## Appendix 1 Individual A3 summary Sheets

## Table A1 List of SS/WVRVP24 options for which an a3 INNS Assessment has been completed and included within this appendix.

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Scheme Reference	Opti	Source Type	- BAG Score		Maior	
2.1.1.1	40 Ml/d new sw abst R.	Trent to Blithfield Reservoir.	Surface water	KAG Score		Major
Option Description				Construction required	d	Yes
Blithfield reservoir is the primary source and Tad Brook. Output at Seedy Mill WT	of raw water for Seedy Mill WTW. Blithfield	I reservoir has a capacity of approximately 18, water availability and this option seeks to pro	200 MI and sources water from the River Blithe mote an alternative source of raw water into the	Raw Water Transfer?	?	Yes
reservoir from the River Trent. An existin	Maintenance required	1?	Yes			
used to introduce River Trent water into	Blithfield reservoir. However, the mode of	operation to fill the reservoir requires flow rev	ersal in the pipelines and causes restricted raw			
at the Yoxall gauge, thereby limiting opt	ion yield. The proposed option is to provide	e a new 40MI/d surface water abstraction on the	he River Trent, including: a river intake (380kW			
pump (760kW pumping station)) and ray	w water pumping station connected to a new	v dedicated pipeline to Blithfield reservoir (3.8)	km, 900mm). A new inlet into Blithfield reservoir	2		
will be installed. However, the abstraction	on on the Trent would be restricted for muc	ch of the summer by the Trent flow restrictions	s. The exact location of the new river intake will			
Rugelev has been selected. Permanent	land take would be required for the river inta	ake and associated plant/building. The pump b	ack capacity would also need to be established.			
as the option would not add extra water	if it resulted in cutback to the existing Blith	he pump back. The River Trent has a high pro	portion of treated sewage effluent, which gives			
rise to water quality concerns, particular	ly associated with introducing River Trent w	ater to Blithfield reservoir which is also used for	or recreational activities. Similarly, there may be			
offer different types of habitat thereby pi	esenting less opportunity for INNS populat	ions to become established as a result of the t	ransfer.			
	Activity Based Ri	sk Assessment Summary				
Construction						
<i>Pre-Mitigation:</i> There is a major pre-m	itigation risk of INNS transfer occurring at t	he construction phase as the option requires t	he construction of new infrastructure outside of			
any existing site/compound and is likely	to result in the transfer of biological materia	I through the transport of significant quantities	of topsoil, aggregates, vegetation or raw water.			
<b>Post-Mitigation:</b> Although extensive con	nstruction activities are required which resul	t in increased distribution of terrestrial and aqua	atic INNS, the risk is considered minor assuming			
Operation	be adopted during construction.					
Pre-Mitigation: There is a High Risk of	INNS transfer occurring during the operati	on of the option resulting from the abstraction	/transfer of raw water utilising an open channel			
transfer mechanism and/or terminating a	at an open reservoir or channel.	INC. There is no evicting nother of transfer t	- Dithefield Deserver from the Diver Treat the			
transfer of water in an upstream direct	ion will create a new pathway for the distribution of in	ring INNS which may not currently be prese	nt at the reservoir and within the downstream			
watercourse. Mitigation to prevent the tr	ansfer of INNS propagules during the trans	fer in order to reduce the INNS transfer risk.				
Maintenance						
<b>Pre-Mitigation:</b> There is a major pre-mi	tigation risk of INNS transfer occurring duri	ng maintenance resulting from the use of mac	hinery such as dredges and excavators and the			
<i>Post-Mitigation:</i> It is assumed that main	intenance will be undertaken under best pro	actice mitigation measures in view of the com	pany-wide biosecurity plan and waste materials			
potentially containing INNS propagules	such as screen debris or mechanical filtration	on solids will be handled appropriately.				
	Activity based Ri	sk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation		Post Mitigation	major			
Invaluence Activity Risk		Deed Million de la				
Pre-Mitigation		Post Mitigation	Negligible			
	INNS Record Ris	SK Assessment Summary		IN	NNS Occurrence Records	
A total of 6 INNS have been recorded wi	thin 500 meters of the proposed scheme info panish bluebell are likely to represent a risk	rastructure. Occurrence density mapping show	s concentrations of INNS at Blithfield Reservoir.	Common Name	Scientific Name	Occurences
plant equipment, soils, and aggregates.	Plant species such as sycamore and Spanish bluebell are likely to represent a risk during the construction phase due to the likelihood of being spread during the movement of plant equipment, soils, and aggregates. Similarly, during construction terrestrial insect species Harlequin Ladybird and Horse chestnut leaf miner are likely to represent a transfer				Potamopyrgus antipodarum	20
risk. During the operation phase aquatic and riparian species such as New Zealand mudsnail and Canadian pondweed are likely to present a risk due to the likelihood of being spread during the transfer of raw water. During maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during				Harlequin Ladybird	Harmonia axyridis	4
				Sycamore	Acer pseudoplatanus	4
contains numerous high risk invasive sp	maintenance related activities, such as dredging and clearing screen debris. Additionally, although not captured within the search area the River Trent and wider catchment contains numerous high risk invasive species including guagga mussel, Himalayan Balsam, Japanese knotweed and numerous other which may present a risk at all stage of the				Cameraria ohridella	4
scheme. The application of mitigation du	uring each phase is likely to reduce the pote	ential risk of spread of the species listed to a v	arying extent.	Canadian Pondweed	Elodea canadensis	2
				Spanish Bluebell	Hyacinthoides hispanica	1

Scheme Reference	Option	n Name	Source Type	PAG Scoro	Minor	
2.2.1.1	Blithfield Reser	voir - 1m raising	Surface water		WINDI	
	Option	Description		Construction required	Yes	
Blithfield Reservoir has a state	d capacity of 18,172MI and a surface area of 3,200,0	00m2 when full to its current top water level of 95	5.25mAOD. It is used for water supply and	Raw Water Transfer?	No	
recreation and is built across the 856m long. The reservoir is cr raising the reservoir full supply the main items included in the	the River Blithe and Tad Brook. The reservoir, built arous ossed by a roadembankment, 487m long, that is cha level by approximately 1m. This will enlarge the actuation works will be as follows:	and 1953, is retained by an earth fill embankment racterised by a causeway formed of a bridge app I storage volume of 18,172 MI to provide an additi	with puddle clay core about 16m high and proximately 70m long. This option intends ional 3,180 MI storage. It is envisaged that	Maintenance required?	Yes	
the main items included in the Raising of the mathe Raising of the dr spillways a new f Raising of the sti Raising of the sti Raising of the roa Two borrow pits assumed to be tw An allowance for additional land ta Construction <i>Pre-Mitigation:</i> There is a mirr existing site but does not invo	works will be as follows: in embankment dam by 1m by forming a reinforced co slope of the embankment. aw off tower, the footbridge and its piers, the main a use gate has been envisaged. A new set of props betw ling basin side walls, and extension of the stilling basin ad embankment on the upstream slope, including the e- have been considered near both embankments in dry vice the granular material needed for the raising of the land acquisition and compensation to affected landor ke would potentially be within existing SST land holdir <b>Activity Based Ris</b> or pre-mitigation risk of INNS transfer occuring at the ve the haulage of significant quantaties of materials su	6				
Post-Mitigation: Although ext assuming best practice biosed Operation Pre-Mitigation: There is a neg open channel transfer mechan Post-Mitigation: Increasing th secondary transfer risk. Provid biosecurity measures (such as Maintenance Pre-Mitigation: There is a ma transport of biological material Post-Mitigation: It is assumed potentially containing INNS pro-	ensive construction activities are required which resu- surity measures will be adopted during construction. gligible risk of INNS transfer occuring during the opera- isms and does not terminate at an open channel or re- e capacity of Blithfield reservoir may in effect increase ed the additional volume is utilised for the supply of S signs, wash down facilities for recreational users, etc) for pre-mitigation risk of INNS transfer occuring during such as screen debris and pipeline foulings. If that maintenance will be undertaken under best prac- pogules such as screen debris or mechanical filtration					
	Activity based Ris	k Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Minor Risk	Post Mitigation N	Ainor			
Operational Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation N	Vegligible			
Maintenance Activity Risk						
Pre-Mitigation	Maior Risk	Post Mitigation N	Vegligible			
	INNS Record Risk	Assessment Summary		INNS Occurr	ence Records	
A total of 6 INNS have been red	corded within 500 meters of the proposed scheme infra	astructure. Occurrence density mapping shows co	ncentrations of INNS at Blithfield	Common Name Scienti	fic Name Occurences	
Reservoir. Plant species such a movement of plant equipment	is sycamore and Spanish bluebell are likely to represe soils, and aggregates. Similarly, during construction te	nt a risk during the construction phase due to the rrestrial insect species Harlequin Ladybird and Ho	likelihood of being spread during the	New Zealand Mudsnail Potamopyrgu	is antipodarum 20	
movement of plant equipment, soils, and aggregates. Similarly, during construction terrestrial insect species Harlequin Ladybird and Horse chestnut leaf miner are likely to represent a transfer risk. Aquatic species such as New Zealand mudsnail and Canadian pondweed are likely to present a risk due to the likelihood of being spread by construction required around the waterbody. These species also present risks during the operation of the reservoir as INNS could be transferred through recreational activities at the reservoir. During maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance related activities, such as dredging and clearing screen debris. Additionally, although not captured within the search area the River Trent and wider catchment contains numerous high risk invasive				Harlequin Ladybird Harmon	ia axyridis 4	
				Sycamore Acer pseu	Idoplatanus 4	
				Horse-Chestnut Leaf-miner Camerar	ia ohridella 4	
				Canadian Pondweed Elodea d	anadensis 2	
species including quagga muss during each phase is likelv to re	el, Himalayan Balsam, Japanese knotweed and nume duce the potential risk of spread of the species listed	Spanish Bluebell Hyacinthoid	des hispanica 1			

Scheme Reference	Option	Name	Source Type	PAG Score		Minor
2.2.2.1	Blithfield Reserv	oir - 2m raising	Surface water	RAG SCOLE		Willion
	Option	Description		Construction required		Yes
Blithfield Reservoir has a stated capacity	of 18,172MI and a surface area of 3,200,00	0m2 when full to its current top water level of	95.25mAOD. It is used for water supply and	Raw Water Transfer?		No
856m long. The reservoir is crossed by a raise the reservoir full supply level by app	road embankment, 487m long, that is charac roximately 2m. This will enlarge the actual s	torage volume of 18,172 MI to provide an add	nt with puddle clay core about 16m high and proximately 70m long. This option is aimed to ditional 6,600 MI storage. It is envisaged that	Maintenance required?		Yes
<ul> <li>Raising of the main embank the downstream slope of the Raising of the draw off towe spillways a new fuse gate ha Raising of the stilling basin s</li> <li>Raising of the road embanke</li> <li>Two borrow pits have been assumed to be twice the gra</li> <li>An allowance for land acquire</li> </ul>	8					
additional land take would p	otentially be within existing SST land holding	J.	с с <i>г</i>			
	Activity Based Risk	Assessment Summary				
Activity Based Risk Assessment Summary           Construction           Pre-Mitigation: There is a minor pre-mitigation risk of INNS transfer occurring at the construction phase as the option requires the construction of new infrastructure inside of an existing site but does not involve the haulage of significant quantities of materials such as top soils, vegetation and raw water.           Post-Mitigation: There is a negligible risk of INNS transfer occurring during the operation as the option does not involve the abstraction/transfer of raw water and does not utilise open channel transfer mechanisms and does not terminate at an open channel or reservoir.           Post-Mitigation: Increasing the capacity of the Bithfield reservoir may in effect increase the potential habitat for aquatic and riparian INNS with in turn may increase the primary and secondary transfer risk. Provide the additional volume is utilised for the supply of Seedy Mill WTW and is not utilised for the downstream transfer and assuming best practice biosecurity measures (such as signs, wash down facilities for recreational users, etc). the risk to the downstream transfer and assuming best practice biological material such as screen debris and pipeline foulings.           Pre-Mitigation: There is a major pre-mitigation risk of INNS transfer occurring during maintenance resulting from the use of machinery such as dredges and excavators and the transfer of biological material such as screen debris and pipeline foulings.           Pre-Mitigation: There is a major pre-mitigation risk of INNS transfer occurring during maintenance resulting from the use of machinery such as dredges and excavators and the transport of biological material such as screen debris and pipeline foulings.     Pre-Mitigation: It is assumed that maintenan						
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Negligible			
	INNS Record Risk	Assessment Summary		INNS O	currence Records	
A total of 6 INNS have been recorded with	in 500 meters of the proposed scheme infra-	structure. Occurrence density mapping shows	concentrations of INNS at Blithfield	Common Name Sc	entific Name	Occurences
movement of plant equipment, soils, and a	agregates. Similarly, during construction ter	restrial insect species Harleguin Ladybird and	Horse chestnut leaf miner are likely to	New Zealand Mudsnail Potamo	oyrgus antipodarum	20
represent a transfer risk. Aquatic species such as New Zealand mudsnail and Canadian pondweed are likely to present a risk due to the likelihood of being spread by construction required around the waterbody. These species also present risks during the operation of the reservoir as INNS could be transferred through recreational activities at the reservoir. During maintenance phase, plant species Canadian pondweed may present a potential risk due to the likelihood of being spread during maintenance related activities, such as dredging and clearing screen debris. Additionally, although not captured within the search area the River Trent and wider catchment contains numerous high risk invasive				Harlequin Ladybird Ha	monia axyridis	4
				Sycamore Ace	pseudoplatanus	4
				Horse-Chestnut Leaf-miner Ca	neraria ohridella	4
				Canadian Pondweed Eld	lea canadensis	2
species including quagga mussel, Himalay during each phase is likely to reduce the p	species including quagga mussel, Himalayan Balsam, Japanese knotweed and numerous other which may present a risk at all stage of the scheme. The application of mitigation				thoides hispanica	1

Scheme Reference		Option Name	Source Type			
2.3.1	Chelma	rsh reservoir 15Ml/d	Surface water	RAG Score		Minor
	C	Option Description		Construction required		Yes
This option is aimed to raise the reserve	voir full supply level by approximately 1	m. This will enlarge the actual storage vo	lume of 3,063 MI to provide an additional 420 MI storage.	Raw Water Transfer?		No
Survey mapping and the record drawin	ngs to perform a design sketch of the rais	ed dams. These sketches were used to for	form the bill of quantities to allow a high-level cost estimate	Maintenance required	?	Yes
<ul> <li>Raising of the main emb to the downstream slope</li> <li>Raising of the overflow a</li> <li>Extension of the culvert a</li> <li>Raising of the subsidiary</li> <li>Two borrow pits have be assumed to be twice the</li> </ul>	main items included in the works will be a bankment dam by 1 m by forming a reinfo e of the embankment. and inlet towers, the footbridges, and the and stilling basin approx. 3 m downstrea <i>i</i> dams on the downstream slope. Conse een considered near the embankments granular material needed for the raising					
	Activity Base	d Risk Assessment Summary				
Construction Pre-Mitigation: There is a major pre- any existing site/compound and is likel Post-Mitigation: Although extensive assuming best practice biosecurity me Operation Pre-Mitigation: There is a Medium ris Post-Mitigation: Increasing the capace and secondary transfer risk. Provided biosecurity measures (such as signs, w Maintenance Pre-Mitigation: There is a major pre- pipeline fouling. Post-Mitigation: It is assumed that m potentially containing INNS propagules	mitigation risk of INNS transfer occurring ly to result in the transfer of biological ma construction activities are required whice easures will be adopted during construction sk of INNS transfer occurring during the of city of the Chelmarsh reservoir may in effect the additional volume is utilised throug wash down facilities for recreational user mitigation risk of INNS transfer occurring haintenance will be undertaken under be is such as screen debris or mechanical fi Activity base	g at the construction phase as the option aterial through the transport of significant th result in increased distribution of terre on. operation of the option resulting from term ect increase the potential habitat for aquat h the supply network and is not utilised rs, etc). the risk to the downstream catch g during maintenance resulting from the t st practice mitigation measures in view o ltration solids will be handled appropriate	requires the construction of new infrastructure outside of quantities of topsoil, aggregates, vegetation or raw water. estrial and aquatic INNS, the risk is considered as minor hination of the option at an open reservoir or channel. tic and riparian INNS with in turn may increase the primary for the downstream transfer and assuming best practice ment and INNS distribution overall is Minor. ransport of biological material such as screen debris and f the company-wide biosecurity plan and waste materials ly.			
Construction Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Moderate Risk	Post Mitigation	Negligible			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Negligible			
	INNS Record	d Risk Assessment Summary		IN	NS Occurrence Records	
A total of 6 INNS have been recorde	ed within 500 meters of the proposed so	cheme infrastructure. Occurrence densit	y mapping shows concentrations of INNS at Chelmarsh	Common Name	Scientific Name	Occurences
reservoir and neighbouring agricultura	al land. Plant species such as ground ele	der, sycamore and cherry laurel are likely and aggregates. Zebra Mussel is record	to represent a risk during the construction phase due to	Zebra Mussel	Dreissena polymorpha	12
stages of the scheme. The application	of mitigation during each phase is likely	to reduce the potential risk of the spread	d of the species listed to a varying extent.	Ground Elder	Aegopodium podagraria	1
				Cherry Laurel	Prunus laurocerasus	1
				Sycamore	Acer pseudoplatanus	1
				Lilac	Syringa vulgaris	1
				Douglas Fir	Pseudotsuga menziesii	1

Scheme Reference		Option Name	Source Type		
2.3.2	Chelm	arsh Reservoir 30MI/d	Surface water	RAG Score	Minor
		Option Description		Construction required	Yes
This option is aimed to raise the res	ervoir full supply level by approximately 2 mated using GIS based tools included w	2 m. This will enlarge the actual storage vol ithin AutoCAD Civils 3D software, AutoCAI	ume of 3,063 MI to provide an additional 890 MI storage.	Raw Water Transfer?	No
Survey mapping and the record draw of this option. It is envisaged that the Raising of the main emban Raising of the overflow and Extension of the culvert an	wings to perform a design sketch of the ra e main items included in the works will be kment dam by 2 m by earthworks to the d inlet towers, the footbridges, and their p d stilling basin approx. 10 m downstream	Maintenance required?	Yes		
<ul> <li>Raising of the subsidiary data</li> <li>Two borrow pits have been to be twice the granular matrix</li> </ul>	ams on the downstream slope. Conseque considered near the embankments in dr aterial needed for the raising of the emba				
	Activity Bas	ed Risk Assessment Summary			
Construction Pre-Mitigation: There is a major pr any existing site/compound and is life Post-Mitigation: Although extensive best practice biosecurity measures of Operation Pre-Mitigation: There is a Medium Post-Mitigation: Increasing the cap and secondary transfer risk. Provide biosecurity measures (such as signs Maintenance Pre-Mitigation: There is a major pr pipeline fouling. Post-Mitigation: It is assumed that potentially containing INNS propagu	e-mitigation risk of INNS transfer occurrin kely to result in the transfer of biological n e construction activities are required which will be adopted during construction. risk of INNS transfer occurring during the bacity of the Blithfield reservoir may in effe ed the additional volume is utilised throu s, wash down facilities for recreational us re-mitigation risk of INNS transfer occurrin maintenance will be undertaken under b ules such as screen debris or mechanical Activity bas				
Pre-Mitigation	Major Risk	Post Mitigation	Minor		
Operational Activity Risk					
Pre-Mitigation	Moderate Risk	Post Mitigation	Negligible		
Maintenance Activity Risk					
Pre-Mitigation	Maior Risk	Post Mitigation	Negliaible		
	INNS Reco	rd Risk Assessment Summary		INNS Occu	rrence Records
A total of 6 INNS have been record	ded within 500 meters of the proposed	scheme infrastructure. Occurrence density	mapping shows concentrations of INNS at Chelmarsh	Common Name Scien	tific Name Occurrences
reservoir and neighbouring agricultu the likelihood of being spread during	ural land. Plant species such as ground e g the movement of plant equipment, soils	elder, sycamore and cherry laurel are likely s, and aggregates. Zebra Mussel is recorde	to represent a risk during the construction phase due to educe to educe to educe to educe the reservoir and represent a risk during all	Zebra Mussel Dreissen	na polymorpha 12
stages of the scheme. The application	on of mitigation during each phase is like	ly to reduce the potential risk of the spread	of the species listed to a varying extent.	Ground Elder Aegopod	ium podagraria 1
					laurocerasus 1
		Sycamore Acer ps	eudoplatanus 1		
			_	Lilac Syrin	ga vulgaris 1
				Douglas Fir Pseudots	suga menziesii 1

Scheme Reference		Option Name	Source Type	PAG Score		Minor
6.1.1	Trent 40 MI/d - new sw intake wi	h 14 day bankside storage and treatment	t works Surface water	KAG Score		
		Construction requi	red	Yes		
This option seeks to make use of the available water in the River Trent by installing a new 40 MI/d capacity treatment works adjacent to the River Trent between Rugeley and Yoxall. Due to the likely summer season HoE restrictions to abstraction a new bankside storage reservoir will be required. Water quality on the River Trent is poor so treatment					er?	Yes
needs are expected to result in	high cost for the option for both capital investi	ment and the operational cost requirements. The	he proposed option is to install a new river abstraction	Maintenance requir	ed?	Yes
(40MI/d) on the River Trent wh	hich discharges via a new pipeline (0.1km, 900	mm, 115kW) into a new bankside storage res	servoir (8,052MI, equating to 183 days at 40 MI/d and			
HoF. There may be opportunity	y to use former gravel workings in the area, bo	th for land and for first stage settlement of rive	r water. However, it should be noted that abstractions			
from gravel aquifers or former	quarry lakes will not be exempt from HoF rest	rictions, so a new dedicated storage reservoir	is likely to be required. A new water treatment works	8		
further investigation and study	y. A notional treatment plant comprising clarif	iers, filters, GAC plant, Manganese contactor	r and chlorine disinfection has been included for the			
purpose of this option assessm	nent. A new pipeline connection (0.2km, 900m	n) will be required between the bankside stora	ge and WTW. New pipelines will be required between			
4.7km. 750mm and a 210kW r	the existing SST distribution grid. It is propos pump (420kW pumping station)) thereby reduc	ed that two connections are installed. The first ing demand on Seedy Mill WTW, the second	to Seedy Mill WTW for distribution into the rest of the			
SST grid (15 Ml/d, 5.0km, 600	Omm and new 90kW pump (180kW pumping	station)). Further investigation is required to e	establish suitable sites for the proposed storage and			
treatment works. For the purpo	ose of this option assessment, a notional local bankside storage. Linear land compensation is	ion near to Kings Bromley has been suggester also required for the construction of the new r	ed. Land acquisition will be required for this option for			
required at the abstraction poir	nt and at the new treatment works. An overall of	delivery period of 10 years.				
	Activity Bas	ed Risk Assessment Summary				
• • •						
Construction Pre-Mitigation: There is a ma	ior pre-mitigation risk of INNS transfer occurri	on at the construction phase as the option requ	uires the construction of new infrastructure outside of			
any existing site/compound an	d is likely to result in the transfer of biological n	naterial through the transport of significant qua	antities of topsoil, aggregates, vegetation or raw water.			
<b>Post-Mitigation:</b> Although extended best practice biosecurity meas	ensive construction activities are required which	n result in increased distribution of terrestrial an	Id aquatic INNS, the risk is considered minor assuming			
Operation						
<b>Pre-Mitigation:</b> There is a Hig	h Risk of INNS transfer occurring during the o	operation of the option resulting from the abstr	raction/transfer of raw water utilising an open channel			
Post-Mitigation: The scheme	creates a new pathway for the distribution of IN	INS between the River Trent and a new waterb	body which could in turn provide secondary distribution			
pathways for introducing new	INNS into the River Trent during releases into	the river. The risk is considered minor give	en the nature of the river Trent at the source and the			
assumption that the storage re Maintenance	servoir will not be utilised for recreational activ	ities.				
Pre-Mitigation: There is a ma	ijor pre-mitigation risk of INNS transfer occurri	ng during maintenance resulting from the use	of machineries such as dredges and excavators and			
the transport of biological mate	erial such as screen debris and pipeline fouling		a company wide biosocurity plan and waste materials			
potentially containing INNS pro	ppagules such as screen debris or mechanical	filtration solids will be handled appropriately.	e company-wide biosecunty plan and waste materials			
	Activity bas	ed Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			L
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Negligible			
	INNS Reco	rd Risk Assessment Summary			INNS Occurrence Records	
A total of 3 INNS have been re WTW and along the A513 which	ecorded within 500 meters of the proposed sch h intersects the pipeline route. Terrestrial speci	eme intrastructure. Occurrence density mappi es such Himalayan balsam and harlequin ladyb	IND Shows concentrations of INNS close to Seedy Mill	Common Name	Scientific Name	Occurences
phase due to the likelihood of being spread during the movement of plant equipment, soils, and aggregates. New Zealand mudsnail and Himalayan Balsam may present a risk during operation if unexpected discharges occur. During maintenance phase, Himalayan balsam, and New Zealand mudsnail may present a potential risk due to the likelihood of being spread during maintenance phase, Himalayan balsam, and New Zealand mudsnail may present a potential risk due to the likelihood of being spread during maintenance phase, Himalayan balsam, and New Zealand mudsnail may present a potential risk due to the likelihood of being spread during maintenance related activities, such as dredging and clearing screen debris. Additionally, although not captured within the search area the River Trent and wider catchment contains numerous high risk invasive species including quagga mussel, Himalayan Balsam, Japanese knotweed and numerous other which may present a risk				New Zealand Mudsnail	Potamopyrgus antipodarum	19
				Himalayan Balsam	Impatiens glandulifera	12
				Harlequin Ladybird	Harmonia axyridis	1
at all stage of the scheme. The	e application of mitigation during each phase is	likely to reduce the potential risk of spread of	the species listed to a varying extent.			
			-			

Scheme Reference	(	Option Name	Source Type	RAG Score		Minor
6.1.3	Trent 70 MI/d - new sw intake with	14-day bankside storage and treatment work	s Surface water	Construction room	ired	Vee
This option eaclys to make use of	U	Construction requ	irea	Yes		
summer season HoF restrictions to	o abstraction a new bankside storage reservoir will be	Raw Water Transf	er?	Yes		
option for both capital investment	and the operational cost requirements. The proposed	Maintenance requi	red?	Yes		
when the River Trent is subject to	HoF. This is to be separated into two reservoir units. B	orage reservoir (282na) is to be sized to provide 6 month ankside storage 1 would comprise of: a new river intake	(200kW) and pumping into bankside storage 1, a new	P2		
pipeline (0.1km, 1,200mm) betwee	en river intake and bankside storage 1, a new inlet to b	pankside storage 1, a new outlet from bankside storage a	and associated pumping (200kW), and a new pipeline	K		
(1.7km, 1,200mm) between banks between river intake and bankside	side storage and WTW. Bankside storage 2 would cor e storage 2. a new inlet to bankside storage 2. a new o	nprise of: a new river intake (200kW) and pumping into l utlet from bankside storage and associated pumping (20	bankside storage 2, a new pipeline (0.1km, 1200mm) 00kW) and a new pipeline (0.8km, 1.200mm) between			
bankside storage and WTW. There	e may be opportunity to use former gravel workings in t	he area, both for land and for first stage settlement of rive	er water. However, it should be noted that abstractions			
from gravel aquifers or former qua 70 MI/d will be constructed. The	rry lakes will not be exempt from HoF restrictions, so a exact works will need to be designed in accordance	a new dedicated storage reservoir will be required. A new with water quality data which requires further investigat	water treatment works (10ha) with design capacity of ion and study. A notional treatment plant comprising			
clarifiers, filters, GAC plant, Mang	anese contactor and chlorine disinfection has been in	cluded for the purpose of this option assessment. New	pipelines will be required between the new treatment			
works and the existing SST distrib	oution grid. It is proposed that two connections are insi a demand on Seedy Mill WTW, the second to Seedy M	alled. The first to the network supplying Burton on Trent /ill WTW for distribution into the rest of the SST grid (45	(25Ml/d, 0.5km, 750mm and a 220kW pump (440kW Ml/d, 11.8km, 900mm and new 300kW pump (600kW			
pumping station)). Further investig	ation is required to establish suitable sites for the prop	based storage and treatment works. For the purpose of this	s option assessment a notional location near to Walton			
on Trent has been suggested. La	nd acquisition will be required for this option for both the	he treatment works and bankside storage. Linear land co	compensation is also required for the installation of the value output $(DO)$ is anticipated to be 60 MI/d (70 MI/d			
peak). An overall delivery period o	f 10 years.	and at the new treatment works. The average deploy				
	Activity Base	d Risk Assessment Summary				
Construction						
<b>Pre-Mitigation:</b> There is a major	pre-mitigation risk of INNS transfer occurring at the	e construction phase as the option requires the constr	ruction of new infrastructure outside of any existing			
Post-Mitigation: Although extension	sive construction activities are required which result in	n increased distribution of terrestrial and aquatic INNS,	the risk is considered minor assuming best practice			
biosecurity measures will be adop	ted during construction.	•	с .			
<b>Operation</b> <b>Pre-Mitigation</b> : There is a High F	Risk of INNS transfer occurring during the operation o	f the option resulting from the abstraction/transfer of raw	water utilising an open channel transfer mechanism			
and/or terminating at an open rese	ervoir or channel.					
Post-Mitigation: The scheme created by the s	ates a new raw water transfer pathway for the distributions into the River. T	on of INNS between the River Trent and two new waterbo he risk is considered minor given the distance of the pro	dies which could in turn provide secondary distribution posed pipeline and the nature of the river Trent at the			
source and the assumption that th	e storage reservoir will not be utilised for recreational	activities.				
Maintenance Bro-Mitigation: There is a major r	the mitigation risk of INNIS transfer accurring during ma	pintonanco reculting from the use of machinery such as d	tradage and executions and the transport of biological			
material such as screen debris an	d pipeline fouling.	antenance resulting nom the use of machinery such as o	nedges and excavators and the transport of biological			
<b>Post-Mitigation:</b> It is assumed the	at maintenance will be undertaken under best practice	e mitigation measures in view of the company-wide biose	ecurity plan and waste materials potentially containing			
		d Dick Accommont Summory				
Construction Activity Pick	Activity base	a Risk Assessment Summary				
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Negligible			
	INNS Record	Risk Assessment Summary			INNS Occurrence Records	
A total of 10 INNS have been r	ecorded within 500 meters of the proposed sche	me infrastructure. Occurrence density mapping sh	ows concentrations of INNS close to along the	Common Name	Scientific Name	Occurences
A515 which intersects the pipe	line route, around Alrewas town centre and near	Barton-under-Needwood quarry. Terrestrial specie	es such Himalayan balsam, sycamore and			Coourchoos
harlequin ladybird are likely to	represent a risk during the construction phase du	ue to the likelihood of being spread during the mov	ement of plant equipment, soils, and	New Zealand Mudsnail	Potamopyrgus antipodarum	19
aggregates. Aquatic species like	e New Zealand musnall, signal crayfish and Nut the maintenance phase. Himalayan balsam, N	tall's waterweed may present a risk during operation uttall's waterweed and New Zealand mudshail may	on of the scheme as the scheme creates a new	Himalavan Balsam	Impatiens glandulifera	14
being spread during maintenar	ice-related activities, such as dredging and clear	Svcamore	Acer pseudoplatanus	10		
Additionally, although not captured within the search area the River Trent and wider catchment contains numerous other high-risk invasive species including quagga mussel, and Japanese knotweed which may present a risk at all stage of the scheme. The application of mitigation during each phase is likely to reduce the potential risk of the spread of the species listed to a varying extent.				Horse-Chestnut Leaf-miner	Cameraria ohridella	8
				Least Duckweed	Lemna minuta	6
				Signal Cravfish	Pacifastacus leniusculus	5
				Harlequin Ladvbird	Harmonia axvridis	4
		Nuttall's waterweed	Elodea nuttallii	4		
				Lilv Beetle	Lilioceris lilii	3
		Western Conifer Seed Bug	Leptoalossus occidentalis	2		

Scheme Reference		Option Name	Source Type			
7.1.2.1	Canal & Rivers T	rust (CRT):: Birmingham Blithfield surplus.	Third party	RAG Score		Major
		Option Description		Construction requ	lired	Yes
This option seeks to make surplus wa	ater in the Birmingham Canal Netwo	ork (BCN) available for water supply purposes. Surplus	s in the BCN can be supported by the CRT's Bradley	Raw Water Trans	fer?	Yes
borehole and Chasewater Reservoir. transferring the water to the Trent an attractive alternative to taking water f discounted owing to assumption of a	transferring the water to the Trent and Mersey canal where it can be abstracted by SST and used to supplement flows into Blithfield Reservoir. This could potentially be a more attractive alternative to taking water from the River Trent, particularly when the River Trent is subject to Hands-off Flow (HoF) restrictions. However, the dry year yield has been discounted owing to assumption of a 1 in 20-year restrictions by CRT. The option requires upgrades to the canal network to facilitate the transfer to the Trent and Mersey Canal.				ired?	Yes
This broadly requires the provision of an upgraded pumping station (4 kW pump (88 kW pumping station)), lock bypasses, appropriate control equipment and a new abstraction point. Permanent land take would be required for the canal intake. There will be two inlet arrangements at the canal and at the reservoir. SST would also need to provide a new pipeline (6.2km, 450mm) from the abstraction point to Blithfield Reservoir. Once within Blithfield Reservoir the canal water would be blended with other inflows and treated at Seedy Mill WTW before onward distribution into water supply. The CRT have indicated that a transfer of up to 15 Ml/d is available. An overall delivery period of 10 years.						
	Activity	Based Risk Assessment Summary				
Construction Pre-Mitigation: There is a major pre- any existing site/compound and is like Post-Mitigation: Although extensive assuming best practice biosecurity m Operation Pre-Mitigation: There is a High Risk transfer mechanism and/or terminatin Post-Mitigation: The use of a canal water will provide a primary and seco a canal with significant boating traffic as signs, wash-down facilities for rec Maintenance Pre-Mitigation: There is a major pre- the transport of biological material su Post-Mitigation: It is assumed that r potentially containing INNS propague	e-mitigation risk of INNS transfer of ely to result in the transfer of biolog e construction activities are require heasures will be adopted during con k of INNS transfer occurring during ing at an open reservoir or channel. I as a transfer mechanism in this s ondary pathway for the transfer of IN c and numerous secondary pathwas creational users, etc) which are likel e-mitigation risk of INNS transfer of uch as screen debris and pipeline for maintenance will be undertaken un les such as screen debris or mecha	ccurring at the construction phase as the option requi ical material through the transport of significant quant ad which result in increased distribution of terrestrial instruction. the operation of the option resulting from the abstract cenario poses a high risk, although there is an exist INS. Additionally, abstraction and transfer to Blithfield tys for the distribution of INNS. Mitigation is limited to by to be only effective in reducing secondary pathway ccurring during maintenance resulting from the use of buling. der best practice mitigation measures in view of the of anical filtration solids will be handled appropriately.	ires the construction of new infrastructure outside of tities of topsoil, aggregates, vegetation or raw water. and aquatic INNS, the risk is considered as minor ction/transfer of raw water utilising an open channel ting canal, the use of a canal for the transfer of raw d reservoir represent a new distribution pathway from o standard best practice biosecurity measures (such risks. of machineries such as dredges and excavators and company-wide biosecurity plan and waste materials			
	Activity	based Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Major			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Negligible			
	INNS F	Record Risk Assessment Summary			INNS Occurrence Records	
A total of 10 INNS have been recorde	ed within 500 meters of the propose	d scheme infrastructure. Occurrence density mapping	g shows concentrations of INNS around Blithfield	Common Name	Scientific Name	Occurences
Reservoir and around the River Sow i the construction phase due to the like	in Shugborough Park. Terrestrial special special special special special special during the r	pecies such Himalayan balsam, ground elder and har novement of plant equipment, soils, and aggregates.	rlequin ladybird are likely to represent a risk during Aquatic species like New Zealand mud snail, signal	Harlequin Ladybird	Harmonia axyridis	18
crayfish and Nuttall's waterweed pres	sent a risk during the operation of the	he scheme as the scheme creates a new pathway for	these INNS, using a canal to transport raw water.	New Zealand Mudsnail	Potamopyrgus antipodarum	6
During the maintenance phase, Hima	layan balsam, Nuttall's waterweed	and New Zealand mudsnail may present a potential r	risk due to the likelihood of being spread during	Himalayan Balsam	Impatiens glandulifera	5
the species listed to a varying extent.	as dredging and clearing screen de	Lily Beetle	Lilioceris lilii	2		
	Ground Elder	Aegopodium podagraria	1			
				Canadian Pondweed	Elodea canadensis	1
		Signal Crayfish	Pacifastacus leniusculus	1		
			Ī	Rosemary Beetle	Chrysolina americana	1
				Nuttall's waterweed	Elodea nuttallii	1
				Snowberry	Symphoricarpos albus	1

Scheme Reference	Optio	n Name	Source Type	RAG Score		Major
7.1.5	Canal & Rivers Trust (C	Description	I hird party	Construction require	ed	Yes
CRT to provide surplus from Chasewat	er Reservoir to SSW. Surplus would be fed	from the reservoir to the Wryley &	& Essington Canal which would then in turn discharge to	Raw Water Transfer	r?	Yes
Cranes Brook. This would free up addition	Cranes Brook. This would free up additional water in the catchment for SSW. The reservoir outflow is released via an automated structure from the Wryley & Essington Canal to					Ves
work are envisaged to be:	nodelling has not been undertaken to detern	line the surplus, but it is likely to be	a in the region of 2- 5 Mi/d. The main items included in the			103
1.0km of new 450mm dia pipel	ine between the Chasewater outlet and Crar	e Brook. To be conveyed by gravit	y.			
<ul> <li>Two inlet arrangements (canal</li> <li>Drill pow borebale at Pipebill w</li> </ul>	and a discharge to the brook.	nd now building	国 同			
<ul> <li>Drin new borehole at Piperini, v</li> <li>0.9m of new 450mm dia main t</li> </ul>	o connect new borehole to the existing Pipe	nill treatment plant.				
New 14kW pump (28kW pump	ing station at new borehole.					
Existing treatment at Pipehill W     Existing distribution as treach for	/TW.					
Existing distribution network inc     Compensation for linear pipelir	e scheme					
Land for SSW access around (	Crane Brook site (priced as 1 ha at £20k/ha)					
Land for new BH site						
	Activity Based Ris	k Assessment Summary				
Construction						
Pre-Mitigation: There is a major pre-m	tigation risk of INNS transfer occurring at th	e construction phase as the option	requires the construction of new infrastructure outside of			
any existing site/compound and is likely	to result in the transfer of biological material	through the transport of significant	quantities of topsoil, aggregates, vegetation or raw water.			
assuming best practice biosecurity mea	sures will be adopted during construction.					
Operation						
<b>Pre-Mitigation:</b> There is a High Risk of	INNS transfer occurring during the operation	n of the option resulting from the a	bstraction/transfer of raw water utilising an open channel			
<i>Post-Mitigation:</i> The use of a canal as	a transfer mechanism in this scenario pose	s a high risk, although there is an	existing canal, the use of a canal for the transfer of raw			
water will provide a primary and seconda	ary pathway for the transfer of INNS. Addition	ally, the discharge of raw water to	Craner Brook represents a new INNS distribution pathway			
from a canal with significant boating tra	Ific and numerous secondary pathways for the content of the second recreational users and the second recreation of the se	he distribution of INNS. Mitigation	is limited to standard best practice biosecurity measures			
Maintenance						
Pre-Mitigation: There is a major pre-m	itigation risk of INNS transfer occurring durin	ng maintenance resulting from the	use of machineries such as dredges and excavators and			
the transport of biological material such	as screen debris and pipeline fouling.	tice mitigation measures in view o	f the company-wide biosecurity plan and waste materials			
potentially containing INNS propagules	such as screen debris or mechanical filtratio	n solids will be handled appropriate	ly.			
	Activity based Ris	k Assessment Summary				
Construction Activity Risk	Mojor Disk	Post Mitigation	Minor			
Operational Activity Pick	Waldi Kisk	rost mitigation				
Pre-Mitigation	Major Risk	Post Mitigation	Major			
Maintenance Activity Risk		reet mitigation				1
Pre-Mitigation	Maior Risk	Post Mitigation	Negligible			
	INNS Record Ris	Assessment Summary			INNS Occurrence Records	
A total of 4 INNS have been recorded wi	thin 500 meters of the proposed scheme infr	astructure. Occurrence density ma	pping shows concentrations of INNS at Chasewater	Common Name	Scientific Name	Occurences
reservoir. Invertebrate species such as li	ly beetle and harlequin ladybird are likely to	represent a risk during the construct	ction phase due to the likelihood of being spread during	Lilv Beetle	Lilioceris lilii	4
due to the transfer of raw water. These a	and aggregates. Aquatic species Zebra mus quatic species also pose a risk during the m	ser and new Zealand mudshall are aintenance of the scheme due to the	e incervice pose a risk during the operation of the scheme he requirement of dredging and the removal of screen	Zebra Mussel	Dreissena polymorpha	2
debris. The application of mitigation durin	Harleguin Ladybird	Harmonia axvridis	1			
			-	New Zealand Mudshail	Potamopyrous antipodarum	1
						•
			-			

Scheme Reference	C	ption Name	Source Type	210.0		Nasisia
7.5.1.1	UU Vyrnwy reservoir raw water rel	ease 15 MI/d to River Severn to support SSW	Third party	RAG Score		Negligible
	0	ption Description		Construction require	d	No
This option assumes that UU releases that Hampton Loade WTW. For cost	se raw water release into the River Severn, n	naking it available for abstraction downstream by SST. V	Vater can then be abstracted for treatment	Raw Water Transfer?	?	Yes
works / asset improvements require	ed by UU will be considered by UU and form	Maintenance required	1?	No		
with this option. An estimate of paragreements. The assessment is be supply water of similar or better qua that SST existing River Severn into needs to be given to the capacity of rebuilt Hampton Loade WTW. Ther	yments to UU has been derived for inclusion ased on the assumption that the water supp ality than that found in River Severn, as well ake will be used to abstract water for treatme of Hampton Loade WTW to treat the addition refore, this option needs to take account of av	R				
	Activity Based	d Risk Assessment Summary				
Construction Pre-Mitigation: There is a negligib Post-Mitigation: As it is assumed Operation Pre-Mitigation: There is a High Ri transfer mechanism and/or termina Post-Mitigation: Minor negative ef additional volume could result in a Maintenance Pre-Mitigation: There is a major p pipeline fouling. Post-Mitigation: It is assumed that potentially containing INNS propage	ble pre-mitigation risk at the construction pha that no capital works are required for the imp isk of INNS transfer occurring during the ope ating at an open reservoir or channel. ffects- the River Severn and River Vyrnwy is slight increase in propagules being transport ore-mitigation risk of INNS transfer occurring at maintenance will be undertaken under bes gules such as screen debris or mechanical fil					
	Activity based	I Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation N	legligible			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	legligible			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	legligible			
	INNS Record	Risk Assessment Summary		41	NNS Occurrence Records	
	No INNS have been prev	iously recorded within 500m of the scheme.		Common Name	Scientific Name	Occurences

Scheme Reference	Oj	otion Name	Source Type			Nestelle
7.5.1.2	UU Vyrnwy reservoir raw water rele	ase 30 MI/d to River Severn to support SSW	Third party	RAG Score		Negligible
	Ор	tion Description		Construction requi	red	No
This option assumes that UU rele	ease raw water release into the River Severn, m	aking it available for abstraction downstream by SST. W	ater can then be abstracted for treatment	Raw Water Transfe	er?	Yes
works / asset improvements requ with this option. An estimate of p agreements. The assessment is supply water of similar or better q that SST existing River Severn ir needs to be given to the capacity rebuilt Hampton Loade WTW. The	any purposes, it is assumed there are no capit payments to UU has been derived for inclusion based on the assumption that the water suppl quality than that found in River Severn, as well a natake will be used to abstract water for treatme of Hampton Loade WTW to treat the additiona erefore, this option needs to take account of ava	Maintenance requir	ed?	No		
	Activity Based	Risk Assessment Summary				
Construction Pre-Mitigation: There is a neglig Post-Mitigation: As it is assume Operation Pre-Mitigation: There is a High transfer mechanism and/or termin Post-Mitigation: Minor negative additional volume could result in a Maintenance Pre-Mitigation: There is a major pipeline foulings. Post-Mitigation: It is assumed th potentially containing INNS proport	geable pre-mitigation risk at the construction pha d that no capital woks are required for the imple risk of INNS transfer occuring during the opera nating at an open reservoir or channel. effects- the River Severn and River Vyrnwy is a a slight increase in propagules being transporte r pre-mitigation risk of INNS transfer occuring of hat maintenance will be undertaken under best ogules such as screen debris or mechanical filtr					
	Activity based	Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation N	egligible			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation N	egligible	<u> </u>		
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation N	egligible			
	INNS Record	Risk Assessment Summary			INNS Occurrence Records	
	No INNS have been previo	busly recorded within 500m of the scheme.		Common Name	Scientific Name	Occurences

Scheme Reference	Optior	Name	Source Type			N1 P. 9.1.
7.5.1.3	UU Vyrnwy reservoir raw water release	45 MI/d to River Severn to support SSW	Third party	RAG Score		Negligible
	Option	Description		Construction requir	red	No
This option assumes that UU release raw	Raw Water Transfe	er?	Yes			
works / asset improvements required by I	Maintenance require	ed?	No			
with this option. An estimate of payments agreements. The assessment is based of supply water of similar or better quality that that SST existing River Severn intake will needs to be given to the capacity of Ham rebuilt Hampton Loade WTW. Therefore, the	s to UU has been derived for inclusion in the on the assumption that the water supplied b an that found in River Severn, as well as mit I be used to abstract water for treatment at pton Loade WTW to treat the additional water this option needs to take account of available	e option modelling but this will need to form part o y United Utilities is abstracted sustainably and all p gating against the risk of spreading invasive nonna Hampton Loade WTW (and potentially for storage er that is abstracted. Option 7.5.1 is therefore linked treatment capacity and licensed volumes. An overa	f negotiations and resulting commercial precautions have been taken in order to tive species. Downstream, it is assumed in Chelmarsh Reservoir). Consideration d to all options involving the existing or a ill delivery period of 5 years (no CAPEX).	Ε		
	Activity Based Ris	Assessment Summary				
Construction Pre-Mitigation: There is a negligible pre-mitigation risk at the construction phase as the option does not require the construction of new infrastructure. Post-Mitigation: As it is assumed that no capital works are required for the implementation of this scheme the risk of distribution of INNS is negligible Operation Pre-Mitigation: There is a High Risk of INNS transfer occurring during the operation of the option resulting from the abstraction/transfer of raw water utilising an open channel transfer mechanism and/or terminating at an open reservoir or channel. Post-Mitigation: Minor negative effects- the River Severn and River Vymwy is already in connection through compensation releases and River Severn Regulation releases. The additional volume could result in a slight increase in propagules being transported downstream. Risk will be negligible once raw water is treated at the WTWs Maintenance Pre-Mitigation: There is a major pre-mitigation risk of INNS transfer occurring during maintenance resulting from the transport of biological material such as screen debris and pipeline fouling. Post-Mitigation: It is assumed that maintenance will be undertaken under best practice mitigation measures in view of the company-wide biosecurity plan and waste materials potentially containing INNS propagules such as screen debris or mechanical filtration solids will be handled appropriately.						
	Activity based Risl	Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation Ne	gligible			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation Ne	gligible			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation Ne	gligible			
	INNS Record Risk	Assessment Summary			INNS Occurrence Records	
	No INNS have been previously	recorded within 500m of the scheme.	-	Common Name	Scientific Name	Occurences

Scheme Reference		Option Name	Source Type			
7.5.1.4	UU Vyrnwy reservoir raw water	release 75 MI/d to River Severn to support SSW	Third party	RAG Score		Negligible
		Option Description		Construction require	d	No
This option assumes that UU rel	lease raw water release into the River Severn	Raw Water Transfer	?	Yes		
at Hampton Loade WTW. For co works / asset improvements req with this option. An estimate of agreements. The assessment is supply water of similar or better that SST existing River Severn needs to be given to the capacit rebuilt Hampton Loade WTW. T	besting purposes, it is assumed there are no c puired by UU will be considered by UU and fo payments to UU has been derived for inclus is based on the assumption that the water su quality than that found in River Severn, as we intake will be used to abstract water for treat ty of Hampton Loade WTW to treat the additi therefore, this option needs to take account of Activity Bas	apital works associated with this item, as existing intake s rm part of the commercial agreement between the two con- sion in the option modelling but this will need to form part upplied by United Utilities is abstracted sustainably and a ell as mitigating against the risk of spreading invasive non- tment at Hampton Loade WTW (and potentially for storage onal water that is abstracted. Option 7.5.1 is therefore link f available treatment capacity and licensed volumes.	ites will be used to abstract the water. Any mpanies. Only OPEX costs are associated t of negotiations and resulting commercial II precautions have been taken in order to native species. Downstream, it is assumed ge in Chelmarsh Reservoir). Consideration and to all options involving the existing or a	Maintenance required	1?	No
Construction Pre-Mitigation: There is a negli Post-Mitigation: As it is assum Operation Pre-Mitigation: There is a High transfer mechanism and/or term Post-Mitigation: Minor negative additional volume could result in Maintenance Pre-Mitigation: There is a majo pipeline fouling. Post-Mitigation: It is assumed potentially containing INNS prop	igible pre-mitigation risk at the construction p ed that no capital works are required for the i in Risk of INNS transfer occurring during the o hinating at an open reservoir or channel. e effects- the River Severn and River Vyrnwy in a slight increase in propagules being transp or pre-mitigation risk of INNS transfer occurri that maintenance will be undertaken under b bagules such as screen debris or mechanical					
	Activity has	ad Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation	Vegligible			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Vealiaible			
Maintenance Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Vealiaible			
Tromingation	INNS Reco	rd Risk Assessment Summary	Togligioro	I	NNS Occurrence Records	
No INNS have been previously recorded within 500m of the scheme				Common Namo	Sciontific Name	Occurrences
	No initio have been pr	evidually recorded within 300m of the acheme.		Common Name		Occurences

Scheme Reference	Third-	Option Name	Source Type	RAG Score	RAG Score		Minor
0.1.1	Third	Option Description	mild-party option, potable	Third-party option: potable import		Third-party or	otion: potable import
The proposed scheme is to form an a	Raw Water Transf	er?		No			
pumping plant would be required, to connect into the SSW network. In exchange for the bulk supply, SSW would compensate Company X by providing a mains water supply of an equivalent amount.					ed?		Yes
<ul> <li>The scale and feasibility of this option</li> <li>The amount of water that ca</li> <li>The mains supply that would</li> <li>The number of abstraction p</li> <li>Managing water quality risks</li> </ul>	E						
	Activity I	Based Risk Assessment Summary					
Construction Pre-Mitigation: There is a major pre- any existing site/compound and is like Post-Mitigation: Although extensive best practice biosecurity measures w Operation Pre-Mitigation: There is a negligible open channel transfer mechanisms a Post-Mitigation: No negative effects Maintenance Pre-Mitigation: There is a minor pre- dredges and excavators and the trans Post-Mitigation: It is assumed that is potentially containing INNS propagul	e-mitigation risk of INNS transfer occ ely to result in the transfer of biologic construction activities are required w vill be adopted during construction. e risk of INNS transfer occurring durir and does not terminate at an open ch s - as the scheme involves the transf e-mitigation risk of INNS transfer occursion asport of biological material such as s maintenance will be undertaken und les such as screen debris or mechan						
	Activity	pased Risk Assessment Summary					
Construction Activity Risk							
Pre-Mitigation	Major Risk	Post Mitigation	Minor				
Operational Activity Risk							
Pre-Mitigation	Negligible Risk	Post Mitigation	Negligible				
Maintenance Activity Risk							
Pre-Mitigation	Minor Risk	Post Mitigation	Negligible				
INNS Record Risk Assessment S	Summary				INNS Occurre	nce Records	
A total of 11 INNS which may repre-	esent a transfer risk have been rec	orded within 500 meters of the proposed sch	neme infrastructure. Occurrence density mapping shows	Common Name	Scientific	c Name	Occurences
concentrations of INNS close to Wir	Golden club	Orontium a	aquaticum	40			
risk of transfer of the species listed of	Swamp Stonecrop	Crassula	helmsii	32			
listed to a varying extent.	Monarch Butterfly	Danaus p	olexippus	16			
	Douglas Fir	Pseudotsuga	a menziesii	10			
	Rusty Crayfish	Orconectes	s rusticus	8			
	Invasive garden ant	Lasius ne	eglectus	6			
				Rapha Whelk	Rapana	venosa	6
				New Zealand Willowherb	Epilobium br	runnescens	4
				Killer shrimp	Dikerogamma	arus villosus	4
					Agrilus pla	anipennis	1

Scheme Reference		Option Name	Source Type	RAG Score		Minor
8.1.5	Third Party Option: d	rill new GW source with licence trade	Third party	RAG Scole		
		Option Description		Construction require	ed	Yes
The proposed scheme is to deve	elop a new groundwater source in the Burto	on-upon-Trent area, licensing it through spa	are licence capacity (secured through third party licence	Raw Water Transfer	?	No
The scheme requires identification standby arrangement). Pumps, pi	on and purchase of an appropriate area of ipework, power supply, switchgear and othe	Maintenance required	1?	Yes		
3 MI/d. The notional concept is fo	or a 17.5km length of 300mm diameter main					
An alternative option would be to	install treatment plant at the site, subject					
concept design assumed similar t	treatment being needed as for the Warton s	cheme.				
	Activity Bas	ed Risk Assessment Summary				
Construction Pre-Mitigation: There is a major any existing site/compound and is Post-Mitigation: Although extens best practice biosecurity measure Operation Pre-Mitigation: There is a neglig open channel transfer mechanism	pre-mitigation risk of INNS transfer occurri s likely to result in the transfer of biological r sive construction activities are required which as will be adopted during construction. hible risk of INNS transfer occurring during the ns and does not terminate at an open chan	ng at the construction phase as the option re naterial through the transport of significant q h result in increased distribution of terrestrial he operation as the option does not involve the nel or reservoir.	equires the construction of new infrastructure outside of juantities of topsoil, aggregates, vegetation or raw water. and aquatic INNS, the risk is considered minor assuming the abstraction/transfer of raw water and does not utilise			
Post-Mitigation: No negative effe	ects - as the scheme involves the abstraction	on and transfer of groundwater water within a	a closed system.			
Maintenance Pre-Mitigation: There is a minor	r pre-mitigation risk of INNS transfer occur	ing during maintenance of the option as the	ere is no requirement for the use of machinery such as			
dredges and excavators and the	transport of biological material such as scre	en debris and pipeline				
Post-Mitigation: It is assumed the	hat maintenance will be undertaken under b	est practice mitigation measures in view of filtration solids will be bandled appropriately	the company-wide biosecurity plan and waste materials			
			y.			
	Activity Bas	ed Risk Assessment Summary				
Construction Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Negligible Risk	Post Mitigation	Negligible			
Maintenance Activity Risk						
Pre-Mitigation	Minor Risk	Post Mitigation	Negligible			
	INNS Reco	rd Risk Assessment Summary		II	NNS Occurrence Records	
A total of 11 INNS which may re	epresent a transfer risk have been recorde	ed within 500 meters of the proposed sche	eme infrastructure. Occurrence density mapping shows	Common Name	Scientific Name	Occurences
concentrations of INNS close to	Winshill and at various points along the pr	oposed pipeline routes. Terrestrial species	such as New Zealand willowherb, Emerald ash borers,	New Zealand Mudsnail	Potamopyrgus antipodarum	21
risk of transfer of the species listed due to the supply source. The application of mitigation during each phase is likely to reduce the potential risk of the spread of the species listed to a varying extent.				Lily Beetle	Lilioceris lilii	10
				Harlequin Ladybird	Harmonia axyridis	7
		Nuttall's waterweed	Elodea nuttallii	4		
		Sycamore	Acer pseudoplatanus	3		
		Heath Star Moss	Campylopus introflexus	2		
				Himalayan Balsam	Impatiens glandulifera	2
		Ground Elder	Aegopodium podagraria	1		
				Cherry Laurel	Prunus laurocerasus	1
				Snowberry	Symphoricarpos albus	1

Scheme Reference	Optie	on Name	Source Type	RAG Score	Moderate	
8.3.1	Third-party option: new raw water s	orage reservoir close to the River Trent	Third party		Woderale	
	Optic	Construction required	Yes			
The proposed scheme is to constru-	ict a new raw water reservoir close to the River	Raw Water Transfer?	Yes			
no longer operational).	on may be identified that is currently owned by it	Maintenance required?	Yes			
The scale and feasibility o	f this option is dependent on several factors, inc	uding:	4 A 2000			
Identification of a	n appropriate location and land purchase.	oison Coors and approved by the Environment	Agency.			
Planning approva	al for a new reservoir.		ſ	a.		
Determination of     Several potential sites alongside th	the DO benefit from increased raw water storag	e. Arison nurnoses By inspection, the plan area	of each site has been estimated. Three sites			
appear to offer an area in the regio	n of 250,000 m <sup>2</sup> . Assuming an average water st	brage depth of 2m, this would provide a storage	e volume of approximately 0.5 Mm3. A smaller			
site has a plan area of approximate	ly 79,000 m2 and an average depth of 2m would	I correspond to a storage volume of approxima	tely 0.16 Mm3.			
main over a distance of approximat	ely 15 km (Chilcote) or 25 km (Seedy Mill). Alter	natively a new, local treatment works could be	constructed in the Burton-upon-Trent area, but			
this would be subject to a suitable I	ocation being identified.	- the setting A site has the networked for				
average depth of 5m.	servoir would be designed to provide 6 months	storage, the option A site has the potential for	250,000 m2 reservoir storing 1250 Mil with an			
	Activity Based Ri	sk Assessment Summary				
Construction						
Pre-Mitigation: There is a major p	re-mitigation risk of INNS transfer occurring at t	e construction phase as the option requires th	e construction of new infrastructure outside of			
any existing site/compound and is I	ikely to result in the transfer of biological materia	through the transport of significant quantities of	of topsoil, aggregates, vegetation or raw water.			
best practice biosecurity measures	will be adopted during construction.	in increased distribution of terrestrial and aquat	in initia, the fisk is considered finition assuming			
Operation						
transfer mechanism and/or termina	sk of INNS transfer occurring during the operati ting at an open reservoir or channel.	on of the option resulting from the abstraction/t	ransfer of raw water utilising an open channel			
Post-Mitigation: The construction	of a new reservoir fed by raw water abstraction v	ill establish new habitat and transfer pathway for	or INNS. Additionally, the reservoir will provide			
new secondary pathways for the d Mill WTW also represents a risk of I	istribution of INNS. Although not terminating at NNS transfer over a significant distance and betw	an open channel or reservoir the transfer of rav	w water from the proposed reservoir to Seedy			
in the Burton-Upon-Trent area. Be	st practice biosecurity measures (such as signs	washdown facilities for recreational users, etc	a may also reduce secondary transfer risks at			
the proposed reservoir.						
<i>Pre-Mitigation:</i> There is a minor p	pre-mitigation risk of INNS transfer occurring du	ing maintenance of the option as there is no	requirement for the use of machinerv such as			
dredges and excavators and the tra	ansport of biological material such as screen det	ris and pipeline				
Post-Mitigation: It is assumed that potentially containing INNS propage	t maintenance will be undertaken under best pro ules such as screen debris or mechanical filtration	ctice mitigation measures in view of the compa in solids will be handled appropriately	any-wide biosecurity plan and waste materials			
	Activity based Di	sk Assassment Summary				
Construction Activity Risk	Activity based Ki	SK ASSessment Summary				
Pre-Mitigation	Major Risk	Post Mitigation	Minor			
Operational Activity Risk						
Pre-Mitigation	Major Risk	Post Mitigation	Moderate			
Maintenance Activity Risk						
Pre-Mitigation	Minor Risk	Post Mitigation	Negligible			
INNS Record Risk Assessment Summary				INNS Occurrence Records		
A total of three INNS have been recorded within 500 meters of the proposed scheme infrastructure. Occurrence density mapping shows concentrations of INNS close to Burton-			Common Name Scient	ific Name Occurences		
on-Trent along the River. Terrestrial species such as Himalayan balsam, lily beetle and harlequin ladybird are likely to represent a risk during the construction phase due to the				Harlequin Ladybird Harmon	nia axyridis 9	
balsam may present a risk during the	ne operation of the scheme, as the transfer of r	aw water creates a new pathway for these INN	NS. During the maintenance phase, Himalayan	Lily Beetle Lilio	ceris lilii 6	
balsam may present a potential risk	due to the likelihood of being spread during ma	ntenance-related activities, such as dredging a	nd clearing screen debris.	Himalayan Balsam Impatiens	s glandulifera 5	
Japanese knotweed which may pres	sent a risk at all stages of the scheme. The appl					
species listed to a varying extent.						
			-			