1 LONG TERM MAINTENANCE TASKS

1.1 Schedule of visits

1.1.1 Schedule of Site Visits (Regular Inspec & Maint)	
Purpose of visit	Frequency
Inspection	Regular inspection and maintenance should be carried out to ensure the system functions as designed. It is recommended that these checks be undertaken on a three monthly basis during the initial period of operating the system. A less frequent schedule might be determined after the system has established.
Maintenance	

1.2 Tasks

The scope of maintenance tasks should include verifying the function and condition of the following elements:

- Filter media
- Horticultural
- Drainage infrastructure
- Other routine tasks

1.2.1 FILTER MEDIA TASKS	
Sediment deposition	Remove sediment build up from forebays in raingardens and from the surface of bioretention street trees. Frequency – 3 MONTHLY AFTER RAIN
Holes or scour	Infill any holes in the filter media. Check for erosion or scour and repair, provide energy dissipation (e.g. rocks and pebbles at inlet) if necessary. Frequency – 3 MONTHLY AFTER RAIN
Filter media surface porosity	Inspect for the accumulation of an impermeable layer (such as oily or clayey sediment) that may have formed on the surface of the filter media. A symptom may be that water remains ponded in the raingarden or tree pit for more than a few hours after a rain event. Repair minor accumulations by raking away any mulch on the surface and scarifying the surface of the filter media between plants. For bioretention tree pits without understorey vegetation, any accumulation of leaf litter should be removed to help maintain the surface porosity of the filter media. Frequency – 3 MONTHLY AFTER RAIN
Litter Control	Check for litter (including organic litter) in and around treatment areas. Remove both organic and anthropogenic litter to ensure flow paths and infiltration through the filter media are not hindered. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS

1.2.2 HORTICULTURAL TASKS	
Pests and Diseases	Assess plants for disease, pest infection, stunted growth or senescent plants. Treat or replace as necessary. Reduced plant density reduces pollutant removal and infiltration performance. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Maintain original plant densities	Infill planting: Between 6 and 10 plants per square metre should (depending on species) be adequate to maintain a density where the plant's roots touch each other. Planting should be evenly spaced to help prevent scouring due to a concentration of flow. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Weeds	It is important to identify the presence of any rapidly spreading weeds as they occur. The presence of such weeds can reduce dominant species distributions and diminish aesthetics. Weed species can also compromise the systems long term performance. Inspect for and manually remove weed species. Application of herbicide should be limited to a wand or restrictive spot spraying due to the fact that raingardens and bioretention tree pits are directly connected to the stormwater system. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
1.2.3 DRAINAGE TASKS	
Perforated pipe	Ensure that perforated pipes are not blocked to prevent filter media and plants from becoming waterlogged. A small steady clear flow of water may be observed discharging from the perforated pipe at its connection into the downstream pit some hours after rainfall. Note that smaller rainfall events after dry weather may be completely absorbed by the filter media and not result in flow. Remote camera (e.g. CCTV) inspection of pipelines for blockage and structural integrity could be useful. Frequency – 6 MONTHLY AFTER RAIN
High flow inlet pits, overflow pits and other stormwater junction pits	Ensure inflow areas and grates over pits are clear of litter and debris and in good and safe condition. A blocked grate would cause nuisance flooding of streets. Inspect for dislodged or damaged pit covers and ensure general structural integrity. Remove sediment from pits and entry sites etc. (likely to be an irregular occurrence in mature catchment). Frequency – MONTHLY AND OCCASIONALLY AFTER RAIN
1.2.4 OTHER ROUTINE TASKS	
Inspection after rainfall	Occasionally observe raingarden or bioretention tree pit after a rainfall event to check infiltration. Identify signs of poor drainage (extended ponding on the filter media surface). If poor drainage is identified, check landuse and assess whether is has altered from design capacity (e.g. unusually high sediment loads may require installation of a sediment forebay). Frequency – TWICE A YEAR AFTER RAIN

1.2.5 FORM (REGULAR INSPECTION & MAINTENANCE)			
Location	**Raingarden/Tree Pit**		
Site Visit Date:		Site Visit By:	
Weather:			
Purpose of the Site Visit	Routine Inspection	☐	Complete section 1 (below)
	Routine Maintenance	☐	Complete sections 1 and 2 (below)

NOTE: Where maintenance is required ('yes' in Section 2), details should be recorded in the 'Additional Comments' section at the end of this document.

1. Filter media				
*In addition to regular inspections, it is recommended that inspection for damage and blockage is made after significant rainfall events that might occur once or twice a year.	Section 1		Section 2	
	Maintenance Required?		Maintenance Performed	
	Yes	No	Yes	No
Filter media (CIRCLE – pooling water/accumulation of silt & clay layer/scour/holes/sediment build up)	☐	☐	☐	☐
Litter (CIRCLE – large debris/accumulated vegetation/anthropogenic)	☐	☐	☐	☐
2. Vegetation				
Vegetation health (CIRCLE – signs of disease/pests/poor growth)	☐	☐	☐	☐
Vegetation densities (CIRCLE – low densities– infill planting required)	☐	☐	☐	☐
Build up of organic matter, leaf litter (CIRCLE – requires removal) BIORETENTION TREE PITS ONLY	☐	☐	☐	☐
Weeds (CIRCLE – isolated plants/infestation) (SPECIES – ……..)	☐	☐	☐	☐

3. Pits, pipes and inflow areas				
	Section 2		Section 3	
	Maintenance Required?		Maintenance Performed	
	Yes	No	Yes	No
Perforated pipes (CIRCLE – full blockage/partial blockade/damage)	☐	☐	☐	☐
Inflow areas (CIRCLE – scour/excessive sediment deposition/litter blockage)	☐	☐	☐	☐
Over flow grates (CIRCLE – damage/scour/blockage)	☐	☐	☐	☐
Pits (CIRCLE – poor general integrity/sediment build up/litter/blockage)	☐	☐	☐	☐
Other stormwater pipes and junction pits (CIRCLE – poor general integrity/sediment build up/litter/blockage)	☐	☐	☐	☐

4. Additional Comments

Note: Each year on the 1st September the occupier or body corporate is to provide to Council's Assets Design Services Section an annual collation of all maintenance carried out from the previous year. This includes the bio retention maintenance as well as the Enviropod Pit basket maintenance.

optimal stormwater

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CDS Unit Cleaning: P2028

Property: Light Horse Interchange Business hub
Location: North of OSD basin **GPS: 301860.114, 6257801.958**
Designer: Henry & Hymas Consulting Engineers – NW **Signature:**

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 17 or 19mm socket, plus a gatic lifter. It could also have a checkerplate steel lid, requiring a Council key to open the padlock. Or it could have gatics.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning: (to be confirmed through monitoring, usually every 3-6 montths)

Open 600mm manhole lid, or other manhole access over the device (depends on device)

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the volume of pollution.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate)(or find a nearby area for decanting water to, or remove then decant back into device). Take a photo before you start suction cleaning. If there is a low flow, enter the diversion chamber and open the "**capped Low Flow Bypass Pipe**", and put a sandbag or two over the CDS inlet to bypass low flows. NOTE: this is a confined space, so use a gas detector and full confined spaces entry procedures.

Suck pollution from the sump (via **sucker truck**). You shouldn't have to clean the screens, but jet them if required.

Alternatively, don't dewater, remove the full lid, and just use a clamshell grab to remove the pollution.

Replace lids, then recycle or dispose of waste.

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Annual or Comprehensive Clean: (once per year)

Remove the CDS lid. Remove the diversion chamber lid.

Suction clean as per a "regular suction clean". Take photo after dewatering showing pollution, take another photo after cleaning to show an empty sump and clean screens.

Using a gas detector and full confined spaces entry procedures, enter the diversion chamber and inspect for any debris or sediment in upstream pipes and diversion chamber. Using the survey staff, measure the height of sediment (if any) behind the screens. If more than 20% of the way up the screens, send a man and suction hose behind the screens to suck it clean.

Grease lids annually, both CDS lids and any gatic lids.

Replace the lids, recycle or dispose of waste.

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CDS Unit Cleaning: P3030

Property: Light Horse Interchange Business hub
Location: West of OSD basin
Designer: Henry & Hymas Consulting Engineers – NW

GPS: 301821.568, 6257574.509
Signature:

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 1mm or 19mm socket, plus a gatic lifter. It could also have a checkerplate steel lid, requiring a Council key to open the padlock. Or it could have multipart gatic lids.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning (to be reviewed from monitoring (usually 3-6 months):

Open 600mm manhole lid, or other manhole access over the device (depends on device)

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the volume of pollution.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate it, or find a nearby area for decanting water to, or remove then decant back into device). Take a photo before you start suction cleaning. If there is a low flow, enter the diversion chamber and open the "**Capped Lowflow Bypass Pipe**", and put a sandbag or two over the CDS inlet to bypass low flows. NOTE: this is a confined space, so use a gas detector and full confined spaces entry procedures.

Suck pollution from the sump (via **sucker truck**). You shouldn't have to clean the screens, but jet them if required. Take a photo when sump is empty.

Alternatively, ...don't dewater, remove the full lid, and just use a clamshell grab to remove the pollution.

Replace lids, clean 10m around the site, then recycle or dispose of waste.

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Using a gas detector and full confined spaces entry procedures, enter the diversion chamber and inspect for any debris or sediment in upstream pipes and diversion chamber. Using the survey staff, measure the height of sediment (if any) behind the screens. If more than 20% of the way up the screens, send a man and suction hose behind the screens to suck it clean (newer devices have an access over the volute straight down to behind the screens. Ensure diversion chamber is clean and clear.

Grease any gatic lids. Ensure the cap is on. Ensure the bolts are all present

Replace the lids, (clean 10m around the device), recycle or dispose of waste.