

***Greater Norwich Development  
Partnership***

**Strategic Housing Land Availability Assessment:  
Stage 8: In combination effects and constraints for  
development**

**11<sup>th</sup> September 2009**

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## **1.0 Introduction**

### **Scope of the Study**

1.1 Nathaniel Lichfield and Partners (NLP) have recently delivered the final version of Stage 7 of the Strategic Housing Land Availability Assessment (SHLAA) report. This report takes into account the findings of the suitability, availability and achievability assessment in order to quantify which of the sites considered by the SHLAA should be considered deliverable or developable and those that should be considered undevelopable.

1.2 The Stage 7 report establishes a theoretical housing trajectory based upon sites which are considered deliverable or developable. This trajectory has taken into account the likely start date of those sites based upon a range of criteria and has incorporated site completion estimates based upon established principles for building rates, which were agreed with a wide stakeholder group.

1.3 However, Stage 7 does not provide a full appreciation of the cumulative effects of development upon ongoing delivery. In particular Stage 7 of the report does not consider the cumulative effects of development on infrastructure needs and delivery, of which the latter may significantly affect the achievable rate of development.

1.4 The Stage 8 report seeks to identify the major upper level constraints which are relevant to housing delivery within the Greater Norwich Development Partnership (GNDP) area and to estimate their impact upon the theoretical housing projections established by the Stage 7 report.

### **Purpose of the Study**

1.5 The purpose of the Stage 8 assessment is to establish a constrained theoretical housing projection based upon an appreciation of the cumulative effects of development on the potential for delivery from an infrastructure perspective. These projections may then be compared against the Joint Core Strategy growth favoured option to establish the feasibility of achieving the development proposed within the necessary timescales.

### **Methodology**

1.6 The assessment comprises four "Parts". The first Part of the Stage 8 assessment establishes infrastructure needs at various levels of development across the GNDP area. The second Part establishes the likely implementation timescales of the infrastructure. The third part will recalculate the housing projections in light of the infrastructure requirements and delivery timescales identified. This process will establish a constrained housing projection. The fourth and final part of the assessment will need to comment upon the relationship between the constrained housing projections and the favoured growth option set out in the JCS.

## **2.0 Part 1: Establishing Infrastructure Requirements**

### **Approach**

2.1 Part 1 comprised a literature review that established the anticipated levels of infrastructure that will be needed to support development within the district.

2.2 The following evidence base documents were considered as part of this literature review:

- Infrastructure Needs and Funding Study, December 2007
- Draft Infrastructure Needs and Funding Study, July 2009
- Water Cycle Study: Stages 1, November 2007
- Water Cycle Study: Stage 2(a), September 2008
- Draft Water Cycle Study: Stage 2(b), July 2009
- Greater Norwich Joint Core Strategy: Public Transport Requirements of Growth, November 2008
- Greater Norwich Joint Core Strategy: Public Transport Requirements of Growth, Technical Note – Appraisal of Emerging Option, December 2008

2.3 The categorisation of necessary infrastructure to support development was broadly based upon the structure of the Infrastructure Needs and Funding Study and included sections on Transport, Utilities and Social Infrastructure. These sections are explained in greater detail below.

2.4 In order to quantify the geographical area that was affected by a particular constraint GNDP area was split into a number of different areas or sectors. These sectors were very broadly based upon those used for the purposes of the Water Cycle Studies, which have broken down the Norwich Policy Area (NPA) into 11 different sectors and the Rural Policy Area (RPA) into 9 sectors.

2.5 A diagram showing the geographical breakdown of the area is shown as Appendix A.

### **Transport**

2.6 The transport section includes roads and highways, public transport and cycling and walking infrastructure. A number of assumptions have been made in order to quantify the level of development that could be accommodated before a particular piece, or suite, of infrastructure is provided and/or the upper capacity threshold of that suite of infrastructure. These assumptions are explained in more detail in the subsequent paragraphs.

2.7 When making these assumptions it should be noted that, the transport solutions considered within the evidence base were holistic solutions predicated on addressing transportation across a broad area, particularly in

the NPA. Therefore it was often not possible to separate out individual elements of infrastructure at any less than a very broad scale. Because of this much of the transport infrastructure is considered to be a complimentary suite that will constrain a broad area.

2.8 It should also be noted that all of the transport solutions are based upon improvements to the transport network within the City Centre. Therefore, for the purposes of this assessment, improvements to the transport network in the City Centre are considered a pre-requisite for the implementation of wider transport solutions in the NPA.

2.9 The transport infrastructure in the NPA has been sub-divide into suites of infrastructure which affect the area on a broadly north/south basis.

2.10 For the northern sectors: NPA1, NPA2, NPA3 (a and b), NPA 9 and NPA10 the NNDR, Postwick Hub and Development Link between Salhouse Road and Broadland Business Park were all key pieces of road infrastructure. BRT corridors along Yarmouth Road, Salhouse and Gurney Roads and along the A140 to the Airport were essential. Improvements to the Rail Station and a new station at Rackheath are important but not critical. Because Rail improvements were not considered critical to delivering growth the implementation of improvements in this regard has not been considered a constraining factor.

2.11 In the southern sectors: NPA4, NPA5, NPA7 and NPA8 capacity improvements to the key A47 junctions at Thickthorn (A11/A47), Longwater (B1074/A47) and Harford (A140/A47), and the junction with the B1108 are considered critical. Therefore the timescale for improvements to these pieces of infrastructure will limit growth capacity.

2.12 In the southern sector NPA6 a bypass at Long Stratton is considered essential.

2.13 Alongside identifying infrastructure needs an assumption has also been made about the threshold of development that could occur before the suite of transport infrastructure was put in place.

2.14 When considering this assumption it is important to remember that it constitutes only a cautious assumption based upon a particular view point about what constitutes the satisfactory functioning of the highway network. It is quite possible that in real terms greater levels of development may be appropriate if a firm commitment is in place to deliver longer term transport solutions. However it is necessary for the purposes of this assessment to provide some quantification of capacity constraints. Therefore assumptions have been made about capacity, these assumption are described below.

2.15 Before implementation of the suites of infrastructure identified above it has been assumed that upper limit capacity is defined either by pre-Regional Spatial Strategy (RSS) housing requirements, i.e. the 1999 Norfolk Structure Plan requirement to 2011, or existing commitments, whichever is the greater.

2.16 This assumption is based on the Infrastructure Needs and Funding Study, November 2007, which established that satisfactory functioning of the highway network can only be maintained by capping additional trips at approximately the projected 2011 levels (assuming consistent levels of modal share), with any additional trips by additional development being accommodate by non-car means.

2.17 However, the information in the EDAW study itself was an assumption. A number of individual decisions on planning applications have been made, which have taken into account highway issues in considerable more detail than is considered here. Therefore it is considered justified to take the existing permitted or allocated capacity within the NPA as the threshold to infrastructure if it currently exceeds pre-RSS targets.

2.18 In the case of development in the northern sectors the pre-RSS level of development equated to 2347 dwellings within the NPA and 1029 within the RPA. The base date of these figures is 2001 and when updating to 2008/09 show an outstanding capacity of only 900 dwellings in the NPA, the RPA figure has already been exceeded. Current commitments in the NPA for northern sectors equates to approximately 2000 new units in the NPA and 700 in the RPA. Therefore in this instance this has been considered to be the upper threshold prior to infrastructure improvements in the northern sectors.

2.19 In the case of the southern sectors (not including NPA6) the current level of commitment also outstripped the pre-RSS capacity to 2011. Therefore existing commitments were also used as the upper capacity. This level equated to approximately 3,500 units in the NPA and 1,300 units in the RPA.

2.20 In the case of NPA6 current outstanding capacity equates to approximately only 100 units.

2.21 The anticipated outstanding capacity for Norwich City is considered to total approximately 4,000 units

2.21 It should be noted that all of the figures used for current commitments have been rounded up reflect the slight flexibility in the assessment of highway capacity.

2.22 As with existing infrastructure, there is likely to be an upper limit to the capacity of the highway network before which further improvement is necessary. However, at this time it is not possible to identify the capacity of the improved highway network. Therefore an upper limit threshold for highway infrastructure has not been defined within this assessment.

## **Utilities**

2.23 The limitations of water supply and disposal, electricity and gas have been considered as part of this assessment.

2.24 The evidence base indicated that gas is not a significant constraint in the Greater Norwich area. Therefore for the purposes of this assessment it has not been identified as a constraint for development.

2.25 Significant electricity improvements would be required across the GNDP area if significant growth is to be accommodated. The existing evidence base has been produced in support of the JCS and therefore its scope is limited to the development levels considered as part of that document. Therefore it is not possible to identify an upper constraint threshold. However, given the nature of electricity infrastructure it is unlikely that an upper threshold constraint would be insurmountable in any case.

2.26 However, the evidence base does give an indication of the phases of development within which upgrading would be required. This phasing, when considered against the assumed housing trajectory, gives an idea of the level of development that can occur before improvements are necessary, in this case 18,000 units in the NPA.

2.27 This threshold is not however an upper limit constraint only a possible time limiting constraint. It is not currently possible from the evidence base available to identify the possible lead-in times for electricity infrastructure. Therefore, for the purposes of this study, it is assumed that electrical infrastructure can be improved in line with development rates i.e. it will not slow down the rate of delivery. This is a simplification as large pieces of infrastructure may require some lead-in time. However given that the evidence base indicates that improvements can be delivered in line with the JCS proposals, in the absence of any contradictory evidence it is considered to be a suitable approximation at this stage.

2.28 Water is a considerably more significant constraint. Globally water is a finite resource. Therefore care needs to be taken when estimating potential supply. There will also be a natural threshold to waste water disposal, which relates to the ability of river systems to accommodate additional flow from existing or new treatment works. Best evidence has been used to estimate the expected maximums for these two constraints. Clearly this is not the final word on the issue and further solutions may in the future be identified that will allow greater levels of development.

2.29 In terms of water supply, Stage 2(b) of the Water Cycle Study (WCS) indicates that there is no notable spare water resource capacity within existing abstraction consents. Therefore, for the purposes of this assessment the total resource capacity will be considered to be a combination of the expected possible increase in consents and additional water resource identified in Anglian Water Services (AWS) draft Water Resource Management Plan (WRMP).

2.30 The additional water resources identified in the draft WRMP comprises increased abstraction consents from existing boreholes, abstraction from new ground water sources and an effluent compensation scheme. In total these resources limit development within the NPA to 52,000 new homes.



2.31 Potential upper limits to water supply in the RPA are taken from the Stage 1 WCS. There are no identified solutions to these upper limits and therefore they are considered to be a hard ceiling for development for the purposes of this study.

2.32 Waste water constraints are much more varied across the area with often multiple waste water treatment works (WwTW) serving any one area, particularly in the NPA. For the purposes of this assessment additional development is considered to go to the most local WwTW first before being routed elsewhere, if this is identified as a possibility in the evidence base.

2.33 Stage 2(b) of the WCS provides estimates of the maximum volumetric discharge from WwTW within the district that are likely to be consented by the Environment Agency. For the purposes of this assessment these are considered to be the hard ceilings to development levels. It is possible that some rivers may be able to accommodate additional volumetric discharge above these rates. However, without consent this would not be possible, therefore the likely upper consent limit is used here.

2.34 No significant consideration has been given to water quality as part of this assessment. Although there are clear problems with the water quality of discharge from certain WwTW there is still a degree of ambiguity over this issue. It is also difficult in the very long term to estimate what standards might be achievable with best technology. Therefore this constraint has not been estimated at this juncture. However, this simplification means that actual housing capacity may in certain instances be lower than that shown by the results of this study.

2.35 In addition to the likely upper discharge consents at WwTW there are infrastructure issues with the pumping mains in the NPA. In order to resolve this issue new mains sewers are likely to be needed to the north and south of Norwich connecting new fringe development to Whitlingham. Until the new sewer is provided development is considered to be limited to the level of existing permissions, which have yet to be implemented within the NPA i.e. approximately 13,000.

### **Social Infrastructure**

2.36 There is a significant amount of additional social infrastructure that will need to be constructed alongside any significant new development within the GNDP area. This infrastructure will include education, health care, emergency services, sport and recreational facilities and community buildings and libraries. This type of infrastructure will eventually require new buildings and facilities to be constructed. However it is possible that interim provision using temporary buildings will fill the void between demand and construction time.

2.37 For the purposes of this assessment it has been assumed that this type of infrastructure will be provided alongside development and will not therefore limit or constrain the rate or level of development.

2.38 Clearly this may be an over-simplification in real terms but is considered a reasonable assumption in order to allow for an estimation to be made in this assessment.

## **Summary**

2.39 Having reviewed the relevant evidence base documents, anticipated cumulative and upper level constraints relative to development within the GNDP area have been able to be defined. These constraints to development come in three key forms: Transportation, water supply and wastewater drainage and treatment.

## **3.0 Part 2: Infrastructure Delivery Timescales**

### **Approach**

3.1 Having established the relevant constraints to development it is then important to make an assessment of the likely timescales within which any identified solutions will come forward.

3.2 This type of assessment is based upon a number of assumptions about future commitment, of which some may not yet be certain. In addition, delivery timescales, particularly in terms of highway infrastructure, may be to some extent dependant upon the progress of the JCS. As part of the evidence base, it is not the appropriate for this study to align itself with the JCS or other planning document. Nevertheless estimates have been made based upon the best evidence available at the time of writing.

### **Transportation**

3.3 As discussed in Part 1, the solutions to NPA transport constraints are reliant on City Centre improvements. The remaining constraints for transport infrastructure are divided on a north-east – south-west basis.

3.4 For the northern sectors primary dependence is related to the Postwick Hub and NNDR. For the purposes of this study, it is considered that these are likely to have the longest lead-in time to delivery of all identified improvements. Therefore the date for their completion has been used as the date at which transportation constraint will have been overcome. In terms of the NNDR and Postwick Hub completion is expected by the end of 2015.

3.5 Therefore using the above assumptions as a base, it is not considered that development in the northern sections, NPA1, NPA2, NPA3 (a & b), NPA 9 and NPA10, can exceed existing commitment levels before 2015.

3.6 In terms of southern sectors NPA4, NPA5, NPA7 and NPA8 delivery of the necessary transport improvements is expected in the period 2015-19. As this does not give a specific date, an estimate has been made to enable the

constraint to be quantified in this study. This estimate places delivery in the middle of the delivery period in 2017.

3.7 Therefore using this assumption, this assessment considers that development in the southern sectors NPA4, NPA5, NPA7 and NPA8 cannot exceed existing commitments before 2017.

3.8 Southern sector NPA6 is reliant on a single piece of infrastructure, namely a bypass to Long Stratton. Delivery of this infrastructure is also expected in the period 2015-19 and therefore the same rationale has been used for this as was used for the other southern sectors i.e. development cannot exceed existing commitments before 2017.

## **Utilities**

3.9 The key utilities constraint as identified in Part 1 is water supply and waste water disposal.

3.11 The funding for infrastructure improvements considered necessary by water companies, in this case Anglian Water, are regulated by Ofwat. Water companies are required to bid for funding within set periods, known as Asset Management Planning Periods (AMPs). For the purposes of assessing when new water infrastructure may be available consideration has been given to the anticipated AMP period when funding for infrastructure is first likely to be available.

3.12 For water supply it is assumed that only the improvements to existing consents will be available before 2015 (AMP5), new ground water consents will be available post 2015 (AMP6) and the effluent compensation scheme will only be available post 2020 (AMP7). This means that a maximum of 10'000 new dwellings can be provided in the NPA before 2015, 20'000 by 2020 with a ceiling of 52,000, post 2026.

3.13 There will also be a time constraint for the construction of new mains sewers. It is possible that developers could construct the sewer to an adoptable standard and in this case the constraint would be resolved as development progressed lessening its time implication. However even in this scenario sites further away from the WwTW could not easily provide a new trunk sewer beyond the end of the particular development site meaning that it would be constrained. In any event AWS may still need to do some connection works.

3.14 In order to make an estimate of the likely effect of this constraint on housing delivery this assessment assumes that the new mains sewer will be provided by AWS ahead of development in the middle of the AMP6 i.e. 2017.

3.15 A Schedule of all of the infrastructure considered as part of this assessment, its limiting effect on development, possible solutions and timescale for delivery of solutions is included as Appendix B.

## 4.0 Part 3: Housing Projections

### Key Constraints

4.1 The cumulative effect of these constraints will have a significant limiting effect on development relative to the “unconstrained” housing trajectory produced for the purposes of stage 7 of the SHLAA. When estimating the expected timings water infrastructure is considered to be the greatest constraint to future development, although if timescale assumptions were changed then this may also change.

4.2 The limiting constraints in sequence to the housing trajectory will be as follows for the NPA:

- 10'000 new dwellings before 2015 due to establishing new water abstraction.
- 12,000 new dwellings to 2017 before new main sewers to the north and south of Norwich can be installed.
- 20'000 new dwellings before 2020 due to likely deployable output from new water abstractions.
- 36,000 new dwellings due to expected maximum volumetric consents within the WwTW serving the Norwich Policy Area (Whitlingham, Rackheath, Poringland, Wymondham).

4.3 Therefore the maximum housing delivery in the NPA will be limited to 36,000 new dwellings.

4.4 In the RPA constraints are more location specific but nevertheless have a limiting effect on the amount of development that can be achieved. These limiting factors are described in more detail below:

- Reepham: WwTW upper limit 2000 new dwellings
- Aylsham: WwTW upper limit 1000 new dwellings
- Wroxham: Potable water supply upper limit 500 new dwellings
- Acle: WwTW upper limit 800 new dwellings
- Hingham: Potable water supply upper limit 2000 new dwellings (note that WwTW capacity in Hingham is dependant upon Wymondham)
- Diss: Potable water supply upper limit 1000 new dwellings
- Harleston: Potable water supply upper limit 100 new dwellings
- Loddon: WwTW upper limit 1500 new dwellings

4.5 Therefore the maximum delivery with the RPA will be limited to approximately 6,000 new dwellings.

4.6 This gives a cumulative total for the GNDP area of 42,000 new dwellings, compared to the approximately 150,000 new dwellings indicated in the unconstrained trajectory.

4.7 The time limiting and upper limit constraints that are relevant to the GNDP area are shown in the table 1.

**Table 1: Upper limit and time limiting constraints to development in the GNDP Area**

Limiting Number are shown in 000s of units		Upper Limit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Description of Constraint	Areas Affected														
Transport	GNDP	n/a							8						
Transport	NPA1, NPA2, NPA3 (a+b), NPA10	n/a							2						
Transport	NPA4, NPA5, NPA7, NPA8, NPA9	n/a									3.5				
Transport	NPA6	n/a									0.1				
Electricity Supply	NPA	n/a								18					
Waste Water	NPA	31									12				
Waste Water	NPA7, RPA5	5													
Water Supply	NPA	52							10					20	
Waste Water	NPA7	5													
Waste Water	RPA2	1													
Water Supply	RPA2	2													
Waste Water	RPA1	2													
Water Supply	RPA1	1													
Waste Water	RPA3	2.5													
Water Supply	RPA3	0.5													
Waste Water	RPA4	0.8													
Water Supply	RPA4	2													
Water Supply	RPA5	2													
Waste Water	RPA6	6.5													
Water Supply	RPA6	1													
Waste Water	RPA7	2													
Water Supply	RPA7	0.1													
Waste Water	RPA8	1.5													
Water Supply	RPA8	2													

4.8 Now that both upper limit and time limiting constraints have been established it is possible to provide some theoretical “constrained” housing trajectories for the GNDP area.

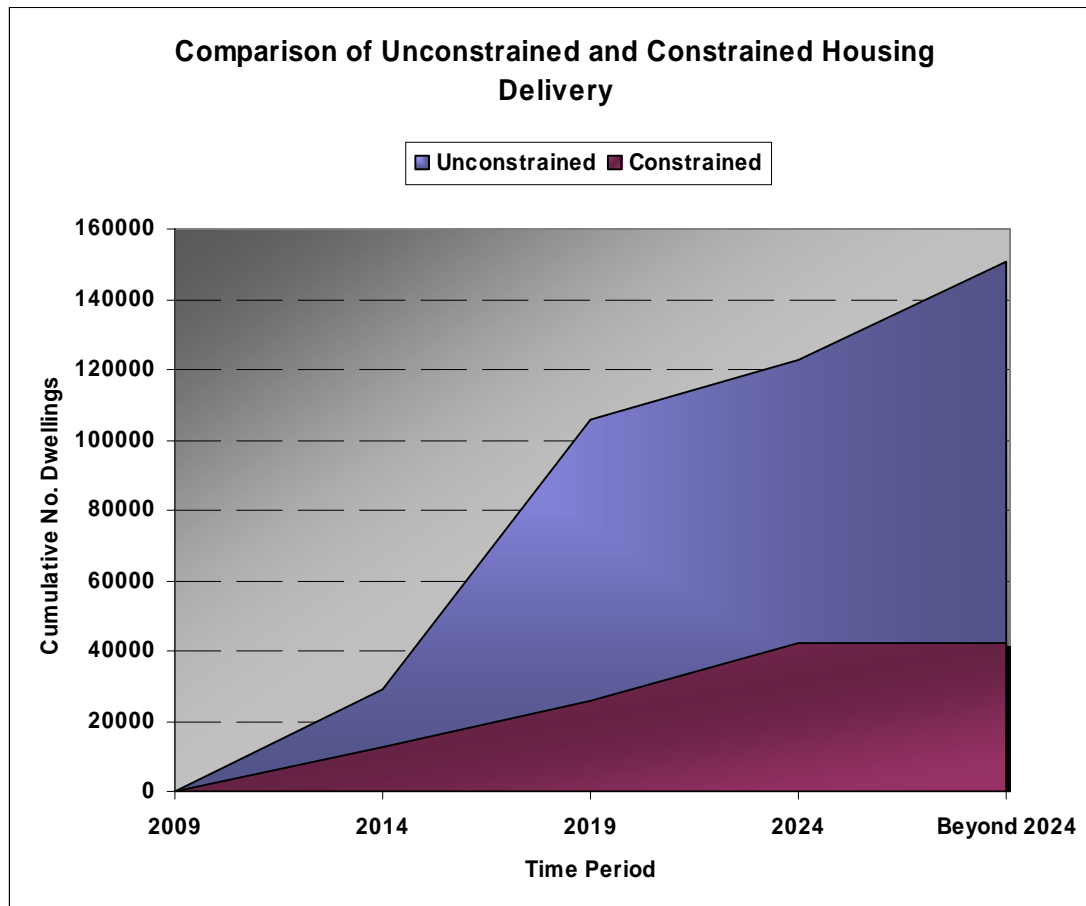
### Comparison of GNDP Trajectories

4.9 Table 2 and figure 1 show a comparison of the constrained and unconstrained capacity for the GNDP area.

**Table 2: Comparison of unconstrained and constrained housing trajectories for the GNDP area**

Completion Estimates				
	2009-2014	2015-2019	2020-2024	2024 +
<b>Unconstrained</b>	28866	105952	122851	150690
<b>Constrained</b>	12500	26000	42000	42000

**Figure 1: Comparison of unconstrained and constrained housing trajectories for the GNDP area**



4.10 Table 2 and figure 1 clearly, and somewhat unsurprisingly, show that the constrained trajectory is significantly below that of the unconstrained trajectory. Key points to identify are that achievable development in the first five year period, 2009 to 2014, is limited in the NPA by the availability of water and in the RPA by the availability of deliverable sites. In the period 2015-2019 development is again constrained by the availability of potable water in the NPA, whilst in the RPA all of the remaining developable sites are built out to the upper levels of water based constraints. In the third period, 2020-2024, the

sites within the NPA continue to be developed out up to the maximum expected volumetric discharge capacity that will be consented at Whitlingham WwTW.

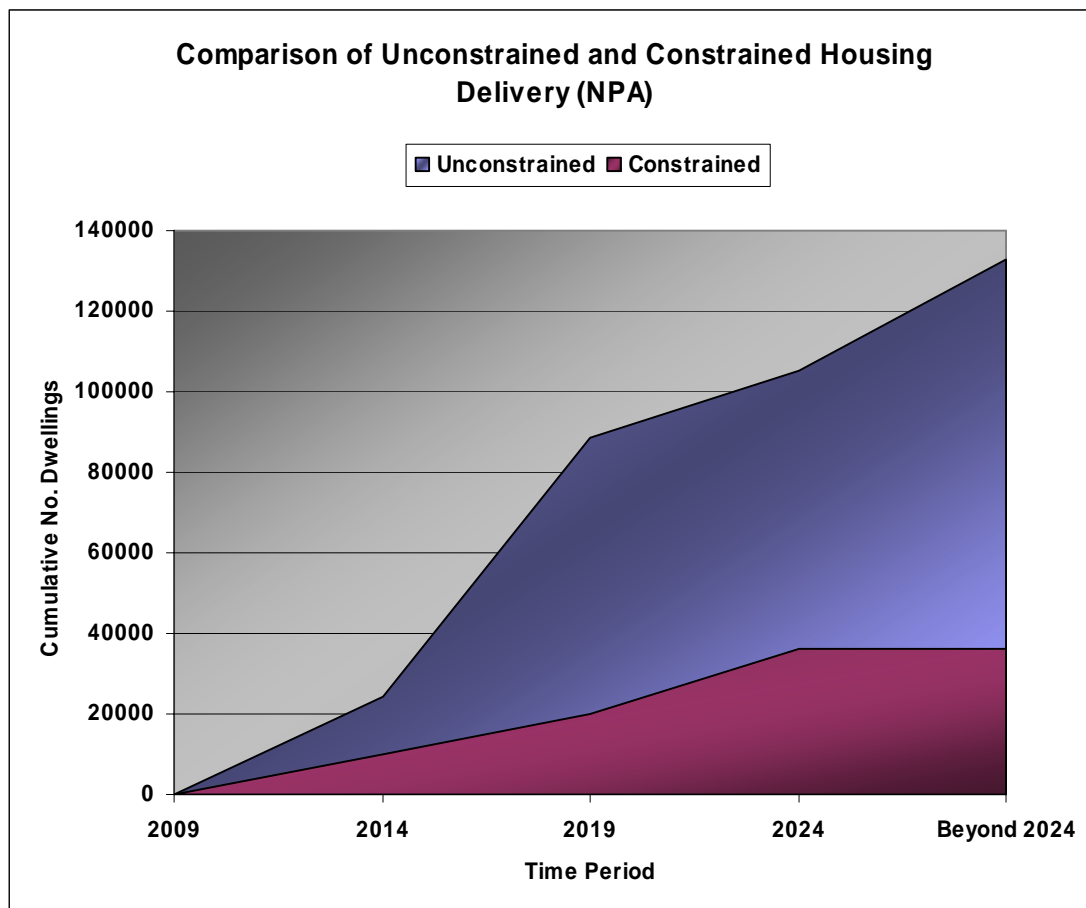
### Comparison of NPA Trajectories

4.11 Tables 3 and figure 2 shows the comparison of the constrained and unconstrained trajectories for the NPA.

**Table 3: Comparison of unconstrained and constrained housing trajectories in the NPA**

Completion Estimates				
Completion Estimates NPA	2009-2014	2015-2019	2020-2024	2024 +
<b>Unconstrained</b>	24350	88641	105052	132891
<b>Constrained</b>	10000	20000	36000	36000

**Figure 2: Comparison of unconstrained and constrained housing trajectories in the NPA**



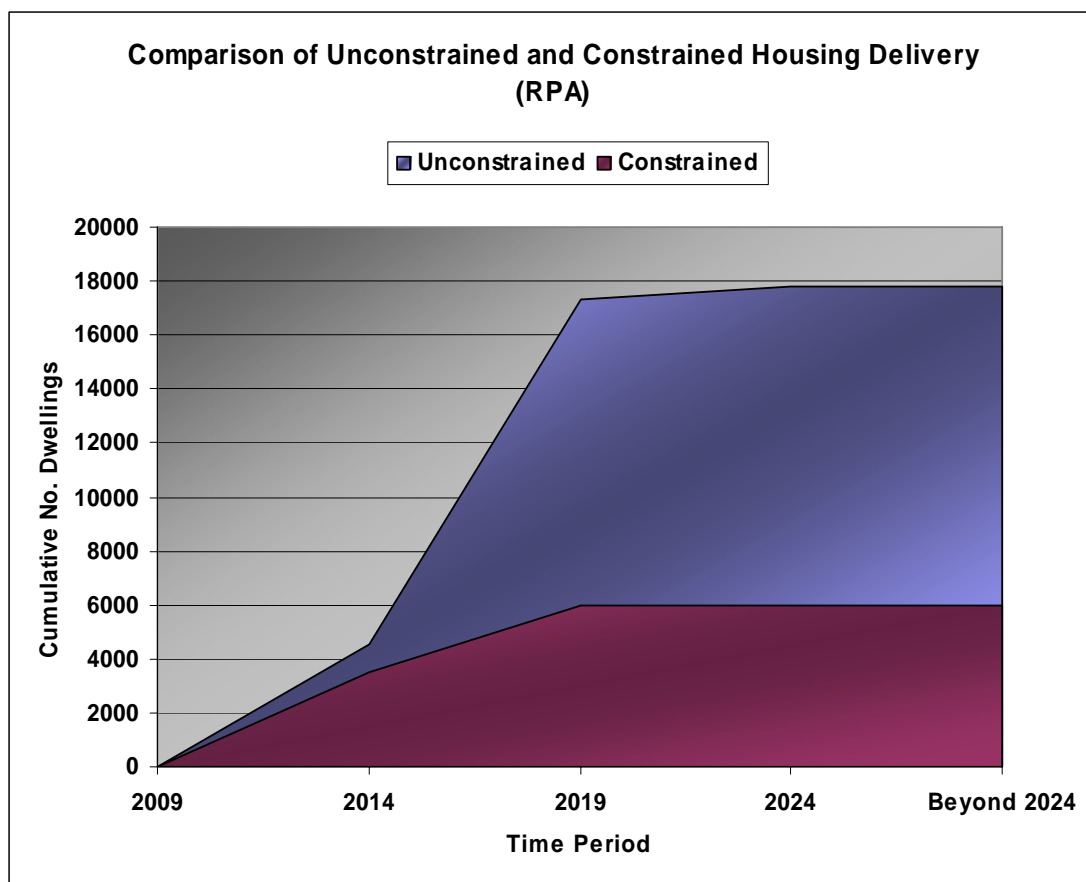
### Comparison of RPA Trajectories

4.12 Tables 4 and figure 3 shows the comparison of the constrained and unconstrained trajectories for the RPA.

**Table 4: Comparison of unconstrained and constrained housing trajectories in the RPA**

Completion Estimates				
Completion Estimates RPA	2009-2014	2015-2019	2020-2024	2024 +
Unconstrained	4516	17311	17799	17799
Constrained	3483	6000	6000	6000

**Figure 3: Comparison of unconstrained and constrained housing trajectories in the RPA**



4.13 The individual constrained trajectories for the NPA and RPA follow the same trend as that for the GNDP area as a whole. The tables and figures illustrate that upper limit constraints will limit development at significantly lower levels than could be developed solely from calculating capacity as a function of area and density multiplier.



## Summary

4.14 It is clear from this section that water supply and disposal place the greatest constraint on development within the GNDP as a whole. Although other constraints are relevant it is water that poses the greatest challenge.

4.15 It should be noted that when considering these trajectories, caution needs to be exercised about the identified upper levels of development. For reasons of practicality it has been necessary to make assumptions about thresholds and limitations. These thresholds and limitations are based upon evidence and therefore have credibility. However they should not be considered insurmountable barriers.

4.16 The key will be whether there are additional interventions that will improve the capacity at key pinch points. Equally some assumptions have been made that may suggest that a level of development can be achieved above that which may actually be possible in reality. In particular there are water quality constraints in Aylsham and Long Stratton which may mean that achievable development levels are significantly below that which would be indicated in this assessment.

## 5.0 Part 4: Implications for the JCS

### Comparison of land to JCS favoured option

5.1 The final part of this assessment is a comparison of the results of the SHLAA assessment to the favoured option for housing distribution in the JCS.

5.2 The favoured option within the JCS proposes the following distribution of development across the GNDP area.

**Table 5: Joint Core Strategy: Favoured Option for the Distribution of Growth**

Location	Favoured Option	
Norwich	3,000	
Broadland smaller sites in the NPA	2,000	
South Norfolk smaller sites in the NPA	1,800	
Old Catton, Sprowston, Rackheath and Thorpe St. Andrew Growth Triangle	7,000	growing to 10,000 after 2026.
South West: Hethersett	1,000	
Cringleford	1,200	
Wymondham	2,200	
Costessey/Easton area	1,000	
Long Stratton	1,800	
Broadland rural sites	650	
South Norfolk rural sites	1,000	
<b>Totals</b>	<b>22,650</b>	<b>25,650</b>

5.3 This favoured option indicates growth above the levels that area already committed through planning permission or allocations in existing local plans. These existing commitments total in the region of 13,000 new dwellings across the GNDP, which is split approximately 2,700 in Broadland, 5,000 in South Norfolk and 6,000 in Norwich City. This means that in total 38,650 new homes need to be delivered to fulfil the commitments of the JCS.

5.4 A simple comparison of the favoured option against the available deliverable and developable sites, shown in table 6, suggest that there are more than enough deliverable and developable sites in the relevant areas to fulfil the commitments of the JCS. The geographical sectors are shown on a map in appendix A.

**Table 6 Deliverable and Developable Sites in the GNDP Area shown by Geographical Sector**

Geographical Sector	Development Trajectory				Totals
	2009-2014	2015-2019	2020-2024	2024 +	
NPA1	1889	7125	4257	2900	16171
NPA2	2110	8964	1500	3406	15980
NPA3a	3021	9114	4243	12668	29046
NPA4	1497	3251	0	0	4748
NPA5	118	1807	0	0	1925
NPA6	294	3963	0	0	4257
NPA7	4624	10000	2609	1451	18684
NPA8	4338	4203	1749	6015	16305
NPA9	1108	5501	817	0	7426
NPA10	2656	3875	1236	1399	9166
NPA11	2695	6488	0	0	9183
RPA1	799	1583	0	0	2382
RPA2	16	2912	488	0	3416
RPA3	1126	94	0	0	1220
RPA4	159	1415	0	0	1574
RPA5	803	1339	0	0	2142
RPA6	304	2260	0	0	2564
RPA7	507	2149	0	0	2656
RPA8	802	801	0	0	1603
RPA9	0	242	0	0	242
<b>Totals</b>	<b>28866</b>	<b>77086</b>	<b>16899</b>	<b>27839</b>	<b>150690</b>

### Comparison to the GNDP Trajectory

5.5 However this simple comparison is not sufficient, what also needs to be considered is the relationship between the constrained trajectory and the requirements of the JCS.

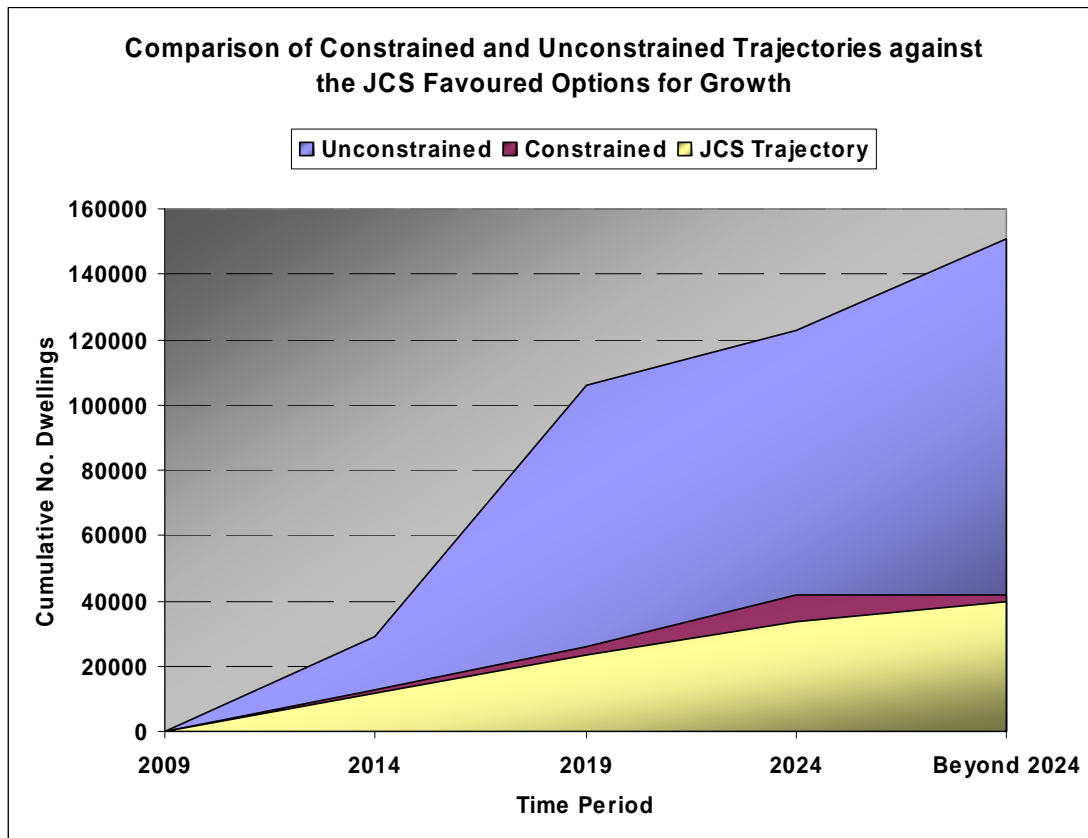
5.6 Table 7 provides a comparison of the unconstrained, constrained and JCS favoured option trajectories. This table shows that across the GNDP area the housing targets can be reached within the constrained trajectory.

**Table 7: Comparison of unconstrained, constrained and JCS favoured option trajectories**

Completion Estimates				
	2009-2014	2015-2019	2020-2024	2024 +
<b>Unconstrained</b>	28866	105952	122851	150690
<b>Constrained</b>	12500	26000	42000	42000
<b>JCS Trajectory</b>	11500	23500	33500	40000

5.7 However there still needs to be some further analysis. A comparison needs to be made between the constrained trajectory for the NPA and RPA and the JCS favoured options trajectories in order to assess whether one is compensating for the other's failing in the overall analysis.

**Figure 4: Comparison of unconstrained, constrained and JCS favoured option trajectories**



**Comparison to the NPA Trajectory**

5.8 Table 8 and figure 5 shows the comparison between the constrained and unconstrained trajectory for the NPA and the trajectory for the JCS favoured option.

**Table 8: Comparison of unconstrained, constrained and JCS favoured option trajectory for the NPA**

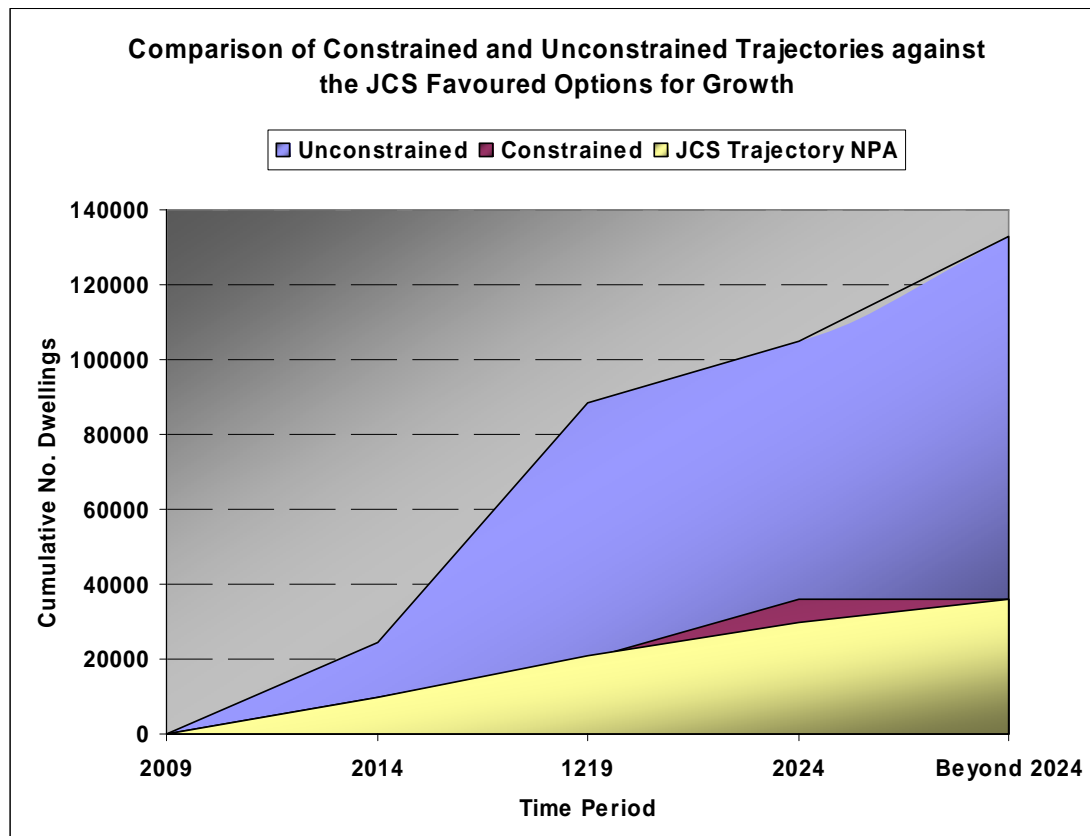
Completion Estimates				
Completion Estimates NPA	2009-2014	2015-2019	2020-2024	2024 +
<b>Unconstrained</b>	24350	88641	105052	132891
<b>Constrained</b>	10000	20000	36000	36000
<b>JCS Trajectory NPA</b>	10000	21000	30000	36000

5.9 Comparing the JCS favoured option trajectory for the NPA and the constrained trajectory three things are clear. Firstly that the availability of water supply constrains the delivery of housing below JCS expectations in the period 2015 to 2019, secondly that the constrained capacity within the period 2020 to 2024 exceeds the JCS expectations and finally that the estimated upper limit of the anticipated volumetric discharge consent for Whitlingham is, allowing for rounding, very close too or at the necessary development levels required to meet the JCS favoured option for development.

5.10 This is notable not only in the lack of tolerance in the expected consent but also the lack of clarity around the capacity of the WwTW at Long Stratton.

5.11 If no development could take place in Long Stratton then it would place additional pressure on other areas within the NPA which would need access to the Whitlingham WwTW and therefore putting additional pressure on the ability to meet the JCS development targets.

**Figure 5: Comparison of unconstrained, constrained and JCS favoured option NPA trajectory**



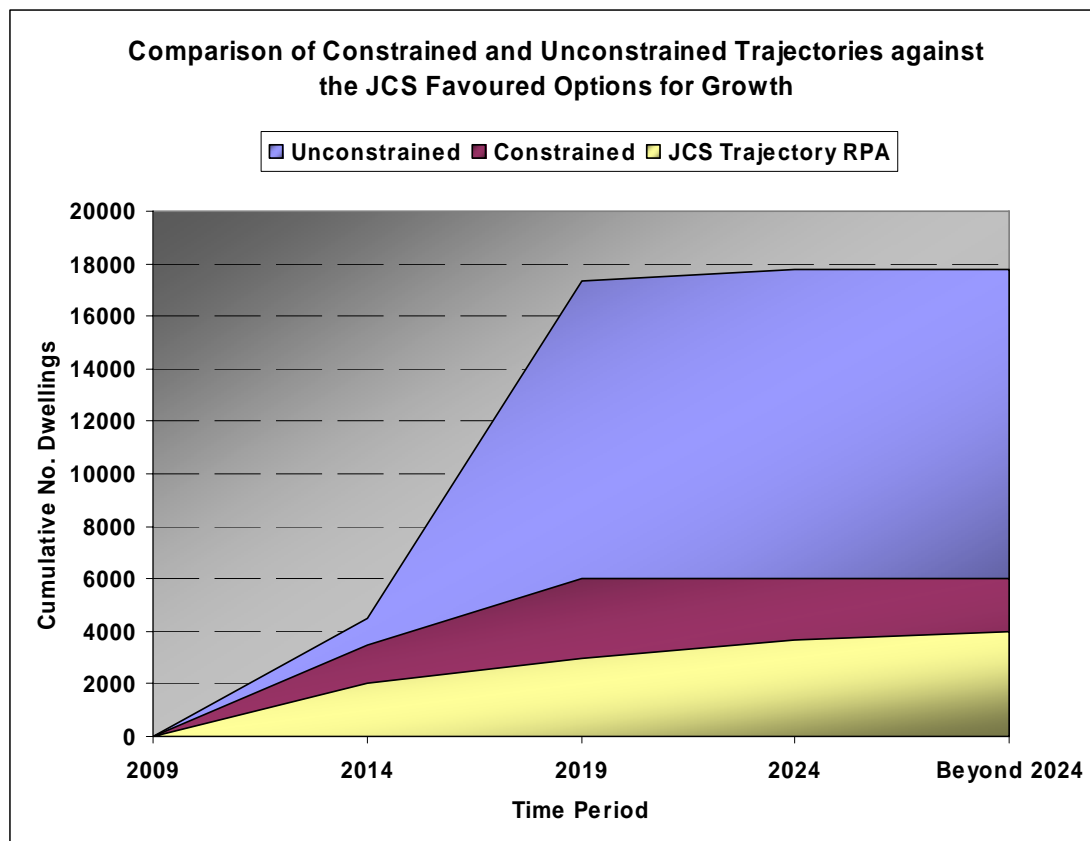
### Comparison to the RPA Trajectory

5.12 Table 9 and figure 6 illustrates the comparison between the constrained trajectory and the JCS favoured option trajectory for the RPA. In the case of the RPA it is clear that the potential supply of housing even at the constrained level and taking into account some sensitivity testing on the Aylsham treatment works will be able to meet the JCS target for growth in the RPA.

**Table 9: Comparison of unconstrained, constrained and JCS favoured option trajectory for the RPA**

Completion Estimates				
Completion Estimates RPA	2009-2014	2015-2019	2020-2024	2024 +
Unconstrained	4516	17311	17799	17799
Constrained	3483	6000	6000	6000
JCS Trajectory RPA	2000	3000	3700	4000

**Figure 6: Comparison of unconstrained, constrained and JCS favoured option RPA trajectory**



## Summary

5.13 The constraints review has led to a number of conclusions. Firstly principle infrastructure constraints to development relate to transport, water supply and waste water disposal. These constraints provide both time-limiting, i.e. constraints that constrain the rate of delivery, and upper limit constraints, i.e. constraints that cap the possible level of development in a particular area.

5.14 These constraints are such that they reduce by more than 2/3rds the level of development that was estimated to be possible through the unconstrained analysis of development sites in Stage 7.

5.15 There is very little tolerance in the anticipated volumetric discharge consent for the NPA and the level of development that will need to be accommodated in this area to meet the JCS favoured option. Although it appears that the overall numbers target within the JCS can be met.

5.16 This assessment of overall likely Volumetric Discharge Consent does however hide one key issue, that issue is that the likely Volumetric Discharge Consent at Wymondham provides the additional capacity to meet NPA targets overall, i.e. it assumes that some of the growth elsewhere in the NPA would need to be discharged to Wymondham. If it were assumed that all NPA developments except Wymondham and Long Stratton were to go to Whitlingham then this assessment would indicate that that commitment could not be met within expected Volumetric Discharge Consents.

5.17 When considering these findings it should be noted that the WCS is not yet complete and early indications are that the development levels proposed within the NPA can be met. The WCS is the key evidence base document that considers the issues of water supply and disposal and the indications of this assessment do not outweigh the finding of that professional report.

5.16 There is more tolerance with the development targets for the RPA, although this tolerance could be reduced by half if it turned out that Aylsham could not accommodate any additional flow because of water quality issues.

5.17 It should be noted that this assessment relies on a number of assumptions, these assumptions may not prove to be true, or may be mitigated. For example reduction in the amount of water used through tough standards on new housing or retrofitting existing stock may reduce water demand, this would lessen the constraint on water supply. Similar effects may be achieved for waste water, through reducing the amount of water disposed by using variable flush toilets and other such technologies. Such mitigation measures or changes in behaviour patterns could also apply to transportation and electricity.

5.18 Overall this assessment supports the conclusion that there is sufficient available and developable land, which is in the right locations, to meet the JCS targets. The major constraints to development in the long term will be

water supply and waste water disposal and post-2026 JCS targets begin to impinge upon expected upper limit constraints in waste water disposal.

## **6.0 Conclusions**

6.1 This assessment highlights that the actual capacity for house building in the GNDP area is very much, 2/3rds, less than would have been suggested by the unconstrained housing trajectory identified in the Stage 7 study.

6.2 The finding is illuminating as it demonstrates the simply the availability of financially viable land for housing is not the sole determinant of the housing supply possible within a particular area. This leads to the conclusion that although the GNDP area has broad swaths of undeveloped land building cannot go on unchecked by the realities of infrastructure and environmental constraints.

6.2 Although significant infrastructure improvement is necessary across Transport, Utility and Social infrastructure topic areas, the key constraints to development appear transport and water related.

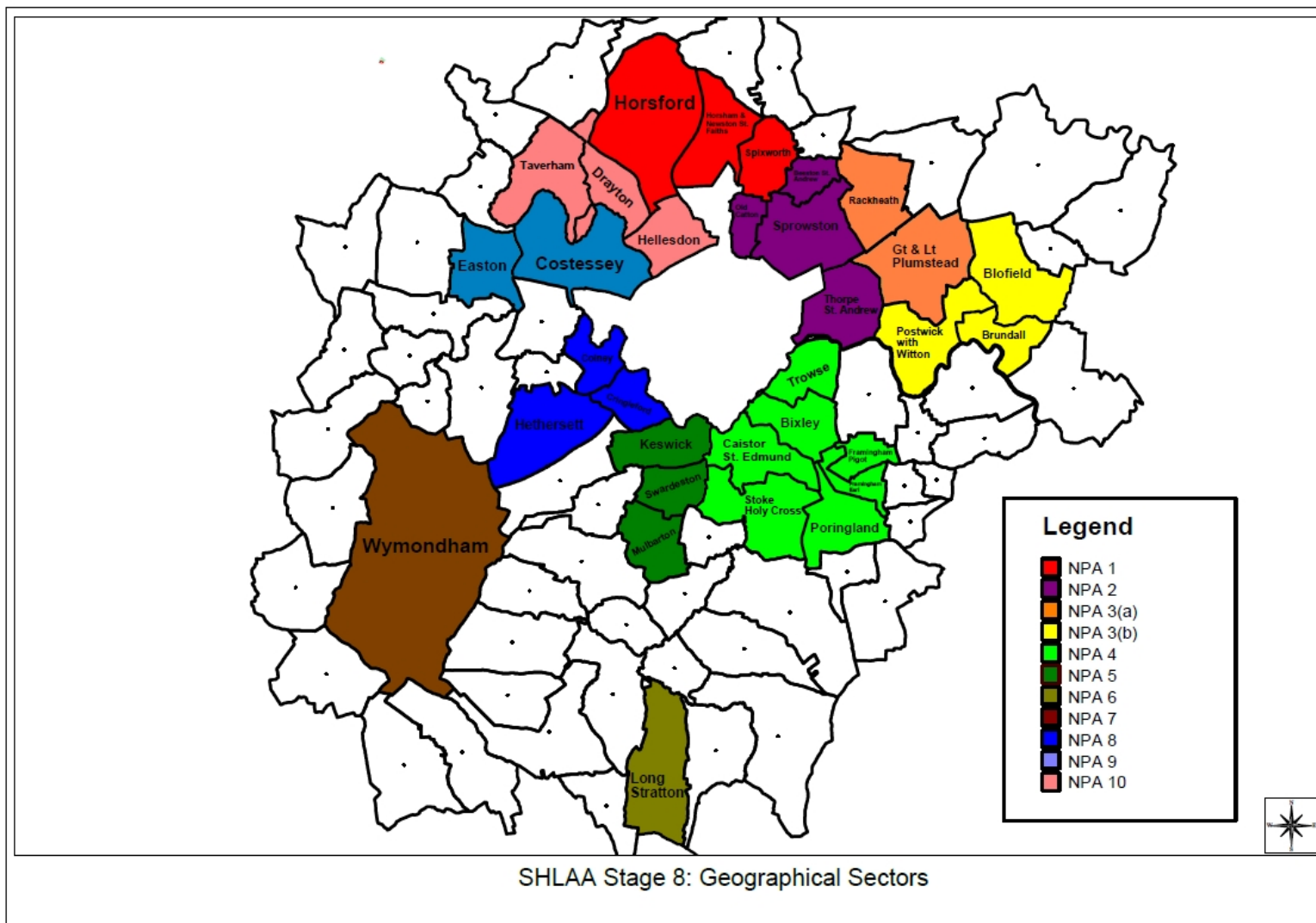
6.3 Sufficient land has been identified in each of the GNDP areas to accommodate the levels of growth identified in the JCS favoured option. This land is available on a timescale that broadly allows the JCS trajectory to be met.

6.4 There is an identified issue however with waste water capacity in the NPA which will come to bear during the post-2026 commitments of the JCS. Such constraints may have a limiting effect upon the upper levels of development. Specific topic based evidence base studies, which are ongoing, will need to be considered if such issues are to be overcome.





### Appendix A: Geographical Sectors



## Appendix B: Schedule of Infrastructure

<b>Constraint</b>	<b>Geographical Area Affected</b>	<b>Level of Development</b> (that can occur prior to necessary improvement to infrastructure).	<b>Infrastructure Solution</b>	<b>Expected Timescale for Delivery</b> (of infrastructure solution if constraint to development rates).
<b>Roads and Highways</b>				
Road Capacity Northern Sectors	East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector	2011 pre RSS development levels or current commitments, whichever is the greater	North Norwich Distributor Road	NNDR to be delivered by 2015
Road Capacity Southern Sectors	Southeast Sector, South Sector, Southwest Sector, West Sector	2011 pre RSS development levels or current commitments, whichever is the greater	NRP transport infrastructure	2015 to 2019
A140 Road Capacity	Long Statton	Existing Commitments Only	A140 Long Stratton bypass	To be delivered on the back of development
Road Capacity Southern Sectors	Southeast Sector, South Sector, Southwest Sector, West Sector	2011 pre RSS development levels or current commitments, whichever is the greater	Junction Improvements - Long Water	2015 to 2019
Road Capacity Southern Sectors	Southeast Sector, South Sector, Southwest Sector, West Sector	2011 pre RSS development levels or current commitments, whichever is the greater	Junction Improvements - Thickthorn	2015 to 2019
Road Capacity in northeast Norwich	NE Sector (outside NNDR), NE Sector (inside NNDR)	2011 pre RSS development levels or current commitments, whichever is the greater	Development Link BBP to Salhouse Road	To be delivered as a result of development

Junction Capacity at Postwick	East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector	2011 pre RSS development levels or current commitments, whichever is the greater	Postwick Hub	Postwick Hub Improvements Stage 1 of NNDR, 2013
Capacity of Highway Network	GNDP	n/a	Local Access Improvements	To be delivered as a result of development
Capacity of Highway Network	RPA	n/a	Village Centre Enhancements	To be delivered as a result of development
<b>Public Transport</b>				
Capacity of Highway Network	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	City Centre Bus Enhancements	2015
Capacity of Highway Network	Northeast, and eastern sectors (inside and outside the NNDR), Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	BRT Corridor - Yarmouth Road	2015
Capacity of Highway Network	Northeast, and eastern sectors (inside and outside the NNDR), Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	BRT Corridor - Salhouse Road, Gurney Road	2015
Capacity of Highway Network	Northeast, and eastern sectors (inside and outside the NNDR), Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	BRT Corridor - growth areas (western end) via airport to A140 to City Centre	2015

Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	BRT Corridor - City Centre via Dereham Road	2015
Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	BRT Corridor - A140 to City Centre	2017
Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	Bus Priority - Hethersett Lane / Hospital / NRP / UEA / City Centre	2017
Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	Bus Priority - B1172	2017
Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	Bus Priority - approach to Harford Junction	2017
Capacity of Highway Network	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	Rail Station Improvements	n/a

Capacity of Highway Network	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	Widening of Rail Bridge at Station	n/a
Capacity of Highway Network	?	2011 pre RSS development levels or current commitments, whichever is the greater	Widening of Rail Bridge for Bus Priority	n/a
Capacity of Highway Network	Northeast, and eastern sectors (inside and outside the NNDR), Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	Relocate / New Rail Station at Rackheath	n/a
Capacity of Highway Network	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)	2011 pre RSS development levels or current commitments, whichever is the greater	Travel Plans	To be delivered as a result of development
<b>Cycling and Walking</b>				
Capacity of Highway Network	Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum)	2011 pre RSS development levels or current commitments, whichever is the greater	Pedestrian / Cycle link to longwater	?

Capacity of Highway Network	GNDP	2011 pre RSS development levels or current commitments, whichever is the greater	City Centre public realm enhancement	?
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Constraint	Geographical Area Affected	Level of Development (that can occur prior to necessary improvement to infrastructure).	Infrastructure Solution	Expected Timescale for Delivery (of infrastructure solution if constraint to development rates).
<b>Electricity</b>				
Electrical Grid Capacity (NPA)	NPA	~18,000 (across NPA based upon supposed development levels by 2016 when infrastructure needs upgrading)	New or improvements to Hurricane Way, Norwich Airport North, Sprowston Rackheath No.2, Hapton Primary, Wymondham Primary, Norwich East Grid and St Stephens substations	Unknown
Capacity at Hurricane Way Grid Substation	North Sector (North of Airport)	2016	New Primary Substation on Existing Site	
Capacity at Norwich Airport North Substation	North Sector (North of Airport)	2021	New Primary Substation on New Site	
Capacity at Sprowston / Rackheath No.2	Northeast and Eastern Sectors (Inside and Outside the NNDR)	2026	New Primary Substation on New Site	
Capacity at Hapton		2026	Replacement of transformers and switchgear	

<b>Primary</b>				
<b>Capacity at Wymondham Primary</b>	<b>Wymondham Area</b>	<b>2026</b>	<b>Replacement of transformers and switchgear</b>	
<b>Capacity at Norwich East Grid</b>	<b>Norwich City</b>	<b>2021</b>	<b>New Grid Substation on Existing Site</b>	
<b>Capacity at St. Stephens</b>	<b>Norwich City</b>	<b>2031</b>	<b>Reinforcement of Existing Sub-station</b>	
<b>Water</b>				
<b>Volumetric Discharge Consent at Whitlingham (based upon new flow consents that AW are considered likely to grant)</b>	<b>Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)</b>	<b>30,000</b>	<b>No identified solution</b>	<b>n/a</b>
<b>Capacity of Norwich City Pumping Mains</b>	<b>Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport), Wymondham (possibly)</b>	<b>13,000</b>	<b>New Strategic Mains (this may comprise 1 to north and 1 to south of Norwich, southern mains may connect to Wymondham)</b>	<b>2017</b>

<b>Volumetric Capacity at Whitlingham</b>	<b>Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport), Wymondham (possibly)</b>	<b>52,000</b>	<b>No identified solution</b>	<b>n/a</b>
<b>Capacity of WWTW (Stoke Holy Cross)</b>	<b>South Sector (A11 - A140 Outside A47)</b>	<b>600</b>	<b>No identified solution</b>	<b>n/a</b>
<b>Capacity at Rackheath STW</b>	<b>NE Sector (Outside NNDR)</b>	<b>250</b>	<b>No identified solution</b>	<b>n/a</b>
<b>Capacity Poringland WwTW</b>	<b>South-east Sector</b>	<b>750</b>	<b>No identified solution</b>	<b>n/a</b>
<b>Potable Water Capacity (as constrained by sewerage distribution network, NPA)</b>	<b>Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport)</b>	<b>1000 (+existing commitments?)</b>	<b>Improvements to Sewerage Distribution Network and/or new main sewer to north or south of Norwich</b>	<b>Unknown</b>
<b>Spare Ground Water Abstraction Capacity</b>	<b>Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport), Wymondham (possibly)</b>	<b>10,000</b>	<b>New Groundwater Resource</b>	<b>2015 (AMP 6)</b>



Maximum Deployable Output from New Ground Water Resources	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport), Wymondham (possibly)	20000 (cumulative total including spare capacity in existing water abstraction licences)	Effluent Compensation Scheme	2020 (AMP7)
Maximum Deployable Output from Effluent Compensation Scheme	Norwich City, Northeast, and eastern sectors (inside and outside the NNDR), Southwest Sector (A11-B1108), West Sector (River Yare to River Wensum, Northwest Sector A1067 - NNDR, North Sector (North of Airport), Wymondham (possibly)	52000 (cumulative total including spare capacity in existing water abstraction licences and DO from New Ground Water Resource)	No identified solution	n/a
Capacity of Wymondham WWTW	Wymondham Area	5,000	No identified solution	n/a
Potable Water Supply (Wymondham)	Wymondham Area	5,000	Water transfer from Norwich?	n/a
WwTW Capacity at Aylsham	Aylsham Area	1000 (remaining questions about overcoming quality constraints)	Improvements Aylsham STW	2013?
Potable Water Supply (Aylsham)	Aylsham Area	2,000	No identified solution	n/a
Capacity of Existing Reepham STW	Reepham Area	2,000	Technological modification required to STW to accommodate growth. NO identified solution above this level.	n/a
Potable Water Supply (Reepham)	Reepham Area	1,000	No identified solution	n/a

Capacity of Belough STW	Wroxham Area	2,500	No identified solution	n/a
Potable Water Supply (wroxham)	Wroxham Area	500	No identified solution	n/a
Capacity at Acle-Damgate STW	Acle Area	800	No identified solution	n/a
Potable Water Supply (Acle)	Acle Area	2,000	No identified solution	n/a
Potable Water Supply (Hingham)	Hingham	2,000	No identified solution	n/a
Capacity at Diss STW	Diss	6,500	No identified solution	n/a
Potable Water Supply (Diss)	Diss	1000 (AW indicates that there is no spare capacity, therefore any development will require investigation need to take a view)	No identified solution	n/a
Capacity at Harleston WwTW	Harleston	2,000	No identified solution	n/a
Potable Water Supply (Harleston)	Harleston	0 (AW no spare capacity in water resource)	No identified solution	n/a
Capacity at Sisland WwTW	Loddon	1,500	No identified solution	n/a
Potable Water Supply (Loddon)	Loddon	2,000	No identified solution	n/a
<b>Gas</b>				
Gas				

<b>Constraint</b>	<b>Geographical Area Affected</b>	<b>Level of Development</b> (that can occur prior to necessary improvement to infrastructure).	<b>Infrastructure Solution</b>	<b>Expected Timescale for Delivery</b> (of infrastructure solution if constraint to development rates).
<b>Education</b>				
Capacity of Pre-schools (NE Norwich)	East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector	?	New Pre-school (1FE for every 60 places)	To be delivered as a result of development
Capacity of Primary Schools (NE Norwich)	East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector	Existing Commitments only?	New Primary Schools (1 FE for every 210 pupils)	To be delivered as a result of development
Capacity of Secondary Schools (NE Norwich)	East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector	1200 (assuming all additional capacity within TSA and Sprowston is used up)	New secondary school (1FE for every 150 places)	To be delivered as a result of development
Capacity of Pre-schools (Norwich City)	Norwich City	?		To be delivered as a result of development
Capacity of Primary Schools (Norwich City)	Norwich City	4330	New Primary Schools (1 FE for every 210 pupils)	To be delivered as a result of development
Capacity of Secondary Schools (Norwich City)	Norwich City	2500 (assuming over-subscription is equalised)	New secondary school (1FE for every 150 places)	To be delivered as a result of development
Capacity of Pre-schools (Wymondham)	Wymondham	?		To be delivered as a result of development
Capacity of Primary Schools (Wymondham)	Wymondham	0	New Primary Schools (1 FE for every 210 pupils)	To be delivered as a result of development

Capacity of Secondary Schools (Wymondham)	Wymondham	50 (assuming over-subscription is equalised)	Expansion of Existing School Site (upper capacity ?)	To be delivered as a result of development
Capacity of Primary Schools (Long Stratton)	Long Stratton	350	New Primary Schools (1 FE for every 210 pupils)	To be delivered as a result of development
Capacity of Secondary Schools (Long Stratton)	Long Stratton	1300	Expansion of Existing School Site (upper capacity ?)	To be delivered as a result of development
Capacity of Primary Schools (Hethersett)	Hethersett	250	New Primary Schools (1 FE for every 210 pupils)	To be delivered as a result of development
Capacity of Secondary Schools (Hethersett)	Hethersett	350	Expansion of Existing School Site (upper capacity ?)	To be delivered as a result of development
<b>Health Care</b>				
GP capacity	GNDP	Not Known	Provision of new surgeries and polyclinics / Extension of existing facilities	To be delivered in line with of development
Dentist capacity	GNDP	Not Known		To be delivered in line with of development
Hospital Beds	GNDP	Not Known		To be delivered in line with of development
<b>Emergency Services</b>				
Police	GNDP	Not Known		To be delivered as a result of development
Fire Service	GNDP	Not Known		To be delivered as a result of development
Ambulance	GNDP	Not Known		To be delivered as a result of development
<b>Community Facilities</b>				

<b>Sport Provision (NE Norwich)</b>	<b>East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>
<b>Community Centre Facilities (NE Norwich)</b>	<b>East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>
<b>Libraries (NE Norwich)</b>	<b>East Sector, NE Sector (outside NNDR), NE Sector (inside NNDR), North Sector, NW Sector</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>
<b>Sport Provision (Broadland, outside NE)</b>	<b>Acle Area, Aylsham Area, Coltishall Area, Reepham Area, Wroxham Area</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>
<b>Community Centre Facilities (Broadland, outside NE)</b>	<b>Acle Area, Aylsham Area, Coltishall Area, Reepham Area, Wroxham Area</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>
<b>Libraries (Broadland, outside NE)</b>	<b>Acle Area, Aylsham Area, Coltishall Area, Reepham Area, Wroxham Area</b>	<b>Not Known</b>	<b>Provision of new facilities</b>	<b>To be delivered as a result of development</b>

**Appendix C: GNDP Housing Trajectories**

<b>GNDP</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>	<b>2018/19</b>	<b>2019/20</b>	<b>2020/21</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>
GNDP Trajectory	1565	1533	1579	1400	1358	1838	2484	1801	1671	1837	2111	2273	1861	2408	2354	2481	2426	2150	2182	2032	1952	1832	1832	1832	1697
GNDP Cumulative	1565	3098	4677	6077	7435	9273	11757	13558	15229	17066	19177	21450	23311	25719	28073	30554	32980	35130	37312	39344	41296	43128	44960	46792	48489
<b>Period</b>	<b>Completions</b>							<b>2009-14</b>					<b>2015-19</b>					<b>2019-24</b>				<b>2024+</b>			
GNDP Period Based	11757							11554					11819					9830				3529			
GNDP Rounded	12000							11500					12000					10000				3500			

<b>NPA</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>	<b>2018/19</b>	<b>2019/20</b>	<b>2020/21</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>
NPA Trajectory	1342	1265	1261	1200	1154	1414	2037	1356	1389	1624	1767	1981	1648	2133	2138	2337	2282	2007	2040	1890	1810	1690	1690	1690	1555
NPA Cumulative	1342	2607	3868	5068	6222	7636	9673	11029	12418	14042	15809	17790	19438	21571	23709	26046	28328	30335	32375	34265	36075	37765	39455	41145	42700
<b>Period</b>	<b>Completions</b>							<b>2009-14</b>					<b>2015-19</b>					<b>2019-24</b>				<b>2024+</b>			
NPA Period Based	9673							9765					10897					9120				3245			
NPA Rounded	9500							10000					11000					9000				6000			

<b>RPA</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>	<b>2018/19</b>	<b>2019/20</b>	<b>2020/21</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>
RPA Trajectory	223	268	318	200	204	424	447	445	282	213	344	292	213	275	216	144	144	143	142	142	142	142	142	142	142
RPA Cumulative	223	491	809	1009	1213	1637	2084	2529	2811	3024	3368	3660	3873	4148	4364	4508	4652	4795	4937	5079	5221	5363	5505	5647	5789
<b>Period</b>	<b>Completions</b>							<b>2009-14</b>					<b>2015-19</b>					<b>2019-24</b>				<b>2024+</b>			
RPA Period Based	2084							1789					922					710				284			
RPA Rounded	2000							2000					1000					700				300			