

7.2.5 ENVIRONMENTAL MANAGEMENT PLAN ELEMENT 5: WATER QUALITY MANAGEMENT PROCEDURES

Introduction

The following is a summary of procedures, guidelines and practices to protect runoff water quality both within and from the Golden Beach (Torquay Sands) development site. They cover procedures both during and after the development phase.

There are a number of factors which will influence the water quality conditions achieved on the site and downstream of the development area. These include:

- the quality of the wastewater used for irrigation of the golf course
- the amount of wastewater used, and how and when it is applied
- the degree of capture of excess irrigation and golf course runoff by storages and wetlands
- the area of treatment wetlands in relation to the area of proposed urban and golf course development
- the extent of reuse of water captured in wetland storages
- provision of passage of flood waters around wetlands and storages
- golf course fertilisation practices and pesticide management
- the nature of the site soils
- effectiveness of clay liners on wetlands and storages
- runoff from constructed and unmade roads
- the staging of construction and best management practices and safeguards adopted during construction

The above factors can be grouped into three major site issues to be managed through the EMP.

- (i) Wastewater irrigation practices
- (ii) Sediment and nutrient generation and mitigation
- (iii) Site maintenance practices

The following EMP sub-elements consider in detail feasible procedures and management responses to these issues. Management of potential eutrophication or other forms of pollution of waterways as a result of turf management practices requires further resolution which will be detailed in a Turf Management Plan. The Golf Course Manager will comprehensively document proposed management practices in line with the Turf Management Plan, to the satisfaction of Council. The Owner is obliged, under the 173 Agreement, to manage turf in accordance with the Turf Management Plan.

EMP Element ¹⁴5: Construction Activities has been formulated to protect wetlands and other areas from adverse impacts during the construction phase of the development. Many issues and measures relevant to the construction phase overlap with issues covered here in Element 5 and in Element 6: Hydrology, Drainage and Constructed Wetlands.

| SUB-ELEMENT 5.1 | Wastewater Irrigation Practices | Responsible Parties | Timing or Frequency |
|-------------------------------|---|---|--|
| Objective | To ensure that the use of wastewater as a makeup water supply for golf course irrigation does not result in pollution of site or downstream soils, groundwater or surface waters. | | |
| Implementation Actions | <ul style="list-style-type: none"> • Engage a qualified consultant to prepare a Surface Water Management Strategy incorporating a Wastewater Management Plan (WWMP) which will include the following elements: <ul style="list-style-type: none"> · Ensure that treated wastewater quality satisfies criteria for the use of reclaimed water, in particular ANZECC Guidelines for the use of Reclaimed Water (NHMRC 1996) and Guidelines for Wastewater Reuse (EPA 1996). Performance standards specified for the use of treated wastewater should be subject to approval by the EPA. · Apply treated wastewater according to Guidelines for Wastewater Irrigation (EPA Publication 168, 1991). Testing of the soil hydraulic conductivity and permeability will be required as a basis for determination of application rates such that surface runoff or input to the regional groundwater would not normally occur. · Apply treated wastewater as a mixture with treated stormwater | <ul style="list-style-type: none"> • Developer | <ul style="list-style-type: none"> • SWMS to be completed by Aug 2001 |

| SUB-ELEMENT 5.1 | Wastewater Irrigation Practices | Responsible Parties | Timing or Frequency |
|-----------------|--|---------------------|---------------------|
| | <ul style="list-style-type: none"> · Apply treated wastewater/stormwater mix directly to the golf course areas only - no injection of treated wastewater to occur to any irrigation storage, amenity lake or wetland. · Apply treated wastewater/stormwater mix at a rate which satisfies plant needs but does not result in any surface runoff in dry weather conditions. In wet weather, or when wet weather is forecast within 2 days, irrigation will be discontinued. This will ensure that any golf course runoff will not contain significant loads of wastewater pollutants. The further protection measures described below are simply secondary backup mechanisms, which provide another degree of protection. · Separate all runoff from areas irrigated with the treated wastewater/stormwater mix, from runoff from other irrigated and non-irrigated areas. · Collect and convey runoff from the separate drainage systems to separate treatment wetlands on the site. Wetland areas receiving drainage from areas irrigated with the treated wastewater/stormwater mixture will have surface area of at least 2.5% of catchment area. Wetland areas receiving drainage from other areas will have surface area of at least 1.2% catchment area. · Convey overflows from the treatment wetlands which receive drainage from areas irrigated with the treated wastewater/stormwater mix only to irrigation lakes and thence store and recycle for golf course irrigation. · Prevent spill occurring from the main irrigation lake system to the saltmarsh at all times · Prevent spill occurring from the minor irrigation lakes on the Back | | |

| SUB-ELEMENT 5.1 | Wastewater Irrigation Practices | Responsible Parties | Timing or Frequency |
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| | <p>Nine holes at all times except when irrigation storage system is full to capacity and further rain occurs (thus any spill is further highly diluted with freshwater)</p> <p>The WWMP shall be prepared and implemented as an Environmental Management System based on the appropriate ISO Standard and shall be submitted for approval to Council.</p> | | |
| | <ul style="list-style-type: none"> • The Developer will install signage to Council’s satisfaction to indicate that certain wetlands and irrigation lakes are subject to runoff derived from a mixture of treated wastewater/stormwater. • Engage a qualified consultant to prepare a Turf Management Plan (TMP). The plan will provide all protocols for timing, rate of application and mixture proportions of irrigation water applied to various parts of the course and arrangements for conveying of all drainage from irrigated areas to the treatment wetlands. The size, configuration and location of these wetlands will be indicated on the detailed design drawings for the development, and their function and operational guidelines will be cross-referenced in the Turf Management Plan. <p>The TMP shall be prepared and implemented as an Environmental Management System based on the appropriate ISO Standard and shall be submitted for approval to Council.</p> | <ul style="list-style-type: none"> • Developer • Developer • Golf Course Manager | <ul style="list-style-type: none"> • Immediately the wetlands become operational. • July 2001 • As detailed in the WWMP. |

| SUB-ELEMENT 5.1 | Wastewater Irrigation Practices | Responsible Parties | Timing or Frequency |
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| Performance Measures and Monitoring | <ul style="list-style-type: none"> • Keep records of times, flow rates and total volumes of all treated wastewater importations and weather conditions during and after application of the treated wastewater/stormwater mixture. • Request that the treated wastewater supplier provides details of the quality of water supplied at least on a monthly basis during the irrigation season. This should include levels of <i>E. coli</i>, total P and total N, 5-day BOD, total dissolved salts, oil and grease and suspended solids. • Sample wetlands for levels of total P and N and conductivity. • Inspect wetlands frequently for condition of aquatic vegetation and occurrence of algal blooms. • Monitor water quality parameters before water leaves the development area and discharges into the saltmarsh. • Record any discharges from the wetlands to the drainage system and the saltmarsh. | <ul style="list-style-type: none"> • Golf Course Manager • Golf Course Manager • Golf Course Manager • Golf Course Manager • Golf Course Manager • Golf Course Manager | <ul style="list-style-type: none"> • As detailed in the WWMP • Monthly, as detailed in the WWMP • Three times per year, as detailed in the WWMP • Minimum monthly, as detailed in the WWMP • As detailed in WWMP • On occurrence. |

| SUB-ELEMENT 5.2 | Sediment and Nutrient Generation and Mitigation | Responsible Parties | Timing or Frequency |
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| Objectives | <p>To ensure that the development of the site (including building construction) does not result in excessive sediment and nutrient input, either to the lake and wetlands constructed on the site, or downstream receiving waters.</p> <p>To provide on-site treatment for future runoff from the development area such that nutrient and sediment loads are not measurably increased over current rural conditions.</p> | | |
| Implementation Actions | <ul style="list-style-type: none"> • The following actions are to be provided for in the WWMP: <ul style="list-style-type: none"> · Separate wastewater reuse irrigation drainage from the remainder of the site surface drainage system. · Employ best management practice in the application of wastewater reuse for irrigation to minimise volumes applied and amounts potentially transferred to the surface water and groundwater environment. · Construct treatment wetlands for urban runoff treatment generally in accordance with “Urban Stormwater Best Practice Environmental Management Guidelines”. In particular size wetlands to achieve 90% hydrologic effectiveness (approximately 1.2% of contributing catchment area). · Design of the inlet zone of the wetlands to preferentially trap coarser sediments to facilitate maintenance removal. These sediment ponds are indicated on the detailed design drawings for the development submitted for Council endorsement. · Ensure that velocities in the wetlands are no higher than 0.4 m/s in storm events to minimise re-suspension of sediments and damage to aquatic vegetation. | <ul style="list-style-type: none"> • Developer / Golf Course Manager · Developer · Developer · Developer | <ul style="list-style-type: none"> • Design, implementation and operational phases • Design • Ongoing operations as per TMP • Design and implementation · Design · Design |

| SUB-ELEMENT 5.2 | Sediment and Nutrient Generation and Mitigation | Responsible Parties | Timing or Frequency |
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| | <ul style="list-style-type: none"> · Plant wetlands with emergent macrophyte species over 60-80% of their area (see Appendix 6 for a list of plant species suitable for use in constructed wetlands). · Maintain the appropriate coverage and density of macrophyte species within the wetlands. Undertake removal or replacement of plants as appropriate. | <ul style="list-style-type: none"> · Developer · Developer/golf course manager | <ul style="list-style-type: none"> · Design and implementation Maintenance task as required |
| | <ul style="list-style-type: none"> · Protect wetlands from damage by flood flows greater than 1 in 1 year Average Recurrence Interval (ARI) · In the event of a blue-green algal bloom initiate response procedures and install warning signs. · The treatment wetlands should be designed to remove up to 80% of incoming sediment and 50% of the input nitrogen and phosphorus from up to the 1 in 1 year ARI flow. • Investigate provision of re-circulation mechanisms on the amenity lakes and wetlands. | <ul style="list-style-type: none"> · Developer · Golf course manager • Developer | <ul style="list-style-type: none"> · Design • Design |
| Performance Measures and Monitoring | <ul style="list-style-type: none"> • Inspect wetlands and lakes frequently (minimum monthly) for condition of aquatic vegetation and occurrence of algal blooms. Observations of excessive concentrations of algae should be followed up by species identification and algal counts. • Sample the lakes six times per year for levels of dissolved oxygen, suspended solids, conductivity, pH, total P and N, and <i>E. coli</i>. • Sample urban runoff water before it enters the wetland three times per year for levels of total P and N. | <ul style="list-style-type: none"> • Golf Course Manager • Golf Course Manager • Golf Course Manager | <ul style="list-style-type: none"> • Minimum monthly • 6 times per year • 3 times per year |

| SUB-ELEMENT 5.2 | Sediment and Nutrient Generation and Mitigation | Responsible Parties | Timing or Frequency |
|-----------------|--|--|---|
| | <ul style="list-style-type: none"> Testing and auditing of water discharged into the saltmarsh will be undertaken at the Developer's / Golf Course Manager's expense by independent consultants to the satisfaction of Council. Water leaving the site should where possible meet receiving water quality objectives as detailed in SEPP "Waters of Victoria". As these objectives often exceed the quality of background rural runoff they are rarely all attained in Victorian catchments | <ul style="list-style-type: none"> Environmental Management Trust | <ul style="list-style-type: none"> As detailed in WWMP |

| SUB-ELEMENT 5.3 | Site Maintenance Practices | Responsible Party | Timing or Frequency |
|-------------------------------|--|--|---|
| Objectives | <p>To minimise the generation and export of waterborne pollutants from the site.</p> <p>To develop and implement an emergency response plan to cope with possible spills to protect site waterbodies and downstream receiving waters.</p> | | |
| Implementation Actions | <ul style="list-style-type: none"> • Prepare and implement a best management practice site maintenance plan which will minimise the generation and export of waterborne pollutants from the site. This site maintenance plan will form part of the WWMP. The plan will include the following actions: <ul style="list-style-type: none"> · Encourage minimal use of fertilisers (part of TMP). · Remove litter from temporary traps after each runoff event. · De-silt sediment ponds as necessary. · Maintain all weirs, pipes, pumps and structures as necessary. · Remove undesirable aquatic weed species from lake and wetland areas and replace any aquatic plants that have been lost. · Repair lake or wetland edges in case of storm damage. • Engage a qualified environmental consultant to prepare a Chemical Spill Emergency Plan (SCEP). • Provide adequate training to construction and operations staff and contractors on chemical use and storage, spill containment, and emergency response procedures. • Provide training and guidelines for extent and timing of fertiliser and pesticide applications to golf course and grassed open-space areas. There should be no fertiliser or pesticide applications within 20 m of the lake edges. Encourage minimal use of fertilisers. | <ul style="list-style-type: none"> • Developer / Golf Course Manager • Developer • Developer • Golf Course Manager | <ul style="list-style-type: none"> • July 2001 • September 2001 • Prior to commencement of development • As part of each employment contract. |

| SUB-ELEMENT 5.3 | Site Maintenance Practices | Responsible Party | Timing or Frequency |
|--|---|--|--|
| Performance Measures and Monitoring | <ul style="list-style-type: none"> • Inspect all drains, diversion channels, traps and structures for condition and correct operation following all significant storm events. For the purposes of this plan a significant storm event is defined as one in which more than 25 mm of rain was recorded in one hour or less. • Undertake and keep records of monthly and post-storm inspections on all site infrastructure and repair as required. • Record any spills or cases of water pollution resulting from site maintenance practices, and report significant spills to EPA for evaluation and advice. • Keep up-to-date records of all chemical use on the site • Review maintenance and monitoring after 2 years, and then 5-yearly thereafter. | <ul style="list-style-type: none"> • Golf Course Manager • Golf Course Manager • Golf Course Manager • Golf Course Manager • Environmental Management Trust | <ul style="list-style-type: none"> • As needed • Monthly or as needed • As needed • Records will be up to date at all times. • After 2 years, 5-yearly thereafter |