

Midland Metro

7.9

Impacts on Water Resources

7.9.1 Introduction

This section of the ES describes the potential for impacts on water resources to occur during the construction of the scheme. This includes impacts associated with both surface and ground water. Where appropriate, mitigation measures have been developed in order to minimise the potential impact of the scheme.

7.9.2 Assessment Methodology

The assessment of impacts on surface and groundwaters has been undertaken based upon existing sources of information. The following sources of information were utilised:

- water quality data available on the Environment Agency's website ⁽¹⁶⁾;
- Groundwater Vulnerability Map, Sheet 22 (South Staffordshire & East Shropshire);
- relevant European Community (EC) legislation;
- Local Environment Agency Plan (LEAP) West Midlands – Tame ⁽¹⁷⁾ ;
- Sandwell UDP ⁽¹⁸⁾;
- Dudley UDP ⁽¹⁹⁾;
- planning policies and Environment Agency (EA) objectives with regard to groundwater; and
- designated sites of nature conservation importance (local, national and international designations).

7.9.3 Assessment Criteria

Local Planning Context

The Sandwell UDP states in Policy PC12 that:

"in conjunction with the Environment Agency, the Council will oppose development which is likely to lead to a significantly adverse impact on groundwater resources, both in terms of protecting their quality and/or ability to use the resource".

Further, the Plan states that the Council will resist development that poses an unacceptable threat to the quality of surface and groundwaters (Policy PC9), and will ensure that adequate pollution control measures are incorporated into new developments, to reduce the risk of water pollution.

Policy EP2 of the First Deposit Dudley UDP that:

"proposals will not be permitted where development would harm the water quality or quantity in underground aquifers. Proposals will be required to include engineering and/or design solutions to overcome any threat. The Council will encourage proposals to include measures to minimise surface water run-off and the use of land management practices which maintain and enhance the quality of ground and surface water".

Surface Watercourse Quality

The water quality of the UK's watercourses is classified by the Environment Agency (EA) under the General Quality Assessment (GQA) Scheme. Each watercourse is assessed and given a grade between A and B (good), through C and D (fair) to E and F (poor). The GQA uses biochemical oxygen demand (BOD) ⁽²⁰⁾, ammonia and dissolved oxygen to assess the water quality.

The quality of the surface watercourse and the EA water quality objectives were used as basis for assessing potential for impacts.

Groundwater

The vulnerability of groundwater to pollution is dependent upon the presence and nature of the overlying soils and drift deposits, the geology and the depth to the water table. This will determine the rate at which a contaminant can migrate into groundwater supplies. Consequently, groundwater abstractions in the UK have designated inner and outer protection zones, defined according to the above criteria. Protection of key groundwater resources, and in particular, those used for public water supply, is one of the key roles of the EA, and is accomplished by calculating Groundwater Source Protection Zones, delimited as follows:

- Zone I – defined by a 50 day travel time to the source (borehole), from any point below the water table, with a minimum of 50 m from the source (the Inner Protection Zone);
- Zone II – defined by a 400 day travel time to the source from any point below the water table, or 25% of the entire catchment area, whichever is the greater (Outer Protection Zone); and
- Zone III – the entire catchment of the water source.

7.9.4 Baseline Characteristics

Introduction

The proposed alignment crosses the River Tame, the Tame Valley Canal, Walsall Canal, Birmingham Canal, Parkhead Locks, Pensnett Canal and Dudley No. 1 Canal. The location of these watercourses in relation to the proposed alignment is detailed in *Figure 1.1* in *Volume 2*.

The River Tame is crossed in two areas, adjacent to the Leabrook Waste Repository site and adjacent to Black Country New Road where it is culverted. The Birmingham Canal is also crossed in two areas, via an aqueduct at Dudley Port and via an underbridge adjacent to Coneygre Leisure Centre and Playing Fields. Dudley Canal is crossed in three areas, adjacent to the Peartree Industrial Estate, adjacent to Round Oak Rail and at Merry Hill. The vulnerability of the surface waters is considered high where the route crosses them, but otherwise low. The sensitivity is considered moderate to low.

Surface Watercourse Water Quality

The EA is currently phasing out the use of LEAPs in favour of 'Local Contributions Plans'. These new documents are currently in draft form and are not publicly available. In addition, at the time of writing, the relevant LEAP was out of print. However, information from the *West Midlands – River Tame LEAP* was used where relevant. Surface water quality information has been taken directly from the EA's website. This includes both chemical and, where available, biological water quality data for relevant stretches of the rivers and canals which are crossed by the proposed scheme. In the majority of cases, water quality data was not available for the proposed crossing point, therefore data from the nearest EA monitoring point (either upstream or downstream) was used.

A summary of the findings is provided in *Table 7.15* below.

The data indicates that chemical water quality, in terms of BOD levels ranges from fair to poor, with the Walsall Canal suffering from particularly elevated levels. Although biological water quality data was not available for this stretch of the canal, it is likely that only those species that can tolerate low levels of oxygen will be able to survive here. The biological water quality of the River Tame likewise is poor, supporting a very limited number of taxa, which are tolerant to pollution.

Table 7.15 Chemical and Biological Water Quality

Watercourse	BOD	Ammonia	Dissolved Oxygen	Biological Water Quality
River Tame (Oldbury Arm)	D – Fair	D – Fair	B - Good	Overall – Poor (biology limited to a small number of species very tolerant to pollution)
Walsall Canal	E – Poor	B – Good	D – Fair	No data available
Gower Branch Birmingham – Wolverhampton Canal	D – Fair	C – Fairly Good	B – Good	No data available
Dudley Canal	D – Fair	A – Very Good	D – Fair	Overall – Fair (a range of pollution tolerant species present)

Discharge Consents

A number of watercourses directly crossed by the proposed scheme (including the River Tame, Tame Valley Canal and Tipton Brook) currently receive authorised discharges, including storm water overflows, cooling water and trade effluent discharges (both process waters and site drainage).

Fish Populations

The *West Midlands – River Tame LEAP* indicates that a number of the canals in this area support coarse fish populations, with roach commonly being the dominant species. Fish populations within the River Tame, however, are seriously constrained by poor water quality from urban run-off from Birmingham, and although coarse fishing does take place on certain stretches, the river is still prone to episodic pollution events.

Flood Risk

An 'indicative floodplain' associated with the River Tame and its tributaries is located at the northern end of the proposed route. This designated area, indicates that the proposed alignment at the northern end of the route lies within the natural river floodplain, calculated by historical flood records and geographic models.

Groundwater

The entire length of the proposed scheme is underlain by the Coal Measures Group which is classified as a Minor Aquifer by the EA's *Groundwater Vulnerability Map, Sheet 22 (South Staffordshire & East Shropshire)*. This unit has variable permeability. A description of the geological setting of the proposed alignment is also provided in *Section 7.10.5*.

The Carboniferous Coal Measures are comprised predominantly of shales and clays with intermittent sandstone, grit and conglomerate lenses, which gives the group variable permeability. Both the shales and the well cemented sandstones have low primary permeabilities; however, secondary permeability is induced by joints and fractures. This formation yields only minor aquifers that seldom produce large quantities of water for abstraction, although they are important for local supplies and base flow to rivers.

Occasional outcrops of Silurian limestones are also classed as minor aquifers, however, the Ludlow Shales are a non-aquifer unit.

No groundwater source protection zones are within close proximity of the proposed scheme.

7.9.5 Predicted Impacts

General

The potential impacts that may arise during the construction of the scheme are described below:

- direct discharges to ground and surface water from run-off during the construction phase, possibly containing increased loads of suspended solids and/or contaminants;
- accidental spillage or leakage resulting from storage of potentially polluting substances during construction, affecting groundwater and surface waters;
- physical damage to watercourse banks resulting from crossings;
- disposal of drainage and effluent from construction sites;
- possible localised flooding from increased siltation in surface watercourses as a result of construction site run-off or as a result of impacts on land drainage; and
- the effect of direct loss, disturbance or other effects on aquatic habitats and the species that they support.

Surface Watercourses

Increased sediment loads resulting from construction site run-off, along with accidental spillages of polluting substances have the potential to enter watercourses in close proximity to the proposed scheme. This would have a detrimental effect on the water quality and aquatic ecology of the watercourse. This is a particular issue where the proposed route crosses the River Tame and the Tame Valley Canal, Walsall Canal, Birmingham Canal, Parkhead Locks, Pensnett Canal and Dudley Canal.

The canals are approximately 2 m deep, probably lined and therefore, are unlikely to be in hydraulic continuity with any perched groundwater or aquifer in the vicinity. The watercourses are not used for potable supply.

The vulnerability of the surface waters is considered to be moderate to high where the route crosses them, but otherwise low, especially with regard to the canals. The overall sensitivity is considered to be moderate to low.

Two balancing ponds at Ocker Hill, located to the west of the proposed scheme, currently take run-off from the Leabrook Waste Repository site. A permanent retaining wall will be required at the foot of the widened embankment. It is proposed to construct temporary sheet piling between the site of the permanent retaining wall and the lagoons to provide a suitable working area during construction. It may be necessary to dewater this area during construction works. This will be subject to consultation with the EA to ensure that minimal impact occurs to water levels within the River Tame and the surrounding groundwater. In addition, it is envisaged that a discharge consent from the EA will be required for any discharge from this activity, as identified within the draft CoCP.

Groundwater

Construction, and in particular excavation works, have the potential to modify groundwater flows. Further, accidental spills of chemicals, oils or fuels have the potential to percolate through the ground and enter the groundwater. The potential for groundwater vulnerability to contamination is considered to be moderate, due to the known absence of overlying low permeability drift on the proposed route. The sensitivity is classed as moderate to low due to the lack of water abstractions from this aquifer. It is considered that the adoption of appropriate mitigation measures (see *Section 7.9.6* below) including good site practices will minimise any of these impacts.

7.9.6 Summary of Mitigation Measures

The following mitigation measures, which form part of the draft CoCP for the scheme, will be implemented during the construction of the project.

- No discharges to surface water courses will take place without the prior consent of the EA.
- All traps (temporary or permanent) will incorporate oil or grease removal facilities.
- Sediment traps will be regularly cleaned and maintained.
- Temporary sanitation facilities will be installed on site.
- Water from concrete batching plants will pass through sediment traps and settlement tanks.
- All drainage facilities will be adequate for the controlled release of storm flows.
- All storage tanks for potential polluting substances will be served by secondary containment facilities which are capable of containing 100% of

the total volume stored, in the event of a spillage.

- Refuelling activities will be carried out at a suitable distance from any watercourses, agreed by the appointed Contractor and in consultation with the EA. Spill containment materials will be available and site personnel will be trained in their use.
- Any areas of exposed soil will be minimised in order to reduce the potential for increased siltation and contaminated run-off.
- Any areas which requires excavation below the water table, including any site dewatering, will be agreed with the EA and the local water company in accordance with the provisions within BS 6031: 1981 Code of Practice for Earthworks, regarding the general control of site drainage.

7.9.7 Summary of Residual Impacts

The principal watercourses in the vicinity to the proposed scheme are the River Tame, Tame Valley Canal, Walsall Canal, Birmingham Canal, Parkhead Locks, Pensnett Canal and Dudley No. 1 Canal. Impacts have the potential to arise during construction due to the works.

A range of mitigation measures have been developed and these will be implemented via the CoCP for the scheme. It is considered that with the adoption of appropriate mitigation (as described above), and liaison with the EA throughout the construction programme, no significant impacts are expected to occur.

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