



STRUCTURAL ENGINEERS

[CONSULTING CIVIL & STRUCTURAL ENGINEERS]

**Proposed Residential Development
Nightingale way
Sutton Bridge**

Surface Water Drainage Maintenance Plan

R – 1886S - 005

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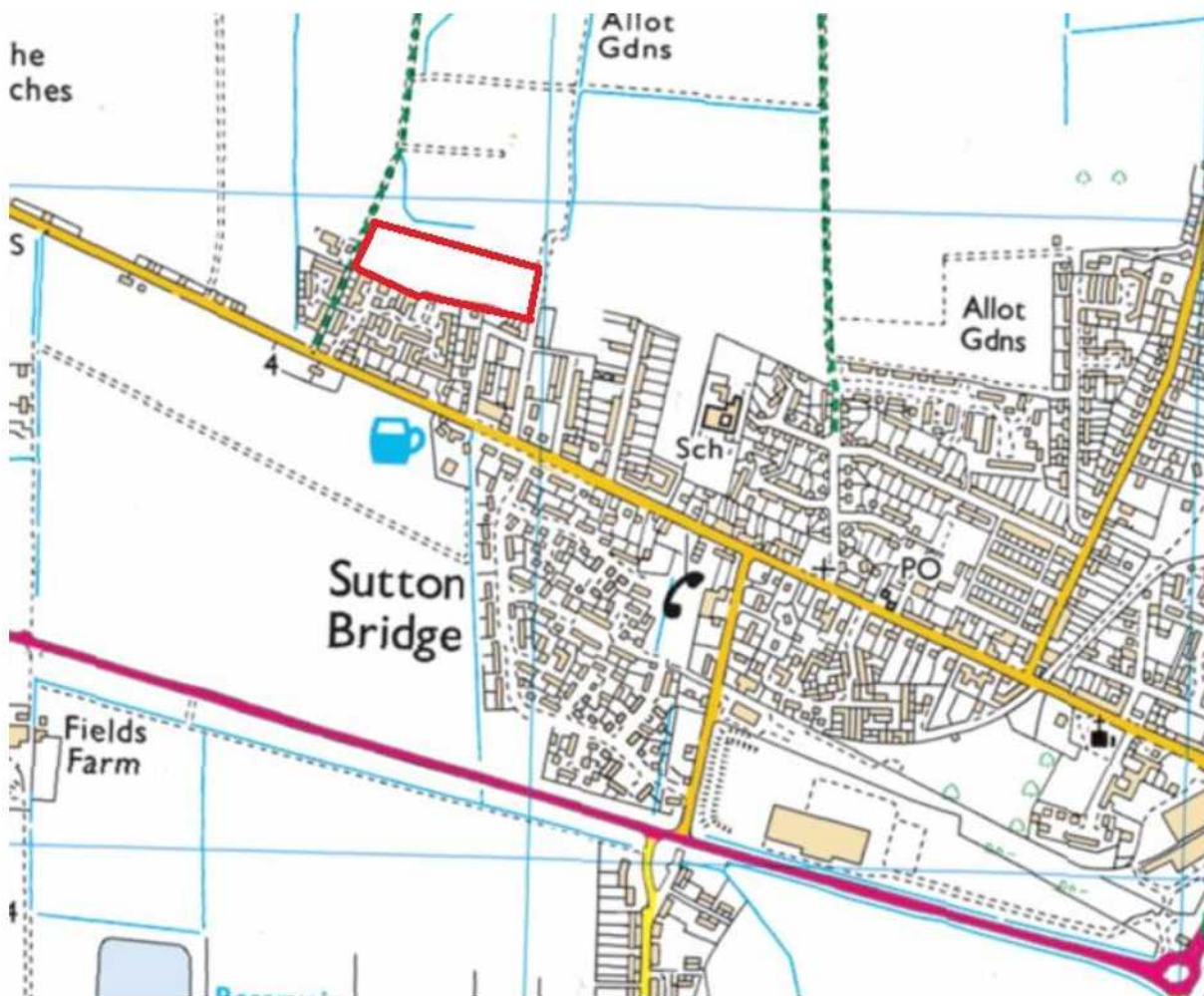
INTRODUCTION

This report is a Drainage Maintenance Plan on behalf of Lincoln Jack Ltd. for a proposed residential development off Nightingale Way, Sutton Bridge. The benefit of this report is limited to our instructing Client.

The objective of this report is to set out the maintenance and management of the developments storm water drainage systems throughout the lifetime of the development which is not being offered for adoption but will remain private and maintained using a management company,

This report has been prepared to support the reserved matters application and for use of the life time of the development.

The proposed site location is present below



Site location plan.

SURFACE WATER DRAINAGE STRATEGY

The surface water drainage for scheme is presented on SEA drawing 1886/S/E30 and E31

The discharge rates from the proposed development have been restricted to 5/s for all storm events up to and including the 1 in 100 year event plus an allowance of 40% for climate change. The storm water will outfall to an existing IDB drain to the north east of the site.

Flows will be attenuated on site with the use of an online detention basin, located to the north of the development.

To help with water quality the use of SUDS has been applied within the scheme providing tanked permeable block paving to all private drives and the use of a filter drains in order to convey storm water from the adopted highways to the main drainage.

The main drainage runs on site will be offered for adoption to Anglian Water with the remaining being privately owned.

MAINTENANCE PLAN

The following paragraphs sets out the proposed maintenance regime required for the developments storm water drainage throughout its lifetime

PIPE SYSTEMS AND INSPECTION CHAMBERS,

Traditional drainage systems using pipes and inspection chambers are the more conventional method of disposing of surface water from the developments impermeable areas.

Inspection chambers/manholes are provided at regular intervals in accordance with Part H and in all changes in direction.

Below sets out the maintenance requirements of the developments traditional drainage systems. All of which are easily accessible and open.

Maintenance Category	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action	Monthly (for the first 3 months) then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures	Annually or as required
Remedial Actions	Remove blockages	As required
	Cleaning/Jetting	As required
	Repair/rehabilitation of system	As required
Monitoring	Inspect/check all part of piped system and inspection chambers to ensure that they are in good condition and operating as required	Annually and after large storms.

PERMEABLE BLOCK PAVING

Permeable block paving is a system in which allows rainwater to penetrate the surface by use of voids between the blocks. Water is then stored within the subbase prior to outfall.

The proposals incorporate the use permeable block paving for all private drives.

Below sets out the required maintenance regime.

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 glyphosate 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

FILTER DRAINS

Filter drains are shallow trenches filled with stone/gravel that create temporary below ground storage for the attenuation and conveyance of surface water runoff. The stone may be contained in a simple trench lined with a geotextile, geomembrane or other impermeable layer.

Filter drains are located adjacent to the main access road which will be offered for adoption to Lincolnshire County Council.

Below sets out the required maintenance regime.

Operation and maintenance requirements for swales		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut 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, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 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
Remedial actions	Repair erosion or other damage by re-turfing or reseeded	As required
	Relevel uneven surfaces and reinstate design levels	As required
	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

DETENTION BASIN

Detention basins are landscaped depressions that are normally dry except during and immediately following storm events. They can be on-line, where surface water runoff from regular events is routed through the basin and when flows rise, because the outlet is restricted, the basin fills and provides storage and flow attenuation. Detention basins can be vegetated that can provide treatment to surface water flows, when flows are directed through them.

The site incorporates an on-line detention basin, whereby surface water flows discharge through the basin prior to outfall into the pumping station. The basin is located within a public open spaces and will be easily accessible for maintenance.

Below sets out the maintenance requirement for the detention basin

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