A303 Amesbury to Berwick Down

TR010025

6.3 Environmental Statement Appendices

Appendix 11.6 Non-Significant Effects

Volume 6

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

October 2018

Table 1: Magnitude of the impacts of the Scheme on the water environment that lead to non-significant effects

Receptor	Attribute	Importance	Magnitude of impact	Reasoning
Construction				
Hampshire Avon (Upper) downstream of Nine Mile River confluence	Water supply/quality	Very High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river. The Scheme will not result in deterioration of the WFD status of the waterbodies and will not prevent achievement of 'good' status.
	Dilution and removal of waste products	High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river.
	Recreation	High	Negligible	No alteration to any existing access to the river for recreation. The Scheme will not result in deterioration of the WFD status of the waterbodies and will not prevent achievement of 'good' status.
	Conveyance of flow (river channel, floodplain and overland pathways)	Very High	Negligible	Fluvial flood risk modelling of the River Avon demonstrates no significant measurable impact on receptors
	Biodiversity	Very High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river. The Scheme will not result in deterioration of the WFD status of the waterbodies and will not prevent achievement of 'good' status.

Receptor	Attribute	Importance	Magnitude of impact	Reasoning
Till (Hampshire Avon)	Water quality	Very High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river. The Scheme will not result in deterioration of the WFD status of the waterbody.
	Dilution and removal of waste products	High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river.
	Recreation	Medium	Negligible	No alteration to any existing access to the river for recreation. The Scheme will not result in deterioration of the WFD status of the waterbody.
	Conveyance of flow (river channel, floodplain and overland pathways)	Very High	Negligible	Fluvial flood risk modelling of the River Till demonstrates no significant measurable impact on receptors
	Biodiversity	Very High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river. The Scheme will not result in deterioration of the WFD status of the waterbody.
Upper Hampshire Avon Groundwater waterbody	Water supply/quality	Very High	Negligible	No significant measurable impact upon groundwater flow or quality reaching receptors
	Vulnerability	Very High	Negligible	No significant measurable impact upon groundwater flow or quality reaching receptors
	Conveyance of flow	Very High	Negligible	No significant measurable impact upon groundwater flow reaching receptors
	Biodiversity	Very High	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river. The Scheme will not result in deterioration of the WFD status of the groundwater waterbody.

Receptor	Attribute	Importance	Magnitude of impact	Reasoning
Lakes and ponds	Water quality	Medium	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river connected to lakes and ponds.
	Dilution and removal of waste products	Low	Negligible	There are currently no permitted discharges to existing lakes and ponds.
	Recreation	Low	Negligible	No alteration to any existing private access for recreation.
	Biodiversity	Medium	Negligible	No significant measurable impact upon groundwater flow which provides the baseflow in the river connected to lakes and ponds. The Scheme will not result in deterioration of the WFD status of the waterbodies and will not prevent achievement of 'good' status (where current status is currently less then 'good').
Operation				
Hampshire Avon (Upper) downstream of Nine Mile River confluence	Water supply/quality	Very High	Minor beneficial	HEWRAT assessment of soluble pollutant (Copper) becomes Pass from the existing where the baseline is a Fail condition.
Upper Hampshire Avon Groundwater waterbody	Water supply/quality	Very High	Negligible	The Scheme will result in an improvement from the existing road drainage situation due to the separation of land and road drainage, and also from the use of proprietary pollution treatment systems in discharge areas. Calculated reduction in spillage risk is less than 50% (when the existing spillage risk is less than 1% annually), and as such a minor beneficial impact is not reached.

Table 2: Summary of non-significant effects – construction

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Temporary Construction Effects							
Reduction of groundwater baseflow as a result of construction dewatering (for bridge foundations and cuttings) or groundwater abstraction (for construction compound water supply)	River Till	Water quantity	Designated SSSI/SAC	Very High	Any dewatering for bridge pier foundations are to be discharged to down hydraulic gradient aquifer Construction of underground structures in line with measures outlined in OEMP (Appendix 2.2) The groundwater abstraction rate and/or location would be non-significant having been informed by the assessment for the abstraction licence application, which will be undertaken subsequent to the DCO application.	Negligible	Neutral
Alteration to hydrological regime Increased sediment transport Alteration to floodplain connectivity Mobilisation of contaminants as a result of disturbance of contaminated sediments		Water quality	WFD classification 'Good'	Very High	Avoid river diversions, realignments and culverting through the design and layout of haul roads Suitable drainage for construction phase with no direct discharge to waterbodies without prior treatment Adoption of best practice construction methods and operational management Any dewatering for bridge pier foundations are to be discharged to down hydraulic gradient aquifer Construction of underground structures in line with measures outlined in OEMP	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Temporary increase in peak flood level and / or decrease in flood storage from 'Bailey' bridge type crossing and associated embankment works over the River Till during scheme construction	River Till, floodplain and overland flow routes	Conveyance of flow (fluvial and surface water flood risk)	Main River watercourse, floodplain and overland flow routes	Very High (owing to Areas of Flood Zone 3 along the River Till and conveyance and storage of low probability river flood events)	The bridge crossing would be an open structure rather than an embankment structure to maintain flood flow in the river channel. Drainage incorporated in approach embankments to maintain flow through the floodplain for fluvial and surface water flows Watercourses are not planned to be diverted or amended to avoid loss of in-channel conveyance or storage. Adoption of best practice construction methods and operational management to minimise impacts as outlined in OEMP	Negligible	Neutral
Changes in topography, overland flow paths and storage from site compounds (for civils infrastructure and tunnelling infrastructure), associated access roads and haul routes	River Till and River Avon floodplains and overland flow routes	Conveyance of flow (fluvial and surface water flood risk)	Main River watercourse fluvial floodplains and overland flow routes for surface water	Very High (owing to Areas of Flood Zone 3 along the River Till and conveyance and storage of low probability river flood events)	High risk flood zones and flow paths have been avoided through design. Embedded drainage mitigation through sustainable drainage techniques and controlling discharges to greenfield runoff rate	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Reduction of groundwater baseflow as a result of construction dewatering (for bridge foundations, cuttings and potentially for cross-passages)	River Avon	Water quantity	Designated SSSI/SAC	Very High	Tunnel and cross passage construction techniques are developed to take into account measures to minimise any dewatering requirements Any dewatering for pier foundations are to be discharged to down hydraulic gradient aquifer Construction of underground structures in line with measures outlined in OEMP	Negligible	Neutral
Alteration to hydrological regime Increased sediment transport Alteration to floodplain connectivity Mobilisation of contaminants as a result of disturbance of contaminated sediments Impact on surface water quality from spillage of fuels, tunnel arisings water or other contaminating materials	River Avon	Water quality	WFD classification 'Moderate'	Very High	Avoidance of river diversions, realignments and culverting through the design and layout of haul roads Suitable drainage for construction phase with no direct discharge to waterbodies without prior treatment Adoption of best practice construction methods as outlined in the OEMP Tunnel and cross passage construction techniques are developed to take into account measures to avoid dewatering requirements Any dewatering for pier foundations are to be discharged to down hydraulic gradient aquifer	Negligible	Neutral
Temporary increase in peak flood level during scheme construction	River Avon	Conveyance of flow (fluvial flood risk)	Main River watercourse	Very High (owing to Areas of Flood Zone 3 along the River Avon)	No planned changes to the structure of the bridge crossing the River Avon Watercourses are not planned to be diverted or amended to avoid loss of in-channel conveyance or storage	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Lowering of the groundwater levels and reduction of groundwater flow as a result of construction dewatering (for bridge foundations, cuttings, and potentially for cross-passages)	Principal Chalk aquifer	Water quantity	Water resource used for public water supply and supporting flow in rivers designated as SACs	Very High	Tunnel and cross passage construction techniques are developed to take into account measures to avoid dewatering requirements Any dewatering for pier foundations are to be discharged to down hydraulic gradient aquifer	Negligible	Neutral
Lowering of the groundwater levels and reduction of groundwater flow as a result of construction dewatering (for bridge foundations, cuttings, and potentially for cross-passages)	Springs	Water quantity	Water resource supports a river ecosystem	High	Tunnel and cross passage construction techniques are developed to take into account measures to avoid dewatering requirements Any dewatering for pier foundations are to be discharged to down hydraulic gradient aquifer Chalk groundwater dewatering discharge returned to Chalk aquifer minimising changes to flow regime	Negligible	Neutral
	Blick Mead Historic site	Water quantity	Preservation of nationally significant archaeological site of high due to saturated water conditions.	Very High		Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Lowering of the groundwater levels and reduction of groundwater flow as a result of construction dewatering (for bridge foundations, cuttings, and potentially for cross-passages)	Chalk aquifer water abstraction	Water quantity - Water supply	Water resource for drinking water supply with published SPZ1	Very High	No construction works are carried out in vicinity of SPZ. Tunnel and cross passage construction techniques are developed to take into account measures to minimise dewatering requirements Any Chalk groundwater dewatering discharge returned to Chalk aquifer minimising changes to flow regime	Negligible	Neutral
			Water resource for licensed drinking water supply with nominal 50m SPZ1	High	No construction works are carried out in vicinity of SPZ1 Tunnel and cross passage construction techniques are developed to take into account measures to minimise dewatering requirements Chalk groundwater dewatering discharge returned to Chalk aquifer minimising changes to flow regime	Negligible	Neutral
Mobilisation of contaminants as a result of disturbance of contaminated ground or groundwater or dewatering	Principal Chalk aquifer	Water quality	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Chalk groundwater will be discharged to self-contained units with appropriate treatment facilities prior to any discharge to down hydraulic gradient aquifer minimising changes to flow regime	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Mobilisation of contaminants as a result of disturbance of contaminated ground or groundwater or dewatering	Springs	Water quality	Water resource supports a river ecosystem	High	Chalk groundwater will be discharged to self-contained units with appropriate treatment facilities prior to any discharge to down hydraulic gradient aquifer minimising changes to flow regime	Negligible	Neutral
	Chalk aquifer water abstraction	Water quality – water supply	Water resource for drinking water supply with published SPZ1	Very High	No construction works are carried out in vicinity of SPZ	Negligible	Neutral
			Water resource for licensed drinking water supply with nominal 50m SPZ1	High	Chalk groundwater will be discharged to self-contained units with appropriate treatment facilities prior to any discharge to down hydraulic gradient aquifer minimising changes to flow regime	Negligible	Neutral
Impact on groundwater quality from spillage of fuels, tunnel arisings water or other contaminating materials	Principal Chalk aquifer	Water quality	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Standard good practice measures are to be taken for storage and handling of potential pollutants to avoid occurrences this is outlined in the OEMP	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Impact on groundwater quality from spillage of fuels, tunnel arisings water or other contaminating materials	Springs	Water quality	Water resource supports a river ecosystem	Very High	Standard good practice measures are to be taken for storage and handling of potential pollutants to avoid occurrences this is outlined in the OEMP	Negligible	Neutral
	Chalk aquifer water abstraction	Water quality – water supply	Water resource for drinking water supply with published SPZ1	Very High	No construction works are carried out in vicinity of published SPZ	Negligible	Neutral
			Water resource for licensed drinking water supply with nominal 50m SPZ1	High	An exclusion zone is to be placed within 50m of all licensed water resources Standard good practice measures are to be taken for storage and handling of potential pollutants to avoid occurrences this is outlined in the OEMP	Negligible	Neutral
Release or leaching of substances used in construction of tunnel (e.g. cement/grout/phosphate)	Principal Chalk aquifer	Water quality	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Adoption of best practice construction methods and operational management to minimise impacts as outlined in OEMP Appro-priate substances to be used in agreement with the Environment Agency	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Release or leaching of substances used in construction of tunnel (e.g. cement/grout/phosphate)	Springs	Water quality	Water resource supports a river ecosystem	Very High	Adoption of best practice construction methods and operational management to minimise impacts as outlined in OEMP Appro-priate substances to be used in agreement with the Environment Agency	Negligible	Neutral
	Chalk aquifer water abstraction	Water quality	Water resource for drinking water supply with published SPZ1	Very High		Negligible	Neutral
		Water quality	Water resource for licensed drinking water supply with nominal 50m SPZ1	High		Negligible	Neutral
Temporary topographic changes as a result of the construction work (topsoil and chalk material stockpiles) may impact on the function of the floodplain by altering surface water flow paths and storage areas.	Floodplain (and overland flow routes)	Conveya nce of flow (fluvial and surface water flood risk)	Floodplain for River Avon and River Till and overland flow routes	Very High (conveyance and storage of low probability river flood events)	Adoption of best practice construction methods and operational management to minimise impacts as outlined in OEMP	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Permanent Construction Effects							
Less groundwater baseflow due to flow interference from tunnel and other underground structures (e.g. piers, foundations)	River Till	Water quantity	Designated SSSI/SAC	Very High	Design of scheme to avoid significant flow interference by minimising tunnel intersection with preferential flow zone between 69 and 73 m AOD.	Negligible	Neutral
Alteration to hydrological regime Alteration to floodplain connectivity Groundwater flooding liberation of unsaturated zone contamination and discharge to rivers		Water quality	WFD classification 'Good'	Very High	Water treated to appropriate standards before discharged to surface water or groundwater	Negligible	Neutral
Increase in peak flood level and / or decrease in storage from River Till viaduct and approach embankments	River Till and floodplain for River Till and overland flow routes	Conveyance of flow (fluvial and surface water flood risk)	Main River watercourse, floodplain and overland flow routes	Very High (owing to Areas of Flood Zone 3 along the course of the River Till and floodplain conveyance and storage of low probability river flood events and overland flow)	The proposed route crosses the River Till floodplain and the bridge crossing would be an open structure rather than an embankment structure. Watercourses are not planned to be diverted or amended to avoid loss of in-channel conveyance or storage.	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Less groundwater baseflow due to flow interference from tunnel and other underground structures (e.g. piers, foundations)	River Avon	Water quantity	Designated SSSI/SAC	Very High	Design of scheme to avoid significant flow interference by minimising tunnel intersection with preferential flow zone between 69 and 73 m AOD.	Negligible	Neutral
Alteration to hydrological regime Alteration to floodplain connectivity Groundwater flooding liberation of unsaturated zone contamination and discharge to rivers		Water quality	WFD classification 'Moderate'	Very High	Water treated to appropriate standards before discharge	Negligible	Neutral
Increase in peak flood level, impedance of fluvial and overland flow and reduction in fluvial and overland flow storage		Conveyance of flow (fluvial flood and surface water risk)	Main River watercourse, floodplain and overland flow paths	Very High (owing to Areas of Flood Zone 3 along the River Avon and floodplain conveyance and storage of low probability river flood events and overland flow))	No changes proposed to the structure of the bridge crossing the River Avon. Countess Roundabout modifications to incorporate flyover and closure of pedestrian subway incorporate sustainable highways drainage techniques to reflect existing greenfield runoff rates and provision of highway drainage attenuation basins Watercourses are not planned to be diverted or amended to avoid loss of in-channel conveyance or storage.	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Less baseflow and lowering of groundwater levels downstream of tunnel due to presence of flow interference from tunnel and other underground structures (e.g. piers, foundations) and any lowering of groundwater level at Portals	Principal Chalk aquifer	Water quantity	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Design of scheme to avoid significant flow interference by minimising tunnel intersection with preferential flow zone between 69 and 73 m AOD.	Negligible	Neutral
	Springs	Water quantity	Water resource supports a river ecosystem	High		Negligible	Neutral
	Blick Mead Historic site	Water quantity	Preservation of nationally significant archaeological site of high due to saturated water conditions.	Very High		Negligible	Neutral
	Chalk aquifer water abstraction	Water supply – water quantity	Water resource for drinking water supply within published SPZ1	Very High		Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Less baseflow and lowering of groundwater levels downstream of tunnel due to presence of flow interference from tunnel and other underground structures (e.g. piers, foundations) and any lowering of groundwater level at Portals	Chalk aquifer water abstraction	Water supply – water quantity	Water resource for licensed drinking water supply with nominal 50m SPZ1	High	Design of scheme to avoid significant flow interference by minimising tunnel intersection with preferential flow zone between 69 and 73 m AOD.	Negligible	Neutral
Contamination of aquifer through infiltration of storm water storage discharge	Principal Chalk Aquifer	Water quality	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Design of storage to incorporate pollutant capture and/or treatment and removal	Negligible	Neutral
Groundwater flooding liberation of unsaturated zone contamination					Design of scheme to avoid significant flow interference by minimising tunnel intersection with preferential flow zone between 69 and 73 m AOD.	Negligible	Neutral
Increase in impermeable area and discharge volume of highways drainage, which could increase flood risk	Floodplain (and overland flow routes)	Highways drainage	Floodplain for River Avon and River Till and overland flow routes	Very High (conveyance and storage of low probability river flood events and surface water)	The Scheme would be designed to reduce the risk of flooding from road drainage structures through sustain-able highways drainage techniques to reflect existing greenfield runoff rates. Provision of highway drainage attenuation basins	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Permanent topographic changes through tunnel excavated material deposition, landscape cutting, filling, re-soiling, and closure of private agricultural subway may impact on the function of the floodplain and surface water by altering flow paths.	Floodplain (and overland flow routes)	Conveyance of flow (fluvial and surface water flood risk)	Floodplain for River Avon and River Till and overland flow routes	Very High (conveyance and storage of low probability river flood events	The fluvial floodplain will not be impacted through mitigation in design. The primary overland flow routes that are impacted through topographic changes have been designed to minimise obstruction to overland flow conveyance. Drainage measures are also utilised to manage and discharge overland flows without increasing flood risk.	Negligible	Neutral
Impedance and change in river baseflow and surface water overland flow from increased groundwater flood risk (presence of the tunnel)	Floodplain (and overland flow routes)	Conveyance of flow (groundwater flood risk)	Presence of groundwater supported watercourses Possibility for groundwater flooding Groundwater interception by road structures, tunnel or drainage	Very High (owing to Areas of Flood Zone 3 and groundwater pathways to the Rivers Till and Avon)	Avoidance or minimising the need for long-term groundwater dewatering, culverting and diversion of watercourses and drains. Discharge of dewatered water where required will be balanced to greenfield runoff rates.	Negligible	Neutral
Changes in flow paths and storage from permanent facilities	Overland flow routes	Conveyance of flow (surface water flood risk)	Overland flow routes for surface water	Very High (conveyance and storage of surface water)	Avoidance of high risk flood zones and implementation of appropriate and sustainable drainage techniques balanced to greenfield runoff rates	Negligible	Neutral

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Changes in flow paths and storage from tunnel power supply facilities	River Avon, floodplain and overland flow routes	Conveyance of flow (surface water flood risk)	Floodplain for River Avon and overland flow routes	Very High (conveyance and storage of low probability river flood events and surface water)	The fluvial floodplain and overland flow paths should not be impacted through mitigation in design. The cable crossing would avoid impacts upon the river channel and overland flow paths, and would locate any pylons outside of Flood Zone 3 where practicable.	Negligible	Neutral

Table 3: Summary of non-significant effects – operation

Potential Impact	Receptor	Attribute	Quality	Receptor Importance	Design and Mitigation Measures	Magnitude	Residual effect
Increased pollution from road runoff Increased sediment transport	River Till	Water quality	WFD classification 'Good'	Very High	Control surface water runoff at its source through the use of sustainable highways drainage techniques to manage road runoff	Negligible	Neutral
Increased pollution from road runoff	Principal Aquifer	Water quality	Water resource used for water supply and supporting flow in rivers designated as SACs	Very High	Control surface water runoff at its source through the use of sustainable highways drainage techniques to manage road runoff	Negligible	Neutral

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