4.16 RPA4 – Acle

The cost mechanism for RPA4 is shown in Table 4-16 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-16 along with relevant traffic lights where appropriate.

Wastewater

Acle-Damgate WWTW has existing headroom capacity of approximately 150 • properties, hence volumetric upgrade will be for only 1,850 properties;

Water Supply

Water would be supplied from Heigham WTW •

Water Resources

• Additional water resources are from connections to Thorpe St Andrew BH and Colney BH, GOGDS, River Wensum reuse and off line storage

Flood Risk

- The area has been assigned a red light as there is more than 25% of the PGA within • Flood Zone 2 or 3;
- Flood risk from the PGA has been assigned the following traffic lights: •
- From Belaugh WWTW amber (Discharges into the River Bure)
- SUDS has been assigned an amber traffic light (average SUDS suitability) •

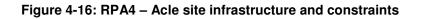
Environment

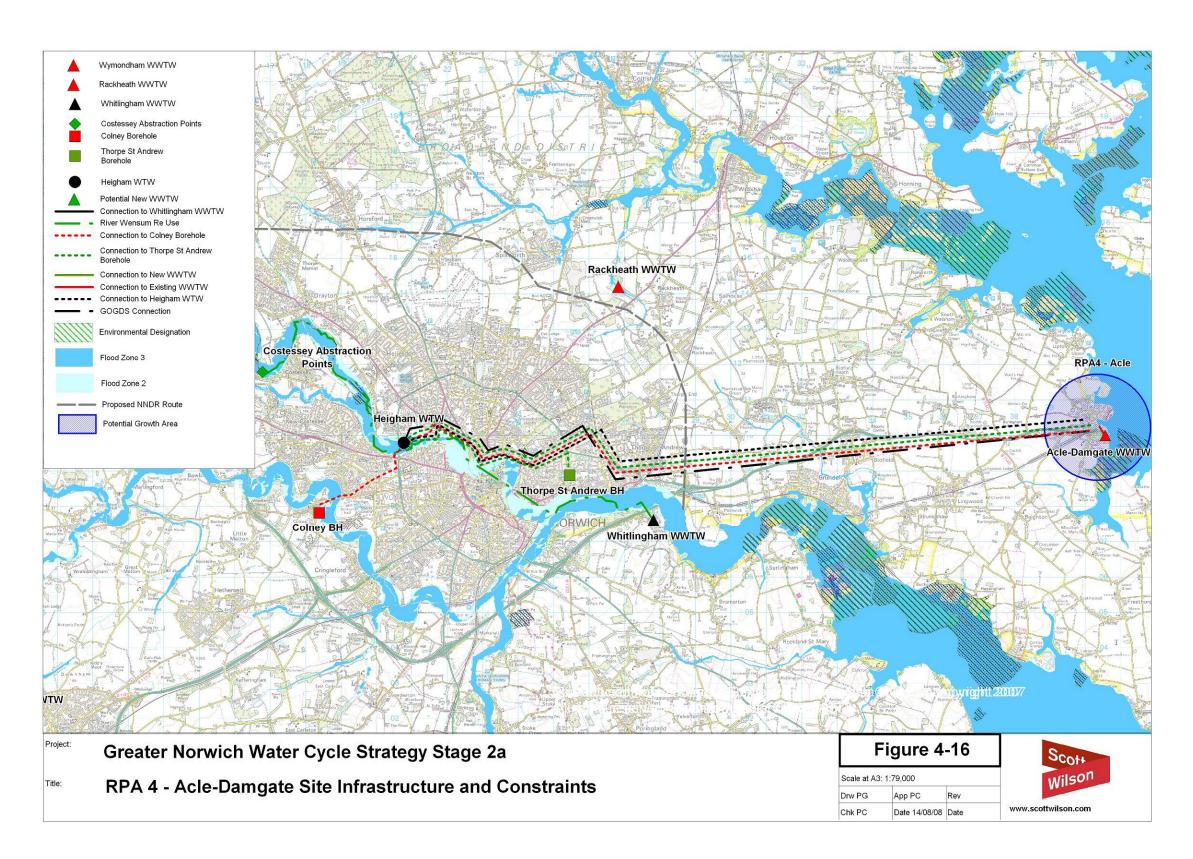
- Conservation designation has been assigned the following traffic lights: •
- From Belaugh WWTW red (There are significant designated areas within the PGA • boundary, including the Decoy Carr SSSI and Damgate Marshes SSSI which are part of the Broads SAC and Broadlands SPA. These areas cover over half of the potential development area. Furthermore, discharge from Acle-Damgate WWTW will be directly into part of the Broads SAC).
- The PGA has been assigned a red traffic light in relation to groundwater vulnerability. •
- The PGA has been assigned a green traffic light in relation to Source Protection Zone • requirements.

Table 4-16: RPA4 total summary costs

						Section		C 1			
Norwich	Water Cycle	Study - Costing	g Calcs			Date	Job no. D11860				
RPA4	01/09/2008	Project no.									
Checked	sion	Suffix	Orig	1	2	ND			П		
ND	Rev	Date	Check		14/08/2008	PM					
Dist (m)	PDS 141	100 (41)	500 359	1,000 859	2,000 1,859						
500		170,000	170,000	190,000	230,000						
		- 20,000 190,000	1,180,000 70,000 1,420,000	2,810,000 140,000 3,140,000	9,460,000 270,000 9,960,000						
Dist (m)	PDS	100	500	1 000	2 000						
21,000	100	4,700,000 1,700,000 6,400,000	4,800,000 2,100,000 6,900,000	4,900,000 2,500,000 7,400,000	5,100,000 3,000,000 8,100,000						
Dist (m)	PDS	100 6.100.000	500 6.100.000	1,000 6,200,000	2,000 6,600,000						
24,500		2,200,000 5,500,000 2,000,000 7,500,000	2,700,000 5,600,000 2,500,000 8,100,000	3,200,000 5,700,000 2,900,000 8,600,000	3,800,000 6,000,000 3,500,000 9,500,000						
		100	500	1,000	2,000						
		6,100,000	6,500,000	6,900,000	7,700,000						
		6,400,000	6,900,000	7,300,000	8,100,000						
		200,000	900,000	1,800,000	3,500,000						
	RPA4 Checked ND Acle Damo Dist (m) 500 Dist (m) 21,000 Dist (m) A 27,000	Acle Damgate WWTW Dist (m) PDS Dist (m) PDS Dist (m) PDS Dist (m) PDS Dist (m) PDS	RPA4 Checked § Suffix ND 22 Date Acle Damgate WWTW Dist (m) PDS 100 1141 (41) 20,000 20,000 190,000 4,700,000 1,700,000 6,400,000 Dist (m) PDS 100 4,700,000 1,700,000 6,100,000 2,200,000 2,200,000 24,500 2,000,000 2,000,000 2,000,000 24,500 100 6,100,000 2,000,000 100 6,100,000 2,000,000 6,400,000	Checked ND § 22 Suffix Orig Date Acle Damgate WWTW Dist (m) PDS 141 100 500 170,000 170,000 170,000 20,000 20,000 70,000 20,000 1,180,000 20,000 21,000 PDS 100 500 Dist (m) PDS 100 500 Dist (m) PDS 100 500 Dist (m) PDS 100 500 4,700,000 4,800,000 2,100,000 6,400,000 6,900,000 2,000,000 24,500 5,500,000 2,600,000 2,000,000 2,500,000 2,600,000 2,000,000 2,500,000 2,600,000 2,000,000 2,500,000 2,600,000 2,000,000 2,500,000 5,600,000 2,000,000 2,500,000 2,600,000 4,500 6,100,000 6,500,000 6,100,000 6,500,000 6,400,000 6,100,000 6,500,000 6,400,000	Acte Suffix Orig 1 ND 32 Suffix Orig 1 Acte Date Check 1 1 Dist (m) PDS 100 500 1,000 141 (41) 359 859 500 170,000 170,000 190,000 - 1,180,000 2,810,000 20,000 70,000 140,000 190,000 1,420,000 3,140,000 21,000 4,700,000 4,800,000 4,900,000 1,700,000 2,100,000 2,500,000 2,500,000 24,500 5,500,000 5,700,000 3,200,000 2,000,000 2,700,000 2,500,000 5,700,000 2,000,000 2,500,000 5,700,000 2,900,000 2,000,000 2,500,000 2,500,000 2,900,000 2,4500 5,500,000 5,600,000 5,700,000 2,000,000 2,500,000 2,900,000 2,900,000 2,000,000 2,5	RPA4 Checked 5 Suffix Orig 1 2 ND 2 Date Check 14/08/2008 Acle Damgate WWTW Dist (m) PDS 100 500 1,000 2,000 111 (41) 359 859 1,859 500 170,000 170,000 190,000 230,000 100 500 1,40,000 2,810,000 9,460,000 2,000 1,90,000 1,420,000 3,140,000 9,960,000 21,000 1,700,000 4,800,000 4,900,000 5,100,000 21,000 6,100,000 6,900,000 7,400,000 8,100,000 24,500 5,00,000 5,000,000 5,000,000 3,200,000 24,500 6,100,000 6,100,000 6,000,000 3,200,000 24,500 100 500 1,000 3,200,000 24,500 100 500 1,000 3,200,000 24,500 5,00,000 5,00,000 5,00,000 5,00,000	RPA4 01/09/2008 Checked § XD Suffix Orig 1 2 ND ND 2 Date Check 14/08/2008 PM Acle Damgate WWTW Dist (m) PDS 100 500 1,000 2,000 141 (41) 359 859 1,859 500 170,000 170,000 190,000 230,000 - 1,180,000 2,810,000 9,460,000 20,000 7,000 3,140,000 9,960,000 190,000 1,420,000 3,140,000 9,960,000 21,000 4,700,000 4,800,000 5,100,000 1,700,000 2,100,000 2,500,000 3,000,000 21,000 4,700,000 4,800,000 5,000,000 22,000 2,700,000 3,200,000 3,800,000 24,500 5,500,000 5,600,000 3,200,000 24,500 100 500 1,000 2,000 2,000,000 2,500,000 3,500,000	Norwich Water Cycle Study - Costing Calcs Date Jo RPA4 01/09/2008 Proj Checked § Suffix Orig 1 2 ND Acle Damgate WWTW Date Check 14/08/2008 PM 1 Acle Damgate WWTW Date Check 14/08/2008 PM 1 500 170,000 170,000 190,000 230,000 - - 500 170,000 170,000 190,000 24,000 240,000 270,000 20,000 70,000 1,420,000 3,140,000 9,960,000 - 21,000 PDS 100 500 1,000 2,000 21,000 4,700,000 4,800,000 4,500,000 5,100,000 21,000 6,100,000 6,100,000 2,500,000 3,000,000 24,500 2,200,000 2,200,000 2,500,000 3,000,000 24,500 2,000,000 2,500,000 3,500,000 3,500,000 24,500 <td< td=""><td>Net Date Joh Joh<td>Norwich Water Cycle Study - Costing Calcs Date Job no. D1 RPA4 01/09/2008 Project no. Checked 5/2 Suffix Orig 1 2 ND Acle Damgate WWTW Date Check 14/08/2008 PM Image: Check 14/08/2008 PM Image: Check Image: Check</td></td></td<>	Net Date Joh Joh <td>Norwich Water Cycle Study - Costing Calcs Date Job no. D1 RPA4 01/09/2008 Project no. Checked 5/2 Suffix Orig 1 2 ND Acle Damgate WWTW Date Check 14/08/2008 PM Image: Check 14/08/2008 PM Image: Check Image: Check</td>	Norwich Water Cycle Study - Costing Calcs Date Job no. D1 RPA4 01/09/2008 Project no. Checked 5/2 Suffix Orig 1 2 ND Acle Damgate WWTW Date Check 14/08/2008 PM Image: Check 14/08/2008 PM Image: Check Image: Check	









4.17 RPA5 – Hingham

The cost mechanism for RPA5 is shown in Table 4-17 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-17 along with relevant traffic lights where appropriate.

Wastewater

Wymondham WWTW has existing headroom capacity of approximately 4.000 • properties, hence no volumetric upgrade will be required;

Water Supply

Water would be supplied from Heigham WTW •

Water Resources

Additional water resources are from connections to Thorpe St Andrew BH and Colney • BH, GOGDS, River Wensum reuse and off line storage

Flood Risk

- The area has been assigned a green light as there is less than 10% of the PGA is • within Flood Zone 2 or 3.
- Flood risk from the PGA has been assigned the following traffic lights: •
- From Wymondham WWTW– green (discharges into River Tiffey) •
- SUDS has been assigned an amber traffic light (average SUDS suitability) •

Environment

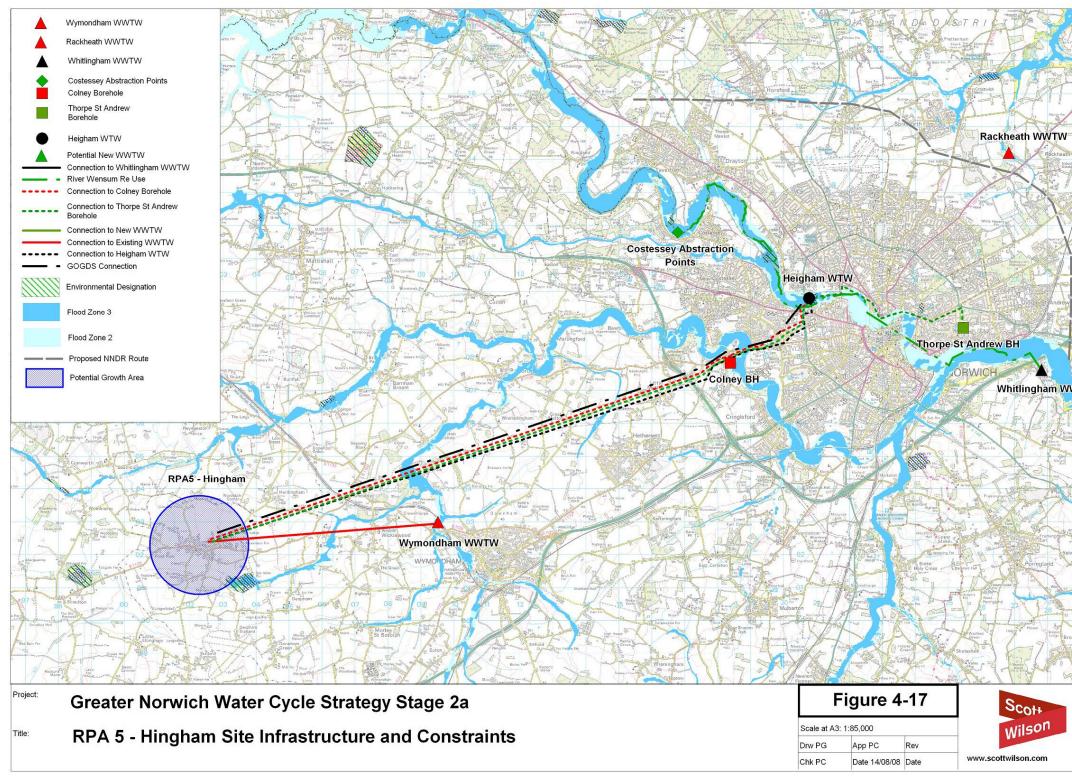
- Conservation designation has been assigned the following traffic lights •
- From Wymondham WWTW amber (no conservation designated areas within the PGA • but discharge into River Tiffey would flow through an SAC site further downstream).
- The PGA has been assigned an amber traffic light in relation to groundwater • vulnerability.
- The PGA has been assigned an amber traffic light in relation to Source Protection • Zone requirements.

Table 4-17: RPA5 total summary costs

							Section		She	et 1	of 1
Job Title	Norwich	Water Cycle	Study - Costing	Calcs			Date	Job no. D11			1860
Element	RPA5	01/09/2008	Project no.								
ginator	Checked	Revsion	Suffix	Orig	1	2	ND				
PC	ND	Re	Date	Check		14/08/2008	PM				
Wastewater											
Upgrade Existing	Wymondhar										
Existing Headroom	Dist (m)	PDS 4000	100 (3,900)	500 (3,500)	1,000 (3,000)	2,000 (2,000)					
Trunk Sewer - Rising		4000	(3,900)	(3,500)	(3,000)	(2,000)					
Trunk Sewer - Gravity	7,000		2,260,000	2,260,000	2,610,000	3,170,000					
Pumping Stations			-	-	-	-					
New WWTW (vol) New WWTW (nut)			- 20,000	- 70,000	- 140,000	- 270,000					
Total Costs (£)			2,280,000	2,330,000	2,750,000	3,440,000					
Vater Supply Heigham											
Heignam	Dist (m)	PDS	100	500	1,000	2,000					
Water Main	19,500	. 50	4,400,000	4,400,000	4,500,000	4,800,000					
Pumping Stations			1,600,000	2,000,000	2,300,000	2,800,000					
Total Costs (£)			6,000,000	6,400,000	6,800,000	7,600,000					
Maximise Boreholes											
	Dist (m)	PDS	100	500	1,000	2,000					
Pipework from Thorpe St Pumping Stations	A 235,000		52,600,000 18,600,000	53,000,000	53,800,000	56,700,000					
Pumping Stations Pipework from Colney	23,000		5,200,000	23,400,000 5,200,000	27,000,000 5,300,000	32,900,000 5,600,000					
Pumping Stations	20,000		1,900,000	2,300,000	2,700,000	3,300,000					
Total Costs (£)			7,100,000	7,500,000	8,000,000	8,900,000					
Water Resources		PDS	100	500	1,000	2,000					
Wensum Reuse			6,100,000	6,500,000	6,900,000	7,700,000					
GOGDS			5,900,000	6,400,000	6,800,000	7,500,000					
Off line Storage			200,000	900,000	1,800,000	3,500,000					











RPA6 – Diss 4.18

The cost mechanism for RPA6 is shown in Table 4-18 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-18, along with relevant traffic lights where appropriate.

Wastewater

Diss WWTW has existing headroom capacity of approximately 4,800 properties, hence • no volumetric upgrade will be required;

Water Supply

Water would be supplied from Heigham WTW •

Water Resources

Additional water resources are from connections to Thorpe St Andrew BH and Colney • BH, GOGDS, River Wensum reuse and off line storage

Flood Risk

- The area has been assigned a green light as there is less than 10% of the PGA is • within Flood Zone 2 or 3.
- Flood risk from the PGA has been assigned the following traffic lights:

From Diss WWTW - red (Discharges into the River Waveney and there is adjacent development).

SUDS has been assigned an amber traffic light (average SUDS suitability) •

Environment

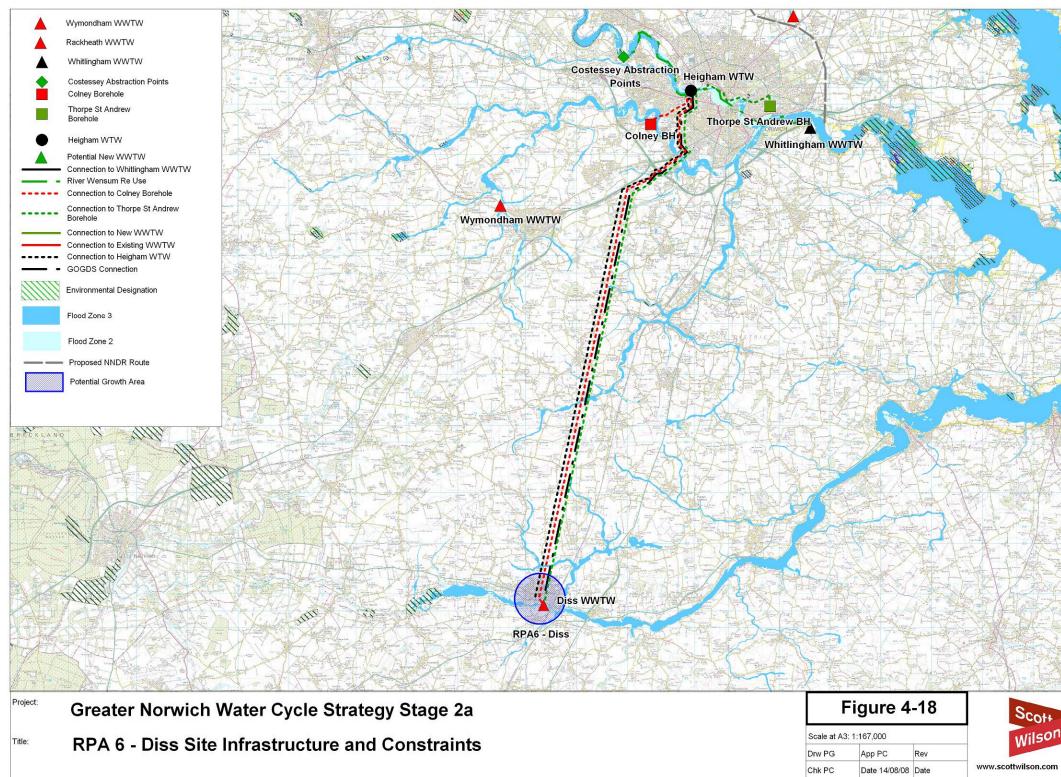
- Conservation designation has been assigned the following traffic lights:
- From Diss WWTW amber (there are no conservation designated areas within the • PGA; Discharge into the River Waveney would flow through a large SAC designated areas downstream of it within the Broads)
- The PGA has been assigned a red traffic light in relation to groundwater vulnerability. •
- The PGA has been assigned a red traffic light in relation to Source Protection Zone • requirements.

Table 4-18: RPA6 total summary costs

alculations										Sco Wils	on
							Section			et 1	
Job Title	Norwic	h Water Cycle	e Study - Costin	g Calcs			Date	J	ob no). D1	1860
Element	RPA6						01/09/2008	Pr	oject no		
ginator	Checked	Revsion	Suffix	Orig	1	2	ND				
PC	ND	Rev	Date	Check		14/08/2008	PM				
Vastewater Jpgrade Existing	Diss WW	TW									
	Dist (m)	PDS	100	500	1,000	2,000					
Existing Headroom		4838	(4,738)	(4,338)	(3,838)	(2,838)					
runk Sewer - Rising runk Sewer - Gravity	500		170,000	170,000	- 190,000	230,000					
Pumping Stations	000		-	-	-	-					
lew WWTW (vol)			-	-	-	-					
lew WWTW (nut) fotal Costs (£)			20,000	70,000 240,000	140,000 330,000	270,000 500,000					
otal Costs (£)			190,000	240,000	330,000	500,000					
Vater Supply											
leigham	Dist (11)		100		4 000	0.000					
Vater Main	Dist (m) 32,750	PDS	100 7,400,000	500 7,400,000	1,000 7,500,000	2,000 7,900,000					
Pumping Stations	02,700		2,600,000	3,300,000	3,800,000	4,600,000					
otal Costs (£)			10,000,000	10,700,000	11,300,000	12,500,000					
Aaximise Boreholes											
Pipework from Thorpe St	Dist (m)	PDS	100	500	1,000 8,900,000	2,000					
Pumping Stations	A 38,750		8,700,000 3,100,000	8,800,000 3,900,000	4,500,000	9,400,000 5,500,000					
Pipework from Colney	36,000		8,100,000	8,200,000	8,300,000	8,700,000					
Pumping Stations			2,900,000	3,600,000	4,200,000	5,100,000					
Total Costs (£)			11,000,000	11,800,000	12,500,000	13,800,000					
Water Resources		PDS	100	500	1,000	2,000					
Wensum Reuse			6,100,000	6,500,000	6,900,000	7,700,000					
GOGDS			10,000,000	10,700,000	11,300,000	12,500,000					
Off line Storage			200,000	900,000	1,800,000	3,500,000					











RPA7 – Harleston 4.19

The cost mechanism for RPA7 is shown in Table 4-19 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-19, along with relevant traffic lights where appropriate.

Wastewater

Harleston WWTW has existing headroom capacity of approximately 1,200 properties, • hence volumetric upgrade will be required for approximately 800 properties;

Water Supply

Water would be supplied from Heigham WTW •

Water Resources

Additional water resources are from connections to Thorpe St Andrew BH and • Colney BH, GOGDS, River Wensum reuse and off line storage

Flood Risk

- The area has been assigned an amber traffic light as there is between 10-25% of the • PGA is within Flood Zone 2 or 3.
- Flood risk from the PGA has been assigned the following traffic lights: •
- From Harleston WWTW amber (Discharges into the Starston Brook a tributary of • the River Waveney).
- SUDS has been assigned an amber traffic light (average SUDS suitability) •

Environment

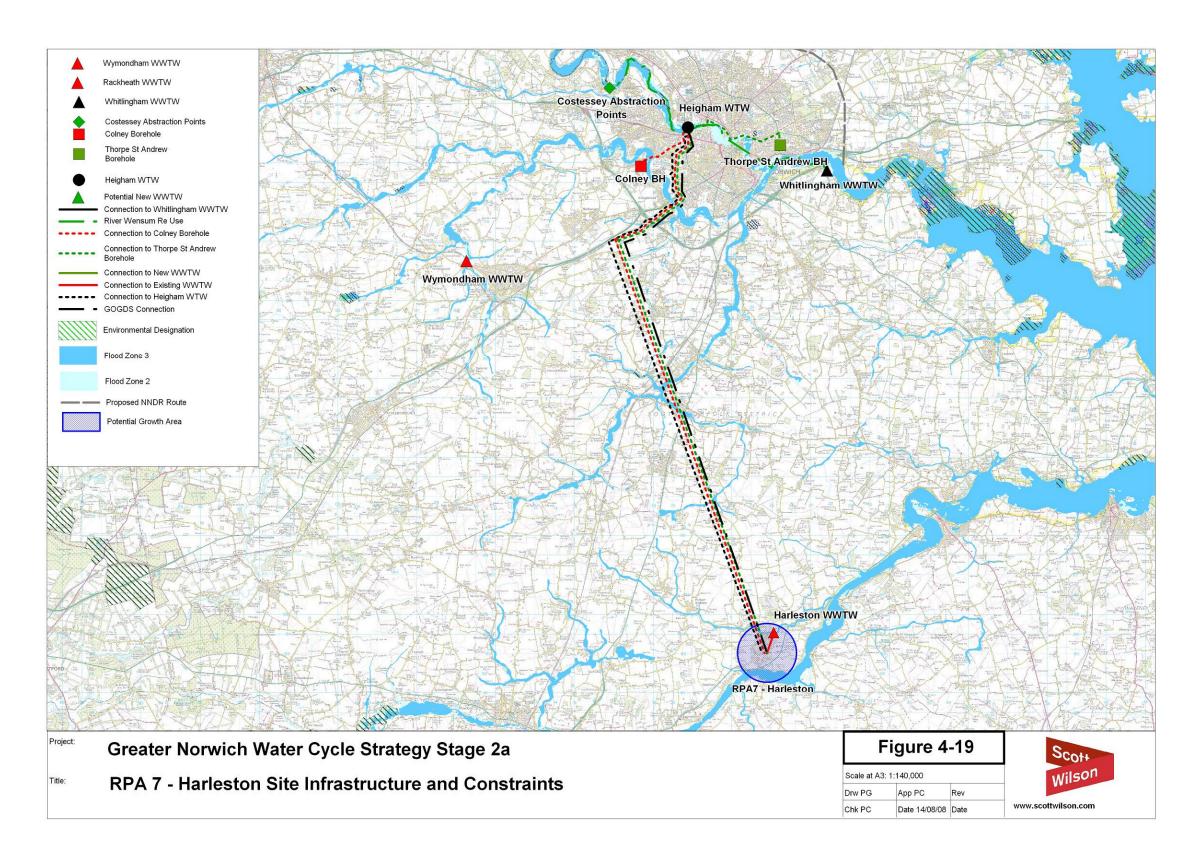
- Conservation designation has been assigned the following traffic lights •
- From Harleston WWTW orange There are no conservation designated areas within • the PGA; Discharge into the River Waveney would flow through a large SAC designated areas downstream of it within the Broads
- The PGA has been assigned a red traffic light in relation to groundwater vulnerability. •
- The PGA has been assigned a green traffic light in relation to Source Protection • Zone requirements.

Table 4-19: RPA7 total summary costs

L-L Tid-	N	h Watan 0	- Otrada - Or etta				Section				of 1
Job Title	Norwich Water Cycle Study - Costing Calcs								Job no.D118		
Element	RPA7						01/09/2008	Pro	oject no.		
inator PC	Checked ND	Revsion	Suffix Date	Orig Check	1	2 14/08/2008	ND PM				
-		Ч								<u> </u>	
/astewater											
pgrade Existing	Harleston	WWTW									
	Dist (m)	PDS	100	500	1,000	2,000					
xisting Headroom runk Sewer - Rising		1192	(1,092)	(692)	(192)	808					
runk Sewer - Gravity	1,100		360,000	360,000	410,000	500,000					
umping Stations	,		-	-	-	-					
ew WWTW (vol)			-	-	-	4,110,000					
ew WWTW (nut) otal Costs (£)			20,000 380,000	70,000 430,000	140,000 550,000	270,000 4,880,000					
			500,000	400,000	330,000	4,000,000					
ater Supply											
eigham	Dist (m)	PDS	100	500	1,000	2,000					
/ater Main	30,500	PDS	6,900,000	6,900,000	7,000,000	7,400,000					
umping Stations			2,500,000	3,100,000	3,600,000	4,300,000					
otal Costs (£)			9,400,000	10,000,000	10,600,000	11,700,000					
laximise Boreholes											
	Dist (m)	PDS	100	500	1,000	2,000					
ipework from Thorpe St	t A 36,500		8,200,000 2,900,000	8,300,000	8,400,000	8,900,000					
umping Stations ipework from Colney	34,000		2,900,000 7,600,000	3,700,000 7,700,000	4,200,000 7,800,000	5,200,000 8,300,000					
umping Stations	0 4000		2,700,000	3,400,000	4,000,000	4,800,000					
otal Costs (£)			10,300,000	11,100,000	11,800,000	13,100,000					
/ater Resources		PDS	100	500	1,000	2,000					
/ensum Reuse			6,100,000	6,500,000	6,900,000	7,700,000					
OGDS			9,300,000	10,000,000	10,500,000	11,700,000					
off line Storage			200,000	900,000	1,800,000	3,500,000					









RPA8 – Loddon 4.20

The cost mechanism for RPA7 is shown in Table 4-20 and is summarised below with a plan of the related estimated infrastructure, flood risk and environmental constraints shown in Figure 4-20 along with relevant traffic lights where appropriate.

Wastewater

Sisland WWTW has existing headroom capacity of approximately 1,000 properties, • hence volumetric upgrade will be required for approximately 1,000 properties;

Water Supply

Water would be supplied from Heigham WTW •

Water Resources

Additional water resources are from connections to Thorpe St Andrew BH and • Colney BH, GOGDS, River Wensum reuse and off line storage

Flood Risk

- The area has been assigned an amber traffic light as there is between 10-25% of the • PGA within Flood Zone 2 or 3.
- Flood risk from the PGA has been assigned the following traffic lights:
- From Sisland WWTW amber (Discharges into the upper reaches of the River Chet) •
- SUDS has been assigned a red traffic light (poor SUDS suitability) •

Environment

- Conservation designation has been assigned the following traffic lights •
- The Hardley Flood SSSI, which is part of the Broads SAC and Broadlands SPA, lies to the northeast of the PGA; Discharge into the River Chet would flow through a large SAC designated areas downstream of it within the Broads;
- The PGA has been assigned an amber traffic light in relation to groundwater vulnerability.
- The PGA has been assigned a green traffic light in relation to Source Protection • Zone requirements.

Table 1-20: RPA8 total summary costs

Calculations									S W	cot+ ilson	
T L Tr'al	<u></u>		<u> </u>				Section		heet 1		
Job Title	Norwich	Water Cycle	e Study - Costing	g Calcs			Date	Job 1	no. D1	1860	
Element	RPA8						01/09/2008	Project	ject no.		
iginator	Checked	sion	Suffix	Orig	1	2	ND				
PC	ND	Revsion	Date	Check		14/08/2008	PM				
Wastewater											
Upgrade Existing	Sisland WV										
	Dist (m)	PDS	100	500	1,000	2,000					
Existing Headroom		1058	(958)	(558)	(58)	942					
Trunk Sewer - Rising	05 000		-	-	-	-					
Trunk Sewer - Gravity	25,000		8,070,000	8,070,000	9,320,000	11,300,000					
Pumping Stations			-	-	-	-					
New WWTW (vol)			-	-	-	4,790,000					
New WWTW (nut)			20,000	70,000	140,000	270,000					
Total Costs (£)			8,090,000	8,140,000	9,460,000	16,360,000					
Water Supply											
Heigham											
	Dist (m)	PDS	100	500	1,000	2,000					
Water Main	20,500		4,600,000	4,700,000	4,700,000	5,000,000					
Pumping Stations			1,700,000	2,100,000	2,400,000	2,900,000					
Total Costs (£)			6,300,000	6,800,000	7,100,000	7,900,000					
Maximise Boreholes											
	Dist (m)	PDS	100	500	1,000	2,000					
Pipework from Thorpe St	A 26,500		6,000,000	6,000,000	6,100,000	6,400,000					
Pumping Stations			2,100,000	2,700,000	3,100,000	3,800,000					
Pipework from Colney	24,000		5,400,000	5,500,000	5,500,000	5,800,000					
Pumping Stations			1,900,000	2,400,000	2,800,000	3,400,000					
Total Costs (£)			7,300,000	7,900,000	8,300,000	9,200,000					
Water Resources		PDS	100	500	1,000	2,000					
Wensum Reuse			6,100,000	6,500,000	6,900,000	7,700,000					
GOGDS			6,300,000	6,700,000	7,100,000	7,900,000					
Off line Storage			200,000	900,000	1,800,000	3,500,000					

water Resources	PD3	100	500
Wensum Reuse		6,100,000	6,500,000
GOGDS		6,300,000	6,700,000
Off line Storage		200,000	900,000

