

# Firepool Taunton

Nutrient Neutrality  
Assessment & Mitigation  
Strategy (NNAMS)

*for*

Somerset West &  
Taunton Council

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## 1 INTRODUCTION

### 1.1 Background

- 1.1.1 Following a court judgement (known as Dutch N), Natural England have advised Somerset West & Taunton Council (SW&T) that, in light of the unfavourable condition of the Somerset Levels and Moors Ramsar site (the Ramsar), before determining a planning application that may give rise to additional phosphates within the catchment, competent authorities should undertake a Habitats Regulations Assessment (HRA).

### 1.2 Scope

- 1.2.1 WCI have been appointed by the Somerset West and Taunton Council to prepare a nutrient neutrality assessment and mitigation strategy to support approval of the Firepool Masterplan.
- 1.2.2 A draft Strategic Environmental Assessment (SEA) / Habitats Regulations Assessment (HRA) Screening Report was consulted upon in August 2021 for the site. The draft report concluded that a full Appropriate Assessment would be required under the Habitats Regulations and, as such, a SEA would also be required to accompany the Masterplan.
- 1.2.3 To this end, the Local Planning Authority (LPA) consider that the SEA and Appropriate Assessments accompanying the Masterplan will need to include the following information:
- Advice on the land uses affected / not affected by the phosphate issue and quantify the likely phosphate load to be mitigated against;
  - An accompanying narrative explaining these inputs and what the outputs mean for the impacts upon the Ramsar and upon the Masterplan;
  - A narrative explaining the range of mitigation solutions that have been considered and the preferred solutions to be taken forwards;
  - A statement recognising that the calculations, approach, and costs will need to be kept under review in light of evolving guidance and processes;
  - A statement recognising that the development will not be able to go ahead unless a project level EIA and Appropriate Assessment can demonstrate that the proposals will not adversely affect the integrity of the Ramsar.
- 1.2.4 This assessment aims to fulfil the above requirements.

### 1.3 Methodology

- 1.3.1 The assessment of phosphate load and mitigation has been undertaken in accordance with the guidance available at the time of writing and may be subject to change as guidance evolves.
- 1.3.2 Where possible, the principles and data included in the Somerset West & Taunton Phosphate Balance Calculator (PBC) version 3.1 have been applied. For ease of presentation and interpretation, some of the calculations included in the PBC are re-created in spreadsheet format referencing the appropriate sources where necessary.
- 1.3.3 Not all assessments and mitigations are covered by the PBC and in these instances, separate calculations are made using reputable sources.

## 2 SITE DESCRIPTION

### 2.1 Proposed Development

- 2.1.1 The Firepool Masterplan at Taunton is a key Town Centre Regeneration Area which secured Outline Planning Permission for a retail-led scheme in 2019. An updated concept Masterplan now presents a residential-led and mixed use scheme with a focal leisure and entertainment block. A copy of the Masterplan is included in Appendix A.
- 2.1.2 For the purposes of this report, the development is understood to encompass a total development area of 69.6ha. The site consists of six primary development blocks which account for 58% of the site area. 28% of the site area is public open space including within development blocks. The roads, which include existing roads and proposed roads, make up 17% of the site area.
- 2.1.3 The land use will include:
- 429 residential units comprised of 77 houses and 352 flats
  - A 745 seat cinema complex
  - A performance venue accommodating 1,800 people
  - A 110 bed hotel
  - Retail space
  - Office space

### 2.2 Location

- 2.2.1 The site is located at postcode TA1 1AX and spans the River Tone.

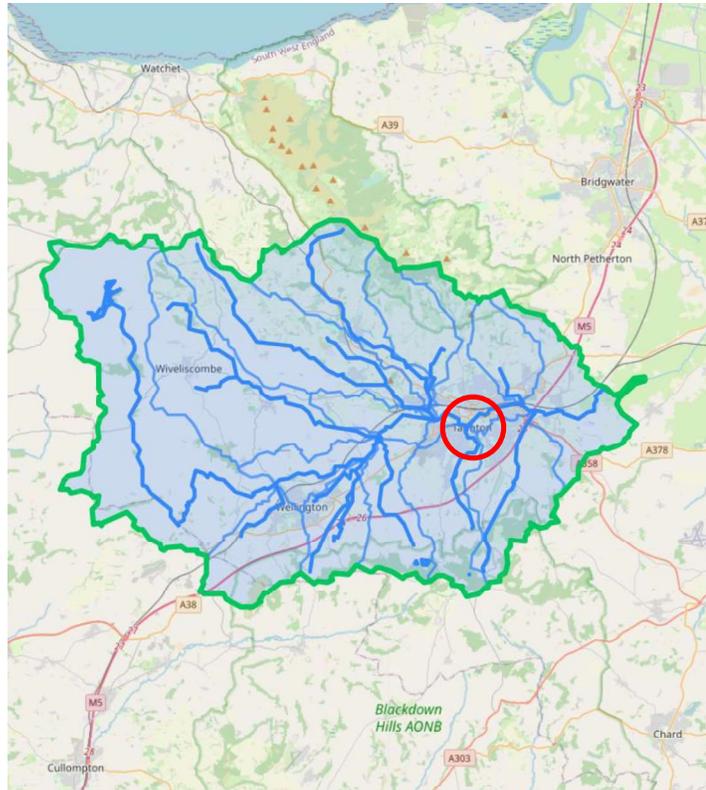


Site Location Plan<sup>1</sup>

### 2.3 Hydrological Catchment

- 2.3.1 The site lies within the hydrological catchment of the River Tone. The River Tone is a key tributary of the Somerset Levels and Moors Ramsar.

<sup>1</sup> BDP Firepool Design Guide ref TFM-BDP-00-XX-XX-005

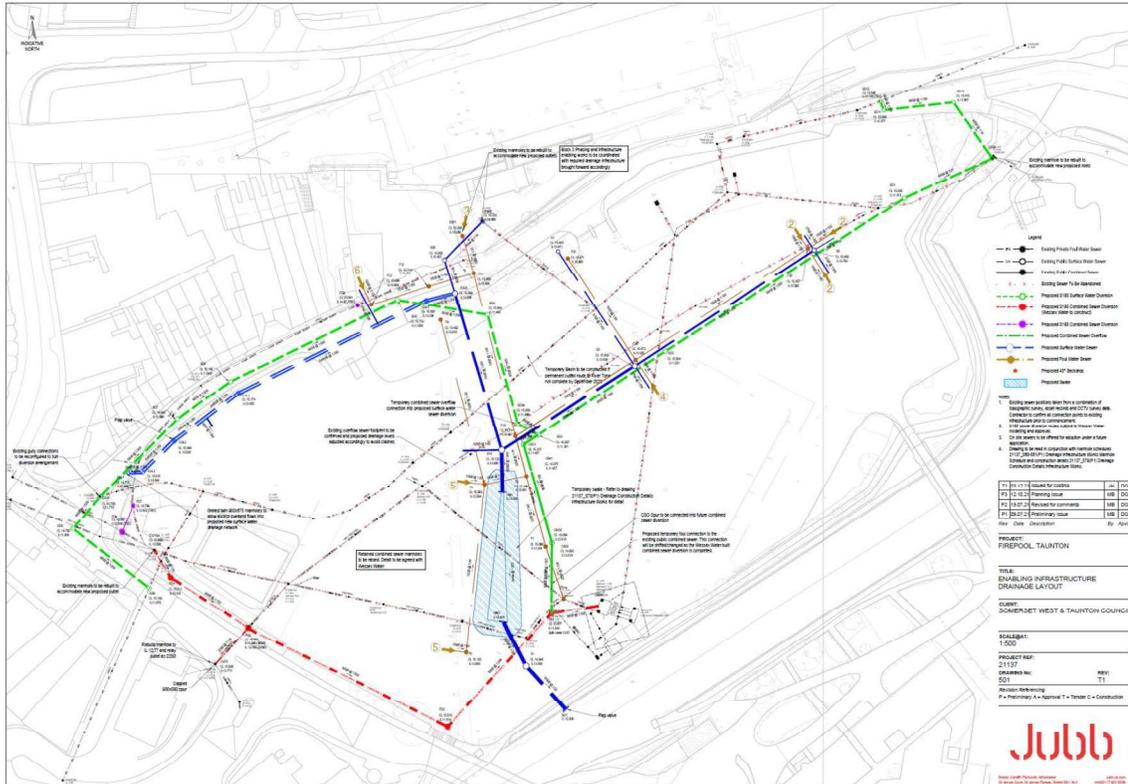


*River Tone Hydrological Catchment<sup>2</sup>*

## 2.4 Existing and Proposed Drainage Strategy

- 2.4.1 The site is served by existing Wessex Water combined and stormwater sewers. Several of the existing sewers will be diverted under S185 agreements with Wessex Water and new foul and surface water sewers introduced to the site.
- 2.4.2 Notably, the existing combined sewers include within the development site a Combined Sewer Overflow (CSO) which discharges to the River Tone.

<sup>2</sup> DEFRA Catchment Data Explorer 01 Feb 2022



Drainage Layout<sup>3</sup>

<sup>3</sup> Jubb Drawing 21137\_501\_T1

### 3 NUTRIENT NEUTRALITY ASSESSMENT

3.1.1 This section of the report presents an assessment of the phosphate balance for the site. The phosphate balance considers phosphates loads as a result of changes in human population and changes in land use.

#### 3.2 Changes in Population - Approach

3.2.1 To establish changes in phosphate load to the Ramsar as a result of development, only those developments which imply an increase in overnight accommodation within the River Tone hydrological catchment are typically included in the calculation of development-related Phosphate loads<sup>4</sup>.

3.2.2 However, a letter from Natural England dated 17 August 2020 states that *"Providing the competent authority is satisfied that new commercial development will not significantly increase loadings at the catchment's waste water treatment works, then they may be screened out from further assessment on the basis that people living in the catchment are also likely to work and use facilities in the catchment, and therefore wastewater generated by the person can be calculated using the population increase from new homes and other accommodation. Tourism attractions (e.g. theme parks) are normally considered exceptions as these land uses attract people into the catchment and generate additional wastewater within the Somerset Levels and Moors catchment."*

3.2.3 Feedback from SW&T on 01 July 2022 confirmed a requirement for calculation of the phosphate load for the proposed cinema and venue on the basis that this would attract people from outside the River Tone hydrological catchment. The feedback acknowledged that some of the attendance of the venue would be accounted for by the hotel occupation.

3.2.4 Given the mixed use nature of the site, and the detailed consideration of potential phosphate imports to the River Tone catchment, recognition of in-catchment and out-of-catchment occupation could be applied to all of the resident population at the site, particularly given the proximity of the site to Taunton train station. Consideration of potential export of phosphates outside of the River Tone hydrological catchment has been considered as a sensitivity to a baseline calculation assuming no export. This sensitivity is presented in Appendix B.

#### 3.3 Changes in Population – Overnight Accommodation

3.3.1 The site is currently a brownfield site with 10 existing buildings/structures on the site. These include the 'Goods House', the 'Auction House', Taunton Rowing Club and warehouse space. There are no current residential buildings or buildings providing overnight accommodation and as such the current overnight population is zero.

3.3.2 The proposed development introduces overnight accommodation within 77 houses and 352 flats, of which 18 are student accommodation<sup>5</sup>. Average physical occupancy levels are assumed to be an average of 2.4 persons per house and 1.6 persons per flat in accordance with the PBC giving a total of 766 persons.

3.3.3 The proposed development also introduces overnight accommodation within a 110-bed hotel<sup>6</sup>. Occupancy rates of the hotel has been applied in accordance with the PBC at 1.65 persons per unit. An assumed availability of 52 weeks per year and an occupancy rate of 70% has been applied to the proposed hotel rooms giving a total of 127 persons.

3.3.4 The combined overnight population increase for the Masterplan is subsequently 893 persons.

3.3.5 The PBC defines water use per person per day of 110 litres with an implicit Total Phosphorus concentration of 24.66 mg/L. Pre-treatment phosphate loads for the proposed additional overnight accommodation are subsequently 883.7 kg/yr from 35,839,989 L).

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<sup>4</sup> Somerset West & Taunton Phosphate Balance Calculator v3.1 – Stage 1 Note

<sup>5</sup> New Resi Numbers from Master Plan, T Bacon September 2022

<sup>6</sup> AHR Masterplan 220823

- 3.3.6 Sewage from the proposed occupation will discharge to the existing combined sewers serving the site. These sewers are ultimately processed by Taunton Wastewater Treatment Works (WwTW) in Ham.
- 3.3.7 The Taunton WwTW is currently subject to a Total Phosphorus (TP) limit of 0.9 mg/l and is forecast under AMP7 to be subject to a TP limit of 0.9 mg/l. These limits are applied to the pre-treatment phosphate loads associated with the proposed overnight population.
- 3.3.8 The total Phosphate Load introduced due to change in overnight population as a result of the proposed Masterplan is **32.26 kg/yr** (0.9 mg/L times 35,839,989 L).

### 3.4 Changes in Population – Venue & Cinema

- 3.4.1 The likely population catchment area for the Venue and Cinema has been evaluated in a report produced by Tim Bacon. The report evaluates the population catchment area against the River Tone hydrological catchment to isolate the population of users of the Cinema and Venue not already accounted for in residential phosphate loads. The full report is attached in Appendix C.
- 3.4.2 The anticipated annual population not resident in the River Tone hydrological catchment served by the Cinema is estimated at 37,474 persons. The anticipated annual population not resident in the River Tone hydrological catchment served by the Venue is estimated at 27,334 persons.
- 3.4.3 To determine likely phosphate loads from these populations, an assumption is made on average toilet usage while within the River Tone hydrological catchment. Total foul flows are subsequently calculated on the basis of 10 litres per use in accordance with the British Water Flows and Loads 4 Code of Practice which, in turn, has the PBC's phosphate load per litre applied to arrive at a total influent Phosphate load.
- 3.4.4 Average toilet usage is assumed at 0.75 times per person for the Cinema and at 1.5 times per person for the Venue based on a typical toilet frequency of 6-7 times per 24hrs and anticipated average stay times at the Cinema and Venue. Together these generate a total annual flow of 691,056 L.
- 3.4.5 Applying the PBC's implicit Total Phosphorus concentration of 24.66 mg/L gives pre-treatment phosphate loads for the proposed tourist population of 17.04 kg/yr.
- 3.4.6 Sewage from the Cinema and Venue will discharge to the existing combined sewers serving the site. These sewers are ultimately processed by Taunton Wastewater Treatment Works (WwTW) in Ham. The Taunton WwTW is currently subject to a Total Phosphorus (TP) limit of 0.9 mg/l and is forecast under AMP7 to be subject to a TP limit of 0.9 mg/l.
- 3.4.7 The total Phosphate Load introduced due to the non-resident population within the River Tone hydrological catchment is subsequently **0.62 kg/yr** (0.90 mg/l times 691,056 L).

### 3.5 Total Phosphate Load due to Change in Occupation

- 3.5.1 The combined phosphate load of 32.26 kg/yr due to change in overnight population and the 0.62 kg/yr due to additional non-resident population within the River Tone hydrological catchment is **32.88 kg/yr**.
- 3.5.2 This phosphate load could be reduced by 1.77 kg/yr to 31.11 kg/yr if reciprocal consideration is given to the export of residential phosphates due to commuting and seasonal occupation of the flats and houses on the site.
- 3.5.3 Full calculations of phosphate load due to changes in Occupation can be found in Appendix B.

### 3.6 Changes in Land Use

- 3.6.1 The PBC presents phosphate loads according to different land use definitions. These land uses are defined according to the CORINE 2018 land use data. There is a single definition presented for Urban Land Use ('Urban'). This is defined as "Development which encompasses the built form, gardens, pathing, roads, hardstanding's, parks and small areas of open space, ponds and SuDS. The phosphorous load results from sewer overflows and from drainage that picks up phosphorous on the urban land."<sup>7</sup>
- 3.6.2 In this context, despite significant areas of open space being introduced to the site as part of the Masterplan, there is insufficient consensus or information available with which to make a more detailed assessment of the phosphate loads due to change of land use. As such, the 'Urban' land use has been applied to the entirety of the development site for both current and proposed land use.
- 3.6.3 This approach is considered precautionary as SuDS features are likely to provide some water quality benefit.



- 3.6.4 As there is no change in land use, the phosphate balance for change of land use is zero.

### 3.7 Phosphate Balance

- 3.7.1 The phosphate balance is the sum of the impacts associated with change in occupation and change in land use. However, the PBC includes a 20% buffer. The explanation for this is included in the *Nutrient Budget Calculator Guidance Document* presented in March 2022.
- 3.7.2 *The 20% buffer is applied to account for the uncertainties that underlie the inputs to Stages 1-3 of the nutrient budget calculations, as well as accounting for some potential nutrient sources associated with new development that cannot be readily quantified. To cover all possible inputs to a nutrient budget with a high enough certainty to remove the need for the buffer would require extensive site-specific investigations. The 20% buffer is a means of accounting for the uncertainties within the nutrient budget calculations and providing confidence that mitigation of the nutrient budget will remove the risk of adverse effects on site integrity in the Somerset Levels & Moors Ramsar site.*
- 3.7.3 **The total Phosphate balance for the Masterplan is subsequently 32.88 kg/yr plus 20% giving 39.45 kg/yr.** See Appendix B for full phosphate balance calculations.

<sup>7</sup> SW&T Phosphate Balance Calculator v3.1

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## 4 MITIGATION STRATEGY

### 4.1 Preferred Strategy

- 4.1.1 A detailed appraisal of the options to achieve nutrient neutrality has been undertaken and is presented in sections 4.3 – 4.10.
- 4.1.2 A significant range of opportunities exist for the mitigation of the Masterplan phosphate load and it is anticipated that a range of mitigation measures may be preferable to a single mitigation method. For example, land use mitigation may require time to achieve full phosphate reduction efficacy and may require other phosphate mitigation measures to be adopted as short-term 'bridging credits'.
- 4.1.3 Based on current information, the preferred mitigation strategy is for the phosphate load from the development to be offset through improvements (the upgrade of existing septic tanks or sewage treatment plants with improved phosphate reduction) to existing private discharges within the River Tone hydrological catchment. See Section 4.8 for details.
- 4.1.4 The specific sites for upgrade will be identified within individual planning applications (see Section 4.2). However, as an illustration of feasibility, the SW&T Housing Initiative has identified 10 sewage works with a potential for more than 70 kg/yr of benefit. On this basis, the Firepool requirement would demand less than 60% of the entirety of these offsets. Alternatively, to fully offset the Firepool requirement would demand upgrades of 41 septic tanks to sewage treatment plants with phosphate reduction delivered without chemical dosing.
- 4.1.5 Upgrades to private discharges will easily be deliverable in line with the build out of the site (which is not expected to be shorter than 5 years) and, as such, this mitigation strategy avoids the dependency that land mitigation has on maturing before a phosphate benefit can be assured.

### 4.2 Statement of Intent

- 4.2.1 It is recognised that the Firepool Masterplan will influence the development of the site and that such development may not be able to go ahead unless project level EIA and Appropriate Assessment can demonstrate that specific planning applications will not adversely affect the integrity of the Ramsar. These planning applications will necessarily be based on specific and defined phosphate mitigation initiatives and it is recognised that the calculations, approach, and costs of the preferred and strategic mitigation options will need to be kept under review in light of evolving guidance and processes.

### 4.3 Options Appraisal

	Option	Description	Dependencies
LAND USE	<b>Off-Site Land Mitigation</b>	Offset the additional TP load from the developments through off-site land mitigation schemes such as Wetland creation or removing agricultural land from production.	Availability of suitable land for the wetland creation where phosphate-laden watercourses can be directed through the wetland.
	<b>On-Site Land Mitigation</b>	Offset the additional TP load from the developments through on-site land mitigation schemes such as Wetland creation. This implies amending the use of parts of the public realm or SUDS to explicit phosphate-reduction use.	Agreed technical standard for wetland creation.  Possible 'bridging credits' to allow for wetlands to mature to an adequate level of performance.
PURCHASE CREDITS	<b>SW&amp;T Strategic Initiatives</b>	Purchase Phosphate offset credits from SW&T strategic development fund.	Availability of offset credits
	<b>EnTrade</b>	Purchase Phosphate offset credits from EnTrade	Availability of offset credits  Economic feasibility to be established.
IMPROVE EXISTING DISCHARGES	<b>SW&amp;T Housing Stock</b>	Purchase Phosphate offset credits generated through the upgrade existing SW&T housing on managed treatment systems.	Availability of offset credits
	<b>3<sup>rd</sup> Party Housing Stock</b>	Purchase Phosphate offset credits generated through the upgrade existing housing from private septic tank systems to treatment plants or mains drainage.	Legal framework for planning approval & management of 3 <sup>rd</sup> party credits to be established Availability of credits through 'offset providers'
WwTW SUPPO RT	<b>Funded WwTW Performance Improvement</b>	Privately fund additional TP mitigation measures at Wessex Water WwTW within RAMSAR hydrological catchment not covered by AMP7 funding.	Requires suitable WwTW(s) to be identified with technical feasibility and scale to provide sufficient TP mitigation to cover proposed developments.

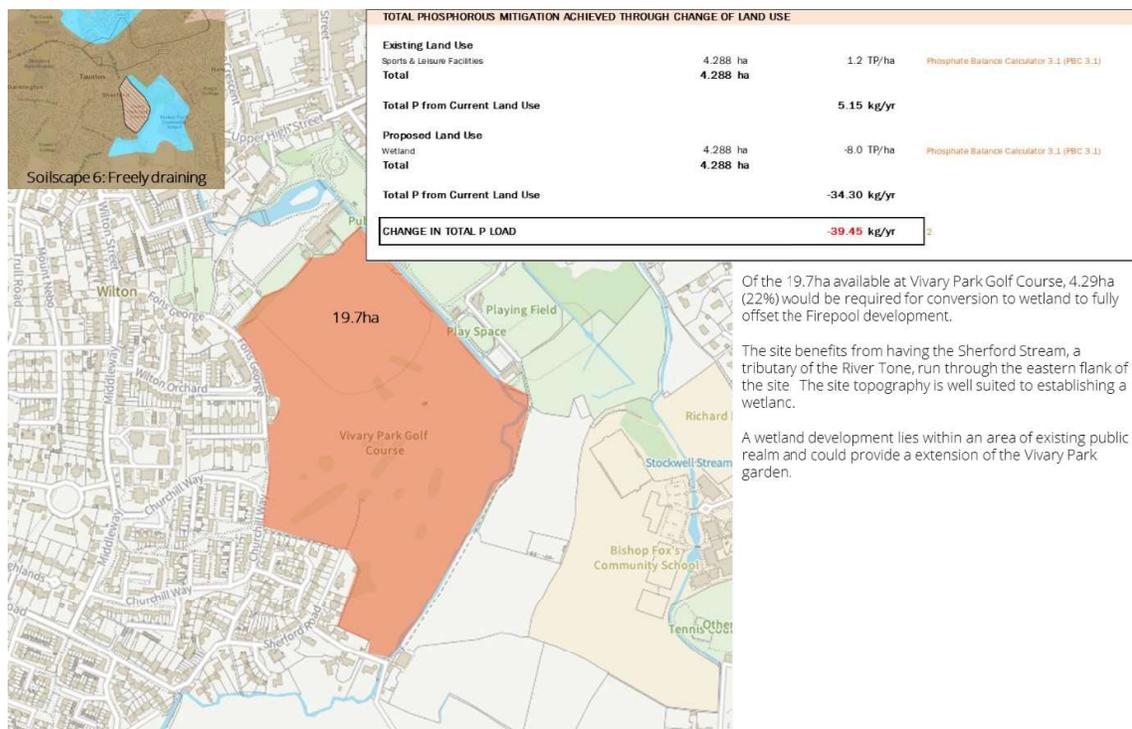
	<p><b>CSO Mitigation</b></p>	<p>Prevent the consented discharge of untreated sewage from the CSO within the Firepool footprint to provide annual TP mitigation</p>	<p>Requires acceptable flow rate of attenuated storm flows to be agreed with Wessex Water. Requires calculation of attenuation volumes and assessment of technical feasibility.</p> <p>Requires LPA/NE to accept CSO mitigation as an acceptable form of TP mitigation.</p>
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## 4.4 Change of Land Use – Off Site

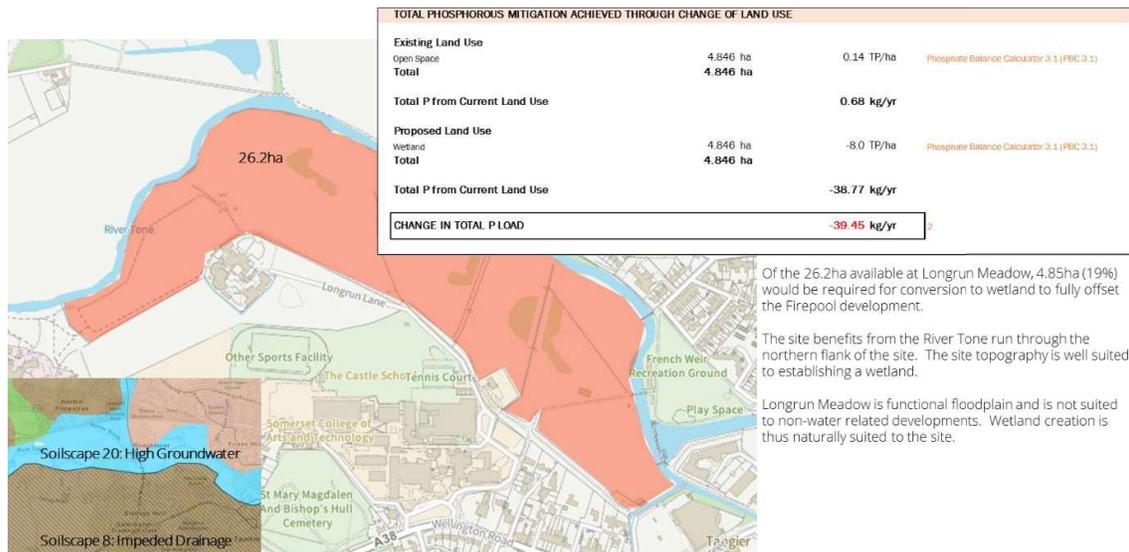
4.4.1 As land use has an implied phosphate load, it is conceivable that applying a permanent or enduring change to the use of land outside the development site will produce a reduction in phosphates that can offset those produced as a result of the development. Such initiatives have been termed “Nature-based solutions” within the *Somerset Levels and Moors Phosphate Mitigation Solutions Report* prepared by Royal Haskoning DHV commissioned by SW&T.

4.4.2 There are a multitude of different scenarios for offsite land use mitigation depending on the current use of the land and the proposed use of the land. To evaluate the potential for this type of mitigation to provide a meaningful contribution to the phosphate balance, several potential Council-owned sites have been identified as examples of potential changes in use.

### 4.4.3 Example 1 – Vivary Park Golf Club



4.4.4 Example 2 – Longrun Meadow



4.4.5 The above examples illustrate the potential for land use mitigation within Council-owned assets.

4.4.6 Establishing wetland at these sites will be dependent on public consultation and time to construct and establish the wetland. As such, 'bridging credits' meaning phosphate offsets that can be applied prior to the wetland efficacy being achieved, may be required from the other sources described in this report.

4.5 Change of Land Use – On Site

4.5.1 As the current use of Firepool is classed as urban use, introducing land use with lower phosphate loads will provide a betterment. As the current guidance excludes the application of SUDS features within this calculation<sup>8</sup>, alternative areas designed as public realm have been identified as potentially being available for wetland creation.

4.5.2 A total of 1ha has been identified for potential conversion from 'urban' land use to wetland. This has the potential to provide up to 8.83kg/yr of phosphate betterment or 23% of the total requirement.

TOTAL PHOSPHOROUS MITIGATION ACHIEVED THROUGH CHANGE OF LAND USE			
<b>Existing Land Use</b>			
Urban	1.000 ha	0.83 TP/ha	Phosphate Balance Calculator 3.1 (PBC 3.1)
<b>Total</b>	<b>1.000 ha</b>		
<b>Total P from Current Land Use</b>		<b>0.83 kg/yr</b>	
<b>Proposed Land Use</b>			
Wetland	1.000 ha	-8.0 TP/ha	Phosphate Balance Calculator 3.1 (PBC 3.1)
<b>Total</b>	<b>1.000 ha</b>		
<b>Total P from Current Land Use</b>		<b>-8.00 kg/yr</b>	
<b>CHANGE IN TOTAL P LOAD</b>		<b>-8.83 kg/yr</b>	<sup>2</sup>

<sup>8</sup> Somerset West & Taunton Phosphate Balance Calculator v3.1 – Land Use Definitions - Urban



Areas Identified for On Site Wetland Creation<sup>9</sup>

4.5.3 Other on-site mitigation strategies were mooted by SW&T including 'floating wetlands'. There is no technical standard nor consensus on how these would be formed nor their efficacy in phosphate reduction. However, it is noted that the PBC (drawing on the Stodmarsh example) generally infers that wetland reduces 8.0 kg of phosphate per year per hectare of wetland. This being the case, 4.9 ha of wetland would be required to fully offset the phosphate load of the development which far exceeds the potential with the site landmass and certainly within the river body itself. As such, on-site mitigation has been discounted in favour of more assured approaches.

## 4.6 Purchase of Credits – SW&T Strategic Initiatives

4.6.1 On the 5<sup>th</sup> October 2021, SW&T published a programme of interim measures<sup>10</sup>. The proposed programme resolved to approve a Supplementary Capital Budget of £2m for Phosphates Mitigation Interim Measures, to be included in the General Fund Capital Programme for 2021/22 and 2022/23. Amongst other things, the programme envisaged the creation of phosphate offset credits through the development of large-scale strategic project(s) (most likely being wetland schemes down stream of existing WWTW's) and a programme for the retrofitting of the Council's own housing stock to improve their water efficiency). Water efficiency improvements envisaged the creation of 3,852 phosphate credits (meaning credits for the creation of 3,852 housing units).

4.6.2 At the time of writing, SW&T has not published any timetable for the availability of credits.

<sup>9</sup> Tim Bacon assessment 14.06.22

<sup>10</sup> Somerset-levels-and-moors-phosphate-mitigation-report-to-full-council-05-oct-2021

## 4.7 Purchase of Credits - EnTrade

- 4.7.1 It is envisaged that a central offsetting scheme will be created by EnTrade, a brokerage for environmental credits. There is potential for this trading platform to consolidate credits generated by third parties (eg farmers with land which will be turned over to phosphate mitigation) which will be sold to developers at a market rate.
- 4.7.2 The currently indicated market rate is £55,000 per kg of phosphate mitigation. This has yet to be verified and it is not clear whether this is for the life of the development or for a defined period. At the time of writing, EnTrade has not published any timetable for the auction of credits nor availability of credits.

## 4.8 Improvement to Existing Discharges

- 4.8.1 All mitigation schemes propose improvements to existing sources of phosphate to the River Tone hydrological catchment. While previous schemes consider improvements to phosphates generated from land use or from discharges from adopted WwTW, there are a significant number of existing dwellings within the River Tone hydrological catchment not served by adopted sewers that discharge to the environment via septic tanks or package treatment plants.
- 4.8.2 Under the Environmental Permitting Regulations (England and Wales) 2015 and preceding regulations, such 'off-mains' discharges are not subject to any particular phosphate reduction performance.
- 4.8.3 Natural England has recommended a baseline performance for septic tanks and package treatment plants of 11.6mg/l and 9.7 mg/l respectively. WCI's own sampling of existing septic tank and package treatment plant discharges suggest that this performance is not consistently achieved.
- 4.8.4 Irrespective of the current performance of the septic tank or package treatment plant, improving on current performance through upgrades to the system will reduce current levels of phosphate to the Ramsar which can be sold as credits to Firepool.
- 4.8.5 The following illustration considers the potential of upgrades from existing septic tanks to a BS EN12566-3:2005-certified package sewage treatment plant (see Appendix D for a PIA Certificate demonstrating the phosphate reduction performance of one such package sewage treatment plant). The illustration uses Natural England's baseline performance for septic tanks and assumes that no chemical dosing is used in the upgrade.
- 4.8.6 On this basis, **upgrades to 41 houses** provides sufficient betterment to offset the phosphate load from the Firepool Masterplan. This number increases to 51 houses where the upgrade is applied to existing package sewage treatment plants rather than septic tanks.
- 4.8.7 Two potential sources of 'upgrade credits' exist at the time of writing. SW&T current own and operate 10 sewage works serving current or ex-Council Houses within the River Tone hydrological catchment. Collectively, upgrades to these sewage works present an opportunity for more than 70 kg/yr of phosphate reduction.
- 4.8.8 Separately, opportunities exist for independent upgrades through 'offset providers'. Such providers will generate and manage banks of phosphate credits for the purchase by developers such as Firepool.
- 4.8.9 In all cases, precedent has been established for agreements to be put in place to secure the improvement at the 'mitigation property' and the development. These may take the form of Unilateral Undertakings or Section 106 agreements. The specific form of agreement is to be included in individual planning applications.
- 4.8.10 Feasibility of this approach has been evaluated against the potential cost of delivery. Using WCI's own experience, the upgrade of a septic tank to a GRAF one2clean treatment plant for a typical dwelling ranges from £15,000 to £20,000. The total capex of this approach thus can be estimated at present at approximately £1m when allowances are made for unknown factors. This figure is significantly below the £55,000 per kg (implying a total requirement of £2.2m) cited by SW&T in recent Developers Forums.

TOTAL PHOSPHORUS MITIGATION ACHIEVED FROM BETTERMENT TO EXISTING OCCUPATION				
			References	
<b>Current TP Load from Existing Dwelling</b>				
<b>Existing Dwelling</b>	<b>Persons per Unit</b>	2.4	Phosphate Balance Calculator 3.1 (PBC 3.1)	
41	<b>Total Persons</b>	98.4		
	<b>Flow per Person per Day</b>	110 l/day		
	<b>Total Daily Flow</b>	10824 L		
	<b>Annual Flow</b>	3,950,760 L		
	<b>Total P (Concentration)</b>	24.66 mg/l		
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr		
	<b>Total P (Pre-Treatment)</b>	97.42 kg/yr		
	<b>Treatment Efficiency</b>	53.0%		Nutrients mitigation - PTP and septic tanks EA and NE_Final - O'Keefe et al 2015
		11.60 mg/l		
<b>Current TP Load</b>		<b>45.82 kg/yr</b>		
<b>TP Load following Improvement</b>				
	<b>Persons per Unit</b>	2.4	Phosphate Balance Calculator 3.1 (PBC 3.1)	
	<b>Total Persons</b>	98.4		
	<b>Flow per Person per Day</b>	110 l/day		
	<b>Total Daily Flow</b>	10824 L		
	<b>Annual Flow</b>	3,950,760 L		
	<b>Total P (Concentration)</b>	24.66 mg/l		
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr		
	<b>Total P (Pre-Treatment)</b>	97.42 kg/yr		
	<b>Treatment Efficiency</b>	93.5%		GRAF One2Clean PIA Certificate
		1.6 mg/l		
<b>TP Load following Improvement</b>		<b>6.32 kg/yr</b>		
<b>CHANGE IN TOTAL P LOAD</b>		<b>- 39.50 kg/yr</b>		

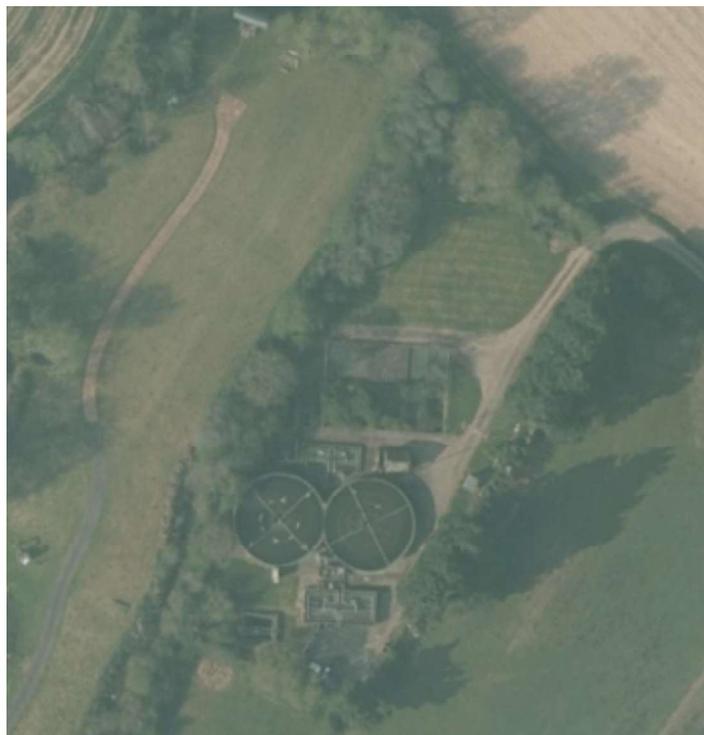
#### 4.9 Funded WwTW Performance Improvement

- 4.9.1 Of the 111 WwTW with discharges affecting the Ramsar (listed on the PBC), only 28 (25%) have TP reductions recognised by the PBC in the AMP7 period. There are a further 75 WwTW which have no TP reductions within AMP7 which serve a current population of 310,855 people.
- 4.9.2 The PBC assumes that WwTW without phosphate limits operate to 5 mg/l efficiency. However, Natural England's own assumptions for package sewage treatment plants is for baseline phosphate reduction efficiencies to be 9.7 mg/l<sup>11</sup>.
- 4.9.3 While the phosphate reduction from large WwTW's is generally achieved through the dosing of chemical precipitants such as Ferric Chloride, Natural England have indicated that they do not support the use of this technology without appropriate management regimes in place. Given the scale of Firepool, it is assumed that such management structures could easily be put in place and a comparable level of phosphate reduction achieved as for the large WwTW.
- 4.9.4 Using Bradford-on-Tone WwTW as an example, even assuming current performance of 5 mg/l, a reduction to the 0.9 mg/l applied to Taunton WwTW has the potential to deliver **419 kg/yr** of phosphate mitigation.

<sup>11</sup> Nutrients mitigation - PTP and septic tanks EA and NE\_Final - May and Woods 2016

TOTAL PHOSPHOROUS MITIGATION ACHIEVED THROUGH WWTW IMPROVEMENT			
<b>Current TP Load from Existing Dwelling</b>			References
<b>Existing Population</b>			
1343	<b>Total Persons</b>	1343	Appendix 8.6.A – Claim WSK02
	<b>Permit Limit</b>	280 m3/day	
	<b>Total Daily Flow</b>	280,000 L	
	<b>Annual Flow</b>	102,200,000 L	
	<b>Total P (Concentration)</b>	24.66 mg/l	
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	
	<b>Total P (Pre-Treatment)</b>	2520 kg/yr	
	<b>Treatment Efficiency</b>	79.7%	Phosphate Balance Calculator 3.1 (PBC 3.1)
	<b>Current TP Load</b>	<b>511.00 kg/yr</b>	
<b>TP Load following Improvement</b>			
	<b>Total Persons</b>	1343	
	<b>Permit Limit</b>	280 m3/day	
	<b>Total Daily Flow</b>	280,000 L	
	<b>Annual Flow</b>	102,200,000 L	
	<b>Total P (Concentration)</b>	24.66 mg/l	
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	
	<b>Total P (Pre-Treatment)</b>	2520 kg/yr	
	<b>Treatment Efficiency</b>	96.4%	Assumed on basis of referenced performance of package treatment works
	<b>TP Load following Improvement</b>	<b>91.98 kg/yr</b>	
<b>CHANGE IN TOTAL P LOAD</b>		<b>- 419.02 kg/yr</b>	

4.9.5 Bradford-on-Tone has been selected due to an apparent availability of land surrounding the WwTW on which possible phosphate mitigation initiatives might be placed.



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## Ordnance Survey Aerial Map of Bradford-on-Tone WwTW

### 4.10 CSO Mitigation

- 4.10.1 Combined Sewer Overflows (CSO) provide the ability for Combined Sewers (which carry both sewage and stormwater) to overflow to watercourses to prevent inundation of WwTW and the potential backing up of sewers causing flooding of homes, roads and open spaces.
- 4.10.2 While CSOs carry Environment Agency Environmental Permits, are closely monitored and are currently a necessary part of the sewerage network infrastructure, they are a significant contributor to TP loads to the environment.
- 4.10.3 The Taunton Market CSO (ID: 17338) is referenced by Wessex Water Storm Overflow Event Duration Monitoring (EDM) and impact data released on 31<sup>st</sup> March 2021 as being located in a waterbody where the “Reason for Not Achieving Good” (RNAG) Ecological Status has been linked to Storm Overflows and where the reason for this status is Phosphate levels.<sup>12</sup> A total of 9 hours of overflow was recorded for the 2020 reporting period.
- 4.10.4 The drainage strategy developed for Firepool has highlighted a requirement to divert the existing Combined Sewer and CSO as part of the development. Providing improvements to the CSO, including the potential for attenuation storage may reduce the frequency and duration of overflows thus reducing the existing TP load from the site.
- 4.10.5 Reduction in total CSO spill volumes will reduce the discharge of untreated sewage to the River Tone. Assuming the concentration of phosphate during spills to be 1.5 mg/l, a reduction of 26,607 m<sup>3</sup> of spill volume is required to achieve 40 kg of phosphate reduction.
- 4.10.6 Wessex Water will have detailed data on the actual storm tank discharges and CSO flow rates. These are required to establish the attenuation volumes that would be required to avoid CSO spills.
- 4.10.7 However, crudely, dividing 26,607 m<sup>3</sup> over 9 hrs suggests an attenuation volume of roughly 3,000m<sup>3</sup>. Provided within an attenuation tank 3m deep, this will require approximately 1,500m<sup>2</sup> of storage area or 2.2% of the site area.

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<sup>12</sup> [wessex-water-storm-overflow-edm-summary-data-20210331](#).

## 5 APPENDICES

### 5.1 APPENDIX A – Masterplan

See appended drawing.



## 5.2 APPENDIX B – Phosphate Balance Calculations

### 5.2.1 Baseline Phosphate Calculations

TOTAL PHOSPHOROUS LOAD DUE TO OVERNIGHT ACCOMMODATION		References	
<b>Housing Units</b>			
Number of Units	77 no.	2.4 per/unit	Phosphate Balance Calculator 3.1 (PBC 3.1)
<b>Total Persons</b>		<b>184.8</b>	equivalent annual persons
<b>Flats</b>			
Number of Units	334 flats	1.65 pers/dwelling	Phosphate Balance Calculator 3.1 (PBC 3.1)
Number of students	18 flats	29.7 persons	
<b>Total Persons</b>		<b>580.8</b>	equivalent annual persons
<b>Rooms in a hotel or guest house proposed</b>			
Number of weeks open per year (1-52)	110 no.	1.65 pers/dwelling	Phosphate Balance Calculator 3.1 (PBC 3.1)
Average occupancy rate (1-100)		52 weeks	
		70%	
<b>Total Hotel/Guest Room Persons</b>		<b>127.05</b>	
	<b>Total Persons</b>	<b>893</b>	
	<b>Flow per Person per Day</b>	110 l/day	
	<b>Total Daily Flow</b>	98,192 L	
	<b>Annual Flow</b>	35,839,898 L	
	<b>Total P (Concentration)</b>	24.66 mg/l	
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	Phosphate Balance Calculator 3.1 (PBC 3.1)
	<b>Total P (Pre-Treatment)</b>	883.72 kg/yr	
	<b>WwTW Treatment Efficiency</b>	96.4%	0.90 mg/l Ham WwTW
<b>TOTAL P DUE TO RESIDENT OCCUPATION</b>		<b>32.26 kg/yr</b>	1
TOTAL PHOSPHOROUS LOAD DUE TO TOURIST POPULATION		References	
<b>Cinema</b>			
Annual population not resident in Tone Catchment	37,474 persons		Appendix G - User Data Phosphate Calcs
Toilet use per person	0.75		
Flow per toilet use	10 L		British Water Flows and Loads 4
Total Flow	281,055 L		
<b>Venue</b>			
Annual population not resident in Tone Catchment	27,334 persons		Appendix G - User Data Phosphate Calcs
Toilet use per person	1.5		
Flow per toilet use	10 L		British Water Flows and Loads 4
Total Flow	410,010 L		
<b>Total Annual Flow</b>	691,065 L		
	<b>Total P (Concentration)</b>	24.66 mg/l	
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	Phosphate Balance Calculator 3.1 (PBC 3.1)
	<b>Total P (Pre-Treatment)</b>	17.04 kg/yr	
	<b>WwTW Treatment Efficiency</b>	96.4%	0.90 mg/l Ham WwTW
<b>TOTAL P DUE TO TOURIST POPULATION</b>		<b>0.62 kg/yr</b>	1
TOTAL PHOSPHOROUS LOAD			
Total P due to current occupation	0.00 kg/yr		1
Total P due to proposed occupation	32.88 kg/yr		2
<b>TOTAL P ARISING DUE TO CHANGE IN OCCUPATION</b>		<b>32.88 kg/yr</b>	3 (1 + 2)

<b>STAGE 2 &amp; 3 - CHANGE IN LAND USE</b>	<b>TOTAL PHOSPHOROUS LOAD DUE TO CURRENT LAND USE</b>			
	<i>References</i>			
	<b>Existing Land Use</b>			
	Urban Use	6.960 ha	0.83 TP/ha	TFM-BDP-00-XX-XX-0005 Phosphate Balance Calculator 3.1 (PBC 3.1)
	<b>Total</b>	<b>6.960 ha</b>		
	<b>TOTAL P DUE TO CURRENT LAND USE</b>		<b>5.78 kg/yr</b>	4
	<b>TOTAL PHOSPHOROUS LOAD DUE TO PROPOSED LAND USE</b>			
	<i>References</i>			
	<b>Existing Land Use</b>			
	Urban Use	6.960 ha	0.83 TP/ha	TFM-BDP-00-XX-XX-0005 Phosphate Balance Calculator 3.1 (PBC 3.1)
<b>Total</b>	<b>6.960 ha</b>			
<b>TOTAL P DUE TO PROPOSED LAND USE</b>		<b>5.78 kg/yr</b>	5	
<b>TOTAL PHOSPHOROUS LOAD</b>				
Total P due to current occupation		5.78 kg/yr	4	
Total P due to proposed occupation		5.78 kg/yr	5	
<b>TOTAL P ARISING DUE TO CHANGE IN LAND USE</b>		<b>0.00 kg/yr</b>	6 (4 + 5)	
<b>TP BALANCE</b>	<b>NET TOTAL PHOSPHORUS DUE TO DEVELOPMENT</b>			
	Change in Occupation TP Balance		32.88 kg/yr	from 3
	Change in Land Use TP Balance		0.00 kg/yr	from 6
	<b>Total Change</b>		<b>32.88 kg/yr</b>	
	20% Safety Factor		6.58 kg/yr	Phosphate Balance Calculator 3.1 (PBC 3.1)
	<b>TP LOAD FROM PROPOSED DEVELOPMENT</b>		<b>39.45 kg/yr</b>	7

5.2.2 Sensitivity for Export of Residential Phosphates

TOTAL PHOSPHOROUS LOAD DUE TO OVERNIGHT ACCOMMODATION				
<b>STAGE 1 - CHANGE IN OCCUPATION</b>				References
	<b>Housing Units</b>			
	Number of Units	77 no.	2.4 per/unit	Phosphate Balance Calculator 3.1 (PBC 3.1)
			184.8 persons	
	No. commuters	20%	37.0 persons	
	Proportion of phosphates while at work	29%		50% of daily phosphates, 4 days out of 7
	Equivalent residential persons		26.4 equivalent annual persons	
	Non-commuting residents		147.8 persons	
	<b>Total Persons</b>		<b>174.2</b> equivalent annual persons	
	<b>Flats</b>			
	Number of Units	334 flats	1.65 pers/dwelling	Phosphate Balance Calculator 3.1 (PBC 3.1)
			551.1 persons	
	No. commuters	20%	110.22	
	Proportion of phosphates while at work	29%		50% of daily phosphates, 4 days out of 7
	Equivalent residential persons		78.7 equivalent annual persons	
Non-commuting residents		440.9		
Number of students	18 flats	29.7 persons		
Number of weeks resident per year (1-52)	40 weeks	22.8 equivalent annual persons		
<b>Total Persons</b>		<b>542.5</b> equivalent annual persons		
<b>Rooms in a hotel or guest house proposed</b>				
Number of weeks open per year (1-52)	110 no.	1.65 pers/dwelling	Phosphate Balance Calculator 3.1 (PBC 3.1)	
Average occupancy rate (1-100)		52 weeks		
<b>Total Hotel/Guest Room Persons</b>		<b>127.05</b>		
	<b>Total Persons</b>	<b>844</b>		
	<b>Flow per Person per Day</b>	110 l/day		
	<b>Total Daily Flow</b>	92,812 L		
	<b>Annual Flow</b>	33,876,351 L		
	<b>Total P (Concentration)</b>	24.66 mg/l		
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	Phosphate Balance Calculator 3.1 (PBC 3.1)	
	<b>Total P (Pre-Treatment)</b>	835.31 kg/yr		
	<b>WwTW Treatment Efficiency</b>	96.4%	Ham WwTW	
	<b>TOTAL P DUE TO RESIDENT OCCUPATION</b>	<b>30.49 kg/yr</b>	1	
TOTAL PHOSPHOROUS LOAD DUE TO TOURIST POPULATION				
			References	
<b>Cinema</b>				
Annual population not resident in Tone Catchment		37,474 persons	Appendix G - User Data Phosphate Calcs Assumed	
Toilet use per person		0.75		
Flow per toilet use		10 L	British Water Flows and Loads 4	
Total Flow		281,055 L		
<b>Venue</b>				
Annual population not resident in Tone Catchment		27,334 persons	Appendix G - User Data Phosphate Calcs Assumed	
Toilet use per person		1.5		
Flow per toilet use		10 L	British Water Flows and Loads 4	
Total Flow		410,010 L		
<b>Total Annual Flow</b>		<b>691,065 L</b>		
	<b>Total P (Concentration)</b>	24.66 mg/l		
	<b>Total P (per Person p.a.)</b>	0.99 kg/yr	Phosphate Balance Calculator 3.1 (PBC 3.1)	
	<b>Total P (Pre-Treatment)</b>	17.04 kg/yr		
	<b>WwTW Treatment Efficiency</b>	96.4%	Ham WwTW	
	<b>TOTAL P DUE TO TOURIST POPULATION</b>	<b>0.62 kg/yr</b>	1	
TOTAL PHOSPHOROUS LOAD				
	Total P due to current occupation	0.00 kg/yr	1	
	Total P due to proposed occupation	31.11 kg/yr	2	
	<b>TOTAL P ARISING DUE TO CHANGE IN OCCUPATION</b>	<b>31.11 kg/yr</b>	3 (1 + 2)	

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### 5.3 APPENDIX C – Phosphates Leisure Uses Firepool v1

See appended documents

## **Phosphates**

### **Catchment Analysis – Firepool**

#### **Leisure Uses**

#### **Cinema, Other Leisure and Venue and Other Uses**

##### Introduction

This report considers the likely population catchment area for the proposed Cinema development at Firepool. The intention is then to compare this to the catchment area that is already caught by phosphates. If the phosphate caught area of the catchment is deducted from the overall catchment area the net will be the number of people that would likely use the cinema that come from outside the phosphate caught area to allow a reasonable estimation of the number of additional phosphates generated from the proposed development. The published phosphate caught area is shown at Appendix A.

##### **General Assumptions**

The proposed Firepool cinema will be identical to the almost finished Northgate Yard Cinema at Bridgewater. This is a 7 screen cinema consisting of 745 seats. The layout for this cinema is enclosed at Appendix B and although the precise nature of the layout for Firepool is to be determined the intention is whatever shape the building consists of

Cinemas are greatly impacted by competition as they are simply a screen to show mainly mainstream movies. The catchment will be very much driven by nearby competition as generally the same films are shown at the same cinemas at the same time. The industry is driven by blockbuster movies which are heavily marketed internationally.

Generally the industry has been greatly impacted by Covid and online streaming services but for the purposes of a prudent occupancy estimate it is assumed that by the time the Firepool Cinema is open in 2 to 3 years that the industry would have returned to the 2019 levels which were a very good year for the industry. 2022 occupancy levels nationally are around 80% of the 2019 peak and there are many variables in the sector such as:

- inflation in living costs squeezing available consumer spend on luxuries such as cinema
- considerable increase in subscription to online streaming services
- Delays in production of new block buster movies because of lockdowns and the 2-3 year period it often takes to get movies made
- some reluctance, particularly in the older age groups to return to pre -covid social interactions
- Ticket pricing due to rapidly rising energy costs for operators

Similar considerations apply to the venue and although there are more acts on tour than movie releases the reality is only so many acts tour at a particular time and when they do they will likely book tours based on venues by geography to minimise travel and waiting times. So one act booked at the Firepool venue may well next appear at the Exeter Phoenix or Octagon Theatre Yeovil for example.

## **Occupancy**

It is of course best to be led by National trends in identifying an average occupancy. The UK Cinema Association provides the data as attached at Appendix C.

In summary this demonstrates that there were 176,000,000 admissions in the UK in 2019 and 937,161 seats. This is a pre covid optimum level and a more than prudent place to set occupancy rates for the future. It is still highly questionable that the UK market will bounce back to 2019 levels but this is a sensible assumption for calculating phosphates. Given the spread of cinemas in the UK area mix of newer purpose built multi-screen and older sometimes much larger single screen venues it is best to take a UK average per screen.

There are 4,564 screens in the UK so this is an average of 38,560 admissions per year per screen. We need also to apply a weighting that assumes as this is a UK average newer purpose built facilities are likely to do better than average so an additional 20% to the UK average is appropriate. This number could though be further discounted given immediate competition from Northgate at Bridgewater a shortly to be opened (October 22) purpose built 7 screen cinema, the existing Odeon in Taunton providing immediate competition. It is probable that average occupation will be impacted by close and near competition from adjacent and modern facilities especially give both will have significantly more on site car parking than at Firepool.

So for Firepool we assume 46,272 annual admissions per average screen.

That makes annual forecast admissions at Firepool at 323,904.

## **Other Leisure Uses**

As this is based on the generic masterplan it is currently uncertain what this use maybe. A simple assumption is that it will have the same characteristics of the cinema as would any leisure use. The masterplan currently shows a leisure box beneath the cinema but this is to become retail space so is not phosphate caught.

The area of the Cinema according to the latest version of the masterplan (attached at Appendix D) is 1293 sqm against the cinema which is 3049 sqm a factor of 42.4%.

Other leisure uses include the restaurants/retail all of which will serve the immediate phosphate caught population as is usual for these types of facilities. Therefore these will not generate phosphates. This was the working assumption with the Block 3 application which was approved without phosphate implications.

## **Venue**

IPW, specialist consultants have looked at the business plan for the venue and have estimated that the annual usage from year 3 (optimum year) would be 89,000 people. The more detailed analysis for optimum usage is provided at Appendix H.

## **Catchment Factors**

In order to calculate the penetration rate in the catchment areas previous work by the Audience Agency have identified the 30 minute drive and 60 minute drive catchment area, enclosed at Appendix F and defined in population number as follows:

- 30 minute drivetime catchment population – 244,000
- 60 minute drivetime catchment population – 1,180,000

The cinema will attract very few if any visitors from the 60 minute drivetime catchment area as there are many cinemas and other leisure facilities closer to residents homes.

Given the proximity of other cinemas it is clear that it will be unlikely that customers for the cinema will travel more than 30 minutes and this is clear from the location of cinemas.

Residents in North Devon are well served by cinemas at Barnstaple, Ilfracombe and Minehead. Residents to the south of North Devon are close to Exeter or Tiverton and it is hard to see that any North Devon residents would use a new cinema at Firepool. This is also true of Mid Devon and East Devon. These are modelled at Appendix G.

Usual weighting for leisure venues is that their core areas are generally mainly from the 30 minute drive time area so to reflect this a 90% factor has been incorporated in assessing where the estimated visits will come from in that catchment area.

The Venue will likely attract more residents from the 30-60 minute drivetime sector so a 75% factor has been assumed. This also reflects that visitors from this distance may stay in the hotel which has already assumed these user stats.

#### Phosphate Caught Districts

These have been calculated from Government data compared against the Ward and District maps from the published Phosphate Catchment plan at Appendix A. There are several Wards in all of the Districts that are part caught by phosphates and prudent assumptions have been made to estimate the population fully caught by phosphates. This has been assessed by Ward and the detailed calculations are provided at Appendix E. For prudency if any part of a ward is caught the whole population is assumed.

#### Conclusion

The calculations demonstrate the phosphate implications and this is provided at Appendix G.



# Layout - Cinema

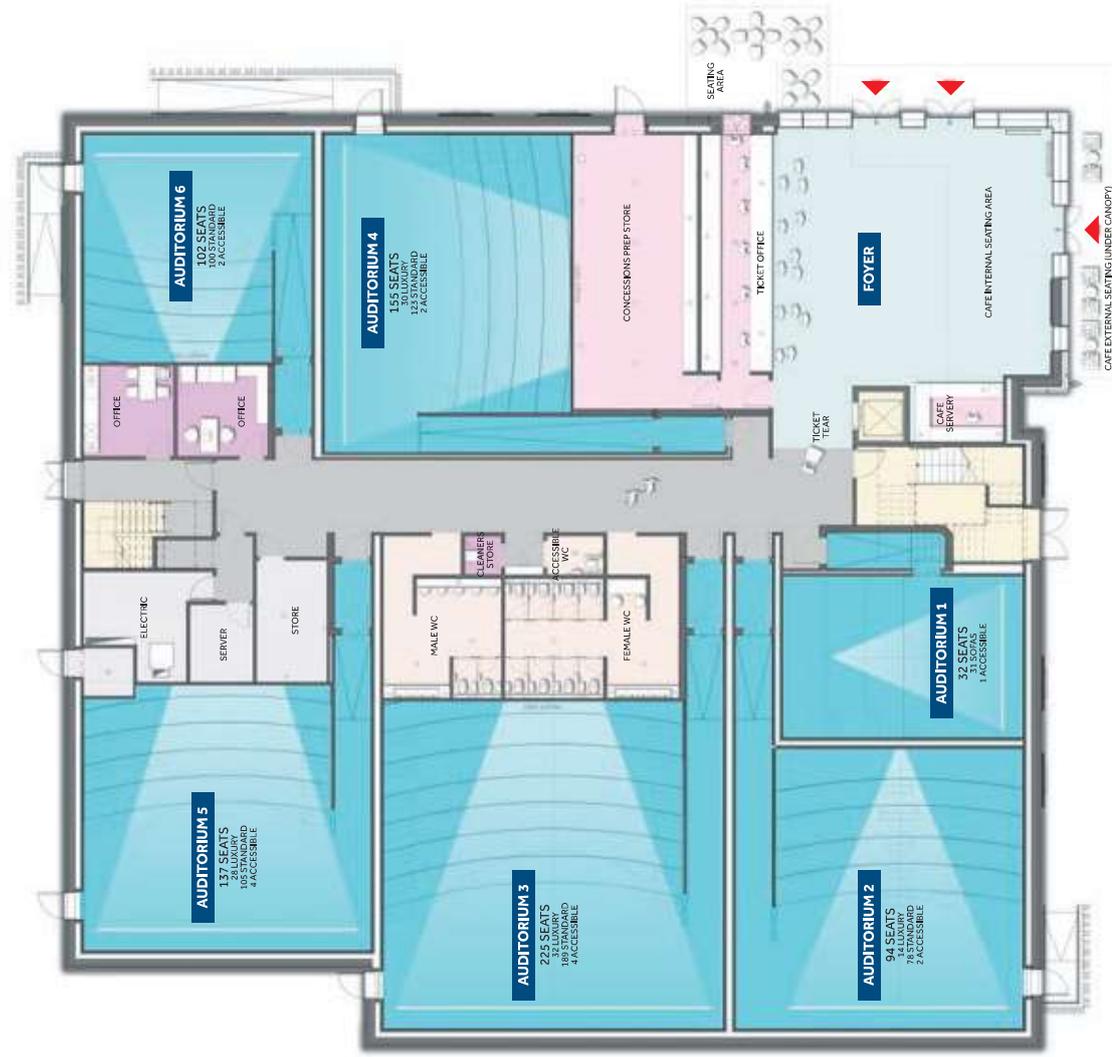
## 4.3 The Cinema

The cinema will contain six screens, plus a boutique studio auditorium and a 'Director's Lounge', which will be available for presentations, meetings and corporate events. A choice of screens of different sizes, provide a range of film choices and a high quality of environment

The building is organised on two levels and is fully accessible.

The ground floor is accessed through an atria space providing views of the activities above and housing concessions and a café. A lift and a stair from the foyer area gives access to the upper level where a boutique studio auditorium and the multi-purpose space are located and equipped with a bar and a corridor accessing the projection rooms and the auditorium balconies providing inclusive access. Ancillary facilities are provided at ground and upper level located in a convenient location for the cinema customers.

The service and refuse area is situated within the A3 service yard.



Cinema Ground Floor Plan

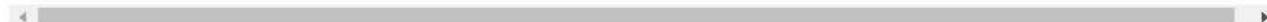


Facts and figures

UK cinema industry infrastructure

## Sites and screens - 2010-2021

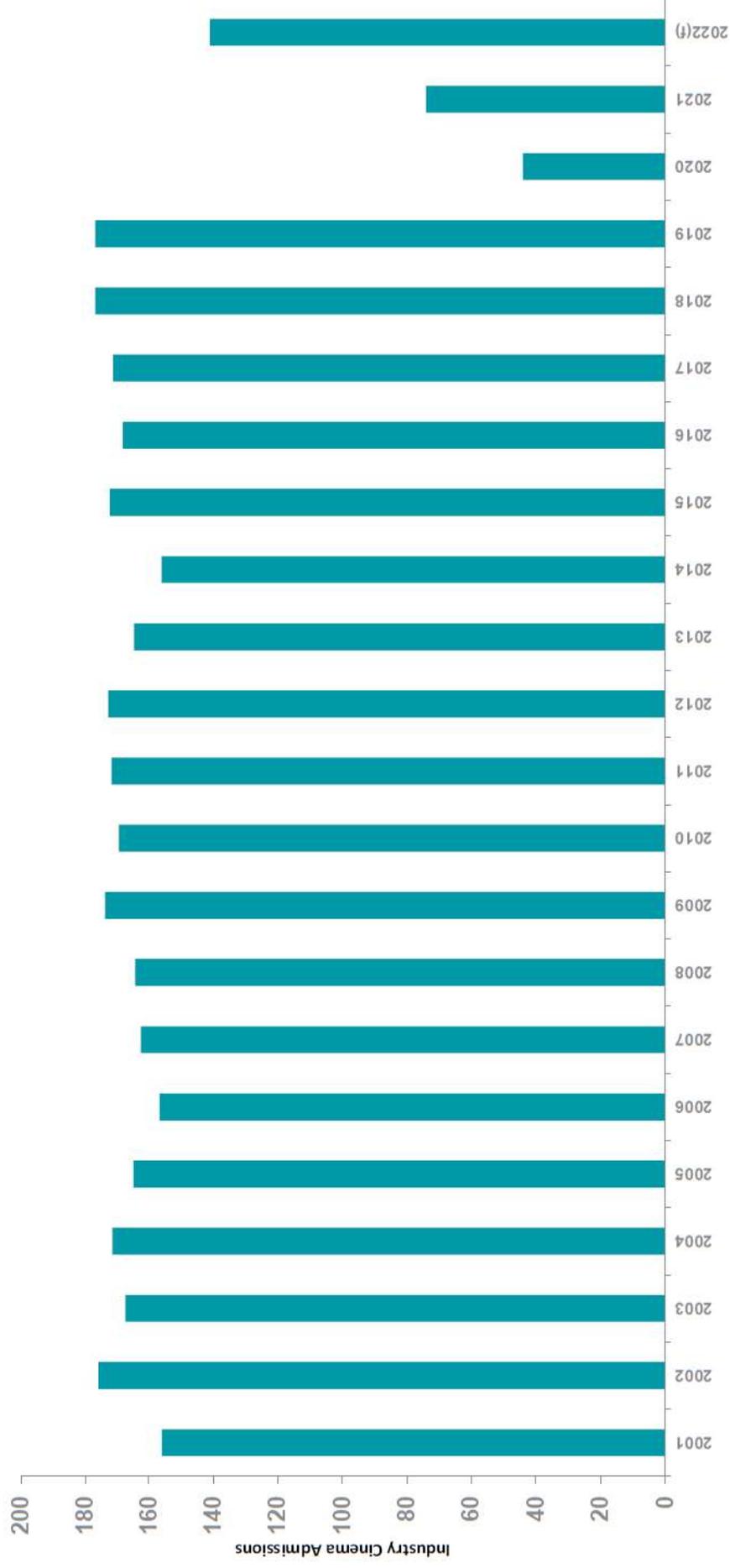
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
cinema screens	3741	3824	3858	3897	3947	4115	4194	4309	4399	4564	4591	4620
cinema sites	763	761	750	747	743	771	788	801	811	840	878	860
cinema seats	n/a	802614	n/a	937161	n/a	n/a						
change in cinema screens/%	1.2	2.2	0.9	1	1.3	4.3	1.9	2.7	2.1	3.8	0.6	0.6
change in cinema sites/%	-0.4	-0.2	-1.5	-0.4	-0.5	3.7	2.2	1.6	1.2	3.6	0.5	-0.2
change in cinema seats/%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
average seats per screen	n/a	209.9	n/a	205.3	n/a	n/a						
average screens per site	4.9	5	5.1	5.2	5.3	5.3	5.3	5.4	5.4	5.4	5.2	5.4

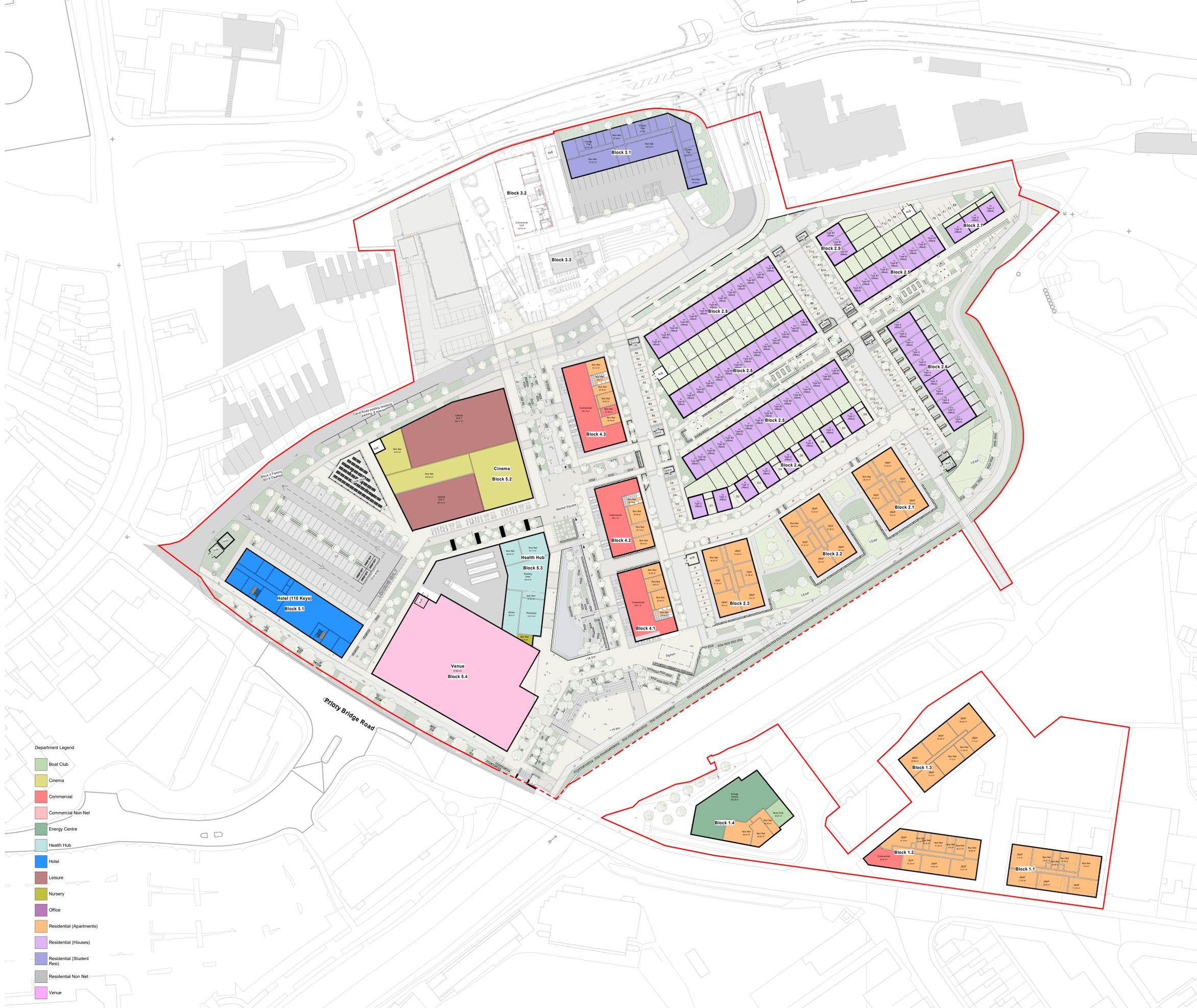


Source: OMDIA, CAA

## UK CINEMA AUDIENCE WILL CONTINUE TO RETURN IN 2022

With the impressive slate for this year lined up, we are forecasting 2022 to reach 80% of the record breaking 2019 admission level.





- Department Legend**
- Boat Club
  - Cinema
  - Commercial
  - Commercial Non Net
  - Energy Centre
  - Health Hub
  - Hotel
  - Leisure
  - Nursery
  - Office
  - Residential (Apartments)
  - Residential (Houses)
  - Residential (Student Res)
  - Residential Non Net
  - Venue

**RESIDENTIAL SCHEDULE:**  
Residential Non Net refers to bin storage/plan/bike parking/storage/ circulation etc  
Areas given exclude partitions: allow 6% in addition to the total when estimating gross internal area.

Residential Area Schedule - Internal Area (excluding partitions)						
Block	Block No.	Department	Name	Count	Area	
Block 1	1.1	Residential (Apartments)	1B2P	6	305.35 m <sup>2</sup>	
Block 1	1.1	Residential (Apartments)	2B4P	19	1376.88 m <sup>2</sup>	
Block 1	1.1	Residential (Apartments)	Non Net	0	390.77 m <sup>2</sup>	
				25	2073 m <sup>2</sup>	
Block 1	1.2	Residential (Apartments)	1B1P	6	274.44 m <sup>2</sup>	
Block 1	1.2	Residential (Apartments)	2B3P	6	447.42 m <sup>2</sup>	
Block 1	1.2	Residential (Apartments)	2B4P	18	1306.8 m <sup>2</sup>	
Block 1	1.2	Residential (Apartments)	3B5P	5	443.84 m <sup>2</sup>	
Block 1	1.2	Residential (Apartments)	Non Net	0	486.48 m <sup>2</sup>	
				35	2958.98 m <sup>2</sup>	
Block 1	1.3	Residential (Apartments)	2B4P	35	2828.12 m <sup>2</sup>	
Block 1	1.3	Residential (Apartments)	Non Net	0	418.96 m <sup>2</sup>	
				35	3247.08 m <sup>2</sup>	
Block 1	1.4	Residential (Apartments)	1B2P	11	583.29 m <sup>2</sup>	
Block 1	1.4	Residential (Apartments)	2B3P	12	805.91 m <sup>2</sup>	
Block 1	1.4	Residential (Apartments)	2B4P	22	1696.23 m <sup>2</sup>	
Block 1	1.4	Residential (Apartments)	Non Net	0	720.57 m <sup>2</sup>	
				45	3806 m <sup>2</sup>	
				140	12085.06 m <sup>2</sup>	
Block 2	2.1	Residential (Apartments)	1B2P	12	612.9 m <sup>2</sup>	
Block 2	2.1	Residential (Apartments)	2B4P	23	1734.7 m <sup>2</sup>	
Block 2	2.1	Residential (Apartments)	Non Net	0	358.7 m <sup>2</sup>	
				35	2706.29 m <sup>2</sup>	
Block 2	2.2	Residential (Apartments)	1B2P	12	612.9 m <sup>2</sup>	
Block 2	2.2	Residential (Apartments)	2B4P	23	1734.7 m <sup>2</sup>	
Block 2	2.2	Residential (Apartments)	Non Net	0	358.7 m <sup>2</sup>	
				35	2706.29 m <sup>2</sup>	
Block 2	2.3	Residential (Apartments)	1B2P	14	715.05 m <sup>2</sup>	
Block 2	2.3	Residential (Apartments)	2B4P	27	2035.95 m <sup>2</sup>	
Block 2	2.3	Residential (Apartments)	Non Net	0	406.74 m <sup>2</sup>	
				41	3157.74 m <sup>2</sup>	
Block 2	2.4	Residential (Houses)	Type C (4Bed)	8	1126.22 m <sup>2</sup>	
				8	1126.22 m <sup>2</sup>	
Block 2	2.5	Residential (Houses)	Type B1 (4Bed)	18	2252.88 m <sup>2</sup>	
Block 2	2.5	Residential (Houses)	Type B2 (4Bed)	37	4629.14 m <sup>2</sup>	
				55	6882.02 m <sup>2</sup>	
Block 2	2.6	Residential (Houses)	Type A (4Bed)	11	1391.53 m <sup>2</sup>	
Block 2	2.7	Residential (Houses)	Type D (4Bed)	3	392.11 m <sup>2</sup>	
				188	18362.19 m <sup>2</sup>	
Block 3	3.1	Residential (Student Res)	Cluster Flat	18	2618.75 m <sup>2</sup>	
Block 3	3.1	Residential (Student Res)	Non Net	0	602.86 m <sup>2</sup>	
				18	3221.6 m <sup>2</sup>	
				18	3221.6 m <sup>2</sup>	
Block 4	4.1	Residential (Apartments)	1B2P	6	315 m <sup>2</sup>	
Block 4	4.1	Residential (Apartments)	2B4P	24	1863.66 m <sup>2</sup>	
Block 4	4.1	Residential (Apartments)	Non Net	0	577.54 m <sup>2</sup>	
				30	2756.2 m <sup>2</sup>	
Block 4	4.2	Residential (Apartments)	1B2P	5	262.5 m <sup>2</sup>	
Block 4	4.2	Residential (Apartments)	2B4P	20	1553.05 m <sup>2</sup>	
Block 4	4.2	Residential (Apartments)	Non Net	0	505.24 m <sup>2</sup>	
				25	2320.79 m <sup>2</sup>	
Block 4	4.3	Residential (Apartments)	1B2P	12	681.27 m <sup>2</sup>	
Block 4	4.3	Residential (Apartments)	2B4P	16	1212.92 m <sup>2</sup>	
Block 4	4.3	Residential (Apartments)	Non Net	0	509.21 m <sup>2</sup>	
				28	2403.4 m <sup>2</sup>	
				83	7480.39 m <sup>2</sup>	
				429	41149.24 m <sup>2</sup>	

**NON RESIDENTIAL SCHEDULE:**  
Excludes existing Viridor Building (circa 2500sqm GIA Office) and current planning application for Block 3 (1550sqm office and 700 sqm retail/leisure).  
The performance venue is estimated to be 6150sqm including approximately 2000sqm conferencing facilities and an auditorium with maximum capacity of 1800 people.

Non Residential Area Schedule - Gross Internal Area			
Block	Block No.	Department	Area
Block 1	1.4	Boat Club	59.87 m <sup>2</sup>
Block 1	1.2	Commercial	86.97 m <sup>2</sup>
Block 1	1.4	Energy Centre	460.38 m <sup>2</sup>
			607.22 m <sup>2</sup>
Block 4	4.1	Commercial	293.1 m <sup>2</sup>
Block 4	4.2	Commercial	293.1 m <sup>2</sup>
Block 4	4.3	Commercial	387.15 m <sup>2</sup>
			973.34 m <sup>2</sup>
Block 5	5.2	Cinema	3048.87 m <sup>2</sup>
Block 5	5.3	Health Hub	1747.62 m <sup>2</sup>
Block 5	5.1	Hotel	4052.69 m <sup>2</sup>
Block 5	5.2	Leisure	1292.92 m <sup>2</sup>
Block 5	5.3	Nursery	362.01 m <sup>2</sup>
			10504.11 m <sup>2</sup>
			12084.67 m <sup>2</sup>

House Type	NIA Schedule	Area
Type A (4B)	125m <sup>2</sup>	
Type B1 (4B)	120m <sup>2</sup>	
Type B2 (4B)	140m <sup>2</sup>	
Type C (4B)	140m <sup>2</sup>	
Type D (4B)	145m <sup>2</sup>	

Parking Schedule Houses		
Block	Parking	Count
Block 2		77

Parking Schedule Other		
Mark	Count	
P	27	

client name	Somerset West and Taunton		
project	Firepool Masterplan		
drawing	Masterplan - Ground Floor		
computer file	C:\Users\AJS\Documents\2021\00440\000\FB5-AHR-MP-XX-DR-L-90101.dwg	plot date	
project number	2021.00440.000	scale	1:500 @A0
drawing number	FB5-AHR-MP-XX-DR-L-90101	no	P08
		rev	S1

APPENDIX E - SOMERSET, EAST DEVON and MID DEVON PHOSPHATE CAUGHT WARDS

[Contents](#)

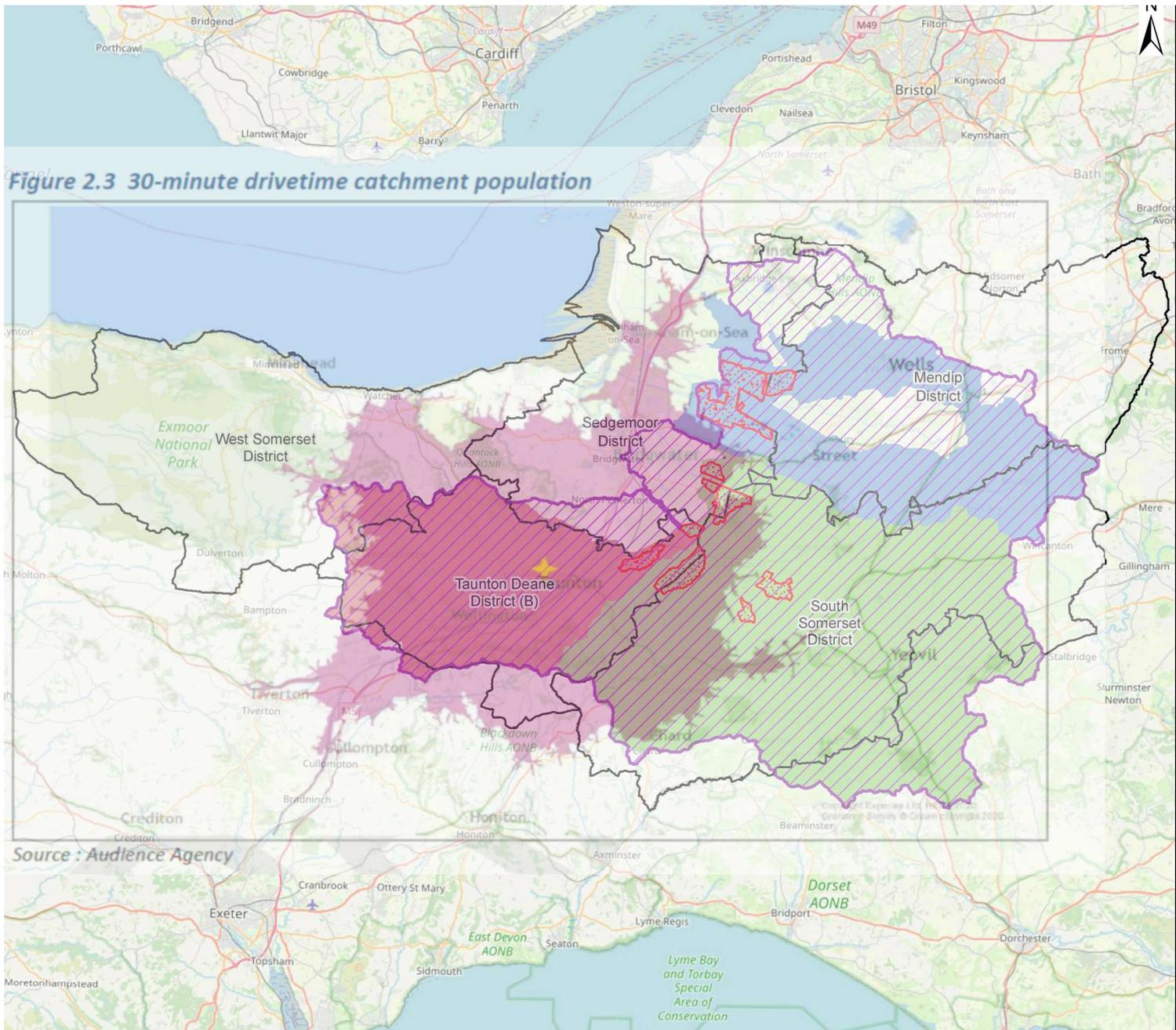
Table SAPE23DT8a: Mid-2020 Population Estimates for 2020 Wards and 2021 LAs in England and Wales

Ward Code <sup>1</sup>	Ward Name <sup>1</sup>	LA Code (2021 LA name (2021 boundaries))	All Ages	Phosphate Caught	Population Phosphate Caught
E05012806	Alcombe	E07000246	2,262	Y	2,262
E05012807	Blackbrook & Holway	E07000246	6,460	Y	6,460
E05012808	Comeytrowe & Bishop's Hull	E07000246	9,111	Y	9,111
E05012809	Cotford St Luke & Oake	E07000246	3,122	Y	3,122
E05012810	Creech St Michael	E07000246	2,900	Y	2,900
E05012811	Dulverton & District	E07000246	2,342	N	0
E05012812	Exmoor	E07000246	2,388	N	0
E05012813	Halcon & Lane	E07000246	6,593	Y	6,593
E05012814	Hatch & Blackdown	E07000246	2,620	Y	2,620
E05012815	Manor & Tangier	E07000246	3,298	Y	3,298
E05012816	Milverton & District	E07000246	2,658	Y	2,658
E05012817	Minehead Central	E07000246	4,876	N	0
E05012818	Minehead North	E07000246	2,484	N	0
E05012819	Monument	E07000246	2,815	Y	2,815
E05012820	North Curry & Ruishton	E07000246	5,424	Y	5,424
E05012821	North Town	E07000246	2,912	Y	2,912
E05012822	Norton Fitzwarren & Staplegrov	E07000246	6,883	Y	6,883
E05012823	Old Cleeve & District	E07000246	4,829	N	0
E05012824	Periton & Woodcombe	E07000246	2,352	Y	2,352
E05012825	Porlock & District	E07000246	2,262	N	0
E05012826	Priorswood	E07000246	9,643	Y	9,643
E05012827	Quantock Vale	E07000246	2,653	N	0
E05012828	Rockwell Green	E07000246	2,873	Y	2,873
E05012829	South Quantock	E07000246	5,143	Y	5,143
E05012830	Trull, Pitminster & Corfe	E07000246	3,412	Y	3,412
E05012831	Victoria	E07000246	5,478	Y	5,478
E05012832	Vivary	E07000246	5,262	Y	5,262
E05012833	Watchet & Williton	E07000246	6,874	N	0
E05012834	Wellington East	E07000246	4,867	Y	4,867
E05012835	Wellington North	E07000246	5,512	Y	5,512
E05012836	Wellington South	E07000246	2,568	Y	2,568
E05012837	Wellsprings & Rowbarton	E07000246	6,659	Y	6,659
E05012838	West Monkton & Cheddon Fitzp	E07000246	8,038	Y	8,038
E05012839	Wilton & Sherford	E07000246	2,657	Y	2,657
E05012840	Wiveliscombe & District	E07000246	5,191	Y	5,191
			155,421		126,713
E05006760	Ammerdown	E07000187	2,324	N	0
E05006761	Ashwick, Chilcompton and Stral	E07000187	4,967	N	0
E05006762	Beckington and Selwood	E07000187	2,416	N	0
E05006763	Butleigh and Baltonsborough	E07000187	2,556	Y	2,556
E05006764	Chewton Mendip and Ston East	E07000187	2,177	N	0
E05006765	Coleford and Holcombe	E07000187	4,843	N	0
E05006766	Cranmore, Doultling and Nunne	E07000187	2,416	Y	2,416
E05006767	Creech	E07000187	2,639	Y	2,639
E05006768	Croscombe and Pilton	E07000187	2,373	Y	2,373
E05006769	Frome Berkley Down	E07000187	4,254	N	0
E05006770	Frome College	E07000187	4,472	N	0
E05006771	Frome Keyford	E07000187	6,782	N	0
E05006772	Frome Market	E07000187	4,844	N	0
E05006773	Frome Oakfield	E07000187	3,220	N	0
E05006774	Frome Park	E07000187	4,893	N	0
E05006775	Glastonbury St Benedict's	E07000187	2,445	N	0
E05006776	Glastonbury St Edmund's	E07000187	2,240	N	0
E05006777	Glastonbury St John's	E07000187	2,573	N	0
E05006778	Glastonbury St Mary's	E07000187	2,018	N	0
E05006779	Moor	E07000187	2,615	Y	2,615
E05006780	Postlebury	E07000187	2,153	Y	2,153
E05006781	Rode and Norton St Philip	E07000187	2,404	N	0
E05006782	Rodney and Westbury	E07000187	2,078	Y	2,078
E05006783	St Cuthbert Out North	E07000187	2,826	Y	2,826

E05006784	Shepton East	E07000187	Mendip	5,974	N	0
E05006785	Shepton West	E07000187	Mendip	4,945	N	0
E05006786	Street North	E07000187	Mendip	4,903	Y	4,903
E05006787	Street South	E07000187	Mendip	5,559	Y	5,559
E05006788	Street West	E07000187	Mendip	2,300	Y	2,300
E05006789	The Pennards and Ditchat	E07000187	Mendip	2,215	Y	2,215
E05006790	Wells Central	E07000187	Mendip	2,167	N	0
E05006791	Wells St Cuthbert's	E07000187	Mendip	5,018	N	0
E05006792	Wells St Thomas'	E07000187	Mendip	4,025	N	0
E05006793	Wookey and St Cuthbert Out W	E07000187	Mendip	2,654	Y	2,654
				116,288		37,287
E05012513	Blackdown & Tatworth	E07000189	South Somerset	5,017	Y	5,017
E05012514	Blackmoor Vale	E07000189	South Somerset	5,663	Y	5,663
E05012515	Bruton	E07000189	South Somerset	2,985	Y	2,985
E05012516	Brympton	E07000189	South Somerset	8,165	Y	8,165
E05012517	Burrow Hill	E07000189	South Somerset	2,829	Y	2,829
E05012518	Camelot	E07000189	South Somerset	2,910	Y	2,910
E05012519	Cary	E07000189	South Somerset	5,349	Y	5,349
E05012520	Chard Avishayes	E07000189	South Somerset	2,869	Y	2,869
E05012521	Chard Combe	E07000189	South Somerset	2,157	Y	2,157
E05012522	Chard Crimchard	E07000189	South Somerset	2,904	Y	2,904
E05012523	Chard Holyrood	E07000189	South Somerset	3,433	Y	3,433
E05012524	Chard Jocelyn	E07000189	South Somerset	2,516	Y	2,516
E05012525	Coker	E07000189	South Somerset	5,304	Y	5,304
E05012526	Crewkerne	E07000189	South Somerset	7,934	Y	7,934
E05012527	Curry Rivel, Huish & Langport	E07000189	South Somerset	5,761	Y	5,761
E05012528	Eggwood	E07000189	South Somerset	2,431	Y	2,431
E05012529	Hamdon	E07000189	South Somerset	2,605	Y	2,605
E05012530	Ilminster	E07000189	South Somerset	5,976	Y	5,976
E05012531	Islemoor	E07000189	South Somerset	2,507	Y	2,507
E05012532	Martock	E07000189	South Somerset	5,512	Y	5,512
E05012533	Milborne Port	E07000189	South Somerset	3,010	Y	3,010
E05012534	Neroche	E07000189	South Somerset	2,653	Y	2,653
E05012535	Northstone, Ivelchester & St Mic	E07000189	South Somerset	9,793	Y	9,793
E05012536	Parrett	E07000189	South Somerset	2,371	Y	2,371
E05012537	South Petherton	E07000189	South Somerset	5,567	Y	5,567
E05012538	Tower	E07000189	South Somerset	2,558	Y	2,558
E05012539	Turn Hill	E07000189	South Somerset	2,534	Y	2,534
E05012540	Wessex	E07000189	South Somerset	5,873	Y	5,873
E05012541	Wincanton	E07000189	South Somerset	6,236	Y	6,236
E05012542	Windwhistle	E07000189	South Somerset	2,248	Y	2,248
E05012543	Yeovil College	E07000189	South Somerset	9,302	Y	9,302
E05012544	Yeovil Lyde	E07000189	South Somerset	7,238	Y	7,238
E05012545	Yeovil Summerlands	E07000189	South Somerset	8,831	Y	8,831
E05012546	Yeovil Westland	E07000189	South Somerset	8,392	Y	8,392
E05012547	Yeovil Without	E07000189	South Somerset	7,263	Y	7,263
				168,696		168,696
E05008893	Axevale	E07000188	Sedgemoor	4,174	Y	4,174
E05008894	Berrow	E07000188	Sedgemoor	2,176	Y	2,176
E05008895	Bridgwater Dunwear	E07000188	Sedgemoor	4,758	Y	4,758
E05008896	Bridgwater Eastover	E07000188	Sedgemoor	5,287	Y	5,287
E05008897	Bridgwater Fairfax	E07000188	Sedgemoor	7,589	Y	7,589
E05008898	Bridgwater Hamp	E07000188	Sedgemoor	5,360	Y	5,360
E05008899	Bridgwater Victoria	E07000188	Sedgemoor	6,435	Y	6,435
E05008900	Bridgwater Westover	E07000188	Sedgemoor	6,238	Y	6,238
E05008901	Bridgwater Wyndham	E07000188	Sedgemoor	4,689	Y	4,689
E05008902	Burnham Central	E07000188	Sedgemoor	7,113	Y	7,113
E05008903	Burnham North	E07000188	Sedgemoor	6,282	Y	6,282
E05008904	Cannington and Wembdon	E07000188	Sedgemoor	4,739	Y	4,739
E05008905	Cheddar and Shipham	E07000188	Sedgemoor	7,297	Y	7,297
E05008906	East Polden	E07000188	Sedgemoor	2,051	Y	2,051
E05008907	Highbridge and Burnham Marin	E07000188	Sedgemoor	8,021	Y	8,021
E05008908	Huntspill and Pawlett	E07000188	Sedgemoor	2,311	Y	2,311
E05008909	King's Isle	E07000188	Sedgemoor	6,714	Y	6,714
E05008910	Knoll	E07000188	Sedgemoor	5,515	Y	5,515
E05008911	North Petherton	E07000188	Sedgemoor	10,083	Y	10,083
E05008912	Puriton and Woolavington	E07000188	Sedgemoor	5,077	Y	5,077
E05008913	Quantocks	E07000188	Sedgemoor	4,434	Y	4,434
E05008914	Wedmore and Mark	E07000188	Sedgemoor	4,622	Y	4,622
E05008915	West Polden	E07000188	Sedgemoor	2,481	Y	2,481
				123,446		123,446
E05011782	Axminster	E07000040	East Devon	7,830	N	0
E05011783	Beer & Branscombe	E07000040	East Devon	2,402	N	0
E05011784	Broadclyst	E07000040	East Devon	5,938	N	0

E05011785	Budleigh & Raleigh	E07000040	East Devon	7,822	N	0
E05011786	Clyst Valley	E07000040	East Devon	2,336	N	0
E05011787	Coly Valley	E07000040	East Devon	4,628	N	0
E05011788	Cranbrook	E07000040	East Devon	4,501	N	0
E05011789	Dunkeswell & Otterhead	E07000040	East Devon	5,553	Y	5,553
E05011790	Exe Valley	E07000040	East Devon	2,508	N	0
E05011791	Exmouth Brixington	E07000040	East Devon	8,028	N	0
E05011792	Exmouth Halsdon	E07000040	East Devon	7,525	N	0
E05011793	Exmouth Littleham	E07000040	East Devon	7,911	N	0
E05011794	Exmouth Town	E07000040	East Devon	7,706	N	0
E05011795	Exmouth Withycombe Raleigh	E07000040	East Devon	4,655	N	0
E05011796	Feniton	E07000040	East Devon	2,613	N	0
E05011797	Honiton St Michael's	E07000040	East Devon	6,764	N	0
E05011798	Honiton St Paul's	E07000040	East Devon	4,735	N	0
E05011799	Newbridges	E07000040	East Devon	2,494	N	0
E05011800	Newton Poppleford & Harpford	E07000040	East Devon	2,227	N	0
E05011801	Ottery St Mary	E07000040	East Devon	7,631	N	0
E05011802	Seaton	E07000040	East Devon	6,987	N	0
E05011803	Sidmouth Rural	E07000040	East Devon	2,206	N	0
E05011804	Sidmouth Sidford	E07000040	East Devon	7,792	N	0
E05011805	Sidmouth Town	E07000040	East Devon	4,328	N	0
E05011806	Tale Vale	E07000040	East Devon	2,761	N	0
E05011807	Trinity	E07000040	East Devon	2,679	N	0
E05011808	West Hill & Aylesbears	E07000040	East Devon	2,695	N	0
E05011809	Whimple & Rockbears	E07000040	East Devon	3,728	N	0
E05011810	Woodbury & Lypstone	E07000040	East Devon	6,601	N	0
E05011811	Yarty	E07000040	East Devon	2,496	Y	2,496
				148,080		8,049
E05003510	Bradninch	E07000042	Mid Devon	2,057	N	0
E05003511	Cadbury	E07000042	Mid Devon	1,678	N	0
E05003512	Canonsleigh	E07000042	Mid Devon	3,257	Y	3,257
E05003513	Castle	E07000042	Mid Devon	4,405	N	0
E05003514	Clare and Shuttern	E07000042	Mid Devon	3,615	N	0
E05003515	Cranmore	E07000042	Mid Devon	4,947	N	0
E05003516	Cullompton North	E07000042	Mid Devon	4,449	N	0
E05003517	Cullompton Outer	E07000042	Mid Devon	2,752	N	0
E05003518	Cullompton South	E07000042	Mid Devon	4,432	N	0
E05003519	Halberton	E07000042	Mid Devon	2,323	N	0
E05003520	Lawrence	E07000042	Mid Devon	3,848	N	0
E05003521	Lower Culm	E07000042	Mid Devon	5,958	N	0
E05003522	Lowman	E07000042	Mid Devon	7,233	N	0
E05003524	Sandford and Creedy	E07000042	Mid Devon	3,358	N	0
E05003525	Silverton	E07000042	Mid Devon	1,959	N	0
E05003526	Taw	E07000042	Mid Devon	1,750	N	0
E05003527	Taw Vale	E07000042	Mid Devon	1,721	N	0
E05003528	Upper Culm	E07000042	Mid Devon	4,438	Y	4,438
E05003529	Upper Yeo	E07000042	Mid Devon	1,788	N	0
E05003530	Way	E07000042	Mid Devon	1,731	N	0
E05003531	Westexe	E07000042	Mid Devon	6,066	N	0
				73,765		7,695
<b>TOTALS</b>				<b>785,696</b>		<b>471,886</b>

## Appendix F - 30/60 Minute Catchment Areas



### Assumptions - Phosphate Caught Districts

Districts % of those Districts covered unless stated

Somerset West and Taunton 80%

Sedgemoor 60%

Mendip 10%

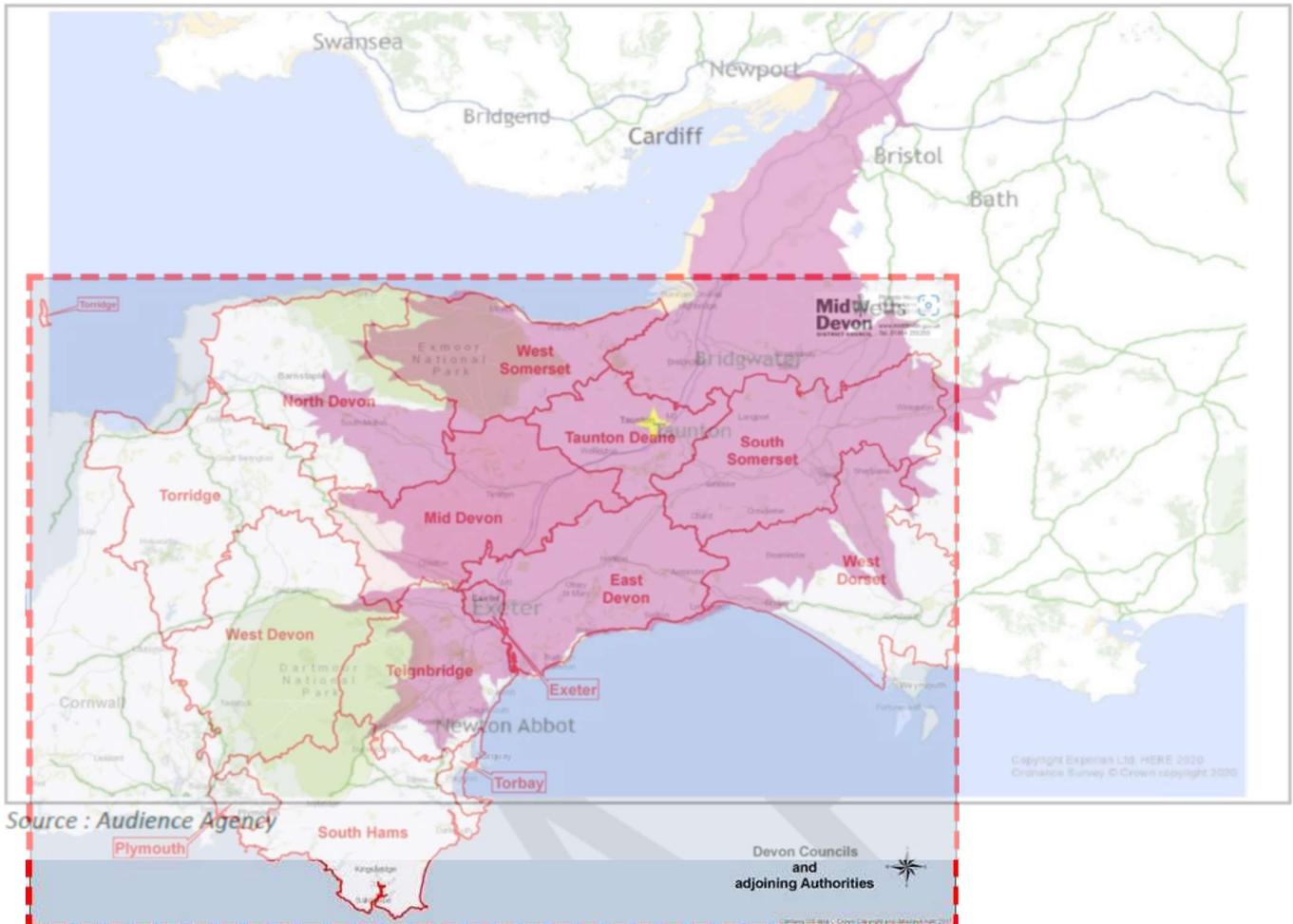
South Somerset 50%

Mid Devon 10%

East Devon 10%

The light pink is the overlaid catchment area over the Phosphate Caught areas

Figure 2.4 60-minute drivetime catchment population



Assumptions - Phosphate Caught Districts

Districts 100% of those Districts covered

Somerset West and Taunton

Sedgemoor

Mendip

South Somerset

Mid Devon

East Devon

The light pink is the overlaid catchment area over the Districts

## Appendix G - User Data

### User Data

Use	Annual Usage	30 Minute		Weighting	Element of Usage that relates to 30 Minute Catchment	Element of Usage that relates to 60 Minute Catchment
		NB1	60 Minute NB2			
Cinema	323,904	244,000	1,180,000	90%	291,514	32,390
Venue	89,000	244,000	1,180,000	75%	66,750	22,250

NB1	30 Minute Drivetime Catchment	244000
NB2	30 Minute Drivetime Catchment	1180000

Within the 30 Minute Drivetime catchment all of the Phosphate Caught Residents are using the facilities  
So we need to estimate of the 244,000 people how many are from within the catchment caught area.

### Catchment Caught Population

	Population	Estimated Within the 30 Minute % of Total Population	Estimated Actual Population in 30 Minute Drivetime	Actual Phosphate Impacted Population	% of Those in Catchment that are Phosphate Caught	30 Minute Catchment that are Phosphate Caught	Population in 30 Minute Catchment that are not Phosphate Caught
Somerset West & Taunton	155,421	84.80%	131,797	126,713	96%	126,713	5,084
Sedgemoor	123,446	53.00%	65,426	123,446	100%	65,426	-
Mendip	116,288	4.30%	5,005	37,287	100%	5,005	-
South Somerset	168,696	16.00%	26,991	168,696	100%	26,991	-
East Devon	148,080	5.00%	7,404	8,049	100%	7,404	-
Mid Devon	73,765	10.00%	7,377	7,695	100%	7,377	-
	785,696		244,000	471,886		238,916	5,084

### Population of Leisure Users that will create new Phosphates

	30 Minute Catchment	60 Minute Catchment	Total
Cinema	5,084	32,390	37,474
Venue	5,084	22,250	27,334

**Table 4.2 Projected event attendances**

<b>Event type</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>Concerts</b>			
Major rock/pop concert standing	4,160	5,600	8,320
Medium rock/pop concert seated	6,240	10,680	15,120
Small standing concert	1,700	2,295	4,208
Small seated concert	1,860	3,000	4,500
<b>Other Entertainment</b>			
Comedy	6,120	8,760	11,520
Boxing and MMA	1,020	2,040	2,040
Other sports Events	600	600	600
Family Entertainment / Christmas Show	7,800	15,720	22,080
Cinema	720	1,440	1,440
Dance Events	1,040	1,040	2,080
<b>Exhibitions</b>			
Exhibitions Trade	300	600	900
Consumer Shows	4,000	6,000	6,000
Product Launch	300	600	900
<b>Banquets, Conferences</b>			
Banquets	800	1,400	1,900
Corporate Events	150	300	600
Conferences (open days)	1,575	4,165	6,505
Conferences (set up days)	0	0	0
<b>TOTAL</b>	<b>38,400</b>	<b>64,200</b>	<b>88,700</b>

*NB Totals are rounded*

5.4 APPENDIX D – GRAF ONE2CLEAN PIA Certificate



**Prüfinstitut für  
Abwassertechnik  
GmbH**

## PERFORMANCE RESULTS

**Otto Graf GmbH**  
 Carl-Zeiss-Str. 2 - 6, 79331 Teningen, Germany  
**EN 12566-3**  
 Small wastewater treatment systems for up to 50 PT  
**Small wastewater treatment system one2clean**  
 SBR plant in one two-zone polypropylene tank  
 Test report PIA2014-216B14.01.e

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Nominal organic daily load*	0.27	kg/d	
Nominal hydraulic daily load	0.75	m <sup>3</sup> /d	
Material	polypropylene		
Treatment efficiency (nominal sequences)		Efficiency	Effluent
		COD	94.2 % 43 mg/l
		BOD <sub>5</sub>	98.0 % 7 mg/l
		SS	96.3 % 14 mg/l
		NH <sub>4</sub> -N**	98.3 % 0.5 mg/l
		N <sub>tot</sub> **	87.0 % 7.9 mg/l
		P <sub>tot</sub>	80.2 % 1.6 mg/l
Electrical consumption	0.63	kWh/d	

\* at a test influent of ≥ 300 mg/l BOD<sub>5</sub> (mean)  
 \*\* determined for temperatures ≥ 12°C in the bioreactor

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Performance tested by:

**PIA – Prüfinstitut für Abwassertechnik GmbH**  
 (PIA GmbH)  
 Hergenrather Weg 30  
 52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.

  
Notified Body  
No.: 1759

  
Certified according to  
ISO 9001:2008

  
RAC-MRA

  
Deutsche  
Akrediteinstanz  
D-PL-37712-01-00

  
Prüfinstitut für Abwassertechnik GmbH  
Berichtet - getestet - testet

Elmar Lancé      November 2014