

DRAINAGE STRATEGY

PROPERTY ADDRESS

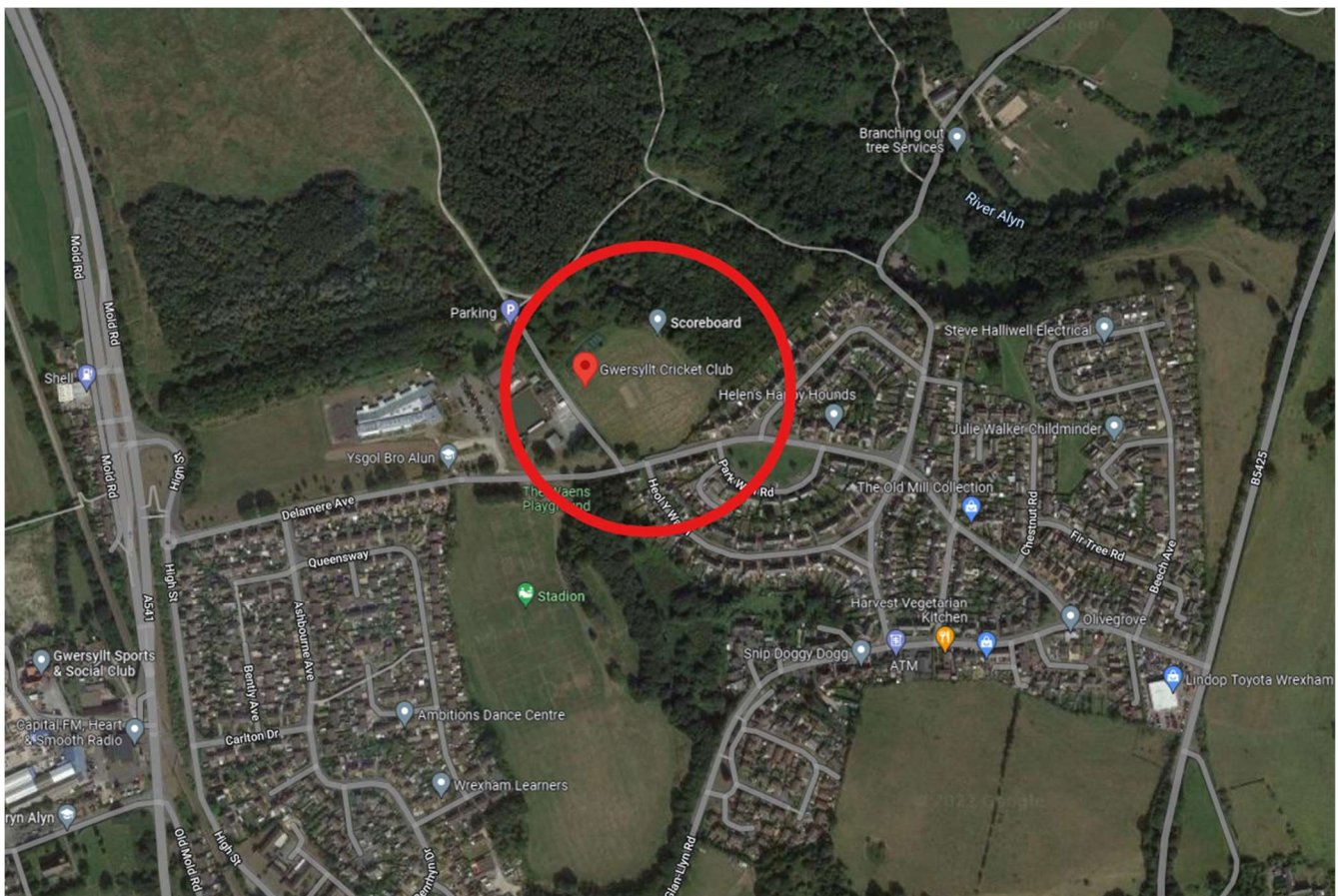
GWERSYLLT PARK CRICKET CLUB
THE PARK
GWERSYLLT
WREXHAM
LL11 4DX

CLIENT

GWERSYLLT PARK CRICKET CLUB

DATE

June 2022



1. Introduction

- 1.1.** The site is situated in Gwersyllt, Wrexham set in a semi-rural area, surrounded to the North by a forest and houses, South/South East.
- 1.2.** The national Grid reference for the site is 332140E, 354003N or SJ321540.
- 1.3.** The site extends to approximately 16000m² and comprises cricket club and field with associated pavilion building and hard landscaped areas, totaling 125m².
- 1.4.** The scheme is for a replacement pavilion building and footpath. The purpose of the report is to appraise the local Planning Authority and SAB Assessor of the drainage implications of the proposed development.

2. Proposed Drainage Strategy

- 2.1.** To demonstrate the development is of low risk the report should show:

That it will be feasible to balance surface water run-off to the Greenfield run-off rate (or existing run-off rate in terms of a brownfield development with a 50% betterment) for all events up to the 1 in 100 year storm (including a 30% allowance for climate change) and set out how this will be achieved

How sustainable drainage techniques (SuDS) will be used with any obstacles to their use, clearly justified.

- 2.2.** The surface water drainage developments for any development site should aspire to be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the development
- 2.3.** For a new development it may be necessary to provide surface water storage and/or infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site.
- 2.4.** A requirement that, for the range of annual flow rate probabilities, up to and including the 1% annual probability (1 in 100 year event) the developed rate of run-off into a watercourse should be no greater than the undeveloped rate of run-off for the same event. In the case of brownfield sites, drainage proposals will be measured against the existing performance of the site. Water authorities take a similar approach, however they ask that flows be restricted to include up to the 3.33% annual probability (1 in 30 year) whilst demonstrating that the 1 in 100 year event does not pose a threat to the locality (known as designing for exceedance).
- 2.5.** Climate change (CC) will be considered by increasing the rainfall intensity by 30%.
- 2.6.** Foul drainage from the site doesn't detrimentally increase phosphate levels to the local watercourse.

3. Existing Site Drainage

- 3.1.** Foul drainage – existing septic tank, redundant. During drainage survey, manhole cover was lifted and found to be collapsed and full of soil.
- 3.2.** Surface Water drainage – RWP's discharge assumed to discharge to soakaway, location and type unknown. Not accessible during drainage survey.

4. Consideration of the Sustainable Drainage Systems

- 4.1.** Following the Hierarchy of Sustainable Drainage Systems (SUDS) the following options must be considered:

- I. Reuse
- II. Infiltration
- III. Watercourse
- IV. Surface Water Sewer
- V. Combined Sewer

- 4.2.** The first option to be considered is reuse, due to the type of development a rainwater harvesting system for toilets/washing machines wouldn't be suitable due to limited roof area/against volume of water required. The use of rainwater butts for watering is considered an option to be implemented.
- 4.3.** The next option to be considered must be infiltration into the ground. Even when there are alternative sewer connections or water courses available, infiltration must be utilised unless it is unfeasible.
- 4.4.** The Phase 1 carried out by Egeo Solutions Limited confirmed the underlying soils to consist of sand and gravels with a suitable percolation rate for soakaways expected, refer to Appendix A.
- 4.5.** In order to prevent an increase in flood risk to adjacent land and downstream of the site it will be necessary to restrict the surface water discharge from the proposed development to the existing rates, if soakaways do not become a feasible option for discharge.

- 4.6.** The existing greenfield run off rates have been calculated using the Wallingford procedure within the Info Drainage analysis program and the results are included within Appendix B. The total existing run-off is calculated in the table below.

Storm Event	Existing impermeable run-off
1 in 1 year	7.9 l/s
1 in 30 year	15.8 l/s
1 in 100 year	19.5 l/s

- 4.7.** Based on the above we would propose to limit any discharge from the site to 7.9 l/s for a rain fall event up to and including the 1 in 100 year event with 30% climate change.
- 4.8.** The proposed requires the collection of rainwater from rooftops and hardstanding areas. Therefore the permeable area for the site is nominally increased by 573m² to 698m², new building and foot path.
- 4.9.** The proposed attenuation provided is via permeable paving and storage tanks below the hardstanding areas to the side of the building. Refer to Appendix C for Calculations – calculations are based on percolation rates giving a larger attenuated volume below ground (a smaller tank would be required if greenfield runoff rates were adopted).

5. Surface Drainage

- 5.1. Surface water is to be attenuated within rainwater butts, permeable paving and underground storage in the way of a plastic crate soakaway.
- 5.2. As required, peak rates of run-off will be restricted to greenfield run off rates and storage will be provided up to and including the 1 in 100 year storm event plus an allowance of 30% increase for climate change.

6. Foul Drainage

- 6.1. It is proposed that the foul drainage will discharge to the local sewer within the lane off Parkwall Road. The sewer currently serves the current Cricket Club adjacent the pavilion across a track. A drainage survey has been carried out by MetroRod, refer to Appendix D
- 6.2. Phosphate levels for the new project are being balanced if not bettered due to the new system being connected to the main Welsh Water sewer system within Parkwall Road (phosphate treatment at their treatment plant) rather than the existing septic tank (possible overflows to land drains/soakaway) and with the new building being a replacement the number of users wont increase as the new building is used as a pavilion for the Cricket players with a set/fixed number of people.

7. Summary

- The site is currently a brownfield site.
- Hardstanding areas increased by 573m².
- Surface water run-off from the proposed development will be stored and discharged on site via plastic crate soakaways.
- Storage will be provided up to and including the 1 in 100 year + climate change event within the site boundary. The attenuation will be in the form of underground crates, permeable paving and swales.
- The drainage proposals are be designed in accordance with the techniques set out within the SUDS manual.
- No surcharging occurs up to and including the 1 in 30 year storm event
- No flooding occurs up to and including the 1 in 100 year storm event with an allowance of 30% for climate change.
- On site storage volumes approximately 25-51m³.
- Foul drainage will connect to local main sewer.

8. Conclusion

- 8.1. The strategy outlined above shows a viable sustainable drainage solution is achievable within the constraints of the site. Detailed design of the system will follow on from any SAB Pre-Application advice.

8.2. No increase in phosphate levels to the local watercourses.

Prepared by	David Barwell	June 2022
Approved by	David Barwell	June 2022
Document	GCC-ENA-XX-XX-RP-C-0001	
Status	Planning and SAB Pre-Application	

APPENDIX A

Egeo Solutions Limited Phase 1 Report

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

- 6.1.1 The information collected has allowed an assessment of the geological, hydro geological and potential contamination status of the site to be made. The assessment has identified that the likelihood of significant solid contaminants and hazards being present on site is very low. However due to possible waste disposal on adjacent land there may be risks from hazardous gasses.
- 6.1.2 The assessment has identified that the natural near surface superficial deposits (soils) consist of Glaciofluvial Sheet Deposits of sand and gravel that are extensive over the area. However, the area to the north and west has been worked for the sand and gravel, with the worked area possibly extending over the site. Restoration materials of natural soils may be present.
- 6.1.3 The sand and gravel are likely to have good load bearing capacity and good permeability, however depending on the soil type if restoration has taken place, any made ground will be of variable load bearing capacity and permeability.
- 6.1.4 There is no risk from past mining.
- 6.1.5 Full radon protection measures will be required.

APPENDIX B

Greenfield Runoff Rates

 UK and Ireland Rural Runoff Calculator

ICP SUDS / IH 124		ADAS 345		FEH		ReFH2	
Method	☒ ICP SUDS ☐ IH 124						
Area (ha)	1.60						
SAAR (mm)	793.0						
Soil	0.470		Map				
Region	Region 9		...				
Additional Options							
Urban	0.000						
Return Period (years)	0						
Growth Curve	(None)		Graphs Help				
Calculate							
Results							
Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)		
Region 9	8.9	8.9	7.9	5.8	19.5		

Greenfield Runoff Rate = 7.9l/s

APPENDIX C

DRAINAGE CALCULATIONS

Input	
Input Type	User Input
Area (ha)	0.07
Volumetric Runoff Coefficient	1.000
Discharge Rate (L/s)	
Infiltration Rate (m/hr)	0.036
Safety Factor	2.0
	Quick
☐ Create New ☒ From Library	
☒ All ☒ FSR	
Method FSR	
Number of Storms 42	
Max. Run Time (mins) 720	
Calculate	
Results	
Quick Storage Estimate variables require approximate storage of between 56m³ - 56m³. With Infiltration storage is reduced to between 25m³ - 51m³.	

Approximate storage volume – 51m³

APPENDIX A

MetroRod Drainage Survey

