

REPORT 2

USE OF WASTE IN CONSTRUCTION AT HERBERT ROAD, NEWPORT

Environmental Risk Assessment

Report Number 1472r2v1d0515

Commissioned by
Riversee Limited
Bridge House
Esperanto Way
Newport
NP19 0RD

Prepared by
Geotechnology Limited
Ty Coed
Cefn-yr-Allt
Aberdulais
Neath
SA10 8HE

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1 INTRODUCTION

1.1 Background

Riversee Limited (Riversee), formerly Greenhill Construction Limited (Greenhill), is developing land off Herbert Road in Newport (see Figure 1). The development will comprise flats and houses on a site measuring approximately 4.5 ha (see Figure 2). As part of the construction development, site levels need to be raised by up to 2m as the site is on the floodplain of the river Usk. In order to raise the site to desired levels, an estimated 9500m³ of material is to be imported. On top of the engineering fill, 600mm of clean capping material made up of subsoil and topsoil will be placed. Newport County Council has confirmed that the works are required and has issued a licence detailing the Permitted Works. A copy of the Licence is provided in Appendix 1 alongside a planning application for the development.

As part of these works, Riversee proposes using suitable waste from other development sites rather than primary aggregates from quarry sources. On this basis, Riversee wishes to secure a Permit to enable waste to be used as part of the construction of the development. Application details are summarised in Table 1-1.

Table 1-1 Application Details

Name of the Applicant	Riversee Limited
Activity Address	Land off Herbert Rd, Newport. NP19 7BH
Activity Description	Use of Waste in Construction
National Grid Reference	331690 189280

1.2 Objective

The objective of this Environmental Risk Assessment (ERA) is to establish the impact, if any, the proposed use of waste may have on the environment, human health or amenity issues of concern.

A full H1 assessment is not required as the application is for a Tier 2 bespoke Permit, based on Standard Rules *SR2010 No8 Use of Waste in construction*, but the location requires assessment due to the proximity to the River Usk. On this basis, this assessment adopts the philosophy that underpins the H1 Environmental Risk Assessment approach set out by NRW and the generic risk assessments which accompany each Standard rules permit.

2 SITE CONDITION

The site has previously been investigated for Greenhill by Terra Firma. As part of these investigations the site history and setting has been evaluated. Intrusive site investigation was also undertaken. Much of the summary information presented in this section is taken directly from these earlier reports (see Terra Firma Geotechnical and Geo-Environmental Report, Proposed Residential Development, Land Off Herbert Road, Newport, March 2013, Job No. 12032). As part of the study, Terra firma consulted the Environment Agency online 'What's in Your Back Yard' database and also purchased records from the Landmark Information Group.

2.1 Site Location

The site is located off Herbert Road, Newport at National Grid Reference 331690 189280. The site is irregular in shape and covers a total area of 4.52 hectares. The site is currently unused with dense vegetation covering the centre and much of the south of the site. A cycle track passes from north to south along the west of the site. The north of the site is undulating and covered by short grass. The southeast corner of the site is covered by rough hardstanding.

A drainage channel/reen passes from east to west at the north of the site, draining into the adjacent River Usk to the west. A railway line runs along the eastern site boundary, a school is located to the north and commercial land to the south. Hedgerows line the north, southwest and southeast boundaries of the site. Beyond the hedgerow to the southeast is a housing estate on Cefn Coed, the A40 is located to the southwest and another open area is located to the north. The site and general surrounding area is flat, low lying but undulating.

2.2 Site History

Historical maps of the site were obtained by Terra Firma and are included in their report. From this information, the following site history was noted:

2.2.2 1883

The site is an open field. A railway line is located to the immediate east of the site. A brick works is located approximately 115 metres south of the site and housing located within 320 metres southeast of the site boundary. A rifle range is located on the opposite side of the River Usk, approximately 160 metres west of the site. Two reens/drains orientated east-west cross the northern and central parts of the site.

2.2.2 1901-02 (1:2,500)

The site shows little change, although changes have occurred in the surrounding area. The brick works to the south has a new building and houses have been built upon some of the land. Residential development to the east has become more dense. An excavation is located approximately 90 metres south of the site. The excavation may be associated with the adjacent brick works. The rifle range no longer appears to be in existence.

2.2.3 1920 (Scale 1:2,500)

No change to the site has been made since the previous edition, apart from a small rectangular building located at the far south of the site, on the present day cycle/walk path. Three saw mills are located along the western side of the railway, the closest of which is 80 metres east of the site. More houses have been built at the former brick works and to the east of the site. Allotment gardens are located to the south of the site.

2.2.4 1936-37 (Scale 1:2,500)

The 1936-37 editions again show that no change to the site has been made apart from a series of small buildings located on the present day cycle track. The number of buildings at the saw mills to the south/east of the site has increased.

2.2.5 1955-57 (Scale 1:1,250)

The 1955-57 editions record a clothing factory at the south of the main portion of the site and at the top of Herbert Road. The drainage channel at the middle of the site has been removed/culverted. Houses have been built on some of the allotment gardens to the south of the site and the small building located upon the present day cycle/walk path have been replaced by two small buildings. Further residential development of the surrounding area has occurred.

2.2.6 1966-70 (Scale 1:2,500)

No change to the site has been made since the previous edition, apart from the construction of a rectangular building at the northeast of the site. To the south of the site, the land has become increasingly industrialised with engineering works, paint works and a light engineering works amongst the units. To the immediate north of the site is a sports stadium.

2.2.7 1993 (Scale 1:2,500)

The factory at the south of the site has been removed. Two tanks are located at the southeast of the site and the far north of the site is known as St Julian's Glebelands Recreation Ground. A new building has also been built at the northeast of the site. Some alteration has been made to the industrial units to the south of the site.

2.2.8 2012 (Scale 1:10,000)

No buildings are currently located on the site. A primary school has replaced the sports stadium to the immediate north of the site and many of the buildings to the south of the site have been removed.

2.3 Geology

The 1:50,000 scale geological map of the area (Sheet 249) shows the site to be underlain by the St Maughn's Formation of the Devonian Period. These rocks are interbedded argillaceous rocks with subordinate sandstone. The solid geology is shown to be overlain by marine and estuarine alluvium.

Made ground of variable thickness is expected to overlie the site.

2.4 Hydrology & Hydrogeology

Surface runoff is likely to naturally drain into the soil underlying the site and a channel/reen crossing the site which flows towards the River Usk. Shallow groundwater is also likely to flow towards the river.

Groundwater flow through the bedrock is likely to be heavily influenced by fractures within the rock, topography and bedding planes. The Environment Agency website illustrates the bedrock beneath the site to be a Secondary A aquifer. These aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. The superficial material overlying the east of the site has also been classified as a Secondary A aquifer. The west portion of the site, along the bank of the River Usk, is not classified as it is considered unproductive strata. The site is not located within a groundwater protection zone.

The Environment Agency database confirms that the site is at risk from flooding from rivers, sea and reservoirs.

2.5 Radon

A British Geological Survey Radon Report obtained for the site confirms that basic radon protection is required for any new development.

2.6 Environmental Records

2.6.1 Industrial Operator Scores

There are no sites within a 1km radius of the site where pollution is regulated.

2.6.2 Industrial Pollution

There are no industrial pollution scores within a 1km radius of the site where pollution is regulated.

2.6.3 Pollution Incidents

There is one pollution incident within close proximity of the site. The incident took place in February 2004, approximately 250 metres south of the site. The incident caused a significant impact to land and involved 'specific waste materials'.

2.6.4 Landfill

Two historical landfill facilities are located within influencing distance of the site; one of which encroaches into the far north of the site.

Glebelands South is located at the far north of the site and beneath the school and playing fields to the north. The Environment Agency does not have any information in relation to the material disposed of, or the date that the facility was active.

Shaftsbury Park historic landfill is located approximately 120 metres west of the site. No information is provided regarding the date at which this landfill was active. Shaftsbury Park received industrial and household waste.

2.7 Site Investigation

Made ground and groundwater at the site was found to contain a number of substances above thresholds. Elevated concentrations of ground gas (methane and carbon dioxide) were also detected.

During the investigation three in-situ soakaway tests were undertaken. Two of the soakaways tests recorded no infiltration and one indicated a water permeability of 8.86×10^{-5} m/s.

Based on these findings, a Conceptual Site Model for the Site was developed and also a Remedial Strategy, which has been accepted by NCC and NRW.

3 PROPOSED USE OF WASTE

Based on the site investigative works and Flood Consequence Assessment ground levels need to be raised by 2m above flood plain. The raising of levels would also reduce the likelihood of future site users coming into contact with current ground conditions. As part of the development, protection against ground gas and vapours is to be installed as well as new water supply pipes. The proposed layout and cross-sections of the site are provided in Appendix 3.

3.1 Technical Competence

Riversee recognises that to operate under a Permit, trained and competent staff are required. On this basis, Riversee has appointed Mr Garry Curtin, who holds an Environmental Permitting Operators Certificate (EPOC), as the Technically Competent Person (TCP). The TCP will coordinate compliance with the Permit and implementation of the management system.

3.2 Waste to be Used

The use of waste is as fill to provide higher ground levels and for the establishment of the correct profiles and falls. A wide range of classes of material can perform these functions and therefore prior to the importation of any materials to the site, they shall be classified in accordance with the Specification for Highway Works (SHW).

The class of each material shall be determined by laboratory testing on a sample prior to source approval. The class of material shall be appropriate for the purpose to which it is to be used. Following source approval, materials being delivered to site will be monitored to confirm the classification of the material.

Unfit materials will include any materials having a U classification, as defined by SHW, as well as any materials not conforming to the requirements of the particular class under SHW. Riversee plans on using just soil and stone but other naturally occurring geological materials or robust anthropogenic construction materials, particularly listed inert wastes, including tiles, ceramics, concrete and brick could be used. The materials shall be free of unacceptable chemical contamination and invasive weeds. The proportion of “contraries”, which is the collective term for undesirable foreign matter such as the wood, plastic and metal shall be 1% of the total mass.

Where chemical contamination is suspected, the material will be tested in accordance with the requirements of the Remedial Strategy. The materials to be used will need to be durable, compactable and non-biodegradable as they will principally be providing a stable platform for construction and flood protection. Materials to be considered for use will primarily be sourced from other Riversee developments and will comprise soil and stone. To demonstrate that the materials are suitable for use and do not pose either a risk to human health or controlled waters, the history of each source will be investigated and a minimum testing regime developed by Terra Firma will be carried out. Full details are provided in the Remedial Strategy. Only materials with acceptable low contaminant concentrations will be used.

To ensure the River Usk is protected, the testing schedule includes single stage leachate analysis using test BS:EN:12457 (often referred to as the WAC test) at 2:1 (liquid/solid) for selected substances.

As the Permit allows a wide range of other wastes to be used, the testing regime will also be applied where there is suspicion of contamination. In some cases, however, where the waste is listed as an inert waste and known to be free from contamination based on a review of its source, testing may not be undertaken e.g. clean concrete, certified topsoil.

4 ASSESSMENT OF RISKS

4.1 Risk Matrices

The scope of the Permit sought and the control measures that will be implemented will limit the potential risks posed to the environment. These operational control measures and aspects are listed below:

- Waste will only be used that has low total element and leaching potential and/or is inert.
- Only wastes listed in the Permit and which meet the Specification will be used.
- Activity will be overseen by a Technically Competent Person with the backing of the company structure.
- Waste will not be burned, either in the open, inside buildings or in any form of incinerator.
- No point source emissions of water will be allowed.
- No dusts, hazardous waste or asbestos will be accepted.
- the only discharges to controlled waters are surface water from the roofs of buildings and from areas of the site not used for the storage of wastes.
- where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.
- The activities shall not extend beyond the Permit boundary.
- All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container shall be used.
- Preventative maintenance programme will be in place for all plant and infrastructure.

Implementation of the operational control measures will significantly reduce the risk to the environment by preventing potential exposure pathways developing.

Within this context, the risk assessments presented in Table 4-1 to Table 4-6 indicate that the proposed operations will not significantly adversely impact the environment, provided the operational control measures are successfully implemented. To minimise the opportunity of these measures not being fully implemented, the activity will be undertaken in accordance with a documented management system which specifically includes measures aimed at protecting the environment (See Report 3. Environmental Management System).

4.1.1 Air emissions

There are no point source emissions from activity. Riversee recognises that dust can be an issue when earthworks are being undertaken and this is reflected by the measures detailed in the Management System.

Odour is not likely to be an issue due to the nature of the wastes.

4.1.2 Noise and Vibration

The operation will utilise plant that is modern and designed to meet current legislative controls relating to noise and vibration emissions. Vehicular plant will be subject to a preventative maintenance programme and a traffic management system will be implemented to reduce the impact on adjacent occupants. The best practical means shall be used to

minimise noise from reversing warning devices which are fitted to mobile plant and vehicles on the site. This may include the fitting of broadband directional alarm to vehicles.

4.1.3 Emission to Water

There are no point source emissions of water from the activity. Only waste with acceptably low leaching potential will be used.

Table 4-1 Evaluation of Potential Impacts from Particulate Matter

Data and information				Judgement				Controls	
				Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	
Receptor	Source	Harm	Pathway	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Local human population	Releases of particulate matter (dusts) and micro-organisms (bioaerosols)	Harm to human health - respiratory irritation and illness	Air transport then inhalation.	Low	Medium	Low	Permitted waste types are non-hazardous and do not include dusts, powders or loose fibres and have a low potential to produce bio aerosols. Dust management procedures are in place.	Ensure effective dust management plans are implemented. Temporarily cease moving materials if dust is problematic. Screens will be erected if needed.	Very low
Local human population		Nuisance - dust on cars, clothing etc.	Air transport then deposition	High	Low	Medium	As above. Local residents often sensitive to dust.		Very low

Table 4-2 Evaluation of Potential Impacts from Litter and Pests

Data and information	Source	Harm	Pathway	Judgement				Controls	Residual risk
				Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	
What is at risk?	What is the agent or process with potential to cause harm?	What are the harmful consequences if things go wrong?	How might the receptor come into contact with the source?	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Local human population and wildlife.	Litter	Nuisance, loss of amenity and harm to animal health	Air transport then deposition	Low	Low	Low	Local residents often sensitive to litter, however waste types have low litter potential.	As above. Appropriate measures will include clearing litter arising from the activities from affected areas inside and outside the site.	Very low
Local human population	Waste, litter and mud on local roads	Nuisance, loss of amenity, road traffic accidents.	Vehicles entering and leaving site.	Low	Med	Low	Road safety, local residents often sensitive to mud on roads. All deliveries of waste will be sheeted or enclosed in tankers with no opportunity for wastes to escape.	As above. Appropriate measures will include clearing waste, litter and mud arising from the activities from affected areas outside the site. Wheel wash and street cleaning will be implemented if necessary.	Very Low
Local human population	Scavenging animals and scavenging birds	Harm to human health - from waste carried off site and faeces. Nuisance and loss of amenity.	Air transport and over land	Low	Medium	Low	Permitted wastes unlikely to attract scavenging animals and birds	Emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution.	Very low
Local human population	Pests (e.g. flies)	Harm to human health, nuisance, loss of amenity	Air transport and over land	Low	Medium	Low	Permitted waste types unlikely to attract pests.	As above	Very low

Table 4-3 Evaluation of Potential Impacts from Odour, Noise and Vibration

Data and information	Receptor	Source	Harm	Pathway	Judgement			Controls	Residual risk
					Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	
What is at risk?	What is the agent or process with potential to cause harm?	What are the harmful consequences if things go wrong?	How might the receptor come into contact with the source?	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Local human population	Odour	Nuisance, loss of amenity	Air transport then inhalation.	Low	Low	Low	Local residents often sensitive to odour, however permitted waste types and process has low odour potential.	Implement effective odour management plan. Respond to complaints.	Very low
Local human population	Noise and vibration	Nuisance, loss of amenity, loss of sleep.	Noise through the air and vibration through the ground.	Medium	Medium	Medium	Local residents often sensitive to noise and vibration. All activities will utilise modern, well maintained machinery and plant. Noise surveys will be completed when needed and management plan updated if necessary.	Implement effective management plan. Site operations will be restricted to 08:00 – 18:00 Monday to Friday and 09:00 to 13:00 Saturdays. Layout site so that vehicle reversing is avoided and noisy operations are away from residents where possible.	Low

Table 4-4 Evaluation of Potential Impacts from Vandalism and Fire

Data and information				Judgement				Controls	
Receptor	Source	Harm	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
What is at risk?	What is the agent or process with potential to cause harm?	What are the harmful consequences if things go wrong?	How might the receptor come into contact with the source?	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Local human population after gaining unauthorised access to the site	All on-site hazards: wastes; machinery and vehicles.	Bodily injury	Direct physical contact	Medium	Low	Low	Permitted waste types are non-hazardous and not readily accessible therefore only a low magnitude risk is estimated	Site boundary will be fenced and secured. Maintain and review management plans.	Medium
Local human population and local environment	Arson and/or vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/vandals. Pollution of water or land.	Air transport of smoke. Spillages and contaminated firewater by direct run-off from site and via surface water drains and ditches.	Medium	Low	Low	Permitted waste types do not include any flammable materials so a low magnitude risk is estimated.		Low
Local human population and local environment	Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land.	Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters. Pollution of water or land.		Medium	Low	Low			Low

Table 4-5 Evaluation of Potential Impacts on Surface Water

Data and information				Judgement				Controls	
				Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	
Receptor	Source	Harm	Pathway	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Local human population and local environment	Flooding of site	If waste is washed off site it may contaminate buildings/ natural habitats downstream	Flood waters	Low	Low	Low	Permitted waste types are non-hazardous with low leaching potential so any waste washed off site will add to the volume of the local post-flood clean-up workload, rather than the hazard.	Ensure waste management procedures are fully implemented as this will result in waste with low leaching potential being imported. Maintain and review management plans.	Very low
River Usk	Spillage of liquids, leachate from waste, contaminated rainwater run-off from waste e.g. containing suspended solids.	Acute effects: oxygen depletion, fish kill and algal blooms	Direct run-off from site across ground surface, via surface water drains, ditches etc.	Low	Low	Low	No point source emissions to water are permitted. Waste will be inert or of low leaching potential.	All liquids including relevant chemical reagents, fuel oils etc. will be stored in accordance with PPG and COSHH and where necessary provided with secondary containment. Spill kits provided.	Low
River Usk / abstraction from watercourse/ groundwater downstream of site		Chronic effects: deterioration of water quality. Acute effects, closure of abstraction intakes.	As above. Indirect run-off via the soil layer	Low	Low	Low	Waste will be inert or of low leaching potential.	Fully implement waste acceptance procedures to ensure material satisfies requirements of Remedial Strategy. This will ensure only inert or material with low leaching potential will be used.	Low

Table 4-6 Evaluation of Potential Impacts on Groundwater

Data and information Receptor	Source	Harm	Pathway	Judgement				Controls	Residual risk
				Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	
What is at risk?	What is the agent or process with potential to cause harm?	What are the harmful consequences if things go wrong?	How might the receptor come into contact with the source?	How likely is this contact?	How severe will the consequences be if this occurs?	What is the overall magnitude of the risk?	On what did I base my judgement?	How can I best manage the risk to reduce the magnitude?	What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment).
Groundwater	As above	Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole.	Transport through soil/ groundwater then extraction at borehole.	Low	Low	Low	Waste will be inert or of low leaching potential.	Fully implement waste acceptance procedures to ensure material satisfies requirements of Remedial Strategy. This will ensure only inert or material with low leaching potential will be used.	Low
Local human population	Contaminated waters used for recreational purposes	Harm to human health - skin damage or gastro-intestinal illness.	Direct contact or ingestion	Low	Medium	Low			Low
Protected sites - European sites and SSSIs e.g. River Usk	Any	Harm to protected site through toxic contamination, nutrient enrichment, smothering, disturbance, predation etc.	Any	Low	Low	Low			No risk

5 MONITORING

5.1 Waste Use

All waste used in the construction will be monitored to ensure that its physical and chemical properties satisfy the Specification and Permit requirements. Records documenting the source, properties and location placed on site will be maintained.

5.2 Environmental Monitoring

Provided the documented management system is implemented, the risk assessment indicates that there are no environmental emissions from the activity that need to be monitored. Riversee will, however, review this situation during the development, with particular attention given to the leachability of the material and the release of dust and noise from the activities. Systems will be in place to deal with observations and complaints and as part of the response, monitoring may be required. Where necessary, Riversee will consult with NRW and NCC.

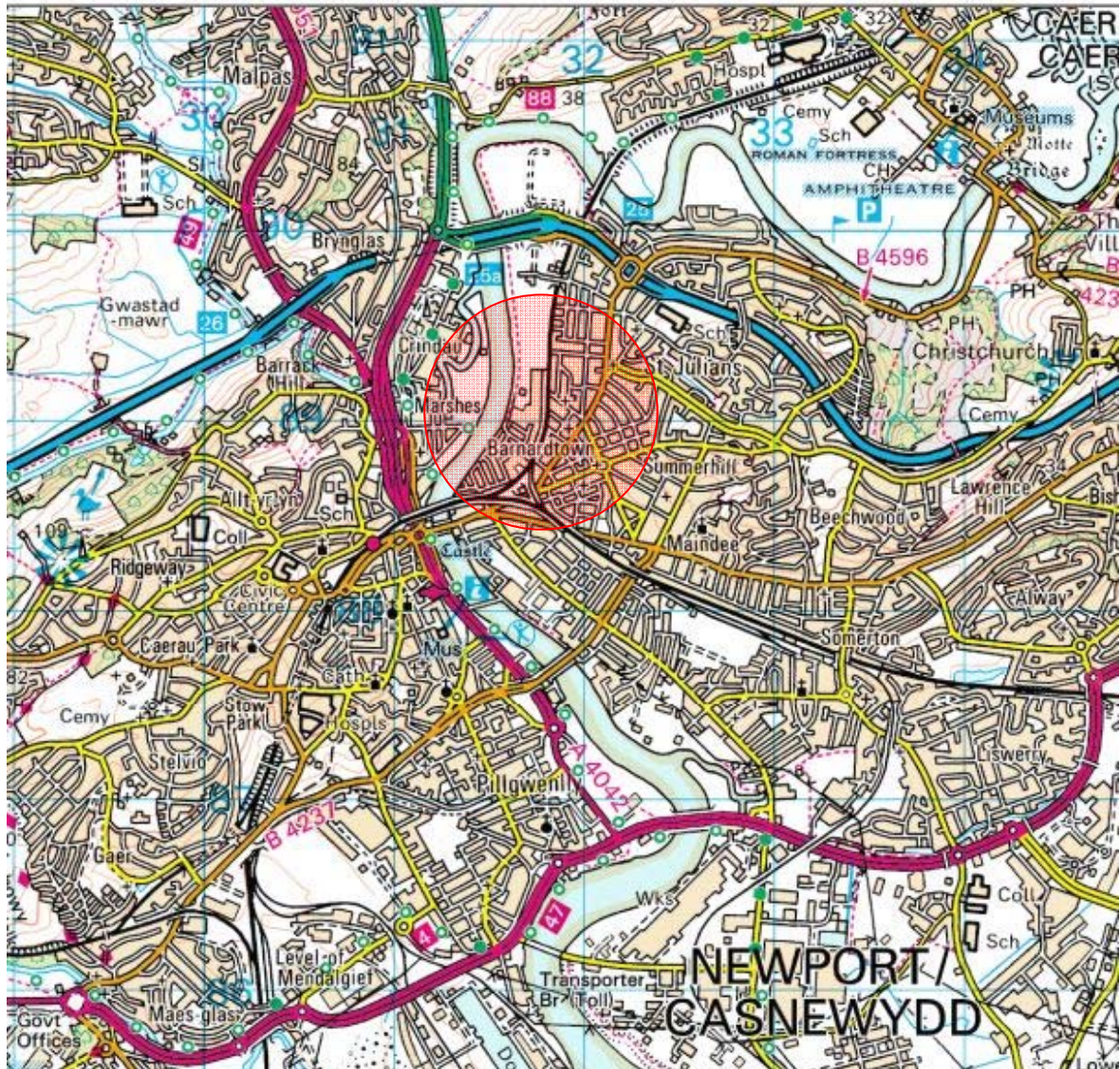
6 SUMMARY AND CONCLUSIONS

The assessment demonstrates that the use of waste will not lead to any significant negative impacts to the environment or humans.

The scheme does, however, provide many positive impacts. Using waste diverts material from landfill and the consumption of primary raw materials that would otherwise have to be used.

This risk assessment will be updated when necessary.

Figure 1 Site Location Plan



Reproduced from the Ordnance Survey Land Ranger Map
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Figure 2 Site Development Boundary

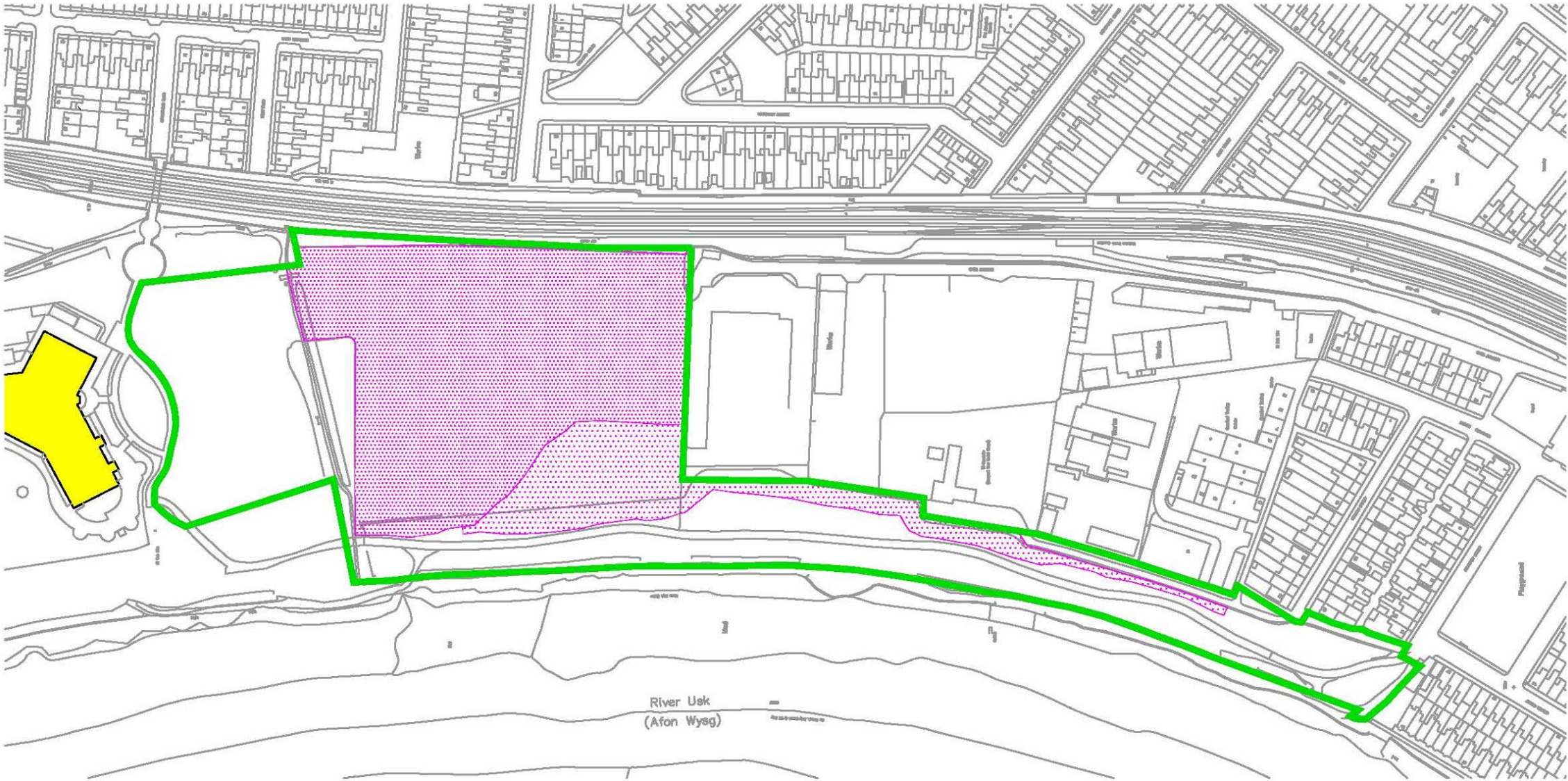
KEY:

DENOTES SITE BOUNDARY

AREA OF FILL TO 7.800 (600MM BELOW FFL)_7.300 AS EXISTING

AREA OF FILL TO 8.400 (600MM BELOW FFL)_7.900 AS EXISTING

LOCAL LANDMARK - GLAN USK PRIMARY SCHOOL /
YSGOL GYNRADD GLAN WYSG



Client

Contract
Herbert Road
NEWPORT

Description
Natural Resources Wales Permit

Scale 1:2500 @ A3	Date Sept' 13
Dwg No. sw49 (00) 100	Revision



Greenhill
BUILDING AN AFFORDABLE FUTURE

The Greenhouse
Esperanto Way,
Newport, NP19 0RD
Telephone (01633) 290159
Fax (01633) 508835

