Works on Waterways: Deviation or Realignment

BACKGROUND

Realignment or deviation of streams is sometimes undertaken to facilitate urban development, new road infrastructure or mining development. The length of works could be less than one hundred metres to several kilometers.

It would be advisable that the proponent discusses the project at the concept stage with the CMA and other authorities such as DSE and DPI, before submitting an application for the works.

POTENTIAL WATERWAY ISSUES

The potential impacts of stream deviations are varied and will depend on the scale and location of the project and include the following:

- Shortening the stream length will increase the stream grade and erosion potential
- Longer streams may lead to sedimentation deposition
- Lengthening the stream will reduce its hydraulic capacity due to the flatter gradient
- There would be a loss of established environmental values in the waterway

ASSESSMENT CRITERIA FOR ALL DEVIATIONS

The following are criteria the CMA will use to assess the feasibility of the proposed deviation.

1 Hydraulic Capacity

The channel and floodplain capacity of the new waterway reach is to be hydraulically equivalent to the original reach for a range of flows up to the 100-year ARI flow. Where the overall stream is significantly lengthened, the new waterway may need to be larger than the original to maintain essentially the same water level in the stream upstream of the works. If the stream is shortened, then stabilisation works may be required to maintain the same bed grade. The hydraulic assessment will depend on the scale of the works. For very minor deviations such as to suit a new road crossing, a waterway physically the same as existing would be acceptable. For major deviations the applicant should submit the hydraulic design report with the application for assessment.

Specialist geomorphological advice will be needed to support diversion applications on all Class 1 and 2 streams (refer to Table 1) or any stream where the course will be altered by 25% or more within the applicant’s property.

Table 1 Stream Classifications

<table>
<thead>
<tr>
<th>Classification</th>
<th>Stream Characteristics</th>
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<tbody>
<tr>
<td>Class 1: Major fish habitat</td>
<td>Large named permanently flowing stream. Aquatic vegetation present. Known fish habitat.</td>
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<tr>
<td>Class 2: Moderate fish habitat</td>
<td>Smaller named permanently or intermittent flowing stream. Aquatic vegetation present. Known fish habitat.</td>
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<td>Class 3: Minimal fish habitat</td>
<td>Named or unnamed watercourse with intermittent flow.</td>
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<td>Class 4: Unlikely fish habitat</td>
<td>Named or unnamed stream with flow during rain events only.</td>
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2 Physical Requirements

- The new course to provide for low flows and flood flows up to the capacity of the natural channel.
- Bed grade to be similar to the existing bed grade. Structures may be needed to maintain suitable bed grades.
- Batters of banks should be designed to mimic natural stable batters on the existing waterway. This can be achieved by providing variation in slopes and benches to provide diversity of habitats for flora and fauna. Batters to generally be a maximum of 1(v):2(h), except where excavation is through rock. A slope stability analysis by a geotechnical consultant is required where the depth of cut exceeds 5 meters.
- The entry and exit points to the original waterway to provide a smooth transition.
- Berms to be constructed where the depth of cut exceeds 5 meters
- The design to provide for maximum retention and protection of existing vegetation in both new and old courses

3 Local Drainage

If the depth of cut exceeds 5 meters, catch drains should be located along the top of cuts and directed to suitable drainage points to direct runoff away from the batters. Catch drains are to be stabilised using grass or rock to suit local conditions. Berms

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are to be graded away from the top of the batter to avoid concentrated flow down the batters and longitudinally to inlets to piped or lined drains to convey runoff down the batter to the new stream.

4 Water table
The works should not cause a significant change to the existing water table regime.

5 Stream Restoration
The rehabilitation plan should attempt to mimic the natural values of the stream reach upstream and downstream and in time provide a net gain to the ecological values of the stream. The requirements are as follows:

- Variability in physical characteristics to reflect the original characteristics and create a natural appearance by inclusion of a meandering course with variable bed depth.
- Pool/riffle sequences to be restored.
- Provision for fish passage for a wide range of flows and during the construction period.
- Stream bed to be covered in similar material as the original bed, i.e. silt, sand or rock.
- Stream banks to be top soiled using the original topsoil on the site.
- The banks and floodplain to be revegetated using indigenous grasses, plants and trees.
- Large woody debris to be placed and secured in the stream to at least the same density as occurs naturally in adjoining reaches.
- Reach to be fenced to restrict stock access.
- Methods to re-establish the native vegetation at the site and otherwise rehabilitate the site including stabilisation of access roads.

6 Abandoned Waterway
The methodology for treatment of the original course is to be defined. In general remnant trees shall be protected at all times.

7 Survey Detail
Survey plans for all deviations are required to be submitted by the applicant. The following plans prepared by a licensed surveyor are to be submitted with the application of a stream deviation:

1. Longitudinal section of the existing creek bed, commencing 500 metres upstream from the start of the proposed deviation and finishing 500 metres downstream from the end of the deviation. Show the lowest point of the bed at 50 metre intervals and any abrupt changes in bed level. Also, show the commencement and re-entry points of the proposed deviation.

2. Longitudinal section of the proposed deviation.

3. Plan view of the proposed deviation showing:
   a. the existing course of the waterway and the proposed deviation;
   b. details of the alignment of the deviation relative to the old course of the waterway at the points of commencement and re-entry of the deviation and
   c. any ‘plugs’ or filling proposed within the abandoned section of the waterway.

4. Typical cross-sections of the creek:
   a. 50 metres upstream of the proposed deviation
   b. 50 metres downstream of the proposed deviation and
   c. between the commencement and re-entry points of the proposed deviation.

5. Typical cross-section of the proposed deviation

8 Works and Environmental Management Plan
A works plan for all deviations is required to be submitted by the applicant. This is assessed to ensure the works are appropriate from a stream process perspective and that the works will be carried out in an acceptable manner. The works plan should identify:

- The construction methods;
- Details of any licenses /permits/ approvals required and proposals to comply with any attached conditions, (eg existing Planning permit, EPBC Act approval, Extraction License);
- Methods to avoid blocking fish passage and flows during and after construction;
- Methods of supervision and instruction of construction staff in relation to site environmental management requirements;
- The timing and staging of all works associated with the deviation;
- The extent of vegetation clearing;
- The treatment of the original waterway;
- Methods to control erosion and sedimentation;
- Methods to control dust from associated works;
- Methods to protect water quality from machinery operations; and
- Methods to re-establish the native vegetation at the site and otherwise rehabilitate the site including stabilisation

9 Maintenance Program
Flows should preferably enter the deviation after a reasonable grass cover has become established on the bank areas of the deviation to minimise potential soil loss. The works should be inspected at 3 monthly intervals and after significant flow events. Any damage to the deviation and structures shall be promptly restored.

10 Future Responsibilities
The future responsibilities for the deviation are resolved as part of the assessment and are determined on a case-by-case basis...