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29th September 2015

Blacktown City Council
62 Flushcombe Road
Blacktown NSW 2148

Your Ref:
Our Ref: 12-108-002
Direct phone: 02 9439 1777

Attention Tony Merrilees

Dear Tony,

Civil / Stormwater Responses to SSD 6962 BCC Conditions – 60 Wallgrove Road, Eastern Creek

Further to our meeting with you on the 28th of September, please find below a detailed summary of the points raised by Council in your letter dated 7th September 2015.

In response to the Council comments and based on our meeting from the 28th of September we have included the following responses.

Andrew.
My comments in blue.
7/10/15
Council

Additions are denoted in **bold**. Deletions are denoted in ~~strikethrough~~.

Please review the table below and confirm your acceptance.

PRIOR TO ISSUE OF A CONSTRUCTION CERTIFICATE

No.	Proposed Condition	AT&L / Mirvac Comments
2.7.1	Amended drainage plans from AT&L consultants (reference 12-108, revision B dated 28 May 2015) are to be provided to meet the requirements under Council's DCP Part R 2006 and Councils Engineering Guide for Development 2005. The amended plans must address the following:	*Condition accepted – No changes proposed.*
2.7.1 (i)	The minimum filter media area of 223 m2 for the bioretention swale and 1445 m2 for the bioretention basin are to be clear of pits and scour protection. Provide dimensions on the plan.	*Condition accepted – No changes proposed.*
2.7.1 (ii)	The eastern catchment does not remove hydrocarbons or oils as part of the treatment train and the bioretention basin needs to be protected from sediment loads that will reduce its effectiveness. Consequently a series of proprietary gross pollutant traps (GPTs) are required on the major inflows into the eastern basin. The GPTs must have oil baffles to retain floatable pollutants, target fine and coarse sediments and be designed for a minimum 6 month treatable flow rate (75% of 1 year ARI). Such GPTs are required downstream of pits	*A GPT is not required downstream of Pit AQ\4 as the catchment draining into this pit is from the roof only, therefor will have no hydrocarbons or oil within the discharge water.*

OK

OK

OK.

	A\20 (663 l/s) **and** G\10 (317 l/s). ~~and AQ\4 (118 l/s).~~ The location of the GPTs is to allow for vehicle maintenance access nearby for cleaning the device using an eductor truck.	
2.7.1 (iii)	Ensure the internal drainage system is design for a minimum of the 20 year ARI storm event.	*Condition accepted – No changes proposed*
2.7.1 (iv)	For scour protection areas provide dimensions and supporting calculations or nomographs.	*Condition accepted – No changes proposed*
2.7.1 (v)	On plan DAC031 - ~~Reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~ - Obtain written approval from the downstream property owner agreeing to allow access to their site and allowing the installation of the scour protection within their property.	*To be deleted. Refer to new clause 7.1.12.* *Condition accepted – No changes proposed*
2.7.1 (vi)	On plan DAC032 - ~~Reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~ - ~~Council recommends there are insufficient access grates for the below ground detention tank and Stormfilter chamber.~~ **Council recommends that** access grates to the below ground detention tank should be a minimum 900 mm by 900 mm and ~~are~~ positioned such that the maximum distance from any point in the tank to the nearest grate is not greater than 6 m. ~~Council~~ **understands that ownership and maintenance responsibilities for the below ground detention tank will remain with the Developer, and that the Developer may alter the configuration of access grates subject to completion of a satisfactory risk assessment, and compliance with the relevant WHS and Confined Space Access requirements.**	*To be deleted. Refer to new clause 7.1.12.* Disagree ~~*Clause amended as discussed.*~~ Keep as is.
2.7.2 (vii)	~~On plan DAC033 reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~	*To be deleted. Refer to new clause 7.1.12.*

2.7.1 (viii)	~~On plan DAC034 reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~	*To be deleted. Refer to new clause 7.1.12.* 2·7·12	OK
2.7.1 (ix)	~~On plan DAC035 reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~	*To be deleted. Refer to new clause 7.1.12.* 2·7·12	OK
2.7.1 (x)	On plan DAC036 - ~~reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~ - provide the GPT downstream of pit A\20 and show eductor access location. - provide a minimum 400 mm deep **sump pit immediately downstream of the proposed GPT's prior to discharging into the basin. Scour protection to still be provided at outlet into basin.** ~~Raingarden Sediment Forebay (concrete base with seepage holes) as part of the scour protection at A\21.~~ - provide a minimum 3 m wide concrete vehicular accessway at maximum 10 % grade down to the northern end of bioretention basin to allow for maintenance.	*To be deleted. Refer to new clause 7.1.12.* 2·7·12 *Condition accepted – No changes proposed* *Clause amended as discussed.* Condition accepted – *No changes proposed*	OK OK OK for changes subject to pit 1500×1500 minimum OK
2.7.1 (xi)	~~On plan DAC037 reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~	*To be deleted. Refer to new clause 7.1.12.* 2·7·12	OK
2.7.1 (xii)	~~On plan DAC038 reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system, except for the south west corner of warehouse 4 which discharges to the Eastern catchment.~~	*To be deleted. Refer to new clause 7.1.12.* 2·7·12	OK
2.7.1 (xiii)	On plan DAC039 - ~~reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~ - provide the GPT downstream of pit G\10 and AQ\4 and show eductor access location. Note these two could be combined into a single discharge with GPT. - -provide a minimum 400 mm deep **sump pit immediately downstream of the proposed GPT's prior to discharging into the basin. Scour protection to still be provided at outlet in basin.** ~~Raingarden Sediment~~	*To be deleted. Refer to new clause 7.1.12.* 2·7·12 *Condition accepted – No changes proposed* Pit not shown on plans. *Clause amended as discussed.*	OK OK. plans.

	~~Forebay (concrete base with seepage holes) as part of the scour protection at G\11 and AQ\5.~~ - delete the subsoil spur lines discharging to the main spur line flushing points and the line from G\11.	*Condition accepted – No changes proposed*	OK
2.7.1 (xiv)	~~On plan DAC041~~ ~~- reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system, except for the south west corner of warehouse 4 which discharges to the Eastern catchment.~~ ~~- provide a detail for the gaps in the kerbs adjacent to the bioretention swale. Ensure a minimum of 35% openings in the kerb.~~ ~~- provide jute mat and dense planting over the batter slope to resist scour.~~ ~~- extend the scour protection for each piped outlet (if required) down to the swale.~~	*To be deleted. Refer to new clause 7.1.12.* 2.7.12 *To Be Deleted* *To Be Deleted* *To Be Deleted*	OK OK OK OK.
2.7.1 (xv)	On plan DAC042 ~~- reconfigure the drainage for 50% of roof water to discharge direct to the rainwater tanks and not to the surface drainage system.~~ ~~-provide for gaps in the kerbs adjacent to the bioretention swale. Ensure a minimum of 35% openings in the kerb.~~ ~~-provide jute mat and dense planting over the batter slope to resist scour.~~ ~~-extend the scour protection for each piped outlet (if required) down to the swale.~~ -provide a minimum 400 mm deep **sump bit immediately downstream of pit J/7 prior to discharging into the basin. Scour protection to still be provided at outlet into basin.** ~~Raingarden Sediment Forebay (concrete base with seepage holes) as part of the scour protection at J\7.~~ ~~-provide a minimum 3 m wide concrete vehicular accessway at maximum 10 % grade down to the southern end of bioretention basin to allow for maintenance.~~	*To be deleted. Refer to new clause 7.1.12.* 2-7-12 *To Be Deleted* *To Be Deleted* *To Be Deleted* *Clause amended as discussed.* *To Be Deleted*	OK OK OK OK OK with Pit J/7 increased to 1500 X1500 minimum OK
2.7.1 (xvi)	On plan DAC083 -Ensure all the access points to the Stormfilter chamber and energy dissipation areas are grated	*Condition accepted – No changes proposed*	OK

	with metal mosquito screen permanently attached to the standard grate.	
Disagree	~~- there are insufficient access grates for the below ground detention tank and Stormfilter chamber. Access grates to the below ground detention tank must be a minimum 900 mm by 900 mm and are positioned such that the maximum distance from any point in the tank to the nearest grate is not greater than 6 m.~~	*Refer to amended clause 2.7.1 (vi)* Keep as is. · NO
	-provide step irons to all access points.	*Condition accepted – No changes proposed* OK
	-Confined space entry warning signs are to be detailed adjacent to all entries into the detention tank and Stormfilter chamber.	*Condition accepted – No changes proposed* OK
	-the Stormfilter weir is to be set a minimum of 770 mm above the false floor.	*Condition accepted – No changes proposed* OK
	-reduce the low flow orifice from 320 mm to 300 mm diameter.	*Condition accepted – No changes proposed* OK
2.7.1 (xvii)	On plan DAC084	
	- On the Plan provide a minimum 400 mm deep **sump pit immediately downstream of the proposed GPT's prior to discharging into the basin. Scour protection to still be provided at outlet into basin.** ~~Raingarden Sediment Forebay (concrete base with seepage holes) as part of the scour protection at A\21, J\7, G\11 and AQ\5.~~	*Clause amended as discussed.* OK subject to pit min 1500 x 1500
	- On the Plan delete the two 0.9 x 0.9 raised grated junction pits.	*Condition accepted – No changes proposed*
	- On the Plan delete the note on the 225 mm pipe to "CAP OFF PIPE AT ENDS" and provided flushing points instead.	*Condition accepted – No changes proposed*
	-On the Plan delete the four 225 mm spur lines that join the central 225 mm subsoil line.	*Condition accepted – No changes proposed* all OK
	- On the Plan provide flushing points at the end for each 100mm subsoil line and intermediate flushing points for the 225 mm subsoil pipe at maximum 25 m spacing.	*Condition accepted – No changes proposed*
	- On the Plan provide a new 900 x 900 sealed pit that the 225 mm subsoil pipes connect to. This pit is to discharge independently to the external pit in the external swale and not to the discharge control pits	*Condition accepted – No changes proposed*
	- On the Plan extend the scour protection from the 100 year overflow weir down and into the external	*Condition accepted – No changes proposed*

	swale. Within Council lands the scour protection is minimum d50 = 400 mm.	
	- On section 1 adjacent to the retaining wall, extend the filter media and two drainage layers up to the retaining wall. Show riser. The filter media adjacent to the embankment is to be designed vertically.	*Condition accepted – No changes proposed*
	- On section 1 the subsoil drains within the bioretention gravel bed are to be un- socked slotted PVC laid at minimum 0.5% with a minimum 50 mm gravel cover over the subsoil.	*Condition accepted – No changes proposed*
	- On section 1 delete the connection of the 225 mm subsoil pipe to the 1.2x1.2 raised grated pit.	*Condition accepted – No changes proposed*
	- On section 1 increase drainage layer B to 250 mm.	*Condition accepted – No changes proposed*
	- On section 1 at pit Z\1reduce the 590 mm orifice to 560 mm diameter.	*Condition accepted – No changes proposed*
	- On section 1 provide a 900 mm pipe from Z\1 to Z\2.	*Condition accepted – No changes proposed*
	-On section 1 reduce the high flow pit level at Z\2 to RL 49.25.	*Condition accepted – No changes proposed*
	-On section 1 provide a 200 mm wide concrete cutoff wall at the centre of the 100 year spillway extending a minimum of 800 mm deep plus footing to provide a level weir and limit seepage flows.	*Condition accepted – No changes proposed*
	-Provide a detail of a subsoil riser for flushing and maintenance of the subsoil collection pipe. The riser is to include two 450 bends with a short section of un- slotted straight (minimum 300 mm) in between. The vertical riser is to stop 50 mm above the extended detention depth and sealed with a removable screw cap	*Condition accepted – No changes proposed*
2.7.1 (xviii)	Provide Floodway Warning Signs for the detention basin, bioretention swale and bioretention basin in accordance with Plan A(BS)114S from Council's Engineering Guide for Development 2005.	*Condition accepted – No changes proposed*
2.7.1 (xix)	Where charge systems are required to discharge to the rainwater tank a charge line cleanout line shall be provided. The charge line cleanout is to be located at the lowest point in the system in a pit a minimum of 10 m from the last connection. Provide a screw cap with 20 mm dribble hole for the charge line cleanout. Confirm the effective operation (HGL) of the charge system using DRAINS.	*Condition accepted – No changes proposed*

all ok.

2.7.1 (xx)	~~Demonstrate that the external swale will drain naturally and not be blocked by any filling from the development.~~	*To Be Deleted*
2.7.1 (xxi)	A civil engineer, registered with NPER, is to assess the design of the detention basin and determine whether there is any existing or future population at risk should the basin fail. Where there is any existing or future population at risk the basin must be referred to the Dam Safety Committee for any requirements. Such requirements are to be implemented.	*Condition accepted – No changes proposed*
2.7.2	Revised landscape plans are required from habitat 8 that include appropriate species for the bioretention systems in accordance with the BCC Handbook Part 5 - Vegetation Selection Guide (October 2012) for the filter media depth of 500mm. Planting within the filter area should incorporate several growth forms, including shrubs and tufted plants and be densely planted (tufted plants at a minimum of ~~510~~ plants per square metre) to ensure plant roots occupy all parts of the media. Groundcover species must not be used. To ensure diversity and disease resistance a minimum of 8 different species is required for the bioretention swale and twelve different species for the bioretention basin, all planted as a matrix. All plants within the filter area are to be planted from tubestock, or virotube and not pots. The planting schedule on L003 is to be revised to include separate planting schedules for the bioretention swale and bioretention basin. About half the species currently nominated for the Detention Basin/Swales are unacceptable to Council due to type or size. No stone or organic mulch is permitted within the bioretention filter area, but Jutemat or jutemesh is permitted.	*Habit8 have reviewed Councils proposed condition and advise the following:* *Plant densities at 10/m2 is excessive. Most of the selected plants grow to 600mm in diameter, hence planting at 10/m2 will create a significantly crowded and overgrown landscape. Projects where these densities have been implemented have resulted in ongoing maintenance and vermin issues, reduced aesthetic quality and desired function of the detention system. In Habit8's experience a maximum of 5 plants per m2 is sufficient in creating a functional bioretention basin.*
2.7.3	Amended architectural plans are required for buildings, or parts of buildings, that are not affected by BASIX, to demonstrate compliance with the minimum standards defined by the Water Efficiency Labelling and Standards (WELS) Scheme for any water use fittings. Minimum WELS ratings are: i. 4 star dual-flush toilets ii. 3 star showerheads iii. 4 star taps (for all taps other than bath outlets and garden taps) iv. 3 star urinals; and v. Water efficient washing machines and dishwashers are to be specified.	*Condition accepted – No changes proposed*
2.7.4	Details are to be provided for permanent interpretive signage minimum A1 size to be installed	*Condition accepted – No changes proposed*

OK

OK

Disagree

All tufted species $10/m^2$

Shrubs typically $1/m^2$ (This would replace one of the tufted species).

OK

OK

	to highlight the water quality improvement process. The sign is to incorporate a simplified drainage layout of the site and detail through words and pictures all the different water quality devices including the rainwater tank and explain the benefit to the site and community. The sign is to be supported by a steel post or on a wall and is to be located adjacent to the major water quality device. The wording and detail is to be approved by Council.	
2.7.5	Maintenance schedule requirements are to be provided for each of the Stormwater Quality Improvement Devices including the rainwater tank. Where these devices are located in roadway/parking areas these are to include traffic management requirements. The designer of the stormwater treatment system must prepare the Maintenance schedule and this schedule must show the designer's name, signature and date on it. The maintenance schedule is to clearly differentiate between the bioretention systems and other landscape areas. No stone or organic mulch, nor any fertiliser is to be applied to the bioretention areas at any time.	*Condition accepted – No changes proposed*
2.7.6	Section 4.5 of the at&l Civil Infrastructure Report of June 2015 is to be revised to ensure that a minimum of **70%** ~~**80%**~~ of non-potable water uses within the site is met through rainwater assessed using the Node Water Balance function in MUSIC based on: ~~i. A separate rainwater tank being provided for each warehouse collecting flow from a minimum of 50% of the roof area, excluding the area of south lot 3.~~ ii. Allow for internal rainwater reuse of 0.1 KL/day per toilet or urinal. However where site is occupied say 6 days per week the daily usage rate can be multiplied by 6/7. iii. Allow for an annual demand for watering landscaped areas (excluding turf areas) of 0.4 kL/year/m2 as PET-Rain. For bioretention filter areas only allow 1 kL/year/m2 as PET-Rain. Note that it is unacceptable to agglomerate the landscape watering into the rainwater reuse daily demand. Nominate which specific tank will be watering the bioretention area. iv. Allow for any other non-potable use on site such as vehicle washing or certain air conditioning units. ~~v. Allow on the design plans for a 20% increase in rainwater tank size volume to that shown in MUSIC to allow for anaerobic zones, mains water top up levels and overflow levels. e.g. where a 40,000 L tank~~	*The WSUD Report approved under the Concept Plan Approval, commits to supplying 70% of non-potable water uses through rainwater harvesting.* *To be deleted. Refer to new cla e 2.7.12* *Condition accepted – No changes proposed* *Condition accepted – No changes proposed* *Condition accepted – No changes proposed* *To be deleted. Rainwater tank sizes to be calculated in accordance with condition 2.7.12*

OK

OK

OK

OK

OK

Disagree. This is to be used in conjunction with 2.7.12

I keep.

	~~is modelled in MUSIC it is to be specified on the drainage plan as 50,000 L.~~	
2.7.7	Revised MUSIC modelling is required to achieve Council's pollution removal targets with the changes nominated above. The extended detention depth for the bioretention swale is to be modelled as zero.	*Condition accepted – No changes proposed*
2.7.8	Provide a section within the at&l Civil Infrastructure Report for an assessment of the Stream Erosion Index (SEI) for the site using the method in Council's MUSIC Modelling Guide within the WSUD Handbook. When preparing the modified MUSIC model the Extended Detention Depth of the Bioretention Swale is to be zero and the detention basins could be included if required with k = 0. The SEI is not to exceed 3.5.	*Condition accepted – No changes proposed*
2.7.9	The retaining walls adjacent to the bioretention basins are to be designed and certified by a Structural Engineer registered with NPER to allow for future excavation of the bioretention basin to be self-supporting (allowing for overturning and sliding), where the basin media including the gravel is removed and replaced for maintenance	*Condition accepted – No changes proposed*
2.7.10	An experienced hydraulic engineer is to prepare and certify a detailed Rainwater Reuse Plan for non-potable water uses (including all toilet flushing and landscape watering) on the site. The plan is to show the rainwater pipe arrangement including pre-treatment system, pump, mains water direct tank top up, isolation valves, flow meters for all mains water inflows, or solenoid controlled mains water bypass (if applicable) and non-potable usage outflows, a timer for landscape watering, an inline automatic backwash filter and certify that all Sydney Water requirements have been satisfied. A solenoid controlled mains water bypass is only permitted for toilet flushing and where fitted, landscape watering or other reuse must only use pump water and be on a separate reuse line, independent to the toilets and their solenoid backup. Where a solenoid controlled mains water bypass is not fitted, a manually operated bypass is to be provided for the toilets independent of landscape watering or other reuse. Provide a warning light to indicate pump failure. All rainwater reuse pipes are to be coloured purple. Rainwater warning signs are to be fitted to all external taps where rainwater is used as a source.	*Condition accepted – No changes proposed*
2.7.11	Provide a detailed Landscape Watering Plan by an experienced irrigation specialist showing the layout of filters, flow meters, timers, taps and pipes and the use of sprinklers or drip irrigation. The system is to	*Condition accepted – No changes proposed*

	be designed to automatically achieve a minimum usage rate of nominated in the Construction Certificate as nominated in MUSIC (bioretention areas to achieve an average annual usage rate of 1 kL / year / m2 of filter area). This is the average usage throughout the year and the system needs to be adjusted to allow for monthly seasonal variations e.g. the flow rate in December is to be designed to deliver a 50% increase above the average yearly flow. All rainwater reuse pipes are to be coloured purple. Rainwater warning signs are to be fitted to all external taps where rainwater is used as a source.	
2.7.12	**Rainwater tanks shall be sized to provide a minimum of 70% of all non-potable water usage for each building.** The minimum rainwater tank sizes are for warehouses 1 - 30kL, 2 - 125 kL, 3 - 35kL, 4 - 50 kL and 5 - 80 kL.	*Insert new clause.* *The WSUD Report approved under the Concept Plan Approval, commits to supplying 70% of non-potable water uses through rainwater harvesting.* OK

DURING CONSTRUCTION

Keep

No.	Proposed Condition	AT&L / Mirvac Comments
4.1.1	~~The 110~~ Stormfilters ~~with 690mm cartridges~~ and ~~minimum fifty-eight 200 micron~~ Enviropods ~~supplied by Stormwater 360~~ are not to be reduced in size or quantity, nor replaced with an alternate manufacturer's product, ~~from that specified in the approved Construction Certificate documentation.~~	*Clause amended as discussed.* NO Disagree
4.1.2	Provide certification ex bin from the material supplier prior to placement, that the bioretention filter media has: i. A minimum hydraulic conductivity as defined by ASTM F1815-06 of 250 mm/hr (actual, not predicted) ii.A maximum hydraulic conductivity as defined by ASTM F1815-06 of 700 mm/hr (actual, not predicted) iii.An Orthophosphate content < 40 mg/kg iv.A Total Nitrogen content < 1000 mg/kg v.Is not hydrophobic.	*Condition accepted – No changes proposed* OK
4.1.3	No fertiliser or additional nutrient material is to be provided to the bioretention basin filter area during planting of the tubestock, or at any time.	*Condition accepted – No changes proposed* OK

OK to delete this only

keep

NO

4.1.4	The filter media in the bioretention area is not to be installed or bioretention plants installed until all the building works, retaining walls, driveways and general landscaping have been completed.	*Condition accepted – No changes proposed*

OK

PRIOR TO ISSUE OF AN OCCUPATION/SUBDIVISION CERTIFICATE

No.	Proposed Condition	AT&L / Mirvac Comments
5.1.1	A Restriction to User and Positive Covenant is to be provided over the Stormwater Quality Improvement Devices and Rainwater Tanks in accordance with the requirements of Council's Engineering Guide for Development 2005. The covenant requirements are to include the submission of an annual report on water treatment and non-potable water usage by the first business day on or after 1 September each year. The Restriction to User and Positive Covenant must be registered with Land & Property Information prior to the final occupation certificate.	*Condition accepted – No Changes Required*
5.1.2	A Restriction to User and Positive Covenant is to be provided over the On-Site Detention System in accordance with the requirements of Council's Engineering Guide for Development 2005. The Restriction to User and Positive Covenant must be registered with Land & Property Information.	*Condition accepted – No Changes Required*
5.1.3	~~A drainage easement with a Restriction to User is to be provided over each lot with an interallotment drainage line or detention and water quality treatment system to the extent of the 1 in 100 year ARI storage in accordance with the requirements of Council's Engineering Guide for Development 2005. The easement is to be in favour of all upstream properties draining through it. The Restriction to User and drainage easement must be registered with Land & Property Information.~~	*To be deleted. Subdivision of industrial lots is not proposed as part of this development application.*
5.1.4	~~Where the road is to be dedicated to Council as public roadway the following is to be provided:~~ ~~i. A minimum 2.5m wide drainage easement with a Restriction to User in favour of Council over the centreline of the proposed stormwater pipe draining the road water through private property to the discharge point as per the Engineering Guide for Development. The Restriction to User and drainage easement must be registered with Land & Property Information.~~ ~~ii. A drainage easement with a Restriction to User in favour of Council over the extent of detention basins up to 1 in 100 year~~	*To be deleted. The estate access road will be retained under private ownership.*

OK

OK.

OK if no subdivisio

OK if no subdivision

	~~extents. The Restriction to User and drainage easement must be registered with Land & Property Information.~~ iii. ~~A positive covenant requiring all maintenance and or replacement of the pipeline and drainage systems during the public road to be undertaken by the property owner, with no obligation for the maintenance of such systems by Council. Such wording to be approved by Council. The positive covenant must be registered with Land & Property Information.~~	
5.1.5	~~Where the lots are to be subdivided a community title is to be provided to ensure the cost of maintenance of the water quality systems and detention systems are shared proportionally based on site area for all lots benefitting from such systems, excluding Council. The community title must be registered with Land & Property Information.~~	*To be deleted. Subdivision of industrial lots is not proposed as part of this development application.*
5.1.6	~~Where the lots are to be subdivided, reciprocal rights of carriageway are to be provided over all shared accessways, or a right of carriageway where access is required over one lot for the benefit of another lot.~~	*To be deleted. Subdivision of industrial lots is not proposed as part of this development application.*
5.1.7	A registered surveyor is to provide a works-as-executed plan of the detention basin and certify that the available storage volumes (ignoring the volumes within the bioretention and Stormfilter basins) are at or exceed the design volumes in the 1 in 100 year ARI events	*Condition accepted – No changes proposed*
5.1.8	A Civil Engineer registered with NPER, is to certify that: i. all the requirements of the approved drainage plan have been undertaken. ii. the bioretention system has been installed with a minimum total filter media area of 223 m2 for the bioretention swale and 1445 m2 for the bioretention basin clear of pits and scour protection. iii. The bioretention systems having a minimum of 500 mm of filter media, a 100 mm transitions layer and a minimum 200 – 300 mm gravel layer with liners. iv. The bioretention subsoil lines are un-socked slotted PVC laid at minimum 0.5%. v. That for the eastern catchment a minimum detention storage of 2370 m3 has	*Condition accepted – No changes proposed*

OK if no subdivision

OK if no subdivision

OK

OK

	vi. been provided below the overflow weir at RL 49.60 excluding the bioretention storage below RL 48.45. vii. That for the western catchment a minimum detention storage of 3610 m3 viii. has been provided below RL 50.87 excluding the overflow weir area and Stormfilter storage. ix. a low flow orifice of 300 mm was provided for the western catchment and a low flow orifice of 560 mm was provided for the eastern catchment. x. the rainwater tanks have been provided as per the approved construction certificate plans collecting all of the roof area. xi. all the signage and warning notices have been installed. xii. any proprietary water quality devices have been installed for the site as per the manufacturer's recommendations. A copy of the certification and the works-as-executed drainage plan is to be provided to Council.	
5.1.9	Stormwater 360 is to certify for the installation of the ~~200 micron~~ Enviropods ~~and 690 mm~~ Stormfilters that: i. It is in accordance with the standard operational guidelines and production drawings. ii. It includes a baffle 400 mm below and 250 mm offset from the Stormfilter weir to retain floatables including oils. iii. The Stormfilters have a minimum flow rate of 176 l/s. iv. Metal mosquito proof screens have been provided to all grated accesses into the Stormfilter tank. v. ~~A minimum of fifty-eight 200 micron~~ Enviropods have been fitted **in accordance with the construction certificate documentation.**	*Clause amended as discussed.*
5.1.10	~~Provide a minimum 1 m wide drainage easement with a Restriction to User over each lot with an interallotment drainage line in accordance with the requirements of Council's Engineering Guide for Development 2005. The easement is to be in favour of all upstream properties draining through it. The Restriction to User and drainage easement must be registered with Land & Property Information.~~	*To be deleted. Subdivision of industrial lots is not proposed as part of this development application.*
5.1.11	A Geotechnical Engineer is to undertake insitu Saturated Hydraulic Conductivity Testing of each of	*Condition accepted – No changes proposed*

OK

OK if No subdivision

OK

	the bioretention systems in accordance with Practise Note 1 of the FAWB guidelines. Provide a minimum of three tests for systems with a filter area up to 100m^2 and an extra test point should be added for every additional 100 m^2 of filter area. Points are to be spatially distributed. Where the hydraulic conductivity of the soil differs from the rate specified in MUSIC of 125 mm/hr (tolerance -15% to +400%), remediation works will be required over the whole filter area to restore the conductivity and the rest repeated until the hydraulic conductivity is achieved. A Geotechnical Engineer is to then certify that in accordance with Practice Note 1 of the FAWB guidelines, the Saturated Hydraulic Conductivity is within tolerance to the rate specified in MUSIC for each of the bioretention systems.	
5.1.12	After the hydraulic conductivity has been certified by the Geotechnical Engineer, a horticulturalist that has relevant tertiary qualifications and technical knowledge with a minimum five (5) years demonstrated experience is to certify that the planting within the bioretention area including bank areas, is of the same quality and type and quantity as per the construction certificate approved landscaping plans, that any plants have been replaced and that any areas of scour or disrepair have been restored.	*Condition accepted – No changes proposed*
5.1.13	Written evidence is to be provided that the registered owner/lessee has entered into a minimum (5) year signed and endorsed maintenance contract with a reputable and experienced cleaning contractor for the maintenance of the bioretention systems, gross pollutant traps, Enviropods, Stormfilter and any other Stormwater quality devices. A copy of the signed and endorsed contract(s) and maintenance contractor(s) details are to be forwarded to Council's WSUD Compliance Officer.	*Condition accepted – No changes proposed*

OK

OK.

Should there be any questions regarding the above please contact the office.

We look forward to you confirming acceptance of the above conditions.

Yours sincerely

Andrew Tweedie
Senior Civil Engineer