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Marine		
Seagrass (direct and indirect loss)		
Justification is required to support predicted degrees of success of any offset for losses.	The PER will include:	
Investigation into seagrass rehabilitation on the scale proposed is required to demonstrate that transplanted meadows could become fully functioning benthic primary producer habitats.	1. An assessment of likely impact to marine benthic primary producer habitat from turbidity generating activities to be included in the PER.	Yes – Section 10 and 12 of PER
Rehabilitation details need to consider the EPAs offsets position (EPA 2006), identify measurable and auditable criteria for rehabilitation for structure, function and endurance and identify the source of propagules.	2. An assessment of potential cumulative impacts to include infrastructure and discharges of existing projects, approved but not implemented projects and proposals currently being assessed by EPA	Yes – Section 12 of PER
	3. An assessment of baseline seagrass monitoring results within the context of the WA Auditor-General's Report Environmental Management of Cockburn Sound, Report 8 September 2010 and its significance in the context of the potential impacts of the Proposal.	Yes – Section 12 of PER
	4. An assessment of the potential impacts to benthic primary producer habitats following construction associated with the ongoing maintenance dredging of the marina access channel	Maintenance dredging considered, maintenance dredging management plan included in Appendix 1
	5. An assessment of the proposal's potential impacts on ecosystem integrity	Yes – Section 10, 12 and 13 of PER
	6. Details on the engineering mitigation measures to reduce impacts to seagrass communities	Yes – Outlined in the CEMP, Appendix 1 of PER
	7. Establishment of the sensitivity of seagrass to disturbance as per the EPA's EAG 7.	Yes – Section 12 of PER
	8. Seagrass transplantation and monitoring plan.	CEMP commits to producing.
Water quality impacts		
The marina should be designed and managed such that the EQC for a high LEP could be met at the boundary of the marine water body and Cockburn Sound	9. Sediments in the area to be dredged will be samples and analysed according to National Assessment Guidelines for Dredging. Data will be used to determine need for management of return water discharge and sediment disposal options and will inform turbidity plume modelling.	Yes – Section 10 of PER
Water in Mangles Bay should at minimum meet the water quality requirements associated with a moderate LEP.	10. Hydrodynamic modelling of sediment transport will be undertaken to simulate turbidity and sedimentation due to the dredge plume, and return water discharge.	Yes – Section 10 of PER
Nutrient rich inputs into Mangles Bay including stormwater and groundwater would need to be monitored and minimised.	11. A validated hydrodynamic model will be used to simulate the residence times of marina waters and outflow of marina waters into Mangles Bay.	Yes – Section 10 of PER
Investigations and modelling required to predict potential changes in hydrology and hydrogeology influencing water in the marine and Mangles bay, in order to prevent water quality impacts on seagrass.	12. The PER will include:	Modelling scenarios based on seasons,

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Thorough validation of hydrodynamic and water quality modelling is required to predict potential long term impacts of the Project on the environmental quality of Cockburn Sound.	(a) Numerical modelling to present best, worst and most likely scenarios (b) Numerical modelling will be undertaken in accordance with EPAs EAG 7	percentiles etc. Likely scenarios presented, no best and worst case. Section 10 of PER. Models used have been used in previous WA projects, no specific reference to EAG 7
Detailed analysis of contaminant inputs to the marina is required to inform modelling.	(c) As assessment of potential impacts to marine water quality following construction associated with ongoing maintenance dredging of the marina access channel	Ongoing maintenance not addressed
Research into the most efficient sediment bypass system should be undertaken, along with detailed sediment transfer modelling to assess the fate of bypassed sediment and evaluate potential consequences.	(d) An assessment of the Proposal's potential impacts on ecosystem (e) A construction environmental management plan detailing management of marine water quality as related to the construction phase (f) Marine water quality management plan for the operation of the proposal (g) Local meteorology data will be collected at a suitable location near the project site.	Yes – Section 10, 12 and 13 of PER Yes – CEMP is Appendix 1 of PER Yes – included in CEMP, Appendix 1 of PER Description of local meteorological data included in Section 2 of PER
Acid sulphate soils		
There needs to be a high level of certainty that exposure of ASS would not result from the Project.	13. A detailed site investigation will be undertaken to confirm the extent of potential contamination and remediation measures. 14. Advice will be sought from contaminated sites branch of DEC to determine appropriate management measures for the land based disposal of dredge spoil during the construction of the proposal.	DSI not included in PER and will be pursued during land use planning phases of the project Advice to be sought prior to construction
Terrestrial Vegetation and Flora		
Detailed spring flora surveys would be required to inform formal assessment processes.	15. Spring surveys completed, however an additional Lomandra maritima survey will be undertaken within and surrounding the Proposal area to further define potential habitat distribution of the Graceful Sun Moth.	Targeted Lomandra survey conducted. Section 8 of PER
An offsets package should be developed as part of a development proposal.	The PER will include: 16. An offsets plan, if required, developed in consultation with the EPA, SEWPAC and relevant government agencies 17. Details on vegetation rehabilitation within and outside the Proposal area	Offsets package is currently being developed in consultation with the DEC, City of Rockingham, EPA, SEWPaC

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Investigations into the hydrogeology of the site are required to ensure that there is no intrusion of salt water into the superficial aquifer, which may impact terrestrial vegetation at the site.	18. Modelling predictions of saltwater intrusion as a result of inland marina and any effects on other water users, Lake Richmond, groundwater dependent ecosystems and the regional groundwater system	Yes – Section 6 of PER and Appendix 5 of PER (modelling report)
	19. Modelling predictions of best, worst and most likely scenarios of the Proposal, including potential effects over time	Best case not modelled, some parameters worst case and likely case modelled. Section 6 PER
	20. Construction environmental management plan outlining flora and vegetation management during construction	Yes – Appendix 1 of PER (CEMP)
Groundwater		
Lake Richmond		
Detailed investigations required to provide greater certainty that Lake Richmond would not be impacted by changes in the water level and water quality.	Groundwater investigations to be undertaken include:	
	21. Continue monthly water level and quality monitoring program until March 2011 to establish a 12 month dataset	Yes – Section 6 of PER
Hydrogeological investigations are required to demonstrate that the separation distances between Lake Richmond and the canals are adequate to maintain the existing hydrological regime.	22. Drilling and construction of one test production bore, targeting the Safety Bay Sand aquifer located in the centre of the planned marina	Yes – Section 6 of PER
	23. Drilling and construction of a network of 3 or 4 monitoring bores around the proposed test production bore	Yes – Section 6 of PER (PB1 shown in Appendix 5 MWH report)
	24. Undertake a controlled pump test of the production bore to determine hydraulic parameters of the Safety Bay Sand aquifer, using the network of new and old monitoring bores to observe drawdown response to aquifer.	Yes – Section 6 of PER
	Groundwater modelling to be undertaken includes:	
	25. Construction and calibration of a numerical groundwater model.	Yes – Section 6 of PER
	26. Undertake simulations for various dewatering scenarios and marina configurations to assess likely aerial extent of impacts	Yes – Section 6 of PER
	The PER will include:	
	27. Groundwater volume required to dewater the marina	Yes – Section 6 of PER
	28. Groundwater volume required for construction activities	Yes – Section 6 of PER
	29. Timeline and staging of the marina construction	Yes – Section 3 of PER
	30. Modelling predictions of expected drawdown as a result of dewatering	Yes – Section 6 of PER
	31. Potential flow of environmental impacts from dewatering	Yes – Section 6 of PER
Proposed engineering solutions to any potential risk of saltwater intrusion will need a high level of surety that hydrological barriers would remain in place.	32. Proposed method and management during opening of the marina water body to Mangles Bay	Yes – Section 3, 6, 10, 11,13 of PER, and Appendix 1 (CEMP)

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Detailed calculations of saltwater intrusion and its potential impact on Lake Richmond, taking into account saltwater dispersion, climate scenarios and effect of groundwater use by bores in the area is required.	33. Modelling predictions of saltwater intrusion as a result of inland marina and any effects on other water users, Lake Richmond, groundwater dependent ecosystems and the regional groundwater system 34. Modelling predictions of best, worst and most likely scenarios of the Proposal, including potential effects over time 35. Construction and calibration of a solute transport model to allow simulation of the potential saline groundwater plume that is likely to develop as a result of the marina connection to the ocean.	Yes – Section 6 of PER and Appendix 5 (Supporting GW docs) Potential effects over time, best case, likely case, no worst case (Appendix 4, ERM report) Yes – Appendix 5 (ERM report)
Need to investigate options for appropriate construction methodology to minimise potential for impact on hydrogeology of the site.	36. Proposed method and management during opening of the marina water body to Mangles Bay	Yes – Section 3, 6, 10, 11,13 of PER, and Appendix 1 (CEMP)
Determine specific characteristics of the potential silty clay layer in Lake Richmond and confining capability that this may have upon drawdown activities.	37. Develop a conceptual hydrogeological model of the area including the geological and hydrogeological relationships of the various units in particular, the relationship of Safety Bay Sands and the underlying Tamala Limestone units, interaction of Lake Richmond with the Groundwater system, impact of tidal influence, dynamics of the salt water interface, groundwater recharge and impacts on the regional groundwater system.	Yes – Section 6 of PER and Appendix 5 (ERM report)
Further information is required for a sound hydrogeological assessment and model conceptualisation including bore logs, geological cross sections, hydraulic data (including recharge, groundwater contour maps, hydrographs and water use data).	38. Develop a conceptual hydrogeological model of the area including the geological and hydrogeological relationships of the various units in particular, the relationship of Safety Bay Sands and the underlying Tamala Limestone units, interaction of Lake Richmond with the Groundwater system, impact of tidal influence, dynamics of the salt water interface, groundwater recharge and impacts on the regional groundwater system.	Yes – Section 6 of PER and Appendix 5 (ERM report)
Characterisation of hydraulic connections between aquifers (superficial and Rockingham aquifers) and Lake Richmond is required to enable development of a well-calibrated groundwater model to assess impact of the marina development and dewatering options.		

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Surface water		
	The PER will include:	
	39. Modelling predictions of expected drawdown as a result of dewatering and effects on other users, Lake Richmond and groundwater dependent ecosystems	Yes – Section 7 of PER
	40. Modelling predictions of best, worst and most likely scenarios of the proposal, including potential effects over time and effects on other water users, Lake Richmond and groundwater dependent ecosystems	Yes – Section 7 of PER and Appendix 5
	41. Input of stormwater runoff within marine modelling flushing scenarios	Stormwater Section 10, implied as a contributor to nutrient loads for flushing model in Section 10
	42. An assessment of the potential impacts to surface water systems, including Lake Richmond, within and around the Proposal area	Yes – Section 7 of PER
	43. A discussion on the strategies used, if required, to ensure the minimisation of impacts to Lake Richmond	Yes – Section 7 of PER
	44. Construction environmental management plan addressing the protection of the environmental values of Lake Richmond	Yes – Appendix 1 (CEMP)
Terrestrial Fauna		
	The PER will include:	
	45. Description of the regional significance of fauna species within the Proposal area, particularly the Bush Forever site	Yes – Section 8 and 17 of PER
	46. An assessment of the potential impacts to regional values of fauna species, including species listed as regionally significant in Bush Forever, within and surrounding the Proposal area.	Yes – Section 8 and 17 of PER
Subterranean Fauna		
	47. A stygofauna habitat assessment will be conducted within and surrounding the Proposal area. If this assessment concludes that there is a moderate to high likelihood of SRE stygofauna occurring within the Proposal area, a stygofauna sampling program will be undertaken in accordance with EPA Draft Guidance Statement 54a.	Yes – Section 21 of PER

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Matters of NES		
	48. A habitat survey is proposed to accurately map the distribution and density of the Lomandra maritima species in the Proposal area and surrounds.	Yes – Section 8 of PER
	49. A follow up survey of GSM on Cape Peron will be undertaken in March 2011.	Yes – Section 8 and 9 of PER
	50. A fauna habitat assessment using current habitat data and targeted for MNES will be conducted within Proposal area to determine potential impacts on foraging, roosting or breeding of migratory bird species that may potentially occur within the Proposal area.	Section 8, 9 and 14 of PER