Southampton to London Pipeline Project

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Environmental Statement (Volume D)
Appendix 8.5: Potential Effects on Groundwater

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Contents

Appendix 8.5 Potential Effects on Groundwater

1.1 Construction

Table 8.5.1: Potential Significance of Effects for Interception of Shallow Groundwater in the Pipeline Trench

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Groundwater dependent terrestrial ecosystems (GWDTEs) with national or international designations and high or moderate groundwater dependency.	Bourley and Long Valley Site of Special Scientific Interest (SSSI) – southerly wet woodland sub-site	GWSA-C	High	Localised dewatering of the trench would drawdown water levels and could reduce discharge at the identified spring located downgradient of the Order Limits and supporting the wetland habitats. The resultant potential magnitude of change is considered to be **medium**.	Moderate
	Bourley and Long Valley SSSI – Wet Heathland sub-site			This sub-site is located up hydraulic gradient and distant from the Order Limits. As such, there would be no effect from any localised dewatering.	N/A
	Eelmoor Marsh SSSI			Groundwater levels are expected to be below the base of the trench such that no dewatering is anticipated to be required within the Order Limits. Additionally, the groundwater dependent parts of the site are remote from the trench. As such, there would be no effect.	N/A
	Colony Bog and Bagshot Heath SSSI – central sub-site			Groundwater levels are expected to be below the base of the trench such that no dewatering is anticipated to be required within the Order Limits. Additionally, the groundwater dependent parts of the site are remote from the trench. As such, there would be no effect.	N/A
	Colony Bog and Bagshot Heath SSSI – Turf Hill			The trench may intercept the water table. However, the Order Limits themselves do not pass through the areas of groundwater-dependent vegetation. As a result, the potential magnitude of change during construction is expected to be **negligible** on groundwater flow.	Minor

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Folly Bog – northeastern sub-site of Colony Bog and Bagshot Heath SSSI			Locally, dewatering may reduce groundwater levels in part of the site. This area may already be affected by the presence of drainage ditches. The resultant potential magnitude of change is considered to be **medium**.	Moderate
	Folly Bog – Mire sub-site			Local dewatering may be required along the Order Limits. However, water is derived some distance from the groundwater dependent vegetation away from the Order Limits, and as such, water levels are unlikely to be affected. The resultant potential magnitude is considered to be **negligible**.	Minor
GWDTEs with national or international designations and low groundwater dependency or non-statutory designations that have high or moderate groundwater dependency.	Peck Copse	GWSA-B	Medium	Localised dewatering of the trench may be required at the Order Limits, reducing the discharge at the identified springs located downgradient. The resultant potential magnitude is considered to be **small**.	Minor
	Ewshot Meadow	GWSA-C		Localised dewatering of the trench may be required at the Order Limits. However, the pipeline would be located some distance downgradient of potential groundwater discharges. The resultant potential magnitude is considered to be **small**.	Minor
	Bourley and Long Valley SSSI – southwest Order Limits and northeast Order Limits			Localised dewatering may be required in these sub-sites. However, low soil permeability means that the potential magnitude of change is expected to be **negligible**.	Negligible
	Cove Brook – Flood Storage Area sub-site			Minor localised dewatering effect may be expected resulting in a potential magnitude of change of **small**.	Minor
	Colony Bog and Bagshot Heath – West and North Order Limits sub-site			No dewatering is anticipated to be required within the Order Limits, resulting in no effect.	N/A

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Chobham Common – Order Limits excluding centre and northeast part			Minor localised dewatering effect may be expected resulting in an overall potential magnitude of change of **small**.	Minor
GWDTEs with non-statutory designations that have low groundwater dependency or non-designated sites with high or moderate groundwater dependency.	Durley Green Lane	GWSA-A	Low	Localised dewatering effect expected resulting in a potential magnitude of change of **medium**.	Minor
	Caker and Lavant Streams Floodplain	GWSA-B		Minor localised dewatering effect away from the main groundwater dependent habitats may be expected resulting in a potential magnitude of change of **small**.	Negligible
	Ashley Head Spring			Groundwater levels are expected to be below the base of the trench such that no dewatering is anticipated to be required within the Order Limits. Additionally, the groundwater dependent parts of the site are remote from the trench. As such, there would be no effect.	N/A
	Foxhills	GWSA-C		No dewatering is anticipated to be required within the Order Limits, whilst the groundwater dependent parts of the site are not down gradient of the Order Limits. As such, no impact is expected.	N/A
	Chertsey Meads	GWSA-D		Localised dewatering effect expected resulting in a potential magnitude of change of **small**.	Minor
	Wintershill Floodplain	GWSA-A	Negligible	Localised dewatering effect expected resulting in a potential magnitude of change of **medium**.	Minor
	Floodplain of River Wey	GWSA-B		Very localised dewatering may be needed along the short trench portion in the southwest corner of the site and the launch and reception point of the directional drilling. As such, the potential magnitude of change is assessed as **negligible**.	Negligible
	Blackwater Valley Frimley Green	GWSA-C		It is unclear whether the trench would intercept the water table, and therefore localised dewatering of the trench may be required at the Order Limits. This is	Negligible

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				likely to result in a very localised effect. The potential magnitude of effect is expected to be **negligible**.	
	Addlestone Moor	GWSA-D		Minor localised dewatering effect may be expected resulting in a potential magnitude of change of **small**.	Negligible
Shallow licensed and unlicensed groundwater supplies.	PW000033 (unlicensed)	GWSA-A	Low	Due to the relatively shallow depth of the trench and associated dewatering that would be required, any impacts on water levels and yields in the wells would be small. The private water supply (PWS) is located approximately 100m away from the Order Limits. Any impacts would be temporary for the duration of pumping. As such, the potential magnitude of change is considered to be **small**.	Minor
	Hawbridge Farm	GWSA-B		Due to the relatively shallow depth of the trench and associated dewatering that would be required, any impacts on water levels and yields in the wells would be small. The PWS is located approximately 110m away from the Order Limits. Any impacts would be temporary for the duration of pumping. As such, the potential magnitude of change is considered to be **small**.	Minor
	Oak Park Golf Club		High	46m deep abstraction well not at risk of potential shallow dewatering effects.	N/A
	Woodcock Lane	GWSA-C	High	40m deep abstraction well not at risk of potential shallow dewatering effects.	N/A
	Shepperton Lane, Laleham - Borehole B Shepperton Lane, Laleham - Wet Pit C Littleton Lane, Shepperton- Point A Point B, Gravel Pit at Littleton Lane,	GWSA-D	High	15m to 110m deep abstraction wells not at risk of potential shallow dewatering effects.	N/A

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Point A, Gravel Pit at Littleton Lane, Gravels at Ashford Road Laleham Staines				
	Highlands (P3100004) Delicia (P3100005)		Low	Due to the relatively shallow depth of the trench and associated dewatering that would be required, any impacts on water levels and yields in the wells would be small. The PWSs are located approximately 160m and 220m away from the Order Limits. Any impacts would be temporary for the duration of pumping. As such, the potential magnitude of change is considered to be **negligible**.	Negligible
Where the pipeline runs parallel to watercourses which may be fed by shallow groundwater.	Unnamed watercourse 44 (Main River) at Frimley	GWSA-C	Medium	An assessment of the connection of the identified watercourses and groundwater has identified that there is moderate connection between the two. Given the flow rates of the water courses, length of trench that runs particularly close to the water course and likely dewatering rates from the trench, a degree of impact on flow in the river would be expected. However, the implementation of good practice measure G132 would keep potential effects to a minimum. As such, the potential magnitude of change is considered to be **small**.	Minor
	River Ash	GWSA-D	Medium	An assessment of the connection of the identified watercourses and groundwater has identified that there is moderate connection between the two. Given the flow rates of the water courses, length of trench that runs particularly close to the water course and likely dewatering rates from the trench, any impacts on flow in the river would be small. Any impacts would be temporary for the duration of pumping as the pipe is laid (G132). As such, the potential magnitude of change is considered to be **small**.	Minor

Receptor Group	Potential Receptor	Groundwater Study Area (GWSA)	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	River Thames	GWSA-D	High	An assessment of the connection of the River Thames and groundwater in the vicinity of Chertsey has identified that there is limited connection between the two. Given the flow rates of the River Thames, distance of trench from the river and likely dewatering rates from the trench, any impacts on flow in the river would be negligible. Any impacts would be temporary for the duration of pumping as the pipe is laid (G132). As such, the potential magnitude of change is considered to be **negligible**.	Negligible

Table 8.5.2: Potential Significance of Effects for Interception of Shallow Groundwater in the Pipeline Trench Leading to Groundwater of Poor Quality Discharging to Sensitive Receptors

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Surface waters within GWSA-D and GWSA-A where the watercourse is crossed by an open trench.	Ordinary watercourse at Wintershill	GWSA-A	Low	Groundwater monitoring as part of the ground investigation has identified elevated sulphate and chloride concentrations in shallow groundwater at this location where the watercourse would be crossed using open cut techniques. Good practice measure G71 would provide a better understanding of the potential impact risks in this area. The potential magnitude of change is considered to be **large**.	Moderate
	No trench crossing through river receptor	GWSA-D	N/A	All river crossings would be trenchless	N/A
GWDTE within GWSA-D and GWSA-A	Ford Lake Valley	GWSA-A	Medium	At Ford Lake Valley, the design is for the pipeline to be tunnelled beneath the GWDTE. As such, no impact is expected on the GWDTE.	N/A
	Durley Green Lane	GWSA-A	Low	For Durley Green Lane, the flood susceptibility map shows groundwater within the Order Limits has limited potential for groundwater flooding to occur, suggesting relatively deep groundwater which would not be	N/A

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				intercepted by the trench. As a consequence, and despite the GWDTE's rural location, contaminated groundwater from anthropogenic sources is unlikely. No impact is expected.	
	Chertsey Meads	GWSA-D	Low	At Chertsey Meads, the flood susceptibility map shows groundwater adjacent to the GWDTE has potential for groundwater flooding of below surface structures and the ground investigation and British Geological Survey borehole logs show shallow groundwater. Given the largely urbanised nature of the area, groundwater may be impacted. The potential magnitude of change is considered to be **medium**.	Minor
	Dumsey Meadow SSSI	GWSA-D	High (for low lying areas of the SSSI)	At Dumsey Meadow, the flood susceptibility map shows groundwater adjacent to the GWDTE has potential for groundwater flooding of below surface structures. Given the largely urbanised nature of the area, groundwater may be impacted. The Order Limits only intercept a very small part of Dumsey Meadow and the potential magnitude of change is considered to be **small**.	Minor
Licensed abstractions within GWSA-D (there are no licenced abstractions within GWSA-A)	Shepperton Lane, Laleham - Borehole B Shepperton Lane, Laleham - Wet Pit C Well 'A' at Laleham Road, Shepperton Littleton Lane, Shepperton- Point A Point B, Gravel Pit at Littleton Lane, Shepperton, Middlesex Point A, Gravel Pit at Littleton Lane, Shepperton, Middlesex	GWSA-D	High	These abstractions are located in an area identified as having the potential for groundwater flooding at the surface and of below surface structures. As such, shallow groundwater is likely to be present. Given the largely urbanised nature of the area and presence of landfills, groundwater is also likely to be impacted as has been identified in boreholes installed as part of the ground investigation. However, these abstractions are located in the area where contamination is likely to be widespread, and changes to groundwater quality due to discharges along the trench are unlikely to change the groundwater quality for these abstractions. As such, the potential magnitude of change is considered to be **small**.	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Mayfield Farm, Staines Road, Bedfont (Well) Gravels at Ashford Road Laleham Staines				
Unlicensed PWSs within 250m of the Order Limits within GWSA-D	Highlands Delicia	GWSA-D	Low	At the location of these two abstractions, the groundwater flood susceptibility map shows groundwater within the Order Limits has limited potential for groundwater flooding to occur, suggesting relatively deep groundwater which would not be intercepted by the trench. As such, the potential magnitude of change on water quality is considered to be **negligible**.	Negligible

Table 8.5.3: Potential Significance of Effects for Changes to Groundwater Levels and Groundwater Flow Direction Caused by Temporary Groundwater Dewatering Activities During Construction of Shafts at Trenchless Crossings

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
GWDTE in the vicinity of dewatering activities for auger bore trenchless crossings.	Blackwater Valley, Frimley Hatches (TC 020)	GWSA-C	Medium	Drawdowns within the GWDTE are expected to be limited and temporary, with the silty surface layers of the wetland limiting the effects. The potential magnitude of change is considered to be **small**.	Minor
	Ively Road (Golf Course) (TC 014)	GWSA-C	Negligible	The groundwater dependency for this GWDTE is considered to be negligible as this area is not groundwater dependent. Therefore, dewatering would not have any effect on the site.	N/A
Watercourses in the vicinity of dewatering activities for auger bore trenchless crossings.	Unnamed surface water flowing into Cove Brook (TC 014); Unnamed standing and flowing water bodies (TC 020);	GWSA-C	Low	Drawdowns due to the dewatering are relatively small and would be temporary. As such, the potential magnitude of change is considered to be **medium** to **small** depending on distance to dewatering pit.	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Three drains, small unnamed surface water body (TC 031)				
	Unnamed surface water body (TC 036) Intake Channel, Unnamed surface water body (TC 037) Two unnamed surface water bodies (TC 041).	GWSA-D			
	River Blackwater (TC 020)	GWSA-C	Medium	Drawdowns due to the dewatering are relatively small and would be temporary, and pumping rates would be relatively small compared with the flow in the river at this point. As such, the potential magnitude of change is considered to be **small**.	Minor
Buildings and key infrastructure in the vicinity of dewatering activities for auger bore trenchless crossings	TC 015: Residential properties along Nash Close Railway	GWSA-C	Medium	Identified buildings and key infrastructure are within the radius of influence for dewatering activities. No assessment has been made to determine the foundation type of the buildings which may be affected and whether the buildings are founded on superficial or bedrock deposits. The maximum drawdown for all abstractions at the abstraction point has been determined to be relatively small (up to 4.5m). As a worst case scenario, the potential magnitude of change is determined to be **medium**.	Moderate
	TC 020: Residential roads and properties, Retail park	GWSA-C	High		Moderate
	TC 023: Residential and farm properties	GWSA-C	Medium		Moderate
	TC 031: Residential properties	GWSA-C	Medium		Moderate
	TC 032: Chertsey High School buildings Jubilee Church	GWSA-D	High		Moderate

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	TC 032: Residential properties	GWSA-D	Medium		Moderate
	TC 036: Unidentified buildings (unlabelled on OS maps)	GWSA-D	Medium		Moderate
	TC 037: Unidentified buildings (unlabelled on OS maps)	GWSA-D	Medium		Moderate
	TC 040: Educational facilities Commercial properties Railway	GWSA-D	High		Moderate
	TC 041: Railway	GWSA-D	High		Moderate
	TC 042: Residential properties	GWSA-D	Medium		Moderate
Listed buildings and scheduled monuments in the vicinity of dewatering activities for auger bore trenchless crossings	TC 023: Steep Acre Farm, Grade II Listed	GWSA-C	Medium	The identified building is within the radius of influence for dewatering activities. No assessment has been made to determine the foundation type of the buildings which may be affected and whether the buildings are founded on superficial or bedrock deposits. The maximum drawdown at the abstraction point has been determined to be relatively small (up to 4.5m). As a worst case scenario, the potential magnitude of change is determined to be **medium**.	Moderate

Table 8.5.4: Potential Significance of Effects Where Surface Water Drainage or Abstracted Groundwater is Discharged to Ground which Could Result in Changes to Groundwater Quality

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Surface water drainage discharges to ground					
Aquifers	Chalk Principal aquifer at the following Eastings and Northings: 458032, 122403; 458348, 122635; 463965, 128771; 465720, 130223; 467329, 132958; and 480207, 148400.	GWSA-B	High	Surface drainage water would need to be discharged to ground where there is potential that fractures could be present in the Chalk, with potential for rapid transport of any contaminants. Dissolved substances in the discharge are likely to be similar to the natural rainfall recharge to ground. Sediment in the drainage would be removed as part of the drainage design and the potential magnitude of change would be **small**.	Minor
	Camberley Sand Formation Secondary A aquifer at: 482238, 152160 489138, 158157	GWSA-C	Medium	Dissolved substances in the discharge are likely to be similar to the natural recharge to ground. Sediment in the drainage would be removed as part of the drainage design and the filtering effect of the sand deposits would further reduce sediment transport. The potential magnitude of change would be **negligible**.	Negligible
Discharge of groundwater abstracted for trenchless crossings					
Aquifers	Groundwater in Secondary A aquifers at the following crossings: TC 014; TC 015; TC 020; TC 021; TC 023; and TC 031.	GWSA-C	Medium	As these abstraction points are within heavily urbanised areas, the abstracted groundwater may potentially be contaminated. To reduce the effects of the discharge of poor quality dewatering water reaching groundwater, good practice measure G143 conveys that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	Negligible
	Groundwater in superficial Principal	GWSA-D	High	As these abstraction points are within urbanised areas where monitoring has shown there to be groundwater	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	gravel aquifers at the following crossings: TC 032; TC 036; TC 037; TC 040; TC 041; and TC 042.			impact, the abstracted groundwater may potentially be contaminated. To reduce the effects of the discharge of poor quality dewatering water reaching groundwater, good practice measure G143 conveys that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	
Discharge of groundwater abstracted from the pipeline trench to allow the pipe to be laid					
Aquifers	Groundwater in superficial and bedrock Secondary A aquifers at the following locations: Ford Lake Valley; and Wintershill to the west of Bishop's Waltham.	GWSA-A	Medium	The areas of high groundwater levels are in rural areas where groundwater quality is likely to be of good quality. To reduce the effects of the discharge of poor quality dewatering water reaching groundwater, good practice measure G143 conveys that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	Negligible
	Groundwater in the bedrock Principal Chalk aquifer at the following locations: in the vicinity of the A272 to the east of Bramdean; in the vicinity of the A32 to the east of Chawton; to the east and northeast of Alton in the Wey Valley; and In the vicinity of Crondall	GWSA-B	High	The areas of high groundwater levels are in rural areas where groundwater quality is likely to be of good quality. To reduce the effects of the discharge of poor quality dewatering water reaching groundwater, good practice measure G143 states that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	Negligible
	Groundwater in superficial and bedrock	GWSA-C	Medium	The areas of high groundwater levels are largely in rural areas where groundwater quality is likely to be of good quality. To reduce the effects of the discharge of	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Secondary A aquifers at the following locations: in the vicinity of Folly Bog; at the crossing of the Hale Borne to the north of West End; in the vicinity of Windlesham Road and the B383 to the northwest of Chobham; and at Chobham Common SSSI.			poor quality dewatering water reaching groundwater, good practice measure G143 states that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	
	Groundwater in the superficial Principal gravel aquifer over most of GWSA-D.	GWSA-D	High	As GWSA-D is within urbanised areas where monitoring has shown there to be groundwater impact, abstracted groundwater may potentially be contaminated. To reduce the effects of the discharge of poor quality dewatering water reaching groundwater, good practice measure G143 states that water quality would be tested prior to discharge. If water is of unsuitable quality, then treatment or alternative disposal would be required. The potential magnitude of change is considered to be **negligible**.	Minor

Table 8.5.5: Potential Significance of Effects Where Surface Water Drainage or Abstracted Groundwater is Discharged to Ground which Could Cause the Groundwater Level to Locally Rise

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Surface water drainage discharges to ground					
Aquifers	Chalk Principal aquifer at:	GWSA-B	High	Shallow groundwater is identified at these locations where discharges to ground could potentially alter	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	458032, 122403; 458348, 122635; and 480207, 148400.			these levels and lead to changes in groundwater flow direction. However, as groundwater would be abstracted from the same aquifer, the net change of groundwater in the aquifer would be negligible. The potential magnitude of change is considered to be **small**.	
	Chalk Principal aquifer at: 463965, 128771; 465720, 130223; and 467329, 132958.			Deep groundwater is identified at these locations where discharges to ground are unlikely to cause a substantial rise in groundwater levels close to the surface. The potential magnitude of change is considered to be **negligible**.	Negligible
	Camberley Sand Formation Secondary A aquifer at: 482238, 152160 489138, 158157	GWSA-B	Medium	Deep groundwater is identified at these locations where discharges to ground are unlikely to cause a substantial rise in groundwater levels close to the surface. The potential magnitude of change is considered to be **negligible**.	Negligible
Discharge of groundwater abstracted for trenchless crossings					
Aquifers	Groundwater in Secondary A aquifers at the following crossings: TC 014; TC 015; TC 020; TC 021; TC 023; and TC 031.	GWSA-C	Medium	Shallow groundwater is identified at these locations where discharges to ground could potentially alter these levels and lead to changes in groundwater flow direction. However, as groundwater would be abstracted from the same aquifer, the net change of groundwater in the aquifer would be negligible. The potential magnitude of change is considered to be **small**.	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Groundwater in superficial Principal gravel aquifers at the following crossings: TC 032; TC 036; TC 037; TC 040; TC 041; and TC 042.	GWSA-D	High		Minor
Discharge of groundwater abstracted from the pipeline trench to allow the pipe to be laid					
	Groundwater in superficial and bedrock Secondary A aquifers at the following locations: Ford Lake Valley; and Wintershill to the west of Bishop's Waltham.	GWSA-A	Medium	The drawdown needed to maintain a dry working trench would be relatively small as the trench would typically only be 1.5m deep. Consequently, the volumes of groundwater abstracted and requiring discharge back to ground would be small. Furthermore, dewatering of the trench would only occur for a relatively short time whilst the pipe is actually being laid. As such, the potential magnitude of change would be **small**.	Minor
	Groundwater in the bedrock Principal Chalk aquifer at the following locations: in the vicinity of the A272 to the east of Bramdean; in the vicinity of the A32 to the east of Chawton; to the east and northeast of Alton in the Wey Valley; and In the vicinity of Crondall	GWSA-B	High		Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Groundwater in superficial and bedrock Secondary A aquifers at the following locations: in the vicinity of Folly Bog; at the crossing of the Hale Borne to the north of West End; in the vicinity of Windlesham Road and the B383 to the northwest of Chobham; and at Chobham Common SSSI.	GWSA-C	Medium		Minor
	Groundwater in the superficial Principal gravel aquifer over most of GWSA-D.	GWSA-D	High		Minor

Table 8.5.6: Potential Significance of Effects for Changes to Groundwater Quality from Releases from Chemicals, Fuels and Oils from Construction Plant or Materials Used in the Installation of the Pipeline

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Where trenches pass through GWDTE	Ford Lake Valley	GWSA-A	Medium	Given the good practice measures set out in the Register of Environmental Actions and Commitments (REAC; in Chapter 16 Environmental Management and Mitigation) (G1, G130, G121, G142 and G122), the potential magnitude of change is considered to be at most **small**.	Minor
	Durley Green Lane		Low		Minor
	Wintershill Floodplain		Negligible		Negligible
	Peck Copse	GWSA-B	Medium		Minor
	Caker and Lavant Streams Floodplain		Low		Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Floodplain of River Wey		Negligible		Negligible
	Ashley Head Spring		Low		Minor
	Ewshot Meadows	GWSA-C	Medium		Minor
	Bourley and Long Valley SSSI – southerly wet woodland sub-site		High		Minor
	Bourley and Long Valley SSSI – southeast Order Limits, northwest Order Limits and Gelvert Stream Floodplain sub-sites		Medium		Minor
	Eelmoor Marsh SSSI		High		Minor
	Cove Brook and Ively Road – Flood Storage Area sub-site		Medium		Minor
	Cove Brook and Ively Road – Golf course sub-site		Negligible		Negligible
	Blackwater Valley Frimley Hatches		Medium		Minor
	Colony Bog and Bagshot Heath SSSI – Central sub-site		High		Minor
	Colony Bog – Order Limits		Medium		Minor
	Folly Bog – Northeastern sub-site of Colony Bog and Bagshot Heath SSSI		High		Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Folly Bog – Mire sub-site		High		Minor
	Chobham Common SSSI – Centre and the northeast part of the Order Limits and trenchless crossings		High		Minor
	Chobham Common – Order Limits excluding centre and northeast part		Medium		Minor
	Foxhills		Low		Negligible
	Addlestone Moor	GWSA-D	Negligible		Negligible
	Chertsey Meads		Low		Negligible
	Dumsey Meadow – Hollows sub-site		High		Minor
	Bourley and Long Valley SSSI – wet heathlands sub-site	GWSA-C	High	This sub-site is located away from the Order Limits up hydraulic gradient. In the unlikely event of a spillage, contamination would not reach this sub-site. As such, there would be no effect.	N/A
Groundwater quality for licensed abstractions with Source Protection Zones (SPZs)	Northbrook SPZ2 New Alresford Watercress Beds SPZ2	GWSA-B	Medium	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Northbrook and New Alresford Watercress Beds. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Selborne Road SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to high for Selborne Road. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Lower Upham SPZ3 Twyford SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is low to moderate for Lower Upham and low for Twyford. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Windmill Hill SPZ3 Boxalls Lane Pumping Station SPZ3 Itchel Pumping Station SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Windhill Hill, Itchel Pumping Station and Boxalls Lane Pumping Station. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Chertsey SPZ2	GWSA-D	Medium	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Chertsey. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Minor
Groundwater quality of licensed PWSs with no SPZs	Oak Park Golf Course	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Oak Park Golf Course. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Lomer Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Lomer Farm. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Bigpath Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				combined pathway and infiltration risk is moderate to high for Bigpath Farm. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	
	Manor Farms Wood Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Manor and Wood Farms. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Stanmore Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to low for Stanmore Farm. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Belmore House	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is low for Belmore House. Taking into account good practice	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	
	Bramdean Wheely Farm Brockwood Park Brockwood Park Estate	GWSA-B	Low	Appendix 8.4 Groundwater Abstraction Assessment concludes there is no potential flow pathway from the pipeline and the supplies. Therefore, no effect is expected.	N/A
	Woodcock Lane	GWSA-C	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Woodcock Lane. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Foxhills Golf Course	GWSA-C	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is negligible for Foxhill Golf Course. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Shepperton Lane Wet Pit C Littleton Gravel Pit A Littleton Gravel Pit B Gravels at Ashford Road Littleton Lane Point A	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for these supplies. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Shepperton Lane B	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Shepperton Lane B. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on this supply.	Negligible
	Mayfield Farm Well A Laleham Road	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is low for Mayfield Farm and Well A Laleham Road. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Groundwater quality of unlicensed small scale PWSs	Greywood (PW000033) Netherhills (PW000034, PW000035, PW000036, PW000037)	GWSA-A	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Greywood and moderate to low for Netherhills. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Joan's Acre Hawbridge Farm Wolfhanger Farm (PW000191)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Joan's Acre and Hawbridge and Wolfhanger Farms. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Blackhouse Farm (PW000021) Beech Farm (LP1110)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Blackhouse and Beech Farms. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Betty Mundy's Cottage (PW000202) Parsonage Farm (PW000092)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to high for Betty Mundy's Cottage and Parsonage Farm. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Rooksgrove Farm (PW000111)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Rooksgrove Farm. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible
	Highlands (P3100004) Delicia (P3100005)	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Highlands and Delicia. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of occurrence of pollution incidents during construction is considered to be very low. In addition, the good practice measure G179 (Emergency Action Plan) provides additional protection. For these reasons, the potential magnitude of change is assessed as **negligible** on these supplies.	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Unknown PWS at the time of writing in close proximity of the pipeline	All	Low	Other PWS, unknown at the time of writing, may be directly or indirectly impacted by the installation of the pipeline. As part of good practice measure G144, active PWS within the Order Limits would be identified through landowner discussions. Taking into account good practice measures in the REAC (G1, G130, G121, G142 and G122), the likelihood of pollution incidents during construction is considered to be very low. However, the non-identification of some PWS would render the implementation of Emergency Action Plan measure G179 as potentially incomplete. As a result, the potential magnitude of change could range from **medium** to **negligible**, depending on the location of other PWS located outside the Order Limits.	Moderate to negligible

1.2 Operation

Table 8.5.7: Potential Significance of Effects due to Changes to Groundwater Flow Direction due to the Below Ground Pipeline

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
GWDTE	Ford Lake Valley	GWSA-A	Medium	Trenchless horizontal directional drilling (HDD) crossing throughout the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little. On this basis, a potential magnitude of change of **negligible** is attributed.	Negligible
	Durley Green Lane		Low	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Where the pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **small**.	Minor
	Wintershill Floodplain		Negligible	The design measure of stanks at right angles to the pipeline direction would prevent the movement of	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				groundwater through the pipe trench. Where the pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **small**.	
	Peck Copse	GWSA-B	Medium	Groundwater is expected to be below the depth of the pipeline for the majority of the time. The design measure of stanks vertical to the pipeline direction would prevent movement of groundwater through the pipe trench and away from the site. The potential magnitude of change is considered to be **negligible**.	Negligible
	Caker and Lavant Streams Floodplain		Low	Groundwater may be below the depth of the pipeline for some of the time, and there would be no effect when this is the case. The design measure of stanks at right angles to the pipeline direction would prevent movement of groundwater through the pipe trench and away from the site. The potential magnitude of change is considered to be **negligible**.	Negligible
	Floodplain of River Wey		Negligible	Trenchless HDD crossing throughout the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little. On this basis, a potential magnitude of change of **negligible** is attributed.	Negligible
	Ashley Head Spring		Low	Groundwater is not expected to be intercepted. As a consequence, no change is expected.	N/A
	Ewshot Meadows	GWSA-C	Medium	The pipeline would be installed downgradient of the groundwater dependent features at the site. There is uncertainty as to how deep groundwater would be at the point where the pipe passes through the site and whether the pipe would be below the water table. The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. The potential magnitude of change is assessed as **small**.	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Bourley and Long Valley SSSI – southerly wet woodland sub-site		High	The pipeline may be installed below the water table and has the potential to divert groundwater away from groundwater dependent parts of the site. The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. In addition, the commitment to good practice measure (G199) will identify specific areas in the vicinity of GWDTEs where increased frequency of stanks would be required to safeguard sensitive habitats which depend on groundwater. The potential magnitude of change is assessed as **negligible.**	Minor
	Bourley and Long Valley SSSI – wet heathlands sub-site		High	This sub-site is located up hydraulic gradient and distant from the Order Limits, and as such, there would be no effect from any changes to flow direction in the groundwater.	N/A
	Bourley and Long Valley SSSI – Gelvert Stream Floodplain sub-site		Medium	Trenchless HDD crossing throughout the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little. On this basis, a potential magnitude of change of **negligible** is attributed.	Negligible
	Bourley and Long Valley SSSI – southwest and northeast Order Limits sub-sites		Medium	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Where the pipeline potentially goes through shallow groundwater within the GWDTE, no change is expected to groundwater flow.	N/A
	Eelmoor Marsh SSSI		High	Groundwater is not anticipated to be present at the depth of the pipeline. As such, there would be no effect on groundwater flow direction to the groundwater dependent parts of the site.	N/A
	Cove Brook and Ively Road – Flood Storage Area sub-site		Medium	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Where the	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **negligible**.	
	Cove Brook and Ively Road – Golf course sub-site		Negligible	Groundwater is not anticipated to be present at the depth of the pipeline. As such, there would be no effect on groundwater flow direction to the groundwater dependent parts of the site.	N/A
	Blackwater Valley Frimley Hatches		Medium	Trenchless augur bore crossing throughout most of the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little.	N/A
	Blackwater Valley Frimley Green		Negligible	Groundwater may be at the level of the pipeline part of the time. The potential magnitude of change is assessed as **negligible**.	Negligible
	Colony Bog and Bagshot Heath SSSI – centre of the site		High	Groundwater is not anticipated to be present at the depth of the pipeline. As such, there would be no effect on groundwater flow direction to the groundwater dependent parts of the site.	N/A
	Colony Bog and Bagshot Heath SSSI – Turf Hill		High	Groundwater may be at the level of the pipeline part of the time. The potential magnitude of change is assessed as **negligible**.	Minor
	Colony Bog and Bagshot Heath SSSI – West and North Order Limits		Medium	Groundwater is not anticipated to be present at the depth of the pipeline. As such, there would be no effect on groundwater flow direction.	N/A
	Folly Bog – northeastern sub-site of Colony Bog and Bagshot Heath SSSI		High	The pipeline would be installed below the water table and has the potential to divert groundwater away from groundwater dependent parts of the site. The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. In addition, the commitment to good practice measure (G199) will identify specific areas in the vicinity of GWDTEs where increased	Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				frequency of stanks would be required to safeguard sensitive habitats which depend on groundwater. The potential magnitude of change is assessed as **small**.	
	Folly Bog – Mire sub-site		High	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Water is derived some distance from the groundwater dependent vegetation, and as such, water levels are unlikely to be affected. On this basis, a potential magnitude of change of **negligible** is attributed.	Negligible
	Chobham Common SSSI – Centre and the northeast part of the Order Limits and trenchless crossings		High	Trenchless HDD crossing through this part of the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little. On this basis, a potential magnitude of change of **negligible** is attributed.	Minor
	Chobham Common – Order Limits excluding centre and northeast part		Medium	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench.. Where the pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **negligible**.	Negligible
	Foxhills		Low	The pipeline is expected to be continuously above the water table. As a result, no change to groundwater flow is expected.	N/A
	Addlestone Moor	GWSA-D	Negligible	The pipeline is expected to be above the water table through most of the site. The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Where the pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **small**.	Negligible
	Chertsey Meads		Low	The design measure of stanks at right angles to the pipeline direction would prevent the movement of groundwater through the pipe trench. Where the	N/A

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				pipeline potentially goes through shallow groundwater within the GWDTE, the potential magnitude of change is considered to be **negligible**.	
	Dumsey Meadow – Hollows sub-site		High	Trenchless HDD crossing throughout the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered.	Negligible
GWDTE	Dumsey Meadow – High ground		Medium	Trenchless HDD crossing throughout the site means that the pipeline would be deeper and sub-surface flows are not expected to be altered, or very little. On this basis, a potential magnitude of change of **negligible** is attributed.	Negligible

Table 8.5.8: Potential Significance of Effects for Changes to Groundwater Quality due to Releases of Aviation Fuel from the Pipeline

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
Principal aquifers and associated secondary receptors	Chalk (excluding the confined Chalk aquifer)	GWSA-B	High	Within GWSA-B, there is potential for rapid transport of contaminants in the Chalk due to fracture flow. However, the scale of the Chalk aquifer is such that, taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, a leak is considered to have a **negligible** potential magnitude at the scale of the aquifer.	Minor
	Thames Gravels	GWSA-D	High	Within GWSA-D, there is potential for fast transport of contaminants due to the high permeability of the gravel deposits. However, attenuation of contaminants in a gravel aquifer would be higher than for an aquifer with fracture flow. In addition, taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, a leak is considered to have a **negligible** potential magnitude at the scale of the aquifer.	Minor
Secondary A aquifers	Wittering Formation	GWSA-A	Medium		Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Whitecliff Sand Member Durley Sand Member Lambeth Group			For Secondary A aquifers, there is potential for moderate rates of movement and transport of contaminants due to the moderate permeability of the deposits with the potential for higher attenuation of contaminants. In addition, taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, a leak is considered to have a **negligible** potential magnitude at the scale of the aquifer.	
	Lambeth Group Bagshot Formation Windlesham Formation Camberley Sand Formation	GWSA-C			
	Bagshot Formation Claygate Member	GWSA-D			
	Superficial Secondary A aquifers	GWSA-A GWSA-B GWSA-C GWSA-D			
Groundwater quality for licensed abstractions with SPZs	Northbrook SPZ2 New Alresford Watercress Beds SPZ2	GWSA-B	Medium	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Northbrook and. New Alresford Watercress Beds. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Minor
	Selborne Road SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to high for Selborne Road. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Lower Upham SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Twyford SPZ3			combined pathway and infiltration risk is low to moderate for Lower Upham and low for Twyford. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	
	Windmill Hill SPZ3 Boxalls Lane Pumping Station SPZ3 Itchel Pumping Station SPZ3	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Windhill Hill, Itchels Pumping Station and Boxalls Lane Pumping Station. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Chertsey SPZ2	GWSA-D	Medium	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Chertsey. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Minor
Groundwater quality of licensed PWSs with no SPZs	Oak Park Golf Course	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Oak Park Golf Course. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Lomer Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Lomer	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				Farm. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	
	Bigpath Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to high for Bigpath Farm. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Manor Farms Wood Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Manor and Wood Farms. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Stanmore Farm	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to low for Stanmore Farm Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Belmore House	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is low for Belmore House. Taking into embedded design measures (in particular O8, O9, O10 and a pipe wall	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	
	Bramdean Wheely Farm Brockwood Park Brockwood Park Estate	GWSA-B	Low	Appendix 8.4 Groundwater Abstraction Assessment concludes there is no potential flow pathway from the pipeline and the supplies. Therefore, no effect is expected.	N/A
	Woodcock Lane	GWSA-C	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Woodcock Lane. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Foxhills Golf Course	GWSA-C	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is negligible for Foxhills Golf Course. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	Negligible
	Shepperton Lane Wet Pit C Littleton Gravel Pit A Littleton Gravel Pit B Gravels at Ashford Road Littleton Lane Point A	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for these supplies. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Shepperton Lane B	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				Shepperton Lane B. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on this supply.	
	Mayfield Farm Well A Laleham Road	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is low for Mayfield Farm and Well A Laleham Road. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
Groundwater quality of unlicensed small scale PWSs	Greywood (PW000033) Netherhills (PW000034, PW000035, PW000036, PW000037)	GWSA-A	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Greywood and moderate to low for Netherhills. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Joan's Acre Hawbridge Farm Wolfhanger Farm (PW000191)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is very high for Joan's Acre and Hawbridge and Wolfhanger Farms. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Blackhouse Farm (PW000021) Beech Farm (LP1110)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Blackhouse and Beech Farms. Taking into account embedded design measures (in particular O8, O9, O10	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	
	Betty Munday's Cottage (PW000202) Parsonage Farm (PW000092)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate to high for Betty Munday's Cottage and Parsonage Farm. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Rooksgrove Farm (PW000111)	GWSA-B	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is moderate for Rooksgrove Farm. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Highlands (P3100004) Delicia (P3100005)	GWSA-D	Low	From a scale of very high to low, Appendix 8.4 Groundwater Abstraction Assessment concludes the combined pathway and infiltration risk is high for Highlands and Delicia. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change on these supplies.	Negligible
	Unknown PWS at the time of writing	All	Low	Other PWS, unknown at the time of writing, may be directly or indirectly impacted by the installation of the pipeline. As part of good practice measure G144, active PWS within the Order Limits would be identified through landowner discussions. Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm), the likelihood of	Negligible

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
				pollution incidents during operation is considered to be very low. As a result, the potential magnitude of change is considered **negligible** on PWS unknown at the time of writing.	
Groundwater quality associated with GWDTEs	Ford Lake Valley	GWSA-A	Medium	Taking into account embedded design measures (in particular O8, O9, O10 and a pipe wall thickness of 11.9mm) and a very low likelihood of occurrence, this is considered to result in a **negligible** change.	Minor
	Durley Green Lane		Low		Negligible
	Wintershill Floodplain		Negligible		Negligible
	Peck Copse	GWSA-B	Medium		Minor
	Caker and Lavant Streams Floodplain		Low		Negligible
	Floodplain of River Wey		Negligible		Negligible
	Ashley Head Spring		Low		Negligible
	Ewshot Meadows	GWSA-C	Medium		Minor
	Bourley and Long Valley SSSI – southerly wet woodland sub-site		High		Minor
	Bourley and Long Valley SSSI – southeast Order Limits, northwest Order Limits and Gelvert Stream Floodplain sub-sites		Medium		Minor
	Eelmoor Marsh SSSI		High		Minor
	Cove Brook and Ively Road – Flood Storage Area sub-site		Medium		Minor
	Cove Brook and Ively Road – Golf course sub-site		Negligible		Negligible
	Blackwater Valley Frimley Hatches		Medium		Minor

Receptor Group	Potential Receptor	GWSA	Value of Receptor(s)	Potential Magnitude of Change	Potential Significance of Effect
	Colony Bog and Bagshot Heath SSSI – Central sub-site		High		Minor
	Colony Bog and Bagshot Heath SSSI – Order Limits		Medium		Minor
	Folly Bog – Northeastern sub-site of Colony Bog and Bagshot Heath SSSI		High		Minor
	Folly Bog – Mire sub-site		High		Minor
	Chobham Common SSSI – Centre and the northeast part of the Order Limits and trenchless crossings		High		Minor
	Chobham Common – Order Limits excluding centre and northeast part		Medium		Minor
	Foxhills		Low		Minor
	Addlestone Moor	GWSA-D	Negligible		Negligible
	Chertsey Meads		Low		Negligible
	Dumsey Meadow – Hollows sub-site		High		Minor