

Maintenance and Management Plan

**Housing Development at
Croesnewydd Road
Wrexham**

CONTENTS

INTRODUCTION AND PURPOSE OF DOCUMENT	3
MAINTENANCE TYPE	4
MAINTENANCE CATEGORY	5
SAFETY INSPECTIONS	6
MAINTENANCE OF THE HIGHWAY	7
FREQUENCY OF SERVICE INSPECTION OF HIGHWAY	9
SERVICE INSPECTION OF STREET LIGHTING	9
SERVICE INSPECTION OF DRAINAGE SYSTEMS	10
FREQUENCY OF SERVICE INSPECTION OF HIGHWAY	11
MAINTENANCE OF CONTOURED TROUGH FRONTING THE SITE	12

INTRODUCTION AND PURPOSE OF DOCUMENT

This document is produced on behalf of the developer to ensure an adequate maintenance regime is established for the drainage, highway and associated ancillary items within the proposed residential development.

The highway is not being offered for adoption to the local Highway Authority thus this document sets out recommendations for the ongoing servicing of the constructed road and drainage by the Housing Authority.

The aim of the document is to assist in preserving and maintaining the roadway and related drainage as nearly as possible in its original condition as constructed. This is to provide satisfactory and safe transportation and facilitate the adequate drainage of the highway and site itself.

There is potential of a flood route through the development site which could occur should a 100% blockage arise within the culvert south west of the site along Croesnewydd Road. These flows are to be intercepted and re-diverted around the development. This document sets out the maintenance regime required for ensuring the flows continue to be intercepted for the lifetime of the development.

MAINTENANCE TYPE

Different maintenance types contribute in varying degrees to the core objectives of safety, serviceability and sustainability. In each case therefore, standards and delivery arrangements should preferably be established having regard to these objectives, focussed on outcomes, rather than on inputs mainly related to maintenance type.

The main types of highway maintenance are as follows:

- reactive - responding to inspections, complaints or emergencies;
- routine - regular consistent schedule, generally for patching, cleaning, drainage cleansing, grass cutting and landscape maintenance;
- programmed - flexibly planned schemes primarily of resurfacing, reconditioning or reconstruction;
- winter service;
- weather and other emergencies.

MAINTENANCE CATEGORY

Within each of the above types there are various categories of maintenance as follows, each of which should be considered in terms of their output contribution towards the core objectives of safety, serviceability and sustainability:

Reactive

- all assets - sign and make safe for safety purposes;
- all assets - provide initial temporary repair for safety purposes;
- all assets - provide permanent repair for safety purposes.

Routine

- carriageways and footways - minor works and patching;
- drainage systems - cleansing and repair;
- verges – grass cutting;
- road markings – replacement;
- lighting installations – cleansing, repair and testing

Programmed

- carriageways - minor works, resurfacing or reconstruction;
- footways - minor works, resurfacing or reconstruction;

Winter Service

- pre-treatment;
- post-treatment;
- clearance of ice and snow.

Weather and other Emergencies

- flooding;
- other emergencies.

SAFETY INSPECTIONS

Safety inspections are designed to identify all defects likely to create danger or serious inconvenience to users of the network. Such defects should include those that will require urgent attention (within 24 hours) as well as those where the locations and sizes are such that longer periods of response would be acceptable. The safety inspection regime forms a key aspect of a strategy for managing liabilities and risks.

The parameters which need to be specified for a safety inspection regime are:

- frequency of inspection;
- items for inspection;
- degree of deficiency;
- nature of response.

The regime should be developed based on a risk assessment and provide a practical and reasonable approach to the risks and potential consequences identified. It should be considered in the same light as a Safety Audit and treated accordingly. The inspection regime should take account of potential risks to all road users, and in particular those most vulnerable.

Safety Inspection Frequency:

- Access Road: 1 year intervals
- Access Footway: 1 year intervals

MAINTENANCE OF THE HIGHWAY

Service inspections for carriageways and footways will generally be undertaken at less frequent intervals than safety inspections.

Each aspect of the maintenance regime needs to be founded on the core objectives of:

Safety

- Meeting users' needs for safety.

Serviceability

- Ensuring availability
- Achieving integrity
- Maintaining reliability
- Enhancing condition

Sustainability

- Minimising cost over time
- Maximising value to the community

The condition of the carriageway fabric can contribute to the core objectives as follows:

Safety

- Nature, extent and location of surface defects;
- Nature and extent of edge defects;
- Nature and extent of surface skidding resistance.

Serviceability

- Nature and extent of surface defects;
- Ride quality of the surface.

Sustainability

- Surface noise attenuation characteristics;
- Nature and extent of surface defects;
- Nature and extent of carriageway deflection.

Pavement maintenance and rehabilitation programs restore riding quality and maintain the structural integrity of the pavement over its full design life. Surface maintenance for low type bituminous surfaces generally involves patching, seal coating or possible loosening oiling, re mixing and relaying.

Asphalt concrete pavements are subjected to various types of pavement distress or failure. These include:

- Alligator Cracking:

A series of interconnecting or interlaced cracks caused by fatigue of the asphalt concrete surface under repeated traffic loading. [Cracking is due to foundation movement at subgrade]

- Block Cracking:

Cracks forming large interconnected polygon usually with sharp corners or angles. These cracks are generated by hardening or shrinking.

- Transverse Cracking:

Cracks approximately at right angle to the pavement centre-line. These may be caused by hardness and shrinkage of asphalt or differential thermal stresses of asphalt concrete or may be reflection cracking.

- Longitudinal Cracking:

Cracks approximately parallel to the pavement centre-line. These are caused by poorly constructed construction joints and shrinkage of the asphalt concrete surface. Longitudinal cracks may also be reflection cracks.

- Raveling:

Wearing away the pavement surface caused by dislodging of aggregate particles and binders. This is usually a result of insufficient asphalt binder in the mix or stripping of asphalt from particles of aggregate.

- Bleeding or Flushing (Fattening Up):

The exuding of bitumen on to the surface causing reduction in skid resistance, occurring in hot weather generally caused by excessive amount of asphalt in the mix or low air void content.

- Pot Holes:

When intersecting cracks become deep and surfacing becomes dislodged.

- Ruts:

Depressions formed under the wheel due to heavy load, causing deformation on the surface.

FREQUENCY OF SERVICE INSPECTION OF HIGHWAY

A service inspection should be undertaken every 5 years to establish the condition of the road and findings recorded for future comparison.

Sweeping the road should occur on a half year basis.

In relation to road markings, inspections in respect of wear, spread, colour, skid resistance and retro-reflectivity shall be undertaken for paint markings and for thermoplastic markings at frequencies of one year and two years respectively. Inspections for reflective conspicuity should be carried out during the hours of darkness and programmed to enable maintenance works to be completed before the onset of winter.

SERVICE INSPECTION OF STREET LIGHTING

A well-designed cyclic maintenance programme will help to prevent the performance of the installation falling below the designed level; will identify any mechanical, structural, electrical or optical work necessary to maintain or increase the life of the installation; reduce the incidence of faults by preventative maintenance; and check that the installation is safe.

Cyclical maintenance will normally include the following tasks:

- Luminaire inspection, maintenance and cleaning.
- Photocell / timing mechanism inspection, adjustment and cleaning.
- Visual inspection and minor repairs to electrical equipment and wiring.
- Mechanical inspection and maintenance including door security.
- Visual inspection of the structural condition of the lighting column or illuminated traffic sign post, bracket, luminaire and any attachments.
- Programmed electrical inspection and testing.
- Programmed structural testing.
- Programmed group lamp replacement.
- Programmed painting.

Different lamp types have a different mean life. Therefore the bulk lamp change is generally undertaken at 5 – 7 year intervals, depending upon the lamp survival curves for each lamp type. There are two main strategies for the replacement of discharge lamps:

- Burn to extinction, under which lamps are replaced on failure.
- Group lamp replacement; under which all lamps of a particular type in a street are replaced at the same pre-defined time.

Longer periods between replacement lead to more expensive reactive replacements or increased outages. Shorter periods do not maximise lamp life.

Cleaning has a significant effect on recovering the depreciation of light output of the luminaires due to dirt. Cleaning the exterior of the luminaire bowl has the most significant effect, followed by cleaning the interior of the bowl.

Regular inspections and checks should be undertaken as follows:

- Scouting to check light operational 4 weekly
- Visual safety check Every visit
- Clean lamps Every 3 years
- Change lamp 5-7 years depending upon lamp type
- Electrical test 6 years
- Structural test *20years then every 1-3yrs depending on results

* Initial structural test undertaken at “Action Age” and then determined by the previous test. The main cause of failure is internal corrosion. After this initial test subsequent tests are undertaken every 3, 2 or 1 year, depending upon the results of the previous test. Columns are generally replaced around 40 years post construction.

SERVICE INSPECTION OF DRAINAGE SYSTEMS

The frequency of emptying will depend upon the location, extent of tree cover, level of rainfall, the extent of kerbing and the frequency of sweeping. In lower risk situations, by default all gullies should be cleansed annually and arrangements made for non-functioning gullies to be recorded for more frequent or detailed attention. Gullies should be over-filled when emptied to ensure they are clear and if not, the unit should be recorded for jetting. No more than 50mm of material should remain in the unit before it is recharged with clean water.

Conventional drainage is traditionally maintained by contractors using specialist machinery to clear gullies, pipework, and storage zones of trash and sediment accumulation. Most conventional drainage infrastructure is out of sight; so the frequency of routine maintenance

is generally determined by routine rather than need, and irregular maintenance activities tend to be triggered by system performance failure.

It is important that a new subsurface drainage system be carefully inspected and maintained for the first two or three years. Any weak spots that have developed in the lateral and main drains and any backfilled areas that have settled can be remedied and filled in.

The ideal time to inspect the system is in the spring, late fall and after a significant rainfall event – when the soil is wet and the drains are running. Prompt repair of any noted issues will ensure that the system is always in good working order and will prevent a more serious issue from developing.

Records should be kept of any maintenance/repairs and changes to the system on the drainage plan. This will ensure that there is always an accurate plan of the system for future inspection and maintenance.

The following default condition standards are suggested for ironware set in carriageways. Manhole covers and boxes in the carriageway should be installed to a tolerance of $\pm 5\text{mm}$ to the surrounding level. Gully frames and gratings should be installed level, or not exceeding 10mm lower than the surrounding carriageway. When boxes, frames and covers are found to be greater than 20mm lower than the surrounding carriageway they should be re-set.

FREQUENCY OF SERVICE INSPECTION OF HIGHWAY

- Drainage pipes should be inspected for the first two or three years.
- Silt traps need to be monitored quarterly in first year and silt accumulation rate noted. Empty based on accumulation rate or empty yearly or following large storms.
- Debris removal from catchment surface on half yearly basis in line with highway sweeping (otherwise could cause risks to performance)
- Cleansing of gutters and any filters on downpipes should be undertaken annually.
- The drainage system should be programmed to be jetted every 5 years to maintain an as-designed network.
- Soakaway – design life in excess of 50yrs where no settlement occurs and cover depth is maintained as designed. Should be checked annually to determine if functioning adequately.

MAINTENANCE OF THE CONTOURED TROUGH (DITCH) FRONTING THE SITE

This is to facilitate the adequate escape of fluvial flows from the site expected during the occurrence of a 100% blockage to the culvert on the Lower Berse Farm tributary. Water is directed down Croesnewydd Road whereby it reached the front of the development site and escapes the road via a low point on the kerblin. Flows are to be intercepted and directed overland via the contoured trough and discharge onto the lower site beyond the site boundary or alternatively directly to Afon Gwenfro. Maintenance to this trough should include ensuring the frequent cutting of the grass and keeping the surface free from debris.

-END-