ENVIROPOD

Field Performance Evaluation of the EnviroBasin™ Water Quality Inlet

Field Performance Evaluation Report

Two-Site Field Monitoring Programme

Sediment and Particle-Size Removal Performance

Field sites: London, Ontario (Canada) · UNH Stormwater Center, Durham, New Hampshire (USA)

Prepared by Enviropod International Ltd

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Definitions

The following terms and abbreviations are used throughout this report.

- **EnviroBasin™ —** the complete at-source water quality inlet system, supplied as a pre-manufactured catch-basin unit incorporating the screening basket, Energy Deflector, extended sump and PODBox outlet baffle.
- **EnviroBasin™ Basket —** the suspended screening basket that captures gross solids — leaves, litter and trash — and incorporates the EnviroPod® patented Energy Deflector. The basket is accessible from the surface for inspection and cleaning.
- **Energy Deflector —** the EnviroPod®-patented component that reverses and spreads the incoming flow across the surface of the sump, dissipating energy and preventing re-suspension of settled sediment.
- **Envirobasin ™ Extended Sump —** the 900 mm deep settling sump beneath the basket, providing sediment storage.
- **PODBox™ —** the patented outlet baffle assembly through which treated water leaves the unit and enters the downstream drainage system.
- **MTFR —** maximum treatment flow rate — the highest flow at which the device is designed to provide treatment.
- **TAPE —** Technology Assessment Protocol – Ecology; the Washington State Department of Ecology (WADOE) protocol for evaluating and approving stormwater treatment technologies.
- **ETV —** Environmental Technology Verification (ISO 14034); independent verification of environmental technology performance.
- **SSC / TSS —** suspended-sediment concentration / total suspended solids; the mass of sediment per litre of water (mg/L).
- **PSD —** particle-size distribution; the proportion of sediment mass in each particle-size range.
- **D50 —** the median particle size — the size at which 50% of the sediment mass is finer.
- **Coarse-sediment storm —** a monitored event whose influent is dominated by the coarse, settleable fraction — a large share of the sediment mass coarser than about 63 µm, with an influent median particle size (D50) well above 63 µm (typically several hundred µm). This is the settleable material the EnviroBasin is designed to capture. By contrast, a “fine” storm carries mostly silt and clay (influent D50 at 63 µm or finer) that stays in suspension and passes through any settling device.
- **EMC —** event-mean concentration; a single flow-weighted composite concentration representing a whole storm.
- **CRE / SOL —** cumulative removal efficiency / summation of loads; concentration- and load-weighted methods for aggregating removal across storms.

Summary

Two field installations of the EnviroBasin™ (EnviroBasin) stormwater pre-treatment device were monitored to characterise its removal of suspended sediment. At the London, Ontario site, fourteen events were sampled between April 2025 and June 2026; eleven rainfall events were included in the removal analysis. Across these events, whole-storm suspended-sediment concentration (SSC) removal averaged 53% (median 61%).

Removal depended strongly on the particle-size distribution (PSD) of the incoming sediment, consistent with a device designed to capture the coarse settleable fraction. Considering only material coarser than 53 µm, mean removal was approximately 80%. On a whole-storm basis, removal was approximately 50% where the influent median particle size (D50) was near 63 µm. The device reduced the effluent D50 to a narrow 25–35 µm band on nearly every event, regardless of how coarse the influent was. An independently monitored installation at the UNH Stormwater Center showed the same behaviour, removing 84–97% of total suspended solids (TSS) in coarse-sediment storms — those whose influent is dominated by settleable particles coarser than about 63 µm (mean ~90%; see Definitions). This behaviour is what a pre-treatment device is designed to do: by capturing the coarse, settleable fraction and gross solids at source, it protects downstream filtration and infiltration systems from premature clogging, so those assets hold their design performance for longer and require less frequent maintenance. A pre-treatment device is therefore best judged on how reliably it removes this coarse, settleable material.

Taken together, the results from the two independently monitored installations characterise the sediment-removal performance of the EnviroBasin under a range of storm conditions and influent particle-size distributions, and document its behaviour as a stormwater pre-treatment device within a wider treatment train.

1. Introduction and purpose

The EnviroBasin is a stormwater pre-treatment device installed in a catch basin at the road surface. It captures the coarser material in road runoff — sand, grit, leaves and litter — before the water continues into the rest of the drainage system. It is designed to remove the coarse settleable fraction of the sediment load; fine silt and clay are not its primary target.

This report presents field-performance data from two independently monitored EnviroBasin installations. Its purpose is to document the measured sediment-removal performance of the device and to characterise how that performance varies with influent particle-size distribution across a range of storm events. The measured results are presented first, followed by interpretation and discussion.

2. Device description

The EnviroBasin is an at-source sediment and trash capture device that works as an alternative to a conventional catch basin, and as pre-treatment ahead of green infrastructure or a primary filtration system. It is supplied as a pre-manufactured unit comprising the concrete catch-basin structure with the Envirobasin Extended Sump, a cast-iron grate and frame, the EnviroBasin Basket (with its integrated Energy Deflector™), and the PODBox™ outlet baffle, all factory-installed (see Definitions). The EnviroBasin has received ISO 14034 Environmental Technology Verification (ETV) certification, and in earlier Canadian ETV oil-and-grit-separator laboratory testing removed greater than 50% of TSS, which is the typical performance requirement for hydrodynamic separators (HDS) and pretreatment (ETV testing report can be downloaded here).

It is an online water quality inlet system, replacing the use of a conventional catch basin. The water quality inlet treats and conveys all runoff that enters the system. Therefore, flow above the maximum treatment flow rate (MTFR) still passes through the treatment system rather than being diverted untreated, without causing scour within the extended sump. An integrated internal bypass — an overflow slot in the basket — protects the upstream catchment from flooding if the basket blocks. For the duration of London monitoring the device remained in treatment for every sampled event, including at the highest measured peak flow of 23.6 L/s (374 gpm).

Figure 1. The EnviroBasin in operation: stormwater drops through the grate, the Energy Deflector reverses and spreads the flow across the sump, and sand and grit settle out while gross solids are held in the basket.

In operation, water enters through the grate in the same way as a standard stormwater inlet. Once the flow drops below the grate it passes through the gross-pollutant EnviroBasin Basket, which catches leaves, litter and other solids and can be hand-maintained from the surface for cleaning. The flow is then intercepted by the Energy Deflector, which reverses its direction and spreads it evenly across the surface of the sump. This dissipates energy and prevents re-suspension of the settled sediment, so the heavier sand and grit settle out. Because the basket sits above the permanent water in the sump, the trapped leaves, litter and other gross solids are held out of the standing water and stay dry, which stops them breaking down and leaching contaminants back into the water. Treated water leaves through the PODBox^{TM} and outlet pipe into the downstream drainage system.

3. Study sites

The EnviroBasin was monitored at two independent field sites in different climates and land uses: an arterial road in London, Ontario, Canada, and a commuter car park at the University of New Hampshire in the United States. Each site is described below, together with its monitoring setup.

3.1 Site 1 — Dingman Drive, London, Ontario, Canada

The Site 1 unit is installed beside Dingman Drive, an arterial road at the southern edge of the city of London, Ontario. The surrounding area — including the roads, footpaths and car parks serving a Costco Wholesale store — was recently developed as part of the city's expansion; before 2022 the land was undeveloped farmland. The site sits at a three-way intersection, is generally flat, and is underlain by a free-draining loamy soil, with no hazardous substances present. The road carries about 10,000 vehicles a day, with 24-hour truck access, making it a steady source of road sediment. The contributing catchment is about 630 m² of asphalt road surface (Figure 2).

A trench drain installed alongside the EnviroBasin captures all runoff from the catchment and forms the inlet chamber, where influent flow and samples are taken; treated water leaves through the outflow pipe on the sidewall of the unit, where effluent flow and samples are taken (Figure 3). Two ISCO 6712 autosamplers collect flow-proportional composite samples at the influent and effluent points. Figure 4 shows the flow path through the system, from the trench drain, through the screening basket and settling sump, to the outlet.

Table 2. Site 1 (London, Ontario) — site and monitoring summary.

Parameter	Detail
Location	Dingman Drive, London, Ontario, Canada
Land use	Asphalt arterial roadway (three-way intersection serving a retail supermarket)
Contributing catchment area	≈ 630 m² (6,800 ft²) of asphalt road surface
Traffic / usage	≈ 10,000 vehicles per day, with 24-hour truck access
Monitoring period	April 2025 – June 2026 (14 events sampled)
Rainfall / hydrology	Rainfall ≈ 1.5–16 mm; peak flow ≈ 1–24 L/s; runoff ≈ 3,000–51,800 L per event
Influent concentrations	TSS 148 – 6,480 mg/L across events
Configuration & sampling	Online catch basin; trench-drain inlet (influent sampling point) and outflow-pipe effluent; two ISCO 6712 autosamplers

Figure 2. Aerial view of the London study site on Dingman Drive. The EnviroBasin treats road runoff from the catchment serving the Costco Wholesale development.

Figure 3. The installed EnviroBasin (right) with the trench drain running along the curb (foreground), which collects catchment runoff and forms the influent sampling point.

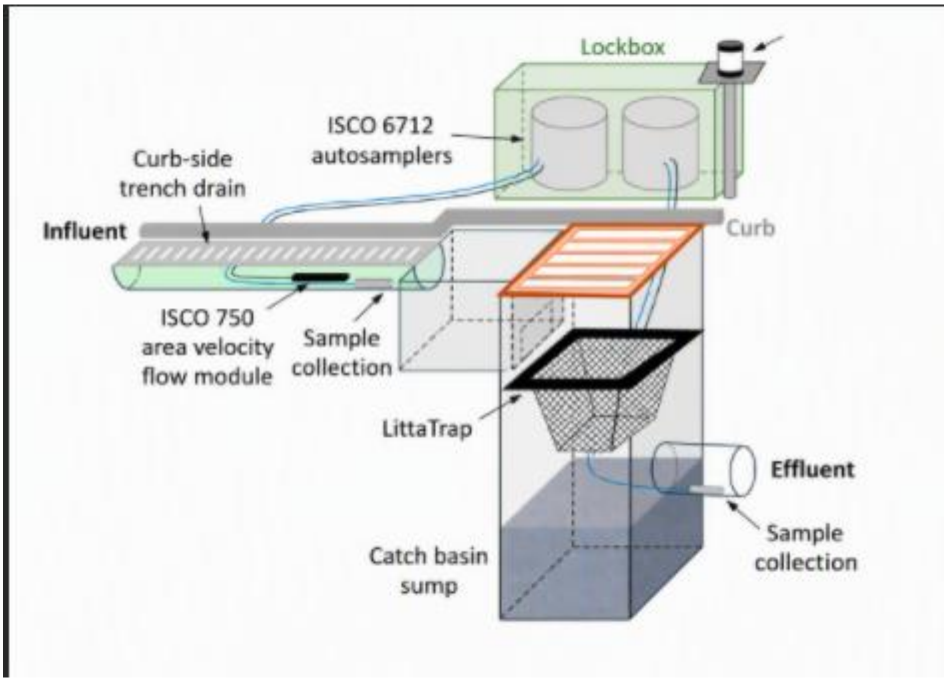

Figure 4. Flow path through the London EnviroBasin: runoff enters via the trench drain, passes through the screening basket and settling sump, and exits through the outlet pipe where effluent is sampled.

Site note: during monitoring the outlet pipe was found disconnected, leaving a slight back-slope and standing water in the outlet line. This can allow some settled material to re-suspend at the start of the next event, which would tend to understate, rather than overstate, the device's measured removal.

3.2 Site 2 — UNH Stormwater Center, Durham, New Hampshire, USA

The Site 2 unit is an independently monitored EnviroBasin field trial at the University of New Hampshire Stormwater Center (UNHSC) in Durham, New Hampshire — a peer-reviewed evaluation facility, built in 2004, that tests stormwater devices in coordination with WADOE TAPE. The unit sits in an online configuration and receives sheet flow from an active UNH commuter car park, whose pollutant loading is representative of a commercial land use. The contributing catchment is about 5,000 ft² (465 m²) of impervious asphalt; Figure 5 shows the extent of the car park that drains to the unit, with the influent and effluent sampling points marked.

Runoff reaches the influent catch basin through a concrete sluice, with granite curbing directing flow into the basin and preventing short-circuiting; a half-section of pipe set in the sluice forms the influent sampling point (Figure 6). The screening basket is accessible from the surface for inspection and cleaning (Figure 7). Treated water leaves through the outlet pipe, where effluent flow is measured at a Thel-mar V-notch weir (Figure 8). As at London, two ISCO autosamplers collect flow-proportional composite samples of the influent and effluent.

Table 3. Site 2 (UNH) — site and monitoring summary. Source: EnviroBasin QAPP, UNHSC (May 2026).

Parameter	Detail
Location	UNH Stormwater Center, 35 Colovos Drive, Durham, NH 03824, USA
Land use	Active commuter car park (commercial-type pollutant loading)
Contributing catchment area	≈ 5,000 ft² (≈ 465 m²) of impervious asphalt car park
Traffic / usage	Daily commuter parking (vehicle count not recorded)
Monitoring period	2026 (6 events sampled)
Rainfall / hydrology	Event precipitation 2.5–34.5 mm (0.1–1.36 in)
Influent concentration	TSS 59 – 1,931 mg/L across events
Configuration & sampling	Online catch basin; concrete-sluice inlet (influent sampling point) and outlet-weir effluent; integrated internal bypass only (no external bypass); two ISCO autosamplers

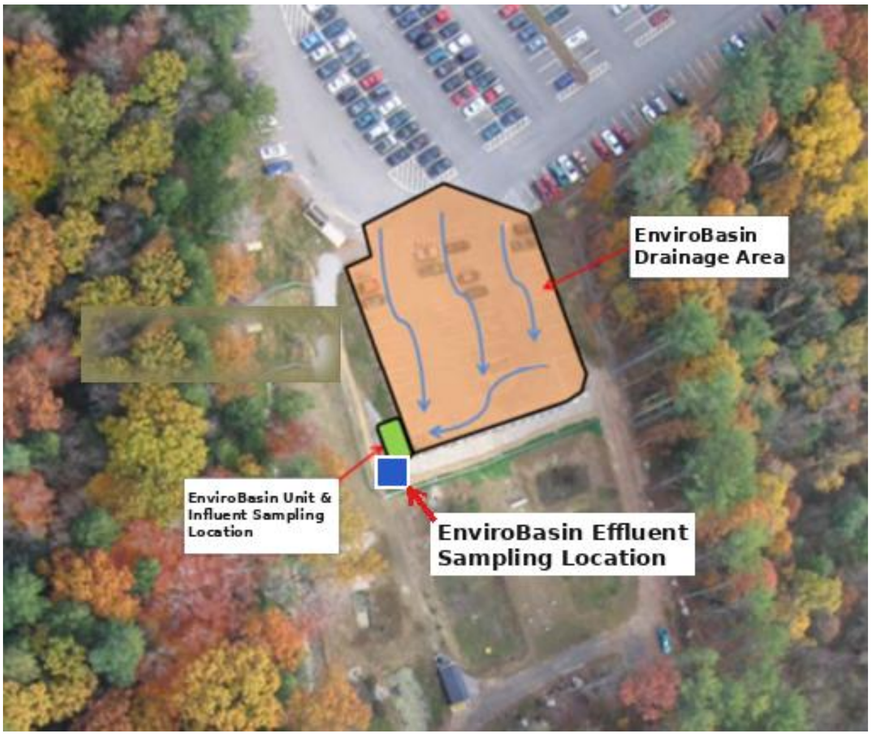

Figure 5. Aerial view of the UNH site. The shaded area is the part of the car park draining to the EnviroBasin, with the influent and effluent sampling locations marked.

Figure 6. Influent sluice and catch basin at UNH. The sample line set in the concrete sluice forms the influent sampling point; granite curbing directs runoff into the basin.

Figure 7. The EnviroBasin screening basket installed in the catch basin, accessible from the surface for inspection and litter removal.

Figure 8. Outlet pipe fitted with a Thel-mar V-notch weir for effluent flow measurement; the two ISCO autosamplers stand on the pallet behind.

4. Monitoring methods

Both sites were monitored in the same way, following the TAPE protocol. For every storm, the runoff (influent) going into the EnviroBasin was compared with the effluent coming out, so the sediment removal could be measured directly.

Note: these are preliminary field-testing results. The programme is being run to the TAPE method, but the dataset is not yet a completed TAPE certified dataset; the results are reported on that basis and will be finalised as monitoring continues.

4.1 Collecting the samples

At both sites the water entering and leaving the EnviroBasin was sampled with a pair of automatic ISCO samplers, one at the inlet and one at the outlet. Sampling was flow-paced — the sampler drew a fixed 200 mL aliquot each time a set volume of water had passed, so more aliquots were taken through the busier, higher-flow parts of the storm — with at least ten aliquots collected at each of the inlet and the outlet. The aliquots from a storm were then combined into a single flow-weighted composite, an event-mean-concentration (EMC) sample: one for the inlet and one for the outlet.

London. Two ISCO 6712 autosamplers were used, run in a primary-secondary configuration: the influent (primary) sampler starts on the rising influent flow and the effluent (secondary) sampler follows on a short delay set to the unit's short detention time, so the two composites cover the same parcel of water. The influent was sampled at the trench drain that collects the catchment runoff and feeds the unit, and the effluent at the outflow pipe on the sidewall of the unit. Inlet flow was measured with a V-notch weir; the V-notch weir was later removed and inlet flow measured from the water level using a Manning's calculation. Outlet flow was measured using a Thel-mar weir. The aliquots were combined and mixed in a churn splitter to produce the composite, so that each sub-sample drawn for testing represented the whole storm.

UNH. Two ISCO 6712 autosamplers were used, as at London, with the influent taken from the concrete sluice that feeds the catch basin and the effluent at the outlet thel-weir;. Any overflow occurring within the mesh bag will be identified based on visual observations made during rainfall events. Flow was measured using a thel-mar weir on the outlet pipe. Aliquots were collected across at least 75% of the storm volume and combined using a cone splitter into one-litre composites. Samples were kept at or below 4 °C and processed within 12 hours of the storm ending.

4.2 Laboratory analysis

Each composite sample is then tested for TSS and for other parameters. The amount of sediment is measured as suspended-sediment concentration (SSC / TSS) following ASTM D3977: a measured sub-sample is filtered, and the captured solids are dried to a constant weight, giving the mass of sediment per litre.

The particle-size distribution (PSD) of each composite sample is processed in-house: the composite is sieved through the sieves and the material retained on each sieve is dried and weighed. The sieves used are #35 (500 µm), #60 (250 µm), #100 (150 µm), #120 (125 µm), #140 (106 µm), #200 (75 µm), #230 (63 µm), #270 (53 µm) and #635 (20 µm); material finer than 20 µm is captured on filter paper of the appropriate aperture. This gives the share of the sediment in each size range, so removal can be examined range by range as well as overall. The same procedure is run on the influent and effluent of every storm.

At the London site, the composite samples were also analysed for a range of water-quality parameters — total phosphorus and orthophosphate, total and dissolved copper and zinc, hardness, pH and electrical conductivity — by accredited laboratories, with time-sensitive tests completed within holding times and all samples tracked under chain-of-custody procedures.

4.3 Calculating removal

For each storm, removal is calculated as (amount in − amount out) ÷ amount in — the reduction in suspended sediment between the inlet and the outlet, as a percentage. Following TAPE, a percentage removal is assessed only where the influent was above 100 mg/L; where the influent is between 50 and 100 mg/L, the target is instead an effluent concentration below 50 mg/L.

Because a single storm removal figure can be combined across events in more than one way, three aggregation methods are calculated and reported (and later compared in Table 11). They are defined here because they are used throughout the results and discussion:

- **Event-average removal —** the arithmetic mean of the individual per-storm removal percentages. Every storm is weighted equally, so a small, low-load event counts as much as a large, high-load one. This is the most conservative measure when the load is concentrated in a few large storms.
- **Cumulative removal efficiency (CRE) —** a concentration-weighted measure. The event-mean concentrations are summed across all events at the inlet and at the outlet, and CRE = (Σ influent EMC − Σ effluent EMC) ÷ Σ influent EMC. This weights each event by its influent concentration, so higher-concentration storms contribute more — it reflects the overall mass-concentration reduction achieved across the monitoring programme.
- **Summation of loads (SOL) —** a load-weighted (mass-reduction) measure. The pollutant load for each event is the event-mean concentration multiplied by the event runoff volume; the loads are summed across all events at the inlet and the outlet, and SOL = (Σ influent load − Σ effluent load) ÷ Σ influent load. This is the true mass-based removal — the total mass of sediment kept out of the receiving environment — and requires runoff volume, which was recorded at London but not at UNH.

In short, CRE and SOL both describe the reduction in the mass of sediment delivered across the whole programme (rather than an average of storm-by-storm percentages), and are the more representative measures of field performance where most of the load arrives in a few coarse, high-concentration storms.

Irreducible concentration. A settling-based device cannot drive the effluent concentration to zero: below a certain point the remaining sediment is fine enough to stay in suspension and passes through. The lowest effluent concentration the device practically reaches — the level at which removal plateaus regardless of how high the influent is — is the irreducible concentration (a SQIDEP performance metric). It is estimated from the effluent data as the concentration the effluent converges toward across events, and corresponds to the narrow fine-dominated effluent band (effluent D50 ≈ 25–35 μm) discussed in Section 6. Reporting it alongside percentage removal is important because, for a pre-treatment device, a consistent low effluent concentration is a more meaningful description of performance than a single percentage, which is sensitive to how high the influent happens to be.

4.4 Event inclusion and exclusion

The programme follows the TAPE method, but this preliminary dataset is not yet a full TAPE-compliant set. A few events were left out of the removal analysis: the two December events were snowmelt rather than rainfall runoff, which TAPE does not assess, and one May event was left out because the effluent sampler malfunctioned, so no outlet sample was collected. On a small number of storms, the influent concentration also fell outside TAPE's assessment range. The remaining rainfall events are included in the analysis, and the dataset will be completed as monitoring continues.

The events that matter most for a pre-treatment device are the coarse-sediment storms — those whose influent is dominated by material coarser than about 63 μm (as defined earlier and discussed in Section 6) — because these carry the highest settleable-solids loads. By capturing this coarse fraction at source, the EnviroBasin removes the bulk of the heavy load before it reaches any downstream filtration or infiltration system, protecting those assets from the heavy loading that would otherwise clog them and shorten their service life.

5. Results

5.1 Site 1 — London

Fourteen events were monitored at the London site. Table 4 summarises the rainfall and flow for each event, and Table 5 the influent and effluent suspended-sediment concentration and the removal, with the maximum, minimum, median and mean across the included events. Eleven rainfall events are included in the removal analysis; three are excluded — the two December events were snowmelt rather than rainfall, and on 19 May the outlet sampler did not collect.

Individual sampling reports (ISRs) are available for the London site on request; ISR reports for the UNH site are not available at this time.

Table 4. Site 1 (London) — rainfall and flow for each monitored event. "Dry days" is the gap since the previous rainfall. Excluded events shaded; hydrology for the June 2026 event is being compiled.

Event	Rain (mm)	Antecedent dry period (days)	Avg flow (L/s)	Max flow (L/s)	90th %ile (L/s)	Runoff (L)
Apr 5 2025	–	–	0.72	1.08	0.94	3,000
Apr 21 2025	–	16	1.45	3.06	2.43	4,550
Jun 18 2025	11.4	58	1.69	6.13	4.35	11,700
Sep 4 2025	8.6	78	1.76	7.05	4.39	7,900
Nov 7 2025	1.5	47	1.52	3.97	2.16	5,300
Dec 10 2025	0	33	2.61	3.42	3.17	13,000

Event	Rain (mm)	Antecedent dry period (days)	Avg flow (L/s)	Max flow (L/s)	90th %ile (L/s)	Runoff (L)
Dec 18 2025	16.0	8	0.49	4.68	0.79	51,800
Jan 6 2026	14.1	19	0.67	4.98	1.13	22,800
Mar 11 2026 AM	9.1	64	5.57	23.58	12.90	25,300
Mar 11 2026 PM	12.0	6 h	2.45	5.97	4.68	20,000
Apr 14 2026	10.9	34	3.30	4.25	7.60	11,400
Apr 15 2026	6.0	1	2.27	8.41	5.10	20,000
May 19 2026	14.6	34	4.66	22.94	15.84	11,400

Table 5. Site 1 (London) — influent and effluent concentration (SSC) and removal for every monitored event; summary statistics are over the eleven included events. Excluded events shaded.

Event	Influent (mg/L)	Effluent (mg/L)	TSS reduction %	Included / excluded
Apr 5 2025	148	68	54	Included
Apr 21 2025	187	193	−3	Included
Jun 18 2025	4,400	237	95	Included
Sep 4 2025	704	278	61	Included
Nov 7 2025	195	147	25	Included
Dec 10 2025	284	369	−30	Excluded — December snowmelt (not rainfall runoff)
Dec 18 2025	377	398	−6	Excluded — December snowmelt (not rainfall runoff)
Jan 6 2026	906	340	63	Included
Mar 11 2026 AM	3,037	895	71	Included
Mar 11 2026 PM	6,480	237	96	Included
Apr 14 2026	149	117	22	Included
Apr 15 2026	217	191	12	Included
May 19 2026	289	—	—	Excluded — outlet sampler did not collect
Jun 6 2026	714	112	84	Included
Maximum	**6,480**	**895**	**96**	
Minimum	**148**	**68**	**−3**	
Median	**704**	**193**	**61**	
Mean	**1,558**	**256**	**53**	

5.2 Site 2 — UNH

Six events were monitored at the UNH site. Table 6 summarises the precipitation and peak effluent flow for each, and Table 7 the influent and effluent concentration and the removal, with the summary statistics across the included events. On the five events carrying enough sediment to assess, removal was 84–97% (mean about 90%). One event is not included because its influent was only 59 mg/L, below the 100 mg/L level at which removal is assessed.

Table 6. Site 2 (UNH) — precipitation and peak effluent flow for each monitored event. Excluded event shaded.

Event	Precip. (mm)	Precip. (in)	Effluent peak (L/s)	Effluent peak (gpm)
1	8.1	0.32	0.44	7
2	11.4	0.45	0.50	8
3	22.9	0.90	2.02	32
4	29.7	1.17	6.37	101
5	34.5	1.36	11.48	182
6	5.3	0.21	3.79	60

Table 7. Site 2 (UNH) — influent and effluent concentration (TSS) and removal for every monitored event; summary statistics are over the five included events. Excluded event shaded.

Event	Influent (mg/L)	Effluent (mg/L)	TSS reduction %	Included / excluded
1	471	49	90	Included
2	332	10	97	Included
3	59	74	—	Excluded — influent below 100 mg/L assessment level
4	418	66	84	Included
5	405	46	89	Included
6	1,931	173	91	Included
Maximum	**1,931**	**173**	**97**	
Minimum	**332**	**10**	**84**	
Median	**418**	**49**	**90**	
Mean	**711**	**69**	**90**	

6. Discussion

From the results, the EnviroBasin™ has shown it achieves above 50% removal across all sediment particle sizes: at the London site whole-storm removal averaged 53% (median 61%), and the UNH site removed a similar or higher share of its (coarser) sediment.

It is useful to set this performance against how TAPE defines pre-treatment and how earlier pre-treatment devices were approved. The TAPE pre-treatment standard itself is a bulk-concentration goal: at least 50% TSS removal for an influent concentration between 100 and 200 mg/L, together with an effluent below 50 mg/L when the influent is under 100 mg/L. The written standard does not prescribe a particle-size or coarse-D50 target. In practice, the earlier generation of TAPE pre-treatment devices — hydrodynamic separators such as Stormceptor and Vortechs — earned their designations largely on laboratory testing against a paired sediment standard: approximately 50% removal of a fine test sediment (D50 ≈ 50 µm) and approximately 80% removal of a coarse test sediment (D50 ≈ 125 µm). Field qualification for those devices was limited — events carrying material finer than about 500 µm were taken to satisfy the pre-treatment requirement, with little particle-size analysis. Measured against this established basis, the EnviroBasin's field performance — approximately 80% removal of the coarse (>53 µm) fraction and approximately 50% whole-storm removal at an influent D50 near 63 µm — is fully consistent with, and demonstrated on a more rigorous basis than, what has previously been accepted for pre-treatment.

Critically, the EnviroBasin™ will be the first pre-treatment device to go through TAPE's full field-testing requirement. Whereas the legacy devices were approved principally on laboratory data with only limited field sampling, the present programme applies the complete TAPE field protocol — multiple qualifying storm events across the required flow-rate range, with full influent and effluent particle-size analysis on every event. This makes the EnviroBasin evaluation a comprehensive, field-based characterisation of a pre-treatment device, with full particle-size analysis on every monitored event.

6.1 How the particle-size distribution changes

The particle-size curves show the reduction directly. On storms with coarse influent the median particle size (D50) dropped sharply between the inlet and the outlet — for example from 419–634 µm down to 31–65 µm at London (Figure 9, Table 8) — while on storms that were already fine it changed little. In almost every case the outlet water was left dominated by fine particles, with a median around 25–35 µm. The UNH site behaved the same way but with much coarser incoming sediment, the influent median being above 500 µm (Figure 10, Table 9). Two things should be kept in mind for the UNH particle-size data: the samples held a large amount of organic material, which is light and settles differently from mineral sand and grit, and the mass of sediment collected on several events was very small (fractions of a gram), so those size measurements are noisy. The coarse removal is clear, but the exact effluent particle size at UNH is less certain.

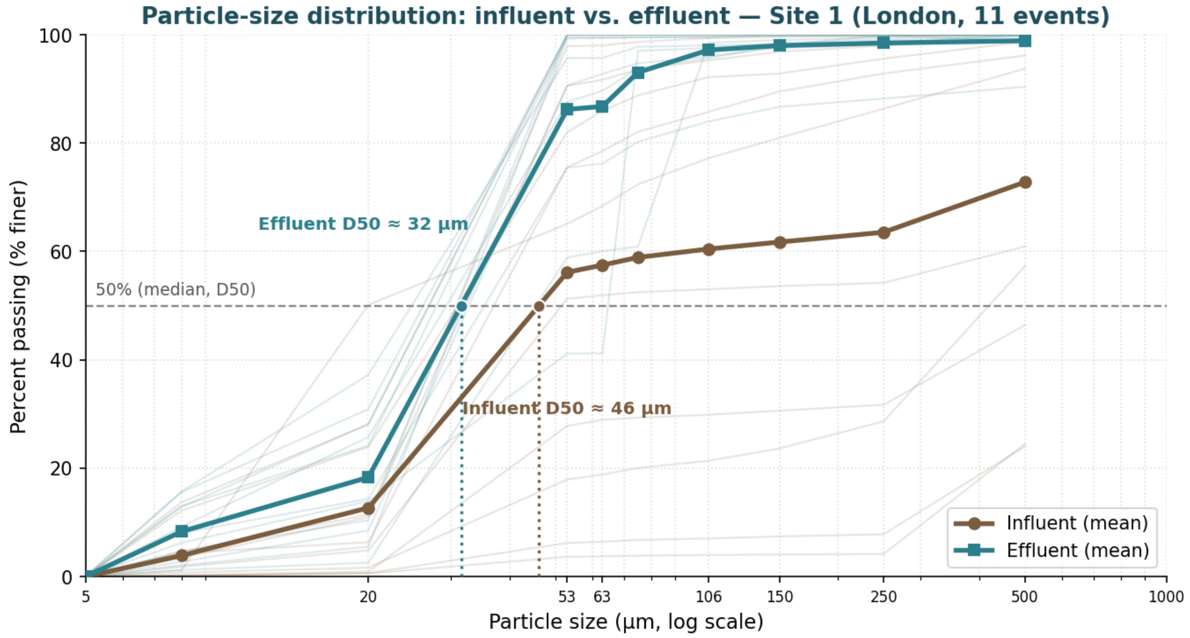

Figure 9. Reduction in particle size at Site 1 (London): influent and effluent particle-size distributions for each included event (faint lines), with the mean of the 11 events shown bold. D50 is read where each curve crosses the 50% line.

Table 8. Site 1 (London) — influent and effluent D50 for each included event, with mean and median. Coarse-sediment events shaded.

Event	D50 in (µm)	D50 out (µm)	Note
Apr 5 2025	20	29	fine influent
Apr 21 2025	37	33	fine influent
Jun 18 2025	634	35	coarse influent — coarse fraction removed
Sep 4 2025	419	65	coarse influent — coarse fraction removed
Nov 7 2025	31	28	fine influent
Jan 6 2026	52	32	fine influent
Mar 11 2026 AM	524	46	coarse influent — coarse fraction removed

Event	D50 in (µm)	D50 out (µm)	Note
Mar 11 2026 PM	632	31	coarse influent — coarse fraction removed
Apr 14 2026	27	26	fine influent
Apr 15 2026	31	27	fine influent
Jun 6 2026	32	25	fine influent
Mean	**222**	**34**	
Median	**37**	**31**	

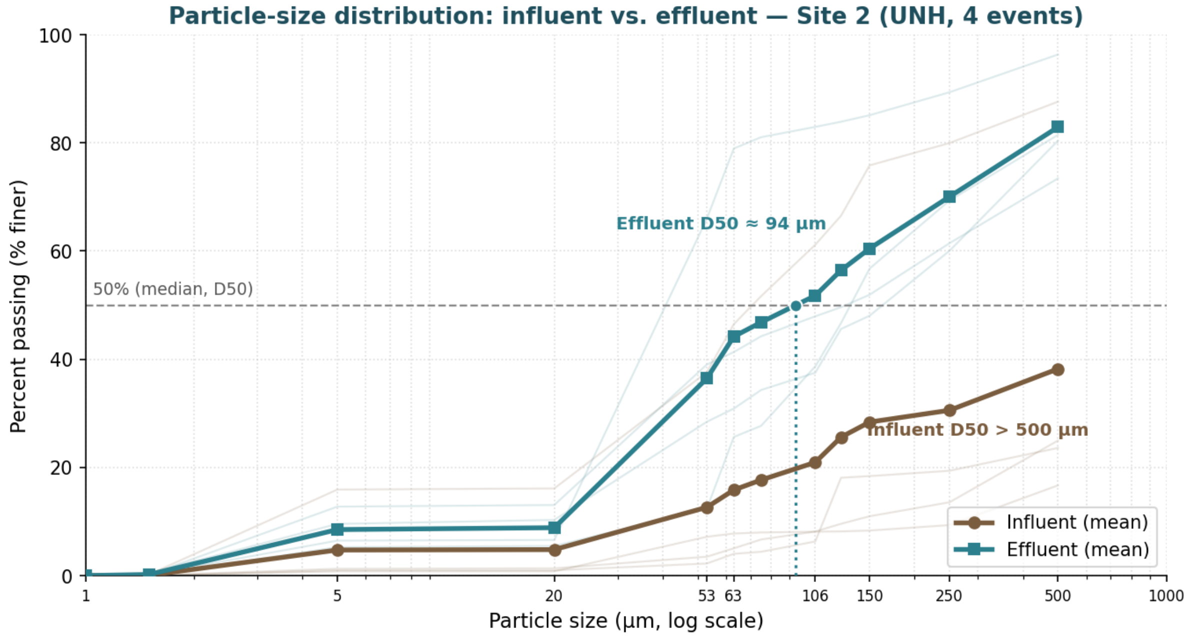

Figure 10. Reduction in particle size at Site 2 (UNH): influent and effluent particle-size distributions for the events with paired PSD data.

Only three of the six UNH events are included in the PSD analysis: two events had no paired PSD data, and one further event had an influent concentration below the 100 mg/L assessment level, leaving events 4, 5 and 6 (Table 9).

Table 9. Site 2 (UNH) — influent and effluent D50 for the three events with paired PSD data, with mean and median. Influent median above the top sieve (>500 µm); effluent D50 from small sediment masses, so less certain.

Event	D50 in (µm)	D50 out (µm)	Note
24 May (event 4)	>500	130	coarse influent
29 May (event 5)	>500	165	coarse influent
6 Jul (event 6)	>500	41	coarse influent; largest sample
Mean	**>500**	**112**	
Median	**>500**	**130**	

6.2 Removal of the coarse fraction (PSD truncation)

The 50% TSS removal covers every particle size, including the fine silt and clay that stays in suspension and passes through any settling device. A pre-treatment device like the EnviroBasin is built to capture the coarse settleable fraction, so a fairer measure looks only at that fraction.

Truncating the particle-size distribution to analyse a defined size band is an established TAPE method, not a departure from it. In its 2024 update, TAPE adopted a PSD-truncation procedure in which the coarser material is removed from the measured distribution to bring the influent D50 down toward the 63 µm used to evaluate downstream filter devices. The same established logic is applied here, but in the opposite direction: because the EnviroBasin is a pre-treatment device designed to capture the coarse settleable fraction — rather than a filter device targeting the fines — the fine material is truncated instead, so the device is assessed on the coarse fraction it is built to treat. In both cases the truncation only re-normalises the measured PSD; it does not alter any measured concentration. Both the untruncated (full-PSD) and truncated results are reported so the device can be evaluated on either basis.

The two bases are directly linked. For a typical stormwater influent with a median particle size (D50) of about 63 µm, removing 50% of the total sediment mass is equivalent to removing about 80% of the sediment coarser than roughly 50 µm: 80% removal of a size fraction that makes up 62.5% of the mass (50% ÷ 80% = 62.5%) yields 50% of the total. Therefore, at a D50 near 63 µm, 80% removal of particles at or above about 50 µm is the particle-size equivalent of the TAPE 50% bulk-TSS pre-treatment target.

Truncating the particle-size distribution to remove everything finer than 53 µm — the material the device is not built to capture — and re-computing the influent and effluent concentrations on the coarse sediment only gives the comparison in Table 10. On this coarse-only basis the EnviroBasin removed about 80% of the sediment on average and about 95% of the total coarse load, meeting the coarse-sediment pre-treatment target of at least 80% removal above 53 µm. The truncation is applied to every event on the same basis. This truncation is shown for the London site (Table 10); at UNH the influent was already coarse (median above 250 µm, with almost all of the sediment above 53 µm), therefore the whole-sample removal of about 90% already reflects coarse-sediment performance and a separate truncation adds little.

Table 10. Site 1 (London) — influent and effluent concentration of sediment coarser than 53 µm (the coarse fraction), obtained by truncating the PSD, and the removal on that fraction. Storms with little coarse sediment (Apr 14/15) are not meaningful on this basis.

Event	Influent >53 µm (mg/L)	Effluent >53 µm (mg/L)	TSS reduction %
Apr 5 2025	52	8	84
Apr 21 2025	46	18	60
Jun 18 2025	4,128	58	99
Sep 4 2025	578	164	72
Nov 7 2025	35	1	98
Jan 6 2026	442	2	99
Mar 11 2026 AM	2,193	368	83
Mar 11 2026 PM	6,244	<1	>99
Apr 14 2026	<1	<1	n/a
Apr 15 2026	5	<1	n/a
Jun 6 2026	67	5	93
Load-weighted (all coarse sediment)	**—**	**—**	**95**

6.3 How removal is calculated, and why it depends on particle size

The percentage removal number also depends on how the individual storms are combined (Table 11). At London, the simple average of the per-storm removals gives 53%, because it weights a small, fine storm the same as a large, coarse one, while weighting by concentration (cumulative removal efficiency, CRE) or by load (summation of loads, SOL) gives about 84%, because most of the sediment arrives in the coarse storms that the device removes efficiently.

At UNH, where every included storm carried coarse sediment, all methods give about 90% with little spread. The contrast makes the point: the removal figure depends strongly on the particle-size distribution of the storms — how coarse their sediment is — rather than on the flow rate. Removal stayed high on the highest-flow events (for example the 23.6 L/s peak on 11 March), and the scatter between storms reflects differences in influent PSD, not flow.

On flow rate, the treated flows sampled across the monitoring programme span the range needed to characterise the device in operation; the current 90th-percentile aliquot flow range can be used as the basis for the device's maximum treatment flow rate (MTFR).

Table 11. Whole-storm TSS reduction computed three ways at each site, over the included events. SOL (summation of loads) needs runoff volume, which was recorded at London but not at UNH.

Aggregation method	London (%)	UNH (%)
Average of the individual storms	53	90
Cumulative removal efficiency (CRE)	84	90
Summation of loads (SOL)	84	n/a

Taken together, the two sites — a road in London and a car park at UNH, in different climates — point to the same behaviour: the device captures the coarse settleable fraction and passes the fine fraction. Because it is online and has no external bypass, this happens on the whole flow. On the coarse material it is designed to treat, removal was about 80% at both sites, in line with the TAPE Basic pre-treatment expectation.

7. Conclusion

Across two independently monitored installations — an arterial road catchment in London, Ontario and a commuter car park at the UNH Stormwater Center — the EnviroBasin consistently removed the coarse, settleable fraction of the stormwater sediment load while passing the fine fraction. At London, whole-storm SSC removal averaged 53% (median 61%), rising to approximately 80% for material coarser than 53 µm and to about 84–95% when weighted by concentration or load, because most of the sediment mass arrives in the coarse, high-concentration storms the device captures efficiently. The independently monitored UNH site reproduced this behaviour, removing 84–97% of TSS in coarse-sediment storms (mean approximately 90%). On nearly every event the device reduced the effluent D50 to a narrow 25–35 µm band, regardless of how coarse the influent was.

Overall, the field programme shows that EnviroBasin performance is strongly and predictably governed by influent particle-size distribution rather than by flow rate, with removal remaining high across the full range of monitored flows. By reliably capturing the coarse settleable load at source, the device performs its intended pre-treatment role — reducing the heavy sediment fraction that would otherwise clog and shorten the service life of downstream filtration and infiltration assets, and delivering a consistent, fine-dominated effluent within a wider stormwater treatment train.

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