

Imperial Buildings, King Street, Wrexham

Foul Water Flow Rate Calculation and Impact of Phosphates

Technical Note

Project ref:	5807 – Imperial Buildings, King Street, Wrexham
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Date:	10 January 2023
Version:	Final v1.1

Introduction

1. Weetwood Services Ltd ('Weetwood') were instructed by M1 Investments Ltd to prepare a Technical Note to calculate pre and post development foul water flow rates in association with the proposed redevelopment of Imperial buildings, King Street, Wrexham LL11 1HE. The Technical Note¹ which was produced also addressed the impacts of the development on phosphates discharged into the public sewer network and ultimately into the River Dee.
2. It is understood that M1 Investments Ltd forwarded the Technical Note to the Local Planning Authority (LPA) who commented as follows:

"The issues is not simply one a matter of density of occupation though, it is a case of overnight use."

"Whilst noting the document you have referred it, it doesn't override the phosphates issue or indeed any other material planning consideration".
3. The Technical Note has now been updated to address the LPA's comments on phosphates as far as possible.

Existing and Proposed Development

4. The site is located at the junction of King Street and Regent Street, Wrexham at Ordnance Survey National Grid Reference SJ 332 504 as shown in **Figure 1**.
5. The existing building is three storeys. Planning application reference P/2022/0837 was validated on 31 August 2022 and is for a change of use of the first and second floors from office space use to 14 residential units comprising ten studio apartments and four one-bedroom apartments (see **Annex 1**).
6. The ground floor will remain as per the current use following redevelopment.
7. The application for planning permission indicates there will be a loss of 798 m² of office space following redevelopment.
8. The 14 proposed residential units all have one bedroom each.

Drainage Assets in the Vicinity of the Site

9. Dŵr Cymru Welsh Water's (DCWW's) public sewer records have not been obtained. DCWW have, however, commented on the planning application (see **Annex 2**) to confirm that:
 - Capacity exists within the public sewer network to receive domestic foul flows from the proposed development
 - The receiving wastewater treatment works at Five Fords (postcode LL13 0PA) has a phosphate permit.

¹ Imperial Buildings, King Street, Wrexham, Foul Water Flow Rate Calculation Technical Note, Final v1.0, 21 December 2021, Reference 5807/TN/Final/v1.0/2022-12-21

Foul flow Rate Calculation

10. Calculations are provided for the existing foul flow rates based on the current usage of 798 m² of office space. Post development foul flow rates are calculated for 14 one-bedroom residential units.
11. Pre and post development foul flow rates have been calculated in accordance with 'Flows and Loads – 4²' as follows:
 - A water usage of 90 litres/person/day for full time office staff
 - A water usage of 150 litres/person/day for residential development.
12. Assuming an office employee density³ of 1 person per 12 m², the existing office space could accommodate 66.5 persons. The calculated water usage per day for the existing site is 5,985 litres.
13. A check has been carried out on pre-development flow rates using the recommendations in the book 'Urban Drainage⁴'. Table 9.2 states that the daily volume of wastewater generated by offices is 750 litres/day/100 m². For an area of 798 m², the calculated daily volume is 5,985 litres, i.e. the same as that calculated using 'Flows and Loads -4'. This provides confidence regarding the accuracy of the existing foul flow rate calculation.
14. All the residential units are one-bedroom units. The maximum number of people on site is therefore 28. The calculated water usage per day for the proposed development is 4,200 litres.
15. This is a reduction of 1,785 litres per day post development.

Phosphorous Levels

16. It is understood that the issue relating to phosphorus is the level of phosphates discharged into the River Dee which is classified as a phosphorous sensitive river Special Area of Conservation.
17. It is noted that the LPA have not challenged the pre and post development foul flow calculation for the site itself as presented in version 1.0 of Weetwood's Technical Note. These calculations show a reduction in foul flow rates discharged into the public sewer network. Both pre and post development foul sewage generated at the site are domestic in nature. The reduction in daily foul flow rates will therefore result in a reduction of phosphates discharged into the public sewer.
18. It seems that the LPA are saying there is an increase in overnight use at the site but have not provided further information.
19. It is acknowledged that the diurnal variation in pre and post development foul flow rates discharged into the public sewer are different for offices and for residential development. For offices, more flow is concentrated into the times when the offices are open (say 8 am to 6 pm Monday to Friday). The diurnal variation in foul flow rates from the proposed residential development will exhibit a morning and evening peak and take place for a longer period each day. The residential discharges will also occur throughout the week rather than just Monday to Friday.
20. A further calculation has been carried out to assess weekly foul flow rates for the pre and post development scenarios.
21. Assuming that the offices are open 5 days per week, the weekly volume of foul sewage discharged into the public sewer network is 29,925 litres per week. The corresponding weekly volume of domestic sewage for seven days is 29,400 litres per week. This also shows a reduction on the pre-development scenario.
22. The key issue is, however, not the level of phosphorous discharged in the public sewer adjacent to the site but rather the level of phosphates that discharge into the impacted watercourse (River Dee) pre and post development. According to the planning consultation response from DCWW, foul sewage from the site

² Flows and Loads – 4, British Water Code of Practice for Sizing Criteria, Treatment Capacity for Sewage Treatment Systems, November 2013

³ Employment Densities Guide, Homes & Communities Agency, 2nd Edition 2010

⁴ Urban Drainage 4th Edition, Butler, Digman et al, 2018, Table 9.2 page 188

discharges into the Five Fords wastewater treatment works which is located approximately 3.8 km from the site. These treatment works already have a phosphate permit. Treated effluent from the Five Fords wastewater treatment works discharge into the River Clywedog, a tributary of the River Dee.

23. It could take well over an hour for foul effluent from the site to reach the treatment works and a number of hours for the effluent to pass through the treatment process at the works prior to discharging into the River Clywedog. The time of travel in the public sewer and time to pass through the wastewater treatment works would attenuate any discharges, i.e. smooth out any peaks in the diurnal discharge from the site.
24. In addition, the confluence of the River Clywedog with the River Dee is approximately 5 km downstream of the Five Fords wastewater treatment work. This would also have the impact of smoothing out the diurnal variations of foul flow from the site itself. The overall impact any diurnal variation in daily foul flows into the River Dee are therefore minimised.
25. It could also be argued that domestic sewage discharges are smoother over the course of the day (and the week) because they occur over a longer period of time in comparison to office working hours. This would also smooth out the impact of any diurnal variations in foul flow rates.
26. The overall conclusion is that the impact of phosphates on the River Dee will be reduced post development. In addition, any diurnal variation in foul flows discharged into the public sewer will be smoothed out by the time the treated effluent reaches the River Dee.

Summary

27. The proposals are to redevelop the first and second floors of Imperial Buildings, King Street, Wrexham.
28. The existing site comprises 798 m² of office space. It is proposed to replace the office space with 14 one-bedroom residential units.
29. The daily foul sewage volume generated by the existing site is calculated as 5,985 litres. The post development daily foul sewage volume is calculated as 4,200 litres, a reduction of 1,785 litres following redevelopment.
30. Pre and post development foul sewage generated by the site are both domestic in nature.
31. The reduction in daily foul sewage volume will result in a corresponding reduction in phosphorous discharged into the public sewer network.
32. Any diurnal variation in foul flows discharged from the site into the public sewer will be significantly smoothed out by the time the treated effluent from the Five Fords wastewater treatment works impacts on the River Dee.
33. It is therefore concluded that the impact of phosphates from the site on the River Dee will reduce if the proposed development proceeds.

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FIGURES

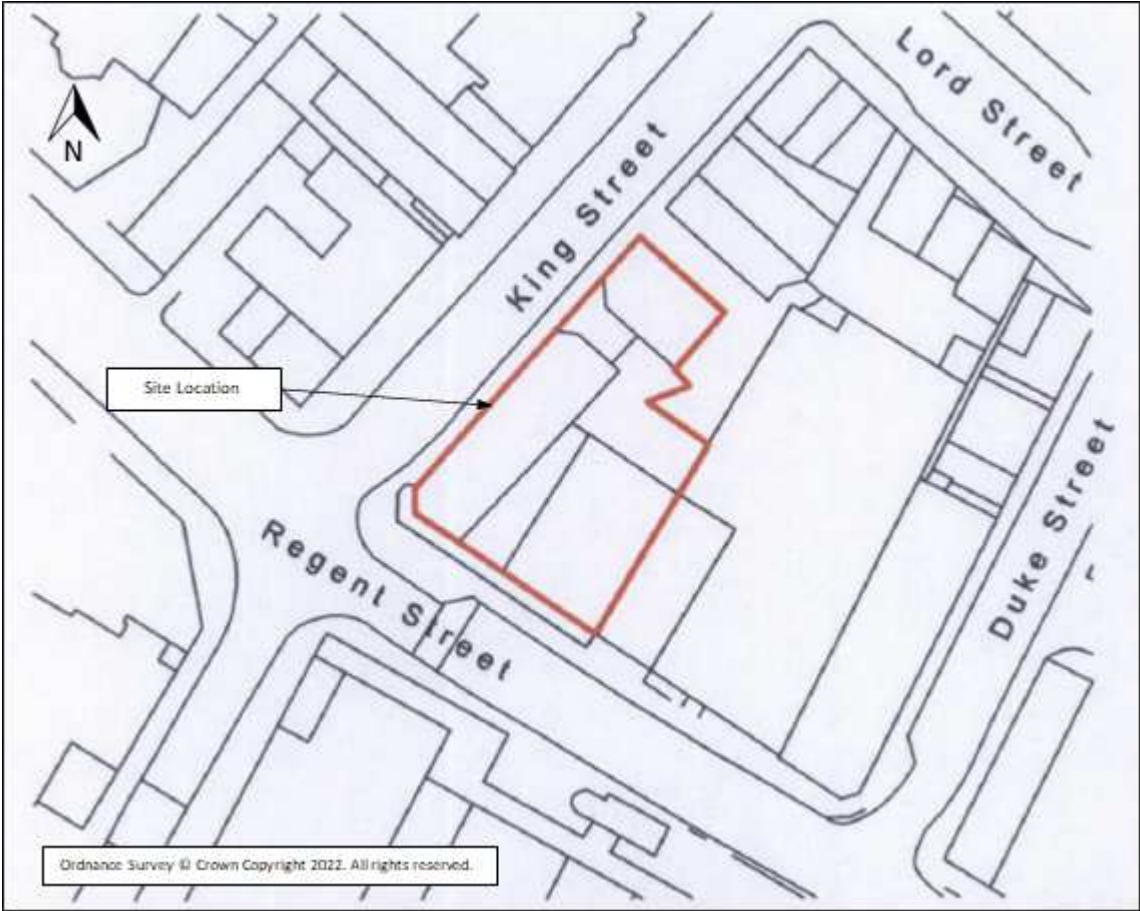
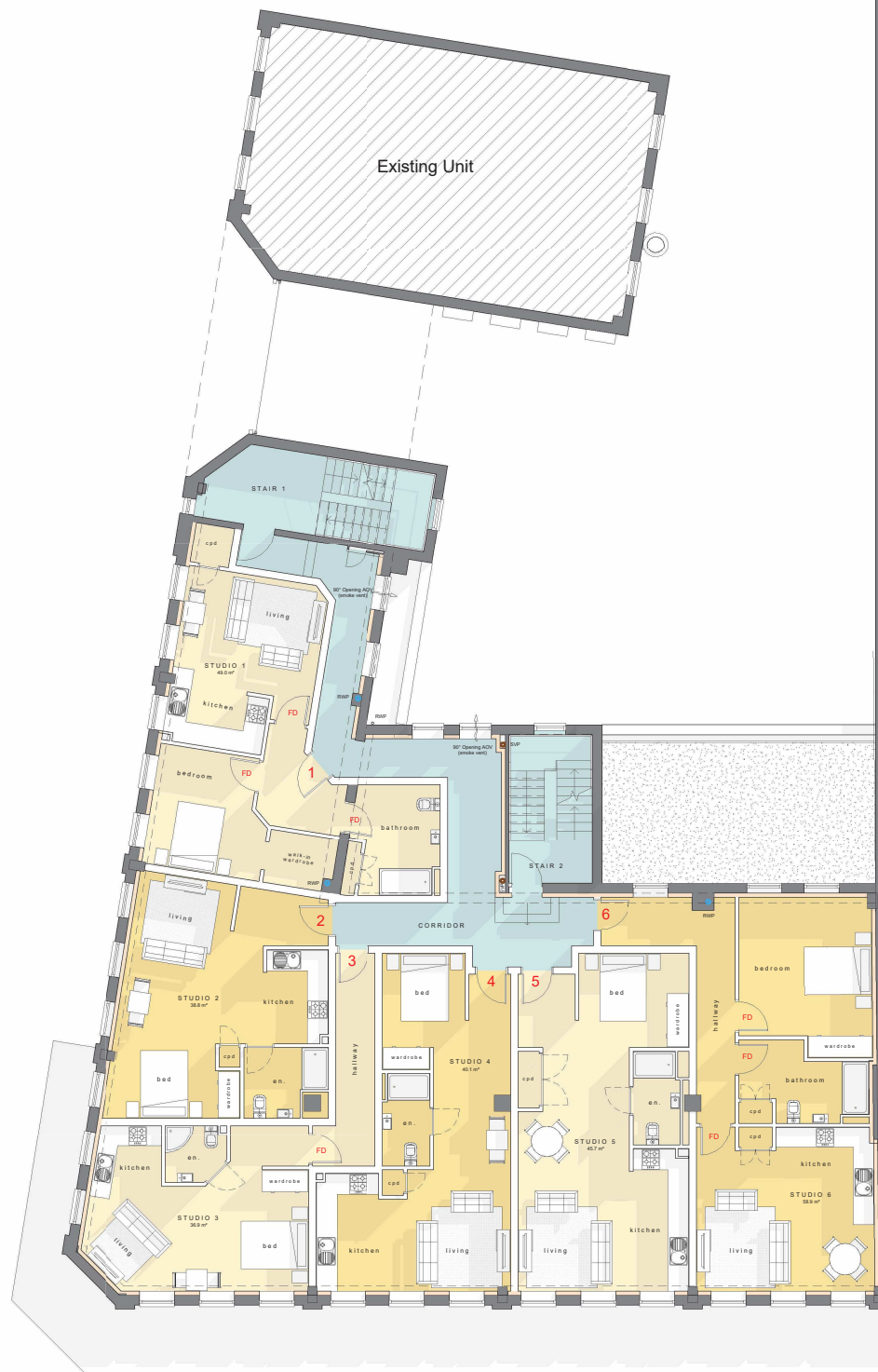


Figure 1: Site Location

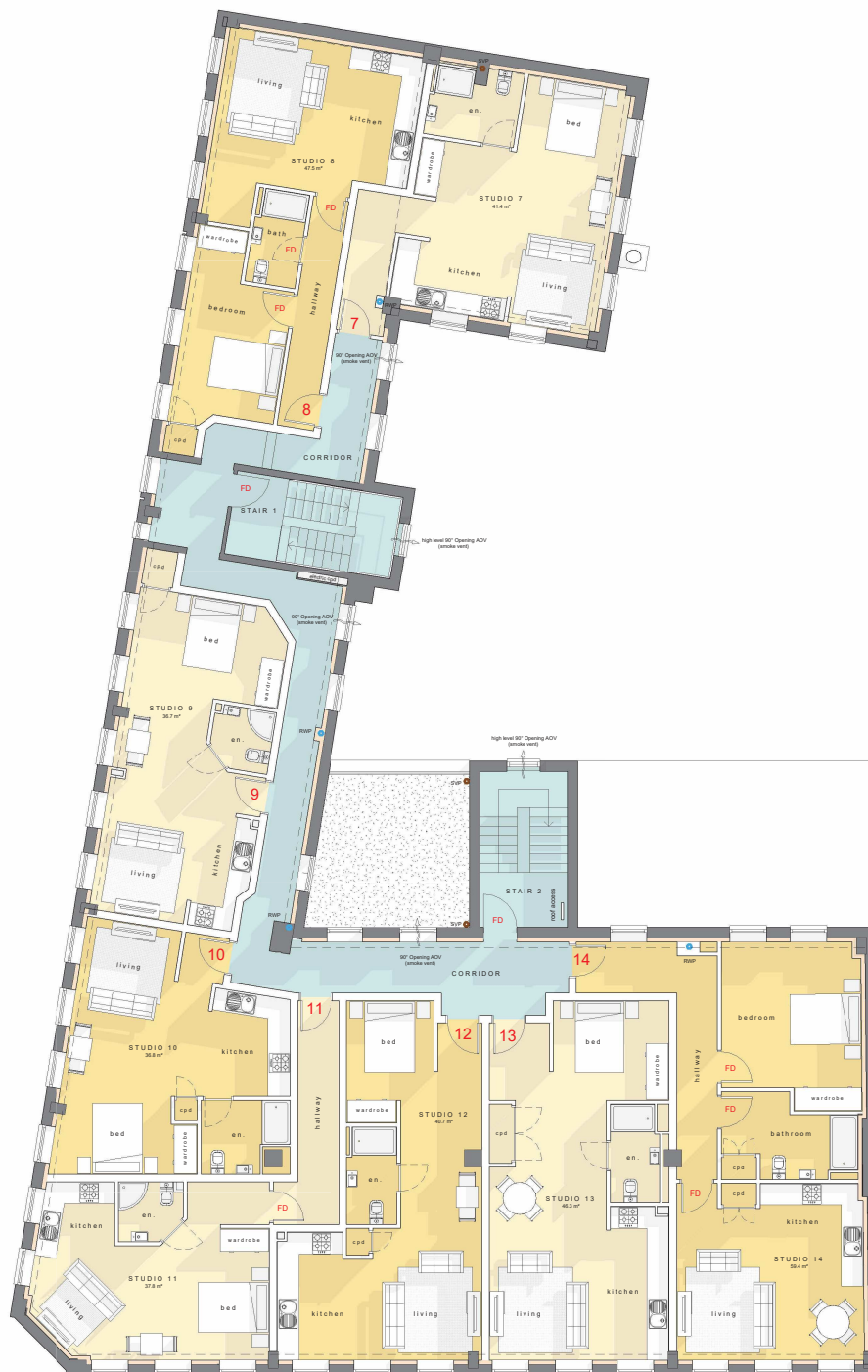
ANNEX 1

Development Proposals



first floor 'as proposed'

A	Rev	11/05/2022	KL	Apartment 1 cpd amended to walk-in wardrobe as requested by client			
	Date		Drawn	Description			
			Clerk Bank House Clerk Bank LEEK Staffordshire ST13 5HE				
			t : 01538 373477 e : info@ctdarchitects.co.uk f : 01538 386503 w : www.ctdarchitects.co.uk				
Client			Project Imperial Buildings Kings Street, Wrexham, LL11 1HF				
M1 Investments Ltd.			Scale 1:100 Size A2 Drawn KL Check KL Date 29/04/22				
Title			Status PLANNING ISSUE				
first floor 'as proposed'			Job No. 2217 Drawing No. AL11 Rev. A				



second floor 'as proposed'



b		11/05/2022	KL	Apartment 7 kitchen layout amended	
a		03/05/2022	KL	Apartment 7 & 10 amended following clients comments	
Rev		Date	Drawn	Description	
		Clerk Bank House		ctd architects © 2022 This drawing is copyright. All dimensions to be checked on site before proceeding. Contractor must notify the architect of any discrepancies before proceeding. Contractor to check layout dimensions of new work to suit existing conditions. Do not assume existing structure or details are plumb, square or level. All drawings to be read in conjunction with all other consultants drawings and specs.	
		Clerk Bank			
		LEEK			
		Staffordshire			
		ST13 5HE			
t: 01538 373477		e: info@ctdarchitects.co.uk			
f: 01538 386503		w: www.ctdarchitects.co.uk			
Client		Project		Scale	
		Imperial Buildings		1: 100	Size
		Kings Street, Wrexham, LL11 1HF		KL	Drawn
				KL	Client
M1 Investments Ltd.				Date	
		Title		29/04/22	
		second floor 'as proposed'		Status	
				PLANNING ISSUE	
		Job No.		Drawing No.	
		2217		AL12	
				Rev.	
				B	

ANNEX 2

Dŵr Cymru Welsh Water Planning Response

Wrexham County Borough Council
16, Lord Street
Wrexham
LL11 1LG

Date: 07/10/2022
Our Ref: PLA0068452
Your Ref: P/2022/0837

Dear Sir/Madam,

Site: Imperial Buildings, King Street, Wrexham.

Development: Change of use of first and second floors from offices to 14 residential units (10 studio apartments and 4 one bedroom apartments)

We refer to your planning consultation relating to the above site, and we can provide the following comments in respect to the proposed development.

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

SEWERAGE

We can confirm capacity exists within the public sewerage network in order to receive the domestic foul only flows from the proposed development site. We recommend that a drainage strategy for the site be appropriately conditioned, implemented in full and retained for the lifetime of the development.

We can advise that Five Fords WwTW has a phosphate permit. You will need to discuss this matter further with the local planning authority.

Conditions

No development shall commence until a drainage scheme for the site has been submitted to and approved in writing by the local planning authority. The scheme shall provide for the disposal of foul and surface water. Thereafter the scheme shall be implemented in accordance with the approved details prior to the occupation of the development and no further foul water shall be allowed to connect directly or indirectly with the public sewerage system.

Reason: To prevent hydraulic overloading of the public sewerage system, to protect the health and safety of existing residents and ensure no pollution of or detriment to the environment.

No surface water from any increase in the roof area of the building /or impermeable surfaces within its curtilage shall be allowed to drain directly or indirectly to the public sewerage system. Reason: To prevent hydraulic overloading of the public sewerage system, to protect the health and safety of existing residents and ensure no pollution of or detriment to the environment.

Advisory Notes

The applicant is advised that some public sewers and lateral drains may not be recorded on our maps; some sewers were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist us in dealing with the proposal the applicant may contact Dwr Cymru Welsh Water. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

The applicant may also need to apply to Dwr Cymru / Welsh Water for any connection to the public sewer under S106 of the Water industry Act 1991. If the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Gravity Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com

In accordance with Planning Policy Wales (Edition 11) and Technical Advice Note 12 (Design), the applicant is advised to take a sustainable approach in considering water supply in new development proposals, including utilising approaches that improve water efficiency and reduce water consumption. We would recommend that the applicant liaises with the relevant Local Authority Building Control department to discuss their water efficiency requirements.

Our response is based on the information provided by your application. Should the proposal alter during the course of the application process we kindly request that we are re-consulted and reserve the right to make new representation.

If you have any queries please contact the undersigned on 0800 917 2652 or via email at developer.services@dwrcymru.com

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Jake MacMillan
Development Planning Officer
Developer Services



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

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Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

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