Moorebank Precinct East – Stage 2 WSUD Independent Audit

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EXECUTIVE SUMMARY

Sustainability Workshop Ltd was engaged to carry out an independent audit of the operation of the water quality management elements of Moorebank Precinct East (MPE) Stage 2 which currently includes Warehouses 1,3,4, 5 and IMEX.

Moorebank Precinct East (MPE) Stage 2 was approved under State Significant Development (SSD) 7628. Therefore this audit was carried out pursuant to SSD 7628, condition of consent (CoC) C51 which requires the independent auditor to:

1) Verify the condition of the treatment systems
2) Verify and document that the systems are working as intended
3) Verify the systems have been cleaned adequately
4) Verify there is no excessive build up of material
5) Identify any rectification issues required for the systems to adequately perform its intended function.

A site meeting followed by an inspection of the stormwater assets included in the scope of the audit was undertaken on the 16th July, 2024.

Prior to the site meeting a link to applicable maintenance records was provided.

The audit finds that:

1) In general, the WSUD infrastructure is being diligently maintained in accordance with CoC51.
2) The precinct continues to be in a state of flux and while it is operational it is not in its final form. Should it be decided that for example OSD1 will remain in its current location and form then I would recommend some rectifications. Given there is some uncertainty with respect to the long term plans for northern part of MPE and that the current measures are in good condition and performing well and are maintained well, I find that its satisfactory to leave OSD1 in its current state.
3) The condition of the systems are generally good.
4) Despite some water quality indicators suggesting poor performance, I find that it is in fact very likely that the constructed elements of the system are working as intended to deliver best practice WSUD. I recommend a change in water quality sampling protocols as I do not consider dry weather sampling appropriate for parts of this site.
5) The systems are being cleaned and maintained so they remain functional, and the maintainer has a good understanding of the systems.
6) The maintainer attended the site following a major rainfall event in April 2024 in accordance with the SIOMP.
7) No excessive build-up of material is evident and I have seen evidence of good cleaning practice to remove deposited material.

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1.0 INTRODUCTION

1.1. Project Overview

Sustainability Workshop was engaged to carry out an independent audit of Moorebank Precinct East (MPE) Stage 2 Water Sensitive urban Design. Approval for works was issued under State Significant Development (SSD) 7628.

Completed works include Area 1 and 2 (warehouses 1,3,4,5,6 and 7) and IMEX

Warehouse 2 remains as a series of 5 smaller warehouses referred to as Warehouses 50-54.

The project is a large transport and industrial land development located east of the Georges River. Moorebank Precinct West (MPW) is under construction and not part of the scope of work.

This Audit report focuses only on stormwater quality infrastructure and the operation and maintenance thereof.

From a stormwater quality perspective, large industrial areas shed high volumes of stormwater. The stormwater can be contaminated with various pollutants in both particulate and dissolved forms, notably Zinc from roofs.

The design development process responded to several consent conditions which required that the proponent comply with what is commonly termed "best practice" stormwater management. That is, assuming that stormwater treatment assets were designed and constructed to best practice then it would be reasonable to expect a best practice outcome.

That outcome is defined in terms of pollutant removal fractions for total suspended solids, total phosphorus and total nitrogen. An approved stormwater system was modelled using MUSIC which is a widely adopted water quality model, design drawings prepared and approved and construction of various elements serving the warehouses undertaken.

While water quality monitoring has been undertaken to assess impacts on receiving waters it is noted that it is not appropriate to rely on that water quality data to assess if the stormwater treatment systems are performing to the standard required. The reasons for this are complex but in brief, the treatment targets required are load based targets and talk of average annual load retention while the monitoring undertaken provides a snap shot in time of only one very small part of the whole average annual load. It is instead deemed appropriate to rely on the condition assessment of the stormwater treatment assets, together with other evidence, such as maintenance log books and defects works to form an opinion of the performance of the system. In summary, we are relying on the best practice nature of stormwater management systems to indicate best practice performance.

On practical completion, built assets are handed over to the site manager which is Knight Frank. Knight Frank has engaged a Contractor, MID Plumbing to both help identify defects during a defects liability period (and to carry out rectification works where approved) as well as to undertake routine maintenance of the stormwater assets.

A stormwater infrastructure operation and maintenance plan (SIOMP), was required and approved by DPIE and prepared by the proponent, SIMTA. The SIOMP identified the routine and non-routine maintenance activities required for the various stormwater assets including water quality assets such as CDS gross pollutant traps and bioretention basins.

We note that maintenance log books have been prepared to align with the specific actions included in the SIOMP.

We note that water quality systems generally take time to commission and establish. This is mostly true of vegetated systems which take at least 1 year to see plants widely established. OSD1 which is large bioretention basin is now well established and has good vegetative coverage.

This report makes a low cost recommendation to protect the vegetation in OSD 1 ahead of impending high temperatures and low rainfall associated with El Nino conditions.

1.2. Approval Requirements

SSD 7628 condition of consent (CoC) C51 requires an annual independent audit.

1.3. Audit Team

The audit of the water quality elements of the MPE Stage 2 site was undertaken by Mark Liebman, CPEng, MIEAust. Mark has over 25 years water quality management experience. He co-authored the design guides, notably the Blacktown City Council Water Sensitive Urban Design Standard Drawings which were used as reference guides for the design of the MPE Stage 2 site.

Mark is also an independent evaluator used by Stormwater Australia to assess the water quality performance of stormwater treatment devices against the newly released stormwater quality improvement device evaluation protocol (SQIDEP). Mark has also undertaken numerous evaluations of stormwater quality improvement devices for Blacktown Council which are relied on by numerous other Council's including Liverpool City Council.

Mark is suitably qualified and has demonstrable experience in WSUD.

1.4. Audit Objectives

The audit objective is to satisfy State Significant Development, condition of consent C51

1.5. Audit Scope

Moorebank Precinct East (MPE) Stage 2 was approved under State Significant Development (SSD) 7628. Sustainability Workshop was engaged to carry out an audit of the Area 1, 2 and IMEX operations.

The scope of this report therefore includes Moorebank Precinct East (MPE) Stage 2 (Area 1 and 2) works. This includes the four warehouses (WH 1, 3, 4 ,5) and IMEX.

Condition C51 specifically requires the independent auditor to:

1) Verify the condition of the treatment systems

2) Verify and document that the systems are working as intended
3) Verify the systems have been cleaned adequately
4) Verify there is no excessive build up of material
5) Identify any rectification issues required for the systems to adequately perform its intended function.

2.0 AUDIT METHODOLOGY

2.1. Audit Process

The Independent Audit was conducted in a manner consistent with AS/NZS ISO 19011.2019 – Guidelines for Auditing Management Systems and the methodology set out in the Department's IAPAR. An overview of the audit activities, as specified in AS/NZS ISO 19011, is presented in Figure 1.

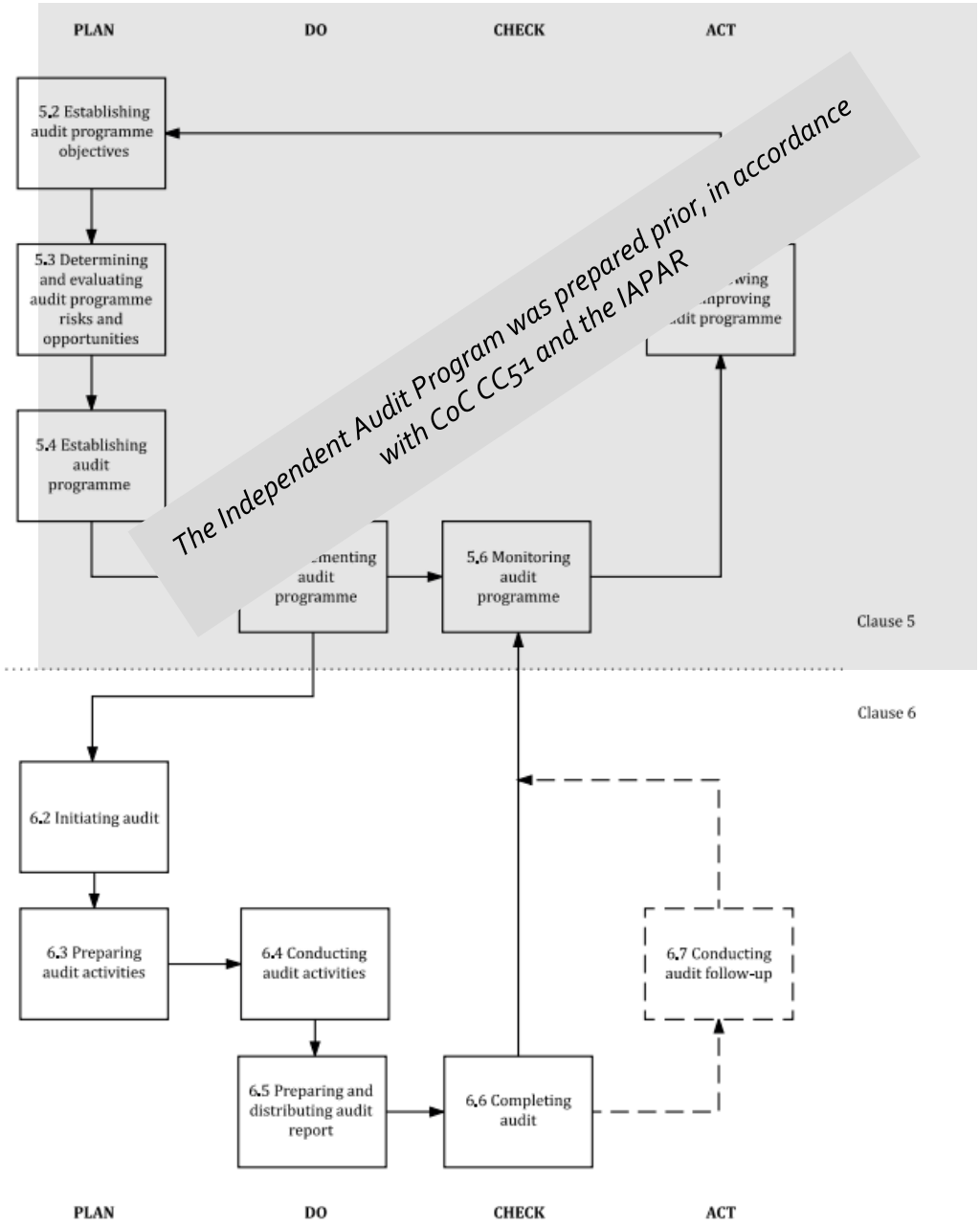

Figure 1 Audit activities overview (modified from AS/NZS ISO 19011). Subclause numbering refers to the relevant subclauses in the Standard.

2.2. Audit Process Detail

2.2.1. Initiation and Scope Development

Prior to the audit we confirmed the scope of the audit and inspected the site to gauge the level of complexity of the audit.

2.2.2. Preparation

Prior to the audit a number of documents were reviewed including:

- *Moorebank Precinct West - Stage 2 Proposal Environmental Impact Statement – (SSD16-7628),* Arcadis, October 2016 (the EIS) – notably Appendix P.
- *PREC-QPMS-EN-PLN-0006 SIOMP_Rev 8_clean_compiledSSD7628 Consolidated Consent on the NSW Major Projects Planning Portal.*

2.2.3. Site Personnel involvement

The on-site audit activities took place on 16th July2024. The following personnel took part in the audit:

- Mark Liebman – WSUD Auditor – Sustainability Workshop
- Mark Cugola – Director – MID Plumbing with an ecologist from Apical (Daniel Anderson)
- Michael Beresford – Facilities Manager – Knight Frank
- Mark Howley – Senior Project Manager - Tactical

2.2.4. Meetings

The on-site audit activities took place on 16th July, 2024.

2.2.5. Interviews

A brief formal interview was undertaken on the 16th July, 2024 with Mark Cugola from MID Plumbing and this occurred throughout the site inspection.

2.2.6. Site Inspection

A site inspection was undertaken on the 16th July, 2024 following the audit meeting. The site inspection involved:

1) Viewing CDS locations
2) Viewing OSD 9
3) Viewing OSD Basin 1 which is a combined OSD and bioretention system.
4) Inspecting Swales 1 to 4.

2.2.7. Document Review

Following the site inspection, a number of documents have been reviewed including:

- *Moorebank Precinct West - Stage 2 Proposal Environmental Impact Statement – (SSD16-7628),* Arcadis, October 2016 (the EIS) – notably Appendix P.
- *Stormwater Infrastructure Operation and maintenance plan, Moorebank Logistics Park – East Precinct, Moorebank Intermodal Terminal Alliance, 26/3/2020q – Rev 7.*
- *SSD7628 Consolidated Consent on the NSW Major Projects Planning Portal.*
- *Stormwater Management Plan SSD 7628 by Costin Roe, Rev A, dated 12 Sept 2018.*
- *Various Work as Executed Drawing Sheets including but not limited PIWE – ARC – CV – DWG – 11202 – H, DWG 11527.*
- *Basis of Design Report -Precinct Infrastructure Works East (PIWE) Package 1A, 19 July 2018.*
- *Maintenance log books prepared by MID Plumbing dated: October 2023, 6 monthly dated January 2024, April Quarterly SIOMP Procedures Combined Including Autumn Water Sampling and Reporting (filename: MID TASK JN9924), MLP SIOMP Scheduled Maintenance Reporting Logbook Annual July 2024, MID Task JN1049.pdf.*
- *Swale flushing and bioretention subsoil flushing videos.*
- *Morebank SIOMP Water quality reports prepared by Apical dated Spring 2023 and April 2024.*
- *Various Safe Work Method Statements for pit cleaning.*

2.2.8. General Audit Findings

Independent Audit findings were based on verifiable evidence. The evidence included:

- relevant records, documents and reports
- interviews of relevant site personnel
- photographs
- figures and plans; and
- site inspections of relevant locations, activities and processes.

2.2.9. Compliance Evaluation

The Auditor determined the compliance status of each compliance requirement in the Audit Table, using the descriptors from Table 2 of the IAPAR, being:

- **Compliant** – The Auditor has collected sufficient verifiable evidence to demonstrate that all elements of the requirement have been complied with within the scope of the audit.

- **Non-compliant** – The Auditor has determined that one or more specific elements of the conditions or requirements have not been complied with within the scope of the audit.
- **Not triggered** – A requirement has an activation or timing trigger that has not been met at the time when the audit is undertaken, therefore an assessment of compliance is not relevant.

Observations and notes may also be made to provide context, identify opportunities for improvement or highlight positive initiatives.

2.2.10. Completing the Audit

The Independent Audit Report was distributed to the proponent to check factual matters and for input into actions in response to findings (where relevant). The Auditor retained the right to make findings or recommendations based on the facts presented.

3.0 FINDINGS

3.1. Documents Audited

The SIOMP defines various maintenance actions and their associated frequencies. These have been documented in various tables in the SIOMP.

Each of these actions has been copied into a corresponding maintenance action within the maintenance logbooks which are completed and submitted quarterly by MID Plumbing in accordance with the quarterly reporting requirements of the SIOMP.

The maintenance log books have been audited for completeness by both verifying that all activities noted in the SIOMP have been correctly translated into the maintenance log books and then by verifying that all activities scheduled have been completed according to the log book.

3.2. Evidence Sighted

Difference sources of evidence have been sighted including:

1) Completed maintenance log books.
2) Evidence of contractor engagement viewed within the log books from photos included within them – generally the photos were within separate documents but locations and images readily identifiable.
3) Evidence of contractor engagement to carry out CDS maintenance from photos included in the log books and also separately via evidence of a contractor receipt.
4) Evidence of contractor maintenance reported within the log books for the bioretention basin including quotes for rectification works.
5) Video evidence was provided for flushing of the subsoil drainage in the OSD Basin 1 and also of a swale with concrete invert.
6) Visual inspections undertaken during the site – notably OSD Basin 1 which is the combined bioretention and OSD basin, OSD 9, Swales 1 to 4 and OSD2 at the south of the site.

At no time were any confined spaces entered. It is noted the CDS units are defined as confined spaces. The lids of the CDS units was not lifted and so the internal condition of the units cold not be determined during this audit. However clear photographic evidence was provided of the units under maintenance by TDK using eductor/combi trucks.

3.1. Compliance with Audit Objectives

CoC C51 requires the independent auditor too:

1) Verify the condition of the treatment systems within the scope
2) Verify and document that the systems are working as intended

3) Verify the systems have been cleaned adequately

4) Verify there is no excessive build up of material

Table 1 to 4 summarise the audit findings with respect to each of these requirements.

Table 1 Verification of the condition of the treatment systems within the scope

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	The condition of OSD 1 was found to be very good. Plants are now well established. Weed removal had taken place. There was no litter debris within the basin. Jute mesh had been placed around batter slopes which have not been planted. Minimal sediment was present on the surface of the basin. The inlet/level spreading trench appears stable. One thing to note was the observation of something which had been digging in the basin – perhaps a hare which had been sighted during the audit. Continue to monitor and repair any damage if required. Fill in holes with suitable filter sand.
CDS units	Condition 51 requires the condition of the water quality management infrastructure assets to be determined. In order for this to be determined inspection of open CDS units needs to be undertaken. We note there was not an opportunity for the independent auditor to assess the condition of the CDS units. It has been reported that 31.46 tonnes of waste was removed and disposed from all GPTs. It has been observed that the GPTs have been maintained twice during the audit period – this is in accordance with best practice. The CDS unit which serves OSD 2 adjacent WH7 is known to be drowned by the basin and can't be maintained or the condition verified without draining the water quality pond its connected to. It is critical this is rectified following completion of WH6 and 7 and sealing of the disturbed areas whereupon the final water quality configuration can be constructed.
Grass Swales including OSD9	The condition of the grass swales observed was good. There was the presence of a large amount of reeds within the swale on the eastern boundary which will improve water quality outcomes. Swale leading to Picolo is in average condition. OSD9 is in good condition with vegetation well established.
Litter baskets	Evidence from the log books shows that litter baskets are being actively maintained and from the volume of material removed performing very well. Some litter baskets near Warehouse 5 needed replacing and I note quotes had been provided to replace these.
Rainwater Tanks	Not scheduled in this audit period.
First flush devices and filters	Evidence of the condition of first flush filters being maintained was provided. Those that were maintained appear to be in good order.

Table 2 Verify and Document the System is Working as intended

Asset Type	Details of item
OSD Basin 1	It appears that the bioretention basin is working as intended however without comprehensive water quality monitoring this statement is based on the performance of a best management practice device. That is, it is well designed and well built and maintained and therefore is most likely to working as intended.

Combined bioretention and OSD Basin	We observe that the discharge channel downstream of the basin was maintained during the audit period to remove excessive build up of vegetation which was occluding the outlet culvert. I have sighted video evidence of the subsoil drainage pipes being flushed out.
CDS Units	A total of31.46 tonnes of material was removed form the units and they are working as intended. Improved inspection will
Grass Swales including OSD9	The grass swales are not technically part of the water quality management system on the site however they are included in the SIOMP and they will influence water quality. OSD9 is likely to be working well as it is well vegetated on both banks. Swale on eastern boundary was well vegetated with dense reeds. This is likely to be delivering good water quality outcomes. The swale leading to Picolo Me is stable and likely to be aiding in water quality.

Table 3 Verification the Systems have been cleaned adequately

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	We verify that OSD Basin 1 to have been thoroughly cleaned.
CDS Units & Litter baskets	Based on the maintenance log books together with additional evidence that the CDS units have been cleaned adequately as required by the SIOMP. Litter baskets were maintained during the audit period as required. Cleaning of the GPTs twice per annum, as is occurring, is best practice.
Grass Swales including OSD9	We verify the swales were generally free from litter, debris and sediment and had been cleaned adequately. From an analysis of aerial images – OSD9 is well maintained and clean. OSD9 was cleaned prior to the site audit.

Table 4 Verification there is no excessive build up of material within the systems

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	We verify that there is no excessive build up of material within the system.
CDS Units	We verify that there is no excessive build up of material within the systems
GrassSwales including OSD9	We verify that there is no excessive build up of material within the swales

3.2. Non-compliance, Observations and Actions

No non-compliances were detected.

This section including Table 5, presents observations from the Independent Audit. Actions are also presented in the table.

Table 5 Condition of consent C51 Audit findings and actions

Type	Details of item	Proposed or completed action	By whom and by when	Status
Observation	OceanGuard litter baskets need replacing at WH5.	Replace baskets. I have viewed a quotation to replace the baskets.	Maintenance Contractor.	Complete.
Observation	Access arrangements around WH7 which has security fencing for maintenance to OSD2 was unknown.	Confirm that easy access will be provided in the long term.	LOGOS.	Methodology of Cleaning equipment changed to suit
Observation	There is evidence of minor erosion on the batter close to the outlet of OSD 1. This is a minor observation.	Repair the batter to stem erosion using jute mesh or similar. Recommend adding good quality topsoil and seeding. I have viewed a quotation for repair of this.	Maintenance Contractor during each quarterly inspection.	Complete
Observation	Conditions of consent B46 requires that all permanent infrastructure to be constructed in accordance with the approved Stormwater Management Plan. The approved plan requires that bioretention cells are not to be larger than 1,000m^2. OSD Basin 1 includes a cell which is approximately 1,200 m^2. It is noted the reason that cells are limited to 1,000 m^2 is for ease of maintenance and in this instance the bioretention basin is clearly being maintained without difficulty. Furthermore, it is not clear if OSD 1 is "permanent" given that warehouse 2 has not been developed.	This basin is to be left in its current state until such time as Warehouse 2 is developed. When warehouse 2 is developed it may be necessary to increase the size of the basin at which point the basin can be split into two or more cells as proposed by Costin Roe and approved by DPIE.	Tactical, prior to construction of Warehouse 2 is to ensure that design plans for the permanent configuration of OSD 1 result in bioretention cells not larger than 1,000m^2.	

3.3. Rectification Measures

Appendix A includes a number of site photos one recommended rectification measure.

The following section also describes more general rectification measures for each of the observed assets. We note we were unable to observe CDS units and so can't recommend any rectification measures beyond those already identified by MID Plumbing. We do note it is essential that defects identified by MID Plumbing are repaired prior to the next reporting quarter and that evidence of such should be included in the next relevant report.

3.3.1. Water Quality Sampling

I have reviewed water quality sample results and find that for DP1 these may be providing erroneous results. DP1 was tested on the 12th April and returned a TN result of 16 mg/L which is extraordinarily high. This was mostly comprised of dissolved nitrogen and is indicating either an outlier result or the commencement of a problem. Other results were in the range of expectations and not notable.

I recommend results from DP1 be monitored closely in the future. I also suggest that a wet weather sample be taken from the inlet and outlet of OSD1 so that comparison of inlet and outlet can be made under wet weather conditions.

3.3.2. Bioretention basin (OSD 1)

The following rectification measures are recommended for the bioretention basin within OSD 1:

1) Vegetate the batters with a mix of small shrubs and drought tolerant plants such as Lomandra. This will help to shade the bioretention system through summer as well as supress weeds. It is preferable to have a well-established vegetative cover rather than continuously spraying the basin batters with glyphosate which is toxic to macroinvertebrates and aquatic fauna and which will ultimately impact on water quality.
2) LOGOS, through Apical have installed a 150mm high weir within OSD Basin 1 facilitate retention of water in a wet sump. The effectiveness of this in providing water through any droughts should be monitored in the coming year.
3) Repair of minor erosion close to the outlet of this basin.

3.3.3. Grass Swales

Continue to monitor the stability of grass swales due to average grass coverage. Grassed areas adjacent to swales should also be monitored for erosion and this stopped as soon as practicable.

4.0 CONCLUSIONS

We conclude that the development is, in all probability, complying with COC C51 and that the constructed stormwater systems are working as intended and are being maintained and cleaned. They are free from excessive build-up of material.

Three minor observations have been made during this audit though we find no evidence of non compliance with COC C51.

A number of rectification measures have been included in this report and Sustainability Workshop would be happy to discuss these further. The recommendations are largely based on the assumption that a reduce life cycle cost is an operational objective.

We commend LOGOS, Tactical, MID Plumbing and Knight Frank for their on-going work in establishing the site in accordance with stormwater quality best practice management.

The vegetative coverage in OSD 1 continues to be one of the best examples in western Sydney and we commend MID Plumbing and Apical for their care and work.

Appendix A
Site Inspection Photos

Photo	Description
	OSD 1 bioretentio n basin showing much improved plant growth throughout whole basin, denuded batters
	Photo showing some minor erosion close to the outlet of OSD 1. Topsoil and reseed and cover with jute mesh.

	Swale adjacent to the OSD 1 in good condition – following maintenance and removal of weeds.
	Photo showing swale 1 in good condition with good vegetative cover.

	OSD2 in good condition. New constructio n of WH7 in foreground. Access considerati ons to be addressed in future.
	Pump to drain OSD2 which continues to operate as a pump out basin. This has provided environmen tal flows during very periods.