Perth Airport Drain is an ephemeral waterway, drying for a short period over summer. The headwaters are in the Darling Scarp where it is a natural waterway called Crumpet Creek. Shortly before it enters the airport it has been converted into a drain. It discharges to the Swan River estuary in Ascot.

European settlers used the land in the catchment for agricultural activities and stock grazing. The site for the airport itself was selected in 1938 on Dunreath golf course. Construction commenced in 1943 though the airport was initially used for military purposes only. Most of the undeveloped land at the airport is technically a wetland and has been categorised as a conservation category wetland. The majority of the airport lies in the Perth Airport North catchment though part of the runways and other infrastructure associated with the airport lies in the Perth Airport South catchment.

There is a mixture of landuse in the catchment including urban, conservation and natural, lifestyle blocks, industry and manufacturing as well as part of the airport itself.

The most common soil type in the catchment is leached sands, associated with the Bassendean Zone. In the eastern portion of the catchment there is a small area of hard acidic yellow soils containing ironstone gravels. Bassendean sands have poor nutrient-retention capabilities so any nutrients applied as fertiliser are quickly transported to groundwater when water is applied.

Water quality is monitored just off Second Avenue, near Brearley Avenue in Belmont. This site is positioned to indicate what nutrients are leaving the catchment and entering the Swan River, so the data may not represent nutrient concentrations in upstream areas.

Average rainfall (2010–14) ~ 686 mm per year (Perth metro)

Catchment area 24.6 km² (total catchment)

Per cent cleared area (2005) 74% (total catchment)

River flow Flows for most of the year, drying for a short period in summer

Major land uses (2005) Transport (roads and airport) and conservation and natural (total catchment)

Nutrient Summary: concentrations, rainfall and targets

<table>
<thead>
<tr>
<th>Year</th>
<th>Site</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual rainfall (mm)</td>
<td>009225</td>
<td>703.0</td>
<td>807.8</td>
<td>607.2</td>
<td>503.8</td>
<td>860.8</td>
<td>608.2</td>
<td>782.4</td>
<td>674.4</td>
</tr>
<tr>
<td>TN median (mg/L)</td>
<td>SCCIS11</td>
<td>0.60</td>
<td>0.79</td>
<td>0.72</td>
<td>0.71</td>
<td>0.67</td>
<td>0.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP median (mg/L)</td>
<td>SCCIS11</td>
<td>0.016</td>
<td>0.021</td>
<td>0.026</td>
<td>0.028</td>
<td>0.027</td>
<td>0.036</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TN short term target = 2.0 mg/L  TN long term target = 1.0 mg/L  TP short term target = 0.2 mg/L  TP long term target = 0.1 mg/L

* best estimate using available data.  * Statistical tests that account for the number of samples and large data variability are used for testing against targets on three years of winter data. Thus the annual median value can be above the target even when the site passes the target (or below the target when the site fails).
Changes in nutrient concentrations over time in Perth Airport Drain

**Trend:**
Total nitrogen (TN) concentrations appear to have increased over the 2010–14 monitoring period. This was not verified by trend testing however, as no trend was detected over this time period.

**Target:**
Perth Airport Drain is passing both the short- and the long-term TN targets.

**Nutrient fractions in Perth Airport Drain**

**Nitrogen**
Just over three-quarters of the nitrogen (N) is present in the form of organic N which consists of dissolved (DON) and particulate (PON) fractions. DON largely comprises organic compounds leached from peaty sub-soils and degrading plant and animal matter. It is available for uptake by plants, algae and bacteria. PON is composed of plant and animal debris and needs to be further broken down to become available to plants and algae. The remaining N is present as dissolved inorganic N (DIN, consisting of ammonium – NH₄⁺ and N oxides – NOₓ) which are mostly from fertilisers, animal wastes and septic tank leachate. These forms of N are readily available for plant and algal uptake.

**Phosphorus**
Just over two-thirds of the phosphorus (P) is present in the form of particulate P which is derived from organic material and sediment-bound forms of P. This form of P is not readily available for use by plants or algae, but may be broken down to available forms over time. The remainder of the P is present as soluble reactive phosphorus (SRP) which is readily available for plant and algal uptake. Likely sources of this kind of P are fertilisers, animal waste and septic tank leachate.
Seasonal variation in nutrient concentrations in Perth Airport Drain

**Nitrogen**

NO\textsubscript{3} showed a clear seasonal pattern, being highest during the months with the most rainfall and hence flow. This suggests that most of the NO\textsubscript{3} is entering the drain via surface and sub-surface flows. DON showed a slight seasonal response, being higher during warmer, drier months, and lower in the wetter months. This suggests that the majority of DON is entering the drain via groundwater. PON and NH\textsubscript{4}\textsuperscript{+} did not show a clear seasonal response. This indicates that a number of pathways are probably responsible for delivering these forms to the drain including groundwater, surface and sub-surface flows.

**Phosphorus**

A slight seasonal pattern was apparent in the 2010 to 2014 monitoring data. TP and particulate P concentrations were highest in winter (June to August), linked to increased rainfall and flow. This relationship suggests that groundwater is contributing SRP to the drain year-round but that it is also coming from surface flows following rainfall. Particulate P is entering the drain year-round from surface flows as well as from instream sources such as macrophytes and algae (the drain often has dense stands of macrophytes present).

Photographs of Perth Airport South:
- (Top left) Perth Airport Drain near the sampling site, note the dense macrophytes growing in the drain, April 2015. (Bottom left) A side drain entering Perth Airport Drain, May 2005. (Right) Perth Airport Drain near the sampling site, July 2015.

Perth Airport South: Nutrient report 2014
Local nutrient reduction strategies for Perth Airport South

Nutrient reduction strategies being undertaken or recently completed in the Perth Airport South catchment include but are not limited to:

- The Perth Airport Environment Strategy which was a five year action plan implemented from 2009–14 and included actions directed towards maintaining and protecting the quality of soil and water within the airport estate; identifying degraded sites and facilitating their remediation; and minimising the potential for adverse impact to groundwater and ecological water flows from the airport and tenant activities.

- Improved management of Ascot Racecourse Lakes to improve water quality flowing to the Swan River.

- Riverbank has funded numerous projects across two key foreshore sites in the Perth Airport South catchment. Projects have included construction of erosion control treatments such as rock revetment and bioengineering as well as restoration techniques using weed control and revegetation. Examples include projects at Ascot Racecourse and the Esplanade, Redcliffe.

- The Healthy Catchments Program aims to protect the environmental health and community benefit of the Swan Canning river system by improving water quality in the catchments. This is achieved through a ‘catchment to coast’ approach and by engaging in partnerships that focus the effort of local governments, sub-regional groups, the community and other organisations in water quality improvement activities.

- Ongoing sub-regional projects. Coordination and support of community led projects to reduce nutrient inputs into the Swan River in the south sub-region led by the South East Regional Centre for Urban Landcare (SERCUL) and funded by the Department of Parks and Wildlife.

- The Phosphorus Awareness Project aims to assist the community in reducing their nutrient outputs through education, promotion and behaviour change programs.

Swan Canning water quality improvement plan

The Swan Canning water quality improvement plan (SCWQIP) complements the delivery of other major programs and presents a roadmap for reducing nutrient inputs into the river system. It uses sophisticated modelling to identify nutrient sources and provides nutrient-reduction targets for each of the subcatchments.

### SCWQIP load and concentration targets for Perth Airport South

<table>
<thead>
<tr>
<th></th>
<th>Max. acceptable load (t/yr)</th>
<th>Concentration target (mg/L)</th>
<th>% reduction required</th>
</tr>
</thead>
<tbody>
<tr>
<td>TN</td>
<td>1.1</td>
<td>1.0</td>
<td>0%</td>
</tr>
<tr>
<td>TP</td>
<td>0.17</td>
<td>0.1</td>
<td>0%</td>
</tr>
</tbody>
</table>

For further information on the SCWQIP contact: rivers.info@dpaw.wa.gov.au

Summary: Perth Airport South

- A small increasing trend of 0.003 mg/L/yr in TP concentrations was detected.
- Perth Airport South is currently passing both the short- and long-term TN and TP targets.
- Of the 12 catchments in this series of nutrient reports, Perth Airport South had the fourth lowest median TN concentration.
- Perth Airport South had the fourth lowest proportion of TN present as DIN and TP present as SRP (the bioavailable forms), of the 12 catchments in this series of nutrient reports.
- The TN and TP loads from the Perth Airport South catchment are currently considered to be acceptable and no load reduction is required to meet the SCWQIP targets.