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17 February 2021

Concrete Recyclers
14 Thackeray Street
Camellia NSW 2142

Attn: Anthony Males

EI Australia
Suite 6.01, 55 Miller Street
Pyrmont NSW 2009

Attn: Emmanuel Woelders

Re: Water Pollution Impact Assessment – Minto Resource Recovery Facility, 7 Montore Road, Minto, NSW

1.0 Background

Environmental Risk Sciences Pty Ltd (enRiskS) has been engaged by Concrete Recyclers Pty Ltd and EI Australia with a proposal to prepare a water pollution impact assessment for a proposed resource recovery facility where construction materials will be recycled. The facility is to be located at 7 Montore Road, Minto, NSW (the "site").

A development application for the proposed facility has been submitted. It is a state significant development. The environmental impact statement (EIS) in support of the application has been reviewed by relevant government departments and has been on public exhibition.

The proposed facility is designed to be a Resource Recovery Facility capable of recovering recyclable concrete, brick, asphalt, sandstone and sand from the waste stream for reuse. The proposed facility would receive concrete, brick, asphalt, sandstone and sand from the building and construction industry by truck. The materials will be stockpiled until processed and then final products (and any relevant wastes) will be taken off-site by truck.

Processing of these materials includes:

- Bricks/Concrete
    - inspection
    - storage
    - crushing
    - removal of metal
    - screening (separation based on particle size) to generate 10 mm or 20 mm aggregate
    - mixing of road base in the pugmill using cement or water and some of the materials generated using processes above.
- Sand
    - inspection
    - storage
    - screening (separation based on particle size)
    - washing

- size fraction – 6 to 18 mm stockpiled for sale
- size fraction – < 6 mm stockpiled for sale
- size fraction – 0.075 mm (i.e. 75 µm) mixed into crushed concrete road base stockpile.

The site is located within Campbelltown City Council local government area. Developments on sites surrounding the site of the proposed facility (adjoining the Site or in the vicinity of the Site) include:

- industrial and warehouse development with frontage to Montore Road to the east, north and south of the site
- Bow Bowing Creek adjoining the Site to the west
- industrial development to the west of Bow Bowing Creek
- residential development to the west of the abovementioned industrial development and on the western side of Campbelltown Road.

Figure 1 shows the site location and Bow Bowing Creek.

Figure 1: Site location

As part of their comments arising from review of the EIS, NSW EPA has requested additional information to be provided in regard to water management at the facility. They have requested the following:

1. Estimated frequency and volume of discharges.
2. Characterise the expected quality of the water to be discharged from the site.
3. Assess the quality of the discharge using the National Water Quality Guidelines and the relevant NSW Water Quality Objectives for the waterway(s) that might receive the discharge.

4. If necessary, propose licence limits for relevant chemicals that may be present in the discharge for consideration.
5. Provide further information on the location of the southern sediment basin in regard to designed flood level.
6. Provide further information on whether there will be automated control systems in place for the pumps that will transfer water from the sediment basins to the recycled water tanks that will provide water for site activities.

This assessment specifically addresses items 2, 3 and 4 of the above list, and will address potential risks to human health and the environment in relation to the discharge of water from the site.

2.0 Objectives

The objectives of this assessment:

- Review the available information in relation to the management of water at the proposed facility. Based on the available information water is expected to be reused/recycled on the site with discharges off-site only occurring during periods of heavy rainfall. The use of water on the site and the circumstances in which water will be discharged will be clearly outlined.
- Review the available information from related facilities and calculate potential concentrations of pollutants in water that would discharge from the site. This would be expected to include runoff calculations relevant to the circumstances where water discharges may occur.
- Understand the NSW Water Quality Objectives relevant to the waterway in which water will be discharged. These are expected to include recreational use and protection of aquatic environments.
- Assess risks to human health and the environment associated with the discharge of water from the site (when this would occur) to determine if the water quality objectives are met.
- If elevated risks are identified, calculate criteria relevant to discharge water that would need to be met, and may be considered as licence limits for water discharges.

The assessment will only address the operation of the facility as proposed and detailed in the EIS. The assessment will not consider any other discharges from the site, other than water.

3.0 Methodology

The methodology adopted for the conduct of this assessment is in accordance with the relevant National protocols/ guidelines including:

- National Guidelines for Water Quality Management, which include:
  - Fresh and marine water quality (ANZG 2018)
  - Drinking water guidelines (NHMRC 2011 updated 2018)
  - Recreational water guidelines (NHMRC 2008)
  - Guidelines for water recycling, including stormwater harvesting and reuse (NHMRC 2006; NRMMC 2009)
- enHealth, Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards (enHealth 2012).

In addition, NSW guidance in relation to water quality objectives relevant to the waterways into which water from the site may be discharged has also been considered in the assessment. International guidance has been considered where there is no appropriate guidance from NSW or the above national guidance.

4.0 Proposed facility

4.1 Proposed stormwater management

In line with NSW Government requirements (and as outlined in the EIS), any rain falling onto sites used for industrial processes such as this one must be appropriately managed. In addition, government policy encourages the collection of such stormwater for reuse on-site wherever possible.

The following discussion outlines the basics of the system proposed from the site. This summary has been developed using information provided in the main EIS report and Appendix 5 – Soil and Water Management Plan.

Site conditions

The site is located adjacent to Bow Bowing Creek. This is a concrete lined drainage line which runs along the western boundary of the site. There is a grassed area between the site boundary and the concrete lined channel. In the vicinity of the Site, this concrete channel is approximately 300 mm deep and approximately 3.5 m wide.

Bow Bowing Creek is a major tributary of Bunbury Curran Creek. Bunbury Curran Creek joins the Georges River approximately 10 km north east of this site. Aside from its headwaters, the creek channel is concrete lined to its confluence with Bunbury Curran Creek. The concrete channel that forms Bow Bowing Creek commences at around 4.5 km upstream of this site near the Campbelltown commuter carpark at Campbelltown train station.

Downstream of the headwaters, the riparian corridor is either absent with industrial development on the right and left bank of the concrete channel or consists of grassed batters of approximately 20 m either side of the channel. Screen planting along industrial lot boundaries is typical as seen at the Site.

Stormwater from industrial areas is discharged to the creek at numerous locations via stormwater pipes with concrete lined flow paths.

Stormwater management system details

The proposed facility has been designed to ensure that stormwater is appropriately managed, and the details are documented in the EIS.

As part of the construction of the facility the site will be cleared and regraded. The regrading is designed to ensure rain that falls onto the site is directed into the stormwater management system. The whole site will be covered in appropriate materials (crushed recycled concrete and aggregates) and will be well compacted to provide an appropriate base for site activities.

Rainfall onto the driveway and the entry to the on-site carpark will not be directed into the stormwater management system as this section of the site is outside the areas that could be impacted by the resource recovery activities (i.e. these areas are subject to the same activities as on the road outside and at residential and commercial sites etc so don't need additional specific management).

The stormwater management system will include 2 sedimentation ponds to which rain will be directed as it falls due to the slope towards these ponds graded into the site during construction. There will be one pond in the northern part of the site and one in the southern part of the site. These ponds will be 100 m^3 concrete tanks that will be built into the ground at the site. They will be approximately 2 m deep.

Rainfall will run into these ponds where flow will slow down. This will allow any sediment (i.e. soil, sand, aggregate, crushed concrete, dust) to fall down to the base of the tank leaving the water at the top of the tank fairly free of suspended sediment. A pump will then remove water from the ponds (from the surface of the water in the tank so as not to disturb the sediments) and transfer it to storage tanks. The water in the storage tanks will be used for various purposes required in processing the various wastes being recycled.

In addition to collecting the stormwater that falls onto the ground, rain that falls onto the roofs of the buildings at the site will also be collected – separately from the rest of the stormwater. This water will also be directed to storage tanks (small ones close to the buildings) and will be used for toilet flushing.

The system will be designed to comply with NSW Landcom (2004) Soils and Construction Handbook which provides guidance on how to size sedimentation ponds, how to organise stormwater systems to ensure they work appropriately given the expected rainfall in a particular location and how to design discharge points or emergency discharge weirs to minimise any potential for adverse effects due to bank wash away etc.

The tanks to be used for storage of water from the sedimentation ponds for reuse across the site will have a capacity of around 520 m^3. Water will be transferred from the ponds into the tanks until the tanks reach capacity. Depending on weather forecasts, remaining water within the ponds may be retained in the ponds until it can be added into the storage tanks or, if necessary, will be discharged into Bow Bowing Creek.

The activities proposed for the facility which require water include:

- dust suppression around the site where mobile plant and trucks drive
- dust suppression within the concrete crushing building
- sand washing.

The stored stormwater will be reused at the site for these purposes with mains water only being used if on-site reuse water is exhausted.

The sedimentation ponds will be designed to cope with relevantly sized storm events in line with the Landcom (2004) guidance.

Each pond will have an overflow pit which will collect water which spills out of the pond during rain events. The overflow pit will be sized to cope with both small and large rain events for the northern sedimentation pond. For the southern sedimentation pond, the overflow pit will be sized to cope with minor storm events. Should the capacity of the ponds and the overflow pits be exceeded during large storm events, then water will directly discharge to Bow Bowing Creek via weir structures.

It is noted that stormwater from all sites in the area (and the public roadways) will discharge to this creek during such storm events.

Water quality and quantity

Evaluating the potential for water discharged from this site to have potential to impact on Bow Bowing Creek requires consideration of both the quality of the water and the quantity of water. This assessment will focus on the quality of the water. Evaluation of issues related to water quantity will be addressed elsewhere, if required.

4.2 Water quality information

Given that this facility has yet to be approved or constructed, it is not possible to collect samples of water at the site to measure the potential for impacts from the resource recovery activities. However, this often occurs when evaluating proposed facilities so other approaches have been developed to allow an appropriate evaluation.

In this case, the proponent has a number of similar resource recovery facilities in other locations in Sydney. Data on stormwater quality at one of those sites (Wetherill Park) are available. The samples tested were from on-site ponds and so are relevant for use to consider water quality at this site as they relate to water running across the site (i.e. prior to any discharge from the site).

The facility at Wetherill Park is also a concrete and brick recycling facility that processes between 250,000 and 450,000 tonnes of brick and concrete per year. The site activities and arrangements are similar to the Minto site, but the Wetherill Park site occupies approximately twice the land area when compared to the Minto facility. The facility utilises a fixed crushing plant of similar nature to the proposed plant at Minto along with a pugmill and mobile equipment such as wheel loaders and excavators.

The data available for Wetherill Park are listed in **Table 1**.

Table 1: Water quality results – stormwater dam, Wetherill Park facility

Pollutant	Units	North Dam		
		Sample 1	Sample 1 (dup)	Sample 2
pH	Unitless	8.1	7.9	9.1
Electrical conductivity	µS/cm	1020	481	680
Suspended solids (total)	mg/L	72	142	6
Dissolved solids (total)	mg/L	--	--	430
Turbidity	NTU	--	--	6.3
Sulfate	mg/L	30	27	--
Chloride	mg/L	221	70	--
Calcium	mg/L	27	29	--
Magnesium	mg/L	20	10	--
Sodium	mg/L	140	46	--
Potassium	mg/L	7	3	--
Fluoride	mg/L	0.8	0.2	--
Ammonia (as N)	mg/L	3.09	0.17	--
Nitrite (as N)	mg/L	<0.01	<0.01	--
Nitrate (as N)	mg/L	0.03	0.08	--
Oxidised nitrogen (i.e. Nitrite + nitrate)	mg/L	0.03	0.08	--
Total nitrogen	mg/L	3.12	0.25	1.8
Total phosphorus	mg/L	--	--	0.05
Total organic carbon	mg/L	17	16	--
Arsenic	mg/L	0.002	0.002	0.002
Cadmium	mg/L	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	<0.001	0.033
Copper	mg/L	0.002	0.003	0.007
Iron	mg/L	0.5	0.87	--
Lead	mg/L	<0.001	<0.001	<0.001
Manganese	mg/L	0.226	0.37	--
Mercury	mg/L	<0.0001	<0.0001	<0.0001
Nickel	mg/L	0.002	0.002	0.001
Zinc	mg/L	<0.005	<0.005	<0.001
Oil and grease	mg/L	8	9	--
TRH C6-C9	µg/L	--	--	<10
TRH C10-C14	µg/L	<50	<50	<50
TRH C15-C28	µg/L	<100	<100	<50
TRH C29-C36	µg/L	<50	<50	<50

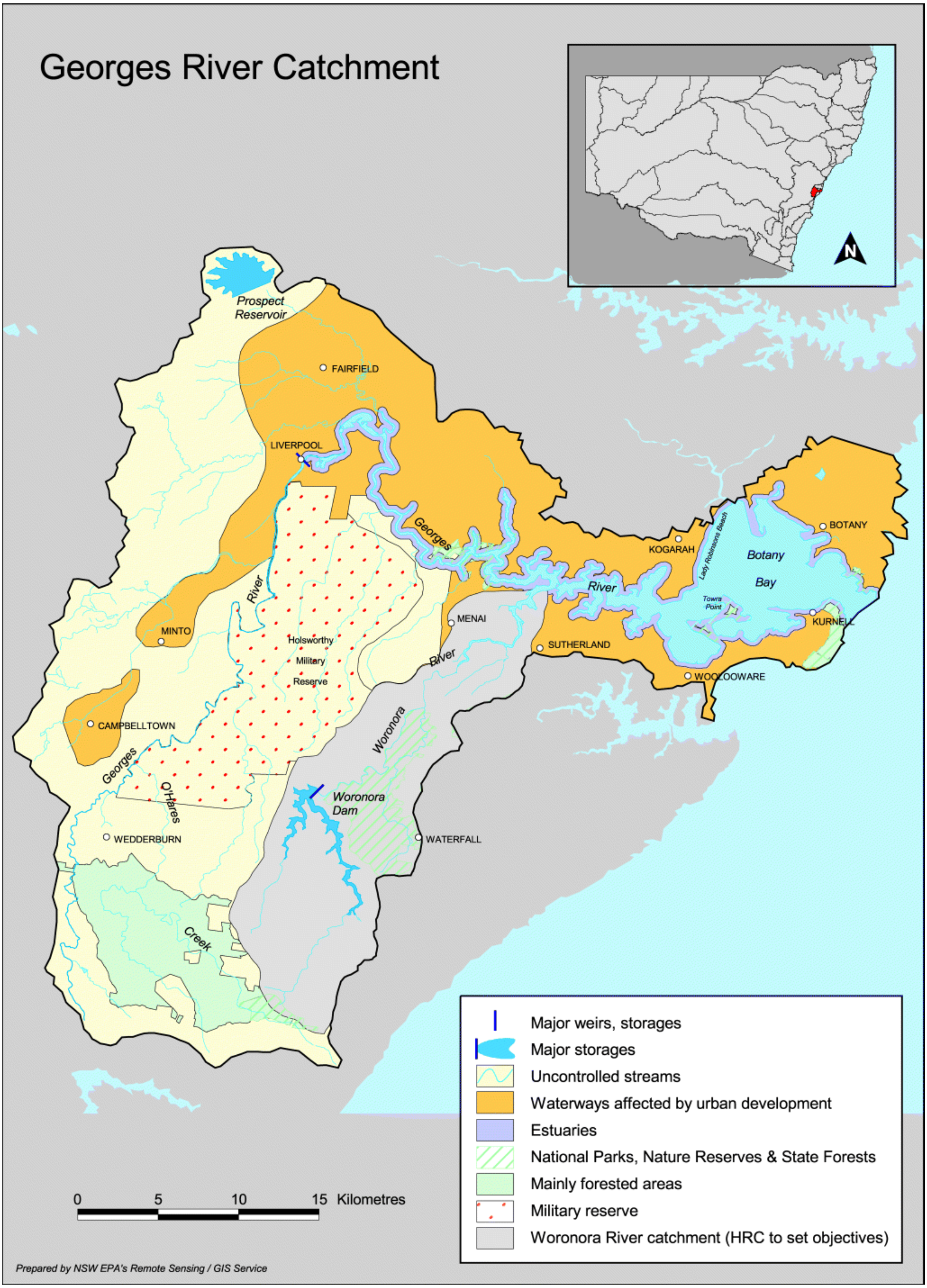

Figure 2: NSW water quality objectives map for Georges River catchment

4.3 NSW water quality objectives

The NSW government has set water quality objectives for catchments throughout NSW (https://www.environment.nsw.gov.au/ieo/).

The creek adjacent to this site is part of the Georges River catchment. Objectives for this catchment are divided into a number of areas – mainly forested areas of the catchment, waterways affected by urban development, uncontrolled streams and the estuary of this catchment. Bow Bowing Creek is in the area affected by urban development as can be seen in **Figure 1** (and the fact that the creek is mostly a concrete lined drain). The map for this catchment showing the various areas as defined in the by the NSW government is shown in **Figure 2** confirming that Minto is located in the urban development part of the catchment.

The objectives for this part of the catchment are:

- protection of aquatic ecosystems
- visual amenity
- secondary contact recreation (within 5 years)
- primary contact recreation (longer term objective – likely more than 10 years).

These objectives indicate that the relevant guidelines to apply in this assessment are recreational water guidelines in regard to human health and protection of ecosystem guidelines in regard to ecological health.

5.0 Screening level risk assessment – human health

The first step in any risk assessment (human health) is to compare the quality characteristics of the water to national guidelines or expected concentrations (for urban stormwater, for example) that indicate concentrations that are likely to have negligible effects on people or that show the characteristics of the water being assessed are no different to what is normally expected for stormwater.

Only if reported concentrations are in excess of the national guidelines or expected concentrations is more consideration required.

The following national guidelines/expected concentrations have been used in this screening assessment in relation to human health risk:

- **Australian Drinking Water Guidelines (ADWG) (NHMRC 2011 updated 2018)**. The National Health and Medical Research Council (NHMRC) and the Agriculture and Resource Management Council of Australia and New Zealand have developed the Australian Drinking Water Guidelines. These guidelines are designed to indicate water that is of acceptable quality for drinking for a lifetime. Generally, it is assumed people drink 2 L of water per day every day. Guidelines are also included to indicate limits based on aesthetic requirements. These include taste, issues with clothes washing, corrosion of pipes/pumps, etc.
- **NHMRC Guidelines for Managing Risks in Recreational Waters (NHMRC 2008).** The NHMRC guidance for recreational waters recommends that a 10 fold factor be applied to drinking water guidelines to assess water to be used for recreational purposes. People are unlikely to ingest the same volume of water when they are recreating (swimming, boating, wading) as they do when drinking each day so exposure is likely to be lower via incidental ingestion during recreational activities. The drinking water guidelines assume a person consumes 2 L of water per day every day of their life. The use of a 10 fold factor to convert to recreational water guidelines would be protective for the consumption of 200 mLs per day every day which is still well in excess of the amount that a person could ingest during recreation. In addition, for this situation, water from this site will only be discharged from the site during high rain events and the discharge is to a concrete lined drainage line which is unlikely to be used for recreation at all.

- **NRMMC Australian Guidelines for Water Recycling (NRMMC 2009).** Table A2.3 in the guidance on stormwater harvesting and reuse provides statistical assessment of data on stormwater quality collected in urban areas in Australia. The table includes mean values as well as 5th, 25th, 50th, 75th and 95th percentile values.

Table 2 presents a comparison of the range of concentrations reported from the Wetherill Park facility with the relevant guideline and the relevant expected concentration in stormwater. If the concentration range is in compliance with the recreational water guidelines for Australia, no further assessment is required. If the concentration range is in compliance with the expected values for typical Australian stormwater, no further assessment is required. Further discussion will be undertaken for chemicals/pollutants present at concentrations above both typical stormwater concentrations and recreational water guidelines, if necessary.

Table 2: Screening assessment – water quality, stormwater, Wetherill Park facility

Pollutant	Units	Measured range in dam	Recreational water guidelines&	Typical stormwater (mean – untreated stormwater)#
pH	Unitless	7.9-9.1	6.5-8.5	6.35
Electrical conductivity	µS/cm	481-1,020	--	--
Suspended solids (total)	mg/L	6-142	--	99.7
Dissolved solids (total)	mg/L	430	600ae	139.6
Turbidity	NTU	6.3	--	50.9
Sulfate	mg/L	27-30	250ae	--
Chloride	mg/L	70-221	250ae	11.4
Calcium	mg/L	27-29	--	--
Magnesium	mg/L	10-20	--	--
Sodium	mg/L	46-140	180ae	10.63
Potassium	mg/L	3-7	--	--
Fluoride	mg/L	0.2-0.8	1.5	--
Ammonia (as N)	mg/L	0.17-3.09	0.5ae	1.135
Nitrite (as N)	mg/L	<0.01	30	--
Nitrate (as N)	mg/L	0.03-0.08	500	--
Oxidised nitrogen (i.e. nitrite + nitrate)	mg/L	0.03-0.08	--	0.680
Total nitrogen	mg/L	0.25-3.12	--	3.09
Total phosphorus	mg/L	0.05	--	0.480
Total organic carbon	mg/L	16-17	--	16.9
Arsenic	mg/L	0.002	0.1	0.009
Cadmium	mg/L	<0.0001	0.02	0.0198
Chromium	mg/L	0.001-0.033	0.5	0.009
Copper	mg/L	0.002-0.007	1ae	0.055
Iron	mg/L	0.5-0.87	0.3ae	2.842
Lead	mg/L	<0.001	0.1	0.073
Manganese	mg/L	0.226-0.37	5	0.111
Mercury	mg/L	<0.0001	0.01	0.0002
Nickel	mg/L	0.001-0.002	0.2	0.009
Zinc	mg/L	<0.005	3ae	0.293
Oil and grease	mg/L	8-9	--	11.47
TRH C6-C9	µg/L	<10	--	--
TRH C10-C14	µg/L	<50	--	--
TRH C15-C28	µg/L	<100	--	--
TRH C29-C36	µg/L	<50	--	--

Notes:

& Taken from NHMRC Drinking water guidelines with a 10 fold factor applied for health based values to generate a recreational water guideline. The values based on aesthetic requirements in the drinking water guidelines are listed unchanged. (NHMRC 2008, 2011 updated 2018)

Taken from Table A2.3 in Australian guidelines for water recycling: managing health and environmental risks (phase 2) – stormwater harvesting and reuse (NRMMC 2009)

Stormwater quality in the dam at Wetherill Park is generally consistent with normal urban stormwater in Australia.

The activities at the site (both the operational one at Wetherill Park and the proposed one at Minto) are similar to those that might impact normal urban stormwater.

In urban areas rain falls on buildings, roads, footpaths, grassed areas, gardens etc. Stormwater running off such areas will contain suspended solids (small particles of soil, vegetation etc), dissolved solids (salts), nutrients (from fertilisers etc and from breakdown of vegetation and from animal manure), a range of metals (from rocks and soils (geology) and, potentially, small amounts of hydrocarbons (from small leaks from vehicles).

The activities at the site include storing and sorting of concrete and bricks, using plant and vehicles to deliver and move material around etc. The crushing of materials and washing of sand occur inside buildings so any materials that might end up on the ground from these processes are not in an area that can be affected by rain.

The only pollutants/parameters that reported levels above both recreational water guidelines (human health based) and typical concentrations in untreated urban stormwater were pH and suspended solids. This is to be expected for this site given the nature of the activities at this site. The potential for any impacts for these pollutants is discussed below.

6.0 Further assessment – human health

pH

The pH of any waters indicates whether the water is acidic, basic or neutral. The water in surface water bodies like creeks is usually in the range 6.5-8.5 – meaning it is neutral to a little basic. One of the samples of water from the Wetherill Park facility had a pH of just over 9. The other two samples were within the relevant neutral/basic range. This occasional slight elevation is to be expected for a site where concrete is recycled. Cement/concrete is made from a range of materials including limestone. The pH of this mix is very basic (often 11-13). This means that, if there is a bit more concrete dust on the open ground at such a site, then the stormwater might have a slightly elevated pH.

It is important to note that the water from the sedimentation ponds will only be discharged from the site during large rain events. During such situations, the pH of the water will be readily diluted by the water already present in the concrete lined creek and people are not expected to recreate in the creek during such events. Consequently, even if water in the ponds has a slightly elevated pH for a short time, no impacts on people are likely.

It is noted that skin irritation can occur during prolonged exposure to water at pH above 10 or 11. In this case, prolonged exposure is not expected, and the pH of the water is not likely to be above 10, so, even if workers at the site come into occasional contact with the water, no effects are expected.

Suspended solids

Suspended solids are just the small particles of soil or concrete or brick (i.e. dust) that may get washed off the open areas of the site into the ponds. The presence of suspended solids in water is not expected to have any impacts on human health. This matter will be further discussed in the next section.

7.0 Screening level risk assessment – ecological health

The first step in any risk assessment (ecological) is to compare the quality characteristics of the water to national guidelines or expected concentrations (for urban stormwater, for example) that indicate concentrations that are expected to have negligible effects on ecosystems or that show the characteristics of the water being assessed are no different to what is normally expected for stormwater. Only if reported concentrations are in excess of the national guidelines or expected concentrations is more consideration required.

The following national guidelines/expected concentrations have been used in this screening assessment in relation to ecological risk:

- **ANZECC Water Quality Guidelines (ANZG 2018).** Section 8.3.7 of ANZECC (2000) provides trigger values for a range of metals and other parameters for the protection of freshwater ecosystems. These guidelines have been determined using available toxicity data for a range of aquatic organisms. The guidelines are based on protecting 95% of species tested which is designed to ensure negligible effects in ecosystems.
- **NRMMC Australian Guidelines for Water Recycling (NRMMC 2009).** Table A2.3 in the guidance on stormwater harvesting and reuse provides statistical assessment of data on stormwater quality collected in urban areas in Australia. The table includes mean values as well as 5^{th}, 25^{th}, 50^{th}, 75^{th} and 95^{th} percentile values.

Table 3 presents a comparison of the range of concentrations reported from the Wetherill Park facility with the relevant guideline and the relevant expected concentration in stormwater. If the concentration range is in compliance with the expected values for typical Australian stormwater, no further assessment is required. If the concentration range is in compliance with the water quality guidelines for Australia, no further assessment is required. Further discussion will be undertaken for chemicals/pollutants present at concentrations above both typical stormwater concentrations and water quality guidelines, if necessary.

Table 3: Screening assessment – water quality, stormwater, Wetherill Park facility - ecosystems

Pollutant	Units	Measured range in dam	Water quality guidelines[&]	Typical stormwater (mean – untreated stormwater)[#]
pH	Unitless	7.9-9.1	6.5-8.5	6.35
Electrical conductivity	µS/cm	481-1,020	125-2,200	--
Suspended solids (total)	mg/L	6-142	--	99.7
Dissolved solids (total)	mg/L	430	--	139.6
Turbidity	NTU	6.3	0.5-50	50.9
Sulfate	mg/L	27-30	--	--
Chloride	mg/L	70-221	--	11.4
Calcium	mg/L	27-29	--	--
Magnesium	mg/L	10-20	--	--
Sodium	mg/L	46-140	--	10.63
Potassium	mg/L	3-7	--	--
Fluoride	mg/L	0.2-0.8	--	--
Ammonia (as N)	mg/L	0.17-3.09	0.9	1.135
Nitrite (as N)	mg/L	<0.01	--	--
Nitrate (as N)	mg/L	0.03-0.08	--	--
Oxidised nitrogen (i.e. Nitrite + nitrate)	mg/L	0.03-0.08	0.04	0.680
Total nitrogen	mg/L	0.25-3.12	0.5	3.09
Total phosphorus	mg/L	0.05	0.05	0.480
Total organic carbon	mg/L	16-17	--	16.9
Arsenic	mg/L	0.002	0.013	0.009

Pollutant	Units	Measured range in dam	Water quality guidelines[&]	Typical stormwater (mean – untreated stormwater)[#]
Cadmium	mg/L	<0.0001	0.0002	0.0198
Chromium	mg/L	0.001-0.033	0.001-0.0033	0.009
Copper	mg/L	0.002-0.007	0.0014	0.055
Iron	mg/L	0.5-0.87	--	2.842
Lead	mg/L	<0.001	0.0034	0.073
Manganese	mg/L	0.226-0.37	1.9	0.111
Mercury	mg/L	<0.0001	0.0006	0.0002
Nickel	mg/L	0.001-0.002	0.011	0.009
Zinc	mg/L	<0.005	0.008	0.293
Oil and grease	mg/L	8-9	--	11.47
TRH C6-C9	µg/L	<10	--	--
TRH C10-C14	µg/L	<50	--	--
TRH C15-C28	µg/L	<100	--	--
TRH C29-C36	µg/L	<50	--	--

Notes:

& Taken from ANZECC Australia and New Zealand Water Quality Guidelines (ecosystem protection values) (ANZG 2018)

Taken from Table A2.3 in Australian guidelines for water recycling: managing health and environmental risks (phase 2) – stormwater harvesting and reuse (NRMMC 2009)

Stormwater quality in the dam at Wetherill Park is generally consistent with normal urban stormwater in Australia as discussed above.

The only pollutants/parameters that reported levels above both guidelines for the protection of ecosystems and typical concentrations in untreated urban stormwater were pH, suspended solids, dissolved solids, chloride, sodium, chromium, copper, ammonia and other nutrients. These pollutants and the levels in the samples are as expected given the nature of the activities at this site. The potential for any impacts for these pollutants is discussed below.

8.0 Further assessment – ecological health

The organisms that live in creeks are already subject to quite wide ranges for parameters like pH, suspended solids, dissolved solids, sodium and chloride during natural cycles of high and low rainfall and normal changes in runoff from urban areas and roads.

Suspended solids

Suspended solids vary depending on the strength of the rain event and the presence of cleared land in the catchment. It is common for creeks in urban areas to have elevated levels during large storm events. Suspended solids will limit how much light gets into the water limiting the growth of algae (food for other organisms). Consequently, it is important to not have elevated levels all the time or for long periods. But occasional elevations during rain events are to be expected in natural systems.

At this site, the stormwater management system includes sedimentation ponds. These ponds are designed to collect the water, allow the speed of the flow of water to slow down which allows most of the particles to settle out onto the bottom of the pond. Agents that assist the settling process (flocculants) may also be added into such systems if the particles are very light and don’t settle easily. Allowing the particles to settle in the sedimentation ponds or in the storage tanks is quite important as the water used for dust suppression or sand washing needs to be quite low in suspended solids. As a result, the only time the levels of suspended solids might be a bit higher is during large rain events. This is also the time that water might overflow from the site into the concrete lined creek nearby. It is important to note that most creeks have elevated levels of particles during large rain events or floods. Given that such situations will be rare and the water in the creek in such situations is already likely to have elevated suspended solids, it is not expected that slightly elevated levels in water overflowing from the site will actually change the level of suspended solids in the creek, so no effects are likely.

pH

As discussed above, the pH of any waters indicates whether the water is acidic, basic or neutral. The pH of water will depend on the amount and mix of salts dissolved in solution. More salty water like the ocean has a pH around 8 while freshwaters are usually more around 7. The water in surface water bodies like creeks is usually in the range 6.5-8.5 – meaning it is neutral to a little basic (ANZG 2018). One of the samples of water from the Wetherill Park facility had a pH of just over 9. The other two samples were within the relevant neutral/basic range. This occasional slight elevation is to be expected for a site where concrete is recycled. Cement/concrete is made from a range of materials including limestone. The pH of this mix is very basic (often 11-13). This means that if there is a bit more concrete dust on the open ground at such a site then the stormwater might have a slightly elevated pH. The only time stormwater from the site can reach an ecosystem requiring protection is during large storm events if the sedimentation pond overflows. Any water that gets discharged in such a situation, will mix with the large volume of water within the creek already. This mixing will bring the pH back down toward 7-8 and so no effects are likely.

Dissolved solids

The levels/concentrations of dissolved solids (i.e. salts)/sodium/chloride give information about the saltiness of the water. Another parameter that gives this information is the electrical conductivity of the water. It is noted that the conductivity of the water in the samples taken at the Wetherill Park facility were within the relevant range for conductivity in the water quality guidelines so no impacts on ecosystems are expected. It is noted that the concentrations reported for dissolved solids etc are above those levels often found in urban stormwater but this does not mean effects on ecosystems would be expected. The water quality guideline for conductivity is the most appropriate indicator for determining potential for effects. The slightly elevated levels of dissolved solids etc are likely to be due to the salts washing out of the materials being recycled at the site like concrete, bricks, sand and sandstone. In addition, any discharge of water from this site will only occur during large rain events so any such water will be immediately diluted within Bow Bowing Creek and the volume of water is unlikely to be sufficient to actually change the overall levels of dissolved solids/sodium/chloride or even the electrical conductivity of water within Bow Bowing Creek during such events.

Chromium/copper

Copper and chromium are metals commonly found in soils and rocks. They are also commonly found in urban stormwater due to runoff from roads and buildings.

The copper concentrations reported at the Wetherill Park facility are well below the concentrations that are commonly found in urban stormwater. Also, any discharge of water from this site will only occur during large rain events so any such water will be immediately diluted within Bow Bowing Creek and the volume of water is unlikely to be sufficient to actually change the overall levels of copper within Bow Bowing Creek during such events.

The chromium concentrations reported at the Wetherill Park facility were essentially not detectable on one occasion and at a slightly elevated level (in comparison to the guideline and to typical concentrations in stormwater) on the other occasion for which results are available. The presence of chromium in stormwater at the site will depend on the nature of the materials stored at the site – for example, different types of rock or bricks will have different levels of minerals in them and so the levels of various common metals will vary over time. Also, the availability of the chromium in such materials will also vary – some will be chemically bound into the fine particles while some will be able to dissolve into the water. Effects on organisms generally only occur for the proportion that can actually dissolve (i.e. the available portion). Slightly elevated concentrations of chromium in water measured on occasion at such a site are likely to be due to less available forms of chromium. Also, any discharge of water from this site will only occur during large rain events so any such water will be immediately diluted within Bow Bowing Creek and the volume of water is unlikely to be sufficient to actually change the overall levels of chromium within Bow Bowing Creek during such events so no effects are expected.

Nutrients

Nutrients are the species of nitrogen and phosphorus that are needed by both plants and animals to live. In waters sufficient nutrients are required to ensure a well functioning ecosystem, however, excess nutrients can result in algal blooms etc if conditions like low flow and higher temperature are also in place. In this case, while the nutrient levels are above trigger values for creeks/rivers in south east Australia, they are still within the concentrations measured in urban stormwater. The levels of oxidised nitrogen in stormwater range from 0.132 (5^{th}) to 1.5 (95^{th}) mg/L. The levels measured in stormwater at Wetherill Park ranged up to 0.08 mg/L, so levels are lower than normal urban stormwater. The levels of total nitrogen in stormwater range from 0.62 (5^{th}) to 7.5 (95^{th}) mg/L. The levels measured in stormwater at Wetherill Park ranged up to 3.1 mg/L, so levels are well within the range for normal urban stormwater. The levels of ammonia in stormwater range from 0.1 (5^{th}) to 3.3 (95^{th}) mg/L. The levels measured in stormwater at Wetherill Park ranged up to 3.1 mg/L, so levels are within the range for normal urban stormwater. Also, any discharge of water from this site will only occur during large rain events so any such water will be immediately diluted within Bow Bowing Creek and the volume of water is unlikely to be sufficient to change the overall levels of nutrients within Bow Bowing Creek during such events nor is it likely that there will be low flow conditions or high water temperatures in the creek during such events, so no effects are expected.

9.0 Conclusions

The proposed facility is one that recycles common construction materials including concrete, bricks, sand and sandstone. These materials are not likely to contain pollutants that are not already common in stormwater in urban areas.

The site is designed, in line with government requirements, to appropriately manage all stormwater that falls on the site. In fact, collecting that water is an important part of operations as it provides water for dust suppression and sand washing at the site. If such water was not available at all, dust suppression and sand washing would need to always be undertaken using reticulated water – a costly and non-preferred use of potable water. The system to collect stormwater at the site will minimise the need for using potable water at the site making the site more water efficient – again, in line with government requirements.

To ensure the most effective operation of the site, collection and storage of stormwater will be maximised at the site.

This means the only time water will leave the site and enter Bow Bowing Creek will be during large rain events. Given that the stormwater from this site is largely the same as stormwater from other urban areas, loss from the site into the creek will be minimised as much as possible and there will be a large volume of water in the creek already during such events, it is not expected that the occasional discharge of stormwater from this site will have any impacts on ecosystems or people.

10.0 Limitations

Environmental Risk Sciences Pty Ltd has prepared this letter for the use of EI Australia Pty Ltd and Concrete Recyclers Pty Ltd in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this letter.

It is prepared in accordance with the scope of work and for the purpose outlined in this letter.

The methodology adopted and sources of information used are outlined in this letter. Environmental Risk Sciences Pty Ltd has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions. No indications were found that information contained in the reports provided for use in this assessment was false.

This letter was prepared in January and February 2021 and is based on the information provided and reviewed at that time. Environmental Risk Sciences Pty Ltd disclaims responsibility for any changes that may have occurred after this time.

This letter should be read in full. No responsibility is accepted for use of any part of this letter in any other context or for any other purpose or by third parties. This letter does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

11.0 Closure

If you require any additional information or if you wish to discuss any aspect of this report, please do not hesitate to contact Jackie or Therese on (02) 9614 0297.

Yours sincerely,

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