



Office of the Environmental Protection Authority	
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Your Ref
Our Ref DEC14484
Enquiries Mark Cugley - 9278 0954

Mr Michael Pengelly
Senior Environmental Officer
Office of the Environmental Protection Authority
Locked Bag 33
CLOISTERS SQUARE WA 6850

16 November 2012

Dear Mr Pengelly

REFERRAL OF THE ELLEN BROOK WETLAND PROPOSAL TO THE EPA UNDER SECTION 38(1) OF THE ENVIRONMENTAL PROTECTION ACT, 1986

The Swan River Trust is planning to construct a series of nutrient stripping wetland basins in the Ellen Brook floodway in Belhus on Lot 81 and Lot 44, immediately north of the West Swan Road bridge. This project will also involve bank stabilisation and floodway restoration including weed control and revegetation.

Please find attached the submission under Section 38(1) of the *Environmental Protection Act, 1986*, including the attachments, for your assessment.

If you have any questions please do not hesitate to contact Mark Cugley, River Systems Manager on 9278 0954.

Yours sincerely

Rod Hughes
GENERAL MANAGER

ATTACHMENTS

1. *Referral of proposal by Proponent under Section 38(1) of the Environmental Protection Act, 1986*
2. *CD with supporting attachments*

Referral of a Proposal by the Proponent to the Environmental Protection Authority under Section 38(1) of the *Environmental Protection Act 1986*.

**EPA REFERRAL
FORM
PROPONENT**

PURPOSE OF THIS FORM

Section 38(1) of the *Environmental Protection Act 1986* (EP Act) provides that where a development proposal is likely to have a significant effect on the environment, a proponent may refer the proposal to the Environmental Protection Authority (EPA) for a decision on whether or not it requires assessment under the EP Act. This form sets out the information requirements for the referral of a proposal by a proponent.

Proponents are encouraged to familiarise themselves with the EPA's *General Guide on Referral of Proposals* [see Environmental Impact Assessment/Referral of Proposals and Schemes] before completing this form.

A referral under section 38(1) of the EP Act by a proponent to the EPA must be made on this form. A request to the EPA for a declaration under section 39B (derived proposal) must be made on this form. This form will be treated as a referral provided all information required by Part A has been included and all information requested by Part B has been provided to the extent that it is pertinent to the proposal being referred. Referral documents are to be submitted in two formats – hard copy and electronic copy. The electronic copy of the referral will be provided for public comment for a period of 7 days, prior to the EPA making its decision on whether or not to assess the proposal.

CHECKLIST

Before you submit this form, please check that you have:


	Yes	No
Completed all the questions in Part A (essential).	X	
Completed all applicable questions in Part B.	X	
Included Attachment 1 – location maps.	X	
Included Attachment 2 – additional document(s) the proponent wishes to provide (if applicable).	X	
Included Attachment 3 – confidential information (if applicable).	X	
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping but excluding confidential information.	X	

Following a review of the information presented in this form, please consider the following question (a response is optional).

Do you consider the proposal requires formal environmental impact assessment?	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> Not sure	
If yes, what level of assessment?	
<input type="checkbox"/> Assessment on Proponent Information	<input type="checkbox"/> Public Environmental Review

PROPONENT DECLARATION (to be completed by the proponent)

I, ROD HUGHES, (full name) declare that I am authorised on behalf of SWAN RIVER TRUST (being the person responsible for the proposal) to submit this form and further declare that the information contained in this form is true and not misleading.

Signature 	Name (print) <u>ROD HUGHES</u>
Position <u>GENERAL MANAGER</u>	Company <u>SWAN RIVER TRUST</u>
Date <u>16/11/2012</u>	

PART A - PROPONENT AND PROPOSAL INFORMATION

(All fields of Part A must be completed for this document to be treated as a referral)

1 PROPONENT AND PROPOSAL INFORMATION

1.1 Proponent

Name	Swan River Trust
Joint Venture parties (if applicable)	N/A
Australian Company Number (if applicable)	ABN 35 439 318 953
Postal Address (where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State)	PO Box 6829 EAST PERTH WA 6892
Key proponent contact for the proposal: <ul style="list-style-type: none"> • name • address • phone • email 	Mark Cugley Level 1 Fortescue Centre 20 Terrace Road EAST PERTH WA 6004 Ph: (08) 9278 0954 mark.cugley@swanrivertrust.wa.gov.au
Consultant for the proposal (if applicable): <ul style="list-style-type: none"> • name • address • phone • email 	N/A

1.2 Proposal

Title	Ellen Brook Nutrient Stripping Wetland System
Description	The Project involves river restoration and construction of pump fed nutrient stripping wetland basins (seven) within the floodway of the Ellen Brook , to reduce the nutrient loads entering the Swan River from the Ellen Brook catchment. A series of riffles (five) will be installed to slow flows and reduce erosive impacts of the flows . The Proposal is to incorporate a nutrient filter system within one of the basins (Basin 6) containing a component (5% or <80 tonnes) of Iluka's mineral sand processing residue neutralised unused acid (NUA) which has very strong nutrient binding qualities. The Project will also involve the dosing of Phoslock™ to the Ellen Brook channel to strip phosphorus. Following construction activities,

	weed control and revegetation will be conducted to improve habitat and amenity of the site. Works will be undertaken in two stages. The first stage will see Wetland Basins 5, 6 and 7, Riffle/s 5 (and possibly 4 dependent upon contractor costs) and embankment stabilisation in the lower section of the site (refer Attachment 1). Monitoring results and further funding availability will guide construction of the second stage of works and potential for installation of further NUA nutrient filters.
Extent (area) of proposed ground disturbance.	The Stage 1 and 2 works will disturb up to 10ha of the Ellen Brook floodway over two stages. Stage 1, to be completed by June 2013, will disturb an area of approximately 5ha.
Timeframe in which the activity or development is proposed to occur (including start and finish dates where applicable).	Stage 1 of the construction will occur over a period of approximately four months from January 2013 to April 2013. Stage 2 construction is subject to the success of Stage 1 and availability of funding.
Details of any staging of the proposal.	See above
Is the proposal a strategic proposal?	Yes
Is the proponent requesting a declaration that the proposal is a derived proposal? If so, provide the following information on the strategic assessment within which the referred proposal was identified: <ul style="list-style-type: none"> • title of the strategic assessment; and • Ministerial Statement number. 	No
Please indicate whether, and in what way, the proposal is related to other proposals in the region.	N/A
Does the proponent own the land on which the proposal is to be established? If not, what other arrangements have been established to access the land?	No. The land is owned by the Western Australian Planning Commission and the Department of Regional Development and Lands. The Swan River Trust has been authorised by the above authorities to undertake the works on the land.
What is the current land use on the property, and the extent (area in hectares) of the property?	The current landuse of the properties is vacant public open space and drainage, covering an area of approximately 35ha. Over half of the property's area is not relevant to the proposal as it is not contained within the Ellen Brook floodway.

1.3 Location

Name of the Shire in which the proposal is located.	City of Swan
For urban areas: <ul style="list-style-type: none"> • street address; • lot number; • suburb; and • nearest road intersection. 	Lot 81 on Plan 29644 and Lot 44 on Plan 10342, West Swan Road, Belhus. Nearest intersection: Leake Place and West Swan Road, Belhus
For remote localities: <ul style="list-style-type: none"> • nearest town; and • distance and direction from that town to the proposal site. 	N/A
Electronic copy of spatial data - GIS or CAD, geo-referenced and conforming to the following parameters: <ul style="list-style-type: none"> • GIS: polygons representing all activities and named; • CAD: simple closed polygons representing all activities and named; • datum: GDA94; • projection: Map Grid of Australia (MGA); • format: Arcview shapefile, Arcinfo coverages, Microstation or AutoCAD. 	Enclosed?: Yes DWG (CAD) drawing EBWC102A8

1.4 Confidential Information

Does the proponent wish to request the EPA to allow any part of the referral information to be treated as confidential?	Yes
If yes, is confidential information attached as a separate document in hard copy?	Mr Rumford's letter and Swan River Trust response (attachment 3)

1.5 Government Approvals

Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.	No		
Is approval required from any Commonwealth or State Government agency or Local Authority for any part of the proposal? If yes, please complete the table below.	Yes. Development Approval is required from City of Swan prior to commencement of construction activities.		
Agency/Authority	Approval required	Application lodged Yes / No	Agency/Local Authority contact(s) for proposal
City of Swan	Development Approval	Yes	Lorenzo Santiorello (08) 9267-9278

Department of Indigenous Affairs (DIA)	Section 18 or regulation 10 approval under the <i>Aboriginal Heritage Act 1972</i>	Yes	Sally McGann (08) 9235-8138
Department of Environment and Conservation (DEC)	Native Vegetation Clearing Permit - Approval under section 51E of the <i>Environmental Protection Act 1986</i>	No, Application Pending	Peter Kiss (08) 9219-8705
Department of Water (DoW)	Permit to interfere with Bed and Banks - Approval under Section 11, 17 and 21A of the <i>Rights in Water and Irrigation Act 1914</i>	No, Application Pending	Yet to be advised
DoW	Dewatering permit Approval under section 5C and 26D of the <i>Rights in Water and Irrigation Act 1914</i>	No, Application Pending	Yet to be advised
DEC - Contaminated Sites Branch	Acid sulfate soils management plan approval	Not required. Management Plan sufficient	Stephen Wong 9333-7576
DEC - Bushforever	Bushforever (2000)	To be assessed via comment on DA	Yet to be advised
DEC - Wetlands Section	Conservation Category Wetlands Approval	Not required. Classification for site revised to Resource Enhanced.	Jennifer Higbid (08) 9219 8763 (Mon-Wed) or (08) 9219 8614 (Thur-Fri)

PART B - ENVIRONMENTAL IMPACTS AND PROPOSED MANAGEMENT

2. ENVIRONMENTAL IMPACTS

Describe the impacts of the proposal on the following elements of the environment, by answering the questions contained in Sections 2.1-2.11:

- 2.1 flora and vegetation;
- 2.2 fauna;
- 2.3 rivers, creeks, wetlands and estuaries;
- 2.4 significant areas and/ or land features;
- 2.5 coastal zone areas;
- 2.6 marine areas and biota;
- 2.7 water supply and drainage catchments;
- 2.8 pollution;
- 2.9 greenhouse gas emissions;
- 2.10 contamination; and
- 2.11 social surroundings.

These features should be shown on the site plan, where appropriate.

For all information, please indicate:

- (a) the source of the information; and
- (b) the currency of the information.

2.1 Flora and Vegetation

2.1.1 Do you propose to clear any native flora and vegetation as a part of this proposal?

[A proposal to clear native vegetation may require a clearing permit under Part V of the EP Act (Environmental Protection (Clearing of Native Vegetation) Regulations 2004)]. Please contact the Department of Environment and Conservation (DEC) for more information.

(please tick) Yes **If yes**, complete the rest of this section.
 No **If no**, go to the next section

2.1.2 How much vegetation are you proposing to clear (in hectares)?

The proposed construction is planning to clear four trees in total and an estimated maximum of 1ha of native vegetation within the Ellen Brook channel to undertake stabilisation works. In Stage 1, two trees and less than 0.5ha of in-stream vegetation will be cleared. All other stands of native vegetation will be protected from construction activities. The rest of the site to be disturbed is dominated by weeds.

2.1.3 Have you submitted an application to clear native vegetation to the DEC (unless you are exempt from such a requirement)?

Yes No **If yes**, on what date and to which office was the application submitted of the DEC?

No, an application to clear native vegetation will be submitted over the next week.

2.1.4 Are you aware of any recent flora surveys carried out over the area to be disturbed by this proposal?

Yes No **If yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

Copy of Flora Survey conducted in Spring 2010 by Dr Stephen Connell, Consultant Botanist, prepared for the Swan River Trust (attachment 4).

2.1.5 Has a search of DEC records for known occurrences of rare or priority flora or threatened ecological communities been conducted for the site?

Yes No If you are proposing to clear native vegetation for any part of your proposal, a search of DEC records of known occurrences of rare or priority flora and threatened ecological communities will be required. Please contact DEC for more information.

Please see attachment 4.

2.1.6 Are there any known occurrences of rare or priority flora or threatened ecological communities on the site?

Yes

No

If yes, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

2.1.7 If located within the Perth Metropolitan Region, is the proposed development within or adjacent to a listed Bush Forever Site? (You will need to contact the Bush Forever Office, at the Department for Planning and Infrastructure)

Yes

No

If yes, please indicate which Bush Forever Site is affected (site number and name of site where appropriate).

Bush Forever Site 300 – Ellen Brook

2.1.8 What is the condition of the vegetation at the site?

Generally the native vegetation is in poor - very poor condition with historic clearing, altered fire regimes and weed invasion being the main disturbance factors. Small pockets of native vegetation are in poor to moderate condition, but will be retained and enhanced by significant revegetation effort with over 100,000 native seedlings (mostly sedges and rushes) to be planted in Stage 1.

2.2 Fauna

2.2.1 Do you expect that any fauna or fauna habitat will be impacted by the proposal?

(please tick)

Yes

If yes, complete the rest of this section.

No

If no, go to the next section.

2.2.2 Describe the nature and extent of the expected impact.

During reshaping of the Ellen Brook channel banks, dewatering will occur which will disturb the Oblong Turtle (*Chelodina oblonga*) habitat. Turtle Oblonga Rescue and Rehab Network have been contacted and are assisting with relocation of the turtles before and during construction activities. The turtles will be relocated to site following completion of the construction activities.

The removal of several mature Flooded Gums (*Eucalyptus rudis*) may have a small impact on some of the birds observed at the site, however as the majority of trees within the site will be retained the likely impact will be negligible.

2.2.3 Are you aware of any recent fauna surveys carried out over the area to be disturbed by this proposal?

Yes

No

If yes, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

Copy of Fauna Assessment conducted in Spring 2010 by Mr Johnny Prefumo - The Frog Doctor, Consultant Biologist, prepared for the Swan River Trust (attachment 5).

2.2.4 Has a search of DEC records for known occurrences of Specially Protected (threatened) fauna been conducted for the site?

Yes

No

(please tick)

Please see attachment 5

2.2.5 Are there any known occurrences of Specially Protected (threatened) fauna on the site?

Yes

No

If yes, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – Schedule 1
Rainbow Bee-eater (*Merops ornatus*) – Schedule 3

2.3 Rivers, Creeks, Wetlands and Estuaries

2.3.1 Will the development occur within 200 metres of a river, creek, wetland or estuary?

- (please tick) Yes **If yes, complete the rest of this section.**
 No **If no, go to the next section.**

2.3.2 Will the development result in the clearing of vegetation within the 200 metre zone?

- Yes No **If yes, please describe the extent of the expected impact.**

During construction, two mature *Eucalyptus rudis* will be cleared along with in-stream vegetation growing within the Ellen Brook channel, where bank stabilisation measures will be implemented. Over 100,000 native seedlings will be planted on the site following completion of the construction activities. (Syrinx Environmental (2012) – Ellen Brook Wetland Revegetation Plan, attachment 6)

2.3.3 Will the development result in the filling or excavation of a river, creek, wetland or estuary?

- Yes No **If yes, please describe the extent of the expected impact.**

Bank stabilisation works within the Ellen Brook channel will be required during construction and will cover a length of approximately 500m. A small section of the Brook will be reconstructed to reduce the impacts of severe erosion and accommodate the construction of part of one of the wetland basins (Basin 7).

2.3.4 Will the development result in the impoundment of a river, creek, wetland or estuary?

- Yes No **If yes, please describe the extent of the expected impact.**

A series of riffles (five) has been designed to slow flows and reduce erosive impacts of the channel flows. Only one riffle (Riffle 5) has been designated for construction during the first stage of construction. There is a possibility that Riffle 4 may also be installed dependent upon contractor costs. The riffles have been specifically designed to accommodate fish migration past the structures. It is intended that base flows will pass over the riffles and not accumulate significant volumes of water.

2.3.5 Will the development result in draining to a river, creek, wetland or estuary?

- Yes No **If yes, please describe the extent of the expected impact.**

Ellen Brook flows directed to the wetland basins via pumps will drain back to the channel after filtering through the wetlands. Flows passing through the nutrient filter (Basin 6) will pass through Basin 7 before returning to the Ellen Brook channel.

2.3.6 Are you aware if the proposal will impact on a river, creek, wetland or estuary (or its buffer) within one of the following categories? (please tick)

Conservation Category Wetland	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure
Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure
Perth's Bush Forever site	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
Environmental Protection (Swan & Canning Rivers) Policy 1998	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
The management area as defined in s4(1) of the <i>Swan River Trust Act 1988</i>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure
Which is subject to an international agreement, because of the importance of the wetland for waterbirds and waterbird habitats (e.g. Ramsar, JAMBA, CAMBA)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure

2.4 Significant Areas and/ or Land Features

2.4.1 Is the proposed development located within or adjacent to an existing or proposed National Park or Nature Reserve?

Yes No **If yes**, please provide details.

2.4.2 Are you aware of any Environmentally Sensitive Areas (as declared by the Minister under section 51B of the EP Act) that will be impacted by the proposed development?

Yes No **If yes**, please provide details.

2.4.3 Are you aware of any significant natural land features (e.g. caves, ranges etc) that will be impacted by the proposed development?

Yes No **If yes**, please provide details.

2.5 Coastal Zone Areas (Coastal Dunes and Beaches)

2.5.1 Will the development occur within 300metres of a coastal area?

(please tick) Yes **If yes, complete the rest of this section.**
 No **If no, go to the next section.**

2.5.2 What is the expected setback of the development from the high tide level and from the primary dune?

2.5.3 Will the development impact on coastal areas with significant landforms including beach ridge plain, cusped headland, coastal dunes or karst?

Yes No **If yes, please describe the extent of the expected impact.**

2.5.4 Is the development likely to impact on mangroves?

Yes No **If yes, please describe the extent of the expected impact.**

2.6 Marine Areas and Biota

2.6.1 Is the development likely to impact on an area of sensitive benthic communities, such as seagrasses, coral reefs or mangroves?

Yes No **If yes, please describe the extent of the expected impact.**

2.6.2 Is the development likely to impact on marine conservation reserves or areas recommended for reservation (as described in *A Representative Marine Reserve System for Western Australia*, CALM, 1994)?

Yes No **If yes, please describe the extent of the expected impact.**

2.6.3 Is the development likely to impact on marine areas used extensively for recreation or for commercial fishing activities?

Yes No **If yes, please describe the extent of the expected impact, and provide any written advice from relevant agencies (e.g. Fisheries WA).**

2.7 Water Supply and Drainage Catchments

2.7.1 Are you in a proclaimed or proposed groundwater or surface water protection area?

(You may need to contact the Department of Water (DoW) for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes**, please describe what category of area.

2.7.2 Are you in an existing or proposed Underground Water Supply and Pollution Control area?

(You may need to contact the DoW for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes**, please describe what category of area.

2.7.3 Are you in a Public Drinking Water Supply Area (PDWSA)?

(You may need to contact the DoW for more information or refer to the DoW website. A proposal to clear vegetation within a PDWSA requires approval from DoW.)

Yes No **If yes**, please describe what category of area.

2.7.4 Is there sufficient water available for the proposal?

(Please consult with the DoW as to whether approvals are required to source water as you propose. Where necessary, please provide a letter of intent from the DoW)

Yes No (please tick)

Discussions with DoW are continuing regarding required water sources

2.7.5 Will the proposal require drainage of the land?

Yes No **If yes**, how is the site to be drained and will the drainage be connected to an existing Local Authority or Water Corporation drainage system? Please provide details.

The site will require dewatering during construction, however the project does not intend to permanently drain water from the landscape during operation of the wetland basins.

2.7.6 Is there a water requirement for the construction and/ or operation of this proposal?

(please tick) Yes **If yes**, complete the rest of this section.

No **If no**, go to the next section.

The proposal will require water for operation, however this will not affect the overall water balance as water extracted will be returned to the Ellen Brook channel following treatment through the wetland basins.

Water required for construction will be predominantly for dust suppression for which a permit is currently being requested through DoW.

2.7.7 What is the water requirement for the construction and operation of this proposal, in kilolitres per year?

Construction water requirements are yet to be determined, pending engagement of a construction contractor.

It is intended that maximum of 1,000,000KL/yr (<3.5% of Ellen Brook flows) will be diverted to the wetland basins for treatment following the completion of Stage 1 and dependant on treatment efficiencies of filtration systems, a maximum of 6,200,000KL/yr (~23% of Ellen Brook flows) will be treated following completion of Stage 2. Water diverted into wetland basins will be returned to the Ellen Brook channel following treatment.

2.7.8 What is the proposed source of water for the proposal? (e.g. dam, bore, surface water etc.)

Water for construction purposes will be sourced either from a nearby dam or treated dewatering effluent (dependent upon DoW advice) or carted to site from a standpipe.

During operation, the water will be sourced from the Ellen Brook channel.

2.8 Pollution

2.8.1 Is there likely to be any discharge of pollutants from this development, such as noise, vibration, gaseous emissions, dust, liquid effluent, solid waste or other pollutants?

(please tick) Yes **If yes**, complete the rest of this section.
 No **If no**, go to the next section.

Construction management controls will significantly reduce the risk and likelihood of offsite pollution (sediment, rubbish, etc) as a result of works.

Application of Phoslock™ into the Ellen Brook will be conducted for at least the first two years in order to strip the high Phosphorus content from the water column. Phoslock™ has been used several times over the past decade in the Swan and Canning river system to great affect. It is intended that 50 tonnes of Phoslock™ will be applied during peak flow periods and handled according to MSDS (attachment 7)

The NUA material will be handled and moved in accordance with the MSDS (attachment 8). NUA release from the nutrient filter is considered unlikely due to its design. The NUA filter material will be contained within an earth bund standing over 1m above the surrounding floodplain and have 100mm coarse aggregate layer on top. During operation, 500mm of freestanding water will sit above the aggregate layer to promote vertical flows. The filter material will be screened from subsurface drainage pipes by a gradually increasing pore size transition, from coarse sand layer, to aggregate bridging layer, then to coarse aggregate layer. Furthermore, a sump has been designed at the filter outlet to aid settling of particulates that escape from the filter and to aid monitoring of filter effluent. A largely vegetated ~1ha constructed wetland will also be located immediately downstream of the NUA nutrient filter, which flows will have to pass through before being discharged back into the Brook.

The hydraulic modelling conducted for the site with the proposed design indicates the flow rates over Basin 6 will not exceed 0.32m/s during a 1:100yr flood event and 1m/s during a 1:1 yr flood event. This flow rate will result in no major velocity related impact to the site.

Based on previous investigations into the use of NUA as an environmental amendment, both as a soil amendment and as a nutrient filter, it has been determined that radiological emissions will not be a concern in the proposed wetland filter design. The radiological levels contained within the pure form of NUA are similar to those found in gravel sourced from laterite in the Darling Scarp, whilst in the blend of filter material, the NUA comprises only 5% and contains significantly lower radiation levels as described in Douglas *et al* (2012) Attachment 11.

2.8.2 Is the proposal a prescribed premise, under the Environmental Protection Regulations 1987?

(Refer to the EPA's *General Guide for Referral of Proposals to the EPA under section 38(1) of the EP Act 1986* for more information)

Yes No **If yes**, please describe what category of prescribed premise.

2.8.3 Will the proposal result in gaseous emissions to air?

Yes No **If yes, please briefly describe.**

2.8.4 Have you done any modelling or analysis to demonstrate that air quality standards will be met, including consideration of cumulative impacts from other emission sources?

Yes No **If yes, please briefly describe.**

2.8.5 Will the proposal result in liquid effluent discharge?

Yes No **If yes, please briefly describe the nature, concentrations and receiving environment.**

Following treatment of the water through the nutrient filter, water will be passed through wetland basin for final polishing prior to discharge to the Ellen Brook channel. The effluent will have significantly reduced nutrient concentrations, particularly phosphorus (our primary nutrient of concern) and nitrogen. Some of the soluble metals existing in the Ellen Brook water will also decrease significantly.

Based upon Trials conducted over the past several years using NUA nutrient filter systems (CSIRO By-Product Characterisation Report (2010), attachment 9; ChemCentre Nutrient Filter Pilot Trial Report (2012), attachment 10) concentrations of calcium and sulfate will be increased in the effluent relative to the influent through the dissolution of the Gypsum within the NUA. Potential increases in concentrations of fluoride, manganese, copper, cobalt, nickel, chromium, uranium and strontium could be expected, however only copper could be expected to increase concentrations from below to above ANZECC 2000 Trigger Values for the protection of slightly to moderately disturbed freshwater ecosystems. Flows will be treated during the winter period only during which time there will be significant dilution of any low levels of contaminants that remain in the treated water.

The CSIRO are currently involved in trialling the use of NUA in nutrient filters in China in a smaller scale, but similar arrangement, to what is being proposed in NUA nutrient filters at the Ellen Brook site. Results from the first 90 days of the trial have shown very little if any loss of NUA material using iron as an indicator of NUA loss, due to the high iron content of NUA. Trials have shown a release of calcium a by-product of the dissolution of the gypsum. The 5% NUA content of the CSIRO trials in China has shown that significant flow can be maintained through the media while still providing elevated nutrient removal at ~80% phosphorus and ~50% nitrogen from treated waters (personal communication Dr Laura Wendling CSIRO, 7 November 2012).

2.8.6 If there is likely to be discharges to a watercourse or marine environment, has any analysis been done to demonstrate that the State Water Quality Management Strategy or other appropriate standards will be able to be met?

Yes No **If yes**, please describe.

Following the completion of a Nutrient Filter Pilot Trial in 2011, ChemCentre finalised a report to the Swan River Trust on the outcomes of the trial (Report attachment 10). The major outcomes are summarised below:

- Phosphorus concentrations were reduced by >80% of inlet levels
- Nitrogen concentrations were reduced by ~20% of inlet levels
- All metals, apart from copper, showed concentrations lower than ANZECC (2000) 95% protection levels for freshwater ecosystems in outlet measurements
- Copper concentrations seemed to follow closely the proportion of NUA in the filter blend (ie Cu in 40% NUA blend > in 25% NUA Blend)
- High pH in effluent (~9.5) was considered to be as a result of Calcined Magnesia (MgO) in the blend rather than the NUA. MgO will be removed in any future filter blend.
- Blockages in the filtration system appeared to be as a result of the considerable "fines" proportion in the filter blend (ie 25% and 40% NUA). The proportion of NUA in the proposed filter blend is to be reduced to 5% to replicate quantities recommended in a CSIRO Soil Amendment trial (attachment 11) and Monash University's Facility for Advancing Water Biofiltration (FAWB) Guidelines for Biofilters (attachment 12).

2.8.7 Will the proposal produce or result in solid wastes?

Yes No **If yes**, please briefly describe the nature, concentrations and disposal location/ method.

Over time it is expected that the filter material will eventually become saturated with nutrients and as such will require replacement. At such a time, it is proposed that the material could be reused as a soil amendment and slow release fertiliser on sandy agricultural soils of the Ellen Brook catchment. Based upon long term laboratory and field trials it is expected that this will not need to occur until several years after application of the filter material.

2.8.8 Will the proposal result in significant off-site noise emissions?

Yes No **If yes**, please briefly describe.

2.8.9 Will the development be subject to the Environmental Protection (Noise) Regulations 1997?

Yes No **If yes**, has any analysis been carried out to demonstrate that the proposal will comply with the Regulations?

Please attach the analysis.

No analysis has been undertaken to ensure the proposal will comply with regulations, however the pumps will be housed in a concrete pumphouse to dampen noise and anti-vibration measures have been incorporated into pump installation design. A noise assessment will be undertaken following

commissioning of the pump infrastructure and any required modifications will be attended to.

2.8.10 Does the proposal have the potential to generate off-site, air quality impacts, dust, odour or another pollutant that may affect the amenity of residents and other "sensitive premises" such as schools and hospitals (proposals in this category may include intensive agriculture, aquaculture, marinas, mines and quarries etc.)?

Yes

No

If yes, please describe and provide the distance to residences and other "sensitive premises".

2.8.11 If the proposal has a residential component or involves "sensitive premises", is it located near a land use that may discharge a pollutant?

Yes

No

Not Applicable

If yes, please describe and provide the distance to the potential pollution source

2.9 Greenhouse Gas Emissions

2.9.1 Is this proposal likely to result in substantial greenhouse gas emissions (greater than 100 000 tonnes per annum of carbon dioxide equivalent emissions)?

Yes

No

If yes, please provide an estimate of the annual gross emissions in absolute and in carbon dioxide equivalent figures.

2.9.2 Further, if yes, please describe proposed measures to minimise emissions, and any sink enhancement actions proposed to offset emissions.

2.10 Contamination

2.10.1 Has the property on which the proposal is to be located been used in the past for activities which may have caused soil or groundwater contamination?

Yes No Unsure **If yes, please describe.**

2.10.2 Has any assessment been done for soil or groundwater contamination on the site?

Yes No **If yes, please describe.**

2.10.3 Has the site been registered as a contaminated site under the *Contaminated Sites Act 2003*? (on finalisation of the CS Regulations and proclamation of the CS Act)

Yes No **If yes, please describe.**

2.11 Social Surroundings

2.11.1 Is the proposal on a property which contains or is near a site of Aboriginal ethnographic or archaeological significance that may be disturbed?

Yes No Unsure **If yes, please describe.**

Yagan Memorial Park is located ~1.5km northeast of the site and Ellen Brook is a potential site. Ethnographic and archaeological Aboriginal heritage investigations undertaken at the site have not revealed any evidence that works will interfere with the cultural values of the site. A Section 18 application has been lodged under the *Aboriginal Heritage Act 1972* for consideration prior to the works being undertaken.

2.11.2 Is the proposal on a property which contains or is near a site of high public interest (e.g. a major recreation area or natural scenic feature)?

Yes No **If yes, please describe.**

The proposal is situated on a site zoned as Public Recreation, however it would not be considered to be of high public interest. To the northern extent of the site, a historical precinct including Cruze's Mill and old bridge is present, however this area will not be impacted by the development undertaken in this proposal.

2.11.3 Will the proposal result in or require substantial transport of goods, which may affect the amenity of the local area?

Yes No **If yes, please describe.**

3. PROPOSED MANAGEMENT

3.1 Principles of Environmental Protection

3.1.1 Have you considered how your project gives attention to the following Principles, as set out in section 4A of the EP Act? (For information on the Principles of Environmental Protection, please see EPA Position Statement No. 7, available on the EPA website)

- | | | |
|--|---------|-----------------------------|
| 1. The precautionary principle. | X Yes | <input type="checkbox"/> No |
| 2. The principle of intergenerational equity. | X Yes | <input type="checkbox"/> No |
| 3. The principle of the conservation of biological diversity and ecological integrity. | X Yes | <input type="checkbox"/> No |
| 4. Principles relating to improved valuation, pricing and incentive mechanisms. | X Yes * | <input type="checkbox"/> No |
| 5. The principle of waste minimisation. | X Yes | <input type="checkbox"/> No |

* Note: Principle 4 is not considered to be applicable in this instance

3.1.2 Is the proposal consistent with the EPA's Environmental Protection Bulletins/Position Statements and Environmental Assessment Guidelines/Guidance Statements (available on the EPA website)?

X Yes No

3.2 Consultation

3.2.1 Has public consultation taken place (such as with other government agencies, community groups or neighbours), or is it intended that consultation shall take place?

X Yes No **If yes, please list those consulted and attach comments or summarise response on a separate sheet.**

Several public consultation events, information sessions and stakeholder engagement meetings regarding this project have occurred since the project commenced in 2010. The first of these consultations included a facilitated workshop with relevant stakeholders to determine the parameters of a feasibility study of an End of Catchment Nutrient Stripping Wetland in the Ellen Brook catchment. This event occurred in February 2010 and the outcome was to investigate the use of nutrient sorbent filtration media through a field trial to be scaled up for use near the end of the catchment and to look at issues and constraints of such a proposal at one of several possible sites including the site near West Swan Rd. (Outcomes Report attachment 13)

Following the initial stakeholder consultation event, Syrinx Environmental was engaged to undertake the feasibility assessment for the construction of a nutrient stripping wetland treatment system in the Ellen Brook Catchment. The feasibility study was split into two stages: Stage 1 - to identify site constraints and opportunities, desktop review the use of NUA as a nutrient filter in a wetland environment and develop three concept designs to take to community

and stakeholders (attachment 14); and Stage 2 – to review the data from the NUA Pilot Trials conducted concurrently to the feasibility assessment, provide recommendations and final concept design for a nutrient stripping wetland system and river restoration in the Ellen Brook floodplain at two sites near the end of the catchment (attachment 15).

A public consultation event occurred on 8 December 2010 at the Oasis Resort in West Swan. Attendees were presented with background information of the investigations and trials being conducted as well as the three concept designs developed by design consultants for the purposes of community feedback. Comments on each of the designs were collated by event organisers and compiled into an outcomes report (Attachment 16). Several key issues were raised by the community including fire management, noise from pumping, flood management, stagnation of water held on the site (including mosquito management) and disposal of used filtration media. All of these issues have been addressed in the design of the proposed wetland system and management responsibilities at the site.

Swan Valley Planning Committee and Brookfield Multiplex (original developer of the neighbouring property) were also provided separate briefings on the concept designs.

Following input from consultation events mentioned above and completion of the nutrient filter pilot trial, the Stage 2 feasibility report provided the basis for further development of the wetland systems presented in this proposal.

The project has been overseen by a core group of stakeholders involved in a Working Group, chaired by the Swan River Trust as project managers. The Project Working Group (PWG) has representation from Swan River Trust, CSIRO, Ellen Brockman Integrated Catchment Group (EBICG), Perth Region NRM, Department of Water, WAPC, Department of Agriculture and City of Swan. The PWG endorsed the following recommendations:

- subject to funding availability, construction of the wetland at site 1 should progress before the end of the 2012/13 financial year;
- the wetland should incorporate a Phoslock™ dosing unit (or similar) to remove Phosphorus; and
- further trials should be conducted on the use of nutrient filter systems with a focus on improving hydraulic conductivity, reducing pH of effluent (through modification of filter blend including removal of MgO) and testing the effects of wetting drying cycles that will be experienced in an ephemeral system such as Ellen Brook.

The above endorsement addressed the recommendations from the Stage 2 feasibility report and enabled the engagement of Design Engineers to develop the Schematic and Detailed Designs represented in the proposal.

A public information session was conducted on 13 September 2012 following completion of the schematic designs, incorporating the comments and suggestions from previous stakeholder consultation and relevant investigations and design development. A list of attendees is attached (attachment 17) and Correspondence with Leon Rumford, including SRT Response is also attached (attachment 3).