



Our reference: EF15/2643, DOC15/506132-01
Contact: John Goodwin

Ms Rebecca Sommer
Department of Planning and Infrastructure
GPO BOX 39
SYDNEY 2001

Dear Ms Sommer

SSD 7228 – SYDNEY ZOO EIS

I am writing to you in reply to your invitation to the EPA to comment on the EIS for the Sydney Zoo project.

The EPA requests that these comments be read in conjunction with its letter and attachment dated 8 September 2015 concerning the SEARs for the project.

The EPA emphasises that it does not review or endorse environmental management plans or the like for reasons of maintaining regulatory 'arms length'. And, has not reviewed the environmental management plans forming part of or referred to in the EIS.

The EPA remains concerned that the 16.5 hectare development site (i.e. proposed lot 11) borders Eastern Creek and may have adverse water quality impacts during construction and operation of the project, even though –

- EIS section 3.1 (6th dot point) commits to "... to maximise the reuse of water on-site through water saving and recycling strategies" and EIS section 6.4 commits to stormwater harvesting; and
- EIS section 3.9.2 (2nd par, p.30) commits to directing daily wash down waters to sewer.

The EPA has identified the following site specific concerns based on project information available on the Department's Major Project's web site:

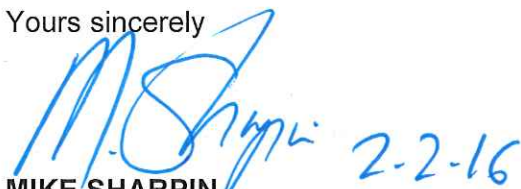
- (a) bulk earthworks, construction and construction-related noise and vibration impacts (including recommended standard construction hours and intra-day respite periods for highly intrusive noise generating work);
- (b) bulk earthworks, construction and construction-related dust control and management;

- (c) bulk earthworks, construction and construction-related erosion and sediment control and management;
- (d) requirements under the Radiation Control Act and Regulation in respect of any 'regulated material' (including any 'ionising radiation device') associated with veterinary services likely to be provided on site;
- (e) operational storage, handling, transport and disposal of 'clinical and related wastes';
- (f) minimisation of operational water quality impacts on surface and groundwater, including Eastern Creek and its tributaries;
- (g) minimisation of odours associated with operational composting of animal and other wastes on the site; and
- (h) operational water conservation and energy efficiency measures.

The EPA expands on its concerns in Attachment A to this letter.

Should you require clarification of any of the above please contact John Goodwin on 9995 6838.

Yours sincerely



MIKE SHARPIN
Acting Manager Metropolitan Infrastructure
Environment Protection Authority
Encl. Attachment A

ATTACHMENT A
- ENVIRONMENT PROTECTION AUTHORITY COMMENTS -
SYDNEY ZOO

1. General

The EPA considers that the project comprises two distinct phases (construction and operational) and has set out its comments on that basis.

2. Construction phase

The EPA anticipates a range of environmental impacts during the construction phase of the development which should be comprehensively addressed in detail by the environmental assessment. And, notes the proximity of Eastern Creek and residences to the north.

The EPA anticipates that site preparation, bulk earthworks, construction and construction-related activities will be undertaken in an environmentally responsible manner with particular emphasis on –

- detailed site contamination investigation,
- compliance with recommended standard construction hours,
- waste management consistent with the hierarchy of re-use, recycle and then disposal as the last resort,
- feasible and reasonable noise and vibration minimisation and mitigation,
- intra-day respite periods from high noise generating construction activities (including jack hammering, rock breaking, pile boring or driving, saw cutting and vibratory rolling),
- effective dust control and management, and
- effective erosion and sediment control.

2.1 Site investigation

EIS Appendix H indicates that that a (electrical/telecommunications) building and poles associated with previous use had been demolished and the site rehabilitated and validated. And, that asbestos was not detected in soil samples taken during the preliminary site investigation (environmental site assessment)

Appendix H goes on to indicate that the site is suitable to development for the purposes of a zoo.

Recommendation

That the proponent be required to develop a protocol detailing measures to be adopted should asbestos containing material be encountered during the site preparation, bulk earthworks or construction phases of the project.

2.2 Waste control and management (general)

All wastes generated during the project must be properly assessed, classified and managed in accordance with the EPA's guidelines to ensure proper treatment, transport and disposal at a landfill legally able to accept those wastes.

The EPA notes that the proponent intends to import a large volume of virgin excavated natural material (VENM) and excavated natural material (ENM) as fill.

The EPA provides guidance material on its web site via the following links –

<http://www.epa.nsw.gov.au/waste/virgin-material.htm>

<http://www.epa.nsw.gov.au/resources/waste/rre14-excavated-natural-material.pdf>

The EPA further anticipates that, without proper site controls and management, mud and waste may be tracked off the site during the course of the project.

Recommendation

The proponent should commit to ensuring that:

- (1) all waste generated during the project is assessed, classified and managed in accordance with the *“Waste Classification Guidelines Part 1: Classifying Waste”* (Environment Protection Authority, 2014);
- (2) any VENM material received on the site is accompanied by a VENM clearance certificate;
- (3) any ENM material received on site satisfies the requirements of the ENM Exemption 2014 issued under the Protection of the Environment Operations (Waste) Regulation 2014;
- (2) the body of any vehicle or trailer, used to transport waste or excavation spoil from the premises, is covered before leaving the premises to prevent any spill or escape of any dust, waste, or spoil from the vehicle or trailer; and
- (3) mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer or motorised plant leaving the site, is removed before the vehicle, trailer or motorised plant leaves the premises.

2.3 Dust control and management

The EPA considers dust control and management to be an important air quality issue during site preparation, bulk earthworks and subsequent construction and construction-related activities, which inevitably generate dust emissions as a result of –

- (a) the excavation, processing and handling of excavation spoil,
- (b) wind action on spoil stock piles, and
- (c) wind action on and plant movement across areas bare of vegetation or other cover.

Recommendation

The proponent be required to:

- (a) minimise dust emissions on the site, and
- (b) prevent dust emissions from the site.

2.4 Erosion and sediment control

EIS section 6.4 outlines proposed measures to avert erosion and sediment impacts during bulk earthworks and construction.

The EPA notes the proximity of Eastern Creek immediately west of the development site. And, considers that erosion and sediment controls should be designed and implemented to prevent pollution of the Creek during site preparation, bulk earthworks, construction and construction-related activities.

The Managing Urban Stormwater Soils and Construction, 4th Edition published by Landcom (the so-called 'Blue Book') provides guidance material for achieving effective erosion and sediment control on construction sites.

The EPA emphasises the importance of –

- (a) not commencing earthmoving or vegetation removal until appropriate erosion and sediment controls are in place, and
- (b) daily inspection of erosion and sediment controls which is fundamental to ensuring timely maintenance and repair of those controls.

Recommendation

The proponent be required to plan and implement erosion and sediment control measures consistent with the practices and principles in –

- Managing Urban Stormwater Soils and Construction, Volume 1, 4th Edition, 2004, and
- Managing Urban Stormwater Soils and Construction Volume 2A Installation of Services.

2.5 Noise

EIS Appendix N comprises a noise and vibration impact assessment report for the project.

Appendix N indicates that site preparation, bulk earthworks, construction and construction-related activities will be undertaken during the standard hours of construction recommended in the Interim Construction noise Guideline.

However, Table 30 in EIS section 6.2.4 suggests that contractors may undertake 'out of hours' work following approval by the "... Principal ...". The EPA does not support the proposed approval process for 'out of hours' work.

At the same time, the EPA accepts that certain emergency work may need to be undertaken urgently (other than during the standard recommended hours) in order to avoid –

- loss of life,
- damage to property, or
- environmental harm.

Recommendation

The proponent be required to obtain approval for proposed periods of 'out of hours' work from the Department, subject to appropriate exemptions for unavoidable emergency work.

2.5.1 intra-day respite periods

ICNG section 4.5 specifies construction activities proven to be particularly annoying and intrusive to nearby residents and which are considered at least as annoying to the nearby private hospital and schools. The EPA anticipates that those activities generating noise with particularly annoying or intrusive characteristics would be subject to a regime of intra-day respite periods where –

- (a) they are only undertaken over continuous periods not exceeding 3 hours with at least a 1 hour respite every three hours, and.
- (b) 'continuous' means any period during which there is less than an uninterrupted 60 minute respite between temporarily halting and recommencing any of the work referred to in ICNG section 4.5

Recommendation

The proponent be required to implement scheduled intra-day 'respite periods' from construction activities identified in the Interim Construction Noise Guideline as being particularly annoying to surrounding residents and other noise sensitive receivers.

2.5.2 reversing and movement alarms

The EPA has identified the noise from 'beeper' type plant movement alarms to be particularly intrusive and is aware of feasible and reasonable alternatives. Transport for NSW (nee Transport Construction Authority), Barangaroo Delivery Authority/Lend Lease and Leighton Contractors (M2 Upgrade project) have undertaken safety risk assessments of alternatives to the traditional 'beeper' alarms. Each determined that adoption of 'quacker' type movement/reversing alarms instead of traditional beepers on all plant and vehicles would not only maintain a safe workplace but also deliver improved outcomes of reduced noise impacts on surrounding residents.

Interim Construction Noise Guideline Appendix C provides additional background material on this issue.

The proponent should commit to undertaking a safety risk assessment of construction activities to determine whether it is practicable to use audible movement alarms of a type that would minimise the noise impact on surrounding noise sensitive receivers, without compromising safety.

3. Operational phase

The EPA considers that environmental impacts that arise once the zoo commences operation can largely be averted by responsible environmental management practices, particularly with regard to:

- (a) feasible and reasonable noise avoidance and minimisation;
- (b) odour control and management;

- (b) proper assessment, storage, handling, transport and disposal of wastes, especially clinical and cytotoxic waste;
- (c) water quality impact avoidance and minimisation;
- (d) radiation control; and
- (e) energy and water conservation.

3.1 Noise impacts

EIS section 6.2 outlines operational noise impact predictions based on the noise and vibration impact assessment report which comprises EIS Appendix H.

Appendix H indicates that with the exception of occasional noise from roaring lions, operation of the zoo is unlikely to cause unacceptable noise impacts on surrounding residences.

Appendix H notes that despite final design and selection of mechanical ventilation plant not having been undertaken, operation of that equipment is unlikely to cause unacceptable noise impacts as measured at the most affected surrounding residences.

However, EIS section 3.12.1 raises the prospect that the zoo may –

- (a) operate up to 10.00 pm during peak periods, and
- (b) overnight zoo experiences.

3.1.1 *public address system and amplified music*

The EPA anticipates that a public address system will operate at the zoo and that evening and night time experiences at the zoo may include amplified music.

The EPA notes that the EIS noise impact assessment did not canvass the predicted impact of noise generated by a public address system or an event involving amplified music.

Recommendation

The proponent be required to ensure that any public address system installed at the site is designed, installed and operated so as not to be audible at any surrounding residence.

Recommendation

The proponent be required not to hold any event (including any sound check and rehearsal) involving amplified music.

3.1.2 *waste collection times*

Waste collection services may generate significant noise impacts, including sleep disturbance.

Recommendation

The proponent be required to ensure waste collection services are undertaken –

- (a) between 7.00 am and 6.00pm Monday to Friday, and
- (c) between 8.00 am and 6.00 pm on Saturdays, Sundays and public holidays

3.2 Organic wastes

The EIS confirms that animal wastes will be collected from enclosures on a daily basis. And, indicates the prospect that organic wastes, including animal manure, generated during operation of the development may be composted on the site. The EPA anticipates that on-site storage and composting of organic wastes may cause odours and generate leachate.

See sections 3.5 and 3.6.2 of these comments concerning control and management of any odours and leachate arising from composting

3.3 Clinical and related waste

The EPA anticipates that the proposed facilities will include veterinary services that generate 'clinical and related waste' in the nature of 'sharps waste' which are defined in clause 50 of Schedule 1 to the Protection of the Environment Operations Act 1997 as follows -

'Clinical and related waste' includes clinical waste; cytotoxic waste; pharmaceutical, drug or medicine waste; and sharps waste.

'Sharps waste' means any waste collected from designated sharps waste containers used in the course of business, commercial or community service activities, being waste resulting from the use of sharps for any of the following purposes:

- (a) human health care by health professionals and other health care providers,
- (b) medical research or work on cadavers,
- (c) veterinary care or veterinary research,
- (d) skin penetration or the injection of drugs or other substances for medical or non-medical reasons,

but does not include waste that has been treated on the site where it was generated (and to a standard specified in an EPA Gazettal notice) or waste that has been treated by a method approved in writing by the Secretary of the Ministry of Health.

Recommendation

The proponent be required to identify the nature and scope of clinical and related waste likely to be generated during operation of the zoo and the measures proposed to handle, store, transport and dispose of those wastes.

3.3.1 *Trackable waste*

Clinical and related waste is identified in Part 1 of Schedule 1 to the Protection of the Environment Operations (Waste) Regulation 2014 as trackable waste subject to the requirements of Part 4 of that Regulation.

However, a limited exemption applies to the tracking of clinical and related waste transported only within New South Wales. The notice of exemption is available via the following link -

<http://www.epa.nsw.gov.au/wasteregulation/track-clinical.htm>

Recommendation

The proponent be required to ensure compliance with any relevant trackable waste requirements of Part 4 of the Protection of the Environment Operations (Waste) Regulation 2014 in relation to clinical and related waste generated in the course of zoo operations.

3.4 Radiation Control Act and Regulation

Table 6 in EIS section 4.2 (p.42) states that –

“There will be no regulated radiation materials stored or used on site ...”.

However, the EPA anticipates that the veterinary services on site are likely to include radiography services the equipment for which is defined as ‘regulated material’ within the meaning of the Radiation Control Act 1990 (and Radiation Control Regulation 2013).

Accordingly, the ‘person responsible’ within the meaning of section 6 of the Radiation Control Act 1990 will be obliged to hold an appropriate ‘radiation management licence’ in respect of regulated material at the zoo.

A natural person who uses regulated material at the zoo must hold a ‘radiation user licence’ and must comply with any conditions to which the licence is subject.

The EPA provides guidance material on licensing and shielding requirements which is available on its web site via the following link –

<http://www.epa.nsw.gov.au/radiation/radiationpubs.htm>

The EPA also provides guidance material on smoke detectors, including proper disposal of detectors, which is available on its web site via the following link –

<http://www.epa.nsw.gov.au/radiation/hholdsmokedetectors.htm>

Recommendation

The proponent be required to consult with the EPA concerning any proposed installation and operation of x ray or other radiography equipment on the site.

3.5 Odour control and management

Figure 19 in EIS section 6.1.3 states that “... peak odour emissions from the zoo would not be detectable.”

The EPA anticipates that on-site storage and composting of organic wastes may generate odours.

Recommendation

The proponent be required to ensure that any on-site organic waste storage and composting is undertaken by such means as may be necessary as to –

- (a) minimise odour emissions on the site, and
- (b) prevent odour emissions from the site.

3.6 Water Quality (Eastern Creek)

The development site adjoins Eastern Creek and slopes down to that waterway. Thus the EPA recommended that the EIS provide a detailed assessment of potential operational impacts on water quality in Eastern Creek and its tributaries. And, identify feasible and reasonable measures including rainwater re-use to minimise those impacts.

The EPA further recommended the EIS explicitly:

- a) assess existing surface water and groundwater quality against relevant criteria for the environmental values of Eastern Creek identified in ANZECC Guidelines for Fresh and Marine Water Quality 2000;
- b) identify pollutants likely to be generated by project activities, including stormwater runoff, and estimate the concentration and quantity of those pollutants reported against the environmental values and criteria referred to in paragraph (a) above;
- c) assess the impact of any pollutants referred to in paragraph (b) on surface and groundwater, including Eastern Creek and its tributaries;
- d) include details of practical measures proposed to be adopted to prevent, control, abate and mitigate any water pollution arising from the project activities; and
- e) include details of any proposed discharge (nature, volume and location) to receiving waters, including Eastern Creek and its tributaries.

The EPA notes that EIS supporting documents 2015 12 03 - EIS EXHIBITION - DRAINS and MUSIC were in a format that required proprietary software for access, albeit that an offer was made late in the exhibition period to provide those documents in a more commonly accessible format.

The EPA is unclear whether the MUSIC model was calibrated using local flow data, expected pollutant concentrations and treatment performance used. The EPA considers that the EIS does not adequately describe or demonstrate the suitability of the nodes and settings used in the modelling or include any discussion of limitations of the model outputs. The Event Mean Concentrations (EMCs) of nutrients and sediments could potentially be much greater for run-off from some of the animal enclosures that would be expected for the urban land use node in the modelling. If for instance actual EMCs are greater than model EMCs, the performance of the water sensitive urban design devices may be over-estimated.

The EPA anticipates that run-off from animal enclosures will contain higher concentrations of nutrients, suspended solids, organic matter and pathogens relative to urban stormwater and thus water sensitive urban design devices may not be suitable to treat that effluent. Similarly, the EPA anticipates that wastewater from the hippopotamus pool, aquaria and wet moats may warrant additional or alternative treatment.

Accordingly, the EPA considers that the EIS neither:

- provides an adequate assessment of the potential groundwater and surface water impacts of the project; nor
- develops ambient water quality targets consistent with maintaining or restoring the NSW Government's Water Quality Objectives for the receiving waters.

Recommendation

The proponent should be required to:

- (a) provide a detailed description of and justification for the nodes and settings used in the modelling; and
- (b) discuss the underlying assumptions and limitations of the modelling when reporting the results of that modelling.

Recommendation

The proponent should be required to clarify the following in the context of ambient water quality targets consistent with maintaining or restoring the NSW Government's Water Quality Objectives for the receiving waters:

- (a) suitability of proposed water treatment measures, including those proposed for the treatment of –
 - (i) run-off from animal enclosures, and
 - (ii) discharges from the hippopotamus pool, aquaria and wet moats;
- (b) expected water quality from different sources on the site; and
- (c) design storm sizing for each storage proposed to discharge to waters.

Recommendation

The proponent should be required to consider measures to separately collect and store water from different sources such as runoff from carparks, exhibit enclosures, hippopotamus pool, aquaria and wet moats to facilitate effective water treatment and prevent pollution of waters.

Recommendation

The proponent should be required not to discharge back-of-house enclosure wash-down water to:

- (a) Eastern Creek or its tributaries; or
- (b) any on site water storage system.

3.6.1 irrigation

The EPA draws the proponent's attention to the EPA (nee DEC) *Environmental Guidelines: Use of Effluent by Irrigation* which aim to:

- encourage the beneficial use of effluent and show how this might be accomplished in an ecologically sustainable manner;
- provide guidelines for planning, designing, installing, operating and monitoring effluent irrigation systems to diminish risks to public health, the environment and agricultural resources; and

- outline the statutory requirements that may be needed for an effluent irrigation system in NSW.

A copy of the Environmental Guidelines are available via the following link -

http://www.epa.nsw.gov.au/Water_pollution/policy.htm

Recommendation

The proponent should be required to adopt and implement all such measures as may be necessary to ensure that any re-use of water by irrigation does not cause pollution of waters (including taking proper account of site, design, effluent quality and other considerations outlined in the EPA *Environmental Guidelines: Use of Effluent by Irrigation* and other relevant guidelines)

3.6.2 compost leachate

As indicated in section 3.2 of these comments, organic wastes may be composted on the site. The EPA anticipates that on-site storage and composting of organic wastes may generate leachate.

Recommendation

The proponent should be required to clarify whether composted manure will be disposed of by means of re-use on site.

Recommendation

The proponent should be required to undertake a nutrient and salt balance assessment for the proposed utilisation areas for the re-use of composted manure on the site.

Recommendation

The proponent should be required to ensure that any on-site organic waste storage and composting is undertaken using such means as may be necessary to –

- minimise leachate generation, and
- prevent pollution of waters.

Recommendation

The proponent should be required to ensure that composting leachate is not directed to or stored in detention ponds or dams.

3.6.3 chemical and fuel (storage and handling)

The EPA understands that chemicals and fuel are proposed to be stored in undefined quantities on the site. And, notes that the service yard is proposed to be located in the north western corner of site adjacent to Eastern Creek.

The EPA notes that the Zoo site is located within an environmentally sensitive zone identified pursuant to the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014 (UPSS Regulation). The EPA expects that the

proponent would satisfy all the relevant requirements of the UPSS Regulation in respect of any proposed underground fuel storage.

The EPA expects that the proponent will ensure all chemicals and fuel proposed to be stored above ground will be stored in a suitably roofed and bunded storage compound secured against unauthorised access. And, that all such measures as may be necessary will be adopted to prevent pollution of waters due to any spill of chemicals and fuel stored or handled on the site. The EPA provides guidance material on bunding a copy of which is available via the following link –

<http://www.epa.nsw.gov.au/mao/bundingspill.htm>

Recommendation

The proponent be required to ensure all chemicals and fuel is stored and handled on the site by such means as may be necessary to prevent water pollution.

3.5 Energy and Water Conservation

The EPA considers the Zoo is likely to be major consumer of energy and potable water.

EIS section 6.13 and Appendix P identify practical opportunities to minimise energy use and generate energy from renewable resources.

EIS section 6.4 outlines measures proposed to minimise potable water demand on site.

Recommendation

The proponent be required to implement feasible and reasonable measures –

- (a) to minimise potable water demand and use through adoption of Water Sensitive Urban Design principles, objectives and approaches, and
- (b) to minimise energy use and maximise on site generation of energy from renewable resources.
