

V2B1® SYSTEM MAINTENANCE

1.0 REQUIRED MAINTENANCE FREQUENCY

- 1.1 The required maintenance practice for the V2B1® System is to initially plan on quarterly inspections and an annual pump-out. After experience is gained, the schedule may be more accurately determined.
- 1.2 It is recommended that the V2B1® System should be pumped out when the sediment storage depth in the first structure is at 50% of the design sediment storage depth. Refer to the project design package for the design sediment storage depth.
- 1.3 Oil Sheen and floating debris are retained in the first two chambers of the V2B1® System. Annual accumulation is estimated at less than 0.50 inches; however, it is dependent on the site.

2.0 CONDITIONS THAT CAUSE THE NEED FOR MAINTENANCE

- 2.1 The most common cause of poor performance of the V2B1® System is lack of maintenance. The V2B1® System removes pollution from the environment and, if this pollution is not routinely removed from V2B1® System, the effectiveness of the V2B1® System could be compromised. The following are things that trigger the need for maintenance and the consequences of not completing said maintenance.
 - 2.1.1 Sediment build-up in the chambers – As the sediment level increases past the recommended maintenance interval, less sediment will be removed from the runoff. Additionally, a large storm could cause entrainment of some of the sediment that was previously captured.
 - 2.1.2 Excess floatables in the chambers – Similar to sediment build-up, floatables (oil and litter) build up risking the capture of additional floatables.

- 2.1.3 Obstructed piping/baffles – If the piping or baffles become obstructed due to improper maintenance (timely removal of obstructions), flooding may occur upstream of the V2B1® System.
- 2.1.4 As with most buried structures, the access covers could be moved out of position during extreme flooding conditions.
- 2.2 In addition to the V2B1® System internal inspections, frequent site inspections should be conducted. These frequent site inspections are recommended as visual only and do not require tools, equipment, or removal of the access covers. Things to look for during these inspections are signs of flooding at catch basins upstream of the V2B1® System, unexpected loss of outlet flow, out of place access covers, and downstream pollution (oil sheen, litter, etc.).

3.0 ACCESS POINTS AND REQUIRED INSPECTION

- 3.1 Maintenance access is through access frames (rings), with covers, which are provided in the V2B1® System roof.
- 3.2 The floatables observation and sediment depth measurement are obtained by removal of the covers and access through the access frames of the V2B1® System.
- 3.3 Illuminate the water surface in the first stage of the V2B1® System while gently stirring the floatables to estimate the depth of the floatables. Obtain a sample of the floatables, water, or sediment, if required, to determine disposal. The depth of the oil sheen and floatable debris will typically be less than one inch and may be skimmed from the surface prior to the pump-out of the sediment. Organic debris that has become waterlogged and settled to the floor is expected to be present in relatively small quantities that will be removed during the pump-out of the mineral sediment.

- 3.4 Inspect all surfaces, which can be seen, of the V2B1® System for wear (e.g., cracking, spalling, etc.). Also, examine the inlet and elbow pipes for wear, blockage, and damage (cracks, etc.). Report signs of degradation to the proper authorities (i.e., property owner, municipality, etc.) as required,
- 3.5 Lower a measuring rod into the first chamber of the V2B1® System until a slight resistance is noticed. The measuring rod is now at the top of the sediment pile. Obtain a measurement by sighting the measure increments on the rod to a point on the access frame. Repeat this several times at different locations of the sediment pile in the first chamber of the V2B1® System to verify the measurement. This is Measurement A.
- 3.6 While the measuring rod is on top of the sediment pile, force it down through the sediment pile using a twisting motion until the measuring rod reaches the floor of the chamber (verify the expected elevation using the project submittal drawings). Obtain a measurement by sighting the measure increments on the rod to the same point on the access frame as was used in Step 3.5. This is Measurement B.
- 3.7 Refer to the Environment 21 system specific design package for the design sediment storage depth. This is measurement C.
- 3.8 Plug the numbers obtained from the previous three steps into the following equation to obtain the percent full sediment depth of the first chamber of the V2B1® System:
$$((B - A)/C) * 100$$
- 3.9 Complete Steps 3.2 through 3.8 for all chambers of the V2B1® System.
- 3.10 Contact the following for approval and notification of the intent to pump out the V2B1® System.
 - 3.10.1 Obtain permission from the property owner to pump out the contents of the V2B1® System.

- 3.10.2 Verify the disposal requirements with the local regulatory agency.
- 3.10.3 Contract with an approved vendor to pump out the V2B1® System. If the pump-out will be completed without a contracted vendor, go to Step 3.11, otherwise go to Step 3.16.
- 3.11 Obtain a standard truck-mounted sewer and catch basin cleaner with proper pump-out equipment (e.g., positive displacement rotary lobe vacuum pump). This equipment will be used for Steps 3.12 through 3.15.
- 3.12 Remove the floatables and hydrocarbons from the first chamber of the V2B1® System. Segregate this waste as required.
- 3.13 Remove the standing water and sediment from the first chamber of the V2B1® System. Segregate this waste as required.
- 3.14 Wash down the interior surface of the first chamber of the V2B1® System using a clean water supply. Suction the chamber while washing it. Break up and suspend into the rinse water any solids found in the chamber and verify all solids have been removed.
- 3.15 Repeat Steps 3.12 through 3.14 for the remaining chambers of the V2B1® System.
- 3.16 Using a flood light inspect all visible surfaces of the V2B1® System. Check for wear (e.g., cracking, spalling, etc.) on the surfaces. In addition, examine the inlet and elbow pipes for wear, blockage, and damage (e.g., cracks, etc.). Report signs of degradation to the proper authorities (i.e., owner, municipality, etc.) as required.
- 3.17 Refill the V2B1® System, with clean water, to the inlet/outlet pipe invert elevation.
- 3.18 Properly dispose of the waste removed from the V2B1® System.

- 3.19 Verify that no personnel, tools, or equipment are in the V2B1® System.
- 3.20 Inspect the access frames and covers for damage (e.g., cracks, deformations, etc.).
- 3.21 Clear the access frames of any extraneous material and carefully replace the covers using proper lifting and rigging techniques and equipment. Verify that the covers are properly seated.
- 3.22 Remove all tools, equipment, and material used in the inspection/pump-out. Verify that the work area is returned to the pre-work or better condition.
- 3.23 Complete an inventory of all tools and equipment used for the inspection/pump-out accounting for lost, damaged, or stolen tools or equipment.
- 3.24 Maintenance is a very important aspect in keeping the V2B1® System performance up to par. Attachment A “V2B1® SYSTEM MAINTENANCE DATA SHEET” is provided and should be used to document the maintenance performed on the V2B1® System.
- 3.25 Provide a copy of the “V2B1® SYSTEM MAINTENANCE DATA SHEET” to the owner, required government agencies, and Environment 21 LLC.

4.0 IMPORTANT ASPECTS

- 4.1 Safety is a priority and the most stringent of regulations (OSHA, local, etc.) should be followed while performing maintenance on the V2B1® System.
- 4.2 An advantage of the design of the V2B1® System is that all of the maintenance may be completed without personnel entry into the V2B1® System. In the remote chance that an entry into the V2B1®

System is needed, refer to regulations (OSHA, Confined Space, local, etc.) for requirements and definitions.

- 4.3 A running inventory of all tools and equipment used for completion of this procedure should be maintained while performing maintenance on the V2B1® System.
- 4.4 The V2B1® System is normally equipped with cast iron access frames and vented covers to provide approach to all chambers. The accesses are normally at ground level so the work area should be staged properly to prevent anyone or anything from inadvertently falling through any of the accesses of the V2B1® System.
- 4.5 After maintenance is complete on the V2B1® System, the access covers must be set securely in place, all materials and equipment should be removed, and the area should be cleared of slip and trip hazards.
- 4.6 This document and the project specific data capture the requirements for maintenance of the V2B1® System. Any additional maintenance and product information may be obtained by calling Environment 21, LLC at 800-809-2801.

5.0 REQUIRED EQUIPMENT

- 5.1 The recommended tools/equipment for completing the work outlined in this procedure include but are not limited to a flood light, proper lifting and rigging equipment, hose that supplies clean water with sufficient pressure (≥ 40 psi) and volume (≥ 5 GPM), and a rigid measuring rod (increments in inches marked on the rod) that will reach the floor of the V2B1® System and still extend a minimum of 2' above the access frames.
- 5.2 Environment 21, LLC should be contacted if any repairs are required so that the system will be restored to proper operation.



V2B1 SYSTEM MAINTENANCE DATA SHEET

SITE NAME: _____

LOCATION: _____ **INSTALLATION DATE:** _____

OWNER NAME: _____ **CHANGE SINCE LAST INS.?** Y N

ADDRESS: _____ **PHONE NUMBER** _____

CITY: _____ **STATE** _____ **ZIP CODE** _____

SITE STATUS: _____

DATE: _____ **TIME** _____ **SITE CONDITIONS** _____



SITE INSPECTION

Inspection Frequency Key: A=annual; M=monthly; S=after major storms

Inspection Items	Inspection Frequency	Inspected (Yes/NO)	Maintenance Needed? (Yes/No)	Comments/Descriptions
Debris Removal				
Adjacent area free of debris?	M			
Inlets and Outlets free of debris?	M			
Facility (internally) free of debris?	M			
Vegetation				
Surrounding area fully stabilized (no evidence of eroding material into proprietary BMP)				
Grass mowed?	M			
Water retention where required				
Water holding chambers at normal pool?	M			
Evidence of erosion?				
Sediment Deposition				
50% full?	A			



environment²¹
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ENV²¹
Technology That Separates

Structural Components				
Any evidence of structural deterioration?	A			
Grates in good condition	A			
Spalling or cracking of structural parts?	A			
Outlet/Overflow Spillway	A			
Other				
Noticeable odors?	A			
Evidence of flow bypassing facility?	A			

Inspector Comments: _____

Overall Condition of Facility: Acceptable Unacceptable



V2B1® SYSTEM INSPECTION

OWNER NOTIFIED AS REQUIRED.

LOCAL AGENCIES NOTIFIED AS REQUIRED.

PIPING

ANY VISIBLE CRACKS/DAMAGE

YES

NO

ANY VISIBLE DISPLACEMENT/LEAKS

ANY VISIBLE OBSTRUCTIONS

STRUCTURE

ANY VISIBLE CRACKS/SPALLING/DAMAGE

YES

NO

ANY VISIBLE CRACKS/SPALLING/DAMAGE

ANY VISIBLE LEAKS

ANY VISIBLE SURFACE WEAR



FRAMES/COVERS

ANY VISIBLE CRACKS/DAMAGE

YES NO

ANY VISIBLE SEAT SURFACE OBSTRUCTIONS

COVERS PROPERLY SEATED

DATE	SEDIMENT PILE DEPTH			OIL SHEEN YES/NO			FLOATABLE DEPTH			PUMPOUT REQUIRED YES/NO		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd			
DATE	SAMPLED YES/NO			SAMPLE RESULTS								
	1st	2nd	3rd	1st			2nd			3rd		

The next routine inspection is scheduled for approximately: _____

(DATE)

NOTE: 1st, 2nd, and 3rd refer to the V2B1 chambers.



WORK COMPLETION

	YES	NO
ALL CAST IRON COVERS HAVE BEEN PROPERLY REPLACED.	<input type="checkbox"/>	<input type="checkbox"/>
NO HAZARDOUS CONDITIONS EXIST AS A RESULT OF THE MAINTENANCE WORK.	<input type="checkbox"/>	<input type="checkbox"/>
ALL PPE, TOOLS, AND EQUIPMENT HAVE BEEN INVENTORIED AND REMOVED FROM THE SITE.	<input type="checkbox"/>	<input type="checkbox"/>
THE WORK AREA HAS BEEN RETURNED TO A SAFE PRE-WORK CONDITION.	<input type="checkbox"/>	<input type="checkbox"/>
ALL NOTIFICATIONS HAVE BEEN MADE, AS REQUIRED, THAT THE WORK IS COMPLETED.	<input type="checkbox"/>	<input type="checkbox"/>

Corrective Actions Taken: _____

INSPECTED BY: (signature) _____

INSPECTED BY: (printed) _____