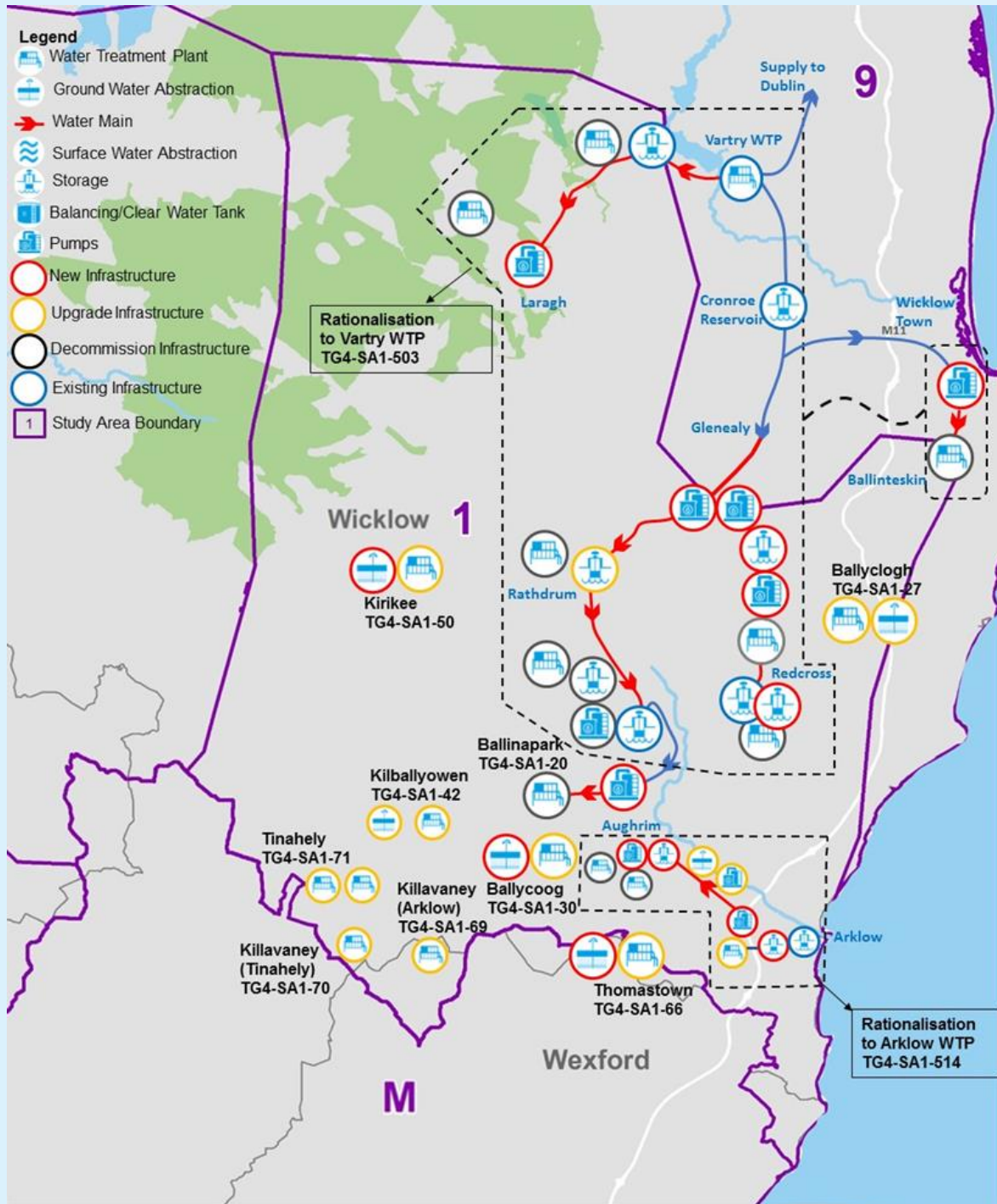


7.5.1 Study Area 1 – Wicklow

Study Area 1					
No. of WRZs	SA1 lies within the counties of Wicklow and Wexford, covering an area of approximately 680 km ² . The population of the Study Area is 24,000.				
18	The Principal Settlements are Arklow, Ashford, Rathdrum, Aughrim, Glenealy, Roundwood, Avoca, Laragh, Ballinaclash, Redcross, and Barndarrig. Arklow is the only Principal Settlement with a population greater than 10,000.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	20	Groundwater	15	DYCP 2019	1,039
High Risk WTP	18	Surface Water	5	DYCP 2044	1,287
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	4	Increase	5	Increase	0
Upgrade (Capacity & WQ)	6	Maintain	4	Maintain	1
Decommission	10	Decommission	6	Decommission	4
New	0	New	1	New	0
<p>The Preferred Approach (PA) for SA1 consists of 10 WRZ Options and two (2) SA Grouped Options.</p> <p>The SA Grouped Options involve:</p> <ul style="list-style-type: none"> rationalisation of Aughrim Annacurra WRZ and Ballymorris WRZ to the Arklow WRZ. This Option requires an increased GW abstraction at an existing wellfield at Woodenbridge, Arklow Ballyduff WTP upgrade, new storage and approximately 13km of new/upgraded network. rationalisation of six (6) WRZs to Vartry WTP in SA9, improving resilience through interconnections: Avoca Ballinaclash, Redcross Conary, Ballinteskinn, Rathdrum. Laragh Annamoe, Barndarrig. The Option will require new pumps and approximately 48km of new/upgraded network to connect the WRZs and allow for the additional supply. <p>The Preferred Approach provides environmental benefits by decommissioning two (2) existing abstractions that may not meet sustainability guidelines - Mill Glen Stream and the Avonbeg tributary.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA1, we have committed to Leakage Targets of 624 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 1

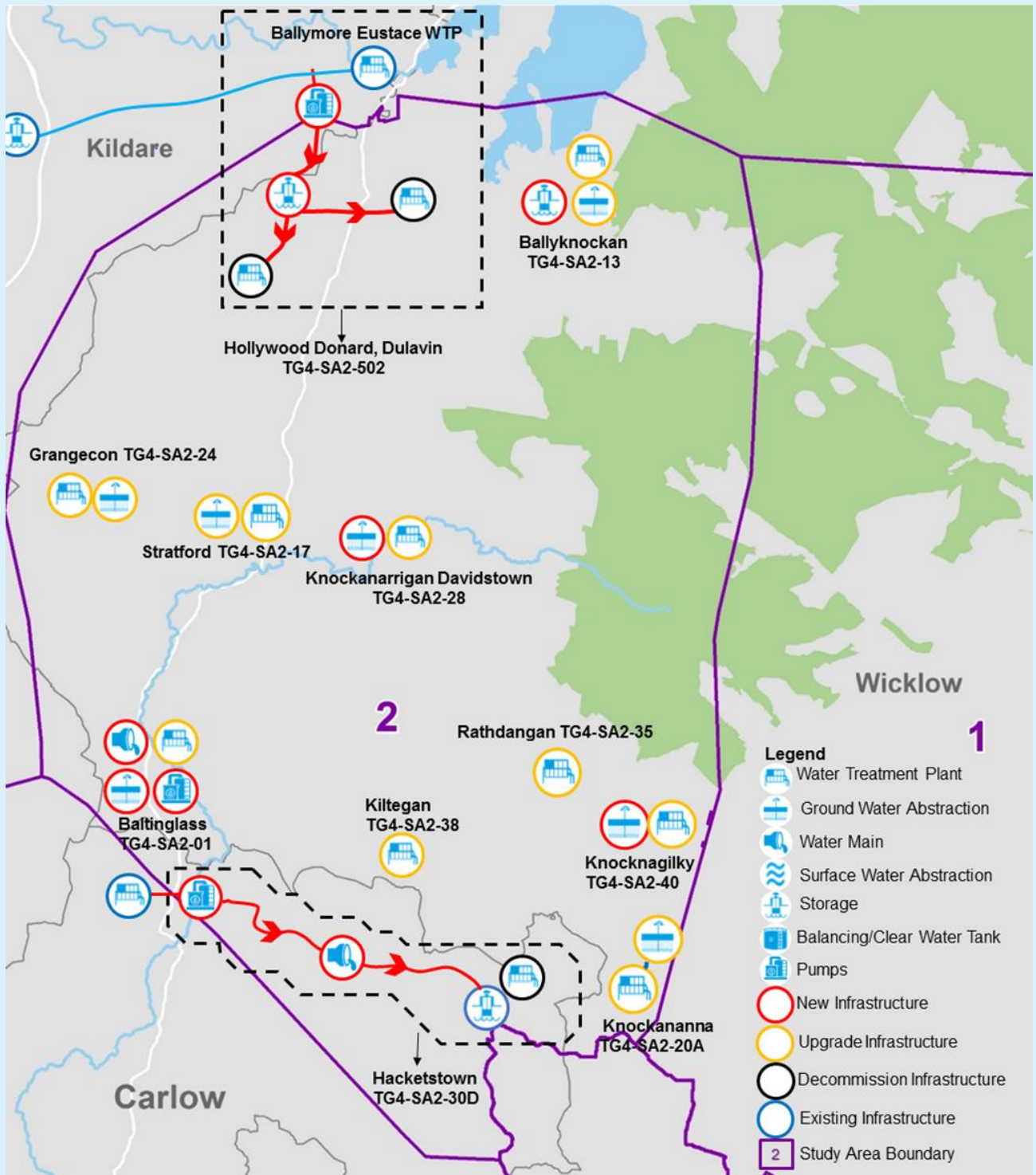


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.2 Study Area 2 – West Wicklow

Study Area 2					
No. of WRZs	SA2 lies within the counties of Carlow, Kildare and Wicklow, covering an area of approximately 545 km ² . The population of the Study Area is about 6,800.				
12	The Principal Settlements are Baltinglass, Dunlavin, Donard, Hacketstown, Stratford, Ballyknockan and Knockananna.				
	The largest settlement is Baltinglass, with a population of approximately 2,200.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	12	Groundwater	11	DYCP 2019	1,278
High Risk WTP	11	Surface Water	1	DYCP 2044	1,510
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	2	Increase	5	Increase	0
Upgrade (Capacity & WQ)	7	Maintain	4	Maintain	0
Decommission	3	Decommission	2	Decommission	1
New	0	New	2	New	0
<p>The Preferred Approach for SA2 consists of local WRZ supplies for 10 the 12 WRZs in the Study Area. This includes a new connection at Rathvilly WTP (in SA6) and the decommissioning of the Hacketstown WTP.</p> <p>There is one (1) SA Grouped Option proposed for two (2) WRZs, Dunlavin and Holywood. This involves rationalising these two WRZs to Ballymore Eustace WTP (SA9) via a new connection to the Ballymore Eustace – Old Kilcullen trunk main. The Option includes a new pumping station, a new service reservoir and approximately 15 km of new/upgraded network.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA2, we have committed to Leakage Targets of 33 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 2

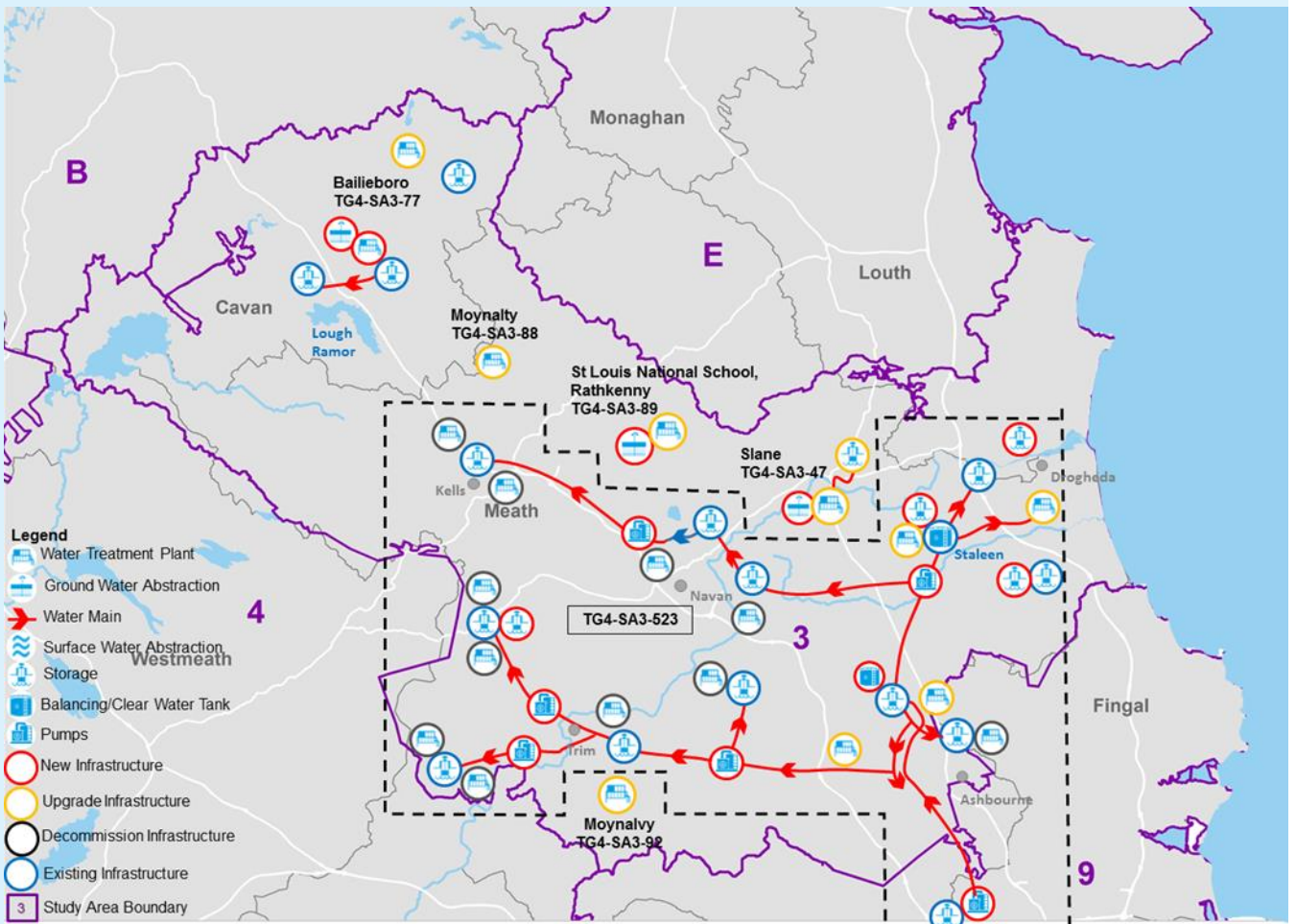


*TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.3 Study Area 3 - Meath

Study Area 3					
No. of WRZs	SA3 lies within the counties of Cavan, Louth, Fingal, Westmeath and Meath, covering an area of approximately 2,400 km ² . The population of the Study Area is about 190,000.				
11	<p>The Principal Settlements are Drogheda, Ashbourne, Laytown-Bettystown-Mornington-Donacarney, Ratoath, Trim, Ceanannas Mór (Kells), Duleek, Gormanston, Dunshaughlin, Stamullen, Bailieborough, Virginia, Clogherhead, Carlanstown and Slane.</p> <p>Settlements with a population over 10,000 include Navan, Drogheda, Laytown-Bettystown-Mornington and Ashbourne.</p>				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	19	Groundwater	13	DYCP 2019	18,155
High Risk WTP	18	Surface Water	7	DYCP 2044	26,013
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	6	Increase	1	Increase	0
Upgrade (Capacity & WQ)	2	Maintain	5	Maintain	2
Decommission	11	Decommission	7	Decommission	5
New	1	New	2	New	0
<p>The Preferred Approach for SA3 consists of local WRZ supplies four (4) of the WRZs in the Study Area.</p> <p>A single SA Grouped Option resolves the deficit for seven (7) of the WRZs, namely Athboy, Ballivor, Kells-Oldcastle, Kilmessan, Navan-Mid Meath, South Louth & East Meath, and Trim. This involves improved interconnection between WRZs, and supply from a New Shannon Source. New storages, new pumps and watermain network of approximately 154 km will be required as part of this Option.</p> <p>The Preferred Approach provides environmental benefits by decommissioning two (2) existing abstractions that may not meet sustainability guidelines. - River Boyne at Liscarton WTP and Lough Bane.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA3, planned leakage reduction programmes will reduce leakage by 356 m³/day in the Athboy, Baeilieboro, Navan Mid Meath and Trim WRZs. We have also committed to Leakage Targets of 13,146 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 3

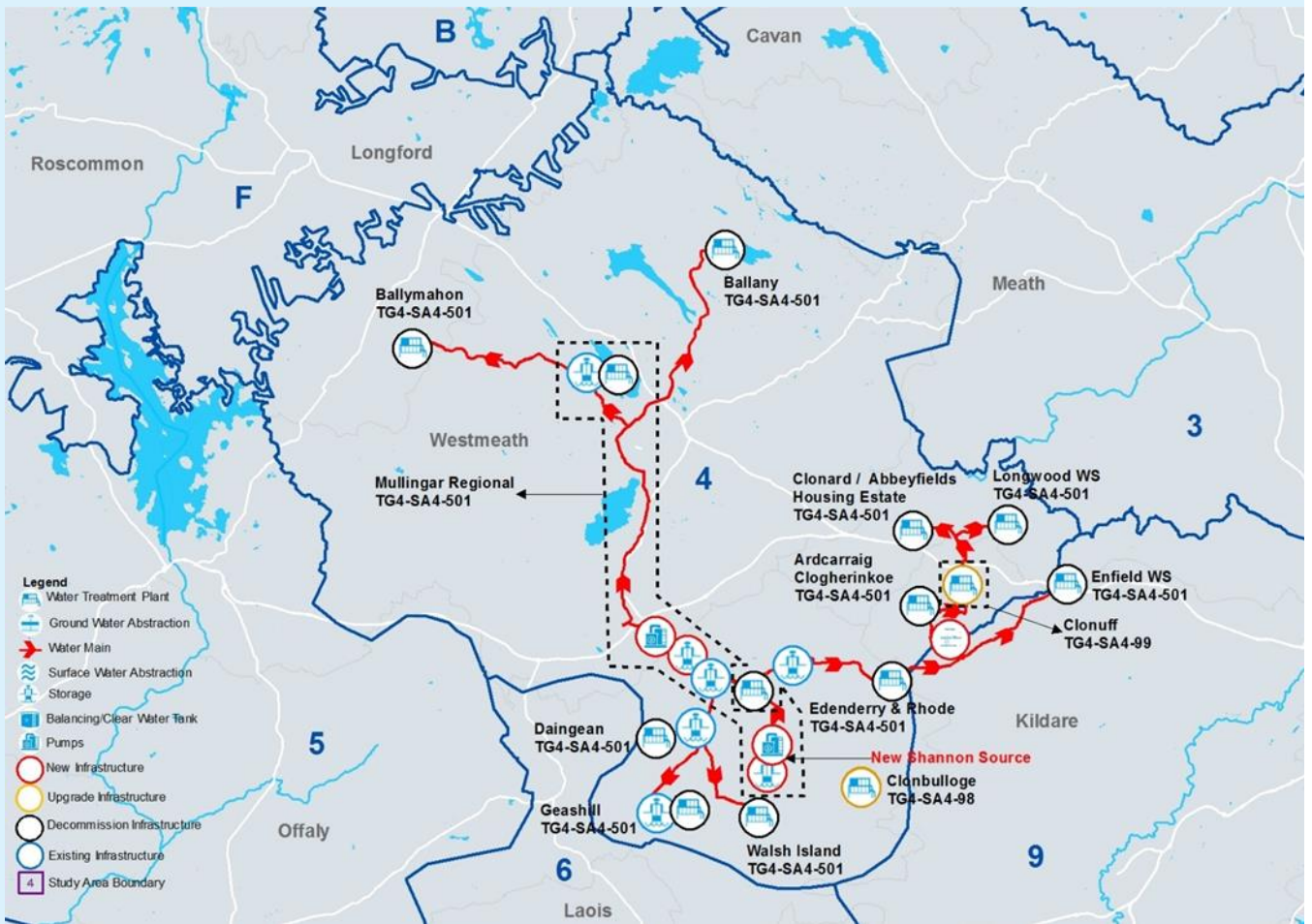


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.4 Study Area 4 – West Meath

Study Area 4					
No. of WRZs	SA4 lies within the counties of Cavan, Longford, Westmeath, Meath, Offaly and Kildare covering an area of approximately 2,640 km ² . The population of the Study Area is about 87,900.				
13	The Principal Settlements are Mullingar, Longford, Johnstownbridge, Edenderry, Drumlish, Meathas Truim (Edgeworthstown), Newtownforbes, Enfield, Kinnegad, Ballymahon, Castlepollard, Rhode and Tyrrellspass. Mullinger is the only settlement with a population over 10,000.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	15	Groundwater	12	DYCP 2019	22,414
High Risk WTP	13	Surface Water	3	DYCP 2044	38,190
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	2	Increase	0	Increase	0
Upgrade (Capacity & WQ)	0	Maintain	2	Maintain	0
Decommission	13	Decommission	10	Decommission	3
New	0	New	0	New	0
<p>The Preferred Approach for SA4 consists of Local WRZ supplies for two (2) of the 13 WRZs. These supplies are not in deficit; however, WTPs will be upgraded to improve water quality. The remaining 11 WRZs will be supplied by transfers from the New Shannon Source (NSS).</p> <p>The Preferred Approach provides environmental benefits by decommissioning two (2) existing abstractions that may not meet sustainability guidelines - Lough Owel (a SAC designated lake) and Enfield GW source adjacent to the River Blackwater. Additionally, meeting growth in Ballany with the NSS transfer rather than increasing existing abstraction at Lough Lane, will assist in meeting WFD objectives.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA4, planned leakage reduction programmes will reduce leakage by 251 m³/day in the Ballymahon and Mullingar Regional WRZs. We have also committed to Leakage Targets of 9,009 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 4

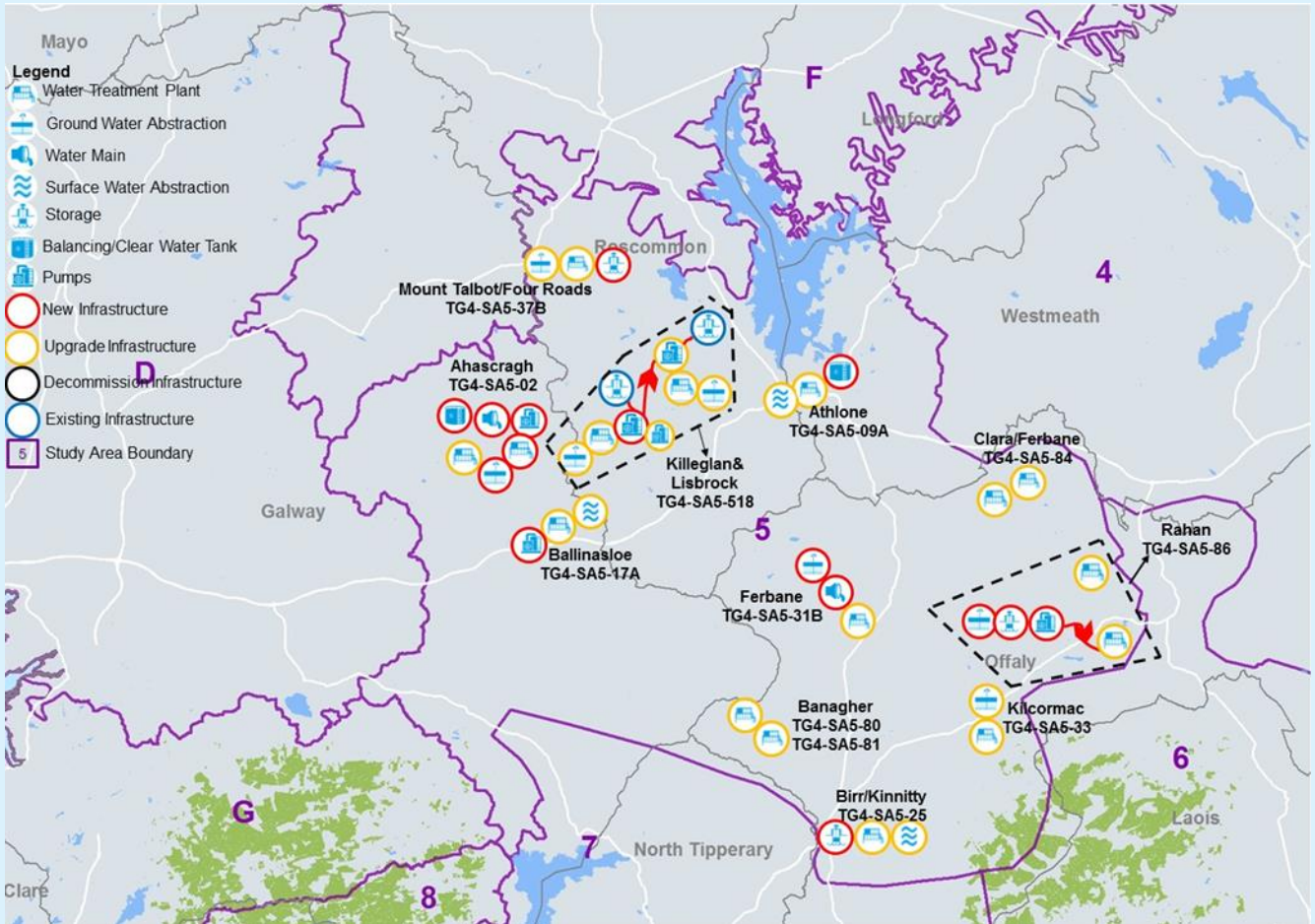


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.5 Study Area 5 – Offaly/Roscommon

Study Area 5					
No. of WRZs	SA5 lies within the counties of Galway, Roscommon, Longford, Westmeath, Tipperary, Offaly and Laois, covering an area of approximately 2,590 km ² . The population of the Study Area is about 72,000.				
10	The Principal Settlements are Athlone, Tullamore, Ballinasloe, Roscommon, Birr, Clara, Ferbane, Mucklagh, Banagher, Cloghan, Athleague, Ahascragh and Kinnitty. Athlone is the only settlement with a population over 10,000.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	16	Groundwater	12	DYCP 2019	6,155
High Risk WTP	14	Surface Water	7	DYCP 2044	9,041
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	9	Increase	5	Increase	3
Upgrade (Capacity & WQ)	7	Maintain	8	Maintain	4
Decommission	0	Decommission	0	Decommission	0
New	1	New	2	New	0
<p>The Preferred Approach for SA5 consists of local WRZ Options for all of the WRZs in the Study Area, primarily driven by the small scale of the supplies and difficulties in transporting small volumes of water over long distances.</p> <p>For one of the larger demand areas, South Roscommon (Lisbrock & Killeglan), the Preferred Approach involves increasing the existing groundwater abstraction at Killeglan and Lisbrock, upgrading the associated WTPs and providing new/upgraded network to allow for the additional supply.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA5, planned leakage reduction programmes will reduce leakage by 570 m³/day in the Birr/Kinnitty, South Roscommon and Athlone WRZs. We have also committed to Leakage Targets of 7,352 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 5

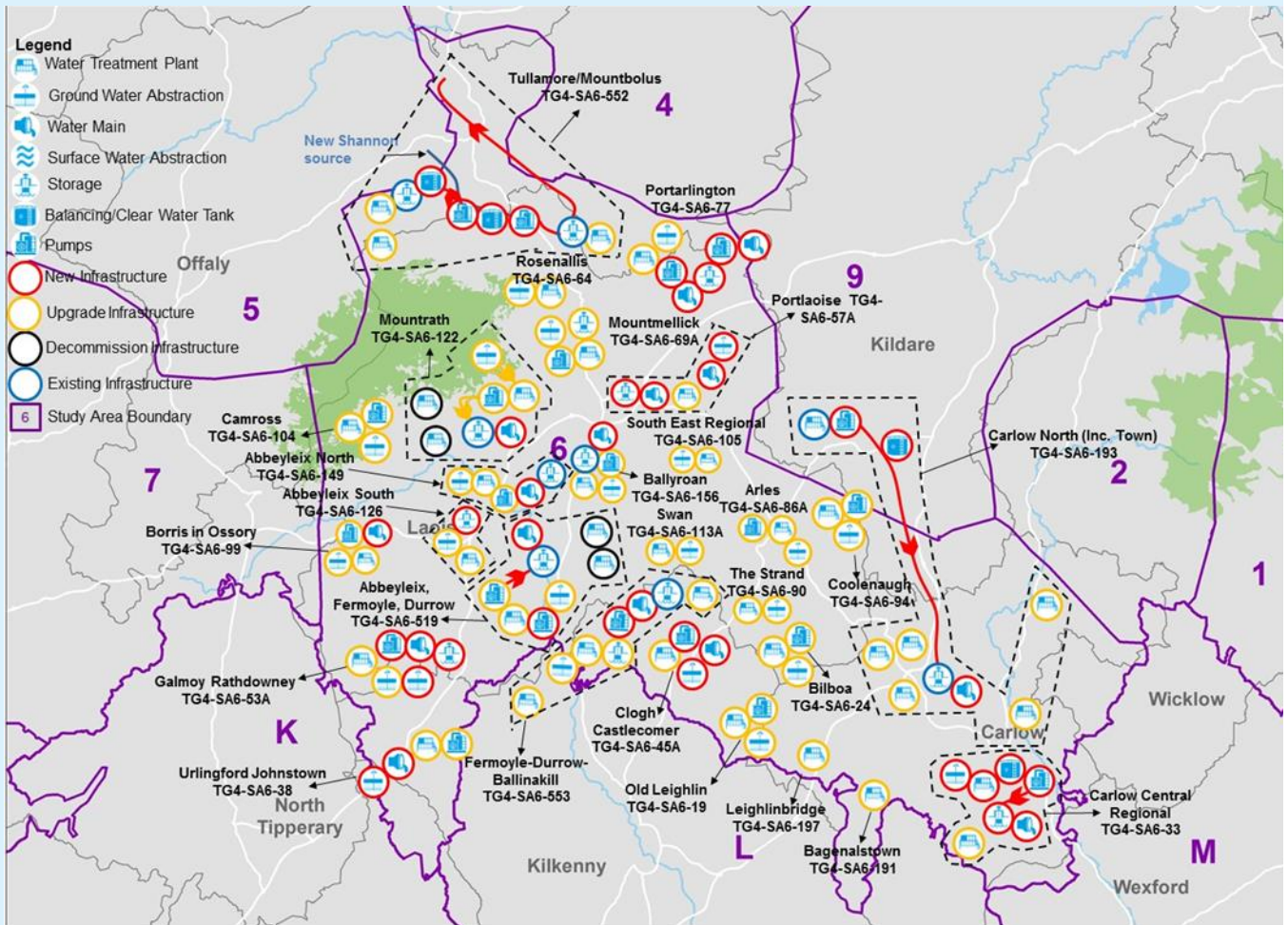


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.6 Study Area 6 – Laois

Study Area 6					
No. of WRZs	SA6 lies within the counties of Carlow, Kildare, Kilkenny, Laois, Tipperary, Offaly, Westmeath, Wexford and Wicklow covering an area of approximately 3,030 km ² . The population of the Study Area is about 126,700.				
	The Principal Settlements are Carlow, Portlaoise, Portarlinton, Tullow, Mountmellick, Castledermot, Abbeyleix, Mountrath, Ballon, Muinebeag (Bagenalstown), Ballyroan and Durrow.				
28	The principal settlements with a population of over 10,000 include Carlow, Portlaoise and Tullamore.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	42	Groundwater	38	DYCP 2019	30,525
High Risk WTP	40	Surface Water	6	DYCP 2044	35,679
Preferred Approach Summary					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	17	Increase	12	Increase	0
Upgrade (Capacity & WQ)	21	Maintain	20	Maintain	5
Decommission	4	Decommission	6	Decommission	1
New	1	New	11	New	0
<p>The Preferred Approach for SA6 consists of WRZ Options for 24 of the 28 WRZs. One of the WRZ Options includes rationalisation of Cloonin Hill and Drim WTPs to Knocks WTP. For the large demand area of Carlow Town, the SA Preferred Approach involves a cross SA transfer from the GDA to Carlow Town (Browneshill Reservoir) via Srowland WTP (SA9). This Option will require the provision of a new storage, new pumps and lay approximately 28.6 km of new network.</p> <p>There are two (2) SA Options:</p> <ul style="list-style-type: none"> Ballinakill and Durrow WRZs will be interconnected. This will include an increased GW abstraction and WTP upgrades. Tullamore and Mountbolus will be supplied via a connection to the proposed NSS. This includes a balancing storage at NSS connection, new reservoir, new/upgraded pumps and approximately 25.5km of new/upgraded network. <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA6, planned leakage reduction programmes will reduce leakage by 823 m³/day across five (5) WRZs - Carlow North, Clogh Castlecomer, Portlaoise, Portarlinton and Tullamore WRZs. We have also committed to Leakage Targets of 8,311 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 6

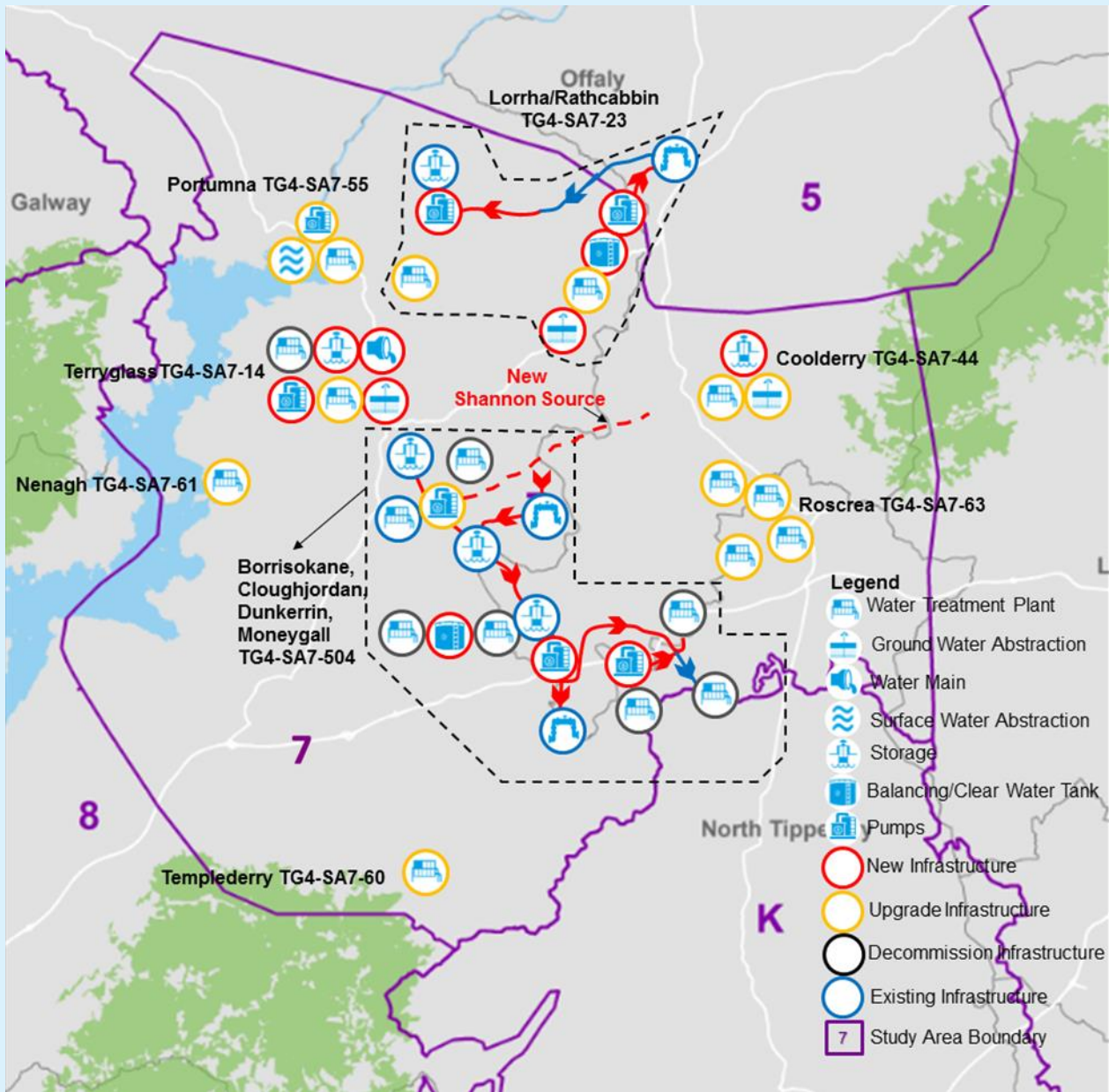


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.7 Study Area 7 – North Tipperary

Study Area 7					
No. of WRZs	SA7 lies within the counties of Clare, Galway, Laois, Tipperary, and Offaly and covers an area of approximately 1,460 km ² . The population of the Study Area is about 31,300. The Principal Settlements are Nenagh, Roscrea, Portumna, Newtown, Borrisokane, Cloughjordan, Shinrone, Portroe, Moneygall and Silvermines.				
10	There are no principal settlements (settlements with a population of over 10,000) within SA7. The two settlements with the highest populations (exceeding 5,000) include Nenagh and Roscrea.				
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	18	Groundwater	16	DYCP 2019	773
High Risk WTP	17	Surface Water	3	DYCP 2044	984
Preferred Approach Snapshot					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	7	Increase	1	Increase	1
Upgrade (Capacity & WQ)	4	Maintain	8	Maintain	2
Decommission	7	Decommission	7	Decommission	0
New	0	New	2	New	0
<p>The Preferred Approach for SA7 consists of WRZ options for seven (7) of the 10 WRZs in the Study Area. One of the Options is a new GW abstraction at Crossanagh, including an upgrade to Crossanagh WTP, new/upgraded pumps and approximately 500 m of new/upgraded network. A new service reservoir or upgrades to existing reservoir will be required in Terryglass.</p> <p>The remaining WRZ Options involve increased groundwater or surface water abstractions and WTP upgrades.</p> <p>The single SA Grouped Option improves the interconnection between three (3) WRZ, namely Dunkerrin/Moneygall, Greyford Source to Crotta and Cloughjorda. A new supply will be provided from the proposed New Shannon Source. This option includes new/upgraded pumps, new storage at Jones Well WTP and approximately 29 km of new/upgraded network to allow for the transfer of additional supply between WRZs.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA7, we have committed to Leakage Targets of 2,077 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 7



* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.8 Study Area 8 – Limerick Clare

Study Area 8	
No. of WRZs	SA8 lies within the counties of Galway, Clare, Tipperary, Limerick City and County, and Cork covering an area of approximately 4,180 km ² . The population of the Study Area is about 233,600. The Principal Settlements are Limerick city and suburbs, Ennis, Shannon. South West Regional, Annacotty, Sixmilebridge, Ardnacrusha or Castlebank, Mungret, Newport, Ballina, Caherconlish, Adare, Clonlara and Foynes
31	Other than Limerick City and Suburbs which has a population exceeding 100,000, Ennis is the only settlement with a population over 10,000.

Current Supply System

WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	47	Groundwater	41	DYCP 2019	22,007
High Risk WTP	39	Surface Water	7	DYCP 2044	28,084

Preferred Approach Snapshot

Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	14	Increase	9	Increase	2
Upgrade (Capacity & WQ)	17	Maintain	15	Maintain	3
Decommission	18	Decommission	17	Decommission	2
New	0	New	6	New	1

The Preferred Approach for SA8 consists of WRZ options for 18 of the 31 WRZs in the Study Area.

For some of the larger demand areas, the SA Preferred Approach used five (5) SA Options to rationalise and provide spare capacity to 13 WRZs:

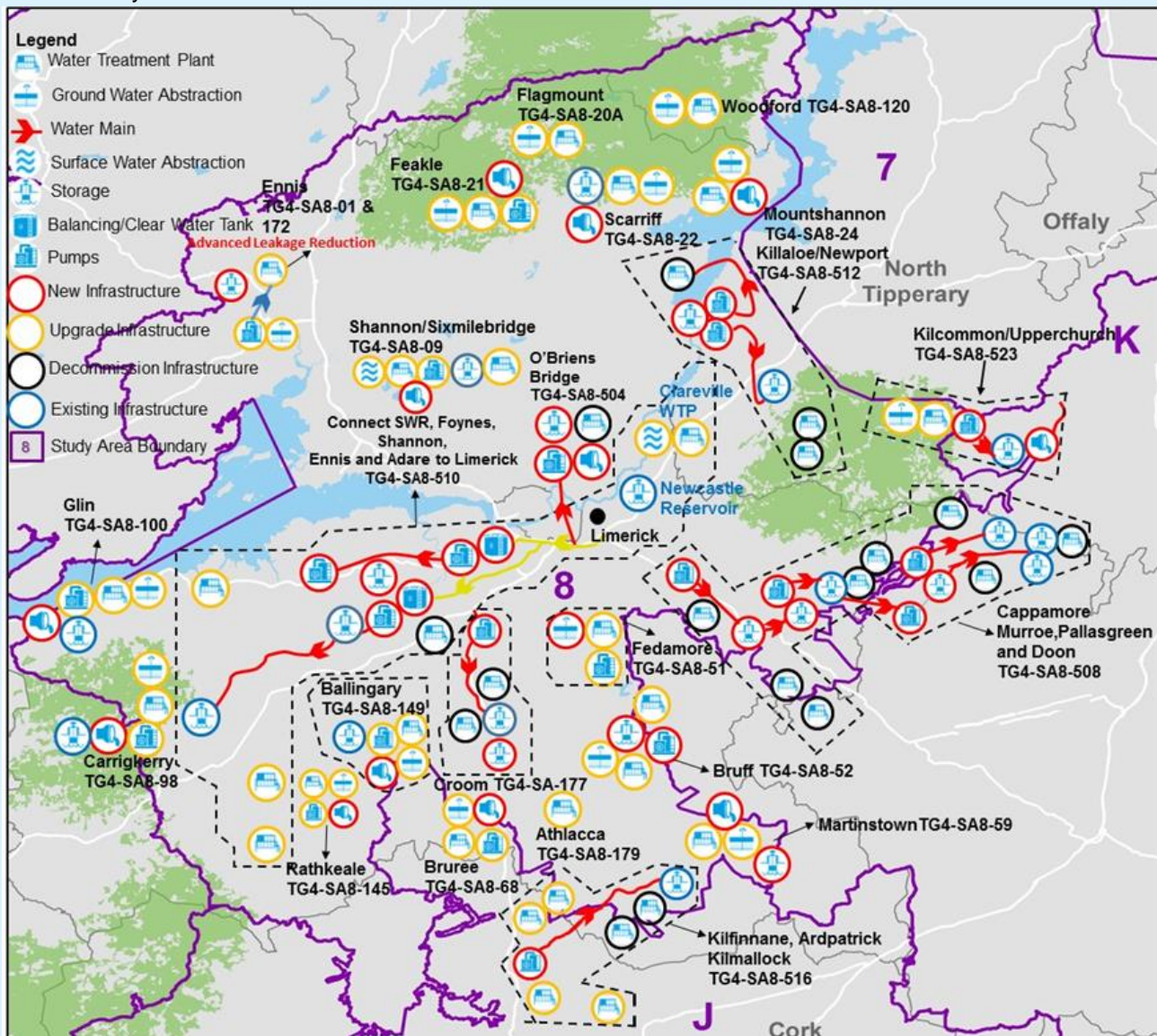
- Supplies spare capacity from Limerick City to neighbouring WRZs, rationalising Cappamore/Murroe/Foileen, Pallasgreen and Doon. This Option includes new/upgraded pumps, new reservoirs and approximately 37.7 km of new/upgraded network to allow for the transfer of the additional supply
- Supplies spare capacity from Glenosheen/Jamestown/Kilmallock to KilfinaneArdpatrick. Rationalise Kilfinane Ardpatrick to Kilmallock WRZ (rationalise to Jamestown WTP (Mount Russell borehole). The Option includes a new pumps and approximately 6.8 km of new network to allow for the transfer of the additional supply. Ballygaddy, Glenosheen, Kilmallock and Jamestown WTPs will be upgraded for water quality purposes.
- Rationalisation of Adare, South West Regional and Limerick City Environs PWS to Limerick
- Rationalisation of Upperchurch to Kilcommon
- One interconnection from the NSS to Newport and Killaloe, enabling the decommissioning three (3) WTPs. The Option includes new storage, new pumps and approximately 11 km of watermain.

Study Area 8

The SA Preferred Approach for the remaining WRZs involves new and increased groundwater abstractions, along with increased surface water abstractions, WTP upgrades, improved connectivity between WRZs and an advanced leakage reduction programme for the Ennis WRZ. The leakage reduction programme needs to be implemented in conjunction with a local GW Option to meet the full WRZ Deficit.

Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA8, planned leakage reduction programmes will reduce leakage by 978 m³/day in the Ennis/Shannon/Sixmilebridge, Ennis and Limerick City WRZs. We have also committed to Leakage Targets of 21,330 m³/day that will reduce leakage to 21% of demand in WRZs where the demand exceeds 1,500 m³/day.

Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.

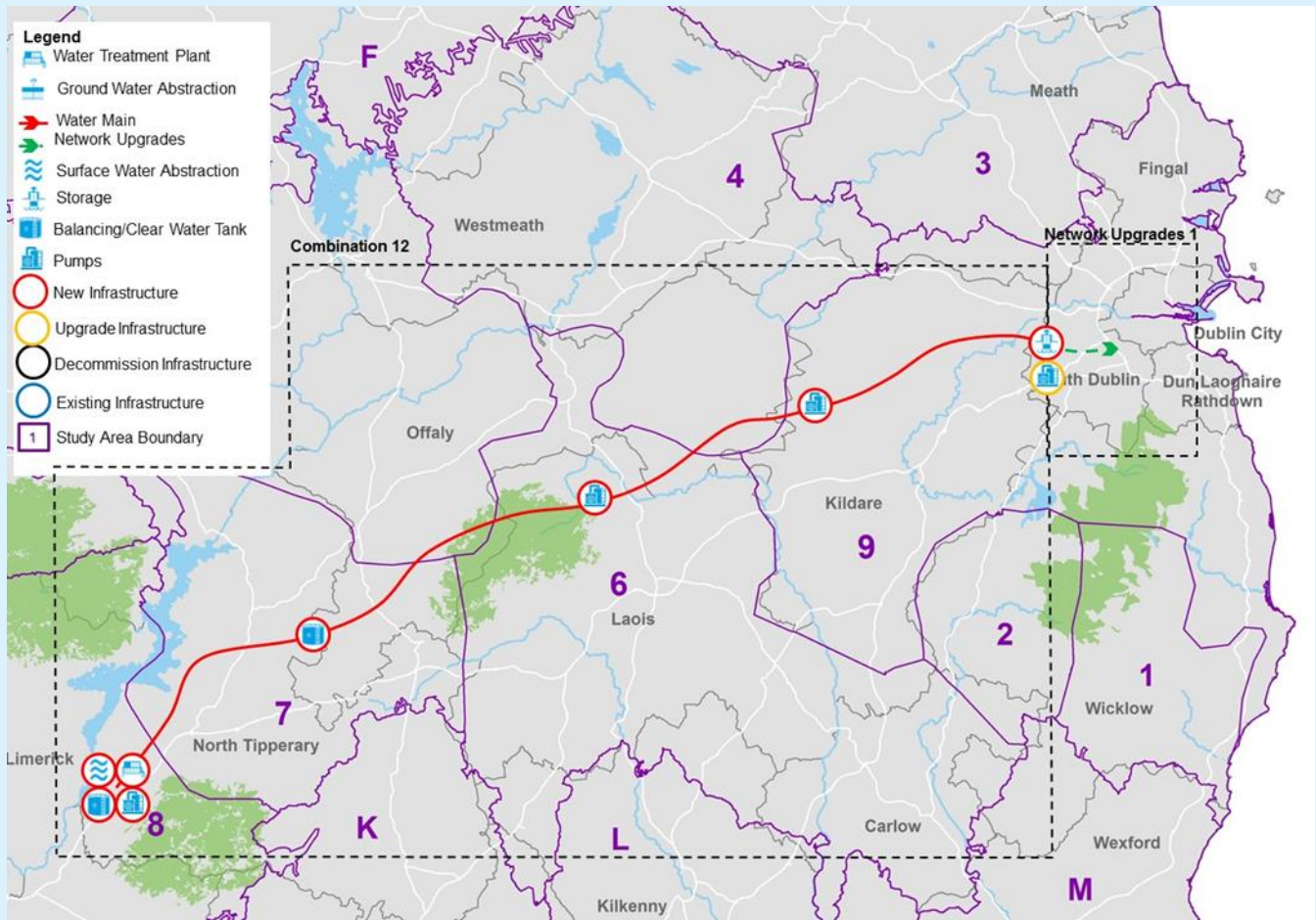


* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.

7.5.9 Study Area 9 – Greater Dublin Area

Study Area 9					
No. of WRZs	Study Area 9 consists of a single Water Resource Zone covering County Dublin and parts of Counties Meath, Wicklow and Kildare, supplying a population of approximately 1.7 million. The area consists of Dublin City and the principal settlements of: Bray, Wicklow, Blessington, Leixlip, Newbridge, Naas, Clonee and parts of Ashbourne.				
1					
Current Supply System					
WTPs	No.	Water Source Type	No.	Supply Deficit	m ³ /day
Existing WTP	12	Groundwater	5	DYCP 2019	132,190
High Risk WTP	11	Surface Water	7	DYCP 2044	182,991
Preferred Approach Snapshot					
Number of WTPs	No.	GW Abstractions	No.	SW Abstractions	No.
Upgrade (WQ only)	10	Increase/New	0	Increase/New	0
Upgrade (Capacity & WQ)	0	Maintain	4	Maintain	6
Decommission	2	Decommission	1	Decommission	1
New	1	New	0	New	1
<p>The Preferred Approach for SA9 comprises a new surface water abstraction of 194 MI/day from The Parteen Basin. The option also includes a new WTP at Birdhill with an output capacity of 185 MI/day, twin rising mains from the abstraction to WTP (2 km), a new break pressure tank, 2 clear water tanks, new pumping station & booster pumping station, new termination point reservoir in Peamount. The supply will be transferred approximately 41 km from the WTP to the break pressure tank via a new 1600 mm pumped pipeline. From the break pressure tank the supply will flow by gravity for the first 170 MI/d and pumped when demand goes above 170 MI/d. The pipeline from the Break pressure tank to the termination point reservoir will be 1600 mm diameter with an approximate length of 130 km.</p> <p>The Preferred Approach includes interventions for improved resilience and quality have been identified. These include upgrades to all WTPs, new storages, new and upgraded trunk mains, pump upgrades and rationalisation of 2 (two) WTPS – Roundwood Well WTP and Glenealy WTP.</p> <p>Ongoing leakage management through our National Leakage Reduction Programme also contributes to reducing the Deficit. In SA9, planned leakage reduction programmes will reduce leakage by 92 MI/day across the Study Area.</p> <p>Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.</p>					

Study Area 9



* TG4-SAX-00X are the Option Codes assigned to each option. A description of each Option is provided in Table 5.9 of the Technical Appendices 1-9.