# **State code 18: Constructing or raising waterway barrier works in fish habitats**

[State Development Assessment Provisions guideline - State Code 18: Constructing or raising waterway barrier works in fish habitats](https://www.daf.qld.gov.au/business-priorities/fisheries/habitats/fisheries-development/sdap-guidelines#:~:text=SDAP%20Guidelines%20Removal%2C%20destruction%20or%20damage%20of%20marine,food%20and%20nursery%20areas%20for%20many%20fish%20species.)**.** This guideline provides direction on how to address State Code 11 below.

**Table 18.1 Operational work**

| **Performance outcomes** | **Acceptable outcomes** | **Response** |
| --- | --- | --- |
| **All development - Impacts on waterway** |
| **PO1** **Waterway** **barrier works** do not result in adverse impacts on **waterways**. | No acceptable outcome is prescribed.  | Complies with PO# / AO#Use this column to indicate whether compliance is achieved with the relevant PO or AO (or if they do not apply), and explain why |
| **PO2** Development is designed, constructed and maintained to avoid and minimise impacts on **matters of state environmental significance**. | No acceptable outcome is prescribed. |  |
| **PO3** Where development impacts on **matters of state environmental significance**, development mitigates impacts and provides an **offset** for any acceptable **significant residual impact**on **matters of state environmental significance**.Statutory note: For Brisbane core port land, an offset may only be applied to development on land identified as E1 Conservation/Buffer, E2 Open Space or Buffer/Investigation in the Brisbane Port LUP precinct plan. | No acceptable outcome is prescribed. |  |
| **All development in general** |
| **PO4** Aspects of development are only permitted within a **waterway** where there is a functional requirement and the development cannot be feasibly located elsewhere. Ancillary elements are to be located outside of the **waterway**. | No acceptable outcome is prescribed. |  |
| **PO5** For the life of the barrier,adequate **fish** passage must be provided and maintained at all **waterway** **barrier works** through:1. **fish way(s)** that adequately provide for the movement of **fish**; or
2. the movement of **fish** is adequately provided for in another way.
 | *For all crossings:***AO5.1** Hydraulic conditions (depth, velocities and turbulence) from the downstream to the upstream limit of the structure allow for **fish** passage of all **fish** attempting to move through the crossing at all flows up to the **drownout** of thestructure.AND**AO5.2** For the life of the crossing, the relative levels of:1. a bed level crossing or a culvert invert;
2. bed erosion protection;
3. apron scour protection; and
4. the **waterway** bed

are maintained to avoid drops in elevation at their joins.AND**AO5.3** The crossing and associated erosion protection structures are installed at no steeper gradient than the waterwaybed gradient.AND**AO5.4** The crossing and associated erosion protection structures are roughened throughout to approximately simulate natural bed conditions.AND**AO5.5** Design and maintenance measures are in place for the life of the crossing to keep crossings clear of blockages through a regular inspection program in order to retain **fish** passage through the crossing.AND*For* ***waterway*** *crossings other than bridges and culverts:***AO5.6** The crossing is built at or below bed level so that the surface of the crossing is no higher than the stream bed at the site.AND**AO5.7** The lowest point of the crossing is installed at the level of the lowest point of the natural **waterway** bed (pre-construction), within the footprint of the proposed crossing.AND**AO5.8** There is a height difference between the lowest point of the crossing and the edges of the low flow section of the crossing so that water is channelled into the low flow section of the crossing.AND**AO5.9** The level of the remainder of the crossing is no higher than the lowest point of the natural **waterway** bed outside of the low flow channel.AND*For bridges:***AO5.10** Bridge support piles are not constructed within the low-flow channel and do not constrict the edges of the low-flow channel, and the number of piles within the **waterway** are minimised.AND**AO5.11** Bridge abutments and bank revetment works do not extend into the waterway beyond the toes of the banks.AND**AO5.12** Suitable **fish habitats** are maintained within the low-flow channel. AND*For culverts:***AO5.13** Culverts are only installed where the site conditions do not allow for a bridge.AND**AO5.14** The combined width of the culvert cell apertures is equal to 100 percent of the main channel width.AND**AO5.15** The base of the culvert incorporates a low flow channel consistent with the natural low flow channel and:1. is buried a minimum of 300 millimetres to allow bed material to deposit and reform the natural bed on top of the culvert base; or
2. the base of the culvert is the **waterway** bed; or
3. the base of the culvert cell and any instream scour protection within the **waterway** is roughened throughout to approximately simulate natural bed conditions.

AND**AO5.16** The outermost culvert cells incorporate roughening elements such as baffles on their bankside sidewalls.AND**AO5.17** Roughening elements are installed on the upstream wingwalls on both banks to the height of the upstream obvert or the full height of the wingwall.AND**AO5.18** Roughening elements provide a contiguous lower velocity zone (no greater than 0.3 metres/second) for at least 100 millimetres width from the wall through the length of the culvert and wingwalls.AND**AO5.19** Culvert alignment to the **waterway** flow minimises water turbulence.AND**AO5.20** There is sufficient light at the entrance to and through the culvert so that fishare not discouraged by a sudden darkness.AND**AO5.21** The depth of cover above the culvert is as low as structurally possible, except where culverts have an average recurrence interval (ARI) greater than 50 years.AND**AO5.22** For culvert crossings designed with a flood immunity ARI greater than 50 years, fishpassage is provided up to culvert capacity.*For all other development no acceptable outcome is prescribed.* |  |
| **PO6 W**aterway**barrier works** are designed, constructed, operated and maintained to provide lateral and longitudinal fishpassage for all members of the **fish** community. | No acceptable outcome is prescribed.  |  |
| **PO7** The development is designed and operated so that all components of **waterway barrier works** and pathways of potential **fish** movement provide for safe fishpassage. Stepped spillways are not acceptable. | No acceptable outcome is prescribed.  |  |
| **PO8** The **drownout** characteristics of the **waterway** **barrier works** are designed and constructed to not result in adverse impacts to **fish** passage. | No acceptable outcome is prescribed.  |  |
| **PO9** Development does not result in adverse impacts to **fisheries resources.**  | No acceptable outcome is prescribed.  |  |
| **PO10** The design, construction and maintenance of the development does not result in non-essential hardening or unnatural modification of the **main channel** of the **waterway.**  | No acceptable outcome is prescribed. |  |
| **PO11** The development retains natural **fish habitat** and features such as shade, pools, riffles, rock outcrops and boulders, wherever possible. | No acceptable outcome is prescribed. |  |
| **PO12** The design, construction and maintenance of the development does not result in straightening of meandering **waterways**. | No acceptable outcome is prescribed. |  |
| **PO13** Where channels are to be significantly modified, the design and construction of the development replicates natural **waterways** and habitat features.  | No acceptable outcome is prescribed. |  |
| **PO14** Where **waterway barrier works** will modify water levels or flow characteristics of the **waterway**, existing up and downstream structures are upgraded to provide adequate **fish** passage in accordance with the new levels or flow characteristics.  | No acceptable outcome is prescribed. |  |
| **PO15** The development is designed, constructed and maintained to provide water exchange sufficient to maintain or improve water quality and flow conditions on which **fisheries resources** depend. | No acceptable outcome is prescribed. |  |
| **PO16** Development likely to cause drainage or disturbance to acid sulfate soils, prevents the release of contaminants and impacts on **fisheries resources** and **fish habitats**. | No acceptable outcome is prescribed. |  |
| **PO17** The development is designed, constructed and maintained to not result in adverse impacts to beds, banks and vegetation adjacent to the permanent development footprint. | No acceptable outcome is prescribed.  |  |
| **PO18** After completion of works, disturbed areas of the bed and banks of the **waterway** outside the permanent development footprint are returned to their original profile and stabilised to promote regeneration of natural fish habitats*.* | No acceptable outcome is prescribed. |  |
| **PO19** The development is designed and constructed to maintain or restore the natural substrate of the **waterway** bed. | No acceptable outcome is prescribed. |  |
| **PO20** Development does not adversely impact on community access to **tidal land** and **waterways**. | No acceptable outcome is prescribed. |  |
| **PO21** Development does not adversely impact on community access to **fisheries resources** and **fish habitats** including recreational and indigenous **fishing** access.  | No acceptable outcome is prescribed. |  |
| **PO22** Development does not adversely impact on commercial **fishing** access and linkages between a commercial **fishery** and infrastructure, services and facilities. | No acceptable outcome is prescribed. |  |
| **Development involving fish ways** |
| **PO23** Having regard to the hydrology of the site and **fish** movement characteristics, the **fish way** is capable of operating, and will operate: 1. for as long as the **waterway barrier work** is in position; and
2. whenever there are inflows into the impoundment or **waterway**, release out of the impoundment and during overtopping events; and
3. when the impoundment is above dead storage level.
 | No acceptable outcome is prescribed.  |  |
| **PO24** The development is designed, constructed and maintained to ensure the hydrology allows for fish movement for the life of the **waterway barrier works**. | No acceptable outcome is prescribed. |  |
| **PO25** **Fish ways** are designed, constructed and maintained to not adversely impact on **fish** and **fish** movement. | No acceptable outcome is prescribed. |  |
| **PO26** **Fish ways** are designed, constructed and operated todirect release water through the **fish way** as a priority over the outlet works. | No acceptable outcome is prescribed.  |  |
| **PO27** **Fish ways** are designed, constructed and operated to ensure flows and releases of water do not result in adverse impacts to **fish** or **fish passage**. | No acceptable outcome is prescribed.  |  |
| **PO28** The development is designed, constructed and operated to ensure **fishway** operational issues are promptly rectified for the life of the **fishway** including:1. all components are designed to be durable, reliable and adequately protected from damage during high flow and flood events
2. all components can be replaced; and
3. a contingency plan ensures provision of alternate adequate **fish** passage during the **fish way** re-instatement process.
 | No acceptable outcome is prescribed.  |  |
| **PO29** The development is designed to allow for installation of monitoring equipment and to allow access for monitoring and maintenance. | No acceptable outcome is prescribed.  |  |
| **PO30 Fish ways** are designed, constructed and operated to source water supply from surface water or equivalent water quality. | No acceptable outcome is prescribed.  |  |
| **PO31** Tailwater control structures are designed, constructed and maintained to allow for **fish passage**. | No acceptable outcome is prescribed.  |  |
| **Development involving floodgates** |
| **PO32** The design, construction and operation of a floodgate does not result in adverse impacts on fish, fish passageorfish habitat*.* | No acceptable outcome is prescribed.  |  |
| **PO33** Floodgates are designed, constructed and maintained to ensure the invert is at bed level. | No acceptable outcome is prescribed. |  |
| **Temporary waterway barrier works** |
| **PO34** The temporary waterway barrier works will exist only for a specified temporary period. | No acceptable outcome is prescribed. |  |
| **PO35** The temporary waterway barrier works provides adequate **fish** movement  | No acceptable outcome is prescribed. |  |
| **PO36** The development is designed, constructed and maintained to ensure temporary barriers are removed and the bed and banks are returned to their original profile and stability. | No acceptable outcome is prescribed.  |  |
| **PO37** Temporary **waterway** **barrier works** aredesigned, constructed and maintained to allow for downstream movement during works, where required by species present. | No acceptable outcome is prescribed. |  |
| **PO38** The condition and value of aquatic macrophytes and other **fish habitats** is maintained.  | No acceptable outcome is prescribed. |  |