Ref: 24059 – Monk Farm, Barn

Class Q prior approval application

Monk Farm, Ruckmans Lane, Dorking, RH5 5QA

Water Neutrality Statement (WNS)

Prepared on behalf of Steve Flavin
Project: Conversion of Agricultural Barn to Three Dwellings
Date: 02.10.2024

1.0 Introduction

1.1 This Water Neutrality Statement (WNS) has been prepared on behalf of Steve Flavin to demonstrate how the proposed development will achieve water neutrality.

1.2 Following the issue of Natural England's (NE's) Position Statement on Water Neutrality within the Sussex North Water Supply Zone (SNWSZ), it is understood that Horsham District Council requires all new and reserved matter planning applications to demonstrate that the development is water neutral and/or that they do not result in a significant effect. NE's Position Statement can be found in full within Appendix A.

1.3 The SNWSZ covers part of the Horsham District, as well as parts of the neighbouring Chichester, Arun, and Crawley Districts. A plan showing the supply area can be found in Appendix B.

1.4 This statement sets out the following:

- Baseline calculations for the existing development;
- Additional demand as a result of the proposed development;
- Water reduction measures, such as water-efficient fixtures and fittings, rainwater harvesting, and greywater recycling; and
- Measures to offset any remaining deficit following the above.

2.0 Background

2.1 The site is located at Monk Farm, Ruckmans Lane, Dorking, RH5 5QA, West Sussex, and consists of an existing agricultural barn.

2.2 The proposed development is for the conversion of the barn into three residential dwellings using Permitted Development rights available under Class Q. Each dwelling will accommodate an average of 4 people. A copy of the proposed plan can be found in Appendix C.

3.0 Existing Demand

3.1 **Historical Usage Context**
The existing site, an agricultural barn of approximately 234 square metres, was previously used for storage of farming equipment, with a water supply primarily used for hosing down machinery and

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performing cleaning tasks. Although precise historical data on water usage is not available, an estimated usage can be derived based on typical agricultural equipment cleaning requirements. However, the data will not be used in the calculations.

3.2 **Estimated Historical Water Usage for Equipment Cleaning**
Equipment cleaning for agricultural purposes typically requires around 20–30 litres per square metre per session. Assuming an approximate monthly cleaning frequency, the historical water demand for the barn can be estimated as follows:

- **Estimated Water Use per Cleaning Session:**

  234 m2×25 litres/m2=5,850 litres/session

- **Monthly Cleaning Estimate:**

  5,850 litres/session×1 session/month=5,850 litres/month

- **Annual Estimate:**

  5,850 litres/month×12 months=70,200 litres/year

4.0 Additional Demand

4.1 The proposed development consists of the conversion of the barn into three residential units. Each unit will include water-efficient fixtures such as toilets, showerheads, and taps.

4.2 The average occupancy of the three dwellings is 12 people (4 people per dwelling).

4.3 The calculated water usage for the proposed facilities is as follows:

- **Toilet Use**: Toilets will have a dual-flush system (3 litres for low flush and 4.5 litres for high flush). Assuming 5 flushes per person per day:

  Total Toilet Usage=12 people×15 litres/person/day=180 litres/day

- **Shower and Tap Use**: With showerheads at 6 litres per minute and an average usage of 5 minutes, along with taps using 3 litres per minute for 5 minutes:

  Total Shower and Tap Usage=12 people×45 litres/person/day=540 litres/day

- **Total Daily Water Usage**:

  Total Daily Usage=180 litres/day+540 litres/day+144 litres/day=864 litres/day

- **Annual Water Usage**:

  Annual Usage=864 litres/day×365 days≈315,360 litres/year

4.4 The proposed residential conversion will also require fresh water for standard domestic uses, such as showering, drinking, cooking, and dishwashing. These are essential for the households and cannot be replaced by non-potable sources like rainwater or greywater.

- **Estimated Water Demand per Person:** Based on typical residential usage, freshwater requirements are expected to average approximately:
    - Showering: 40 litres/person/day
    - Drinking and Cooking: 5 litres/person/day
    - Dishwashing: 10 litres/person/day (using an efficient dishwasher)
- **Daily Fresh Water Demand for the Development:** Assuming 4 people per dwelling across three dwellings (total 12 people), the daily demand is calculated as:

  (40+5+10) litres/person/day×12 people=660 litres/day

- **Annual Fresh Water Demand:**

  660 litres/day×365≈240,900 litres/year

Source: https://www.water.org.uk/news-views-publications/news/vast-majority-brits-have-no-idea-how-much-water-they-use-each-day

4.5 At this stage, the proposed development cannot be considered water neutral.

Greywater can replace fresh water for common household uses that don't require potable water quality, such as flushing toilets and running washing machines.

5.0 Water Reduction

5.1 In line with the NE Position Statement, water usage will be minimised by implementing water-efficient fixtures, rainwater harvesting, and greywater recycling.

5.2 **Rainwater Harvesting**:

- The barn has a 234 m² roof area, with average annual rainfall for the region of 800 mm (0.8 metres). Using a runoff coefficient of 0.85, the expected rainwater harvesting is calculated as: Rainwater Harvested=0.8 m×234 m2×0.85≈159,120 litres/year
- Rainwater will primarily be used for non-potable purposes, including toilet flushing and garden irrigation, reducing reliance on potable water by up to 159,120 litres annually.

5.3 **Greywater Recycling**:

- A greywater recycling system will be installed to reuse wastewater from showers and sinks for toilet flushing, further reducing potable water demand.
- Greywater recycling can typically reduce toilet flushing water needs by up to 80%.

5.4 **Estimated Greywater Recycled**:

- Assuming 12 residents each generate 45 litres per day from showers and tap use, the greywater available for recycling is:
  Daily Greywater=12 people×45 litres/person/day=540 litres/day
- The annual potential for greywater recycling: 540 litres/day x 365≈197,100 litres/day

5.5 **Recycled Greywater Use for Toilet and Washing Machine**
To further reduce reliance on potable water, the greywater recycling system will be extended to supply non-potable water for both toilet flushing and washing machine use. This recycled water is suitable for these applications, significantly reducing the demand for fresh water.

- **Estimated Greywater Demand for Toilet Flushing:** Toilets with dual flush systems (using 3 litres for low flush and 4.5 litres for high flush) are expected to require approximately 15 litres per person per day for typical use. Assuming an occupancy of 12 people across the three dwellings, the total greywater demand for toilet flushing is calculated as:

  12 people×15 litres/person/day=180 litres/day

- **Annual Greywater Demand for Toilet Flushing:**

  180 litres/day×365≈65,700 litres/year

- **Estimated Greywater Demand for Washing Machines:** Each washing machine cycle typically uses 50 litres, and with an estimated 4 cycles per week per dwelling, the total greywater demand for washing machines is:

  3 dwellings×4 cycles/week×50 litres/cycle=600 litres/week

- **Annual Greywater Demand for Washing Machines:**

  600 litres/week×52≈31,200 litres/year

5.6 **Total Projected Potable Water Offset**
The greywater recycling system, supplying both toilet flushing and washing machines, is expected to provide substantial offsets against the total freshwater demand. With an estimated 65,700 litres/year offset for toilet flushing and an additional 31,200 litres/year offset for washing machine use, the total greywater recycling offset is:

- **Total Annual Offset from Greywater Recycling:**
  65,700 litres/year+31,200 litres/year=96,900 litres/year

5.7 **Conclusion on Baseline and Offset Usage**
The historical baseline water usage of 70,200 litres/year was limited to equipment cleaning. However, with the residential conversion and the integration of greywater recycling for toilets and washing machines, the new development's potable water demand is expected to be substantially offset by these systems. This approach supports the development's compliance with water neutrality requirements, demonstrating a responsible and sustainable use of both fresh and recycled water resources.

6.0 Conclusion

6.1 Through the combination of greywater recycling, rainwater harvesting, and the implementation of water-efficient fixtures, the proposed development will significantly reduce its freshwater demand and achieve water neutrality.

6.2 With the projected offsets and reductions outlined in this statement, the development aligns with sustainable water management practices and contributes to water neutrality in the SNWSZ.

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Appendices

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- **Appendix A**: NE's Position Statement on Water Neutrality

Natural England's Position Statement for Applications within the Sussex North Water Supply Zone

September 2021 – Interim Approach

Please take the following as Natural England's substantive advice for all applications which fall within Sussex North's Water Supply Zone.

Sussex North Water Supply Zone

Arun Valley SPA, SAC and Ramsar Site - Sussex North Water Supply Zone

The Sussex North Water Supply Zone includes supplies from a groundwater abstraction which cannot, with certainty, conclude no adverse effect on the integrity of;

- Arun Valley Special Area Conservation (SAC)
- Arun Valley Special Protection Area (SPA)
- Arun Valley Ramsar Site.

As it cannot be concluded that the existing abstraction within Sussex North Water Supply Zone is not having an impact on the Arun Valley site, we advise that developments within this zone must not add to this impact. This is required by recent caselaw, Case C-323/17 People over wind and Sweetman. Ruling of CJEU (often referred to as sweetman II) and Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu Case C-293/17 (often referred to as the Dutch Nitrogen cases).

Between them these cases require Plans and Projects affecting sites where an existing adverse effect is known (i.e. the site is failing its conservation objectives), to demonstrate certainty that they will not contribute further to the existing adverse effect or go through to the latter stages of the Regulations (no alternatives IROPI etc).

Developments within Sussex North must therefore must not add to this impact and one way of achieving this is to demonstrate water neutrality.

In addition, the Gatwick Sub regional Water Cycle Study concluded that water neutrality is required for Sussex North to enable sufficient water to be available to the region.

The definition of water neutrality is the use of water in the supply area before the development is the same or lower after the development is in place.

www.gov.uk/natural-england

Strategic approach

Natural England has advised that this matter should be resolved in partnership through Local Plans across the affected authorities, where policy and assessment can be agreed and secured to ensure water use is offset for all new developments within Sussex North. To achieve this Natural England is working in partnership with all the relevant authorities to secure water neutrality collectively through a water neutrality strategy.

Whilst the strategy is evolving, Natural England advises that decisions on planning applications should await its completion. However, if there are applications which a planning authority deems critical to proceed in the absence of the strategy, then Natural England advises that any application needs to demonstrate water neutrality. We have provided the following agreed interim approach for demonstrating water neutrality;

Minimising water use of new builds.

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets (e.g., 85L/pp/day*)

  This can be achieved by measures such as:

- Grey water recycling (advantage of being reliable in hot dry weather);
- Rainwater harvesting;
- Water efficient fixings (such as shower aerators) to demonstrably reduce demand-this would need to be suitably certain.

In addition, water offsetting is required

- One way to achieve this is retrofitting of council owned properties/commercial buildings-located within Sussex North. Examples include:

- Grey water recycling- (for example there are clear opportunities for commercial properties).
- Rainwater harvesting of commercial settings;
- Installation of water reduction fittings in Council-owned buildings.

These measures need to be implemented until such time as a more sustainable water supply has been secured.

It will also need to be ensured that measures are not already proposed (for example in Southern Water's Management Plan) to avoid double-counting.

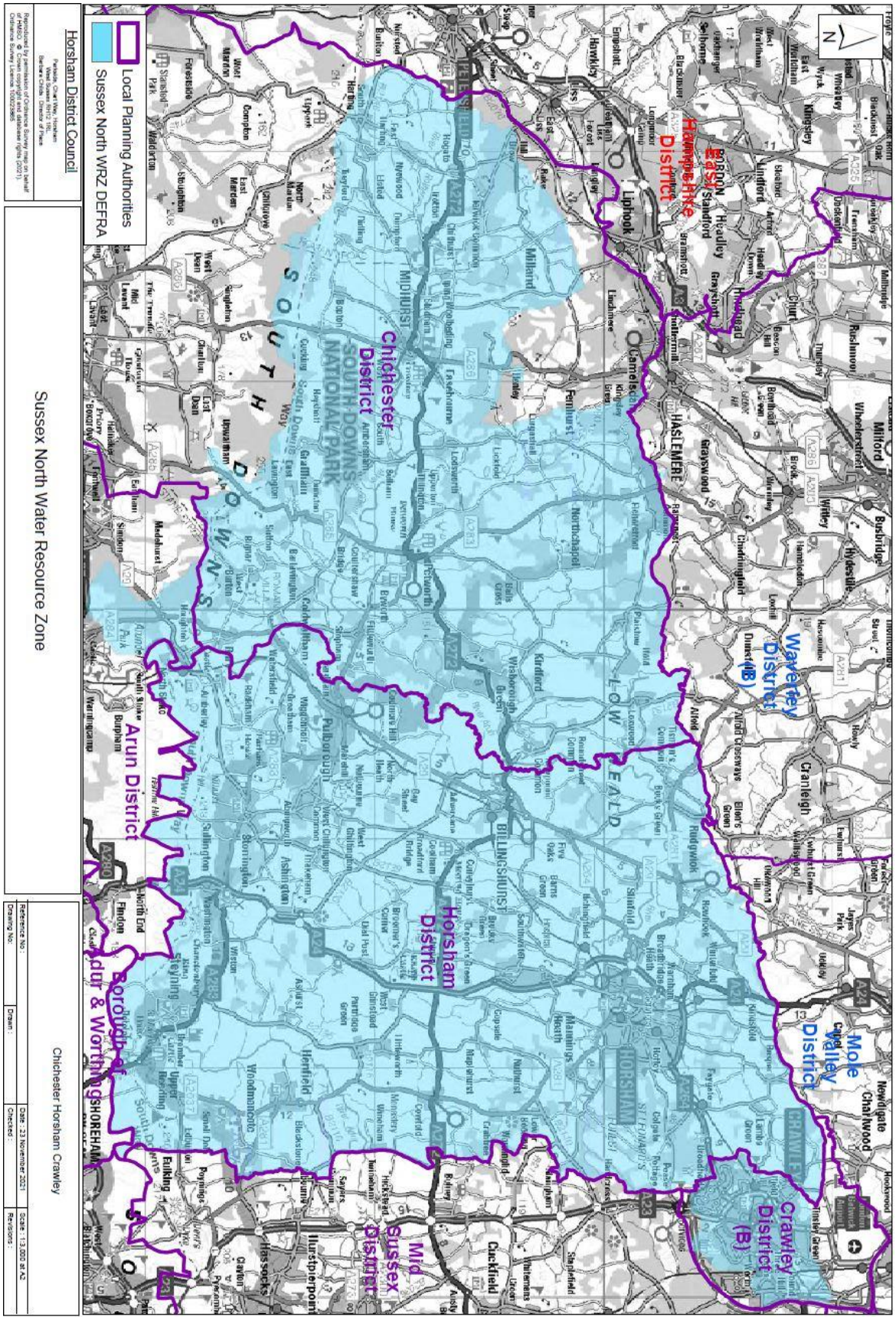
Any mitigation must be suitably certain in order to comply with the Habitats Regulations and Caselaw.

If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

The securing of water neutrality is a matter which needs to be resolved at a strategic level and Natural England is working with the relevant authorities and the water company to achieve this. In light of this, Natural England will not be engaging with individual planning applications whilst the strategy is evolving.

***This this is the reasonably achievable figure with the above measures based on the early data from the strategic solution and may be subject to change as the strategic solution evolves.**

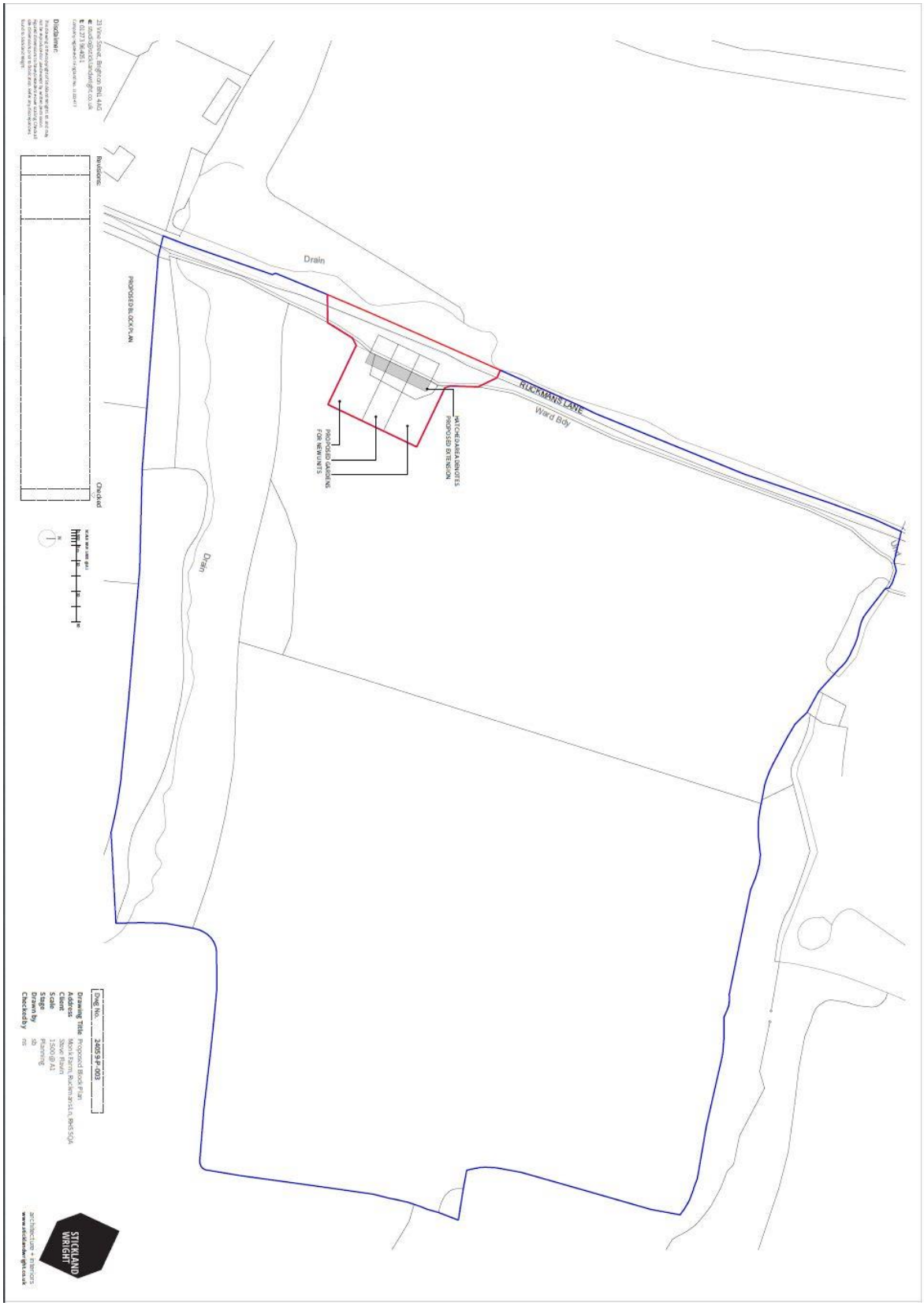
- **Appendix B**: Map of the Sussex North Water Supply Zone



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- **Appendix C**: Proposed Plan



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Appendix D: **Greywater Recycling Calculations**

1. Greywater Generation

1.1 Daily Greywater Generation from Showers and Sinks

- **Assumptions**:
  - Average greywater generation per person per day from showers and sinks: 45 litres/person/day
  - Total occupancy: 12 people (4 people per dwelling × 3 dwellings)
- **Daily Greywater Generation Calculation**:

  Daily Greywater = Number of People × Greywater per Person
  Daily Greywater=12 people×45 litres/person/day=540 litres/day

1.2 Annual Greywater Generation

- **Annual Greywater Generation Calculation**:

  Annual Greywater = Daily Greywater × 365

  Annual Greywater = 540 litres/day × 365≈197,100 litres/year

2. Greywater Reuse

2.1 Greywater Reuse for Toilet Flushing

- **Assumption**:
  - Greywater can replace up to 80% of the water needed for toilet flushing.
- **Daily Toilet Flushing Requirement**:
  - Total daily toilet use from the previous calculations: 180 litres/day.
- **Daily Greywater Available for Toilet Flushing**:
  - Total greywater available: 540 litres/day
  - Percentage reused for toilet flushing: 80%
- **Daily Toilet Flushing Offset Calculation**:

  Daily Toilet Flushing Offset = Daily Greywater × 0.8

  Daily Toilet Flushing Offset = 540 litres/day x 0.8 = 432 litres/day

- **Annual Toilet Flushing Offset Calculation**:

  Annual Toilet Flushing Offset=432 litres/day×365≈157,680 litres/year

2.2 Greywater Reuse for Washing Machines

- **Assumption**:
  - Each washing machine cycle uses approximately 50 litres, and each dwelling has an estimated 4 cycles per week.

- **Daily Greywater Demand for Washing Machines**:
    - Number of dwellings: 3
    - Cycles per week per dwelling: 4
    - Total greywater required for washing machines per week:

  Weekly Greywater for Washing Machines = 3 dwellings × 4 cycles/week × 50 litres/cycle = 600 litres/week

- **Annual Greywater Demand for Washing Machines**:

  Annual Greywater Demand = 600 litres/week × 52 ≈ 31,200 litres/year

3. Total Greywater Offset Calculation

- **Total Annual Offset from Greywater Recycling**:

  Total Annual Offset=Annual Toilet Flushing Offset+Annual Greywater Demand for Washing Machines

  Total Annual Offset=157,680 litres/year+31,200 litres/year=188,880 litres/year

Summary of Greywater Recycling Calculations

- **Total Greywater Generated Annually**: 197,100 litres/year
- **Total Annual Offset from Greywater Recycling**:
    - Toilet Flushing: 157,680 litres/year
    - Washing Machines: 31,200 litres/year
    - **Total**: 188,880 litres/year

This calculation demonstrates the potential of greywater recycling to significantly reduce potable water demand in the proposed residential development while ensuring sustainability and compliance with water neutrality requirements.