



**University of Glamorgan**

**Local Climate Impacts Profile (LCLIP)  
2008**



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# **1 Executive Summary**

## **1.1 Background**

Changes to the UK climate over the next 30 years will be mainly driven by historical emissions of greenhouse gases; however it is becoming highly difficult to prevent or avoid these changes, which are almost certain to include more frequent severe weather events. Such events affect many aspects of organisational activity, and, as climate change accelerates over the coming decades, are likely to have more frequent and increasingly significant impacts on service delivery.

Although efforts to mitigate further future climate change remain important, in order to be able respond creatively and effectively to the various threats and opportunities that will arise organisations must now also focus on adapting to climate change. Strategic planning in relation to climate change adaptation needs to become embedded into the way in which organisations plan around service delivery, staff resources, finances and reputation.

As a first step towards developing effective adaptation strategies, there is a clear need to measure and assess the likely impact of weather-related events on an organisation's staff and services. The Local Climate Impact Profile (LCLIP) presented in this report is an initial attempt to identify and quantify these likely impacts to the University of Glamorgan.

The LCLIP exercise considers the impact of weather-related events upon University operations during the period January 2003 to September 2008. The research process broadly consists of identifying, extracting, collating and analysing data from media resources and University records, followed-up by interviews with departmental managers to verify the data.

## **1.2 Summary of Results**

It is expected that with climate change, severe weather events will become more frequent and severe. However, it is important to note that the predicted impacts associated with climate change are not entirely negative. Hot summers will allow for more income to be generated from the playing fields at Tyn-y-Wern. High winds will be beneficial during the winter months when the pitches at Tyn-y-Wern are saturated with rain. The winds will help dry out the pitches, therefore improving the recovery time of the turf. Warmer winter temperatures will also benefit the pitches as the decrease in ice, snow and frost events will allow the pitches to be used more and will cause less damage to the turf.

Warmer temperatures will make the local area more desirable and could encourage more student applications to the University. However, the potential negative impacts from a changing climate outweigh the possible benefits. The report identifies excessive rainfall and flooding to be the most significant weather event to affect the services provided by the University.

### 1.3 Identified Costs

Under current recording mechanisms, it is difficult to accurately quantify the cost of extreme weather events. However, utilising past insurance records has provided an indication of the financial impact of such events. The costs associated with maintenance duties taken from Job Cards have not been added as they are minimal and have little impact on service delivery. Therefore the cost of extreme weather events affecting the University of Glamorgan can be calculated at:

Insurance claims:	£289,992
Lost income from Tyn-y-Wern:	£33, 810
	<hr/>
Total cost of extreme weather events between 2003 and 2008:	<b>£323, 802</b>

This figure does not represent the true cost of extreme weather events which have affected the University of Glamorgan. Thus, it is likely that this figure is much higher, however without adequate records; it is difficult to determine the true cost.

### 1.4 Recommendations

The report sets out several key recommendations which focus on improving current reporting mechanisms within the University. It is clear that current data is limited or not accessible. It is also recommended that the University prepares an Emergency Plan for future flooding. This will be beneficial with the expected increase in the occurrence of excessive rainfall and flood events. It is also recommended that the LCLIP exercise be repeated in five years to determine whether the University's vulnerability to extreme weather events has changed. It will also provide an opportunity to identify new key trends and thresholds. Other recommendations are set out in section five.

## **2 Introduction**

### **2.1 Introduction to a Local Climate Impacts Profile (LCLIP)**

A Local Climate Impacts Profile is a resource that organisations can use to identify the effects of extreme weather events on service delivery. The impacts of these events are anticipated to worsen with the increasing effects of climate change. Thus it is necessary to identify the impacts of severe weather events in order to adapt to them.

The LCLIP methodology was originally piloted in 2006 by Oxfordshire County Council (OCC) in partnership with the UK Climate Impacts Programme (UKCIP). Oxfordshire County Council identified costs of up to £16 million affecting the local authority, caused by extreme weather events over a 10 year period. The LCLIP project has also been taken on by other organisations such as the Nottingham NHS Trust. The methodology of the LCLIP allows it to be adapted so that it can be used by other organisations other than local authorities.

The LCLIP is a 12 week process involving several key stages. It begins by identifying extreme weather events by either using local media sources or organisational records. These events are recorded in a database which is later verified by interviewing department managers affected by the event providing an opportunity to validate the data and gain further information. Once this process is completed, the information is collated into the LCLIP report.

### **2.2 The University of Glamorgan**

The Estates & Facilities department is primarily responsible for the overall management of the University of Glamorgan's estates, which include the Treforest Campus the William Price Business Park, the Tyn-y-Wern playing fields and the Glyntaff campus. However, both the William Price Business Park and the Glyntaff campus is managed by an external management company, Kier Management.

The Estates and Facilities department maintains all sites and buildings on the Treforest campus. It is also responsible for the strategic development of the University's estate where capital building projects such as new builds and refurbishments are undertaken as part of the University's long-term development plan.

### **2.3 Location**

The University of Glamorgan is set in the heart of the Rhondda Valley with smaller campuses based in Cardiff and Merthyr Tydfil. It is primarily located in Treforest with an additional campus located in Glyntaff (see Figure 1).



Figure 1. The Treforest campus based in the Rhondda Valley.



Figure 2. The Glyntaff campus (*left*) and the Tyn-y-Wern playing fields (*right*).

This report focuses on the campus based in Treforest and Glyntaff as well as the Tyn-y-Wern playing fields (Figure 2). Both the Treforest and Glyntaff campus are located on either side of the Rhondda Valley.

## 2.4 The University and the Environment

The University of Glamorgan has made the environment a key priority by publishing an environmental policy statement that seeks to protect and preserve the environment (see Appendix 1). In order to demonstrate the University's commitment to the environment, it has set up a formal management system which runs according to the principles of BS EN ISO14001.

The BS EN ISO14001:2004 accreditation was awarded to the University of Glamorgan in 2002. The accreditation is a specification for effective environmental management, which helps organisations minimise how their services and operations negatively affect the environment through objectives and targets.

After working towards it for several years, the University of Glamorgan became the first university in the UK to receive the accreditation. It was first awarded ISO 14001: 1996 in 2002 which was later upgraded in 2004 to BS EN ISO 14001:2004. The accreditation demonstrates the University's commitment to reducing its impact on the environment.

By completing a Local Climate Impacts Profile, the University is also demonstrating its commitment to the environment by addressing the impacts of climate change. The LCLIP will be a resource that the University can use to identify the effects of past extreme weather events. It will also provide an assessment of how the University copes during and after these events.

## 2.5 Current and Future Climate

The term "climate" refers to the average weather conditions in a region over a 30-year period. This includes temperature, wind and precipitation patterns<sup>1</sup>. In contrast "weather" relates to the short-term conditions of the atmosphere, which also include temperature, wind and precipitation patterns usually on a daily or weekly basis.

The main University campus is subject to a climate which is primarily controlled by its location. The altitude of the area encourages heavy rainfall with the highest rainfall occurring between October and January. In addition, typical wind strength tends to be higher within this region as wind speed intensifies on higher land where it aligns itself with the well-defined valley creating a wind tunnel effect.

The mean annual temperature in Wales varies from 9.5°C to 10.5°C with a 0.5°C decrease in temperature for every 100m increase in height. The high ground also

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<sup>1</sup> [www.ukcip.org.uk](http://www.ukcip.org.uk)- 2008

encourages snowfall events although these are less frequent on the Treforest and Glyntaff campuses. In addition, hill fog can be extensive in upper valley regions and can last for several days although it not a regular weather event for the University<sup>2</sup>.

The impacts of climate change are expected to change the British climate by creating milder, wetter winters and hotter, drier summers (see Figure 3). The UK Climate Impacts Programme (UKCIP) predicts that by 2080 under a low emission scenario, the Welsh climate will change in the following ways<sup>3</sup>:

- Greater warmth all year round by 1.1- 2.9°C (see Fig. 3)
- Less precipitation in summer by 7- 14% (see Fig. 4)
- More precipitation in winter by 7- 24% (see Fig. 5)
- Rise in sea level of 18 –79cm
- Higher mean wind speed by 1- 4%
- More drought years and severe gales by 10%
- More variability from year to year
- More frequent and intense storms

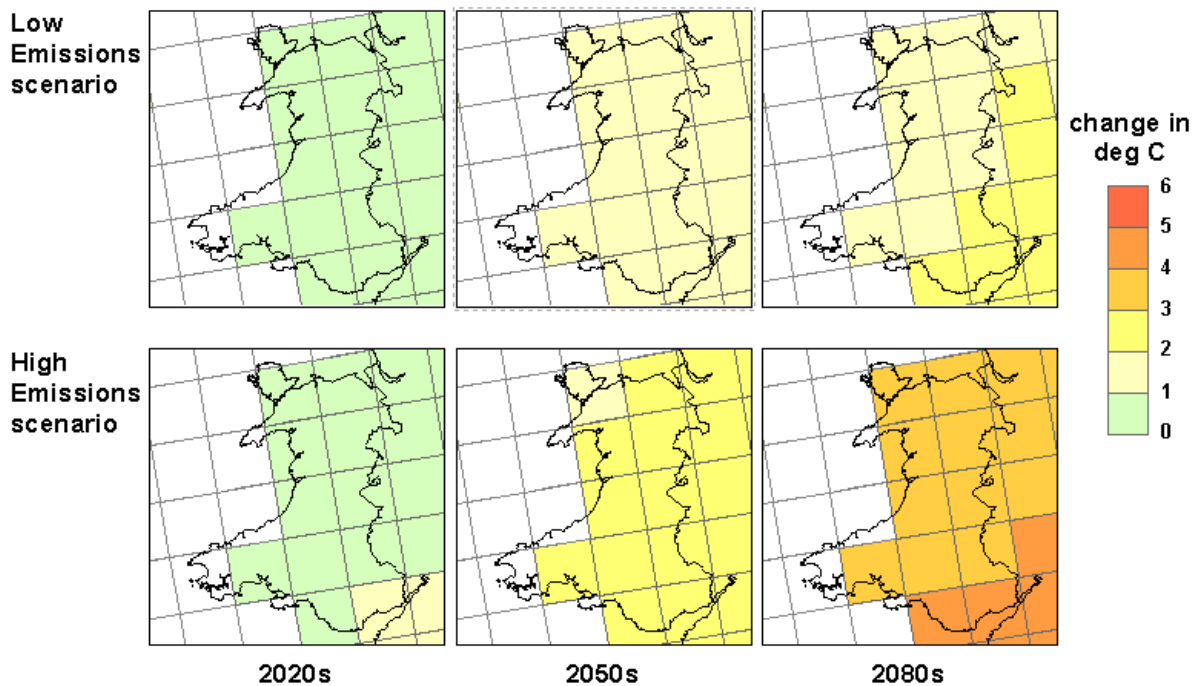


Figure 3. Predicted changes in annual daily temperature for Wales  
Source: UKCIP02 Climate Change Scenarios

<sup>2</sup> www.metoffice.gov.uk- 2008

<sup>3</sup> "Wales Changing Climate Challenging Choices- 2000"

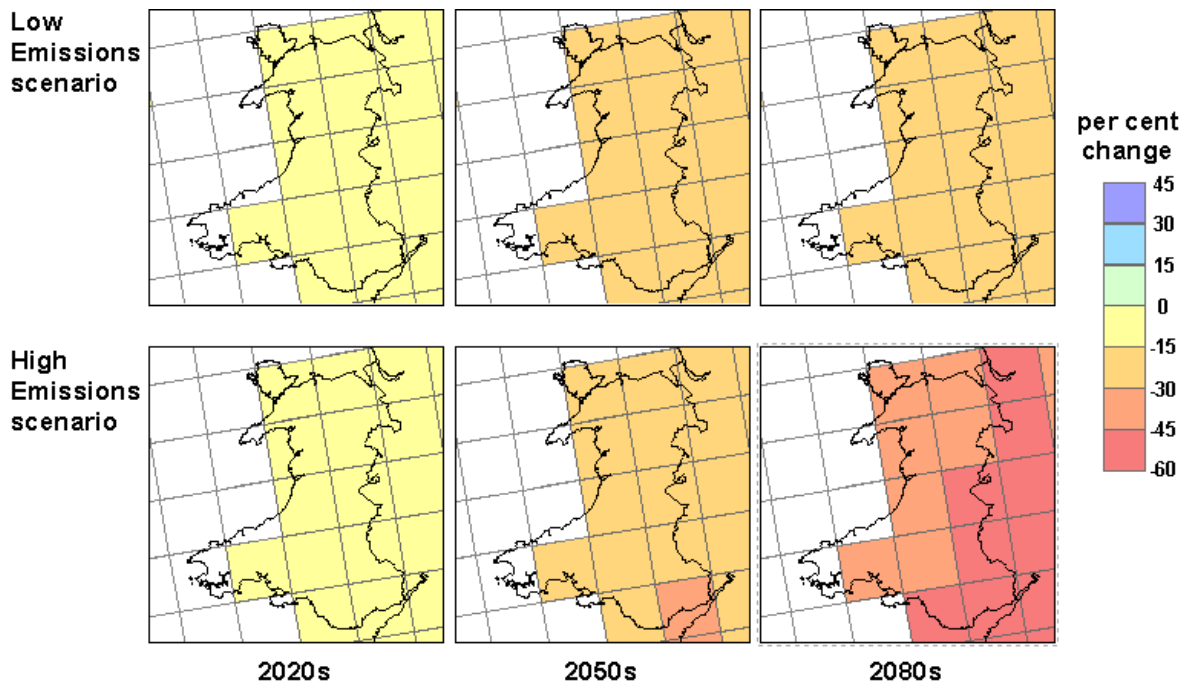


Figure 4. Percentage change in summer precipitation for Wales  
 Source: UKCIP02 Climate Change Scenarios

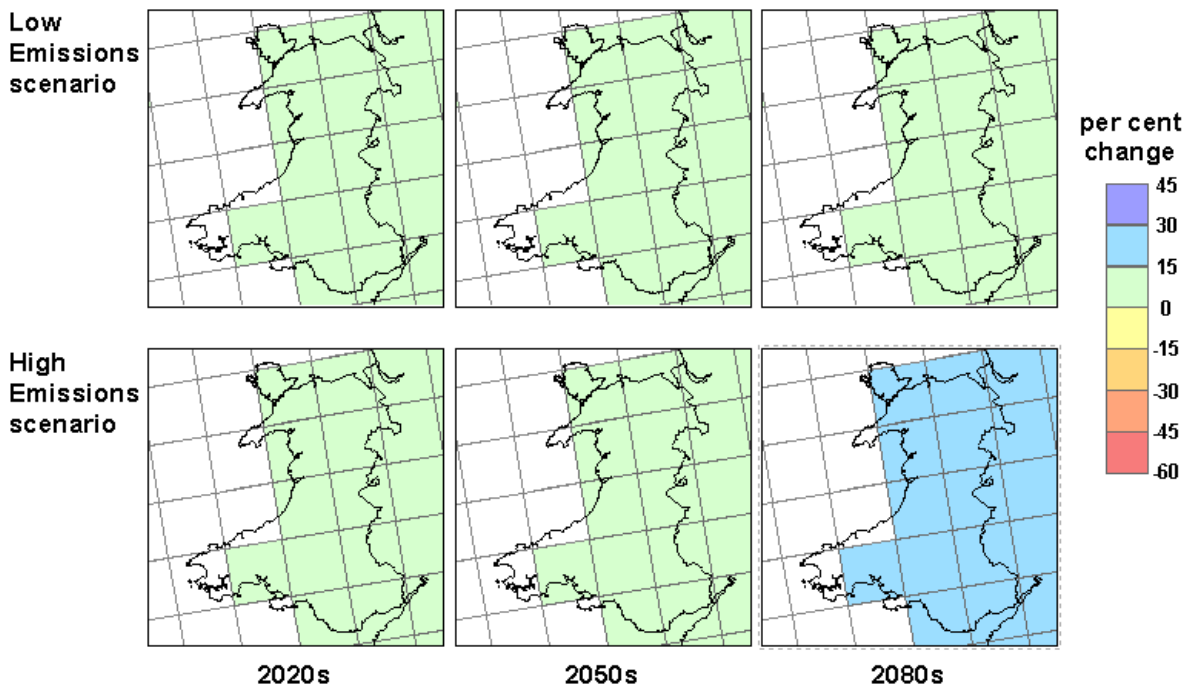


Figure 5. Percentage change in winter precipitation for Wales  
 Source: UKCIP02 Climate Change Scenarios

## 2.6 Extreme Weather Impacts

The most anticipated extreme weather event expected to affect the main University campus will be excessive rainfall and flooding. With wetter winters, it is likely that current drainage will fail to cope with additional water in the system increasing the frequency and scale of the flooding. The likelihood of flooding occurring will be higher than present. Other weather conditions such as high winds and ground subsidence will also become a challenge in addition to higher summer temperatures.



Figure 6. Flooding caused by heavy rain on the Treforest campus in September 2008.

## 2.7 Aims and Objectives

This LCLIP is intended to be a resource that will allow the University to better understand the impacts of a changing climate. It will provide a clearer understanding of the impacts surrounding extreme weather events on the University's various services thus allowing for greater adaptation to future events.

The aims of this LCLIP are as follows:

- To raise awareness of the influence of climate change and subsequent impacts related to extreme weather events
- To assess the costs and resource implications associated with extreme weather events
- To provide information to support climate change adaptation measures within the University

## **3 Method**

### **3.1 Data Sources**

In order to identify extreme weather events affecting the University, local media records such as newspapers and online resources were utilised (see Appendix 5). Some events were found using these sources, however due to their ambiguous nature it was essential to use University records such as insurance and financial data as well as maintenance logs. This was achieved by using a local Research Officer.

The initial survey was completed using Job Cards, a record of maintenance tasks undertaken by the Estates and Facilities maintenance staff. The information from Job Cards was compared with insurance and financial records. Further information was also obtained using Met Office data taken from the Cardiff Bute Park weather station. This information was used to find unusual trends in weather records that were later cross-referenced with University records.

### **3.2 Weather Types**

The main categories of extreme weather events are as follows:

1. High temperatures/ heat wave
2. Drought
3. Excessive rainfall/flooding
4. Fog/ mist/ low- cloud
5. High wind
6. Storm/ hurricane/ tornado
7. Frost/ ice/ snow
8. Low temperatures/ cold spell
9. Lightning strikes/ storms
10. Others

This list was used to classify the type of extreme weather events affecting the University whilst completing the data survey.

### **3.3 Interviews**

The research officer and a supporting member of staff from the Estates and Facilities department carried out interviews with staff whose services had been affected by the extreme weather events identified in the survey. The interviews were used to verify and identify any discrepancies in the database and to gain further information regarding costs, staff time and awareness.

### **3.4 Reporting**

The information gained from the data survey and interviews will be used to communicate through this report the significance of extreme weather events to the University of Glamorgan. It will be made available to the relevant departments as identified within the report.

## 4 Outputs and Outcomes

### 4.1 Evidence of weather related events

In total there have been seven extreme weather events affecting the University between 2003 and 2008 with excessive rainfall and flooding being the most common event (see Table 1). However, weather conditions such as high temperatures and high winds also have an impact on the University and with climate change expected to increase both temperatures and wind strength, it could become a more prominent weather event.

Table 1. The number of extreme weather events affecting the University of Glamorgan since 2003.

Extreme weather event	Number of events
Excessive rainfall/ flooding	5
Frost/ ice/ snow	1
Lightening strikes/ Thunder storms	1

The table shows that the frequency of frost, ice and snow events are lower than other extreme weather events. With the climate gradually warming, the likelihood of these events occurring will eventually decline.

## 4.2 University of Glamorgan service impacts

### 4.2.1 Excessive Rainfall/ Flooding

This is the most frequent extreme weather event to affect the University of Glamorgan with most events occurring in the summer. Since 2003, records taken from Tyn-y-Wern show that summer rainfall has significantly increased (see Appendix 2).

- **Treforest Campus-**

- ***Learning and Corporate Support Services- Flooding-*** During August 2004, the ground floor of the LRC flooded ruining carpets, computers and files (see Figure 7). The event occurred outside term time which minimised the impact of the event to the LRC service. However, if the event had occurred during the term, the impact to students and other LRC users would have been much higher.



Figure 7. Flooded offices in the LRC during the August 2004 flood.

- ***Campus Services- Hosting events-*** In August 2000, the Gallery restaurant was scheduled to have its roof replaced. The contractors started the work during the summer when weather conditions should have been favourable. However, high wind conditions combined with excessive rainfall lifted the tarpaulins, which were covering exposed sections of the roof allowing rainwater to soak through and flood the Gallery.

At the same time the Gallery flooded, the University was hosting a conference and was expected to provide catering for the attendees. With the Gallery flooded, the University was required to hire two catering tents for cooking and feeding the attendees.

The cost of the event was claimed back from the University's insurance company. However it was not settled until April 2002, when the University was awarded £108, 220. If the event had occurred during the term, the impact of the event would have had a high impact on students living in catered halls. The temporary loss of the catering facilities would have placed additional pressure on other food outlets on the campus.

- **Damage to equipment-** The flooding on 5 September 2008 caused rapid flooding of G block car park where the University's hydrogen workshop is located. Consequently, the flooding damaged equipment and tools that were located on the floor in the workshop.
- **Damage to infrastructure-** The road leading up to the University's main entrance, Forest Grove, was severely affected by the flooding in September 2008. A grit bin, tarmac and mud were washed down the hill in a fast moving current of water. The damage to the road made access into the University very difficult, which led to the side gates near Forest Hall being opened. During the same flood event, there was also damage to the road leading to the side gates at Forest Hall where a man-hole cover lifted taking out 15- 20m<sup>2</sup> of brickwork, which had to be re-laid.
- **Flooded walkways-** During the flooding in September 2008, the LRC avoided flooding whereas the walkways outside the building were severely affected due to the ponds overflowing. The stage area by G block also flooded which had never occurred before. This prevented access to the LRC and the wheelchair lift (see Figure 8).



Figure 8. Flooded walkways outside the LRC in September 2008.

- **Tyn-y-Wern –**

- **Cancellation of matches-** The playing fields are highly sensitive to the weather, especially heavy rain. If pitches flood, some high profile bookings may be transferred to the artificial pitches resulting in the cancellation of other bookings. Some teams may decide to continue to play despite the pitch's condition, which affects the quality of the pitch and its subsequent recovery time.
- **Loss of income-** Records show that on average, 70 matches are cancelled per year with a value of £80.50 per match. This equates to an annual loss of £5635.00 with the total loss of income since 2003 equalling £33, 810.00.
- **Fertiliser application-** The fertilisers at Tyn-y-Wern are applied once a year, however during periods of heavy rainfall, the fertiliser will be leached through the ground by percolation requiring reapplication.
- **Marking lines-** These are applied to the pitches every 14 months however due to heavy rainfall and usage, they need to be reapplied every 9 months.
- **Waterlogged pitches-** The soil becomes spongy and waterlogged after heavy rainfall (see Figure 9). Playing on the pitches during these conditions pushes the air out of the soil, closing the interstitial pores and reducing the level of percolation. As a result, the pitch will need additional time to recover, and if this is not possible, the pitch will wear down at a faster rate requiring more maintenance.



Figure 9. A waterlogged pitch at Tyn-y-Wern caused by heavy rainfall in December 2006.

- **Grass cuttings-** Due to the increased rainfall seen in recent years, the number of grass cuttings undertaken by the grounds men have increased each year. The mowers run on diesel fuel, thus more pressure is placed on the diesel budget and staff time.
- **Grass seed-** In order to assist the recovery of pitches, grass seeds are sowed in to the ground to replenish the existing turf. However, during heavy rainfall, the ground moves under the weight of the water which disrupts the seeding. Consequently the grass seeds have to be reseeded when the weather improves which has a negative impact on staff time.
- **Damping off-** Heavy rainfall during the summer can affect the grass by causing “damping off”. It is a condition brought on when the soil is warm causing fungi to develop. The fungi attack the stem of the plant which subsequently thins and rots. This tends to happen during wet summers when the air in the ground is poorly circulated. When damping off occurs, it destroys the quality of the turf. With high profile teams using the playing fields at Tyn-y-Wern, it is important that the pitch is in optimum condition otherwise it may affect the reputation of the University.
- **Interruption to scheduled works-** When excessive rainfall causes the pitches to become waterlogged, scheduled maintenance duties may have to be deferred. The image in Figure 10 illustrates a pitch at Tyn-y-Wern with its turf removed showing severe water-logging. A concrete base was intended to be put into the ground, however due to the state of the ground; the works were delayed until ground conditions were suitable.



Figure 10. Waterlogged ground at Tyn-y-Wern preventing maintenance work being carried out.

- **Glyntaff Campus-**

- **Reputation-** During the September 2008 flooding, the Glyntaff campus was not affected by the excessive rainfall that caused parts of the Treforest campus to flood. However, Cemetery Road which leads up to the campus was heavily flooded due to a blocked drain and high amounts of runoff coming down the mountain side. Previously, the University had undertaken road works on Cemetery Road as part of its redevelopment of the campus. The residents of Cemetery Road blamed the University for causing the flooding, which was picked up by the local media (see Appendix 3). However, the University had actually installed new drainage that had become blocked from the debris being brought down the mountain, subsequently causing the road to flood.

- **William Price Business Park-**

- **Damage to buildings-** Prospect House located on the William Price Business Park (see Appendix 4) has been subject to frequent flooding. The building sits within a dip in the road with a drain located in front, thus when the drain overflows, the water naturally pools in the road. The Chiropractic Clinic which is also situated on the William Price Business Park has also been subject to flooding (see Figure 11).



Figure 11. The Welsh Institute of Chiropractic located on the William Price Business Park.

In August 2004, the Chiropractic Clinic flooded after a period of intense rainfall. The two drains located on the roof became blocked with leaves and other debris causing water to back up in the down pipes and run over the flashing.

Subsequently, many treatment rooms suffered electrical damage that needed to be replaced and PAT tested. Several carpets were soaked through and needed to

be dried out with dehumidifiers. There was also flooding in the Students room on the back wall which had to be rectified as mould started to develop. The cost of the event was claimed back from the University's insurance company which came to a total of £105, 371.

- **Damage to equipment-** In September 2008, after weeks of unseasonal heavy rainfall and a day of intense heavy rainfall, Prospect House flooded due to the external drains overflowing in the road. A total of £26,000 of equipment was damaged which included equipment such as prosthetics. Additionally there was £2000 of damage to carpeting which had to be professionally restored by a specialist cleaning company.
  
- **Timetable-** On 28 September 2005, heavy rain caused damage to Prospect House due to the outside drain overflowing causing water to flood the ground floor. An insurance payout for £7532 was awarded to the University to cover the damage to the carpets and the cost of redecorating the ground floor. However, the flooding set back the student timetable by one week whilst the building was restored. This placed additional stress on the teaching staff who were required to make up for the lost time.
  
- **Clinic Closure-** The flooding in August 2004 closed the Chiropractic clinic for two weeks whilst it was being restored. The clinic was also forced to close during the 5 September 2008 flooding as the road became inaccessible due to the height of the flood water. However, the clinic was only closed for one afternoon which had a minimal impact on lost income.
  
- **Reputation-** When the Chiropractic clinic closes it is expected that it would have a negative impact on the clinic's reputation. However, the clinic staff will contact patients immediately to inform them that their treatment has been cancelled. The majority of patients understand and thus impact to the clinic's reputation is minimal.
  
- **Psychological effects-** The occurrence of flooding has a psychological impact on staff who worry over getting the facilities ready for Chiropractic students. There are also concerns regarding hygiene and the waste water with some students worrying about possible allergies.

## 4.2.2 High Temperatures/ Heat Wave

- **Treforest Campus-**

- **Security and fire hazards-** If temperatures are too high, some staff open windows and leave them open, which presents a security risk to the University. There have also been cases where fire doors are propped open to increase air ventilation producing a potential fire hazard.



Figure 12. A hot day on the Treforest campus.

- **External cladding-** Several academic buildings including G, J and H block are noticeably warmer during periods of high temperatures. This is due to the external cladding providing insulation to the building that restricts air ventilation. These blocks also contain hundreds of computers which also increase the internal temperature.
- **Reputation-** During the summer, the University hosts summer schools and conferences, which are paid for by the attendees. As a result, the attendees have higher expectations from the University and are more likely to complain if temperatures in lecture halls or class rooms are too high.

- **Tyn-y-Wern -**

- **Ground moisture-** If summer temperatures are too high, the ground dries out stopping the turf growing. Additionally, new turf being laid down will not grow. This can be rectified by irrigating the pitches, however irrigation requires extra staff time and also increases the amount of time the pitch is out of use, which during warm summers can be a problem as demand for pitches is higher.
- **High demand-** High temperatures often experienced in the summer produce a higher demand for pitches resulting in less recovery time for the pitch. If the pitches are overplayed, there is more maintenance required and the pitches are worn down more quickly.
- **Subsidence-** During the summer, the ground tends to shrink causing it to subside. This affects the quality of the pitch and the amount of time needed for recovery.

- **William Price Business Park- Chiropractic Clinic**

- **Hygiene-** High temperatures or heat waves can become a hygiene concern as it causes patients and students to perspire which increases the risk of spreading infection. The Chiropractic Clinic was built in 2000 without air conditioning therefore fans and air conditioning units are used to reduce the temperature within the treatment rooms. In one particular treatment room, the temperature often exceeds 30°C as there is no window or natural ventilation.

In order to reduce the temperature inside the clinic, reflective glazing has been added to some windows which has already shown to be effective in reducing room temperatures. However, in recent years, summer temperatures have been lower than normal which has been beneficial to the clinic.

- **Complaints-** There have been no official complaints from patients regarding the temperature in the clinic although some patients have made comments.

### 4.2.3 Lightening Strikes/ Storms

- **Treforest Campus/Glyntaff Campus-**

- **Failure of electrical systems-** On 19 April 2005, a lightening storm over the area struck several buildings on both the Treforest and Glyntaff campus. Some of the strikes were picked up by lightening conductors which are fitted to most buildings on the campus. The conductors saved the roofs from being damaged; however an electrical current travelled through the guttering, down the steel frames which make up the buildings, around window frames and into door frames where it melted the intruder alarms.

The lightening strikes burnt out several electrical systems including the CCTV, fire alarm system and security alarms. Various halls of residence, academic buildings and administrative buildings were affected by the strikes.

- **Compromised security-** Due to the failure of the security systems, Q Park increased their evening patrols to prevent theft from vulnerable buildings. The overall cost of the event cost was claimed back from the University's insurance company which came to a total of £37,870.

### 4.2.4 High Winds

There have been no major high wind events, however when they do occur on a smaller scale, they can have an impact on the services at Tyn-y Wern.

- **Tyn-y-Wern-**

- **Application of weed killer-** If winds are over 4mph, weed killer can not be applied to the pitches as it is picked up by the wind. This may lead to deferment of staff duties until the wind dies down.
- **Drying out pitches-** When pitches are damp, high winds have proven useful in drying out the pitches. With climate change expected to increase winter rainfall, the increase in wind strength will be beneficial in drying out the pitches and increasing recovery time.

## 4.2.5 Frost/ Ice/ Snow

Weather records show that these events are becoming less regular which has a positive impact on resources, costs and reputation.

- **Treforest Campus/ Glyntaff Campus-**

- **Cancellation of lectures-** In early February 2007, the University was forced to close due to heavy snowfall (see Figure 13). The University did not phase its closure which resulted in a bottleneck of cars by Forest Hall where the side gates had been opened. Many staff and students were unable to exit the University as the main road was gridlocked.



Figure 13. Heavy snowfall on the Treforest Campus in February 2007.

- **Gritting-** When snow or ice has been forecasted, maintenance staff both at Treforest and Glyntaff will be sent out early in the morning to grit the campuses. According to the University's Snow and Ice Policy, the University will do all it can to ensure that the University can remain open and function as normal during the extreme weather conditions. However, the policy states that the first priorities for gritting are the pavements and walk ways to Halls of Residence.
- **Tyn-y-Wern-**

**Frozen pitches-** During icy or frosty conditions, the top layer of the ground often becomes soggy, which results in frost lift. Nevertheless, no games will be played if

the pitch is deemed to be too icy or frosty as the grass will snap under the weight of the players. This leaves black patches on the turf which takes longer to recover.

- **Cancellation of games-** When frost conditions disrupt matches, high profile teams will expect to play on the artificial pitches resulting in cancellation of matches that had already been pre-booked.

- **William Price Business Park-**

- **Accessibility for patients- Chiropractic Clinic-** If conditions are unfavourable, some patients, especially those who are elderly, will have trouble accessing the clinic. However, the clinic will not close as the majority of patients will be able to access the clinic.
- **Gritting-** Kier Management will grit the area so that it is safe for patients, staff and students.

## **5 Conclusion**

### **5.1 Concluding Statement**

From completing the LCLIP, it is evident that the availability of information regarding extreme weather events varies according to each department or service. The LCLIP process identified that the level of awareness varies according to the service manager. Some service managers had a clear understanding of how extreme weather events affect their service. However, it is apparent that there is some misunderstanding regarding the difference between extreme weather and climate change.

With regards to adaptation, the LCLIP found that some services have already made small changes to their service in response to past extreme weather events. The Chiropractic Clinic has ensured that equipment within Prospect House is elevated off the ground so that if the building floods again, the impact will not be as high as past events. By observing and making small changes to current practices, services within the University can adapt to extreme weather events without making costly changes.

The report has also found that there is no definitive record of extreme weather events within departmental records. The most detailed information is found in insurance records, however, these only account for events where an insurance claim was submitted. The LCLIP has highlighted the need for a database that could be used to record vital information regarding extreme weather events.

The LCLIP process found that snow and ice events have the least financial impact on the University as they are less frequent whereas excessive rainfall and flood events have the greatest impact due to the drainage and topography of the area. They are also responsible for the majority of insurance claims relating to extreme weather events.

The report identified several hot spots that frequently flood on the Treforest campus such as Prospect House, which raises concern over the increasing frequency of future extreme weather events. During the flooding in September 2008 several more hot spots were recognised. Nevertheless, the scale of the flooding in September 2008 was unprecedented. The approach to the flooding was seen as more reactive than proactive, however, the departments affected by the flooding felt that they coped well considering the scale and extent of the flood. The event also highlighted the lack of an emergency plan for flooding events of this magnitude, which is due to that fact that it has never occurred before on such a scale. Thus it is recommended that the event be used as an opportunity to prepare an Emergency Plan for future flooding events.

With climate change set to increase the severity and frequency of extreme weather events, it is necessary to identify ways in which the University can implement proactive measures. Training and awareness is also vital as well as recognising the impact of

climate change on extreme weather events. There are potential difficulties in adaptation as the majority of the University's estate outside Treforest is managed by an external management company, Kier Management. Therefore it is essential that the University works closely with Kier in order to maintain a consistent approach across all services and campuses.

The impacts of future extreme weather events will depend upon the University's commitment to awareness and adaptation. By identifying and making small changes now, the University can prepare for the anticipated effects of extreme weather. The LCLIP has made several key recommendations which are set out in section 5.2

## 5.2 Proposed actions arising from the LCLIP

- **Set up an extreme weather database-** It was noted that record keeping across the University varies according to each department or service. The report found that some information is not recorded by various departments thus when staff leave the employment of the University, the information is lost. This could be rectified by setting up a database to document extreme weather events that affect the various campuses belonging to the University of Glamorgan. It could also be used as a tool for monitoring and improving service delivery during and after these events.

Vital information such as the date and duration of incidents and the services involved could form part of the database. This information would be provided by relevant departments. However, initially this may be limited to the Treforest campus as both Glyntaff and the William Price Business Park are managed by Kier. The Tyn-y-Wern playing fields are also set to become part of the Kier Management portfolio.

- **Implement an Emergency Procedure for flooding-** The flooding in September 2008 was an unprecedented event for the University. As a result, the flooding highlighted several flooding hot spots, which could be utilised in producing an Emergency Plan for future flood events. Therefore it is recommended that the flood event in September 2008 be used as a tool to produce an Emergency Protocol for the occurrence of future plans.
- **Consider whether it is economically and environmentally feasible to install air conditioning in the Chiropractic Clinic-** With climate change set to increase summer temperatures, it will be necessary to maintain low temperatures within the clinic for hygienic reasons, thus preventing future complaints from patients and minimising the risk of infections.
- **Improve the recording of staff time-** This will provide an indication of the financial impact of the event on human resources during and after extreme weather events.

- **Record weather related jobs on Job Cards-** When writing up Job Cards for maintenance staff, it would be useful if the helpdesk include whether the job has been caused by extreme weather conditions. This would provide a comprehensive record of maintenance duties caused by extreme weather events that could be used as a tool for post-event analysis.
- **Provide staff training relating to extreme weather events-** This would include the present and future impacts of severe weather events in relation to climate change. The relevant staff to be trained would be those who are most affected by extreme weather events including department managers and maintenance staff.
- **Repeat the LCLIP exercise in five years-** This will be useful in identifying new trends and thresholds in extreme weather events.
- **Investigate land drainage including culverts on the Treforest and Glyntaff campuses-** With flooding expected to have the most impact on the University, it is essential that the current drainage system is investigated to determine whether it is capable of dealing with increased discharge on a more frequent basis. This project could be undertaken by a student as a research project in conjunction with Science Shops Wales.

## Appendix 1

**University of Glamorgan**

**ENVIRONMENTAL POLICY STATEMENT**

Environmental responsibility means first that our actions should comply with the relevant environmental legislation. It also means that we should seek to behave in a way that protects or preserves the environment.

Although it is the Board of Governors of the University of Glamorgan which has the ultimate responsibility for the environmental performance of the University, we all have to share this responsibility.

In order to demonstrate the University's commitment to the environment, it has set up a formal environmental management system according to the principles set out in BS EN ISO 14001:1996 "Environmental Management Systems".

An Environmental Handbook has been produced so that everyone may know how they should contribute to the care of the environment. It is issued with the authority of the Vice Chancellor, who is accountable to the Board of Governors for the University's performance and behaviour.


The Handbook describes our statutory obligations including the prevention of pollution, the people who have been nominated as environmental representatives, and the procedures which we have adopted to ensure that we not only comply with legislation, but that we are also environmentally aware and take the necessary action to improve our environmental performance.

This Policy Statement is supplemented by other specific policy statements relating to particular environmental aspects, e.g. energy conservation, traffic. These supplementary statements can be found in the Handbook.

To ensure that this environmental policy is kept up to date, we have instituted an annual environmental audit. The audit has three objectives:

- To ensure that we react properly as the law changes.
- To update the Handbook accordingly.
- To check that we are complying with the procedures that have been adopted.

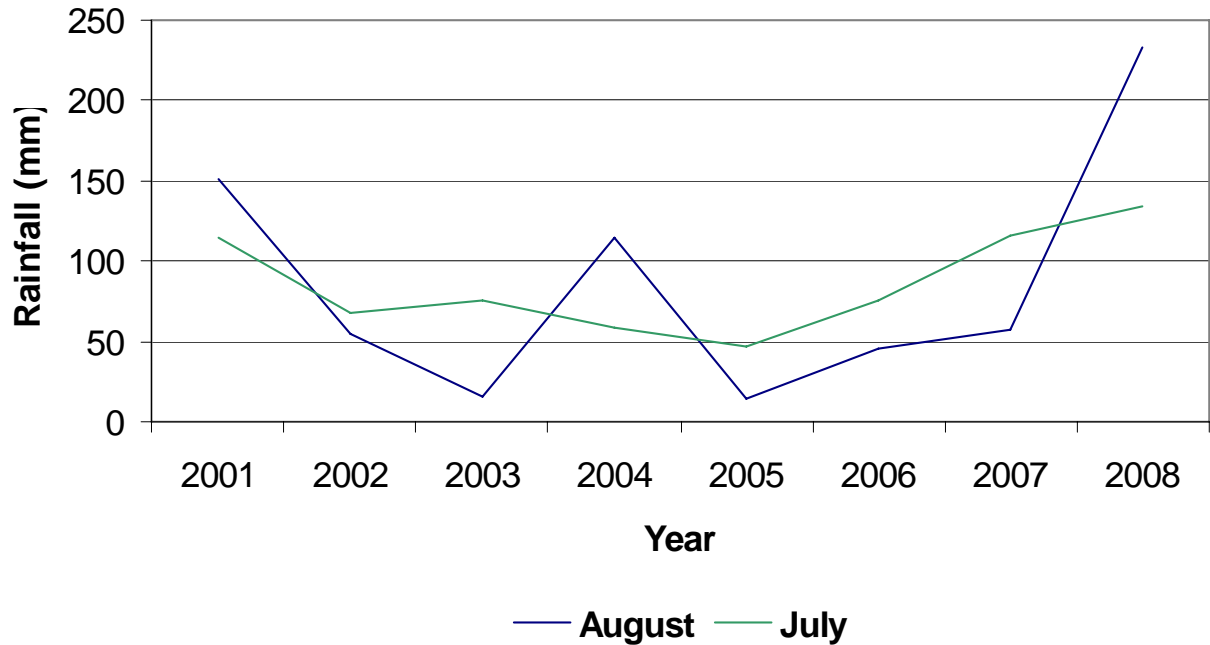
The Governors encourage everyone, staff and students, to act in a way which will enhance rather than harm the environment, and will gladly receive any practical suggestions about ways in which our performance can be improved.

Vice Chancellor  Date 14 / February / 05

The University of Glamorgan's Environmental Policy Statement.

## Appendix 2

Graph to show the amount of summer rainfall between 2001 and 2008



The above graph shows the amount of summer rainfall measured at Tyn-y-Wern from 2001- 2008. The graph shows that during August summer rainfall has significantly increased especially in 2007 when a severe rainfall affected the area. The trend line for July shows that there has been a steady increase in summer rainfall from 2005 onwards.

## Appendix 3

Pontypridd Observer- 11 September 2008

# Dad's worries over expectant partner



● **DEEP:** Cemetery Road residents say flooding has become worse after roadwork were carried out by the University of Glamorgan

A GLYNTAFF man living in a street plagued by floods fears that he won't be able to get his pregnant partner to hospital if his street floods when she gives birth.

Richard Slocombe and his partner Amy Riseborough, of Cemetery Road, are expecting their first child in a month.

But after seeing his street flood with up to two feet of water on Thursday, September 4, Mr Slocombe wants immediate action taken to ensure that it doesn't happen again.

"It was like there was a river running through the street this morning," he said.

"I'm concerned because Amy has only got four weeks to go, but if it floods like this again I won't be able to get out to take her to the hospital and no one will be able to get in."

Neighbour Stacey Yeo, who has lived on the street for 24 years, says flooding has been a problem for as long as she can remember.

The 44-year-old said: "My son was late for school today because he couldn't get out."

"It happens two or three times a year – every time we have this bad weather.

"When cars were driving through here it was creating a tidal wave. We believe that Rhondda Cynon Taf Council and the University of Glamorgan has spent up to £1m on road works, which involved widening the road and drainage work.

"But it's still the same, nothing

has been solved, so now we are back in the same boat."

Rosina Gardiner, an 83-year-old grandmother who has lived on the street for 54 years, added: "We were told that a new culvert was put in.

"People in the street are fed up because when it floods they cannot get out."

Her next-door neighbour Dafydd Burns is also concerned.

"I blame the university for making the road higher and wider to make way for a 770-space car park for their law department," he said.

"Residents are afraid because we get floods five or six times a year anyway and with all this bad weather the people living in first four or five houses on the street won't be able to get out."

Residents believe that the flooding is caused by a broken culvert in the Old School Lane where the old College Morgannwg art college used to be.

A University of Glamorgan spokeswoman denied that the university is to blame for the exacerbated flooding problems.

She said: "We understand that the flooding in Cemetery Road was caused by the severe rainfall bringing debris down from the surrounding areas in Glyntaff.

"The flooding was not as a direct result of the roadworks in Cemetery Road which the University is undertaking as a requirement of the ongoing development of its facilities at Glyntaff."

## Appendix 4



The red box shows the location of the William Price Business Park on the Treforest campus (*Prospect House is located on the far left of the box and the Chiropractic Clinic is located on the far right*).

## ***Appendix 5***

### **Media Sources-**

Pontypridd & Llantrisant Observer

### **Online Media Sources-**

BBC News Online- [www.bbc.co.uk/news](http://www.bbc.co.uk/news)

### **Other-**

University of Glamorgan Snow and Ice Policy

Insurance Records

Environment Agency

LCLIP of Aylesbury Vale

Met Office

Science Shop Wales

UKCIP- UK Climate Impacts Programme

## ***Appendix 6***

Electronic copy of the LCLIP database.