



## Nutrient Neutral Assessment and Mitigation Strategy

Report Ref: NNAMS/185

**McDonalds Restaurant**

**Plas Coch**

**Wrexham**

**LL11 1SA**

Prepared by: Sarah Belton MSci MSc FGS – Director & Hydrologist/Hydrogeologist

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## 1 INTRODUCTION

Nutrient Neutral has been commissioned by Planware to undertake an assessment of the phosphorus budget calculation for a proposed development and to propose a mitigation strategy. The site is located in the catchment of the River Dee, which has been identified as failing its water quality targets with respect to phosphorus.

To ensure compliance with the requirements of the Habitats Regulations and Water Framework Directive, new development within the failing catchment must not (alone or in combination) result in non-compliance with the River Dee water quality targets or compound existing problems of target exceedance in those parts of the catchment already failing standards.

The proposed development comprises a McDonalds Restaurant which is classified as a commercial development. This site was subject to a planning application and appeal P/2019/0919 [12/12/2019]. Only during the appeal process was it indicated by the Inspector that the proposed development had to demonstrate that it would not increase the phosphorus discharged to the River Dee SAC (CAS-01515-G4Y1D HRA – Letter2):

*“Following the publication by Natural Resource Wales (NRW) of the results of the compliance assessment of [Welsh Riverine SACs against Phosphorus targets](#), the Planning Inspectorate has identified the development subject of this appeal as potentially capable of increasing the levels of phosphates discharged into the catchment of a riverine SAC.”*

However, the appeal was dismissed on the grounds that it would increase phosphorus to the Riverine SAC. The Inspector stated that:

***“The development would attract custom from a wide geographical area, for example, away supporters from football fixtures at Wrexham football club, those travelling and passing Wrexham on the A483, those visiting Wrexham for shopping and leisure activities and those people who travel in from other catchments to Glyndŵr University. It does not seem likely that the development would not increase phosphorus inputs into the riverine SAC.”***

We believe the inspector was mistaken to cite that those attending football fixtures, shops or Glyndŵr University will generate additional phosphorus as they would be in the catchment regardless and the restaurant is not the reason for their visit to Wrexham. This existing load

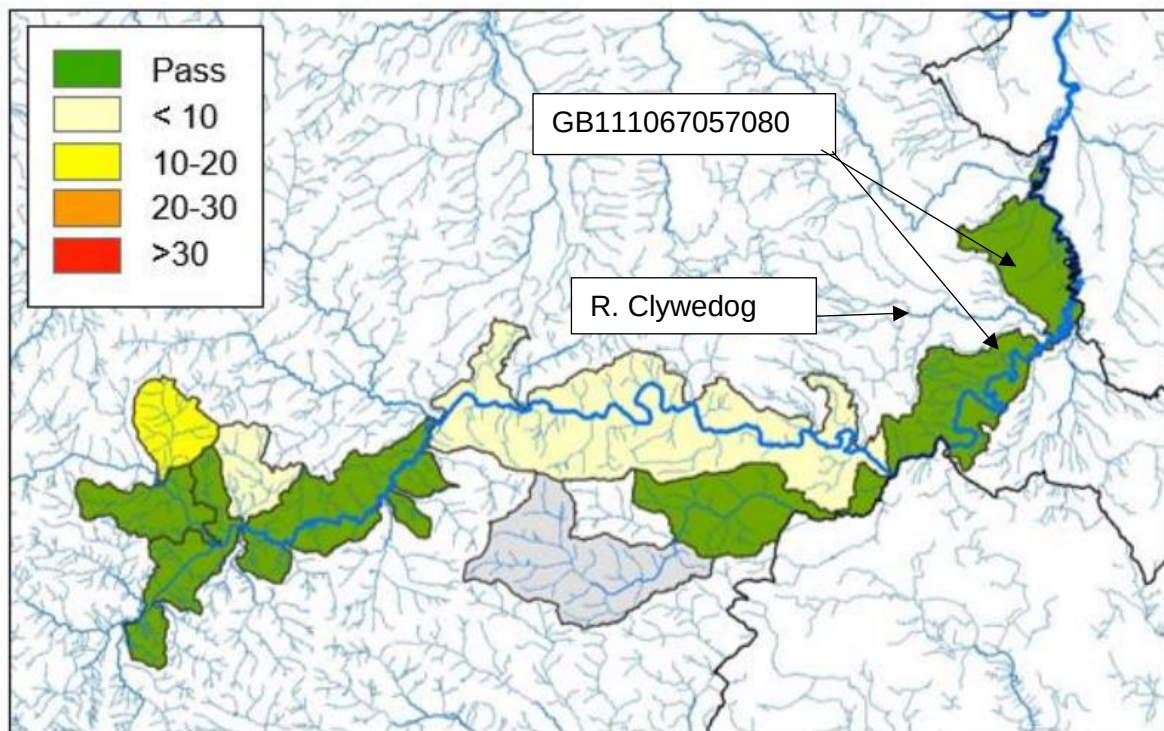
is already accounted for within the catchment. Any increase in the facilities of the football ground is the responsibility of Wrexham football to mitigate. It is worth noting that this development would be excluded from nutrient neutrality in England (per. Comms. Natural England); only commercial developments providing overnight accommodation or tourist attractions have to consider nutrient neutrality. However, in the absence of guidance, it is not clear whether any passing traffic from the A483 should be included within phosphorus neutrality considerations or not.

Upon further investigation, in preparation for this resubmission, it has come to light that this development should not be subject to phosphorus neutrality. The receiving Dŵr Cymru (Welsh Water) wastewater treatment works is Five Fords, located at National Grid Reference (NGR) SJ 36323 48207. This discharges to the River Clywedog (water body ID GB 111067052110). This flows eastwards to its confluence with the River Dee (water body ID GB 111067057080) at NGR SJ 40914 47320. This water body, described as 'Dee – Chester Weir to Ceiriog' is not subject to phosphorus neutrality as it passed the assessment against the revised phosphorus targets for the SAC (extract from the 'Compliance Assessment of Welsh River SACs against Phosphorus Targets', last line in the table provided below).

| Waterbody ID   | Waterbody Name                       | Site         | Target ( $\mu\text{g l}^{-1}$ ) | N Samples | Annual Mean ( $\mu\text{g l}^{-1}$ ) | Growing Season Mean ( $\mu\text{g l}^{-1}$ ) | Result       | Status      |
|----------------|--------------------------------------|--------------|---------------------------------|-----------|--------------------------------------|----------------------------------------------|--------------|-------------|
| GB111067051990 | Mynach                               | 300          | 10                              | 19        | 25                                   | 27                                           | Fail         | Confirmed   |
| GB111067051900 | Tryweryn - Dee to Mynach             | 294          | 10                              | 25        | 10                                   | 4                                            | Pass         | -           |
| GB111067051960 | Meloch                               | 496          | 10                              | 19        | 20                                   | 9                                            | Fail         | Unconfirmed |
| GB111067052240 | Dee - Alwen to Llyn Tegid/ Bala Lake | 1            | 10                              | 27        | 7                                    | 4                                            | Pass         | -           |
| GB111067052060 | Dee - Ceiriog to Alwen               | 70           | 10                              | 31        | 15                                   | 16                                           | Fail         | Confirmed   |
| GB111067051610 | Ceiriog - upstream of Teirw          | -            | 28                              | No data   |                                      |                                              | Not Assessed | -           |
| GB111067051910 | Ceiriog - confluence Dee to Teirw    | 578          | 28                              | 31        | 22                                   | 26                                           | Pass         | -           |
| GB111067057080 | Dee - Chester Weir to Ceiriog        | 87, 671, 689 | 50                              | 60        | 15, 50, 47                           | 17, 46, 49                                   | Pass         | -           |

Table 2. Phosphorus Compliance for the River Dee SAC. All orthophosphate concentrations are in  $\mu\text{g l}^{-1}$ .

The catchment map below shows the location of the lower water body (Dee – Chester Weir to Ceiriog) which does not fail the environmental targets for phosphorus.



This is confirmed by National Resources Wales (NRW) in a statement on their website<sup>1</sup>.

*“The whole of the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC catchment, with the exception of water body GB111067057080 at the downstream end of the Dee, as the phosphate target passes and there are no further river water bodies downstream. This affects Flintshire, Denbighshire, and Gwynedd County Councils; Wrexham and Conwy County Borough Councils and Snowdonia National Park Authority.”*

However, in the event that the inclusion of this water body within the nutrient neutrality requirement is disputed by Wrexham Council, an assessment for the additional load generated from passing traffic from the A483 that will use the new restaurant, has been undertaken and mitigation is proposed.

<sup>1</sup> <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/our-role-in-planning-and-development/principles-of-nutrient-neutrality-in-relation-to-development-or-water-discharge-permit-proposals/?lang=en>

## 2 Site Description

The proposed development is for a new restaurant on the Plas Coch retail park – a site plan is provided in Appendix 1. A detailed assessment has been undertaken by ADL Traffic to estimate the likely number of vehicles from the A483 that would use the restaurant. This is provided below.

**Table 2: Additional Daily Trips Diverted From A483**

|          | Total Vehicles Inbound | Additional Trips Diverted from A483 |            | Activity of Trips Diverted from A483 |                     |
|----------|------------------------|-------------------------------------|------------|--------------------------------------|---------------------|
|          |                        | %                                   | No vehicle | Drive Through and Leave 50%          | Park and Eat In 50% |
| Friday   | 1,362                  | 4%                                  | 54         | 27                                   | 27                  |
| Saturday | 1,314                  | 7%                                  | 92         | 46                                   | 46                  |

Friday and Saturday are the busiest days, the worst case scenario for the additional number of people using the restaurant per day from outside of the catchment is observed on Saturday with 92 cars and the average occupancy of these is 2.4. This equates to an additional 221 customers per day. It should be noted this is the worst-case scenario and therefore considered precautionary. Water use is averaged over all the customers, therefore consideration of the percentage that eat in or take away is irrelevant.

Based on an average water use of 3.55 litre/person ( CDM Partnership , **Appendix 2** ) , the additional discharge is 784.55 litres/day . Five Fords WwTW has a discharge consent of 1 mg/l for phosphorus. However, within all English nutrient methodologies it is assumed that the works discharge at 90% of the consent limit i.e. 0.9 mgTP/l.

Based on the above, the discharge is **0.258kg TP/year**. The calculation is provided below in Table 3.

| Step                            | Measurement                    | Value    | Unit         | Explanation/ info source      |
|---------------------------------|--------------------------------|----------|--------------|-------------------------------|
| Development Proposal            | Development Type               | 92       |              |                               |
| Step 1                          | population                     | 221      | persons      |                               |
| Step 2                          | Wastewater volume generated    | 784.55   | litres / day | mean water use 3.55 l/p/visit |
| Step 3                          | Receiving treatment            | 0.9      | mg/l         | Five fords 1 mg/l limit       |
| Step 4                          | TP discharged after treatment  | 706.095  | mg/TP/day    | Concentration * volume day    |
| Step 5                          | Convert mg/TP to kg/TP per day | 0.000706 | kg/TP/day    | Divide by 1,000,000           |
| Step 6                          | \\                             | 0.257901 | kg/TP/yr     | x 365.25 days                 |
| Wastewater total Phosphate load |                                | 0.258    | kg/TP/yr     |                               |

### 3 Mitigation Strategy

A review has been undertaken by CDM Partnership (**Appendix 2**) of the water efficiency measures at an existing McDonalds restaurant in Wrexham High Street, which also discharges to Five Fords WwTWs. It was concluded that by replacing existing cisterns and wash basin taps with those of higher water use efficiency, a saving of 2,859 l/day could be achieved. This far exceeds the requirement to mitigate the additional 784.55 l/day from the proposed development by 2086.2 l/d. This has an associated phosphorus load of 0.686 kgTP/ yr, i.e. provides additional benefit.

### 4 Conclusion

A review of the 'Compliance Assessment of Welsh River SACs against Phosphorus Targets' combined with information provided by NRW has confirmed that the receiving water body of treated sewage is not failing its water quality target and is not included in the NRW nutrient neutral designated waterbodies. This application should not have previously been required to and should not now be required to demonstrate neutrality with respect to phosphorus.

However, should this be disputed by Wrexham Council, a solution has been developed to mitigate the additional 784.55 l/d generated by additional traffic from the A483, from outside the catchment. It is proposed to upgrade cisterns and wash basin taps at an existing restaurant located on the High Street, Wrexham. It is confirmed that this restaurant also discharges to Five Fords WwTWs and the savings are calculated at 2,859 l/d. This far exceeds the required mitigation load, thereby confirming that the proposed development can achieve phosphorus neutrality and would not prevent the conservation objectives of the River Dee SAC being achieved.

## **APPENDIX 185/NNAMS/A1**

### **Site Plan**



## **APPENDIX 000/NNAMS/A2**

### **CDM calculations**

## MCDONALDS RESTAURANT – WREXHAM PLAS COCH

### WATER EFFICIENCY STATEMENT

|              |                       |
|--------------|-----------------------|
| Date         | March 2023            |
| Prepared by  | Craig Taylor          |
| Project No.  | 1727                  |
| Project Name | McDonalds Restaurants |

#### Introduction

The proposed McDonalds Restaurant #1727 Wrexham, Plas Coch was refuse planning approval due to Phosphate Neutrality.

An assessment has been undertaken to review existing restaurants within the vicinity to evaluate whether there is the potential to offset the phosphates, by improving efficiency of water usage

Restaurants identified to undertake this assessment are;

- #1023 Chirk
- #154 Wrexham High Street

The information contained within this statement provide an indication of the reduction in water consumption where existing water fittings/appliances are replaced for more efficient alternatives.

#### Existing/Proposed Water fittings

Both Chirk and Wrexham have very similar existing water fittings/appliances as per the following.

| Restaurant                 | Description     | Location           | Spec Info                                | Water use per cycle (l) | Cycles/use per day/operation | Total water use (l) |
|----------------------------|-----------------|--------------------|------------------------------------------|-------------------------|------------------------------|---------------------|
| <b>Existing</b>            |                 |                    |                                          |                         |                              |                     |
| <b>Chirk</b>               | WC Cisterns     | Customer           | Single flush                             | 6.0l                    | n/a                          | n/a                 |
|                            | WC Cisterns     | Staff              | Dual flush                               | 6.0l / 3l               |                              | n/a                 |
|                            | Whb taps        | Customer toilets   | Grohe Cosmapoliton                       | 5.7 / min               | 10 sec                       | 0.95                |
|                            | Whb taps        | Staff toilets      | Avon 21 B8268                            | 5 / min                 | 10 sec                       | 0.833               |
|                            | Washing machine | Washup             | Miele 507                                | 6.6 per kg              | 3                            | 150                 |
|                            | Dishwasher      |                    |                                          | n/a                     | 3                            | n/a                 |
| <b>Wrexham</b>             |                 |                    |                                          |                         |                              |                     |
| <b>Wrexham</b>             | WC Cisterns     | Customer           | Single flush                             | 6.0l                    | n/a                          | n/a                 |
|                            | WC Cisterns     | Staff              | Single flush                             | 6.0l                    |                              | n/a                 |
|                            | Whb taps        | Customer toilets   | Grohe Cosmapoliton                       | 5.7 / min               | 10 sec                       | 0.95                |
|                            | Whb taps        | Staff toilets      | Avon 21 B8268                            | 5 / min                 | 10 sec                       | 0.833               |
|                            | Washing machine | Washup             | Miele 507                                | 6.6 per kg              | 3                            | 150                 |
|                            | Dishwasher      |                    |                                          | n/a                     | 3                            | n/a                 |
| <b>Proposed</b>            |                 |                    |                                          |                         |                              |                     |
| <b>Chirk &amp; Wrexham</b> | WC Cisterns     | All to be replaced | Dual flush                               | 4.5/3l                  | n/a                          | n/a                 |
|                            | Whb taps        | All to be replaced | Grohe Euroeco CS self-closing pillar tap | 4.5 l/min               | 7 sec                        | 0.52                |

It is proposed to replace the existing wc flushing cisterns and wash hand basin taps within each restaurant based on the following.

## Water Consumption

The water consumption information used for this assessment have been taken from either billing data for each restaurant or calculated using BS 8542 Calculating Domestic Water Consumption In Non-Domestic Buildings.

| Water Consumption Figures |                     |              |                     |              |                      |
|---------------------------|---------------------|--------------|---------------------|--------------|----------------------|
| Existing Restaurant       | Billed (average)    |              | Reduced (assessed)  |              | Percentage reduction |
|                           | m <sup>3</sup> /day | Litres / day | m <sup>3</sup> /day | Litres / day |                      |
| <b>154 Wrexham</b>        | 7                   | 7,078        | 4.2                 | 4,219        | 41%                  |
| <b>1023 Chirk</b>         | 5.6                 | 5,590        | 3.6                 | 3,638        | 35%                  |
|                           |                     |              |                     |              |                      |

The water consumption figures in the table above indicate that there would be a significant saving by changing the existing wc cisterns and wash hand basin taps.

We have reviewed both the Wrexham and Chirk existing sites to assess whether rainwater harvesting would be an additional viable option.

Wrexham is a high street restaurant so the yield and efficiency of the system would not provide an adequate water supply for wc flushing.

Chirk is an existing drive through restaurant which has both roof and carpark surface water drainage interconnected so installing a rainwater harvesting system on this site would not be cost effective.

## Wrexham – Reduced Water consumption assessment

### McDonalds Restaurants - Water Use Assessment

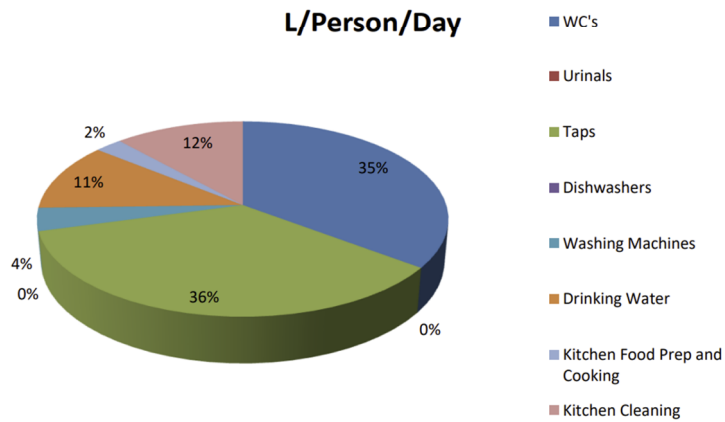
Date: Mar'23  
 Rev: --  
 Restaurant: #154 Wrexham High Street  
 Occupancy: 1,117 (per day)

### Water Consumption Summary - Efficient

| Appliance                      | L/Person/Day                                    |
|--------------------------------|-------------------------------------------------|
| WC's                           | 1.25                                            |
| Urinals                        | 0.00                                            |
| Taps                           | 1.26                                            |
| Dishwashers                    | 0.00 No dishwasher installed at this restaurant |
| Washing Machines               | 0.13                                            |
| Drinking Water                 | 0.40                                            |
| Kitchen Food Prep and Cooking  | 0.09                                            |
| Kitchen Cleaning               | 0.42                                            |
| <b>Total Litres/Person/Day</b> | <b>3.55</b>                                     |

**Recycled Rainwater Yield** 0.00 (L/Person/Day)  
**Greywater harvesting Yield** 0.00 (L/Person/Day)

**Baseline Calculated Water Consumption** 3.55 (L/Person/Day)  
**Baseline Total water volume used** 4,219 (L/Day)



## Chirk – Reduced Water consumption assessment

### McDonalds Restaurants - Water Use Assessment

Date: Mar'23  
 Rev: --  
 Restaurant: #1023 Chirk Drive Throug

Occupancy: 1,532 (per day)

### Water Consumption Summary - Efficient

| Appliance                      | L/Person/Day                                    |
|--------------------------------|-------------------------------------------------|
| WC's                           | 1.25                                            |
| Urinals                        | 0.00                                            |
| Taps                           | 0.26                                            |
| Dishwashers                    | 0.00 No dishwasher installed at this restaurant |
| Washing Machines               | 0.10                                            |
| Drinking Water                 | 0.40                                            |
| Kitchen Food Prep and Cooking  | 0.06                                            |
| Kitchen Cleaning               | 0.30                                            |
| <b>Total Litres/Person/Day</b> | <b>2.37</b>                                     |

**Recycled Rainwater Yield** 0.00 (L/Person/Day)  
**Greywater harvesting Yield** 0.00 (L/Person/Day)

**Baseline Calculated Water Consumption** 2.37 (L/Person/Day)  
**Baseline Total water volume used** 3,638 (L/Day)

