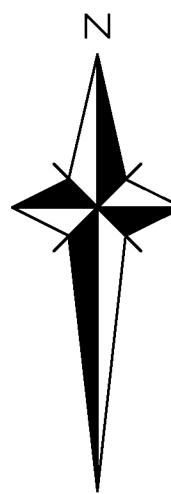
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GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-contractors or suppliers work must be checked and agreed between the sub-contractor or supplier and the main contractor.
2. This drawing is to be read in conjunction with all relevant architects, services and engineers drawings and specifications.
3. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-invasive observations, record drawings or the file. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gap prior to works commencing.
4. Tender or billing drawings shall not be used for construction or the ordering of materials.
5. Do not scale. All dimensions and levels to be site confirmed.
6. Copyright - This drawing must not be copied, amended nor reproduced without the prior written agreement of gap.

LEGEND

|                                                                                  |                                           |                             |
|----------------------------------------------------------------------------------|-------------------------------------------|-----------------------------|
|  | TANK 1 CATCHMENT                          | AREA = 680 M <sup>2</sup>   |
|  | TANK 2 CATCHMENT                          | AREA = 1128 M <sup>2</sup>  |
|  | TANK 3 CATCHMENT                          | AREA = 1373 M <sup>2</sup>  |
|  | TANK 4 CATCHMENT                          | AREA = 408 M <sup>2</sup>   |
|  | TANK 5 CATCHMENT                          | AREA = 320 M <sup>2</sup>   |
|  | PLOT SOAKAWAY CATCHMENT                   | AREA = 1379 M <sup>2</sup>  |
|  | PERMEABLE PAVING CATCHMENT                | AREA = 14461 M <sup>2</sup> |
|  | SWALE CATCHMENT                           | AREA = 248 M <sup>2</sup>   |
|  | BASIN CATCHMENT                           | AREA = 269 M <sup>2</sup>   |
|  | PERMEABLE PAVING CATCHMENT SUB-BOUNDARIES |                             |

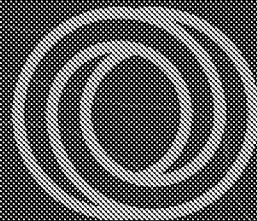


|                                                                                                                                                                                                                             |          |               |       |          |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|-------|----------|------------|
|                                                                                                                                                                                                                             |          |               |       |          |            |
| P1                                                                                                                                                                                                                          | 11.08.21 | INITIAL ISSUE |       | RH       | SL G2      |
| REV                                                                                                                                                                                                                         | DATE     | DESCRIPTION   |       | BY       | CHK/APP    |
| <b>Gynergy Self</b><br>CONSULTING ENGINEERS<br>16117 BOUNDARY ROAD, HOWE,<br>EAST SUSSEX BN1 4EF<br>TELEPHONE 01753 414410<br>E-MAIL: info@gyneryself.co.uk<br>Website: www.gyneryself.com<br>Also at Farnham and St Albans |          |               |       |          |            |
| <br>REDROW<br>HOMES                                                                                                                    |          |               |       |          |            |
| CLIENT<br>RHP                                                                                                                                                                                                               |          |               |       |          |            |
| PROJECT<br>FORD LANE<br>YAPTON<br>REGULARISATION APPLICATION                                                                                                                                                                |          |               |       |          |            |
| DRAWING TITLE<br>SURFACE WATER CATCHMENT<br>AND IMPLEMENTATION PLAN                                                                                                                                                         |          |               |       |          |            |
| AN NO.                                                                                                                                                                                                                      | 20160    | SCALE         | 1/500 | DATE     | MARCH 2021 |
| DRAWN                                                                                                                                                                                                                       | MR       | CHECKED       | CTA   | DESIGNED | APP        |
| STATUS<br>S4 SUITABLE FOR APPROVAL                                                                                                                                                                                          |          |               |       |          |            |
| REVISION<br>P1 STAGE 3 - SPATIAL CO-ORDINATION                                                                                                                                                                              |          |               |       |          |            |
| DRAWING NO.<br>20160-GS-Z1-XX-DR-C-2108                                                                                                                                                                                     |          |               |       |          |            |

## Appendix B – Redrow construction phase plan

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# ODYSSEY

CELEBRATING 15 YEARS

**FORD LANE, YAPTON**

**MANAGEMENT AND MAINTENANCE MANUAL**



**FORD LANE, YAPTON**

**MANAGEMENT AND MAINTENANCE MANUAL  
ON BEHALF OF CLIENT**

Prepared by

**Odyssey**

Tuscany House

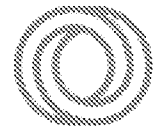
White Hart Lane

Basingstoke

RG21 4AF



April 2021

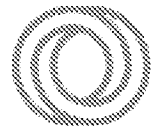


## DOCUMENT CONTROL SHEET

Project Name Ford Lane, Yapton

Project No. 18-344

| Rev | Issue Purpose                                                    | Author | Checked | Reviewed | Approved | Date       |
|-----|------------------------------------------------------------------|--------|---------|----------|----------|------------|
| -   | Planning                                                         | SG     | LH      | SG       | LH       | 16/09/2020 |
| A   | Flow control<br>maintenance details<br>added                     | SG     | LH      | SG       | LH       | 28/01/2021 |
| B   | Updated to suit<br>Client comments                               | SG     | LH      | SG       | LH       | 29/01/2021 |
| C   | Surface Water<br>Catchment and<br>Implementation Plan<br>updated | SG     | LH      | SG       | LH       | 29/01/2021 |
| D   | Updated to suit<br>Arun DC comments                              | SG     | LH      | SG       | LH       | 18/02/2021 |
| E   | Updated to suit<br>Arun DC comments                              | LH     | RS      | LH       | RS       | 23/04/2021 |

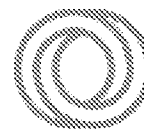


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- Appendix B    Redrow Construction Phase Plan



## 1.0 INTRODUCTION

1.1.1 This document outlines the proposed management and maintenance regimes of the drainage systems at the proposed residential development site at Ford Lane in Yapton. It also aims to support the discharge of Condition 11 which is set out below:

### Condition 11

*“No development shall take place until details of the implementation, maintenance and management of a sustainable drainage scheme have been submitted to and approved in writing by the LPA. The scheme shall be implemented and thereafter managed and maintained in accordance with the approved details. Those details shall include:*

- i) A timetable for the scheme’s implementation; and*
- ii) A management and maintenance plan for the lifetime of the development which shall include the arrangements for the adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.*

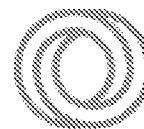
1.1.2 The drainage features on site comprise of a mixture of traditional and sustainable drainage systems. Permeable paving, cellular attenuation crates, infiltration basin and infiltration swales will receive run-off either directly or from piped systems and direct flows to infiltrate into the ground below. Piped networks will convey flows from roof run-off to the permeable paving or cellular attenuation crates.

1.1.3 The surface water systems and SuDS features on site are to remain private and will be maintained by a private management company with charges levied to residents.

1.1.4 All drainage features have an estimated design life of typically 50 years; subject to installation as per manufacturer guidance by a competent contractor, and regular maintenance as per manufactures recommendations, for the lifetime of the development

1.1.5 This report sets out the management and maintenance of the site’s drainage system throughout its lifetime. All drainage features will be maintained by a private management agreement which will incorporate the recommendations in this document. In all cases, reference should be made to the manufacturer’s inspection and maintenance recommendations.

1.1.6 The following text has been divided into sections which correspond to each relevant drainage type detailing:



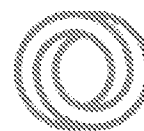
- Description of feature
- Maintenance activities and frequency
- Inspection and frequency

1.1.7 The implementation plan for the sites proposed drainage features has been set out in the table below. Catchments associated with these features are also shown on Odyssey **drawing 18-344/108** in **Appendix A**.

**Table 1.1: Drainage Feature Implementation Schedule**

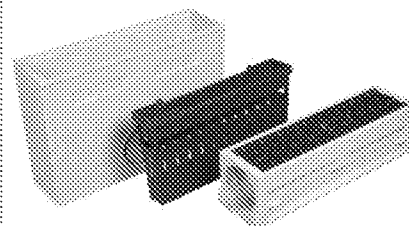
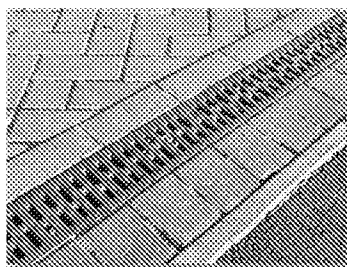
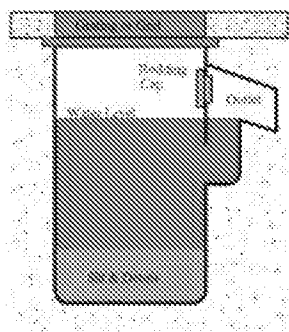
| Drainage Feature              | Area/Plots                                                        |
|-------------------------------|-------------------------------------------------------------------|
| Tank 1, Tank 2, Tank 6, Basin | 19 – 24, 37 – 50,<br>turning head facility opposite plots 34 – 36 |
| Tank 3                        | 1 – 9, 94 – 100                                                   |
| Tank 4                        | 7, 10 – 14                                                        |
| Tank 5                        | Site Access                                                       |
| Private Soakaway              | 25 – 36, 79 – 82                                                  |
| Permeable Paving              | 15 – 18, 50 – 93                                                  |
| Swale                         | Lay-bys on main access road                                       |

1.1.8 The buildout sequence of the site will be broadly in line with the build route indicated on the **Construction Phase Plan** in **Appendix B**.



## 2.0 MAINTENANCE OF GULLIES, LINEAR / KERB DRAINS, PIPE SYSTEMS & MANHOLES / INSPECTION CHAMBERS / CATCHPITS / CATCHPITS WITH PERMAFILTERS

### 2.1 *Description*



2.1.1 Drainage systems comprising of pipe runs, manholes and gullies are a more conventional method of draining surface water run-off from roof and highway areas. Linear/kerb drains catch surface water runoff similar to gullies and discharge to the surface water network.

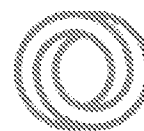
2.1.2 Surface water falling on impermeable surfaces, such as roof and footways areas, drain at surface level and convey the water below ground to the drainage network. Manholes or inspection chambers are also provided on the drainage system at regular intervals, changes in sewer direction, gradient or pipe diameter. This type of drainage system can be accessed from the gullies or manholes/inspection chambers for routine inspection and maintenance.

2.1.3 Gullies are 'trapped' where possible such that on collecting and conveying surface water they trap sediment and prevent any unpleasant odours returning from the sewers.

2.1.4 Linear drainage channels can have covers removed for routine inspection and maintenance and to remove leaves or debris. Kerb drains can be jetted through and sump/outlet covers removed/inspected.

2.1.5 Catchpits or catchpits with permafilters are provided upstream of the infiltration soakaways or permeable paving in order to trap silt/sediment before the surface water discharges into soakaways or permeable paving, thus prolonging the life of the structure. These can be accessed and maintained in a similar way to inspection chambers.

2.1.6 Pipe runs, manholes, inspection chambers, sumps/slit traps and linear drains are to be maintained by a private management company in accordance with the following recommendations.



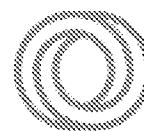
**Table 2.1: Gullies, Linear Drains, Pipe Systems and Manholes / Inspection Chambers Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity                                                           | Comments                                                                           | Frequency                                           |
|------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------|
| Routine Maintenance    | Inspect and identify any areas that are not operating correctly.               | Gullies, manholes, inspection chambers, catchpits and catchpits with permafilters. | Monthly (for the first three months) then annually. |
|                        | Remove debris from gratings, sumps, catchpits and catchpits with permafilters. |                                                                                    | Annually.                                           |
| Infrequent Maintenance | Clear blockages.                                                               | Piped system.                                                                      | As required.                                        |

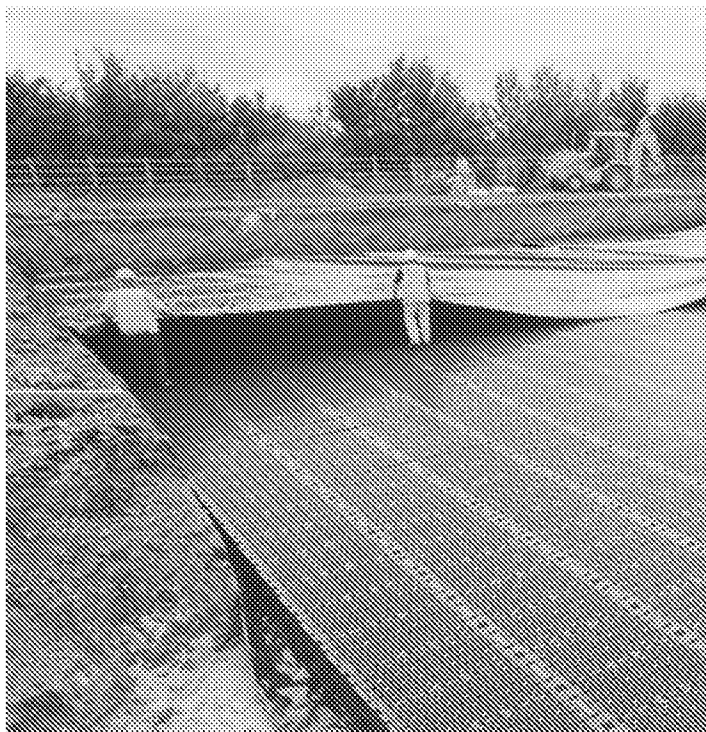
**Table 2.2: Pipe Systems, Gullies and Manholes Inspection & Frequency**

| Inspection Activity                                                    | Comments                                                                                                                                                                                                           | Frequency                                      |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Clearing of gullies / sumps, catchpits and catchpits with permafilters | Gullies, sumps, catchpits and catchpits with permafilters found to be non-functioning/blocked on annual inspection will be noted and cleared at six monthly intervals. Recurring blockages should be investigated. | Annually (or six monthly if blocked annually). |
| Cleaning / jetting                                                     | Pipes, manholes, inspection chambers, catchpits and catchpits with permafilters.                                                                                                                                   | When required.                                 |

2.1.7 The above maintenance and inspection regime is recommended; however, reference should be made to the appropriate manufacturers guidance and recommendations and the more frequent maintenance and inspection regime implemented.



### 3.0 MAINTENANCE OF CELLULAR INFILTRATION SYSTEMS

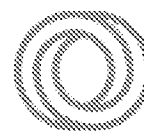


#### 3.1 *Description*

3.1.1 Cellular (or Modular) systems provide storage within a void space. They are usually built out of plastic, or other man-made materials, and can store and infiltrate (where conditions permit) run-off. Cellular systems are sub-surface components that can cater for vehicle loading, given appropriate specification and installation depth.

3.1.2 As cellular systems only offer a limited improvement in water quality, it is preferable that they form one part of a treatment train. It is important to pre-treat upstream as this will curtail sediment influx and increase the system's longevity.

3.1.3 Surface water flow to the cellular system will be via trapped gullies prior to connecting to the piped network. All manholes immediately upstream of the cellular storage structure will incorporate a catchpit / sump. The above system will offer treatment of surface water prior to entering the cellular system and infiltrating to ground.

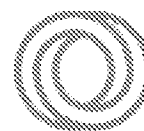
**Table 3.1: Cellular Infiltration System Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity                                                                     | Comments                                                                                                                             | Frequency                                              |
|------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Routine Maintenance    | Inspect and identify any areas that are not operating correctly.                         |                                                                                                                                      | Monthly (for the first three months) then six monthly. |
|                        | Remove sediment from upstream catchpit (sump).                                           | Remove sediment from sump when 50% volume lost.<br>N.B. Sumps must be maintained to limit sediment entry into the underground cells. | Six monthly, or as required.                           |
| Infrequent Maintenance | Clear blockage of half perforated underflow pipes (Stormcell only) by rodding / jetting. | Stormcell system (if used) should be designed with underflow pipes laid at self-cleansing velocity; reducing likelihood of blockage. | As required.                                           |
| Corrective Maintenance | Excavate, uncover & jet cells to remove sediment (Wavin Aquacell or similar).            |                                                                                                                                      | As required or typically every 50 years.               |
|                        | Excavate, remove and replace clogged geotextile                                          |                                                                                                                                      | As required or typically every 50 years.               |

**Table 3.2: Cellular Infiltration System Inspection & Frequency**

| Inspection Activity                                                                                              | Comments            | Frequency     |
|------------------------------------------------------------------------------------------------------------------|---------------------|---------------|
| Inspect all inlets / outlets, vents and overflows to check they are in good condition and operating as designed. |                     | Annually.     |
| Check mechanical devices within associated chambers.                                                             |                     | Half yearly.  |
| CCTV survey to inspect condition of cellular infiltration systems                                                | In open space areas | Every 5 years |

3.1.4 The above maintenance and inspection regime is recommended however reference should also be made to the appropriate manufacturers guidance and recommendations and the more frequent maintenance and inspection regime implemented.



## 4.0 MAINTENANCE OF PERMEABLE PAVING



### 4.1 Description

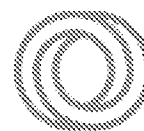
4.1.1 Permeable Block Paving allows water to pass through the gaps between the blocks into underlying sand and gravel layers allowing for the attenuation, conveyance and where possible infiltration, of surface water runoff.

4.1.2 Permeable paving will cleanse surface water run-off. The initial cleansing occurs within the sand bedding layer where hydrocarbons are collected. The layer of geotextile below the sand acts as a secondary filter before infiltration through to the sub-base further filters the discharge before infiltrating into the soil strata below.

4.1.3 Cellular diffuser units are used within areas of permeable paving to filter and disperse flows or to mitigate any 'wash-out' of the granular material for outflows.

**Table 4.1: Permeable Paving Maintenance Activities & Frequency (*continued overleaf*)**

| Maintenance Category | Maintenance Activity                                      | Comments                                                                          | Frequency                                               |
|----------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------|
| Routine Maintenance  | Visual inspection of paving.                              | Ensure joints are kept fully filled.                                              | Monthly (depending on local environment).               |
|                      | Paving should be agitated (e.g. brushed, vacuumed, etc.). | To ensure no vegetation of any sort is allowed to grow and develop in the joints. | Six monthly or as required (Spring and Autumn seasons). |



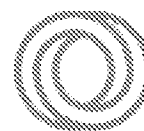
| Maintenance Category   | Maintenance Activity                                       | Comments                                                                                                                                                                                  | Frequency                   |
|------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Corrective Maintenance | Paving should be inspected after any heavy precipitations. | Ensure no displacement of any organic matter into the surface of the pavement.                                                                                                            | As required.                |
|                        | Inspection of outfall should be undertaken.                | Non-infiltration systems to have outfall checked for debris and blockages.                                                                                                                | Six monthly or as required. |
|                        | Removal of weeds.                                          | To ensure weeds are killed effectively they should be actively growing so that the glyphosate will go down to the roots.<br>Glyphosate based weed killers include Roundup and Tumbleweed. | As required.                |
|                        | Laying material may require cleaning and /or replacing.    | Depending on the environment the permeable pavement has received and been exposed to.                                                                                                     | 25 to 30-year period.       |

**Table 4.2: Permeable Paving Inspection & Frequency**

| Inspection Activity                                        | Comments                                                                                          | Frequency |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|
| Visual inspection of permeable surface for poor operation. | Includes visual inspection of blocks, water ponding, weeds and to make sure joints are kept full. | Monthly.  |
| Visual inspection of outfall.                              | Includes visual inspection of control structures and outfall to check for damage and blockages.   | Monthly.  |

4.1.4 It is recommended that the surfaces should be regularly inspected and cleaned accordingly. Based on the results of full-scale trials carried out by Aggregate Industries, the most effective method is to use a cleaner with suction only. Even if the surface has become completely clogged, trials have shown that this method of cleaning can rehabilitate the surface to an acceptable level.

4.1.5 The maintenance and inspection regime is recommended however reference should also be made to the appropriate manufacturers guidance and recommendations and the more frequent maintenance and inspection regime implemented.



## 5.0 MAINTENANCE OF INFILTRATION BASINS



### 5.1 Description

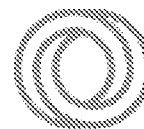
5.1.1 Basins are generally dry, intermittently wet, SuDS that are used in the later stages of the treatment train, and they are seen as site or regional controls. Basins attenuate and treat the runoff through sedimentation and biological degradation.

5.1.2 Basins are visually pleasing and offer various types of planting and vegetation in and around the basin.

5.1.3 Hard engineered headwalls are used for inlet pipes.

**Table 5.1: Basin Maintenance Activities & Frequency (*continued overleaf*)**

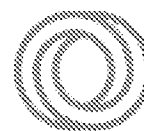
| Maintenance Category | Maintenance Activity                                          | Comments                                                                                                                                                                                                   | Frequency                                       |
|----------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Routine Maintenance  | Litter and debris removal.                                    | Litter & debris to be removed prior to any grass cutting activity (of perimeter areas) to minimise risk of shredding litter. Particular attention should be paid to inlet pipes and grilles (if in place). | Monthly.                                        |
|                      | Grass cutting: landscaped areas, spillways and access routes. | All cuttings to be removed from SUDS component.                                                                                                                                                            | Monthly (during growing season) or as required. |
|                      | Grass cutting: meadow grass.                                  | All cuttings to be removed from SUDS component.                                                                                                                                                            | Half yearly (Spring before                      |



| Maintenance Category   | Maintenance Activity                                                                           | Comments                                                                                                                                                 | Frequency                                     |
|------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
|                        |                                                                                                |                                                                                                                                                          | nesting season, and Autumn).                  |
|                        | Remove dead vegetation from pond edge.                                                         |                                                                                                                                                          | 1-3 years, or as required.                    |
|                        | Manage other vegetation and remove nuisance plants.                                            | Weeding should be conducted by hand or use non-toxic and biodegradable weed killer. Invasive species should be removed in accordance with best practice. | Monthly (at implementation) then as required. |
|                        | Tidy all dead growth before start of growing season.                                           |                                                                                                                                                          | Annually.                                     |
|                        | Re-seed or replant areas of poor vegetation growth.                                            |                                                                                                                                                          | As required.                                  |
| Infrequent Maintenance | Prune and trim trees and remove cuttings.                                                      | Where vegetation is planted as a barrier management of upward growth to encourage outward growth is necessary (after shrub seedlings are established).   | As required.                                  |
|                        | Remove sediment from forestry and main body of large ponds when pool volume is reduced by 20%. | Sediment level will be dependent upon presence and type of upstream SUDS, size and land use of catchment as well as local soil conditions.               | >25 years usually, or as required.            |
| Corrective Maintenance | Repair erosion or other damage.                                                                |                                                                                                                                                          | As required.                                  |
|                        | Repair / rehabilitation of inlets.                                                             |                                                                                                                                                          | As required.                                  |

**Table 5.2: Basin Inspection & Frequency**

| Inspection Activity                                                           | Comments                                              | Frequency    |
|-------------------------------------------------------------------------------|-------------------------------------------------------|--------------|
| Inspect structures for evidence of poor operation                             |                                                       | Monthly.     |
| Inspect banksides, structures, pipework etc. for evidence of physical damage. |                                                       | Monthly.     |
| Inspect inlets and pre-treatment components for silt accumulation.            | Includes visual inspection of chamber (where present) | Half yearly. |



## 6.0 MAINTENANCE OF INFILTRATION SWALES

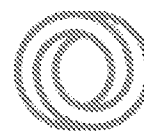


### 6.1 Description

6.1.1 Infiltrations swales are linear, flat bottomed grassed or vegetated channels that store and infiltrate conveyed surface water runoff into the ground.

**Table 6.1: Swale Maintenance Activities & Frequency (*continued overleaf*)**

| Maintenance Category | Maintenance Activity                              | Comments                                                                                                              | Frequency                                         |
|----------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Routine maintenance  | Debris and litter removal.                        |                                                                                                                       | Monthly, or as required.                          |
|                      | Grass cutting and vegetation management.          | Retain grass height to an ideal height of 100mm and remove nuisance plants.                                           | Monthly during growing season, or as required.    |
|                      | Manage other vegetation & remove nuisance plants. |                                                                                                                       | Monthly for first three months, then as required. |
|                      | Inspection for blockages.                         | Inspect inlets for blockages, and clear if required.                                                                  | Monthly.                                          |
|                      | Inspection for infiltration.                      | Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where extended ponding occurs. | Monthly or when issues arise.                     |

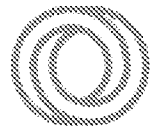


## MANAGEMENT AND MAINTENANCE MANUAL

| Maintenance Category   | Maintenance Activity              | Comments                                                                                                   | Frequency                                                                         |
|------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Infrequent maintenance | Inspection for silt build up.     | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies. | Half yearly.                                                                      |
|                        | Check for poor vegetation growth. | Cut back adjacent vegetation where possible.                                                               | Annually.                                                                         |
|                        | Reseed.                           | Reseed areas of poor vegetation growth.                                                                    | As required, or when bare soil is exposed over 10% or more of the treatment area. |
|                        | Scarify                           | Scarify top layer to improve infiltration performance                                                      | As required.                                                                      |
|                        | Sediment removal                  | Remove build-up of sediment on upstream gravel trench or at top of filter strip.                           | As required.                                                                      |
|                        | Oil removal                       | Remove oils or petrol residues using safe work practices.                                                  | As required.                                                                      |

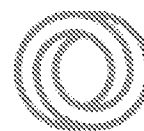
Table 6.2: Swale Inspection & Frequency (*continued overleaf*)

| Maintenance Schedule   | Required Action                                                                                                       | Typical Frequency                                                                    |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Regular maintenance    | Remove litter and debris.                                                                                             | Monthly, or as required.                                                             |
|                        | Cut the grass – to retain grass height within specified design range.                                                 | Monthly (during growing season), or as required.                                     |
|                        | Manage other vegetation and remove nuisance plants.                                                                   | Monthly at start, then as required.                                                  |
|                        | Inspect inlets for blockages, and clear if required.                                                                  | Monthly.                                                                             |
|                        | Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where extended ponding occurs. | Monthly, or when required.                                                           |
|                        | Inspect vegetation coverage.                                                                                          | Monthly for six months, quarterly for two years, then half yearly.                   |
|                        | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies.            | Half yearly.                                                                         |
| Occasional maintenance | Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required.                     | As required or if bare soil is exposed over 10% or more of the swale treatment area. |
|                        | Repair erosion or other damage by re turfing or reseeding.                                                            | As required.                                                                         |
|                        | Relevel uneven surfaces and reinstate design levels.                                                                  | As required.                                                                         |

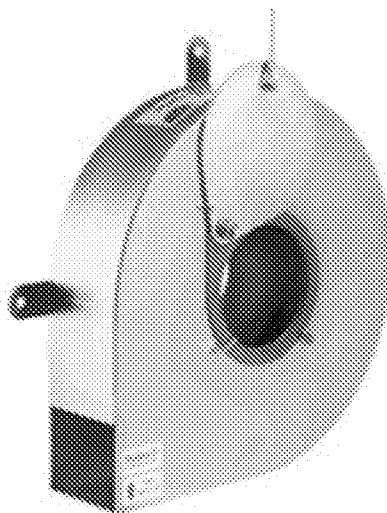


## MANAGEMENT AND MAINTENANCE MANUAL

| Maintenance Schedule | Required Action                                                                                                                         | Typical Frequency |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Remedial actions     | Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface. | As required.      |
|                      | Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.                                         | As required.      |
|                      | Remove and dispose of oils or petrol residues using safe standard practices.                                                            | As required.      |



## 7.0 MAINTENANCE OF FLOW CONTROL DEVICES (VORTEX AND ORFICIE CONTROLS)



### 7.1 *Description*

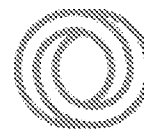
7.1.1 A flow control device usually comprises of a fixed orifice or an alternative form of throttle such as a vortex flow control unit. Its principal function is to throttle the discharge passed down stream and thereby retain water upstream within associated storage facilities.

7.1.2 The vortex flow controls provide a non-linear flow curve and as such, can respond to both high and low intensity rainfall events.

7.1.3 This site utilises a vortex flow control device (Hydrobrake or similar) and will usually contain a sump within the flow control chamber and associated parts for access and maintenance.

7.1.4 Normally, little maintenance is required as there are no moving parts within the flow control device and generally if blockages occur, they do so at the intake and can be due to poor installation or upstream treatment of water entering the system.

7.1.5 The vortex flow control is to be fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.

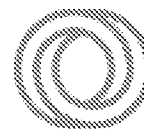
**Table 7.1: Flow Control Devices Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity                                                               | Comments                                                                                                                                                                                                           | Frequency                                          |
|------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Routine maintenance    | Inspect and identify any areas that are not operating correctly.                   |                                                                                                                                                                                                                    | Monthly (for the first 3 months) then half yearly. |
|                        | Remove sediment from upstream silt trap (sump).                                    |                                                                                                                                                                                                                    | Half yearly, or as required.                       |
|                        | Hose down unit / chamber.                                                          |                                                                                                                                                                                                                    | Half yearly, or as required.                       |
|                        | Test bypass chamber door operating rope to ensure door closes fully when released. |                                                                                                                                                                                                                    | Half yearly, or as required.                       |
| Infrequent maintenance | Clear blockages.                                                                   | Pivoting bypass door to ensure manhole can be drained in the event of a blockage.                                                                                                                                  | As required.                                       |
| Corrective Maintenance | Removal and inspection of unit.                                                    | The materials have an estimated life span in excess of the design life of drainage systems. Should however the above maintenance not resolve issues then the unit may need to be removed and repaired or replaced. | As required.                                       |

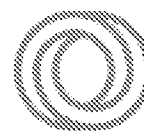
**Table 7.2: Flow Control Inspection & Frequency**

| Inspection Activity                                                                          | Comments | Frequency    |
|----------------------------------------------------------------------------------------------|----------|--------------|
| Inspect all inlets / outlets, to check they are in good condition and operating as designed. |          | Annually.    |
| Check mechanical devices within associated chambers.                                         |          | Half yearly. |

7.1.6 The above maintenance and inspection regime is recommended; however reference should also be made to the appropriate manufacturers guidance and recommendations and the more frequent maintenance and inspection regime implemented.

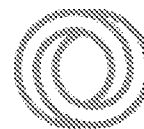
**8.0 GLOSSARY**

|                               |                                                                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Amenity grass                 | Close mown grass, cut 16 times per annum to a length of 50-65mm.                                                                                              |
| Attenuation                   | Storage of runoff; used with a flow control to control discharge.                                                                                             |
| Baseflow                      | Sustained (or constant) flow required for wetlands.                                                                                                           |
| Barrier vegetation            | Vegetation to deter access.                                                                                                                                   |
| Berm                          | A mound of earth used to control flow (similar to a submerged dam or weir).                                                                                   |
| Check dam                     | Small dam used to control flow, common (for swales) where site slope exceeds 4%.                                                                              |
| Conveyance                    | Movement of runoff from one point to another.                                                                                                                 |
| Diaphragm trench              | Small trench (normally containing pea gravel) acting as a silt trap prior to sheet flow onto a filter strip.                                                  |
| Design level (or flood level) | Level of water storage within SUDS.                                                                                                                           |
| Emergent vegetation           | Vegetation which grows in water but which pierces the surface, e.g. <i>Phragmites</i> .                                                                       |
| Energy dissipation technique  | A method to reduce energy of water flow to prevent damage / erosion to the structure.                                                                         |
| Filter bed                    | A gravel filled base designed to ensure the base of a structure remains dry during small storm events. Similar in nature and construction to a filter trench. |
| Flow control                  | A device used to control the discharge from a structure, e.g. weir, orifice.                                                                                  |
| Flow spreading technique      | A method to reduce intensity of flow, scattering across a wider area, reducing erosion and scour.                                                             |
| Forebay                       | Small basin designed to capture and retain sediment.                                                                                                          |
| Gabion                        | Wire baskets filled with large boulders, offering reinforcement whilst allowing water to drain through.                                                       |
| Geocellular system            | Plastic storage system used to attenuate runoff.                                                                                                              |
| Geotextile                    | Synthetic permeable fabric commonly used in SUDS construction, e.g. filter trenches, helping to retain sediment.                                              |
| Groundwater recharge          | Where surface water moves downward to groundwater.                                                                                                            |




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|                        |                                                                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Half drain down        | Time taken for the attenuated volume (in SUDS) to reduce to half of the storage volume by infiltration or use of flow control.                          |
| Hydro-Brake            | Control device to regulate flow. Uses a vortex system to achieve design flow.                                                                           |
| Infiltration           | Process by which water on the ground surface enters the soil.                                                                                           |
| Inspection chamber     | Open chamber used to assess level of sediment in the structure and assess half drain down time.                                                         |
| Long grass             | Similar to meadow grass but without wildflower mix.                                                                                                     |
| Meadow (or long) grass | Long grass with wildflower mix (sown or natural) cut 1-2 times per annum.                                                                               |
| Modular system         | See geocellular system.                                                                                                                                 |
| Overflow weir          | Type of weir (hard or soft engineered) to control flow when design level is exceeded.                                                                   |
| Penstock               | An adjustable vertical sliding plate to control flow.                                                                                                   |
| Permeable paving       | Paving designed to allow infiltration of runoff between blocks; can be designed to attenuate or allow infiltration into the ground.                     |
| Permanent water level  | Static level of water within a pond. Storage capacity is the volume above this.                                                                         |
| Point flow             | Inflow from a specific source, i.e. a pipe.                                                                                                             |
| Regional control       | Management of runoff from a site or several sites, typically a pond or wetland.                                                                         |
| Reno mattress          | Type of gabion, typically wider and shallower (in depth) than normal gabions.                                                                           |
| Rip-rap                | Rock or other material used to prevent erosion, reduce velocity and dissipate flow.                                                                     |
| Runoff                 | Surface runoff is water from rain, snow melt or other sources that flows over the land surface.                                                         |
| Safety bench           | Shallow sloped margin areas normally used around pond edges to reduce risk of falling in and allows ease of exit from the water following an emergency. |
| Scarify                | Method to break up silt deposits, remove dead grass and other organic deposits and relieves compaction of the soil surface.                             |
| Scour                  | Localised erosion usually as a result of high flows (or velocities of flow).                                                                            |
| Sediment forebay       | See forebay.                                                                                                                                            |




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|                              |                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Sheet flow                   | Runoff that moves as overland flow in very shallow depths.                                                          |
| Site control                 | Management of runoff from a local area or site, typically detention basins or infiltration basins.                  |
| Slotted (or perforated) pipe | Pipe usually (UPVC) with holes or slots at regular intervals allowing water to drain out or in as required.         |
| Source control               | Control of runoff at or near its source, e.g. soakaway.                                                             |
| Spike                        | Method (usually mechanical) to open up soil, improving infiltration.                                                |
| Spillway                     | Structure allowing the controlled release of water when design levels are exceeded. Can be soft or hard engineered. |
| Storage                      | See attenuation.                                                                                                    |
| Stormwater                   | An interchangeable term for surface water runoff. See runoff.                                                       |
| Surface blinding             | Blockage of the soil (normally by sediment) preventing infiltration.                                                |
| Treatment                    | Improving water quality by physical, chemical and/or biological means.                                              |
| Treatment train              | Series of SUDS component used to provide incremental water quality improvement and storage.                         |
| Void space                   | The storage volume between gravel particles (usually for filter/infiltration trenches).                             |
| Weir                         | Horizontal structure designed to control flow.                                                                      |

## Abbreviations

|      |                                      |
|------|--------------------------------------|
| Ha   | Hectare (1ha = 10,000 square metres) |
| SUDS | Sustainable Urban Drainage Systems   |

**APPENDIX A**

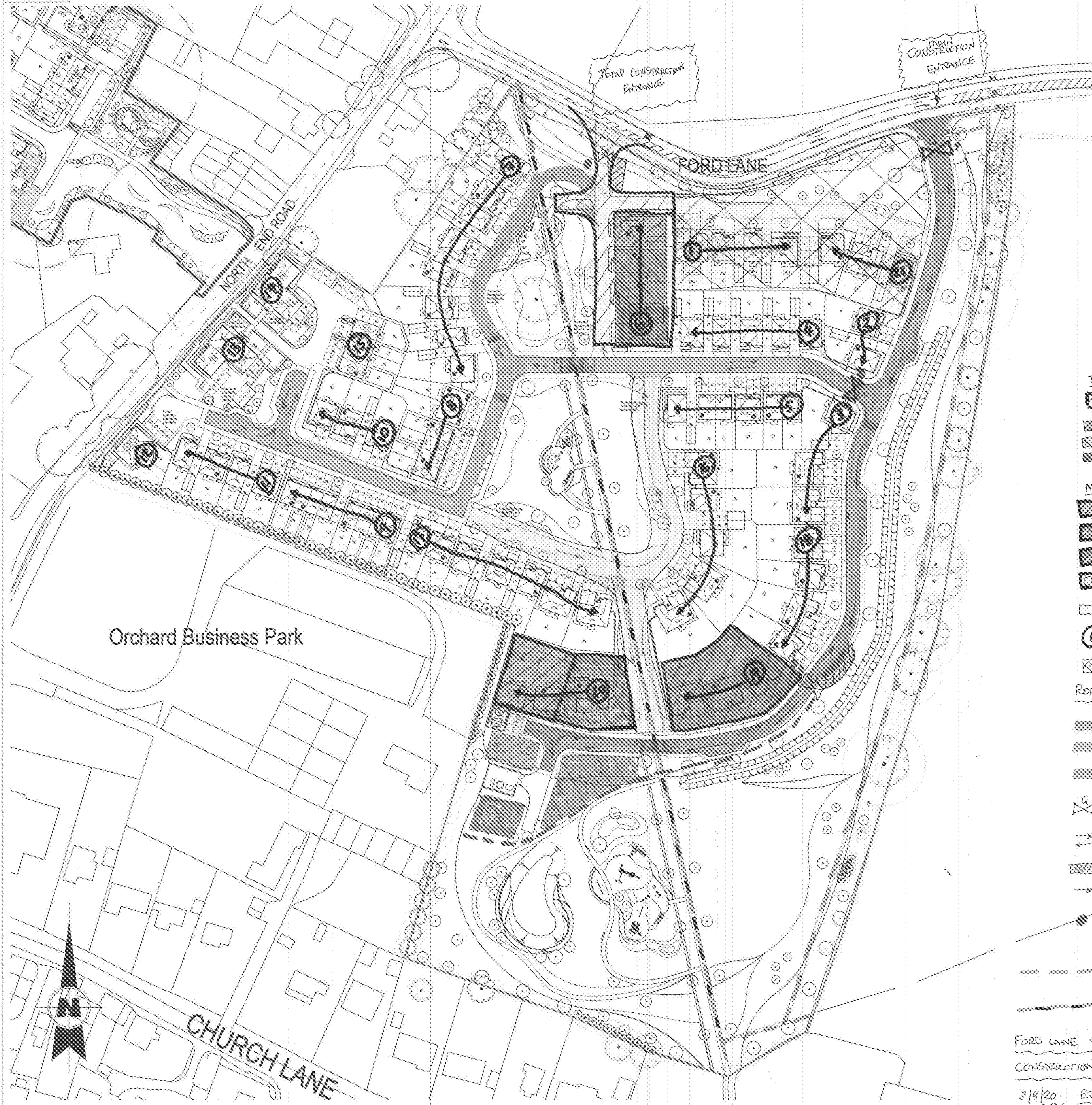
**Odyssey Drawing 18-344/108**

**Surface Water Catchment and Implementation Plan**



## **APPENDIX B**

### **Redrow Construction Phase Plan**



### Legend.

- Application Boundary - to be verified by Land Registry / Client
- Indicates 1.8m high Close Boarded Fencing
- Indicates 1.8m Brick Screen Wall
- Indicates Low Level Wall
- Pedestrian crossing points  
Charcoal block paviments
- Autumn Gold block paviments
- Brindle block paviments
- Affordable dwellings
- Buildings to be demolished
- Trees to be removed

### TEMP ACCESS AREA

- TEMP ACCESS FOR S273 CONSTRUCTION + ROADS + SEWERS.
- STORAGE AREA
- WELFARE
- CAR PARK

### MAIN SITE SET UP

- SITE WELFARE AREA
- SITE CAR PARK
- STORAGE AREA
- SILLO BASE.
- HAUL ROAD (TARMAC)

### ROAD CONSTRUCTION.

- ROAD 1
- ROAD 2
- ROAD 3
- GATE. MOVABLE GATE
- TWO WAY TRAFFIC ROUTE
- WHEEL WASHING AREA.
- ONE WAY TRAFFIC ROUTE.
- H+S SIGNAGE.

### FINAL BOLD COMPOUND AREA

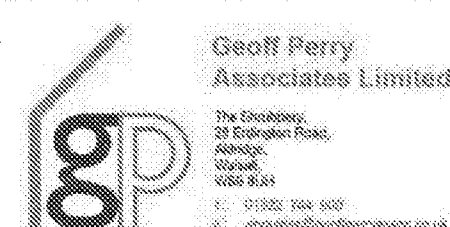
- WELFARE
- STORAGE
- PARKING.

### TEMP FENCING.

FORD LANE YARDON  
CONSTRUCTION PHASE PLAN.

2/9/20. ESJ.

|   |                                                                                                                                     |            |
|---|-------------------------------------------------------------------------------------------------------------------------------------|------------|
| L | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| K | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| M | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| N | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| O | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| P | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| Q | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| R | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| S | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| T | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| U | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| V | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| W | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| X | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| Y | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |
| Z | Plot 1 in front of plot 17 replaced with a white stone. Plot 1 replaced with 2 contemporary. Stone wall amended. A new access road. | 01/01/2020 |



Client:  
REDROW HOMES SOUTHERN  
COUNTIES LTD

Project:  
FORD LANE, YAPTON (SOUTHERN  
PARCEL)

Title:  
PLANNING LAYOUT

Date: 28/10/2019 Scale: 1:500 @ A0

Drawn by: GVP Checked by: -

Job No. 855 Drg No. 042 Rev. L

Scale Check:

1:500

1:1000

1:2000